

Investment Stance, Shifts, and Concerns

At the end of the third quarter of 2019:

EQUITIES

- Our (long term) investment stance on equities is **long**. For longer-term traders, the bull market is strong and intact, with no cause for concern.
- Some subtle risks have been developing in price action, as [volatility has shown many more downside shocks](#) than upside in 2019. This may point to some cracks in the psychological foundation of the market. Short-term traders (as opposed to longer-term) will likely need to be flexible through the fourth quarter.
- Though indexes have hovered near all-time highs, the third quarter ended without the conviction needed to push the market into new highs.
- Risks still remain, but fears of a bear market are overstated in the current environment.
- Traders and investors on all timeframes should focus on being long, and perhaps aggressively long, while watching for signs that bulls are losing control of the markets.

RATES

- The [yield curve clearly inverted](#) last quarter. This is a factor that has strong power to forecast recessions, but we cannot draw any timing conclusions.
- Rates moved lower this quarter.
- Credit spreads moved very little, showing no real lessening of stress and fears.
- Debt levels may become a concern in the next few years but are not a major factor at this time.

SHIFTS

- [Housing has shown renewed strength](#) after being a point of concern for several quarters.

CONCERNS

- [Production should be nearing a cycle low](#). If we do not see an upturn in the next 6 months, more serious weakness may be in the cards.
- Consumer Sentiment measures were unclear at the end of the quarter. This is a fuzzy factor, at best, but could portend some issues with the Consumption component of future GDP numbers.
- Economic data around the globe shows slowing, with significant slowing in some regions.
- The main risks still seem to lurk in trade tariff-related issues.

Note that date axes on graphs in this report reflect the period for which the data was published. Economic data sometimes lags significantly. All data are current as of report publication.

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Publication Schedule

Global Asset Strategy: Weekly, Sunday evening

Audio Update: Weekly, Sunday evening

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Macro Trends & Shifts: Published in the first week of each quarter

Adam Grimes

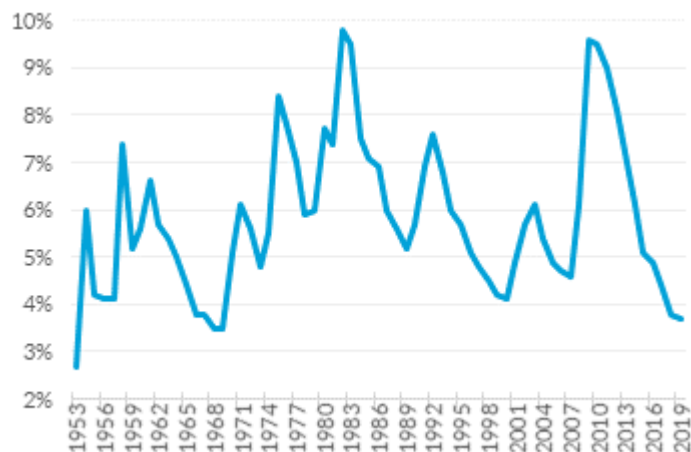
Chief Investment Strategist
adam@talonadvisors.com

Economy at a Glance & Scorecard

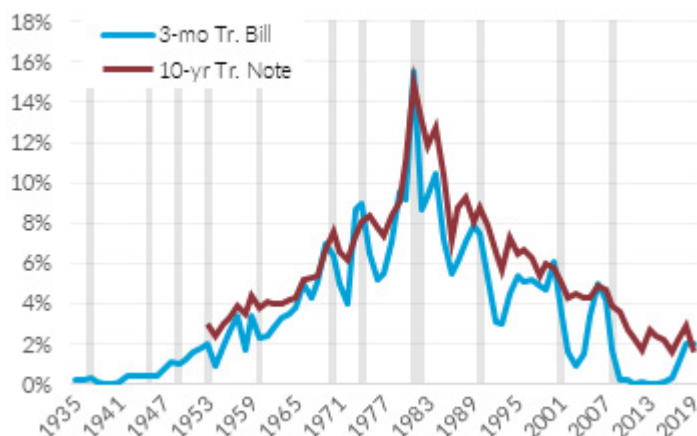
Real GDP (QoQ, Seasonally Adjusted)



Civilian Unemployment Rate (% of Labor Force)



Interest Rates



CPI (YoY Percent Change, Seasonally Adjusted)



This page summarizes the most important indicators and datapoints for the economy. In a very real way, the data presented here are the “bottom line” for the Economy, and we carefully watch these for signs of recessionary pressures and broad economic stress.

- GDP is probably in the “Goldilocks” zone—not too slow, but not hot enough to raise concerns of overheat.
- Unemployment is at historic lows. Any fluctuations have been within noise for these measures.
- Interest are likely to continue to decrease. Yield curve inversion occurred this quarter, and raises significant concerns.
- Inflation remains muted.
- Slowing global growth, trade pressures, and contagion are key risks—there is nothing new here. These are the risks we have been watching for more than a year.

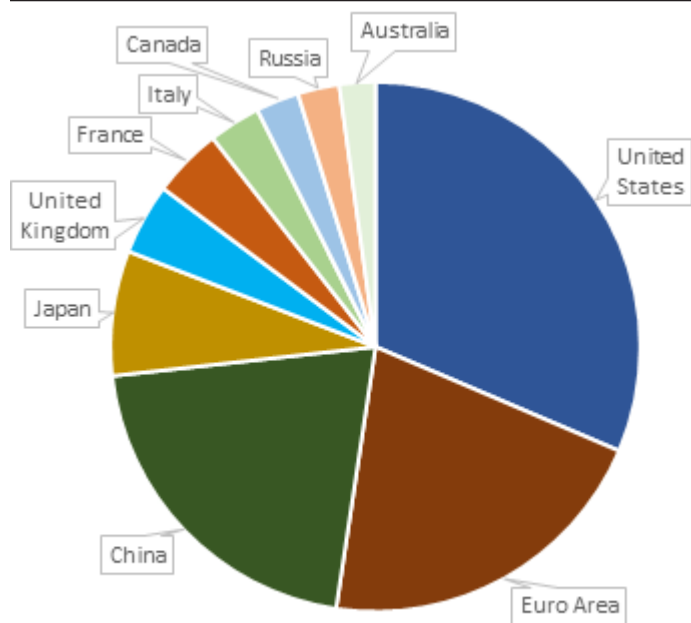
Quarterly Scorecard

	Neg	↔	Pos	Chg	Comment
Global GDP Growth	○ ● ○ ○ ○				Impact of trade is uncertain but a risk
US GDP Growth	○ ○ ○ ● ○				
Production	○ ○ ● ○ ○				Cyclical effects project strength in coming quarters.
Labor Market	○ ○ ○ ○ ●				
Retail Sales	○ ○ ○ ● ○				
Personal Income	○ ○ ○ ● ○				
Housing	○ ○ ○ ● ○				Significant strides toward recovery
Trade	● ○ ○ ○ ○				
Sentiment	○ ○ ○ ● ○				
Corporate Profits	○ ○ ○ ● ○				
Debt Levels	○ ● ○ ○ ○				
Lending Conditions	○ ○ ● ○ ○				
Credit Spreads	○ ○ ○ ● ○				
Yield Curve	● ○ ○ ○ ○			↓	3Q had true inversion
Inflation	○ ○ ● ○ ○			↓	
Technical Factors	○ ○ ○ ● ○			↓	lack of upside followthrough
Market Internals	○ ○ ○ ● ○				
Volatility	○ ○ ○ ● ○				

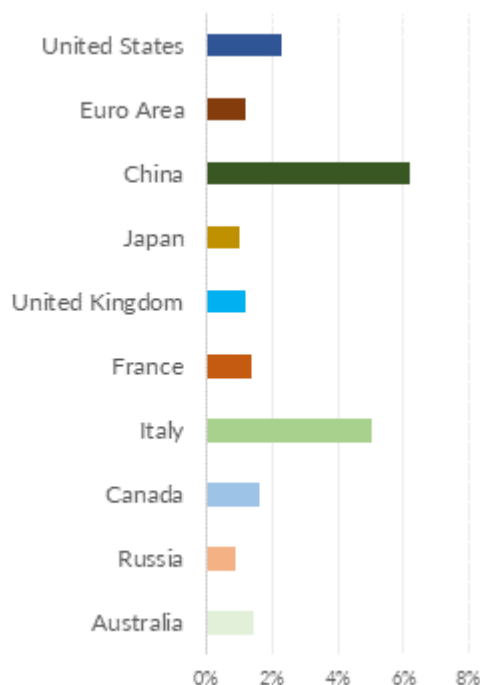
Global Comparisons: Major Economies

	GDP YoY	Interest Rate	Inflation	Jobless	Debt/GDP	1 Yr Perf	3 Yr Perf	Volatility	Trend
United States	2.3%	2.0%	1.7%	3.7%	106.1%	2.1%	37.7%	Low	Neutral
Euro Area	1.2%	0.0%	1.0%	7.5%	85.1%	-5.8%	10.8%	Avg	Neutral
China	6.2%	4.2%	2.8%	3.6%	50.5%	-7.5%	4.7%	Avg	Neutral
Japan	1.0%	-0.1%	0.3%	2.2%	238.2%	-6.0%	12.0%	Low	Neutral
Germany	0.4%	0.0%	1.4%	3.0%	60.9%	-11.1%	3.7%	Low	Neutral
United Kingdom	1.2%	0.8%	1.7%	3.8%	84.7%	-8.8%	0.2%	Avg	Neutral
France	1.4%	0.0%	0.9%	8.5%	98.4%	-4.9%	26.0%	Avg	Neutral
India	5.0%	5.4%	3.2%	6.0%	68.3%	-2.6%	10.1%	High	Neutral
Italy	5.0%	0.0%	0.4%	9.9%	134.8%	-3.9%	27.2%	Avg	Neutral
Brazil	1.0%	5.5%	3.4%	11.8%	77.2%	22.6%	24.2%	Low	Neutral
Canada	1.6%	1.8%	1.9%	5.7%	90.6%	0.5%	14.8%	Low	Neutral
Russia	0.9%	7.0%	4.3%	4.3%	13.5%	5.6%	23.8%	Avg	Neutral
South Korea	2.0%	1.5%	0.0%	3.1%	36.6%	-17.8%	-3.4%	Low	Neutral
Australia	1.4%	1.0%	1.6%	5.3%	40.7%	0.6%	7.3%	Low	Neutral

Comparison of Selected GDP Sizes



Latest GDP Growth Rates



The tables on this page provide a quick overview of the largest global economies, as well as representative performance of US-based ETFs, when available, for each of these regions. (Data compiled by <https://tradingeconomics.com>)

The tables on the next page (Flashpoint Economies) show economies that are particularly vulnerable. Some of these regions are small enough that economic stress is unlikely to take on global significance, but some are potential risk factors. Investors should keep this list in mind and carefully monitor for further developments and/or news related to these regions.

Flashpoint Economies

Highest Inflation Rates

	GDP YoY	Interest Rate	Inflation	Jobless	Debt/GDP	1 Yr Perf	3 Yr Perf	Volatility	Trend
Venezuela	-22.5%	27.9%	282972.8%	7.3%	23.0%				
Zimbabwe	4.0%	70.0%	288.5%	4.9%	77.6%				
Argentina	0.6%	80.0%	53.6%	10.6%	86.2%	-15.8%	-0.8%	Low	Down
Sudan	4.1%	15.3%	53.1%	12.9%	62.0%				
South Sudan	-3.8%	0.0%	51.9%	11.5%	0.0%				
Iran	1.8%	18.0%	41.6%	10.9%	44.2%				
Liberia	3.1%	12.4%	23.3%	2.4%	32.0%				
Haiti	1.5%	27.0%	19.1%	14.0%	33.0%				
Ethiopia	9.2%	7.0%	17.9%	19.1%	60.0%				
Angola	-0.4%	15.5%	17.5%	29.0%	80.5%				

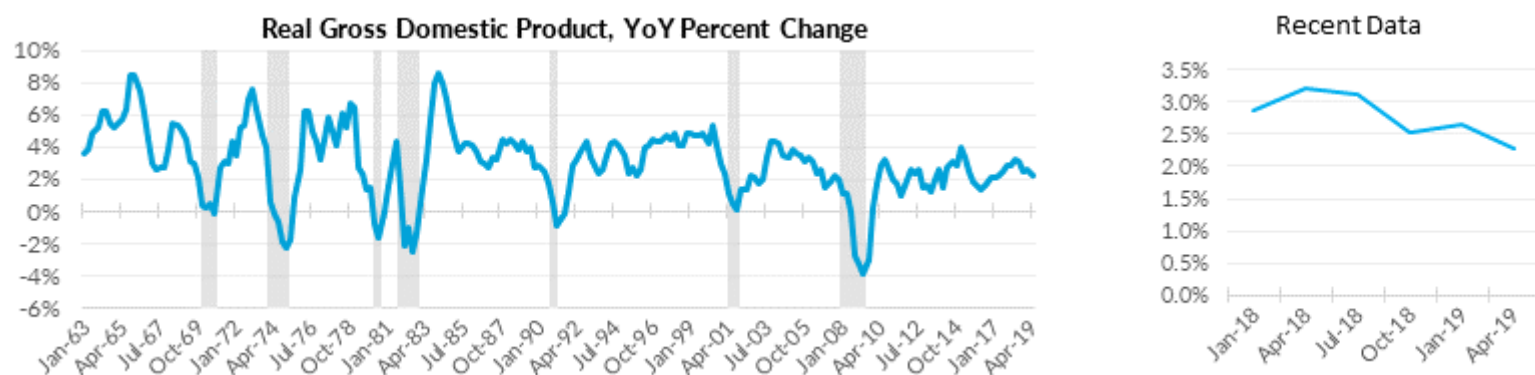
Highest interest Rates

	GDP YoY	Interest Rate	Inflation	Jobless	Debt/GDP	1 Yr Perf	3 Yr Perf	Volatility	Trend
Argentina	0.6%	80.0%	53.6%	10.6%	86.2%	-15.8%	-0.8%	Low	Down
Zimbabwe	4.0%	70.0%	288.5%	4.9%	77.6%				
Venezuela	-22.5%	27.9%	282972.8%	7.3%	23.0%				
Yemen	-2.7%	27.0%	9.5%	12.9%	63.2%				
Haiti	1.5%	27.0%	19.1%	14.0%	33.0%				
Suriname	1.9%	25.0%	4.3%	7.6%	57.3%				
Iran	1.8%	18.0%	41.6%	10.9%	44.2%				
Turkey	-1.5%	16.5%	15.0%	13.0%	30.4%	11.2%	-31.0%	Low	Neutral
Ukraine	4.6%	16.5%	8.8%	7.8%	60.9%				
Sierra Leone	3.5%	16.5%	17.5%	4.3%	60.3%				

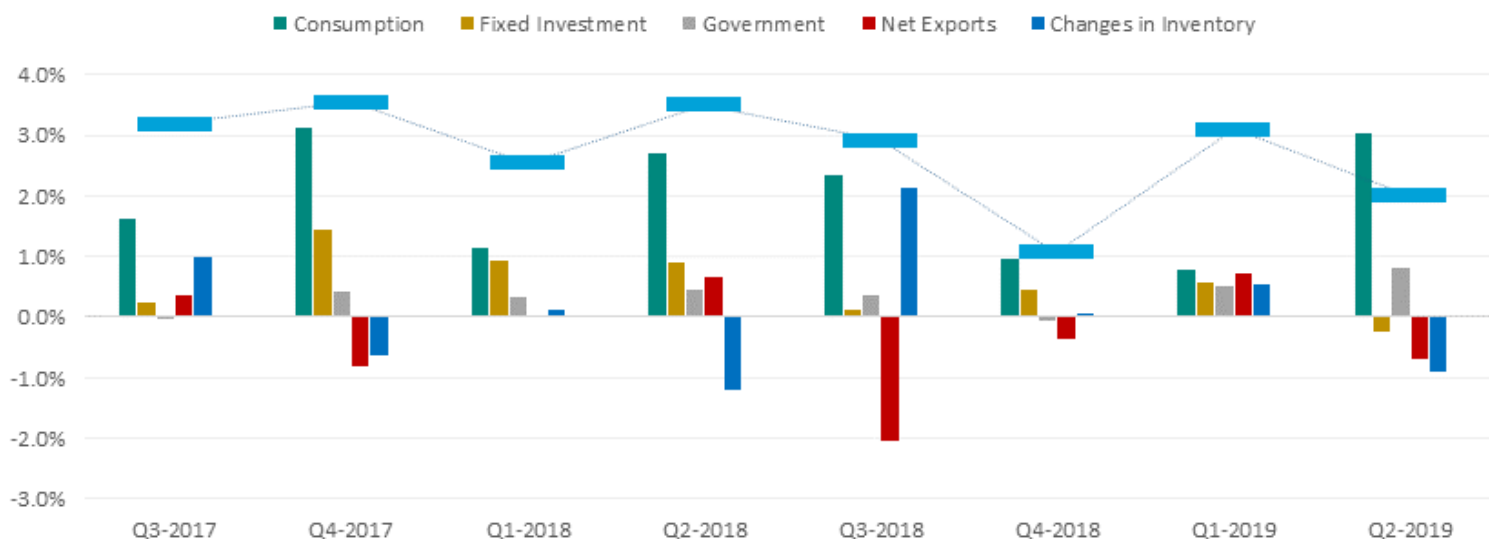
Largest GDP Losses

	GDP YoY	Interest Rate	Inflation	Jobless	Debt/GDP	1 Yr Perf	3 Yr Perf	Volatility	Trend
Venezuela	-22.5%	27.9%	282972.8%	7.3%	23.0%				
Equatorial Guinea	-7.9%	3.5%	1.3%	6.9%	53.8%				
Nicaragua	-7.7%	0.0%	6.1%	5.2%	52.5%				
Puerto Rico	-4.7%	0.0%	0.3%	7.0%	0.0%				
South Sudan	-3.8%	0.0%	51.9%	11.5%	0.0%				
Monaco	-3.5%	0.0%	0.0%	0.0%	0.0%				
Yemen	-2.7%	27.0%	9.5%	12.9%	63.2%				
Namibia	-2.6%	6.5%	3.7%	33.4%	45.1%				
Trinidad and Tobago	-2.1%	5.0%	1.1%	4.4%	61.0%				
Paraguay	-2.0%	4.0%	2.8%	7.4%	20.2%				

US GDP



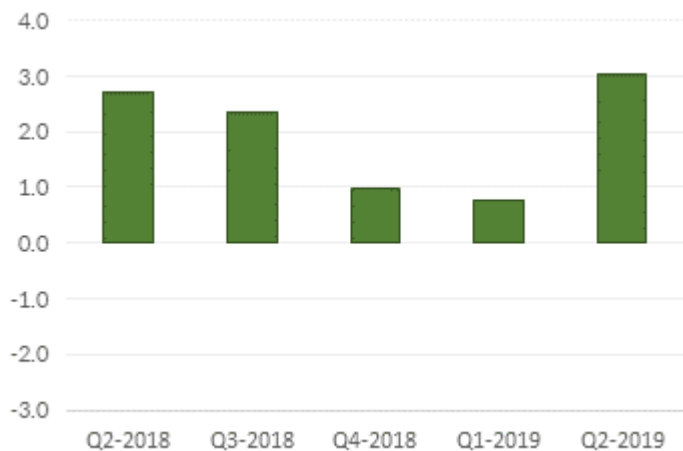
Contributions to Real GDP Growth, Percentage Points at Annual Rate, Seasonally Adjusted



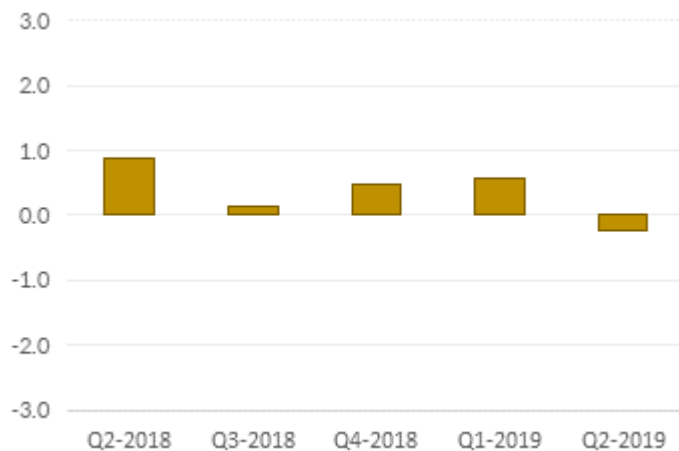
- GDP growth is strong, and right on target.
- Though concerns remain (chief among these concerns are trade-driven production issues), the numbers are robust.
- After a few soft quarters, Consumption came roaring back this quarter. The Consumer retains his place as the key driver of GDP.
- There is little value in digging into details here: up is up, and US growth appears to be on track.

GDP Components

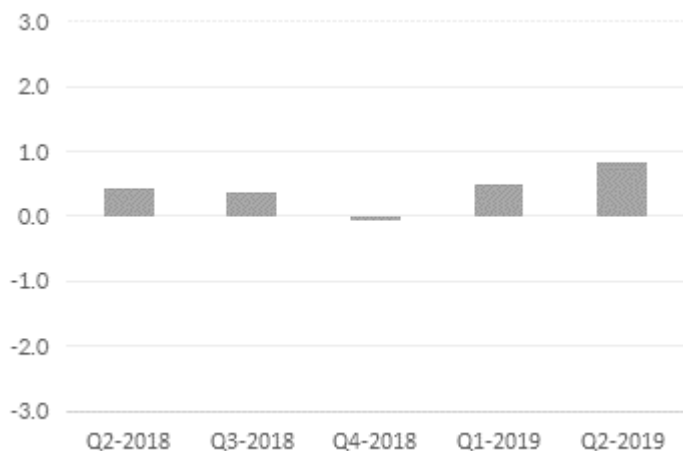
Consumption



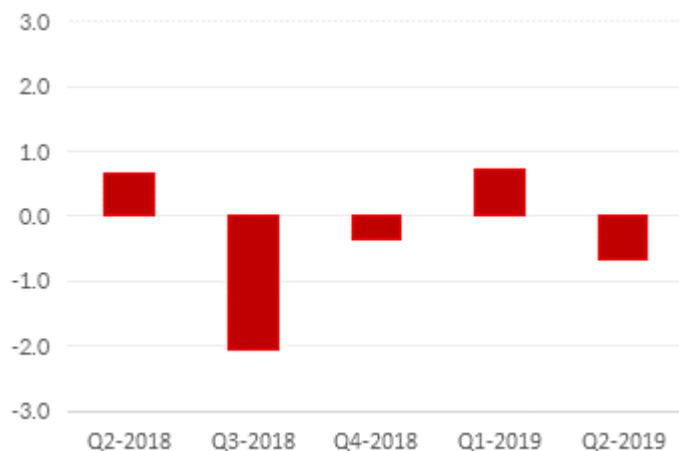
Investment



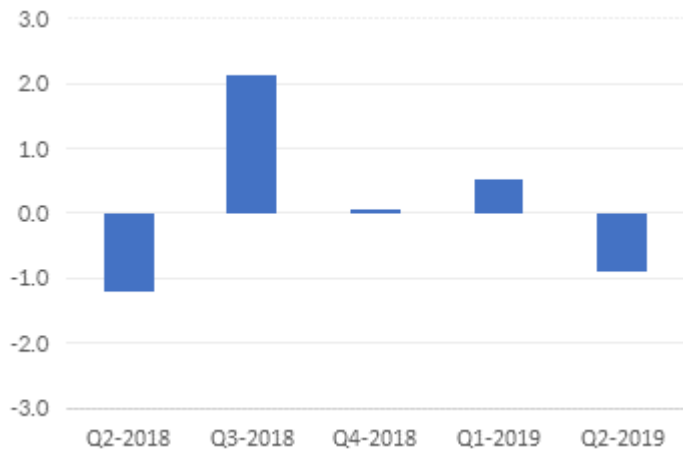
Government



Net Exports



Change in Inventories

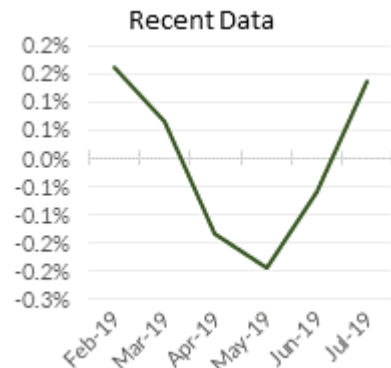
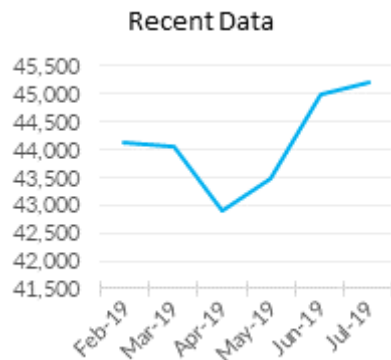
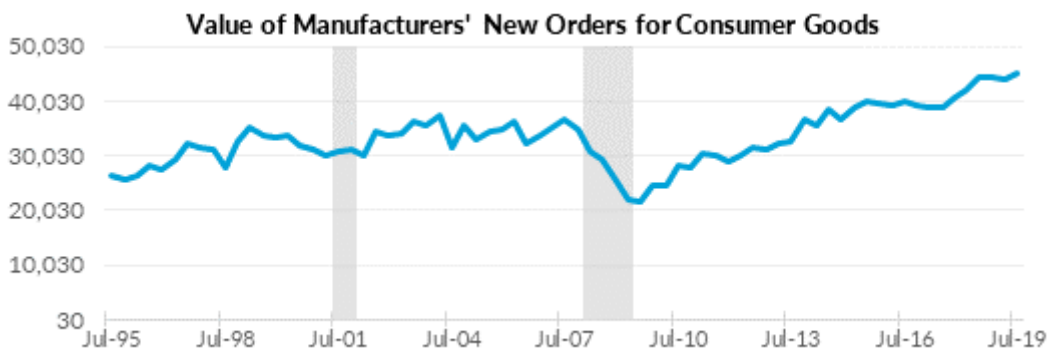
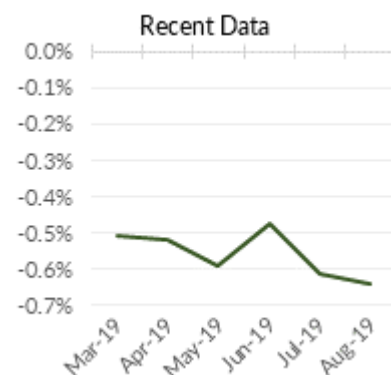
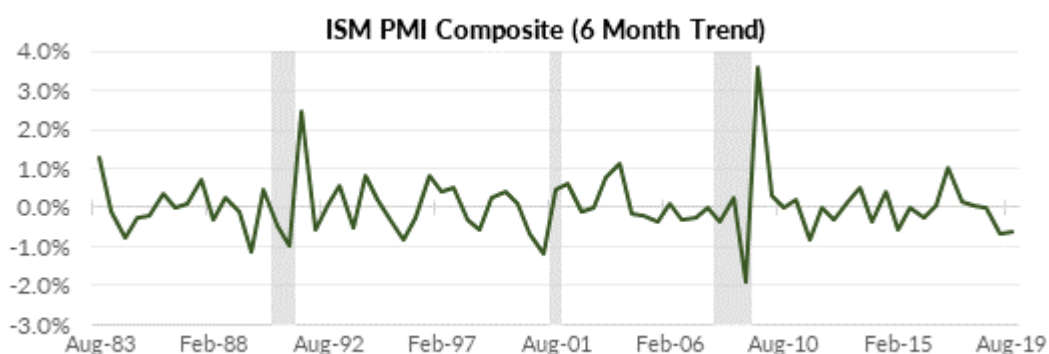
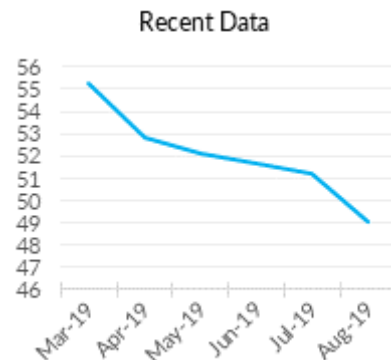
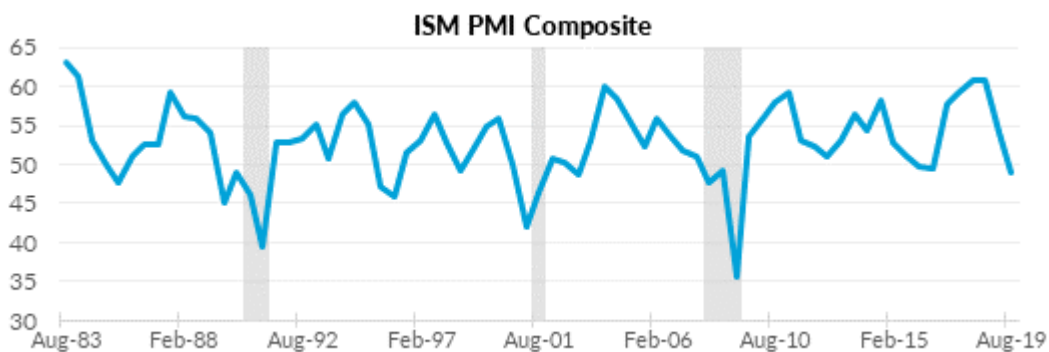


These charts show the individual components of GDP over the past five quarters.

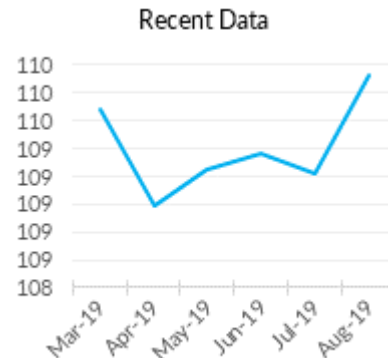
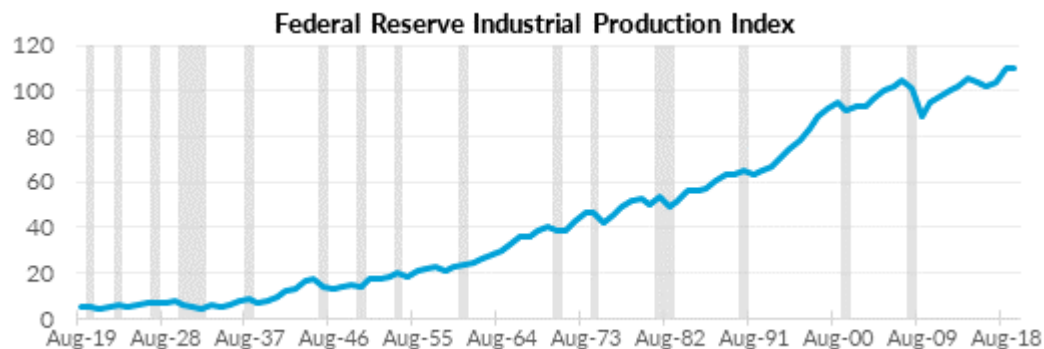
Though these data points have a lot of natural noise/variation, trends, shifts, and surprises are visible when the individual components are examined individually.

See previous page for additional commentary.

Production

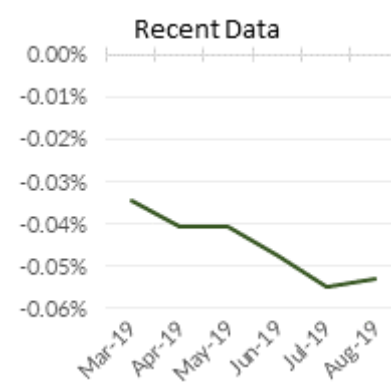
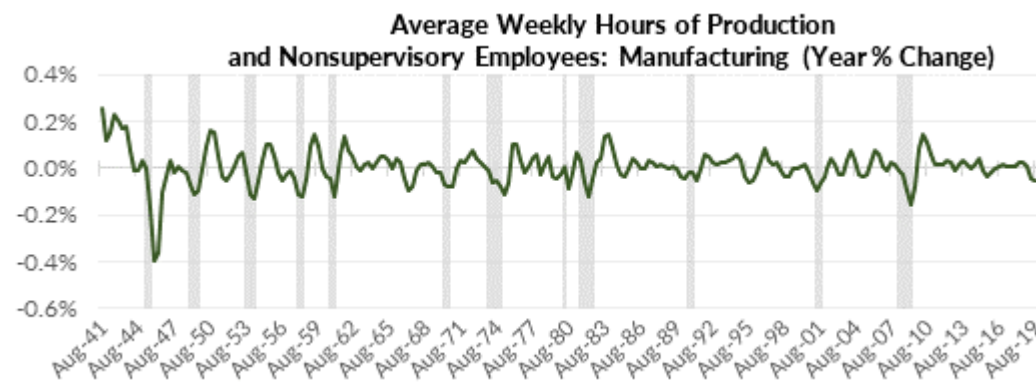
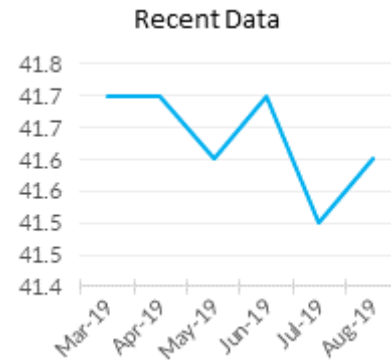
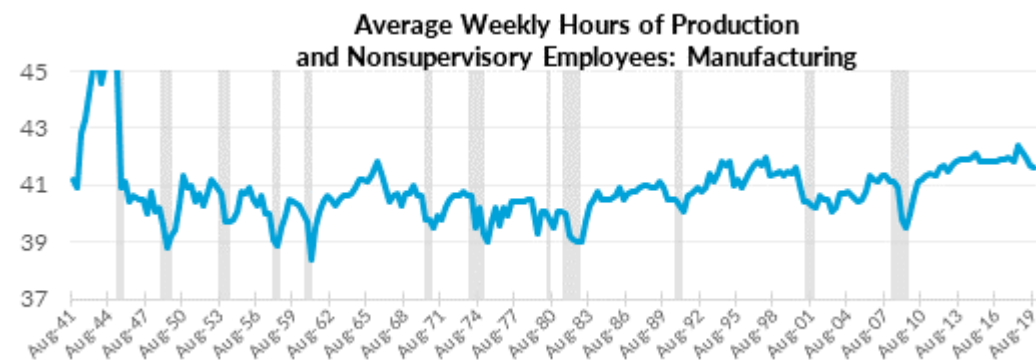
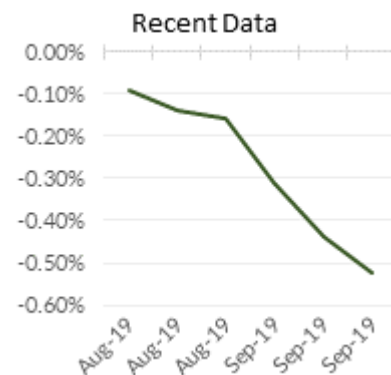
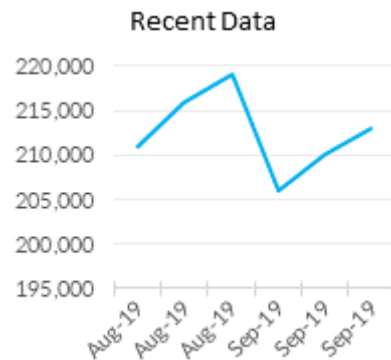
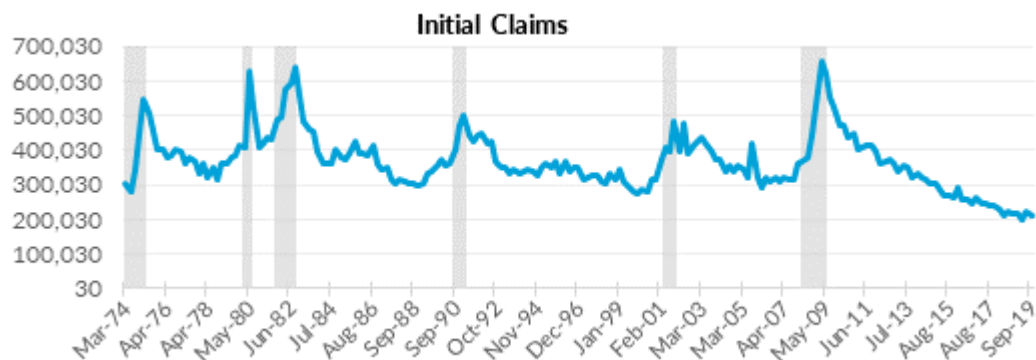


Production (cont.)

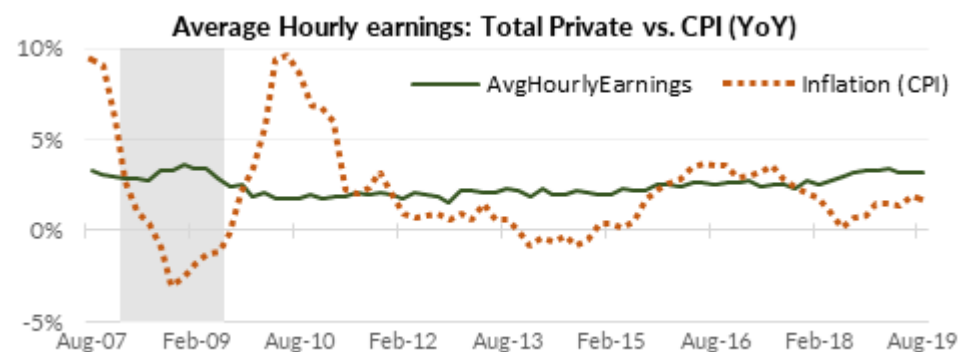
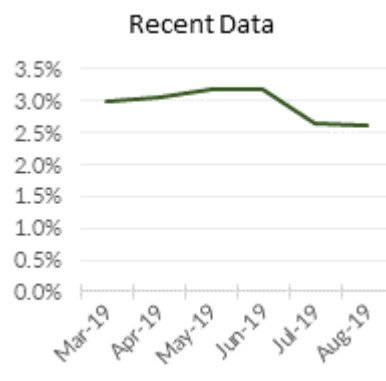
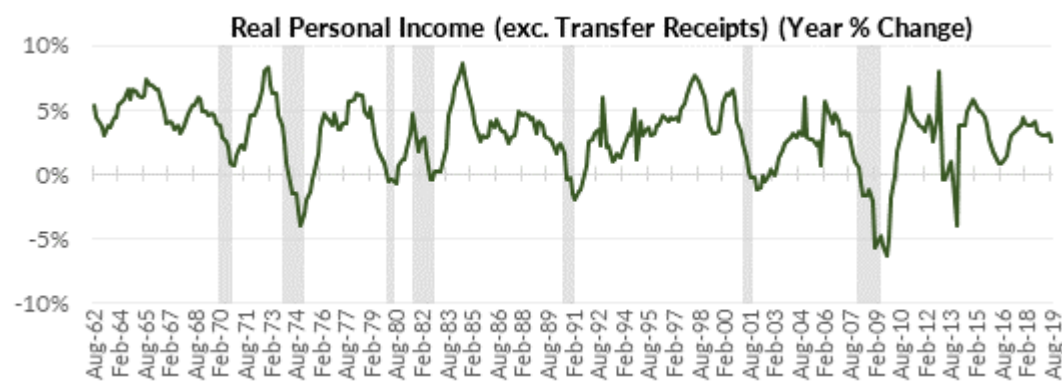
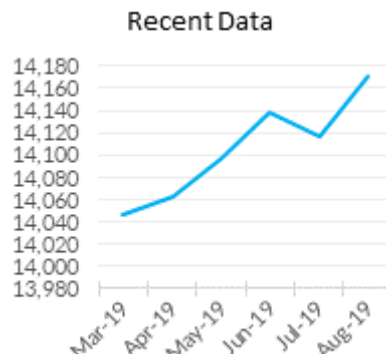
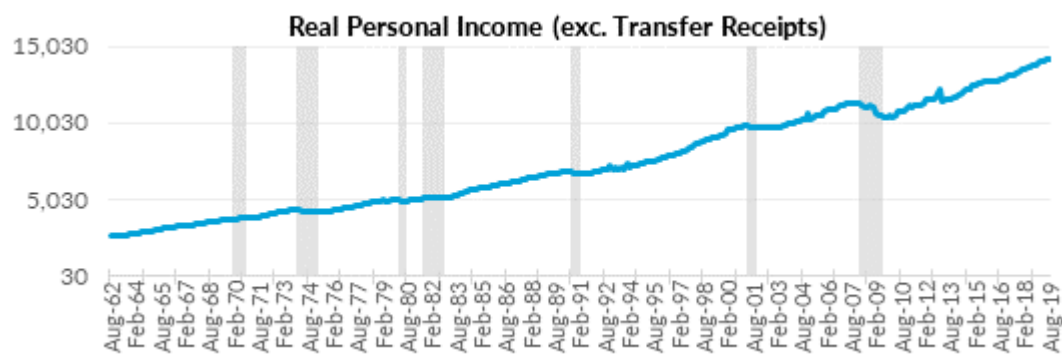


- The world has been very concerned about contracting production in 2019. We did not share these concerns, as we wrote in January, "A moderate contraction would be in-line with cyclical expectations for production, and should not be taken as a cause for concern."
- The clearest picture of the production cycle can be seen in the ISM PMI on the previous page.
- We are reaching a point from which cyclical strength "should" emerge. Production is now vulnerable; further weakness could lead to a much more significant stagnation.
- Durable goods orders are showing some slowing, but no clear decline. (A decline in Durable Goods, when it does occur, does tend to forecast recessionary pressures.)
- Watch for renewed production strength within the next two quarters. If this does not develop, we have deeper cause for concern.

The Consumer: Employment

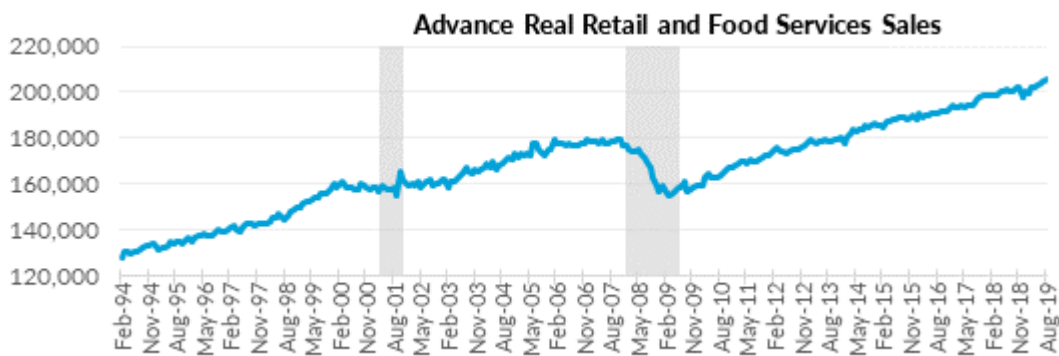


The Consumer: Income

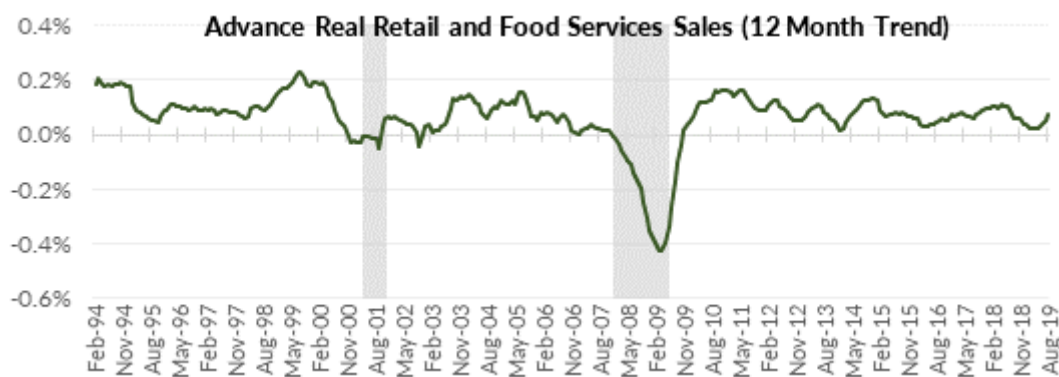


- The Consumer is strong.
- The Labor Market is robust, with jobless claims at historic lows. Though wage pressures have been slow to develop, real earnings saw a moderate uptick in the most recent report.
- Consumption is holding on very well, and was the primary driver of GDP growth in the last report.
- Overall, a look at the Consumer, from income to saving to spending, shows a nearly optimal picture, and certainly no cause for concern.
- (See concerns about sentiment [here.](#))

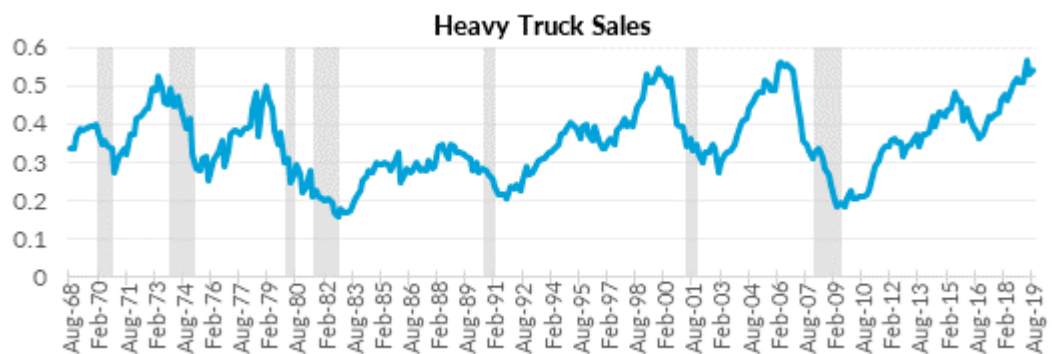
The Consumer: Spending



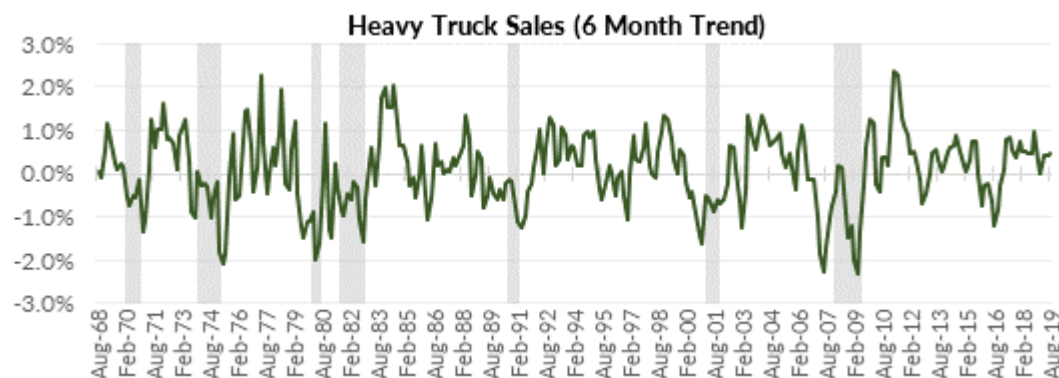
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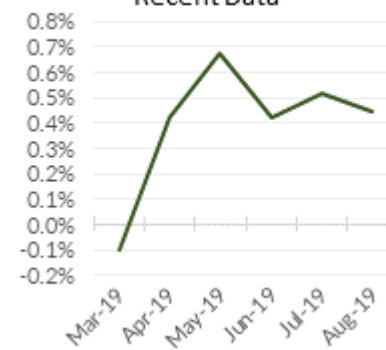
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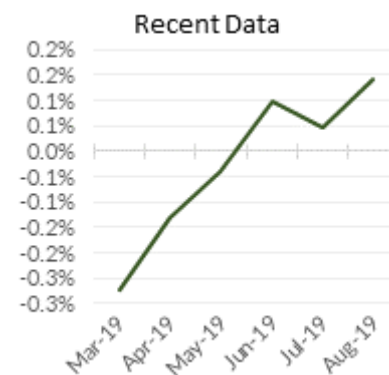
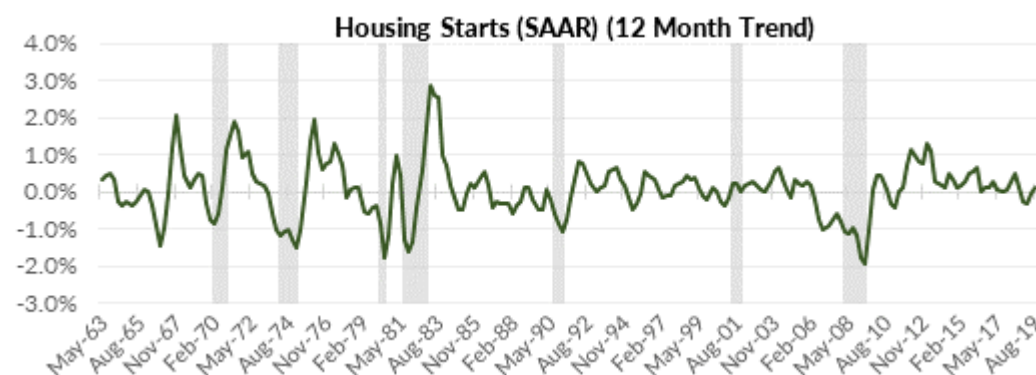
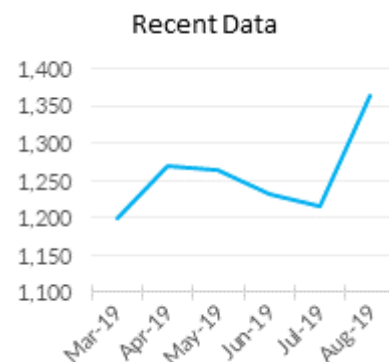
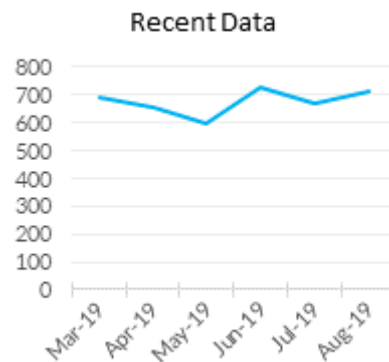
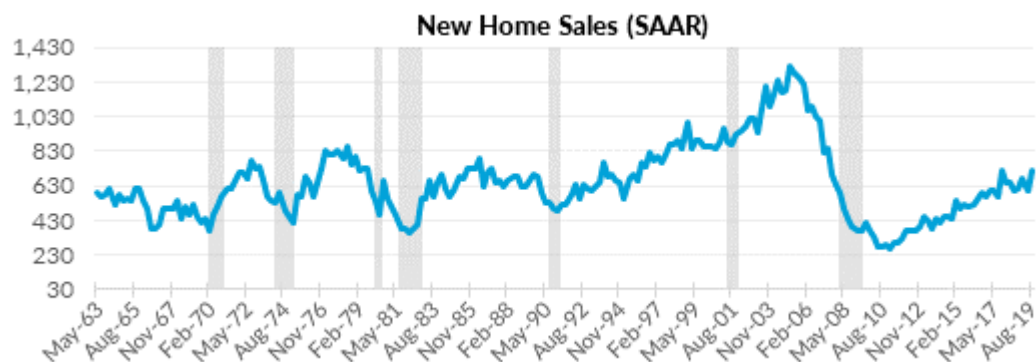
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Recent Data

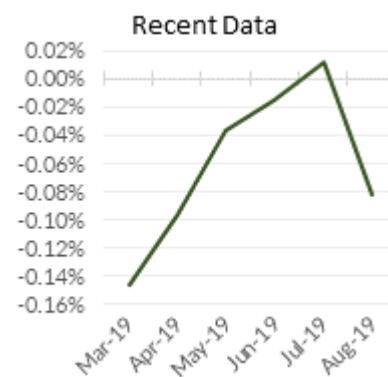
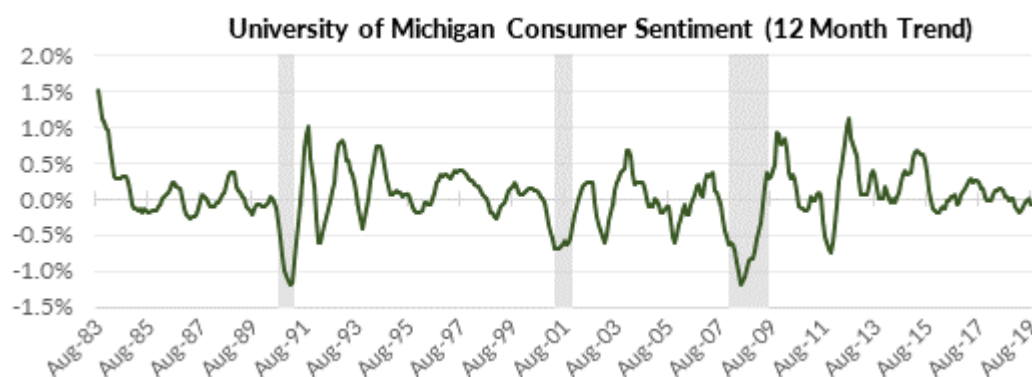
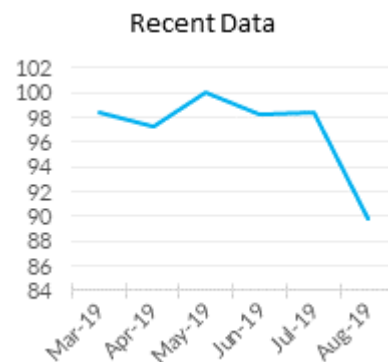
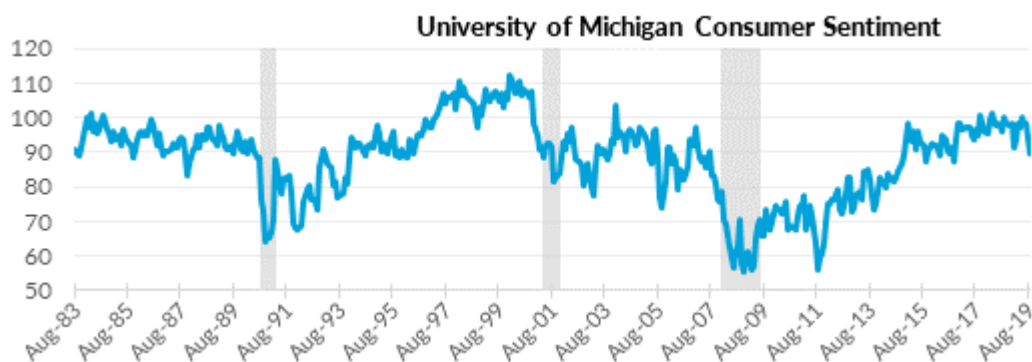


Housing



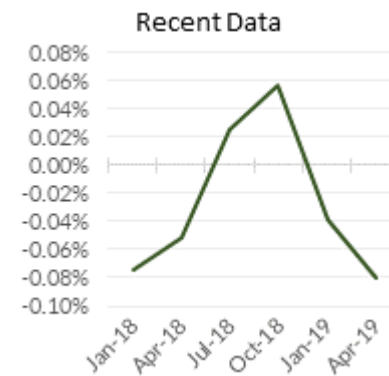
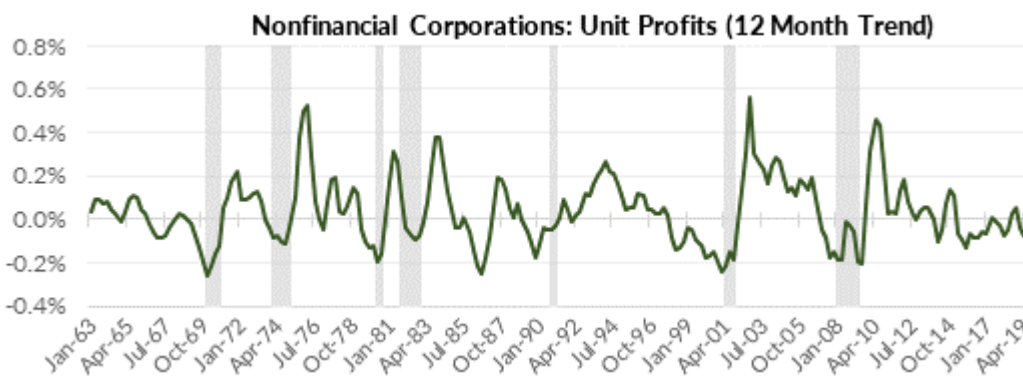
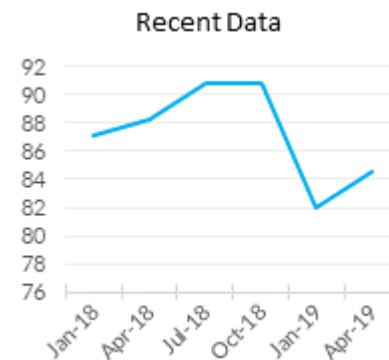
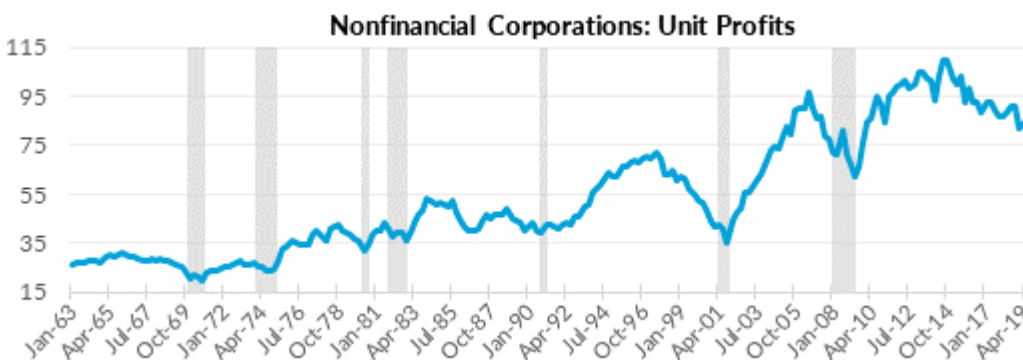
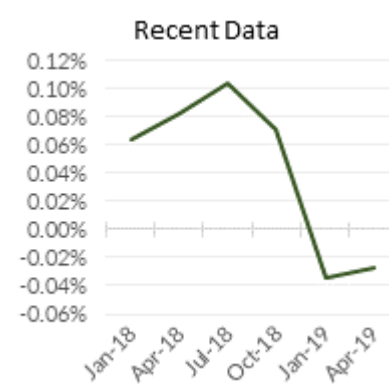
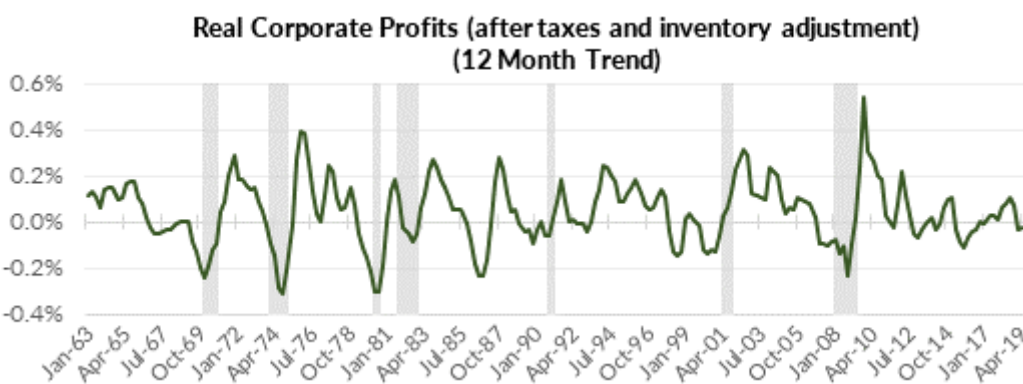
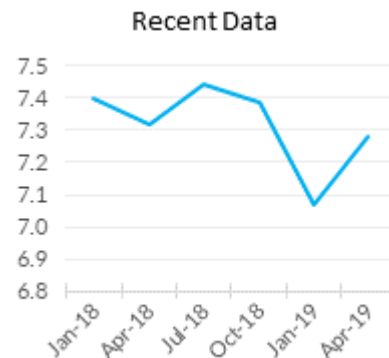
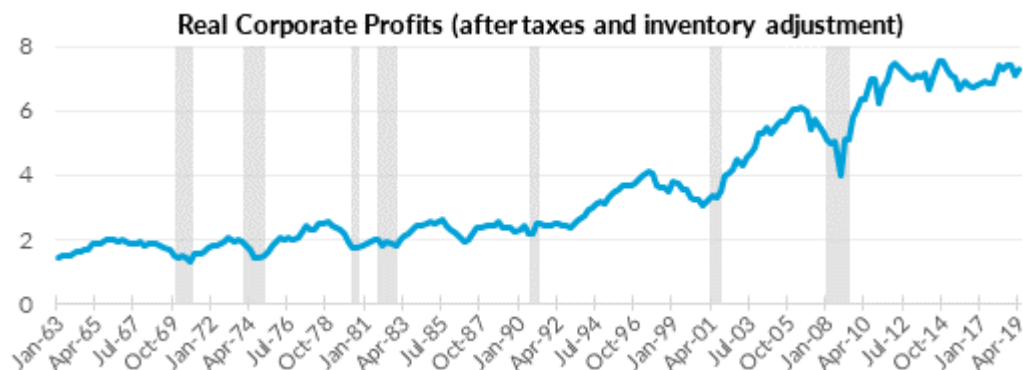
- This is a bright spot—we have had concerns about Housing for several quarters. In particular, New Home Sales (a small but sensitive segment) have been soft.
- However, recent data is supportive to perhaps strongly supportive.
- The quarter ended with a big boost in Housing Starts; even moderate strength here will extend the intact trend off the 2009 Housing lows.
- New Homes have not developed serious weakness, and are poised for recovery this month. Obviously, rates and broad conditions play a part in Sales, but this is why Housing is one of the useful measures for forecasting recessions.

Consumer Sentiment

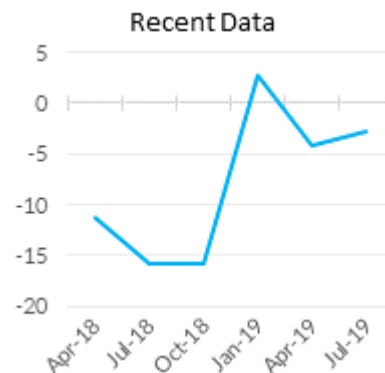
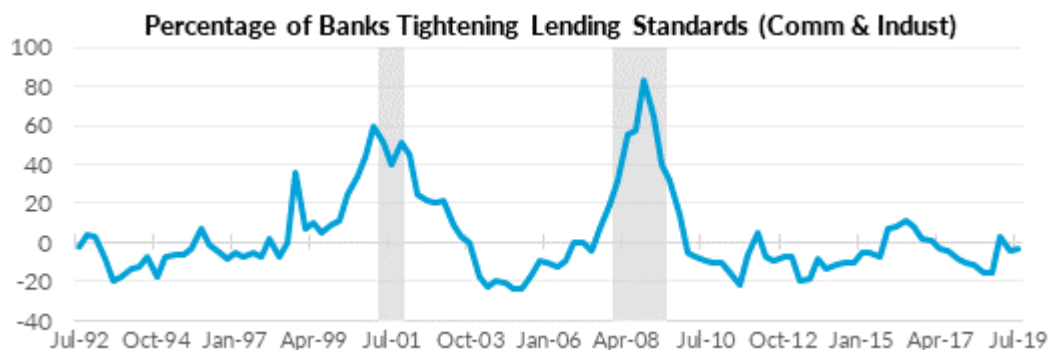
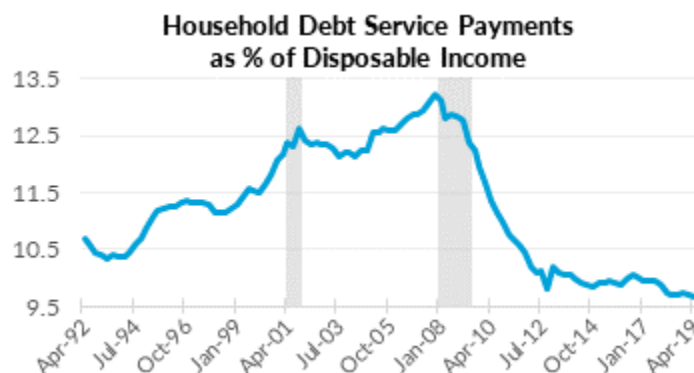
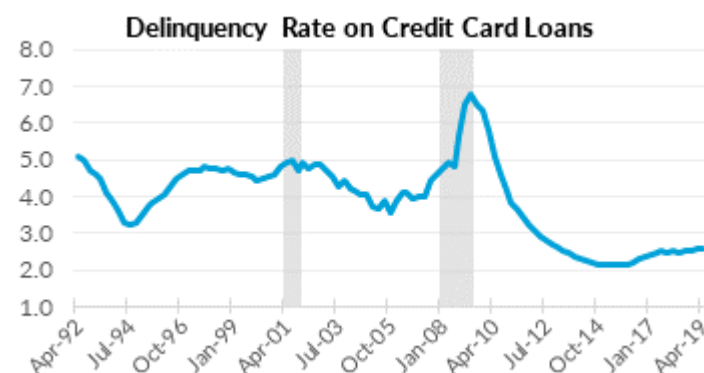
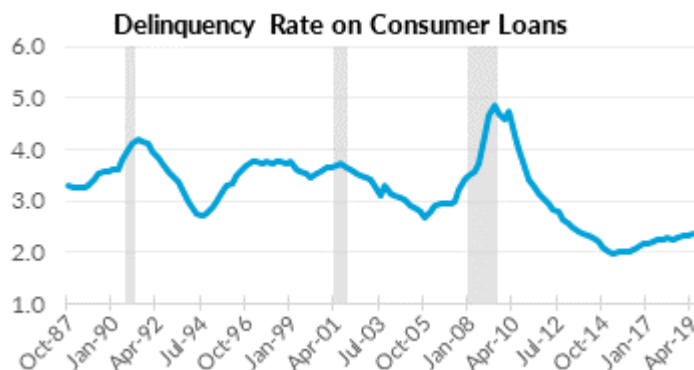
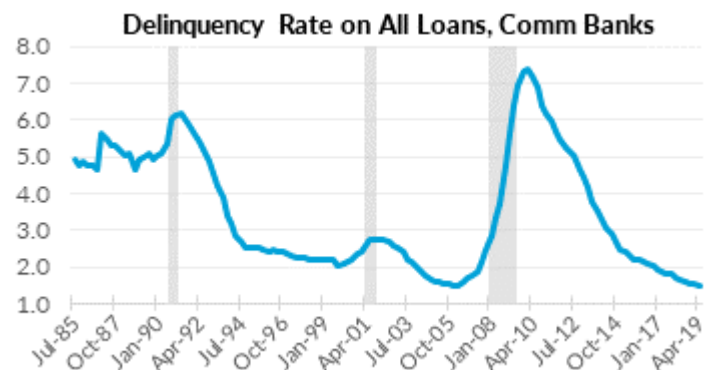


- Broadly speaking, there are two ways to measure sentiment: by asking people what they think or by watching what they do. Both the Consumer Sentiment and Confidence measures are surveys, while measures such as Retail Sales are direct measures of consumer action.
- We have long believed that surveys were less reliable. Even if we assumed that a survey could accurately capture the respondents' opinions, there are issues of sample size, sample choice, and other methodology to consider. These issues are particularly relevant as we have seen major divergences between the competing Consumer Sentiment and Consumer Confidence surveys this quarter.
- Recent softness in Sentiment could forecast trouble with the Consumption component of GDP. Watch this closely.

Corporate Profits

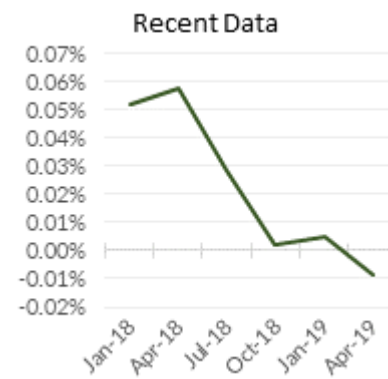
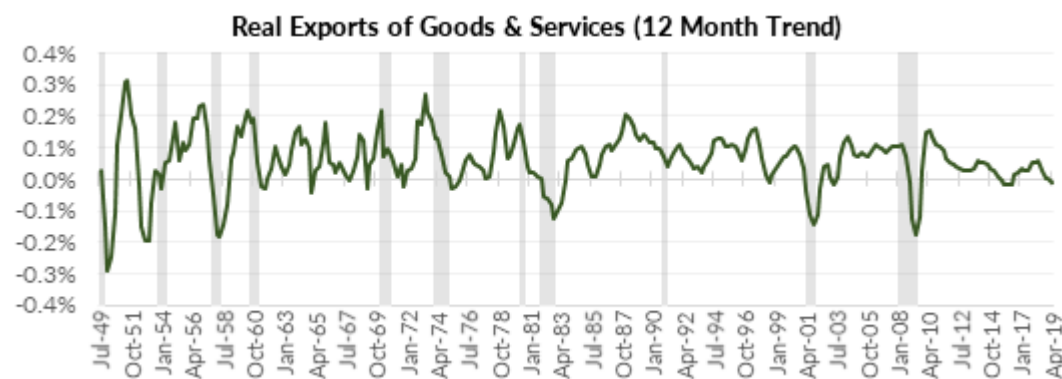
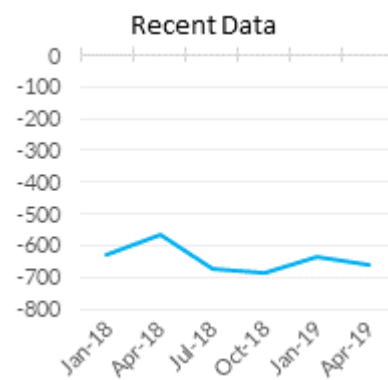
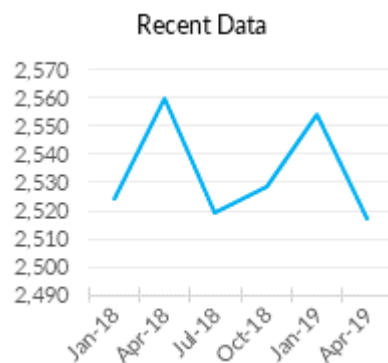


Debt & Lending



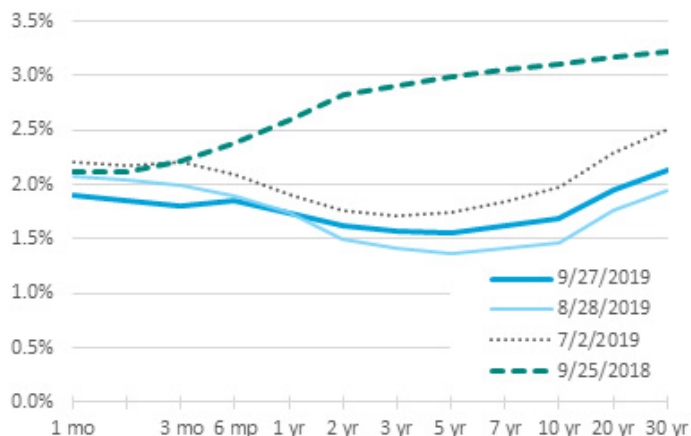
- After a moderate pullback, Corporate Profits saw a strong uptick this quarter.
- Delinquency rates for Consumer datapoints (see next page) continue to increase moderately, but are still at relatively low levels. We see no cause for concern here, particularly since Household debt represents an ever-smaller portion of disposable income.
- Lending standards remain conducive to new business and show no signs of pressure.
- At the end of September 2019, some issues have arisen with overnight repos. We do not think these justify the media attention and do not represent any real risk at this time.

Trade: Exports

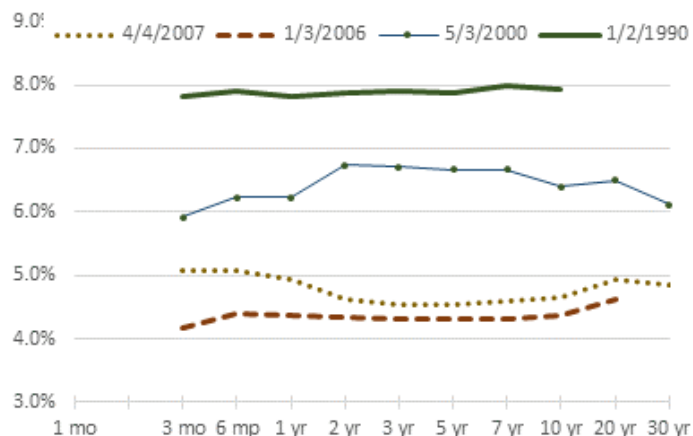


Yield Curve

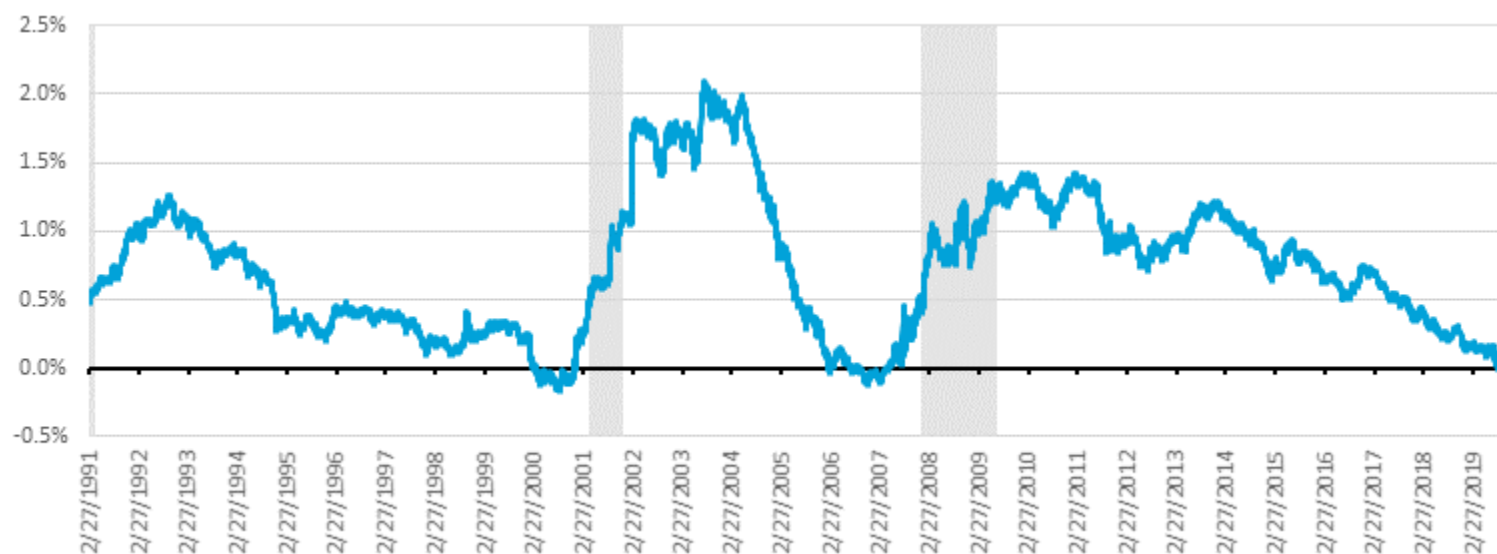
Yield Curve, Current



Historical Examples: Curves Under Stress

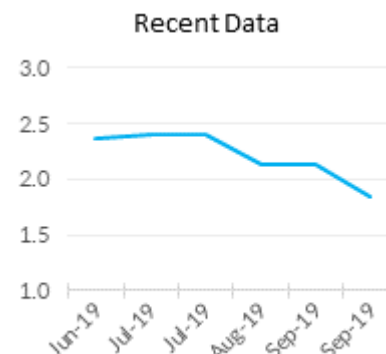
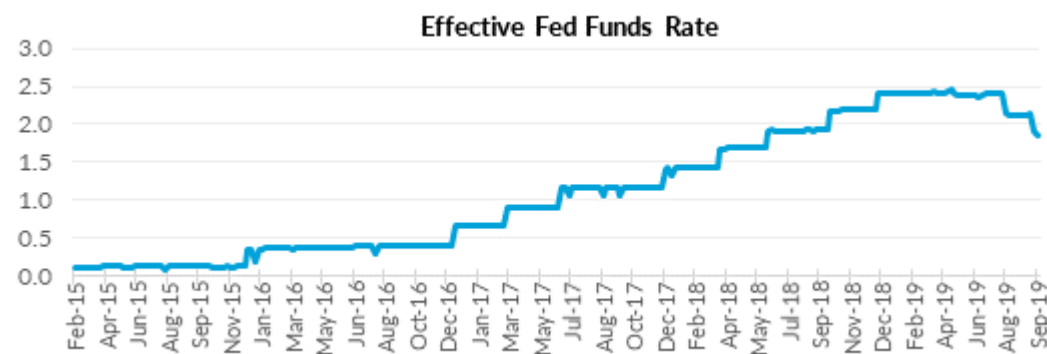
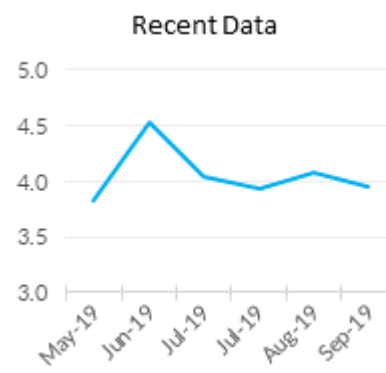
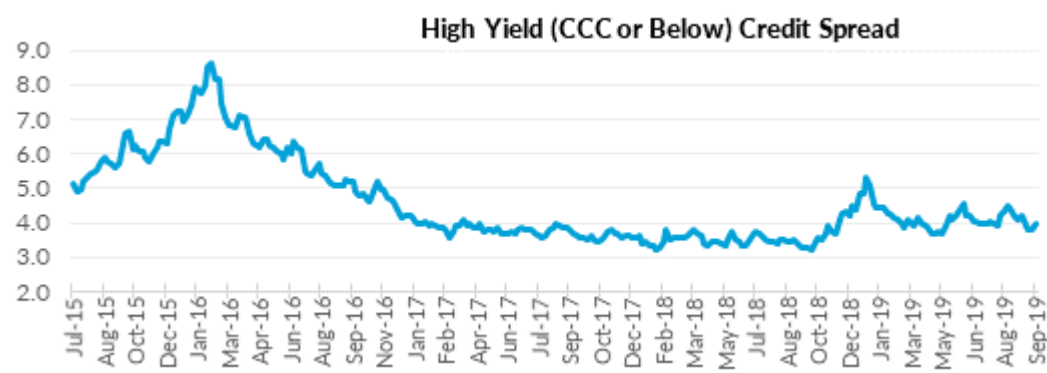
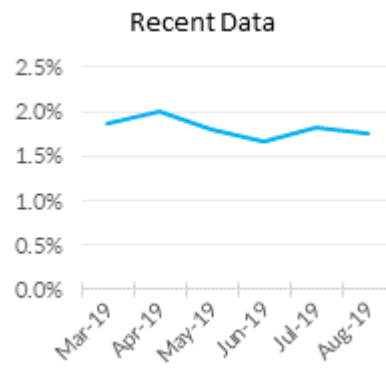
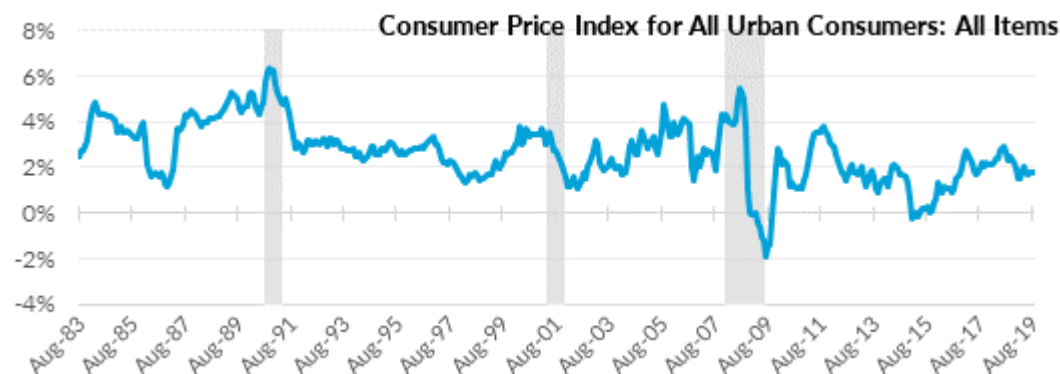


Yield Curve History (Regression Line Slope)



- Yield curve inversion deepened in the third quarter, after first showing signs of inversion in the second quarter. Our methodology (which considers the shape of the *whole* curve rather than the popular 2s and 10s) did invert last quarter.
- Yield curve inversions have preceded major economic stress in the past. This is one of the more accurately prescient measures, but timeframe matters. There could be as much as two years between inversion and actual recession.
- Market expectations are for lower rates in coming months. The Fed has power over the short end of the curve; reduced rates here would naturally work toward curve normalization.

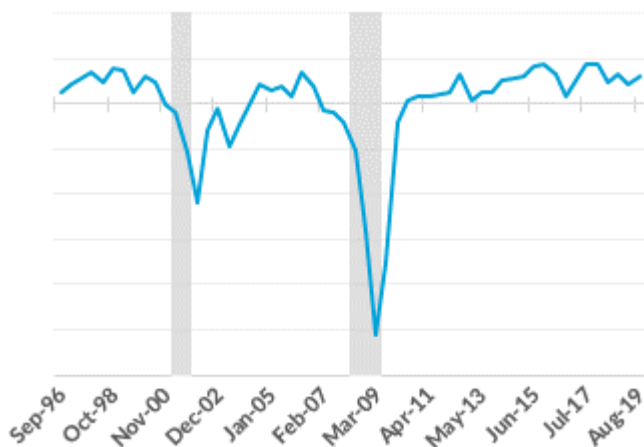
Rates



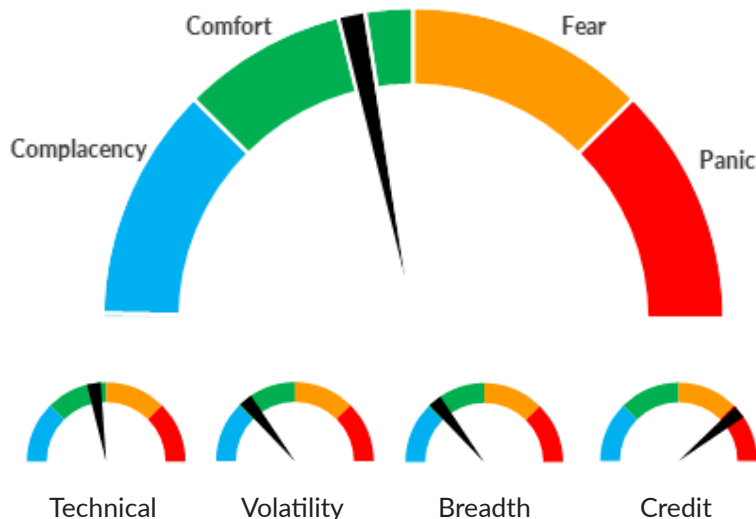
- Inflation is always a difficult conversation with Main Street, as consumers generally feel inflation that is not accurately reflected in official measures.
- However, all standard measures of inflation remain flat, and in the Fed's target zone.
- Inflation is one of those measures that only needs attention when it diverges from expectations, shows moves inappropriate to the current stage of the business cycle, or shows large shifts. We see none of those factors at this time.
- Credit spreads have widened through 2018 (reflecting increased macro tensions) but have stabilized since late 2018. (Credit spreads are a coincident or lagging indicator.)

Our Models

Employment Recession Indicator



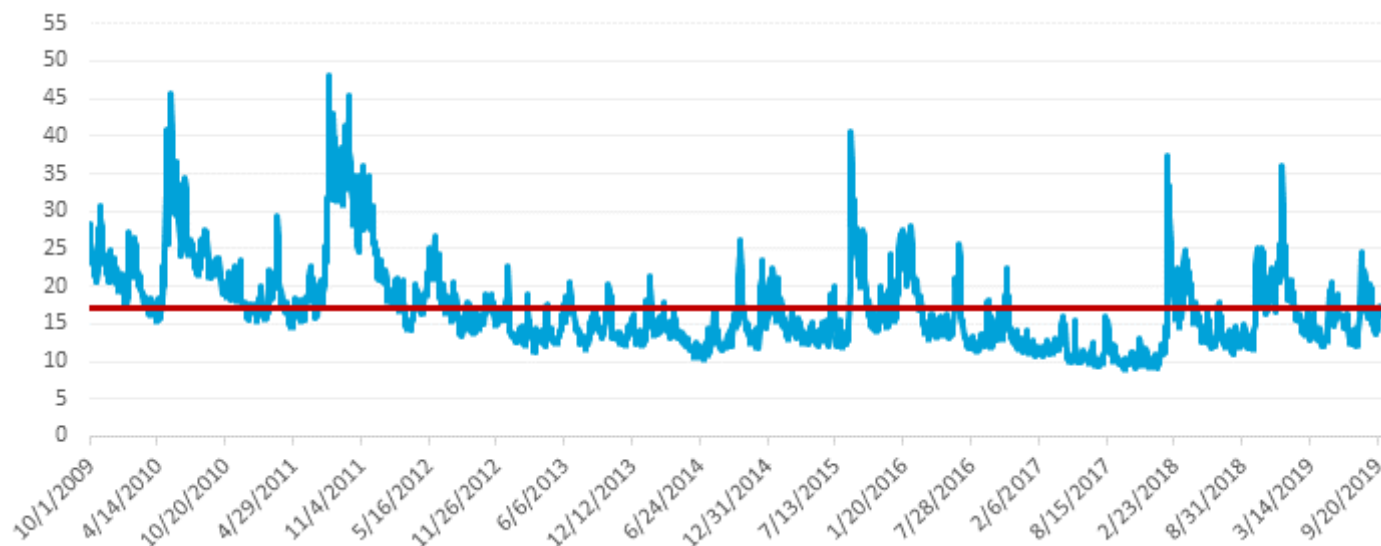
Market Stress Index (MSI)



- The Market Stress Index (MSI) is a proprietary tool composed of three components, two of which are illustrated on this page, along with the composite measure. Recent history gives perspective on shifts from this index.
- Current MSI readings show that the market recovered from moderate stress this quarter, and is now in a comfort zone.
- This reflects stable technical conditions supported by good market breadth and correspondingly low volatility.
- Credit spreads move more slowly, and still show slightly elevated levels from 2018's stress.
- Our Employment Recession Indicator measures the relationship between trends in several measures of employment. This measure, alone, is a powerful predictor of recessions. (The indicator falling below the zero line is a potential warning sign.) **Current readings show absolutely no hints of recession.**

Stock Market Volatility

VIX (20 Year History with 20 Year Average Level)



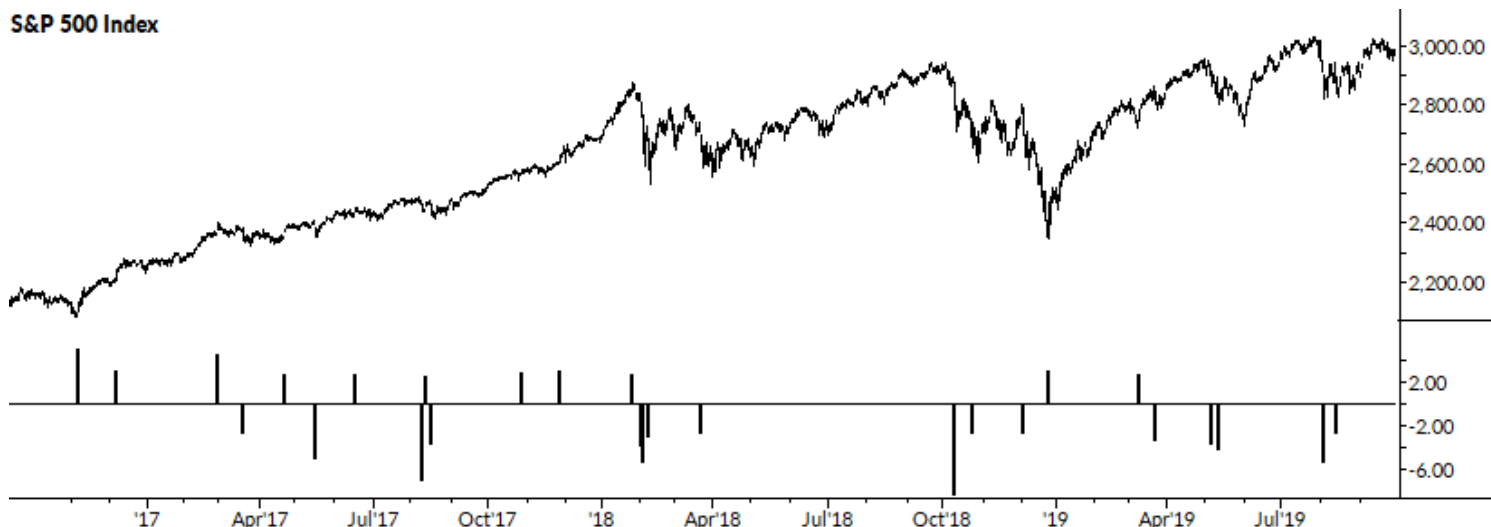
VIX (1 Year History with Trailing 1 Year Max, Min, and 1 Year Average)



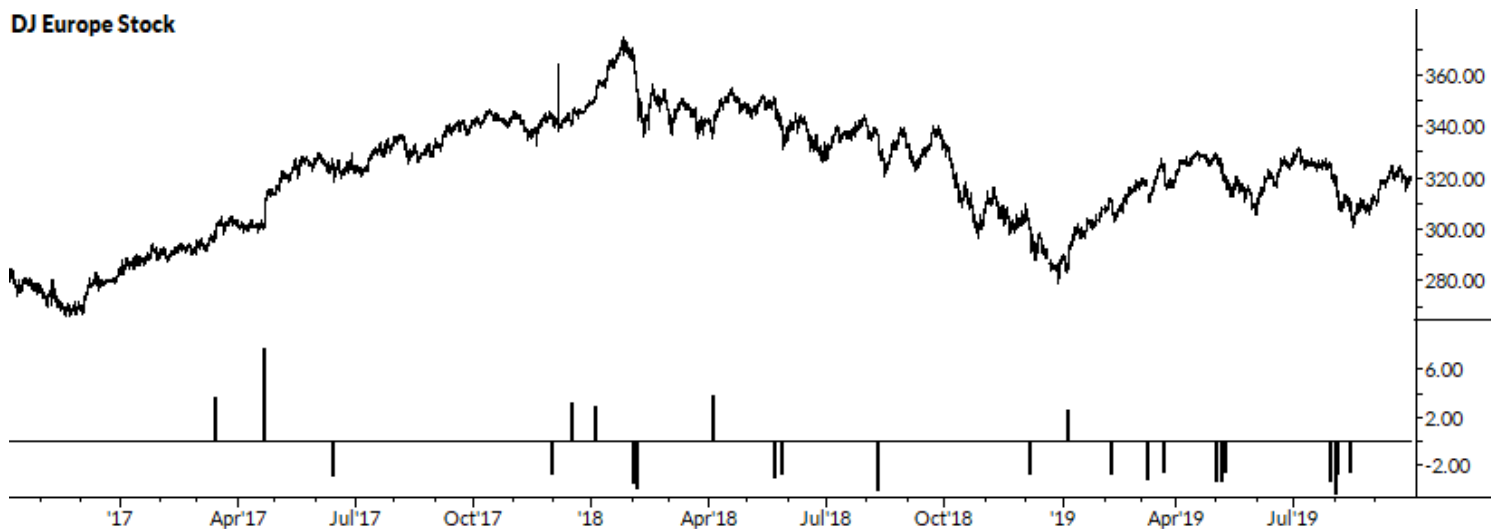
- Market volatility tends to move through quantifiable steps or regimes. Volatility usually mean-reverts in the short term (i.e., remains near current levels) and trends back toward long-term averages.
- Both of those factors are significant influences on the behavior of volatility, and we have seen all of these elements in recent action.
- Volatility rose into the end of the quarter, but is now hovering at longer-term averages.
- Risks in volatility are mainly to the upside, but expect volatility is likely to contract in December into the end of the year.

Market Shocks and Stability

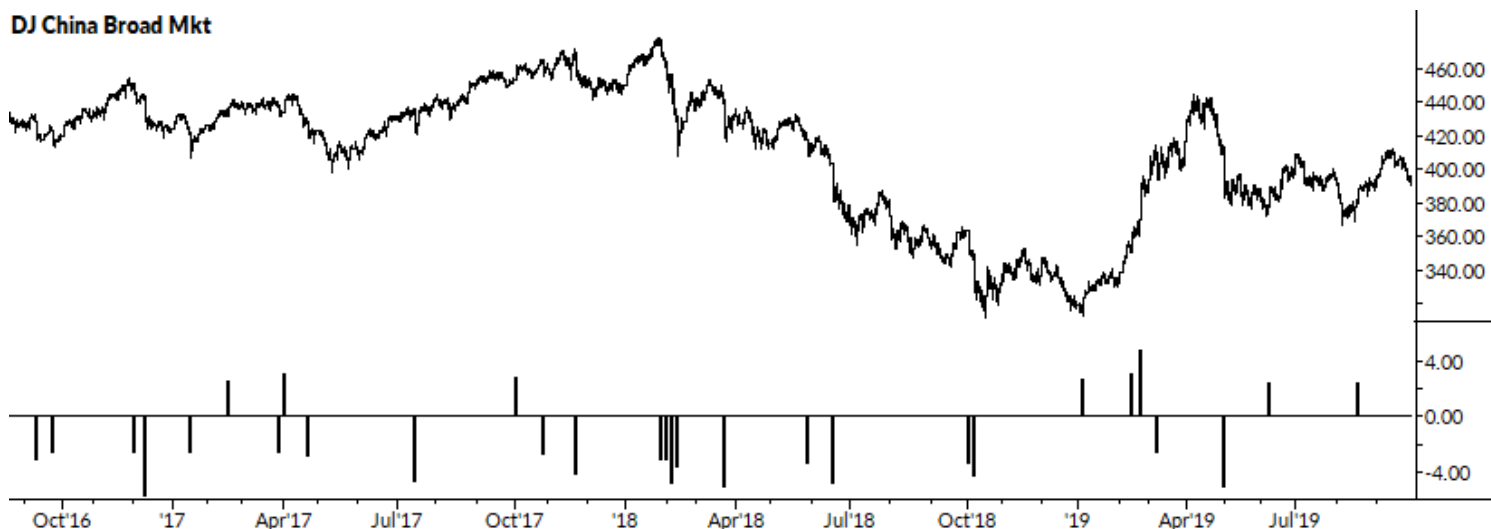
S&P 500 Index



DJ Europe Stock



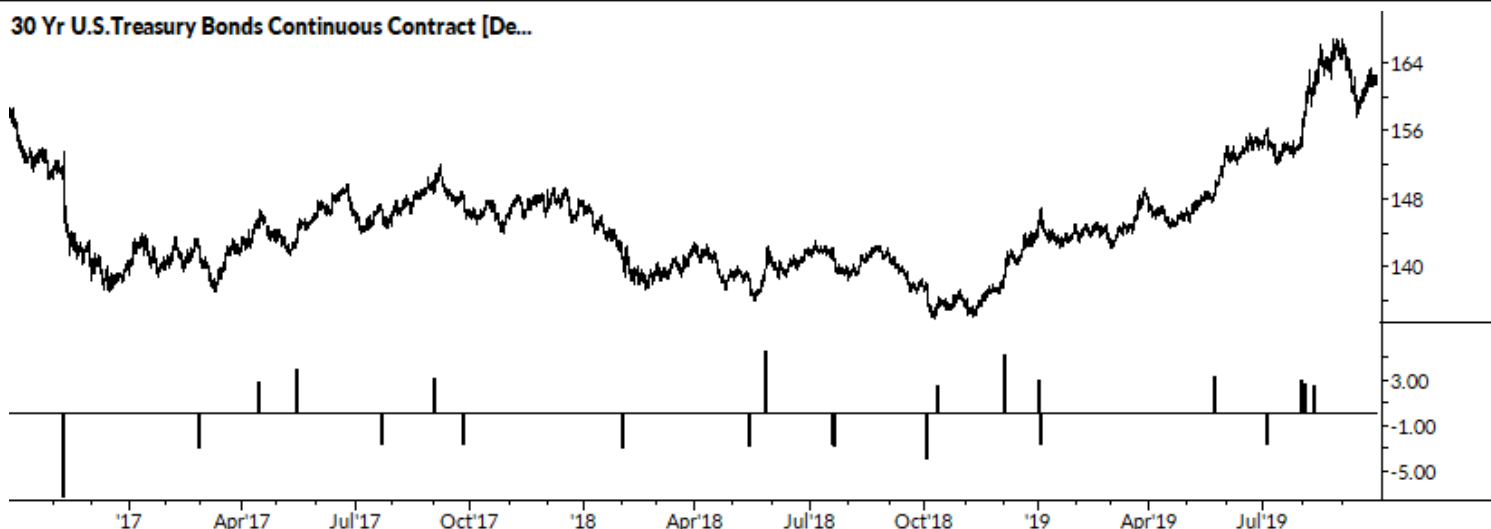
DJ China Broad Mkt



The bottom panels on these charts (this page and next) show Sigma Spikes (z scores) for daily bars as a multiple of the 20 day standard deviation. Only large moves >2.5 sigma or <-2.5 sigma are shown. This further removes noise from the chart and allows us to see any asymmetry of daily volatility.

Market Shocks and Stability (cont.)

30 Yr U.S.Treasury Bonds Continuous Contract [De...



Crude Oil Continuous Contract [Nov19]



- This page and the previous page show volatility in an unusual way: the histogram below price filters out small moves (inside of $\pm 2\sigma$) and only shows larger, more significant volatility shocks.
- This procedure filters out the noise, and highlights the most important moves on a daily basis.
- In stocks, volatility has been predominately to the downside this year. **This type of action has preceded periods of significant market stress in the past.** Take this as a warning sign to be watched.
- Similar patterns exist in EU indexes, while China shows a more symmetrical distribution.
- Volatility in bonds has been strongly skewed the upside.

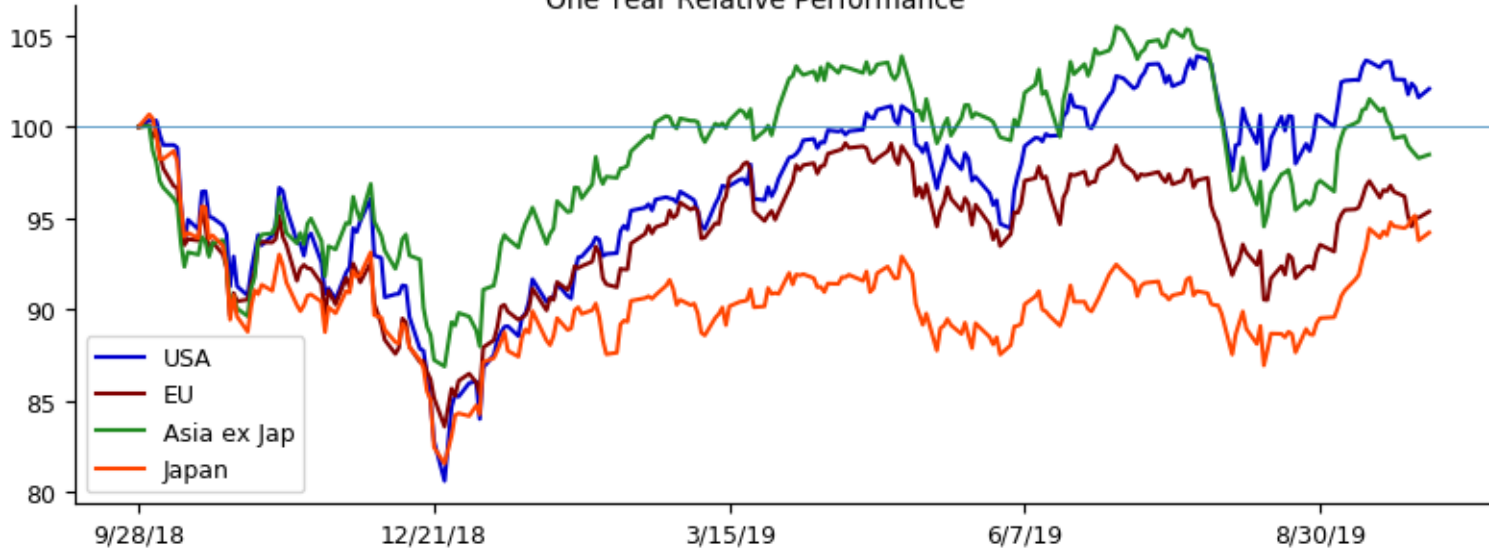
Relative Performance

Regional Indexes

Five Year Relative Performance



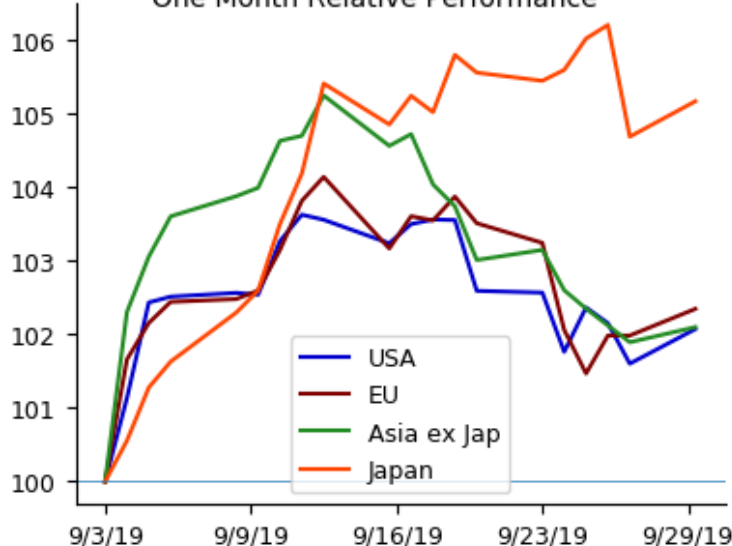
One Year Relative Performance



One Quarter Relative Performance



One Month Relative Performance



Relative Performance (cont.)

Global Indexes

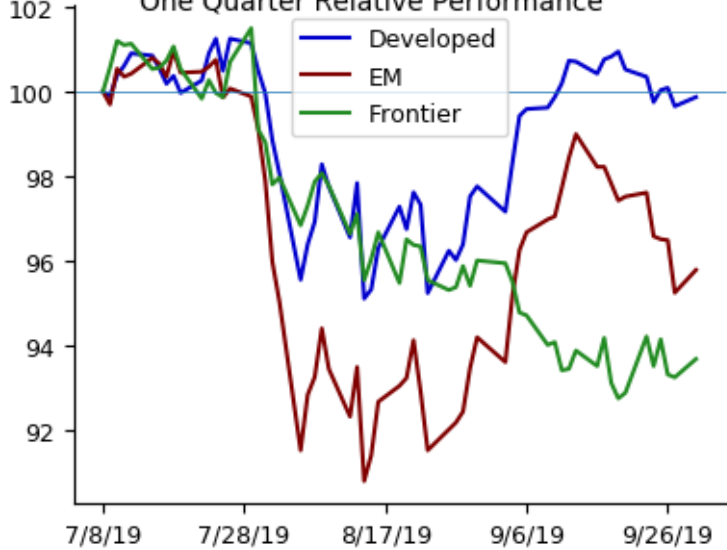
Five Year Relative Performance



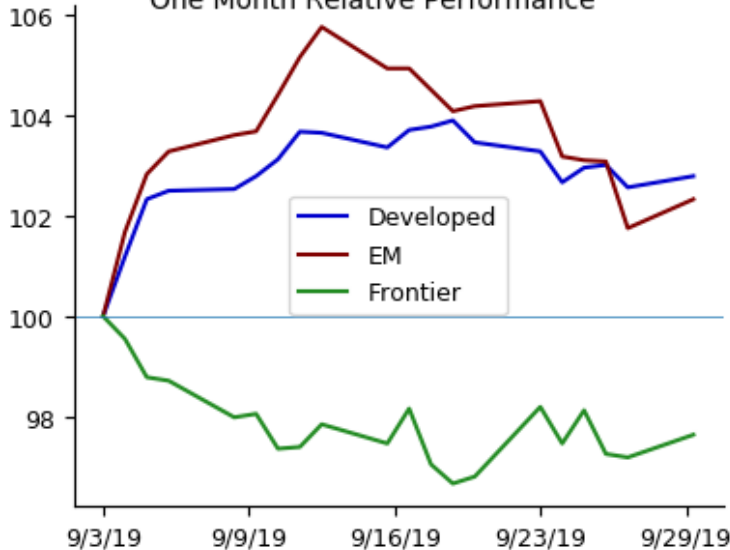
One Year Relative Performance



One Quarter Relative Performance



One Month Relative Performance



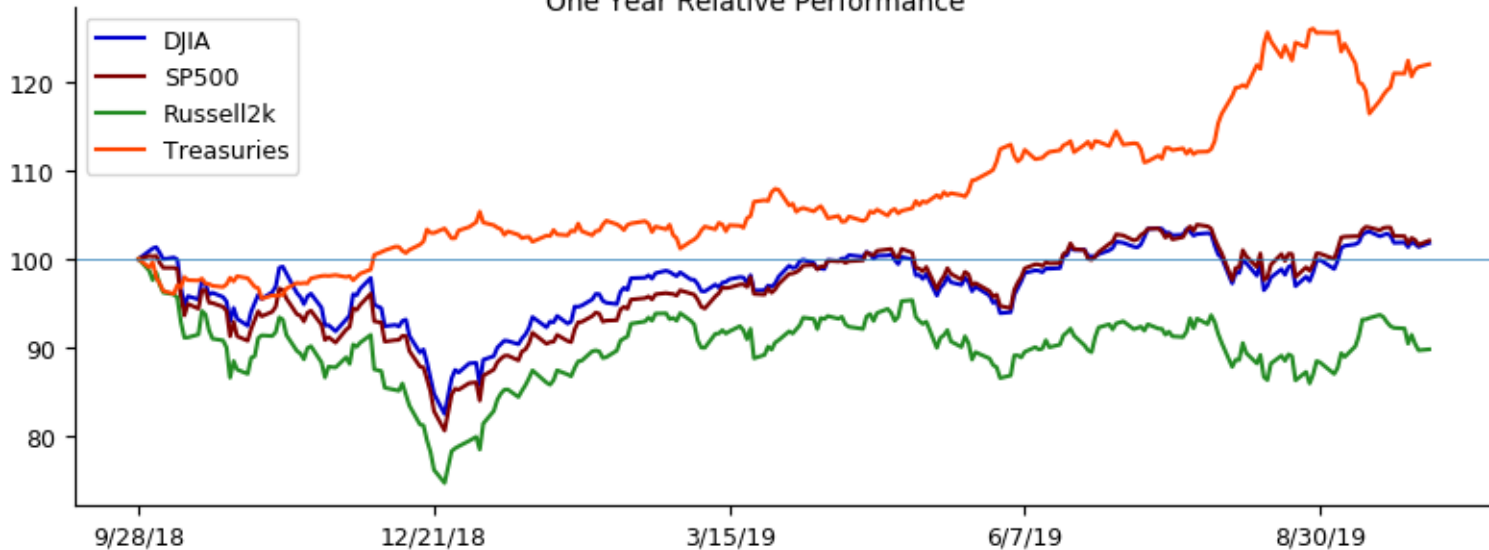
Relative Performance (cont.)

Global Indexes

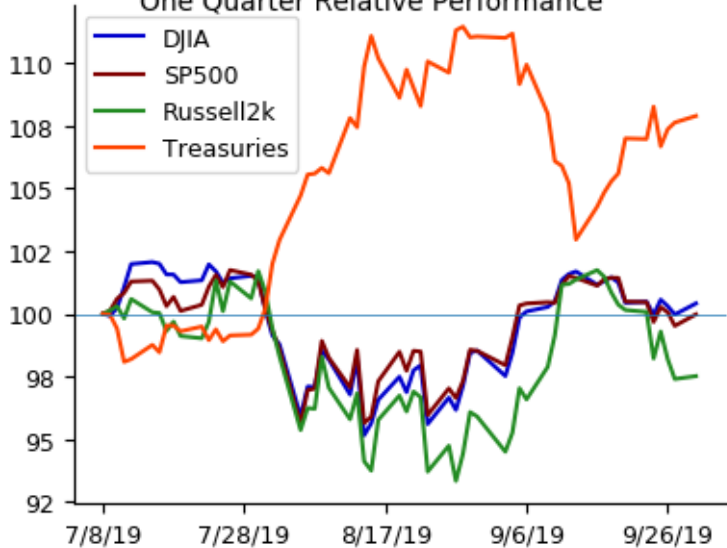
Five Year Relative Performance



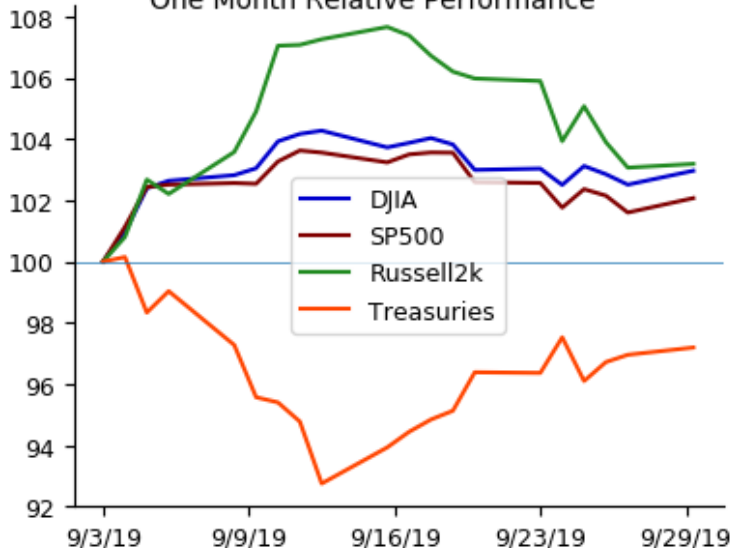
One Year Relative Performance



One Quarter Relative Performance

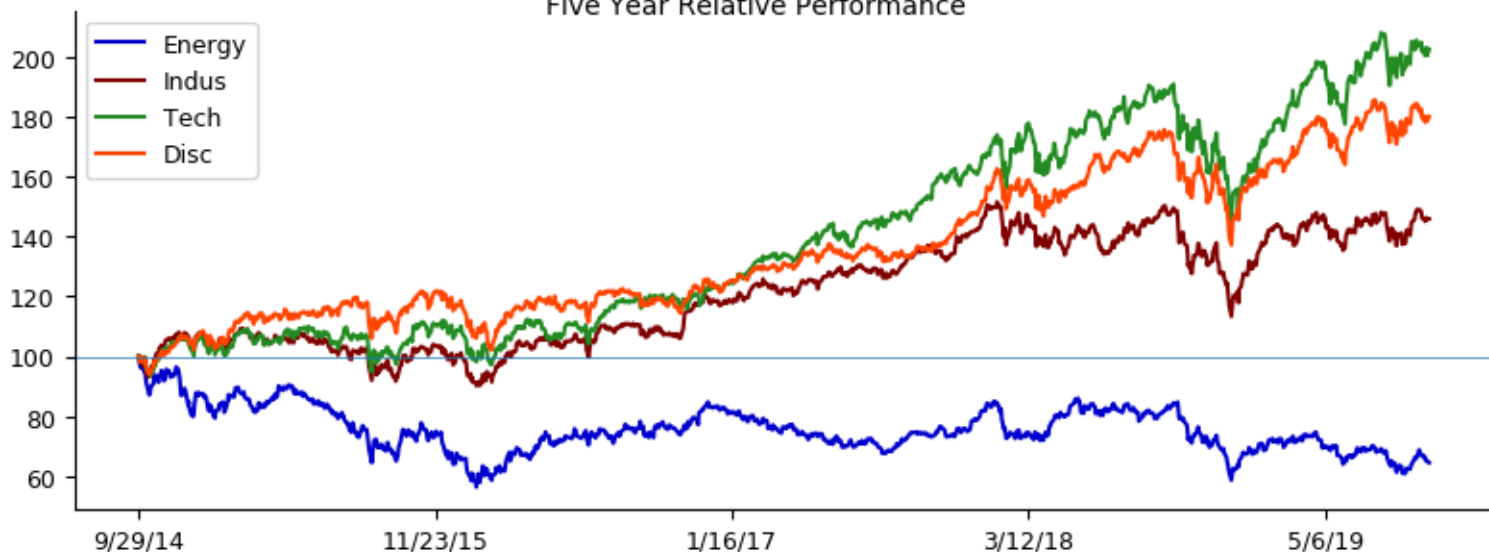


One Month Relative Performance

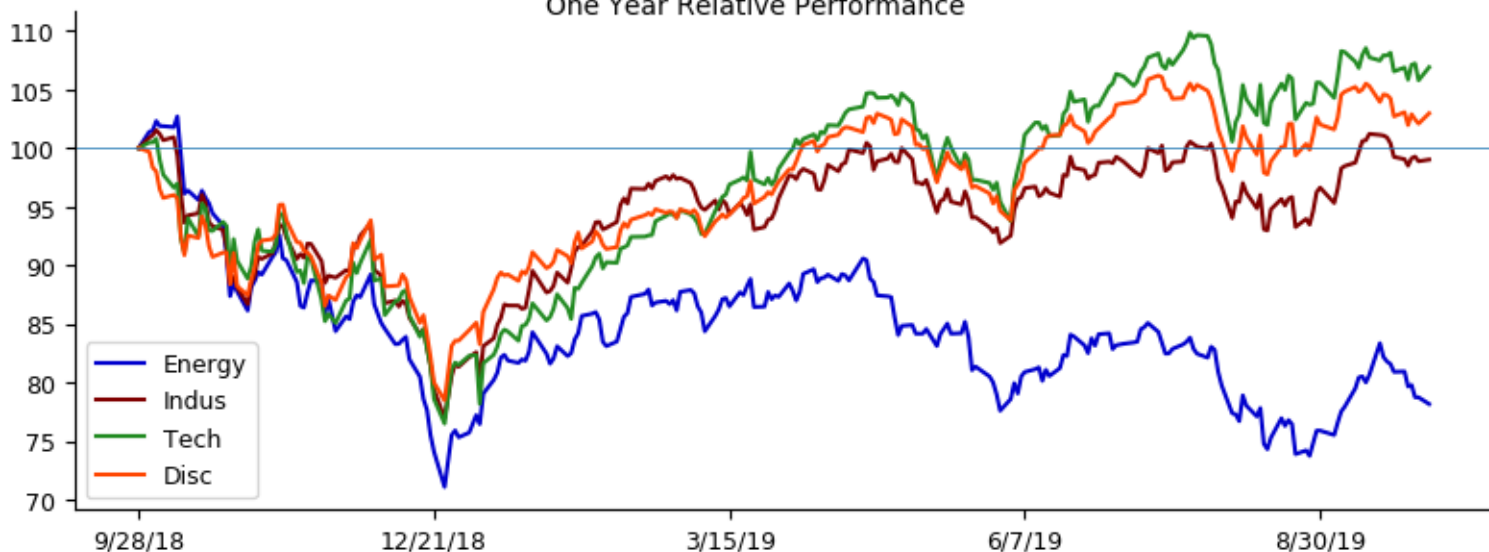


Sector Relative Performance

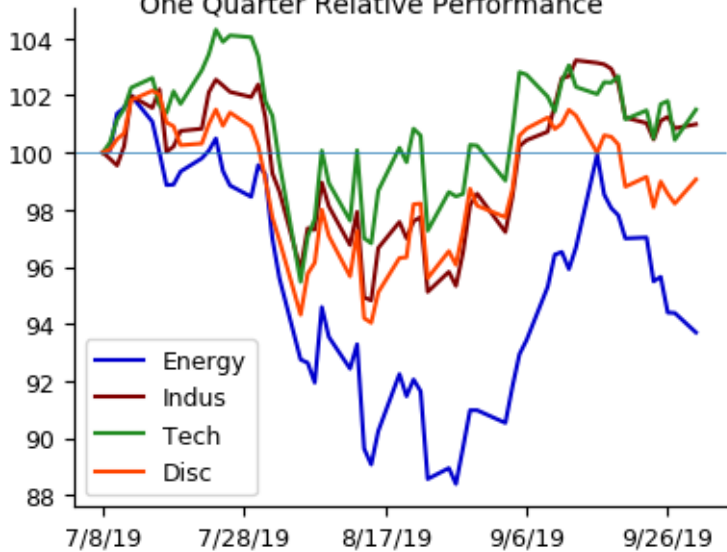
Five Year Relative Performance



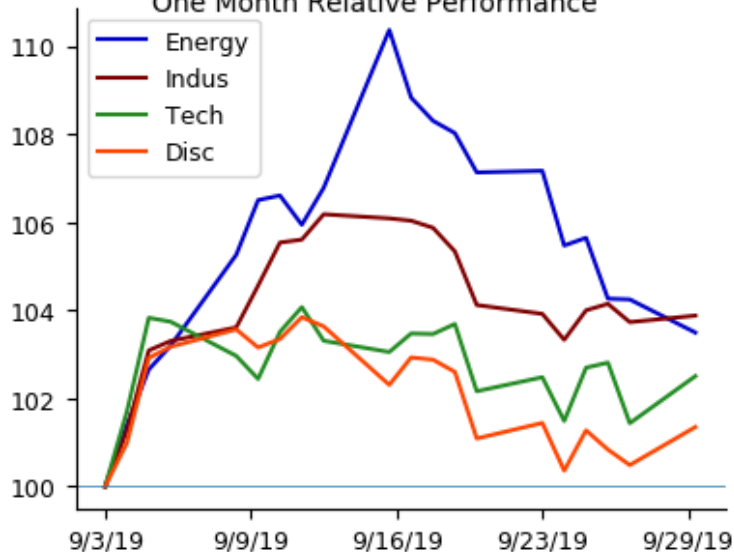
One Year Relative Performance



One Quarter Relative Performance



One Month Relative Performance

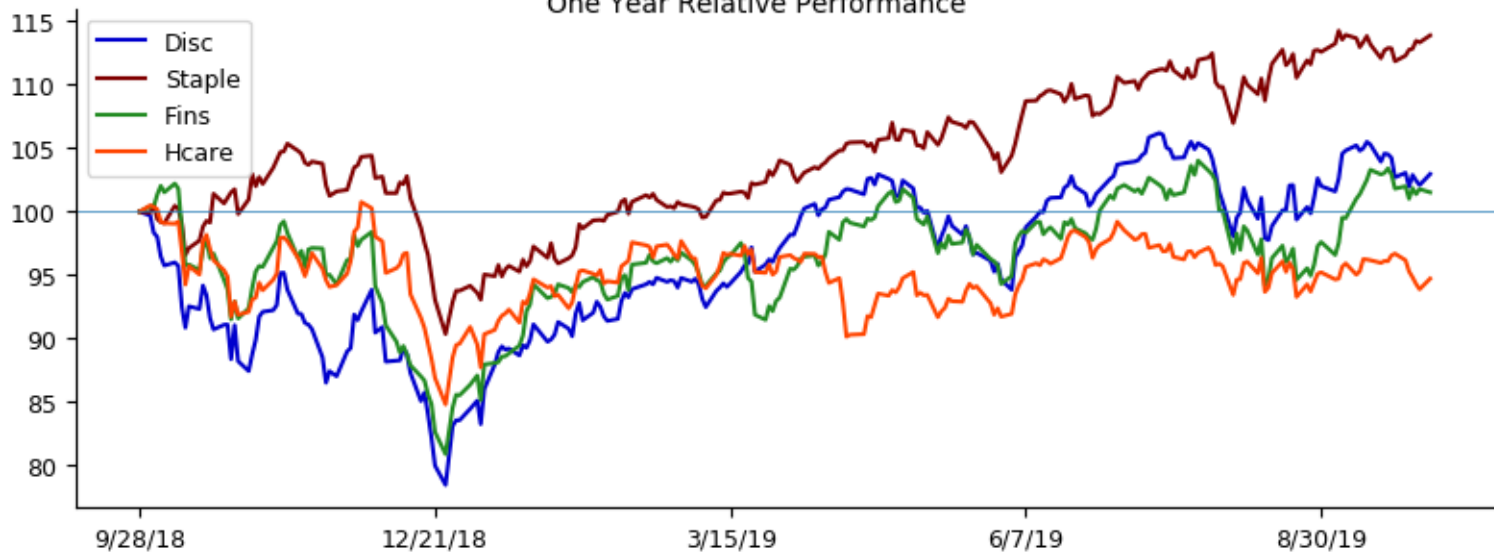


Sector Relative Performance (cont.)

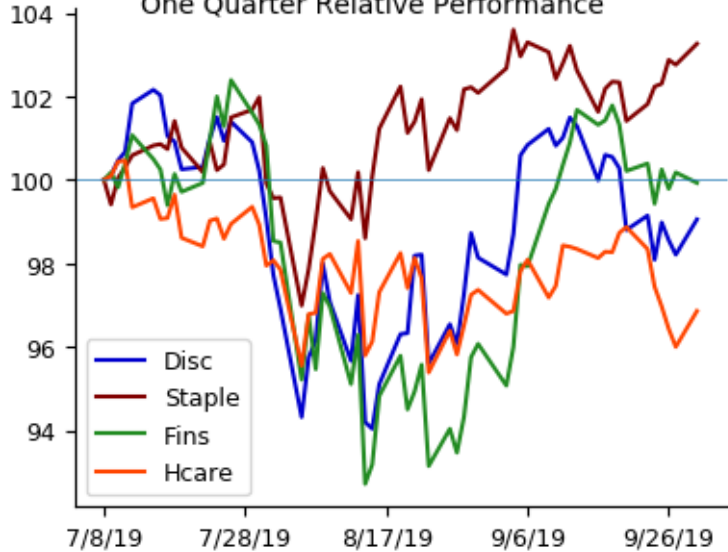
Five Year Relative Performance



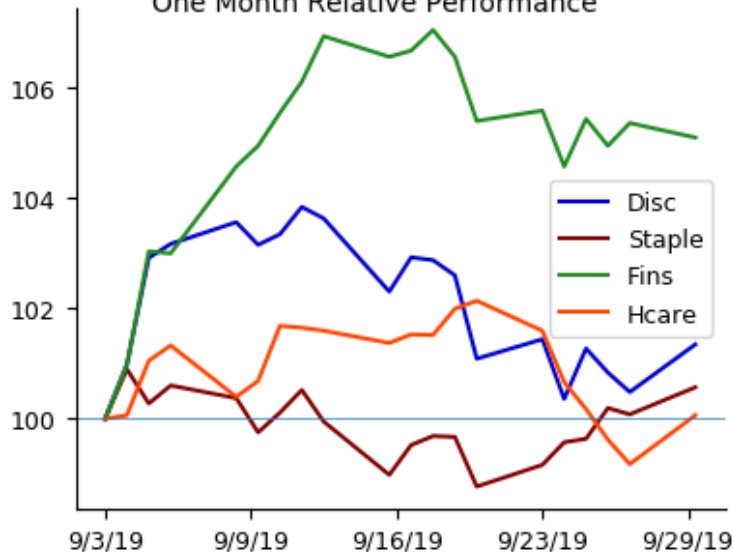
One Year Relative Performance



One Quarter Relative Performance



One Month Relative Performance

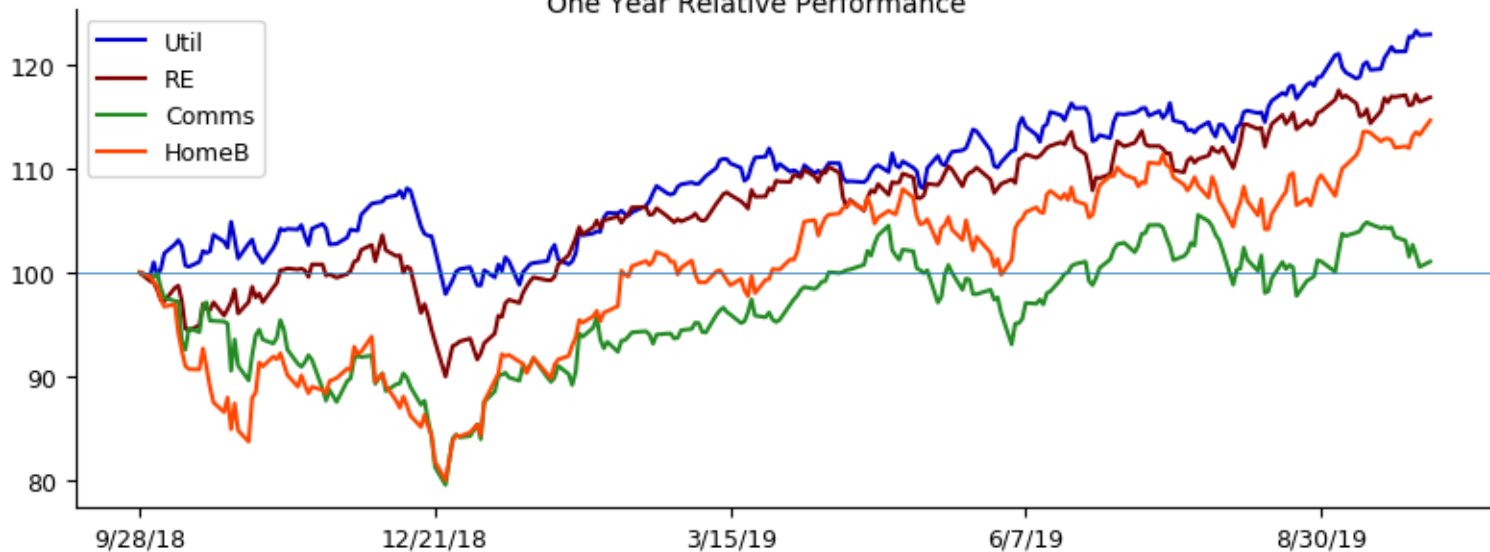


Sector Relative Performance (cont.)

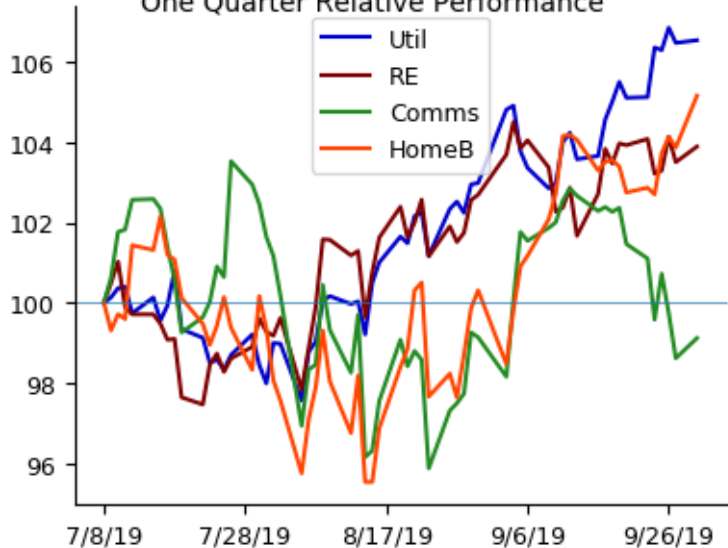
Five Year Relative Performance



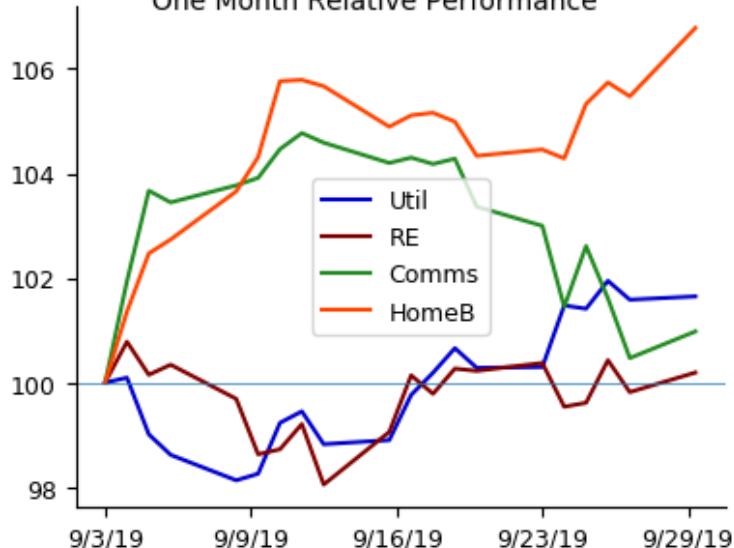
One Year Relative Performance



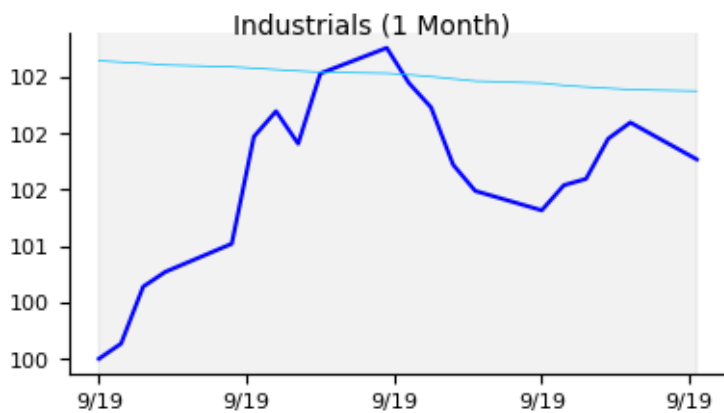
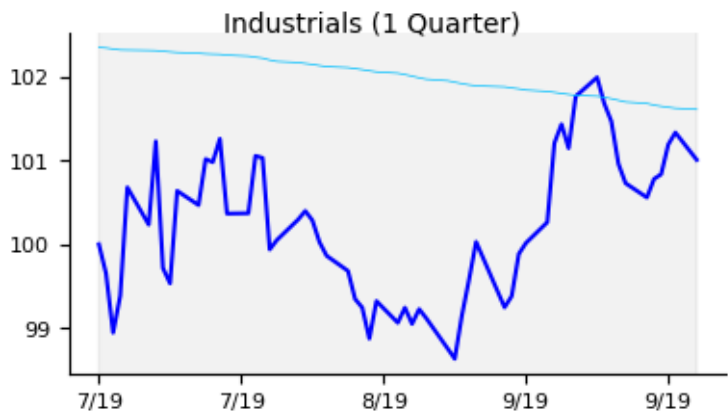
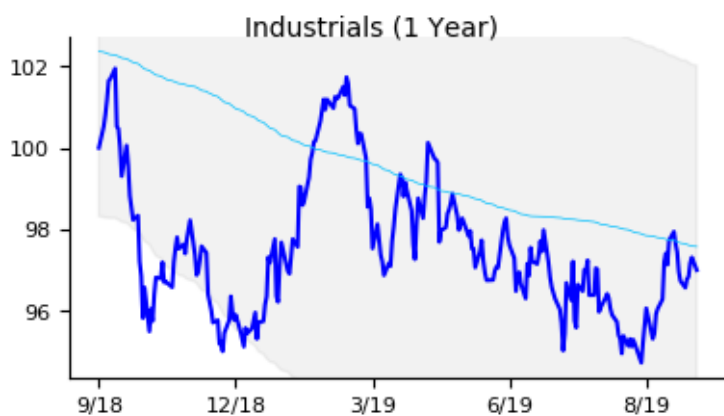
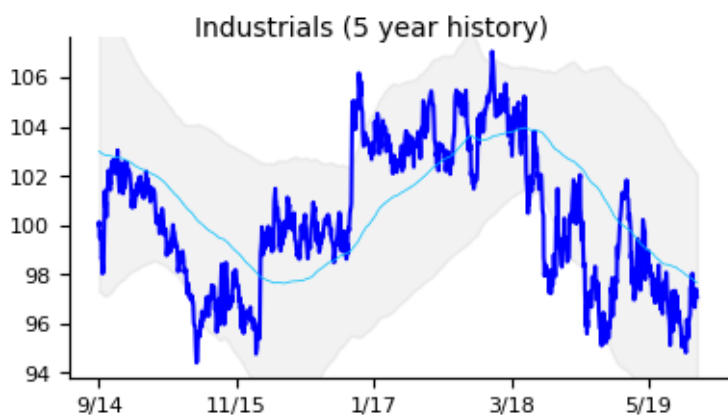
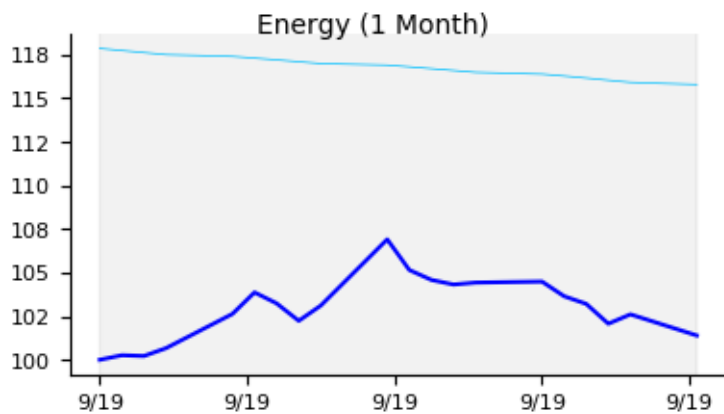
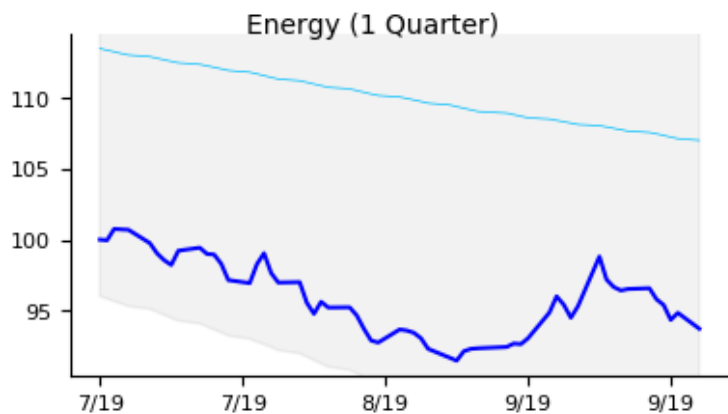
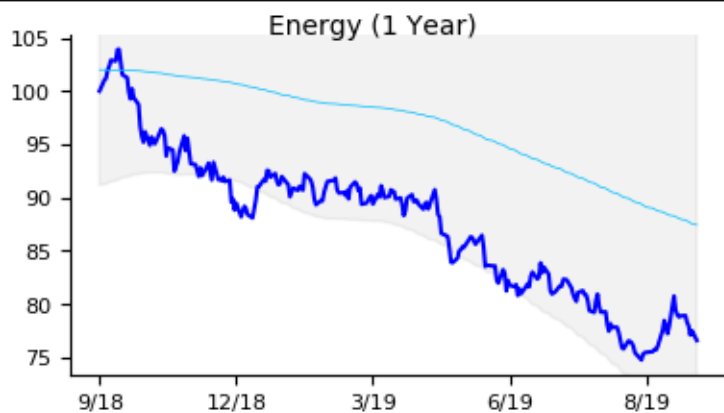
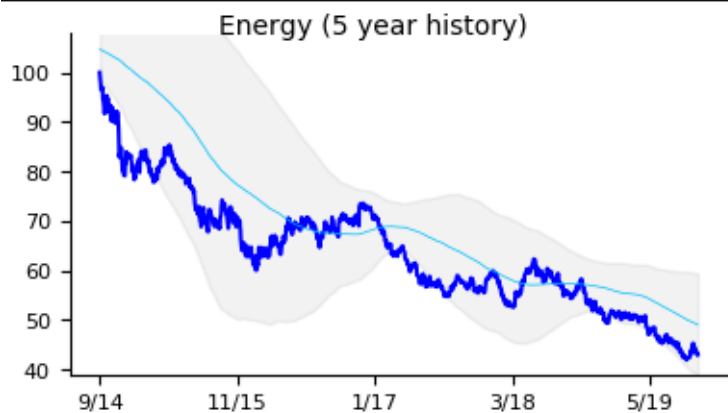
One Quarter Relative Performance



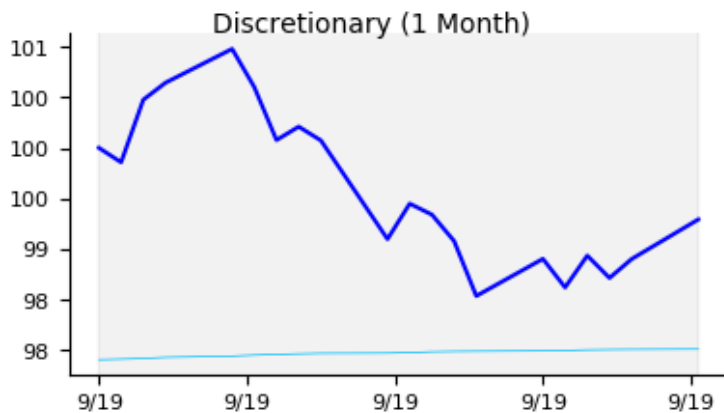
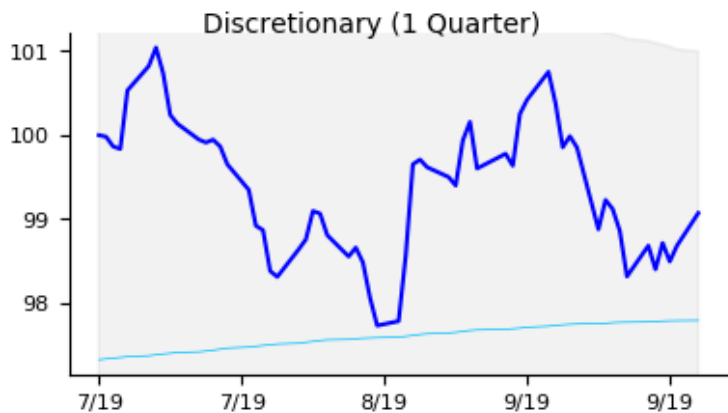
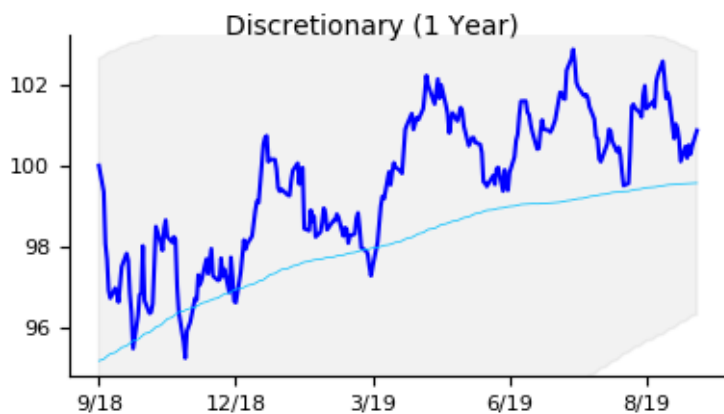
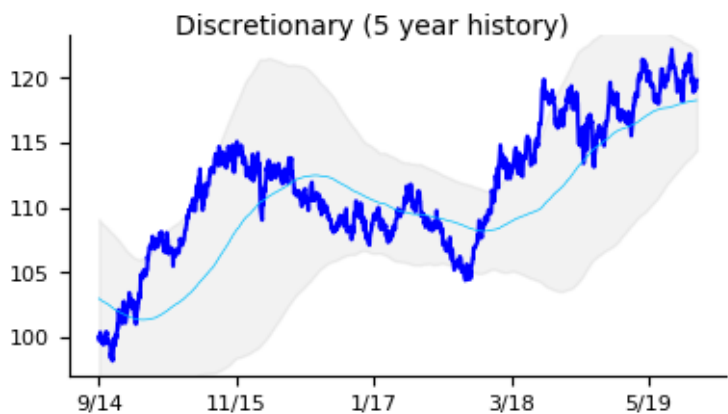
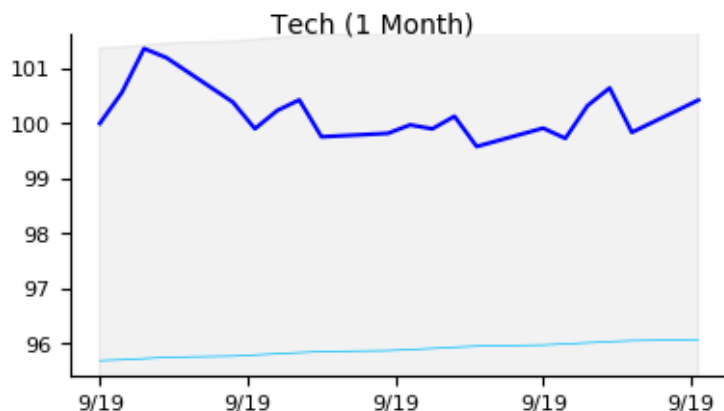
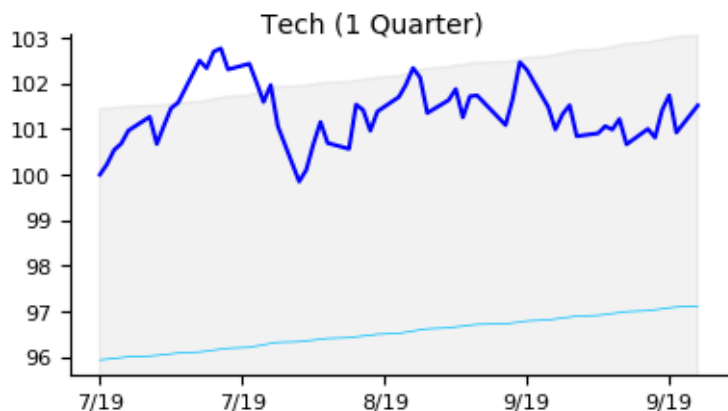
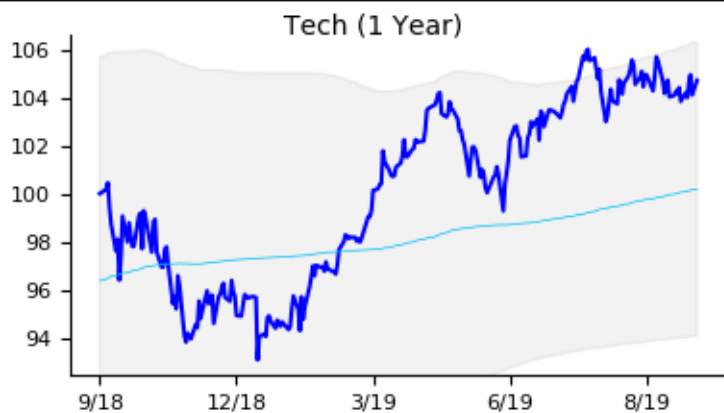
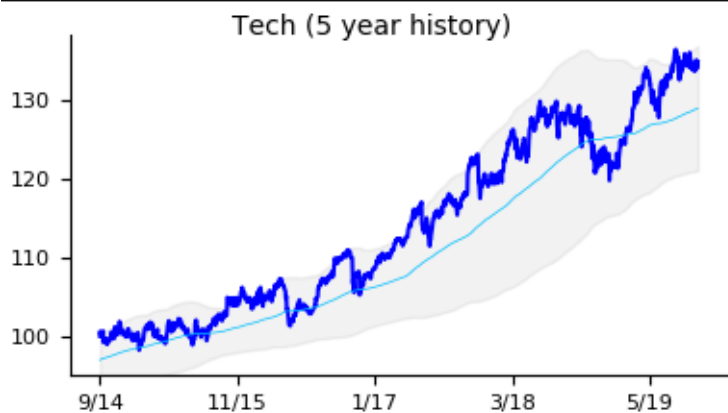
One Month Relative Performance



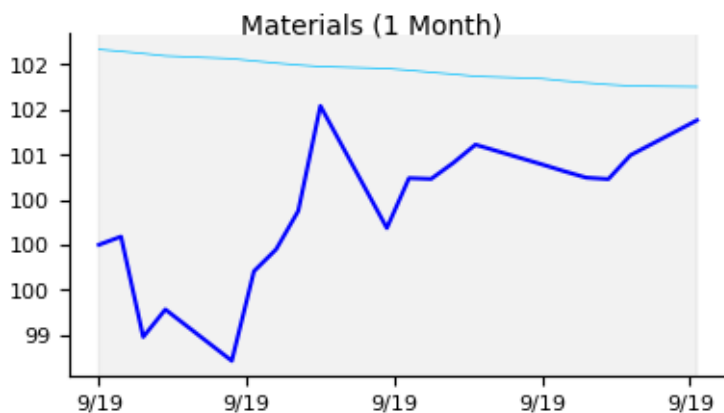
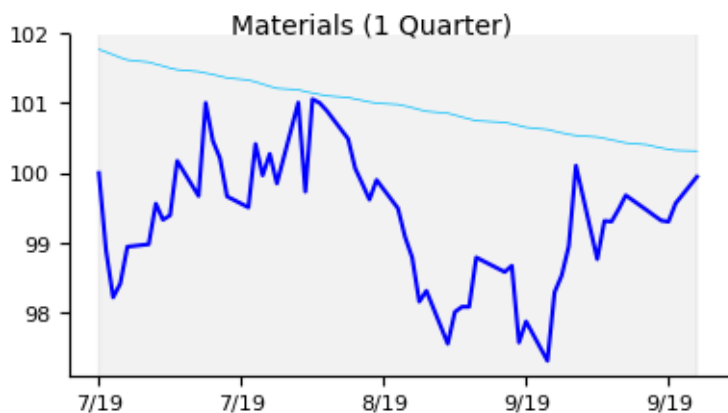
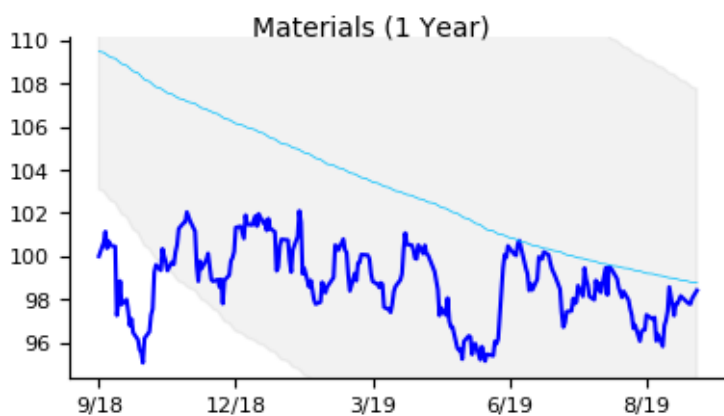
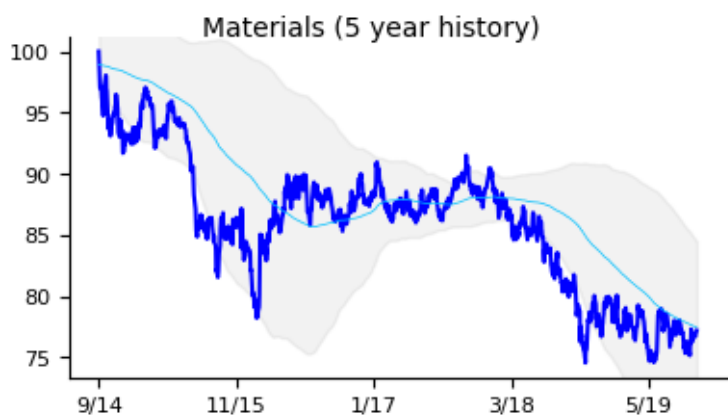
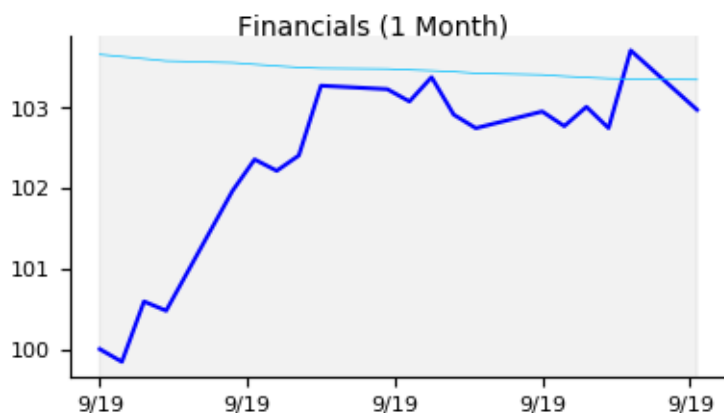
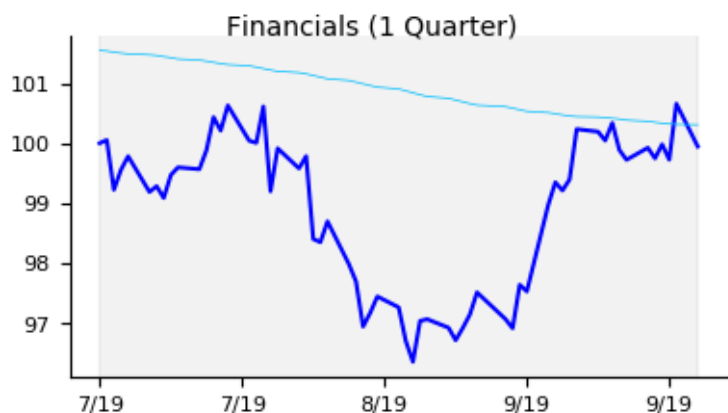
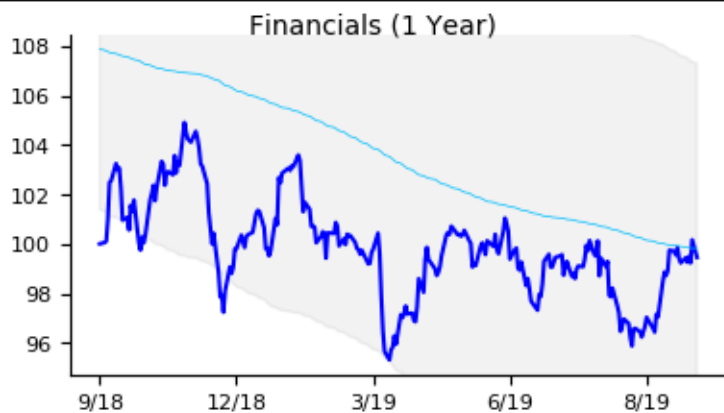
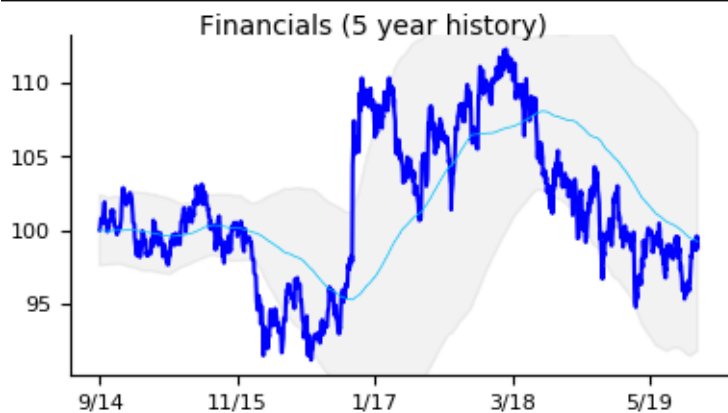
Major Sector Relative Performance



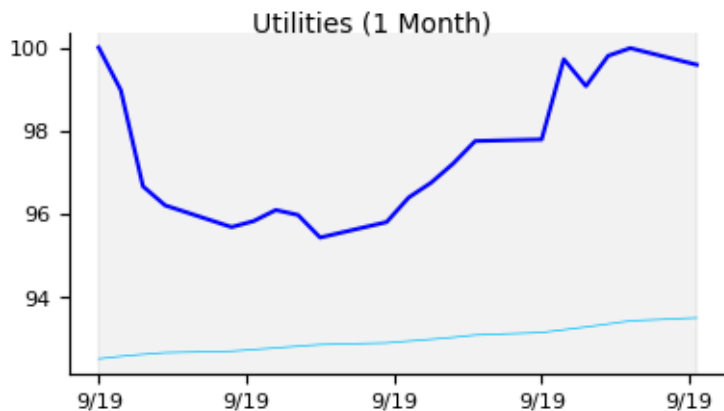
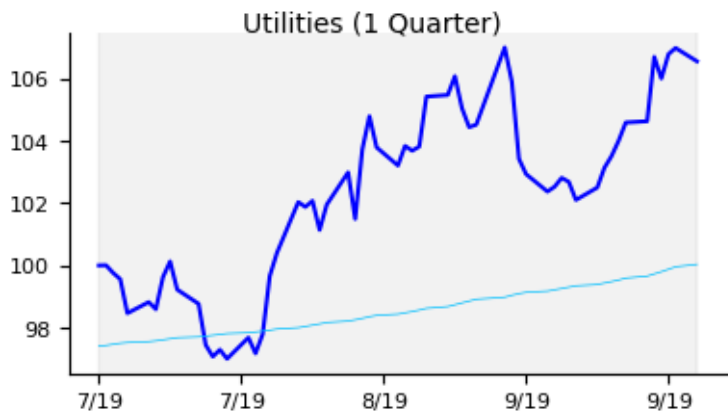
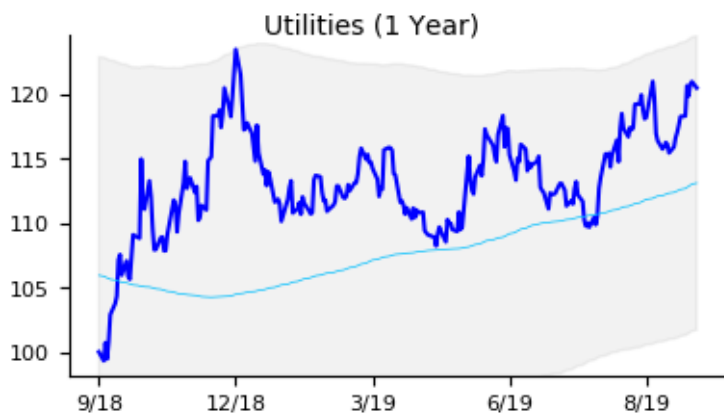
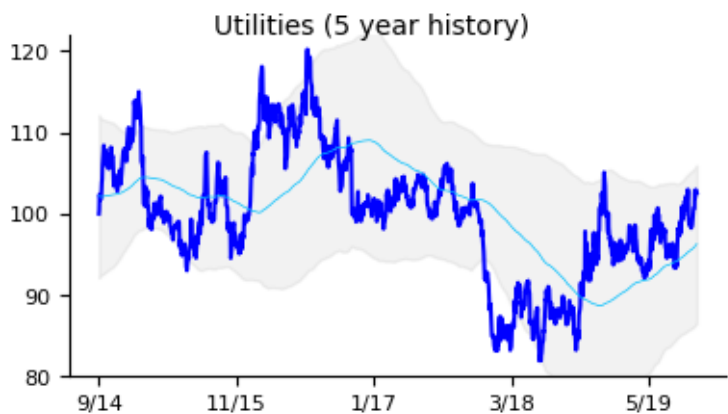
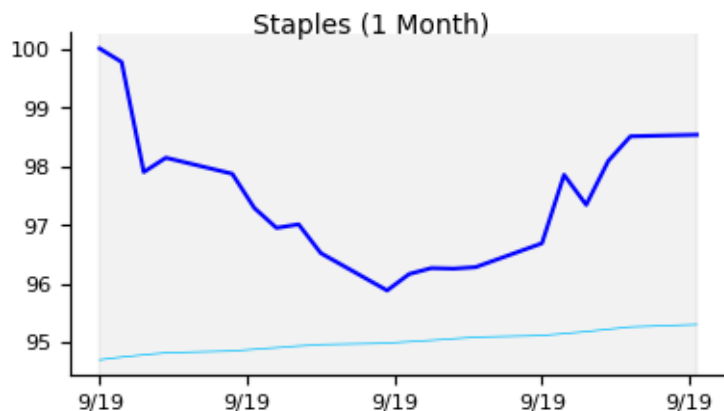
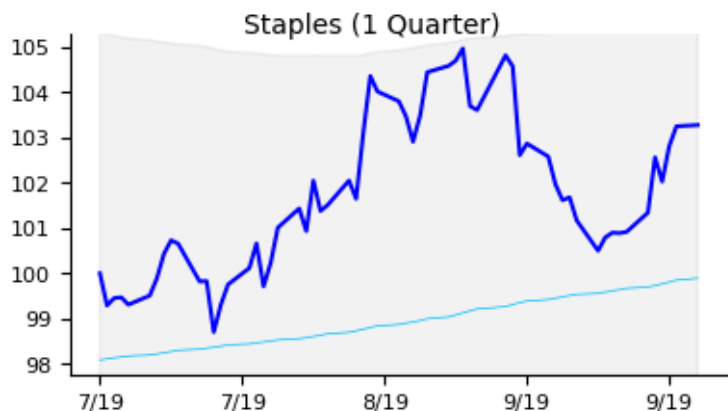
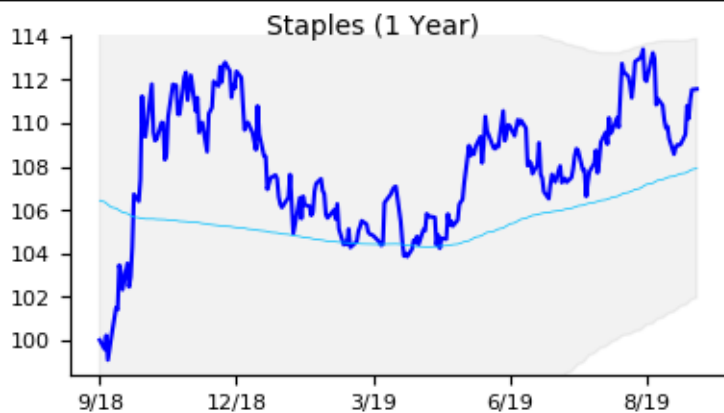
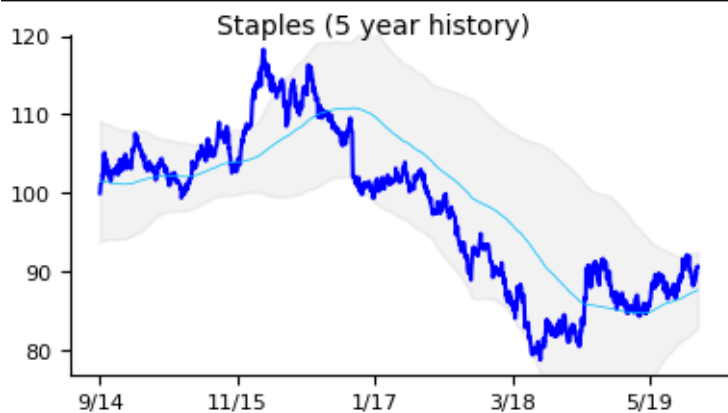
Major Sector Relative Performance (cont.)



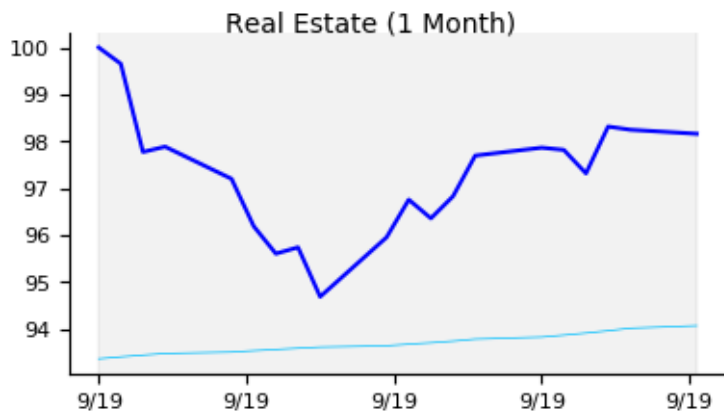
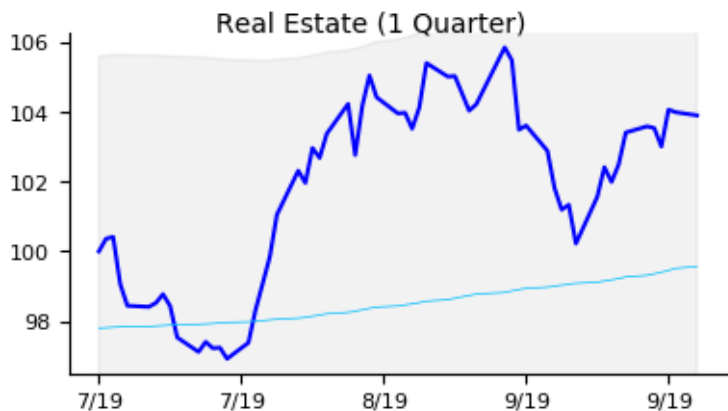
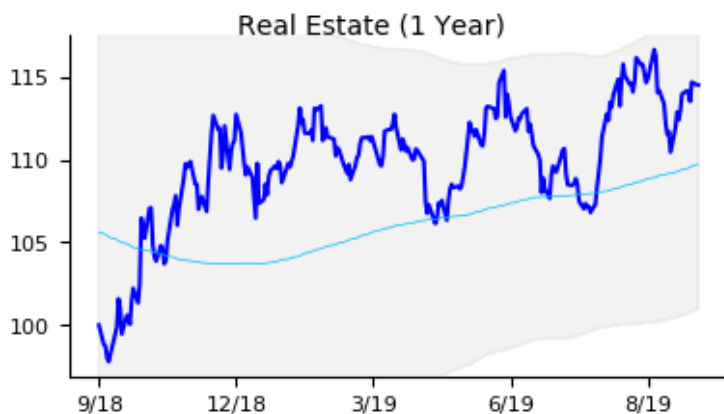
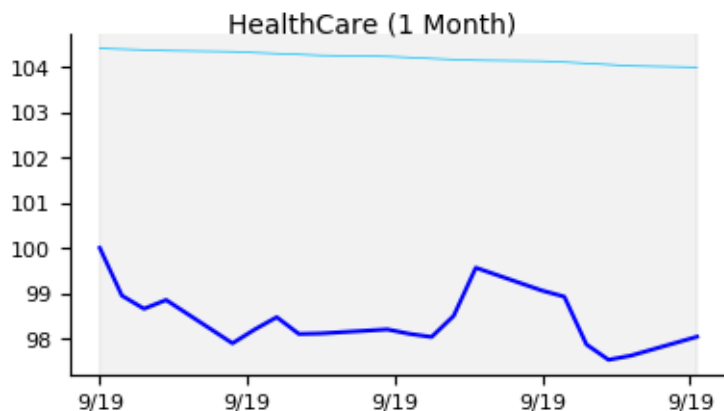
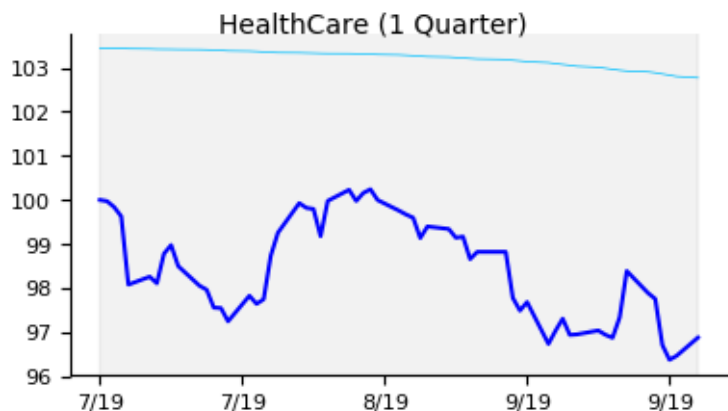
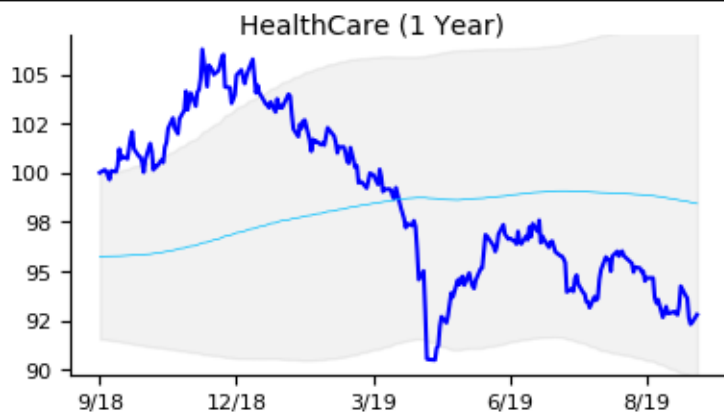
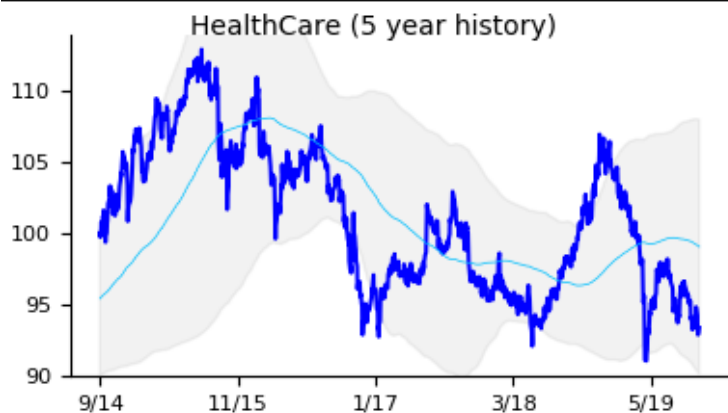
Major Sector Relative Performance (cont.)



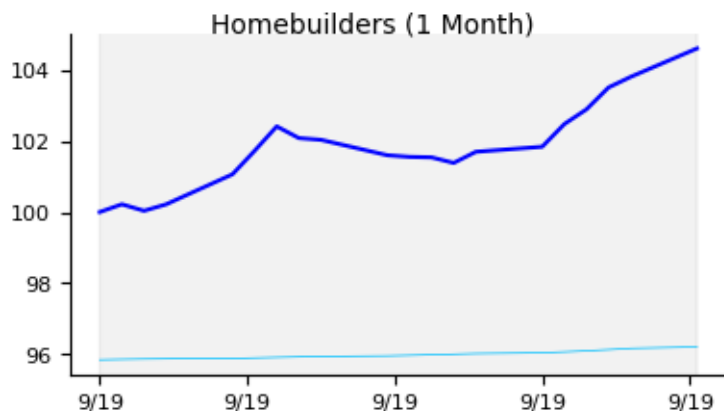
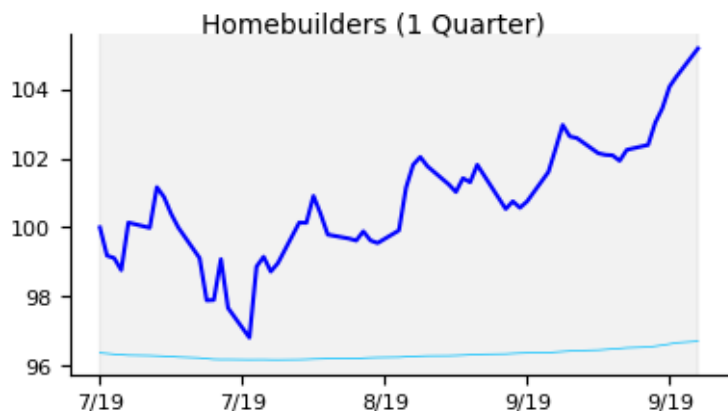
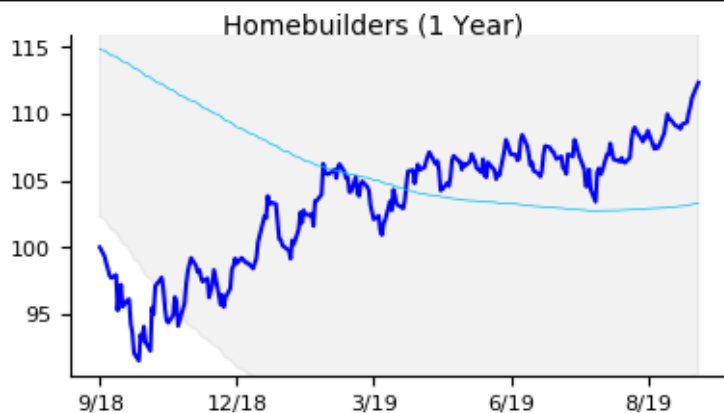
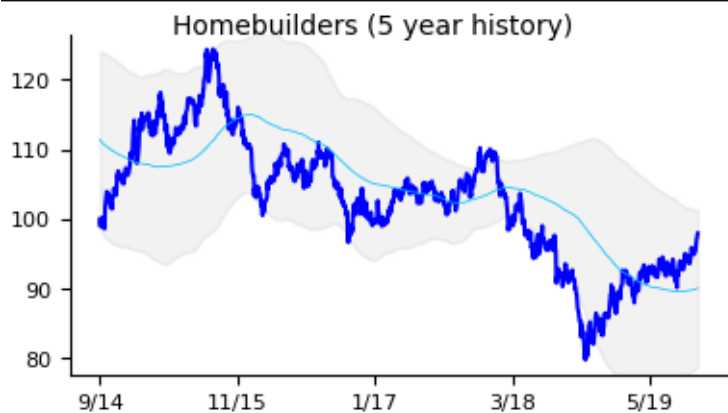
Major Sector Relative Performance (cont.)



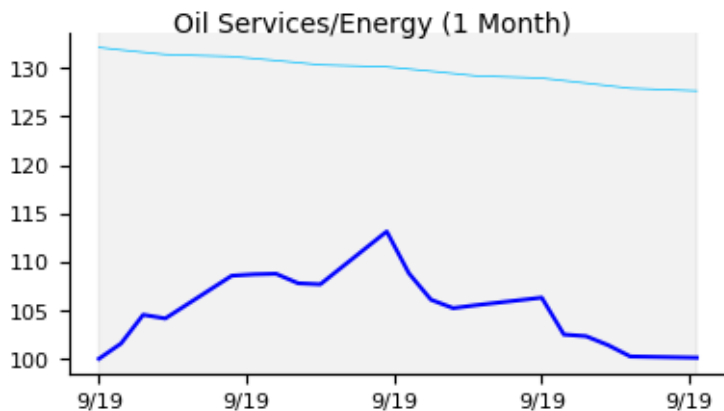
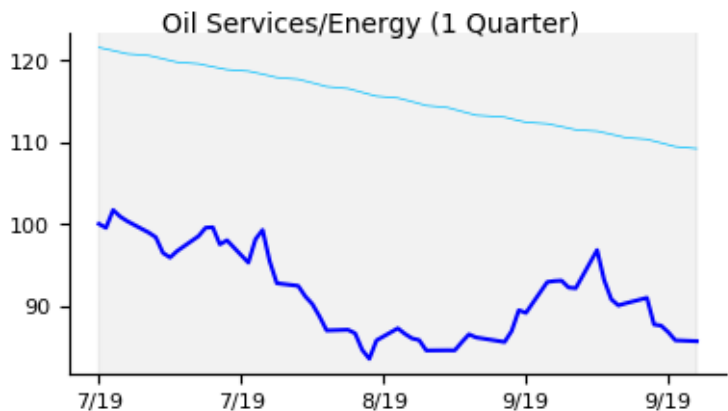
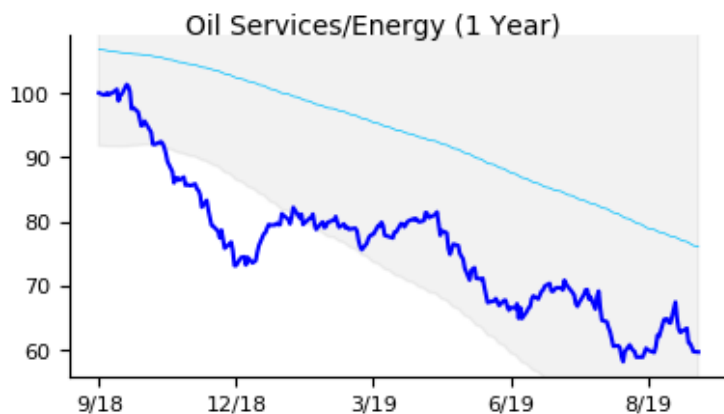
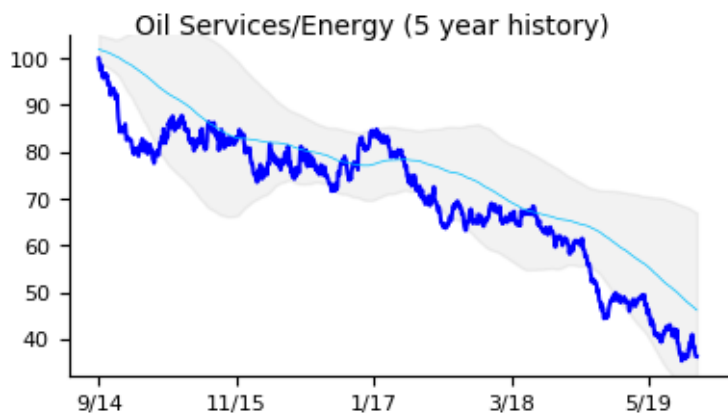
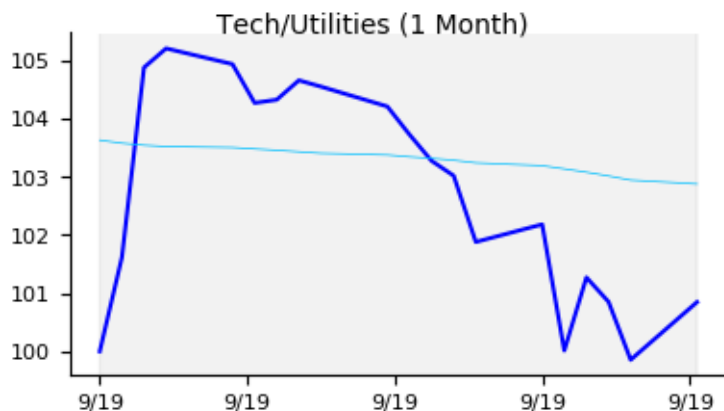
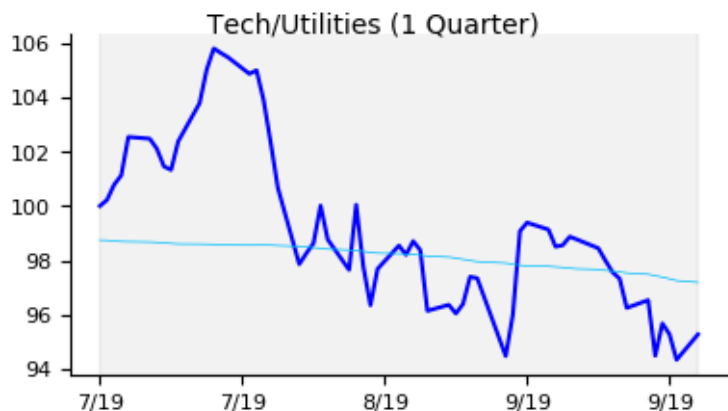
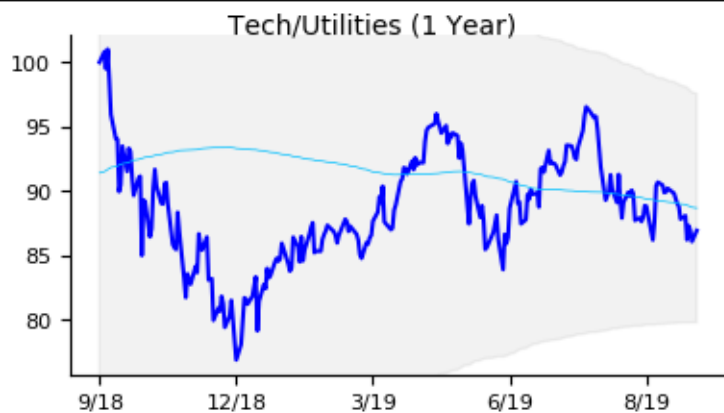
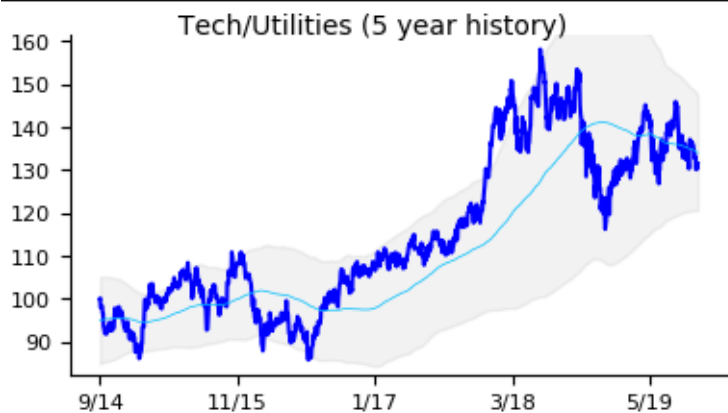
Major Sector Relative Performance (cont.)



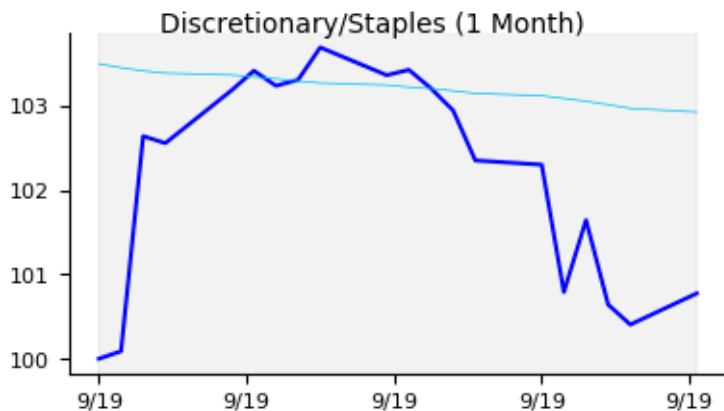
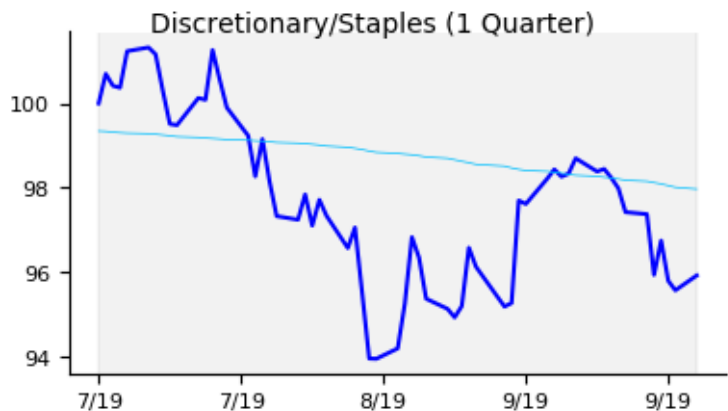
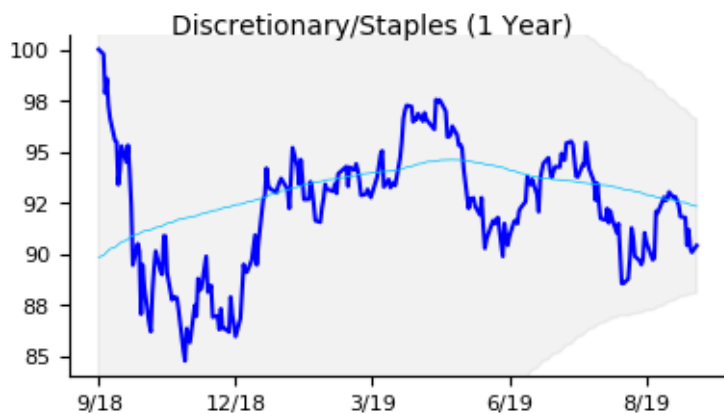
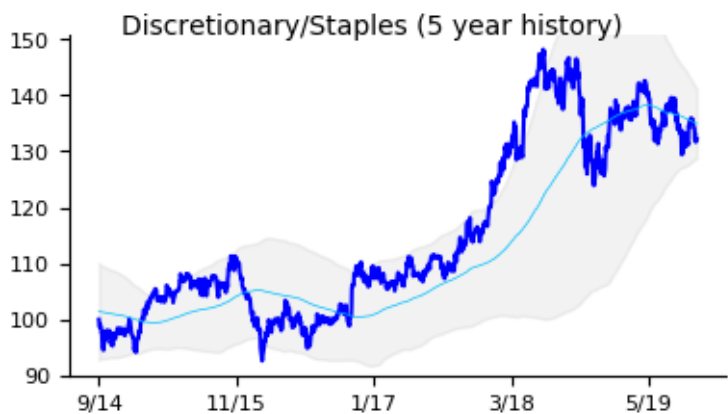
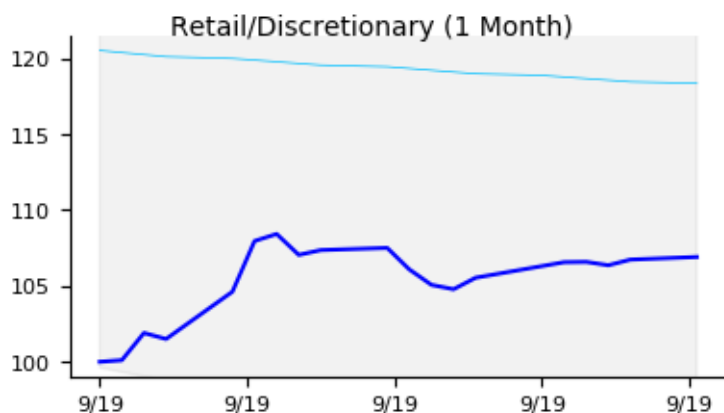
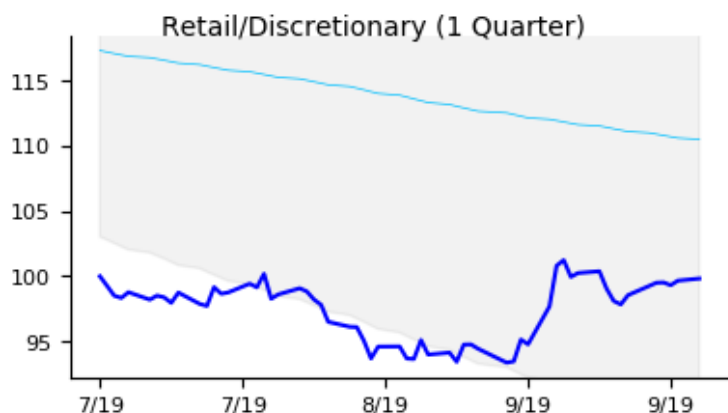
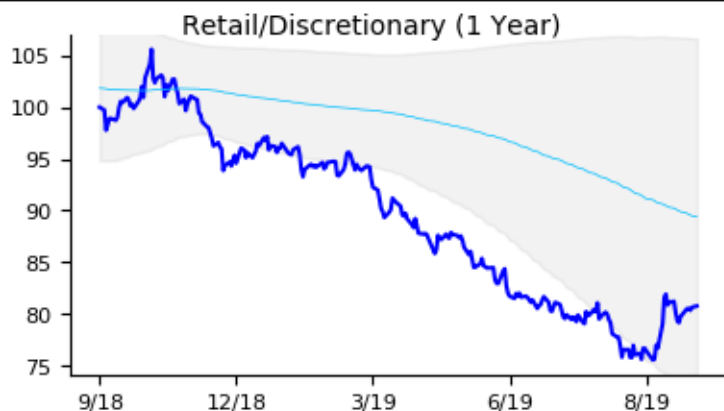
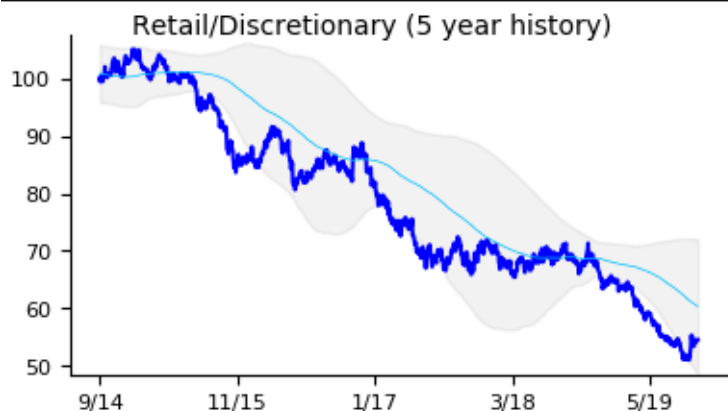
Major Sector Relative Performance (cont.)



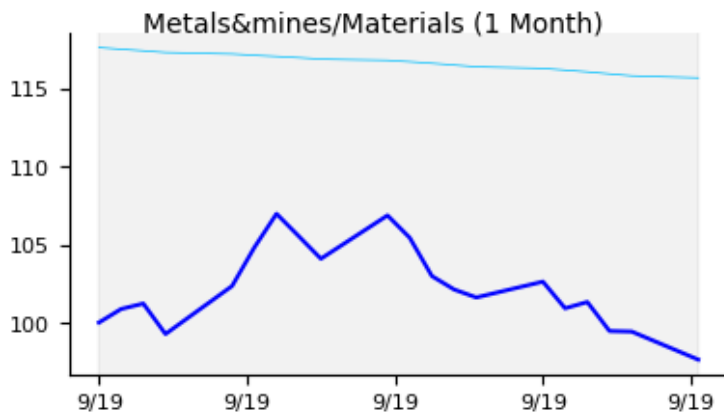
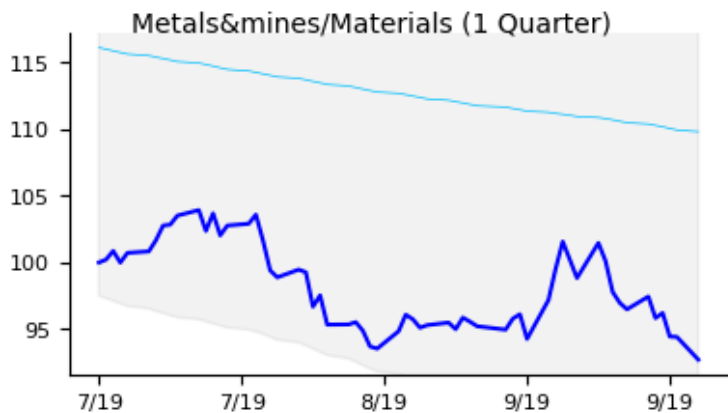
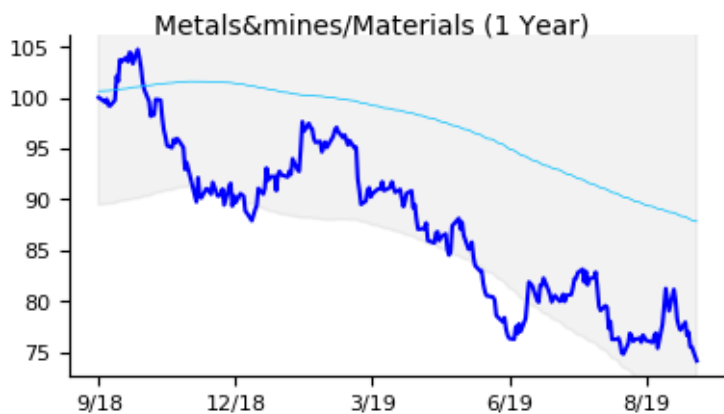
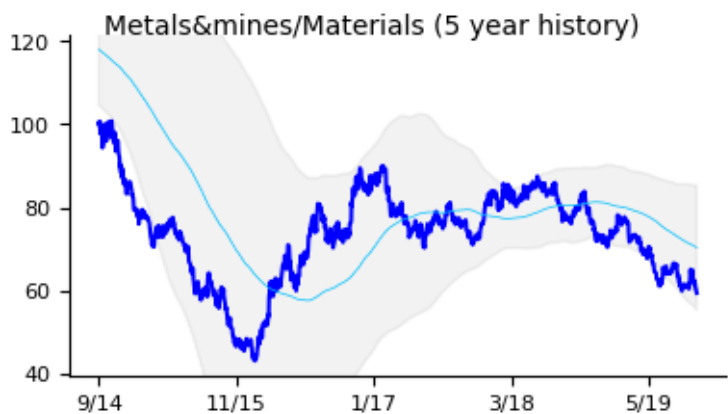
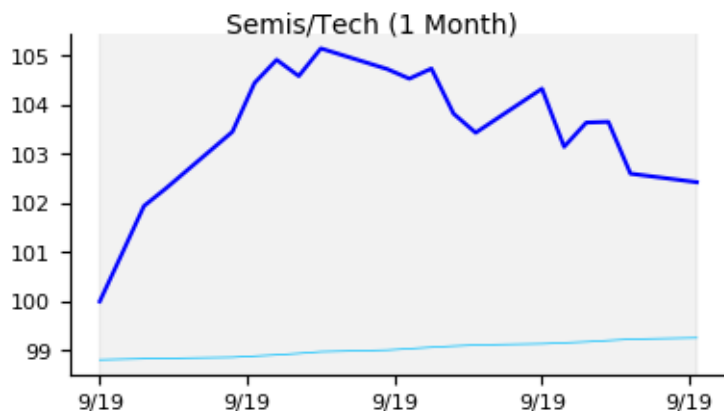
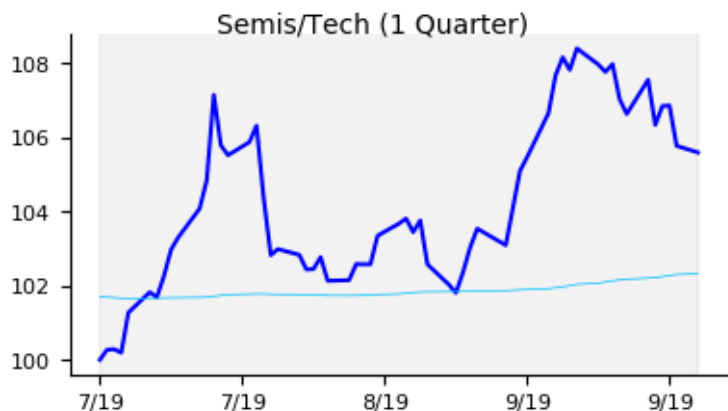
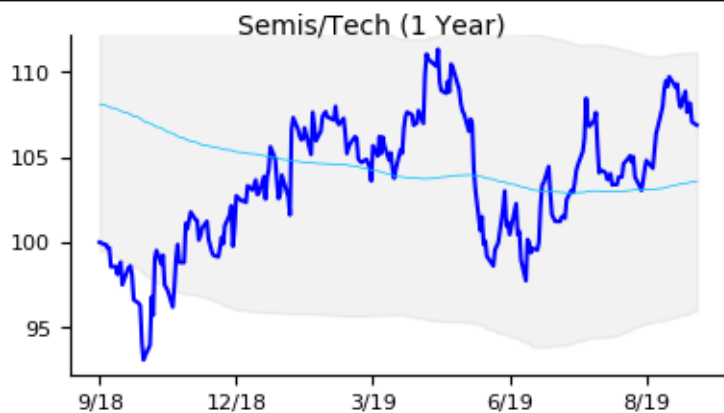
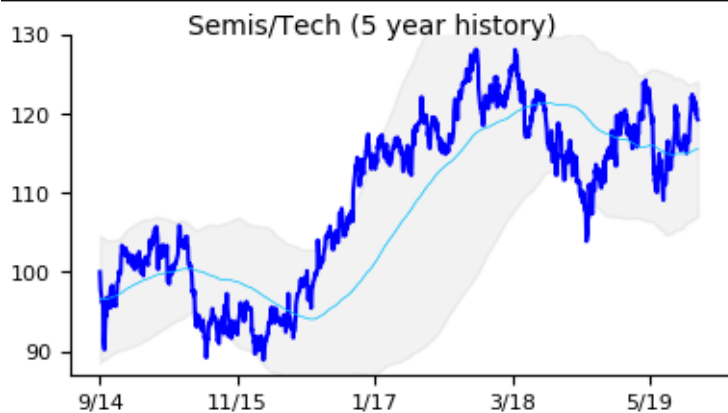
Sub-Sector Relative Performance



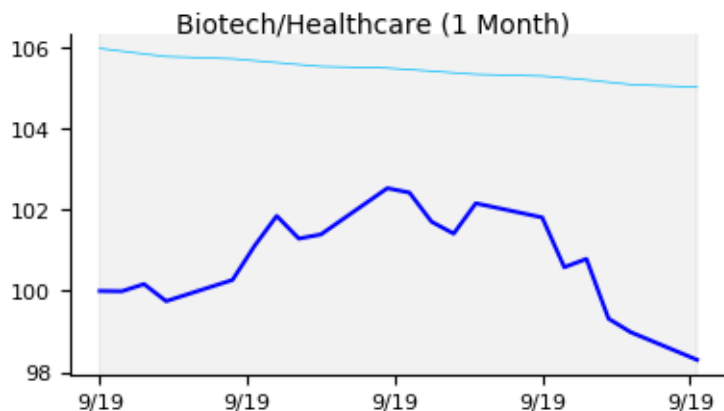
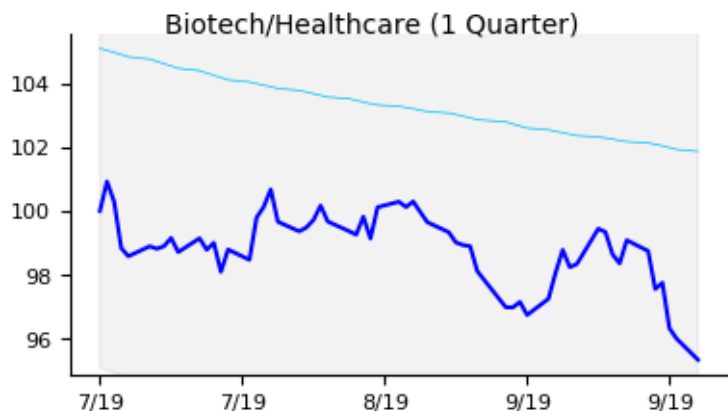
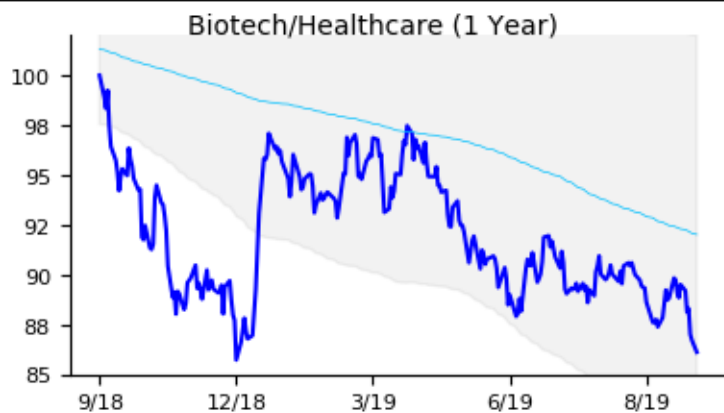
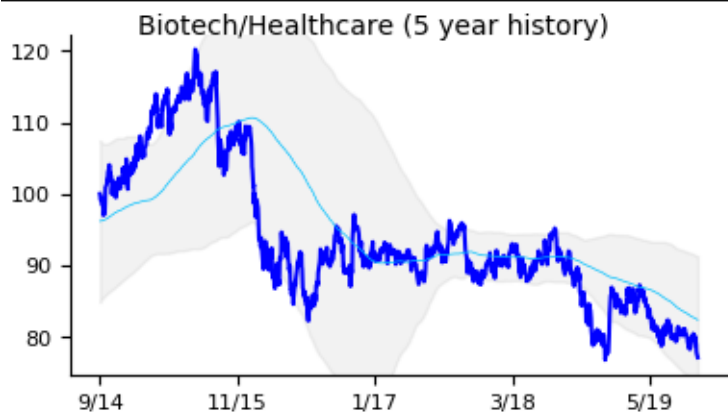
Sub-Sector Relative Performance (cont.)



Sub-Sector Relative Performance (cont.)



Sub-Sector Relative Performance (cont.)



Asset Class Correlations

Long-term (1 year) Correlations

US Stocks

SP500	10	10	8	9	9	8	9	9	7	9	3	7	6	8	8
NASDAQ	10	10	7	8	10	7	9	7	6	8	2	7	5	7	8
Energy	8	7	10	8	7	7	7	7	4	6	1	7	3	6	6
Indust	9	8	8	10	8	9	9	8	6	7	2	7	5	8	8
Tech	9	10	7	8	10	7	9	7	5	8	2	6	5	7	9
Mats	8	7	7	9	7	10	8	8	6	7	2	7	4	7	7
ConDisc	9	9	7	9	9	8	10	8	6	8	2	7	5	8	8
Fins	9	7	7	8	7	8	8	10	6	7	2	6	4	7	7
ConStpl	7	6	4	6	5	6	6	6	10	6	6	3	7	5	4
Hcare	9	8	6	7	8	7	8	7	6	10	4	5	6	6	6
Utils	3	2	1	2	2	2	2	2	6	4	10	-0	6	1	0
MtIs&Mines	7	7	7	7	6	7	7	6	3	5	-0	10	2	6	7
REITs	6	5	3	5	5	4	5	4	7	6	6	2	10	5	3
Homebldrs	8	7	6	8	7	7	8	7	5	6	1	6	5	10	7
Semis	8	8	6	8	9	7	8	7	4	6	0	7	3	7	10
	SP500	NASDAQ	Energy	Indust	Tech	Mats	ConDisc	Fins	ConStpl	Hcare	Utils	MtIs&Mines	REITs	Homebldrs	Semis

Global Stocks

SP500	10	8	8	6	9	8	8	7	4	8	8
Europe	8	10	9	6	9	8	8	7	5	8	8
UK	8	9	10	6	8	8	7	7	5	8	8
Russia	6	6	6	10	7	6	6	6	4	6	6
AsiaPacific	9	9	8	7	10	9	10	8	5	8	8
AsiaPacex.Jap	8	8	8	6	9	10	8	8	5	9	8
Japan	8	8	7	6	10	8	10	7	4	7	8
China	7	7	7	6	8	8	7	10	5	7	7
India	4	5	5	4	5	5	4	5	10	4	4
Australia	8	8	8	6	8	9	7	7	4	10	8
Canada	8	8	8	6	8	8	8	7	4	8	10
	SP500	Europe	UK	Russia	AsiaPacific	AsiaPacex.Jap	Japan	China	India	Australia	Canada

Commodities

USDIndex	10	-2	-5	-4	-2	0	0	-0	-0	-1	-1	-1	0	-1	1
T-bonds	-2	10	5	3	-2	-2	-2	-2	-1	-1	-1	-1	-2	-0	-1
Gold	-5	5	10	8	1	-0	-1	-1	-1	1	1	0	-1	2	0
Silver	-4	3	8	10	2	1	0	0	-1	1	-0	-1	1	2	0
Copper	-2	-2	1	2	10	2	2	2	1	2	1	0	1	2	2
Crude	0	-2	-0	1	2	10	9	9	1	1	1	1	-1	1	2
HeatOil	0	-2	-1	0	2	9	10	9	1	1	1	1	-1	1	2
RBOB	-0	-2	-1	0	2	9	9	10	1	0	1	1	-0	1	2
NatGas	-0	-1	-1	-1	1	1	1	1	10	0	-1	0	0	1	0
Beans	-1	-1	1	1	2	1	1	0	0	10	4	6	1	3	2
Wheat	-1	-1	1	-0	1	1	1	1	-1	4	10	6	-0	1	1
Corn	-1	-1	0	-1	0	1	1	1	0	6	6	10	2	1	1
Cattle	0	-2	-1	1	1	-1	-1	-0	0	1	-0	2	10	-0	1
Coffee	-1	-0	2	2	2	1	1	1	1	3	1	1	-0	10	3
Sugar	1	-1	0	0	2	2	2	2	0	2	1	1	1	3	10
	USDIndex	T-bonds	Gold	Silver	Copper	Crude	HeatOil	RBOB	NatGas	Beans	Wheat	Corn	Cattle	Coffee	Sugar

Currencies

USDIndex	10	-9	-6	-7	-5	-5	-5	-5	-3	-5	-3
EUR	-9	10	5	7	4	5	5	4	3	4	3
GBP	-6	5	10	4	2	4	4	3	2	3	3
CHF	-7	7	4	10	6	3	4	2	1	2	1
JPY	-5	4	2	6	10	0	2	0	-0	-0	-1
AUD	-5	5	4	3	0	10	8	6	4	7	5
NZD	-5	5	4	4	2	8	10	5	3	5	4
CAD	-5	4	3	2	0	6	5	10	3	5	4
MXN	-3	3	2	1	-0	4	3	3	10	5	4
ZAR	-5	4	3	2	-0	7	5	5	5	10	5
CNH	-3	3	3	1	-1	5	4	4	4	5	10
	USDIndex	EUR	GBP	CHF	JPY	AUD	NZD	CAD	MXN	ZAR	CNH



Long-term (1 year) Correlations

SP500	-10	10	8	9	9	8	9	9	7	9	3	7	6	8	8	8	8	6	9	8	8	7	4	8	8	-4	-2	0	4	3	3	3	1	2	-0	0	0	2	1	1	0	1	-2	-5	4	2	4	3	4	3
NASDAQ	-10	10	7	8	10	7	9	7	6	8	2	7	5	7	8	8	7	6	8	8	8	7	4	7	8	-4	-2	0	3	3	2	2	0	1	-0	0	0	1	0	1	0	1	-2	-5	4	2	3	3	4	3
Energy	8	7	10	8	7	7	7	7	4	6	1	7	3	6	6	7	6	6	7	7	7	6	2	6	8	-4	-1	0	4	6	6	6	1	2	0	1	0	1	2	-0	1	1	-2	-4	3	2	4	3	4	3
Indust	9	8	8	10	8	9	9	8	6	7	2	7	5	8	8	8	7	5	8	7	8	7	3	7	8	-5	-2	-0	4	3	3	3	1	2	-0	1	1	1	1	1	0	1	-2	-5	4	2	4	3	3	3
Tech	9	10	7	8	10	7	9	7	6	8	2	6	5	7	9	8	7	5	8	7	8	7	4	7	8	-4	-2	0	4	3	2	3	-0	-2	0	0	1	1	0	1	0	1	-2	-5	4	2	4	3	3	3
Mats	8	7	7	9	7	10	8	8	6	7	2	7	4	7	7	8	7	5	8	7	7	6	4	7	8	-4	-1	1	4	2	2	2	0	2	0	1	1	1	1	-0	1	1	-1	-4	4	2	4	3	4	3
ConDisc	9	9	7	9	9	8	10	8	6	8	2	7	5	8	8	8	7	6	8	7	8	7	4	7	8	-4	-2	0	4	2	2	2	0	2	-0	1	1	2	1	0	0	1	-2	-5	4	2	4	3	4	3
Fins	9	7	7	8	7	8	8	10	6	7	2	6	4	7	7	7	7	5	8	7	8	6	4	7	8	-6	-3	-1	3	3	3	3	1	1	-0	1	1	1	1	1	-0	1	-3	-5	3	1	3	2	3	3
ConStpl	7	6	4	6	5	6	6	6	10	6	6	3	7	5	4	5	5	4	5	5	5	4	2	5	5	-2	-1	1	2	2	1	2	1	1	-0	0	0	1	1	1	-0	-2	-3	3	2	3	1	2	2	
Hcare	9	8	6	7	8	7	8	7	6	10	4	5	6	6	6	7	6	4	7	6	7	5	4	6	7	-3	-1	0	3	2	2	2	0	1	-0	0	-1	2	1	0	0	1	-2	-4	3	2	3	2	3	
Utils	3	2	1	2	2	2	2	2	6	4	10	-0	6	1	0	1	1	1	2	1	2	0	1	1	1	1	0	0	0	0	0	0	0	-1	-1	-1	-0	0	1	-1	-0	-1	-1	1	1	-1	-0	0		
Mtls&Mines	7	7	7	7	6	7	7	6	3	5	-0	10	2	6	7	6	6	6	7	7	6	7	3	6	7	-4	0	2	5	3	3	2	1	3	1	1	1	2	1	-1	2	2	-0	-3	5	3	5	3	5	4
REITs	6	5	3	5	5	4	5	4	7	6	6	2	10	5	3	4	3	3	4	4	4	3	2	3	4	-0	0	0	1	2	1	2	1	-1	-1	-0	-0	1	1	1	-1	-0	-1	-2	2	1	2	0	1	1
Homebldrs	8	7	6	8	7	7	8	7	5	6	1	6	5	10	7	7	6	5	7	6	7	6	3	6	7	-3	-1	0	2	2	1	1	1	2	0	1	0	1	1	-0	1	1	-1	-4	4	2	3	3	3	3
Semis	8	8	6	8	9	7	8	7	4	6	0	7	3	7	10	7	6	5	7	7	7	4	6	7	-4	-1	1	3	2	2	2	-0	-2	0	0	1	1	0	1	0	1	-2	-5	3	2	3	3	4	4	
Europe	8	8	7	8	8	8	7	7	5	7	1	6	4	7	7	10	9	6	9	8	8	7	5	8	8	-4	-1	1	5	3	3	3	1	2	0	1	0	1	0	-2	3	-1	-4	5	3	5	3	5	4	
UK	8	7	6	7	7	7	7	7	5	6	1	6	3	6	6	9	10	6	8	8	7	7	5	8	8	-4	-0	1	5	3	3	3	0	1	0	0	0	2	1	-2	2	4	-1	-4	5	3	5	3	5	4
Russia	6	6	6	5	5	5	6	5	4	4	1	6	3	5	5	6	6	10	7	6	6	6	4	6	6	-2	1	2	4	4	4	4	1	3	0	1	0	2	1	-2	2	1	-1	-3	5	3	5	4	6	4
AsiaPacific	9	8	7	8	8	8	8	8	5	7	2	7	4	7	7	9	8	7	10	9	10	8	5	8	8	-4	-1	1	4	3	2	3	1	2	0	1	1	2	1	-1	1	2	-1	-4	5	3	5	4	5	5
AsiaPacex.Jap	8	8	7	7	7	7	7	7	5	6	1	7	4	6	7	8	8	6	9	10	8	8	5	9	8	-4	-1	1	5	3	3	3	0	2	1	1	1	2	1	-1	2	2	-1	-4	6	4	5	4	6	5
Japan	8	8	7	8	8	7	8	8	5	7	2	6	4	7	7	8	7	6	10	8	10	7	4	7	8	-4	-1	0	4	2	2	2	1	2	0	1	0	2	1	-1	1	2	-1	-4	4	3	5	4	5	4
China	7	7	6	7	7	6	7	6	4	5	0	7	3	6	7	7	6	8	8	7	10	5	7	7	-3	-1	1	5	2	2	2	0	2	0	1	1	2	0	1	-1	2	-1	-4	5	3	4	4	5	5	
India	4	4	2	3	4	4	4	4	2	4	1	3	2	3	4	5	5	4	5	5	4	5	10	4	4	-1	0	1	3	0	-0	0	0	1	0	1	0	1	-0	-1	2	2	0	-1	4	3	2	2	4	3
Australia	8	7	6	7	7	7	7	7	5	6	1	6	3	6	6	8	8	6	8	9	7	7	4	10	8	-4	-1	1	4	3	3	3	-0	2	1	1	1	2	1	-1	2	2	-0	-3	6	4	5	3	5	4
Canada	8	8	8	8	8	8	8	8	5	7	1	7	4	7	7	8	8	6	8	8	8	7	4	8	10	-4	0	1	5	5	4	4	1	2	0	1	1	2	2	-1	2	-1	-4	5	3	6	3	5	4	
T-bonds	-4	-4	-4	-5	-4	-4	-6	-2	-3	1	-4	-0	-3	-4	-4	-2	-4	-4	-3	-1	-4	-4	-1	-4	10	5	3	-2	-2	-2	-1	-1	-1	-1	-2	-0	-1	-2	-0	-1	-3	6	-0	1	-0	-1	-1	-1		
Gold	-2	-2	-1	-2	-2	-1	-2	-3	-1	-1	0	0	-1	-1	-1	-1	0	-1	-1	-1	-1	-0	-4	-10	5	10	8	1	0	-1	-1	-1	-1	1	1	0	1	2	0	-5	4	3	6	5	3	4	3	1	2	2
Silver	0	0	0	-0	0	1	0	-1	1	-0	0	2	0	0	1	1	1	2	1	1	0	1	1	1	1	3	8	10	2	1	0	0	-1	1	-0	-1	1	2	0	-4	3	2	4	3	3	3	4	2	3	2
Copper	4	3	4	4	4	4	4	3	2	3	0	5	1	2	3	5	5	4	4	5	4	5	3	4	5	-2	1	2	10	2	2	2	1	2	1	0	1	2	2	-2	2	2	0	-2	4	3	4	2	3	4
Crude	3	3	6	3	3	2	2	3	2	2	0	3	2	2	2	3	3	4	3	3	2	2	0	3	5	-2	0	1	2	10	9	9	1	1	1	1	-1	1	2	0	-0	-0	-1	-2	1	-0	4	1	1	2
HeatOil	3	2	6	3	2	2	2	3	1	2	0	3	1	1	2	3	3	4	2	3	2	2	-0	3	4	-2	-1	0	2	9	10	9	1	1	1	1	-1	1	2	0	-1	-0	-2	-2	0	-0	3	1	1	2
RBOB	3	2	6	3	3	2	2	3	2	2	0	2	2	1	2	3	3	4	3	3	2	2	0	3	4	-2	-1	0	2	9	9	10	1	1	0	1	-0	1	2	0	-0	-0	-2	-2	0	-0	4	1	1	1
NatGas	-1	0	1	1	-0	0	0	1	1	0	0	1	1	1	-0	1	0	1	1	0	1	0	0	0	-0	-1	-1	-1	1	1	1	1	1	10	0	-1	0	0	1	0	-0	-0	1	-0	-1	1	0	-0	1	0
Beans	-2	1	2	2	2	2	2	1	1	1	-1	3	-1	2	2	2	1	3	2	2	2	2	1	2	2	-1	1	1	2	1	1	0	0	10	4	6	1	3	2	-1	1	1	1	-0	2	2	2	3	3	3
Wheat	-0	-0	0	-0	-0	0	-0	-0	-0	-1	1	-1	0	-0	0	0	0	0	1	0	0	0	1	0	-1	-1	0	1	1	1	1	-1	4	10	6	-0	1	1	-1	1	0	0	-0	1	1	1	0	0	0	
Corn	0	0	1	1	0	1	1	1	0	0	-1	-1	0	1	0	1	0	1	1	1	1	1	1	1	-1	0	-1	0	1	1	1	1	0	6	6	10	2	1	1	-1	0	0	0	0	1	-0	1	1	0	0
Cattle	0	0	0	1	1	1	1	1	1	0	-1	-1	0	0	1	0	0	1	1	0	1	0	1	0	1	-2	-1	1	1	-1	-1	0	0	1	-0	2	10	-0	1	0	-0	-1	-0	-1	0	-0	1	1	0	-0
Coffee	-2	1	1	1	1	1	2	1	1	2	0	2	1	1	1	1	2	2	2	2	2	1	2	2	-0	-2	2	2	1	1	1	1	3	1	1	1	10	3	-1	1	1	1	0	2	2	2	1	2	2	
Sugar	-1	0	2	1	0	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	0	-0	1	2	-1	0	0	2	2	2	2	0	2	1	1	1	3	10	1	-1	-1	-0	-1	0	-0	2	1	0	1
USDIndex	-1	1	-0	1	1	-0	0	1	1	0	1	-1	1	-0	1	-2	-2	-2	-1	-1	-1	-1	-1	-1	-1	-2	-5	-4	-2	0	0	-0	-0	-1	-1	-1	-0	-1	1	10	-9	-6	-7	-5	-5	-5	-3			

Seasonal Charts

ABOUT SEASONALITY

Seasonality is a controversial topic in financial markets. A time series that exhibits seasonality has a reliable and dependable seasonal variation. In some data series, this is obvious and clear—consider retail sales, which naturally peak around the end of the year due to the holiday season. Crops are harvested at certain times of the year, and energy is needed for specific uses (e.g., heating, summer driving) at predictable times of the year.

When we get to the question of seasonality in market prices, things become more complicated. Despite many market adages, such as “sell in May and go away” for stocks, prices do not exhibit overwhelmingly strong seasonal tendencies. If they did, it would be easy to trade around those tendencies, and such trading would naturally suppress the cycle.

Any seasonal tendency is only a slight influence on price direction, and is rarely the most important. These tendencies are easily lost in noise or trending action. Executing on the basis of seasonal tendencies is not trivial, but, for some traders and investors, seasonal influences are an important part of the toolkit.

ABOUT THESE CHARTS

We present a set of seasonal charts here that will be useful in a number of contexts. These charts represent several careful choices, and may be different than other seasonal charts you are used to seeing. (These charts correct many of the common errors in seasonal charts!)

The upper left hand panel presents seasonal indexes for each month for the full data set chosen for that instrument. The crosshatched bars present a subset of recent data, providing a check for stability. The units along the vertical axis are in standard deviations of the daily return for that instrument. All seasonals on this page are detrended.

The top right hand panel presents seasonal indexes for bull years, bear years, and flat years, superimposed on the same monthly bars from the first panel. The decision to rank a year bull or bear is algorithmic, relying on a proprietary instantaneous (point-in-time) trend indicator. (Note that a subset of data will almost always have higher variability than the larger dataset, so these trended indexes will naturally show larger effect sizes.)

The bottom left hand panel shows the forward-looking seasonality. Many approaches slice seasonals far too finely, but a look at weekly-level data can be useful. However, this approach raises many questions. How many weeks in a month? There are five weeks in far more months than you might expect. What to do with weeks that only have two days in them, or one day? What of three day weeks?

Any answer to these questions will distort the data, so we present the month cut into four temporal quartiles by trading day. These will roughly correspond to weeks, but this chart can give both a guideline for expected future seasonality and for how to place that seasonality within the month.

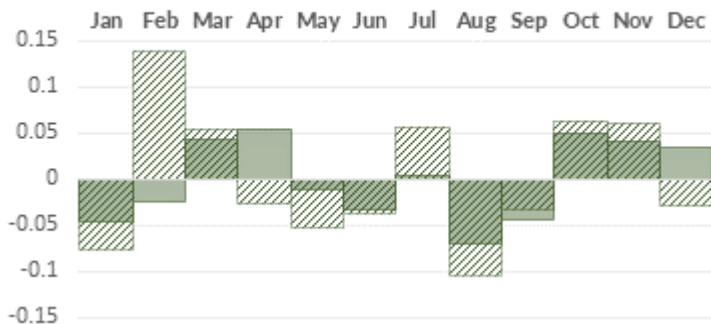
The last panel shows the seasonality of volatility for the instrument. This is an oft-neglected aspect of price behavior, and there is solid evidence that many instruments exhibit more predictable seasonal variation in volatility than in price direction.

CONCLUSION

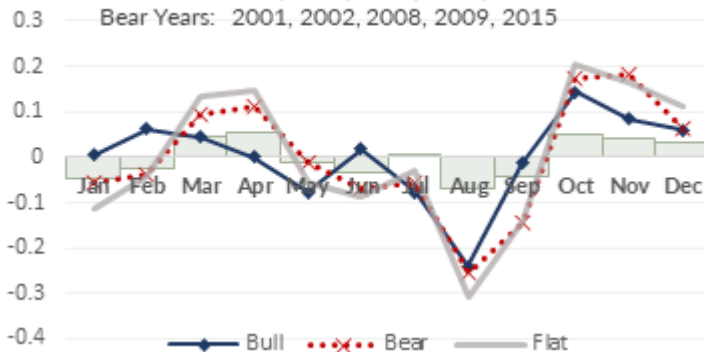
These tools can be useful for active traders, for investors who wish to consider potential seasonal inflections, or for anyone who wishes to “fact check” the facile market statistics that are so common today. The pages that follow will give deep insight and will help to put seasonal influences in context of market movement and variability.

S&P 500

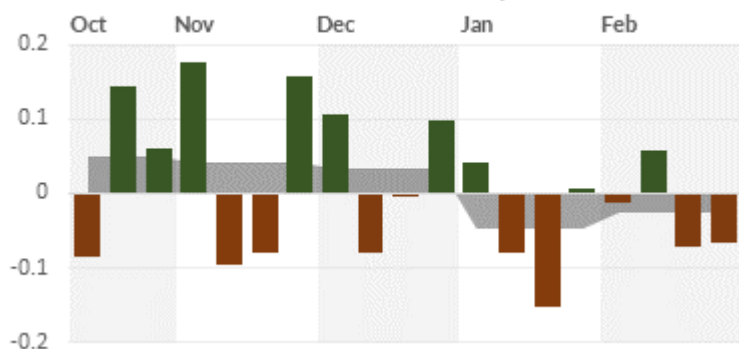
1997 - 2017 (Shaded: 2012 - 2017)



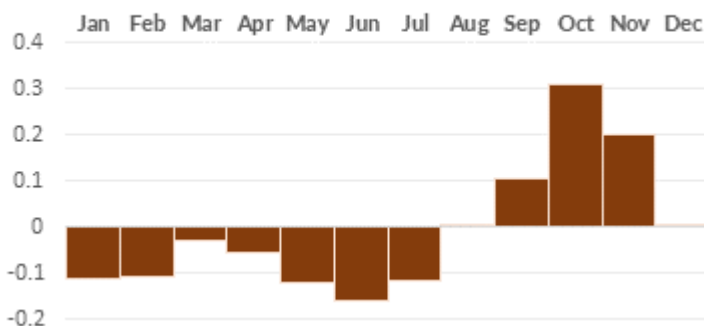
Bull Years: 1998, 1999, 2013, 2014, 2017
Bear Years: 2001, 2002, 2008, 2009, 2015



Forward Seasonality

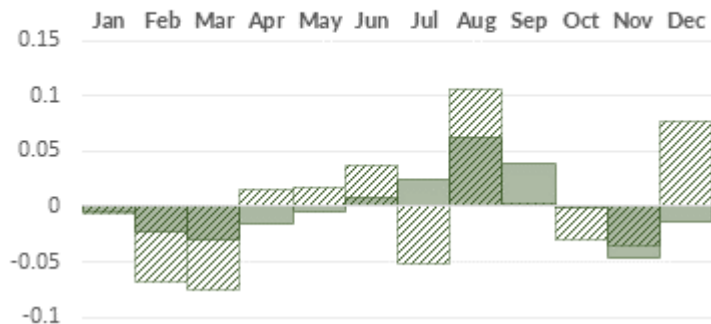


Seasonality of Realized Volatility

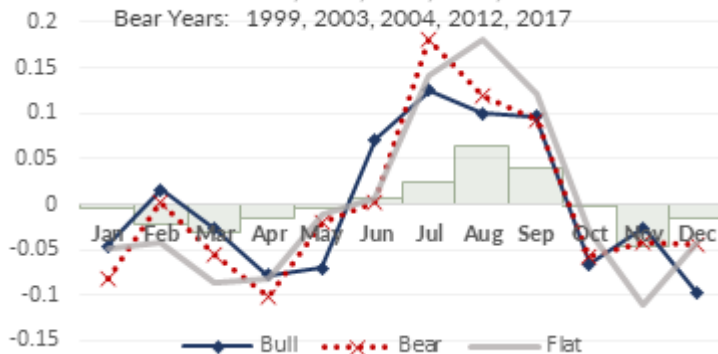


VIX Index

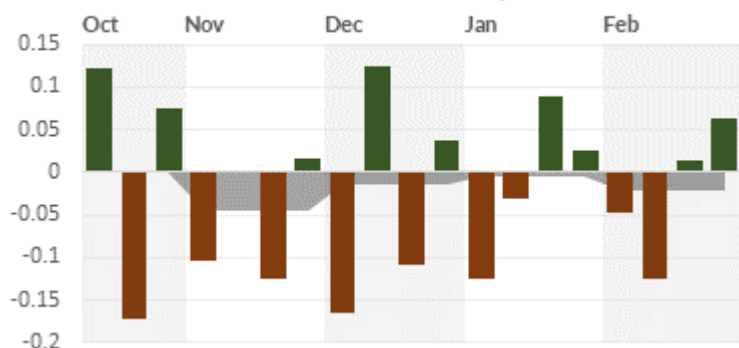
1997 - 2017 (Shaded: 2012 - 2017)



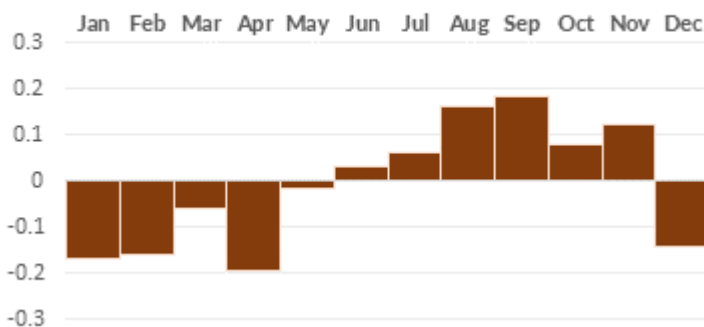
Bull Years: 1998, 2002, 2007, 2008, 2011
Bear Years: 1999, 2003, 2004, 2012, 2017



Forward Seasonality

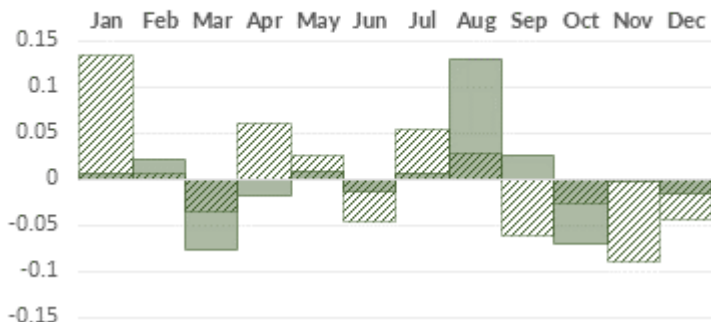


Seasonality of Realized Volatility



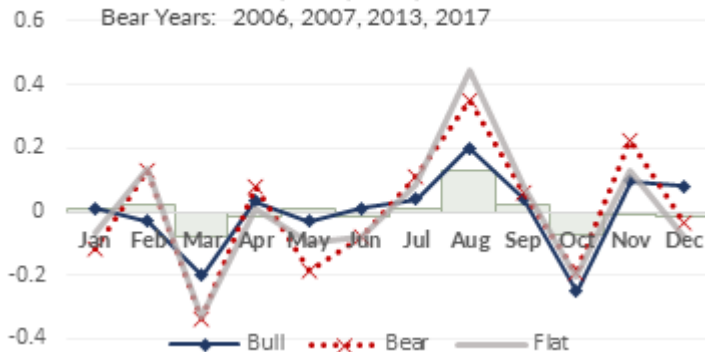
30 Year Treasury Bond Futures

2001 - 2017 (Shaded: 2012 - 2017)

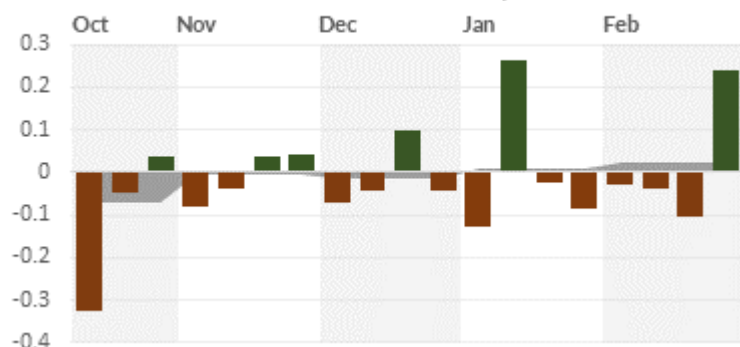


Bull Years: 2002, 2008, 2010, 2011

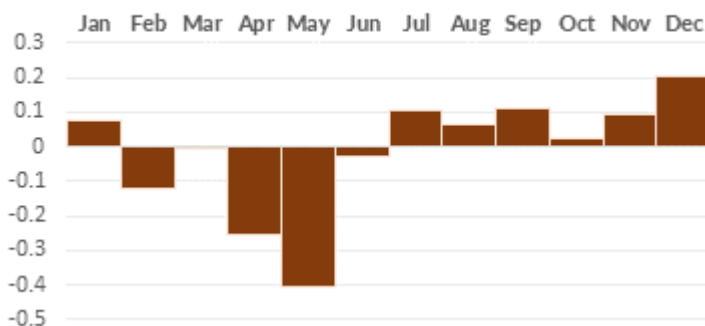
Bear Years: 2006, 2007, 2013, 2017



Forward Seasonality

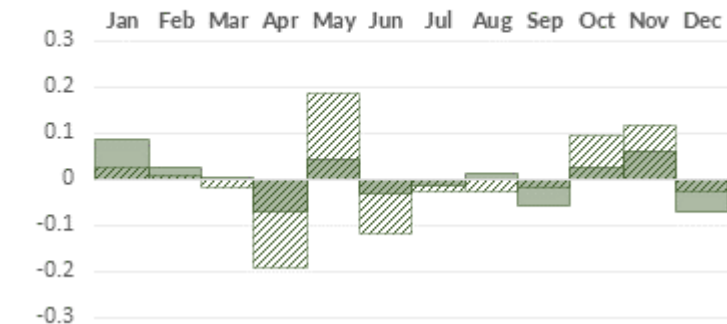


Seasonality of Realized Volatility



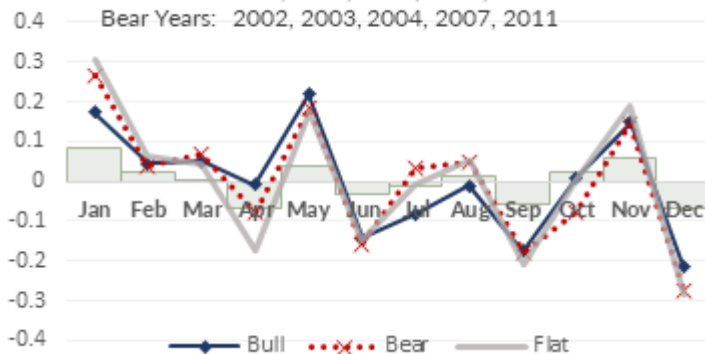
US Dollar Index

1997 - 2017 (Shaded: 2012 - 2017)

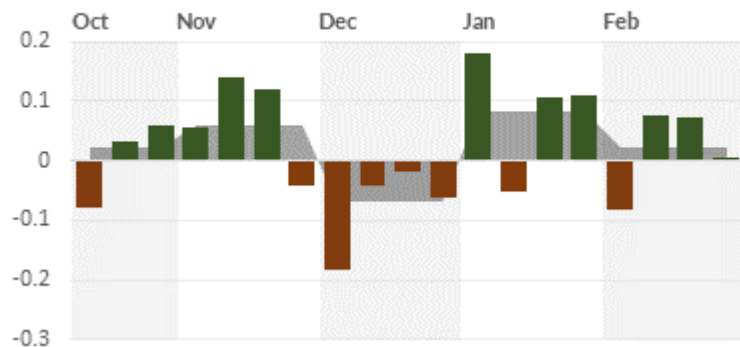


Bull Years: 1999, 2000, 2010, 2012, 2015

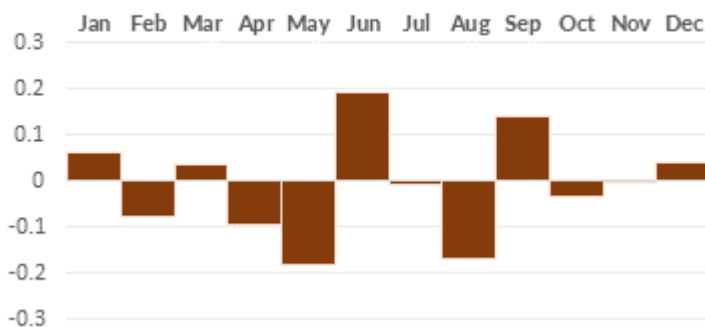
Bear Years: 2002, 2003, 2004, 2007, 2011



Forward Seasonality

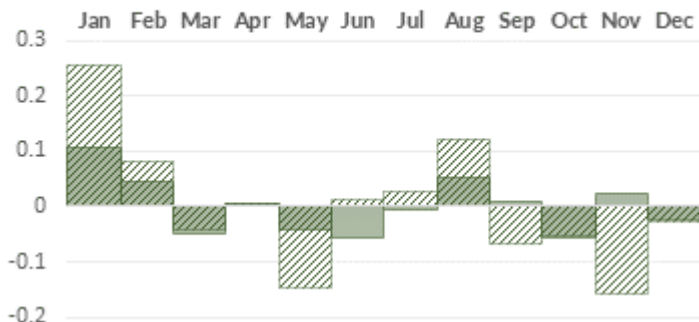


Seasonality of Realized Volatility

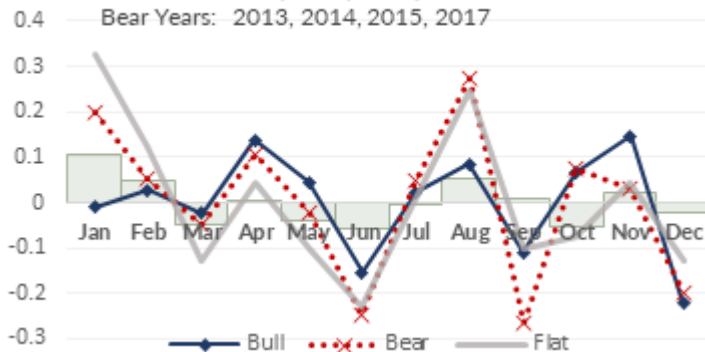


Gold

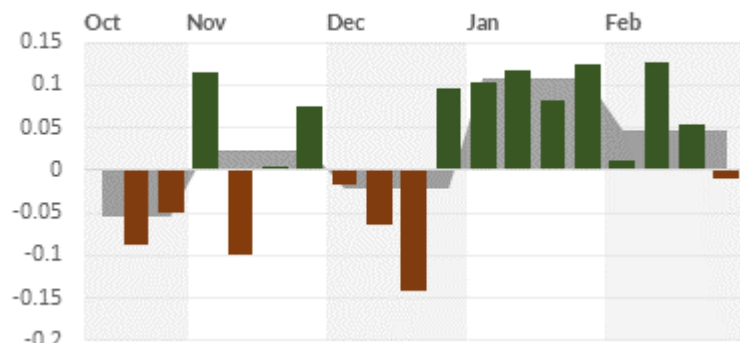
2001 - 2017 (Shaded: 2012 - 2017)



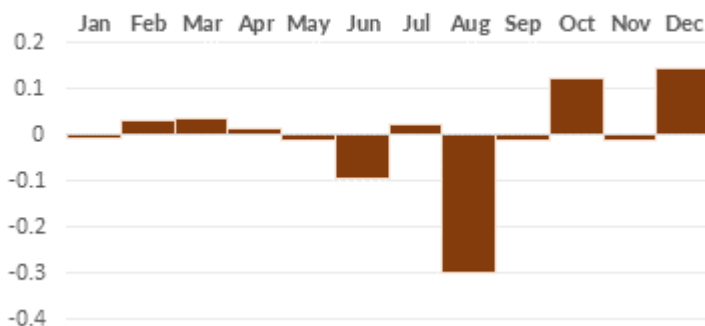
Bull Years: 2006, 2009, 2010, 2011
Bear Years: 2013, 2014, 2015, 2017



Forward Seasonality

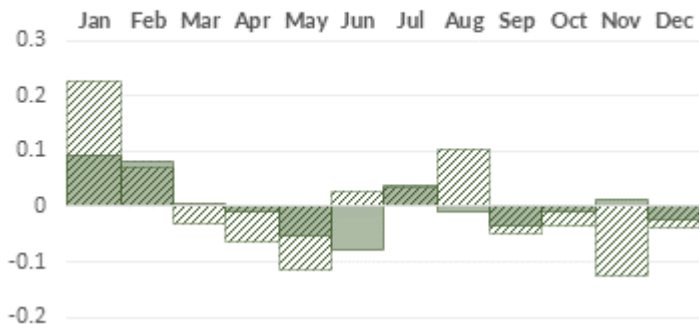


Seasonality of Realized Volatility

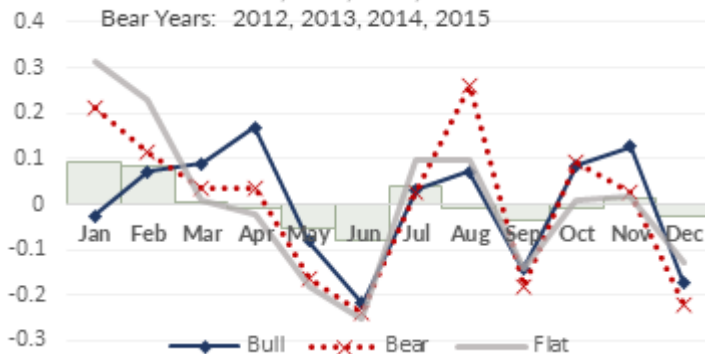


Silver

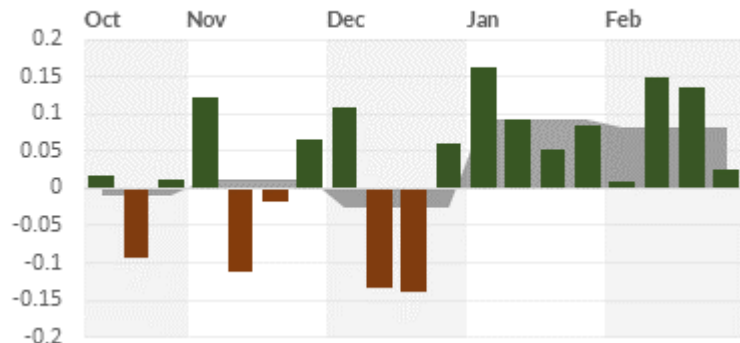
2001 - 2018 (Shaded: 2012 - 2017)



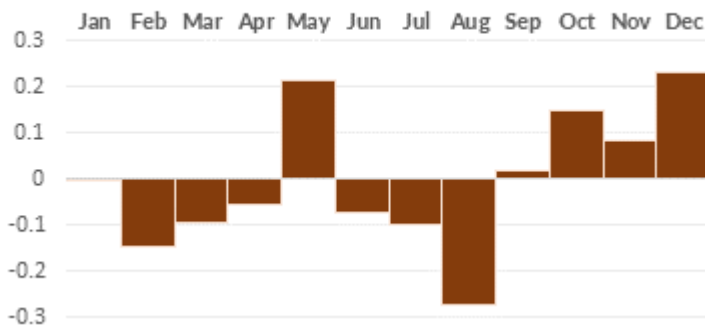
Bull Years: 2006, 2009, 2010, 2011
Bear Years: 2012, 2013, 2014, 2015



Forward Seasonality

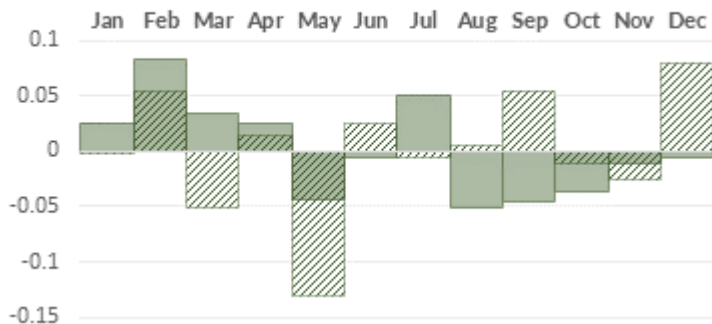


Seasonality of Realized Volatility



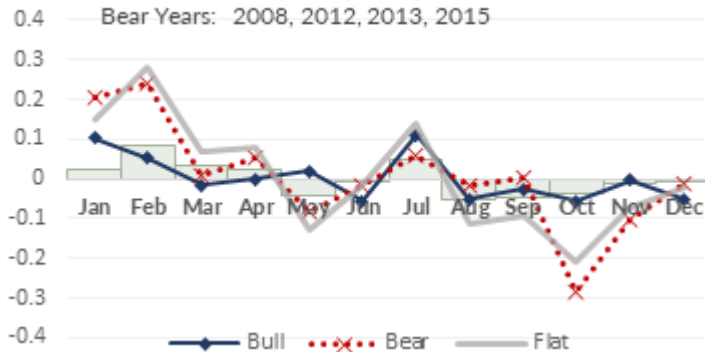
Copper

2001 - 2017 (Shaded: 2012 - 2017)

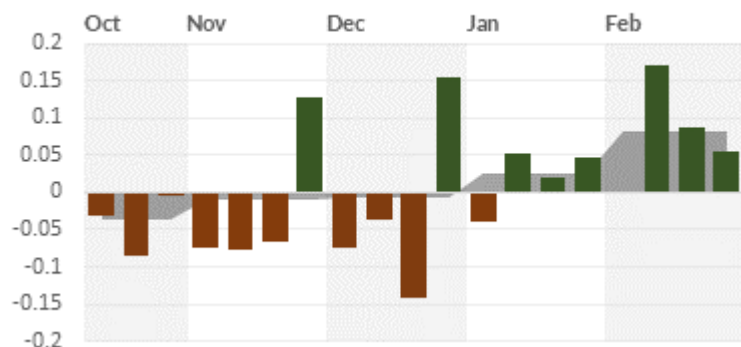


Bull Years: 2004, 2005, 2006, 2017

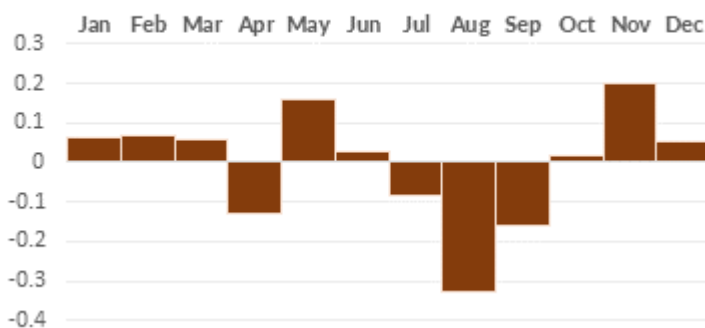
Bear Years: 2008, 2012, 2013, 2015



Forward Seasonality

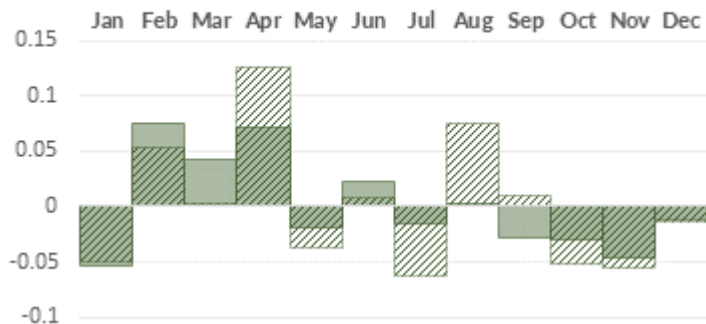


Seasonality of Realized Volatility



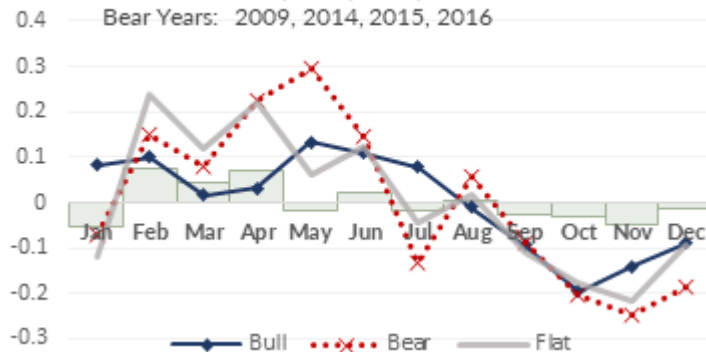
Crude Oil

2001 - 2017 (Shaded: 2012 - 2017)

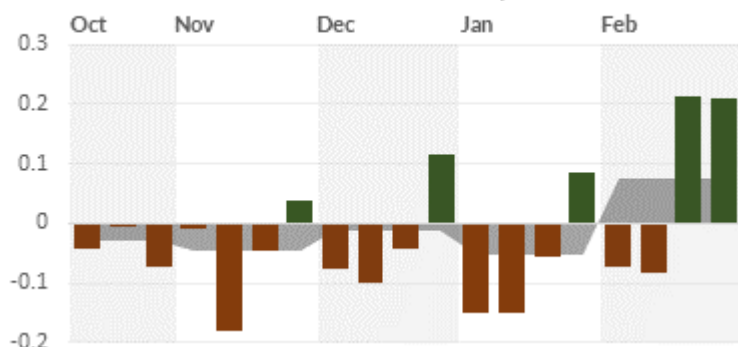


Bull Years: 2003, 2004, 2008, 2013

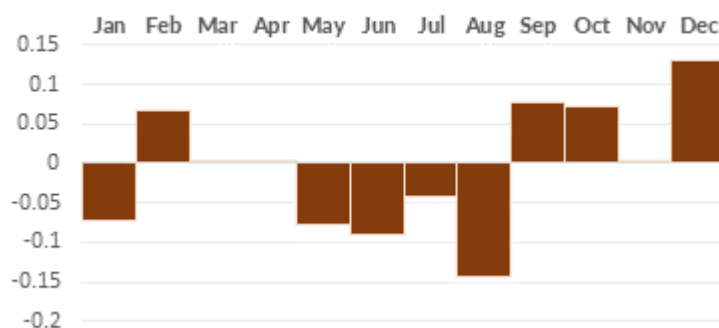
Bear Years: 2009, 2014, 2015, 2016



Forward Seasonality

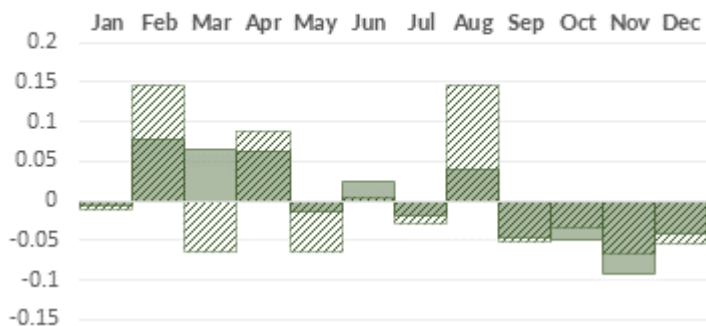


Seasonality of Realized Volatility



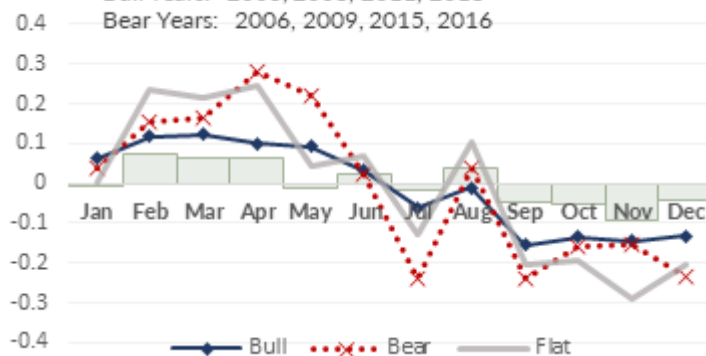
Heating Oil

2001 - 2018 (Shaded: 2012 - 2017)

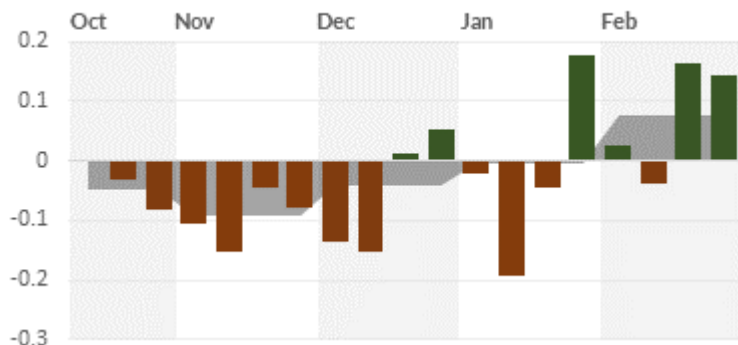


Bull Years: 2003, 2008, 2011, 2018

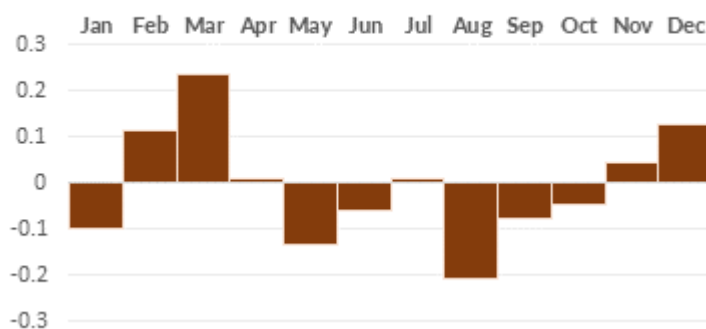
Bear Years: 2006, 2009, 2015, 2016



Forward Seasonality

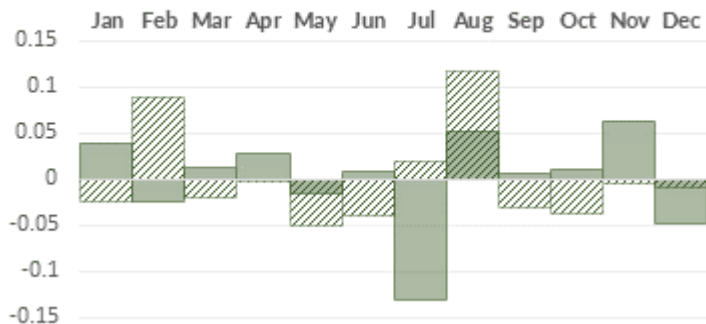


Seasonality of Realized Volatility

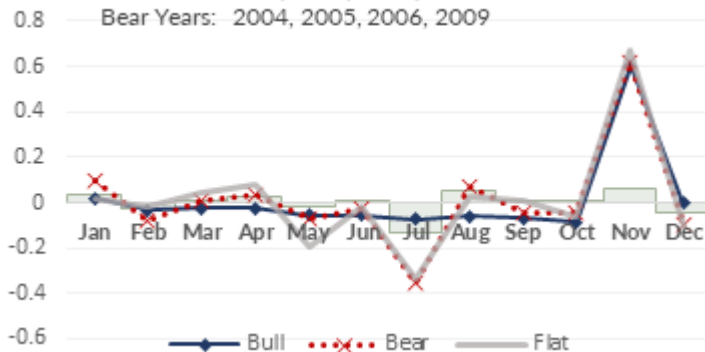


Gasoline

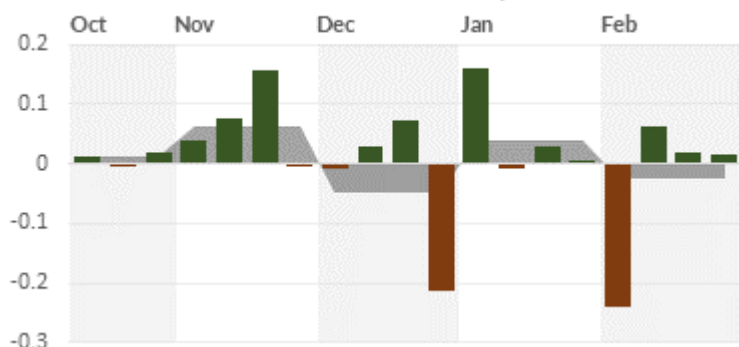
2001 - 2018 (Shaded: 2012 - 2017)



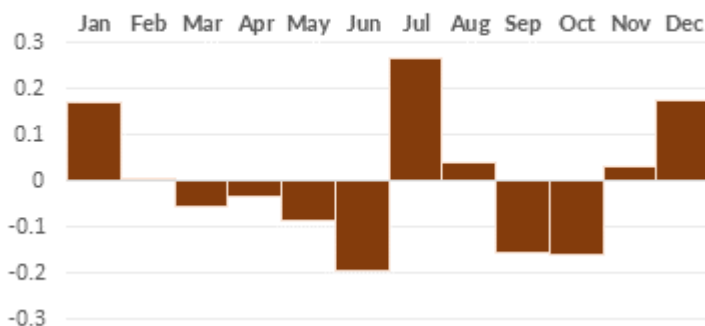
Bull Years: 2007, 2008, 2011, 2018
Bear Years: 2004, 2005, 2006, 2009



Forward Seasonality

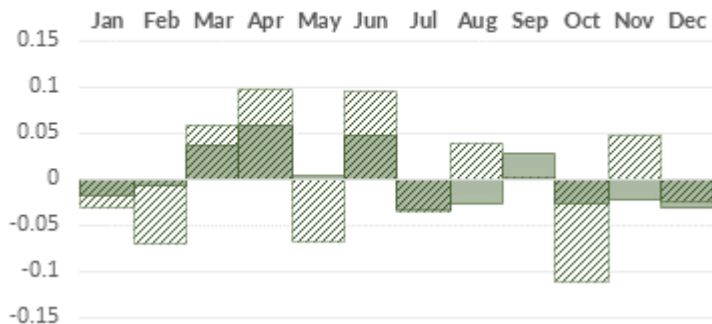


Seasonality of Realized Volatility

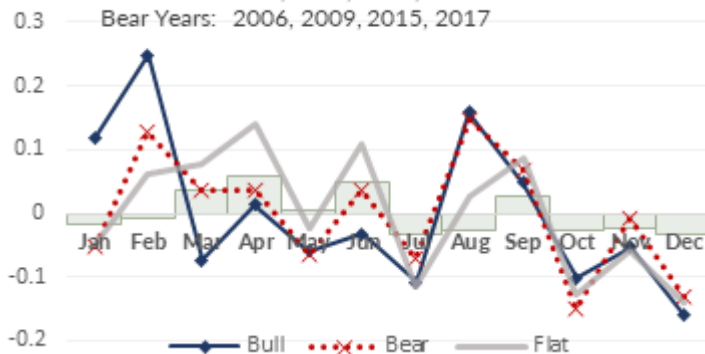


Natural Gas

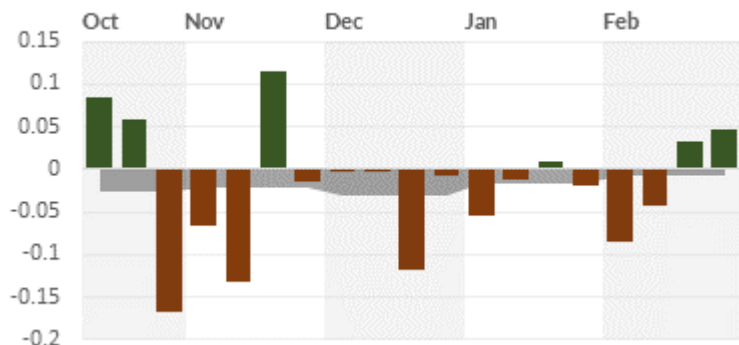
2001 - 2017 (Shaded: 2012 - 2017)



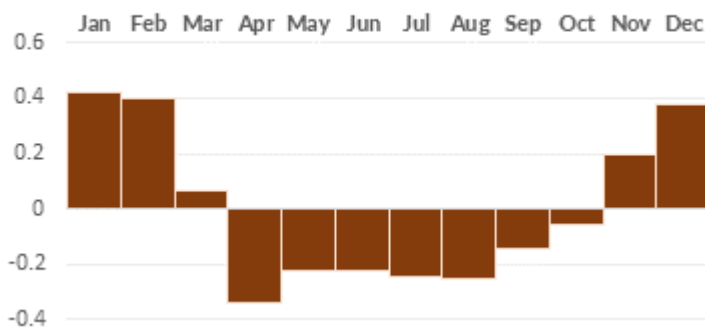
Bull Years: 2002, 2003, 2005, 2014
Bear Years: 2006, 2009, 2015, 2017



Forward Seasonality

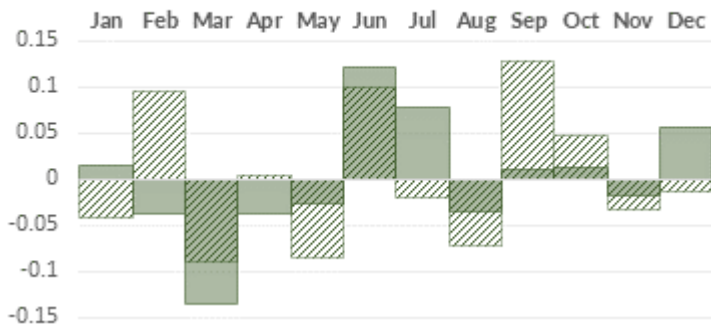


Seasonality of Realized Volatility



Sugar

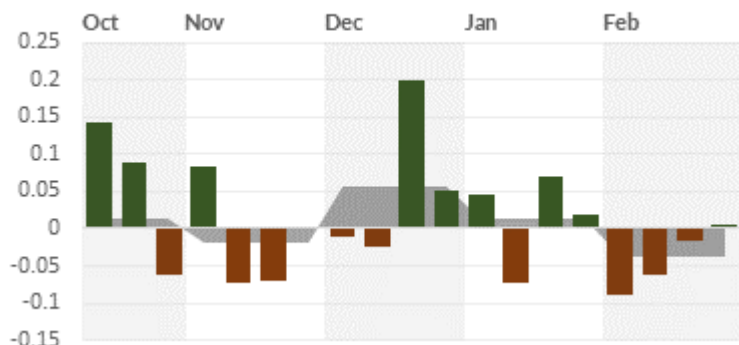
1997 - 2017 (Shaded: 2012 - 2017)



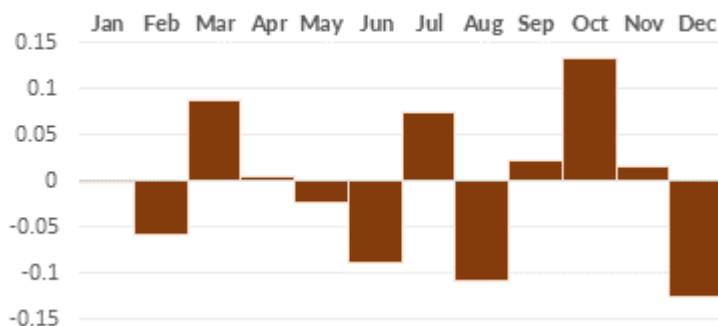
Bull Years: 2006, 2008, 2010, 2012
Bear Years: 2003, 2004, 2005, 2007



Forward Seasonality

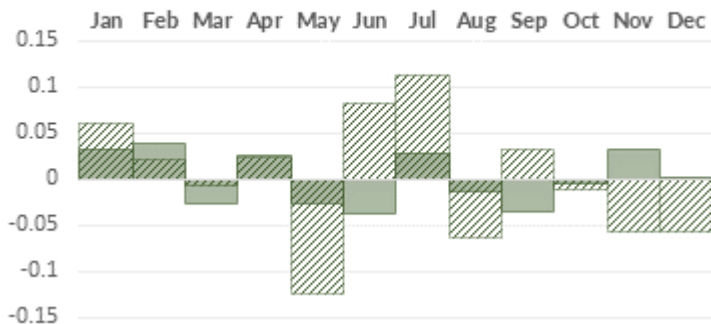


Seasonality of Realized Volatility



Coffee

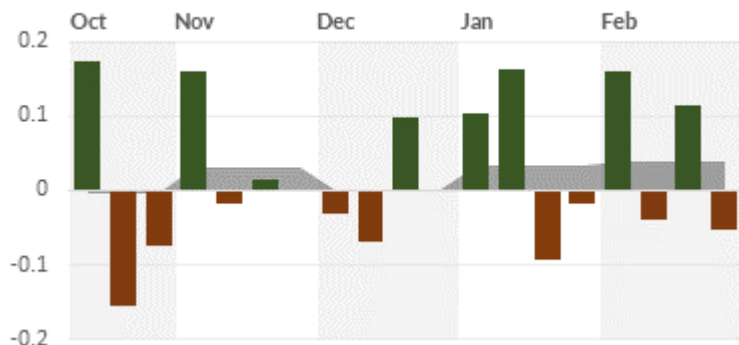
1997 - 2017 (Shaded: 2012 - 2017)



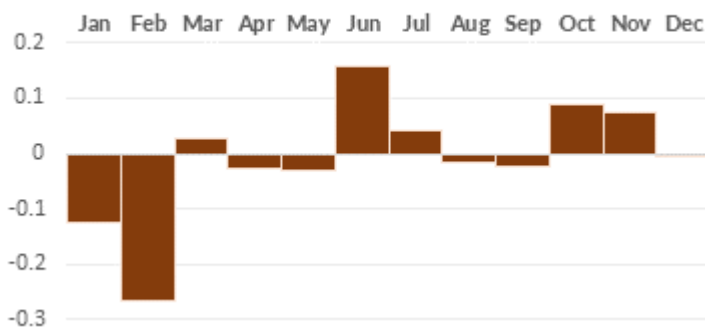
Bull Years: 2005, 2010, 2011, 2014, 2016
Bear Years: 2001, 2012, 2013, 2015, 2017



Forward Seasonality

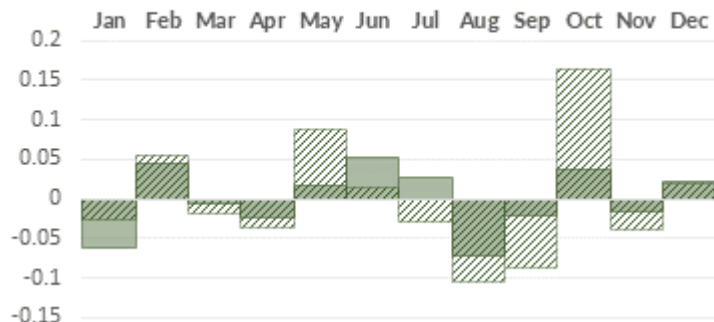


Seasonality of Realized Volatility

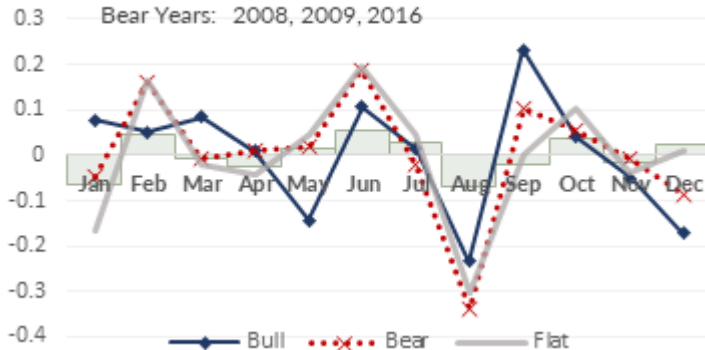


Live Cattle

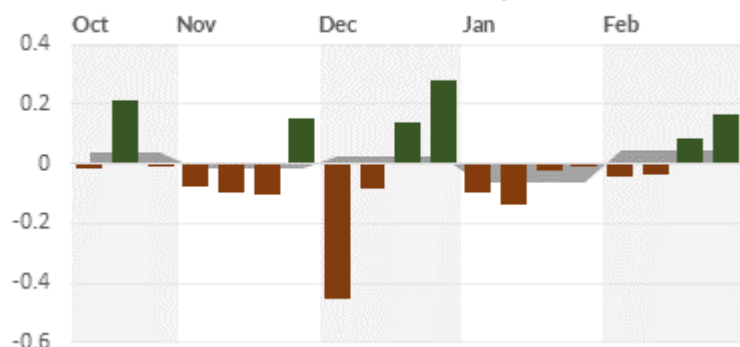
2005 - 2017 (Shaded: 2012 - 2017)



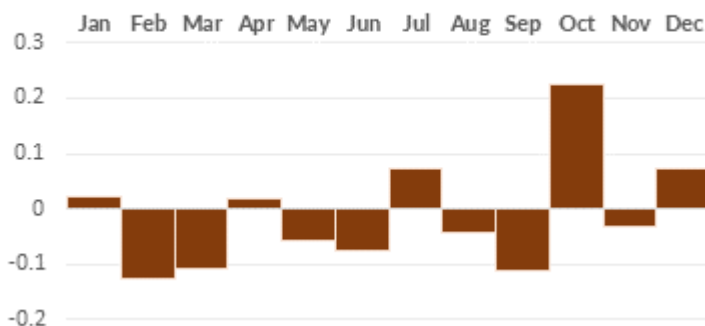
Bull Years: 2011, 2014, 2017
Bear Years: 2008, 2009, 2016



Forward Seasonality

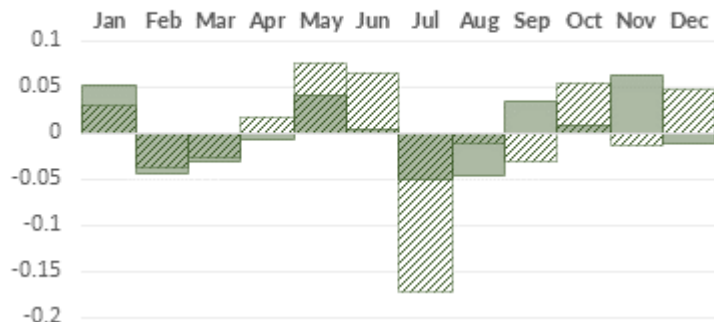


Seasonality of Realized Volatility

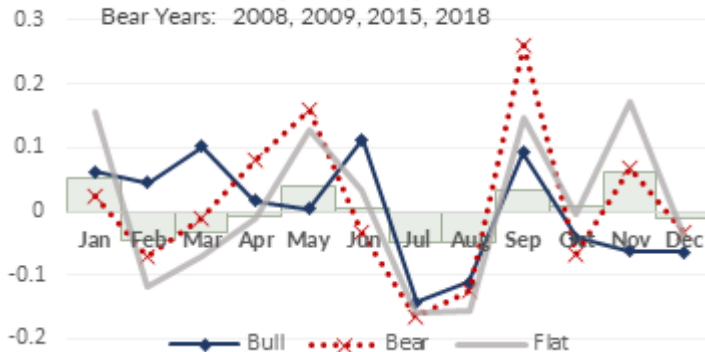


Live Hogs

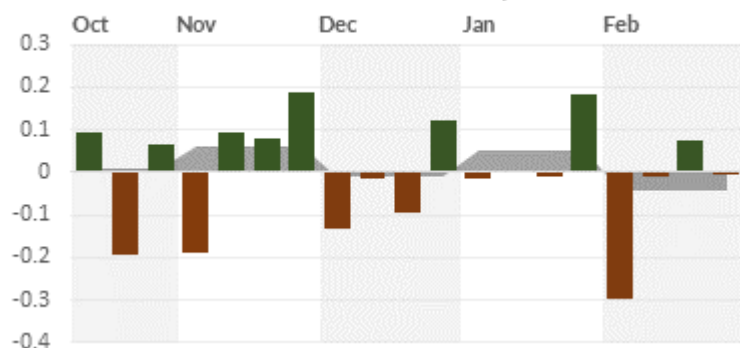
2004 - 2018 (Shaded: 2012 - 2017)



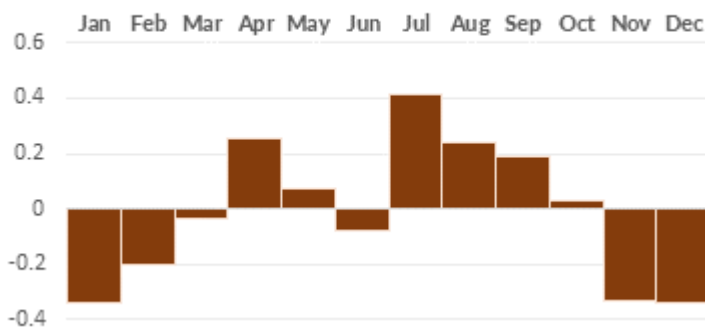
Bull Years: 2010, 2013, 2014, 2017
Bear Years: 2008, 2009, 2015, 2018



Forward Seasonality

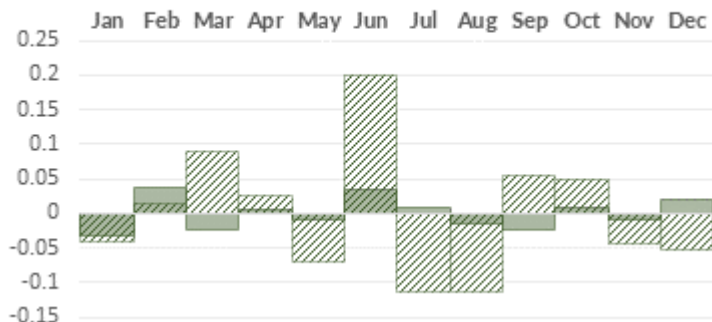


Seasonality of Realized Volatility

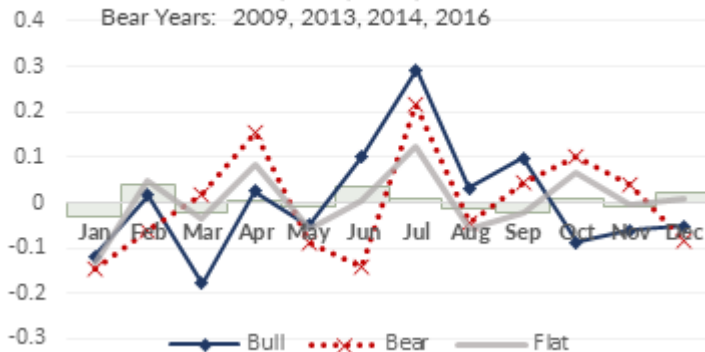


Wheat

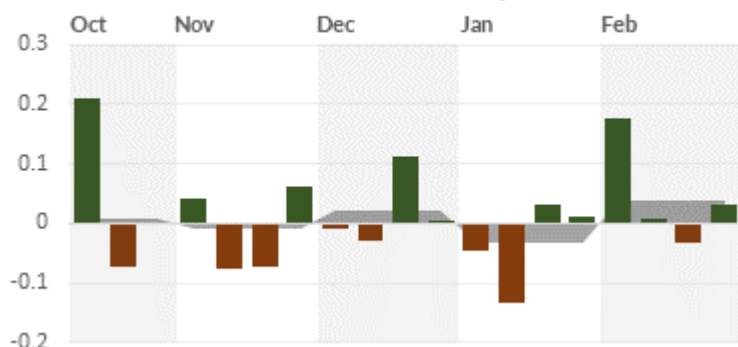
2003 - 2017 (Shaded: 2012 - 2017)



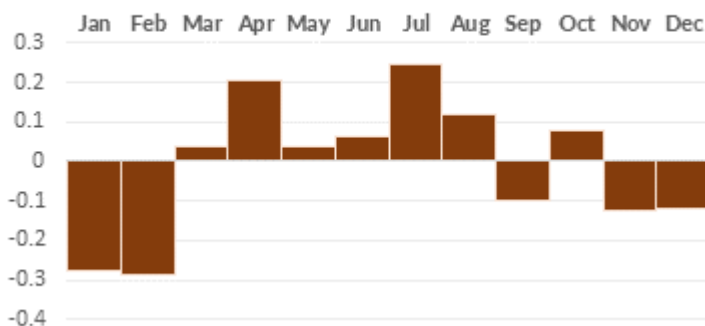
Bull Years: 2006, 2007, 2010, 2012
Bear Years: 2009, 2013, 2014, 2016



Forward Seasonality

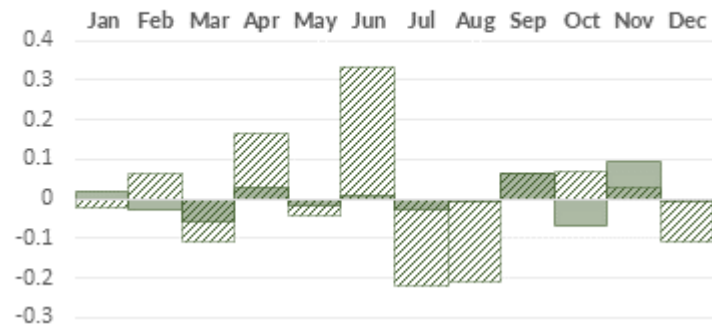


Seasonality of Realized Volatility



Soybeans

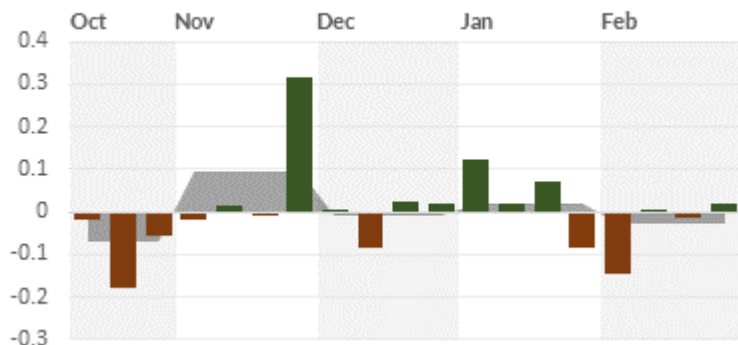
2002 - 2017 (Shaded: 2015 - 2017)



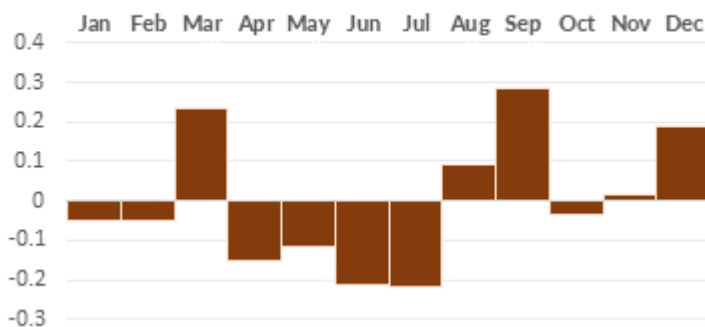
Bull Years: 2006, 2008, 2010, 2012
Bear Years: 2003, 2004, 2005, 2007



Forward Seasonality

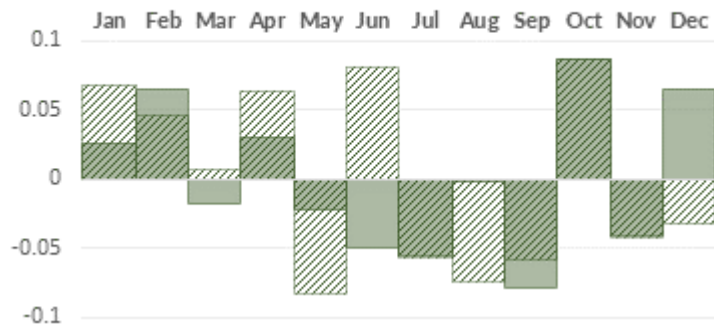


Seasonality of Realized Volatility

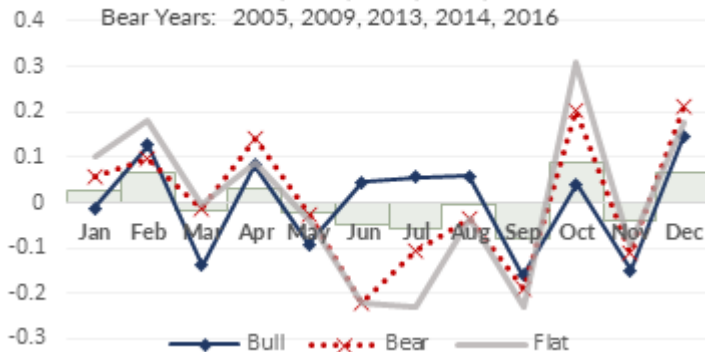


Corn

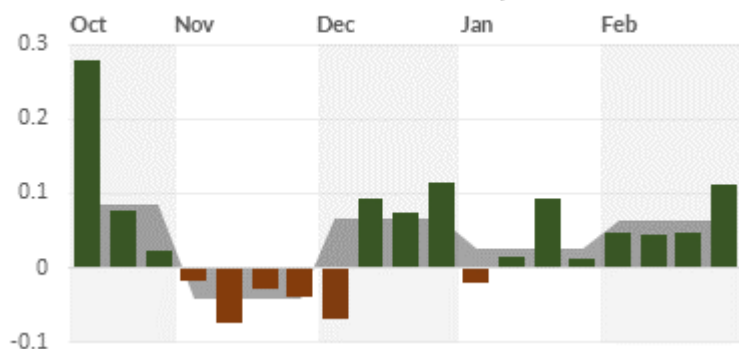
1997 - 2017 (Shaded: 2012 - 2017)



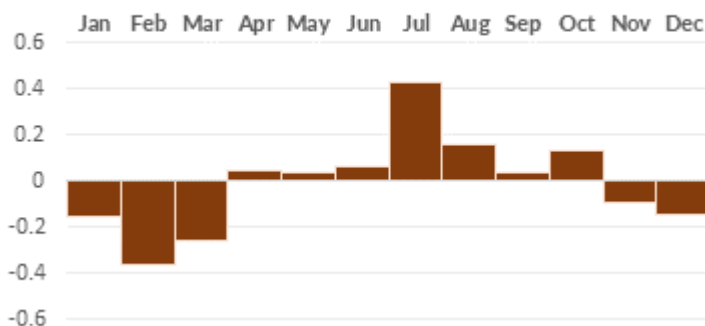
Bull Years: 2007, 2008, 2010, 2011, 2012
Bear Years: 2005, 2009, 2013, 2014, 2016



Forward Seasonality

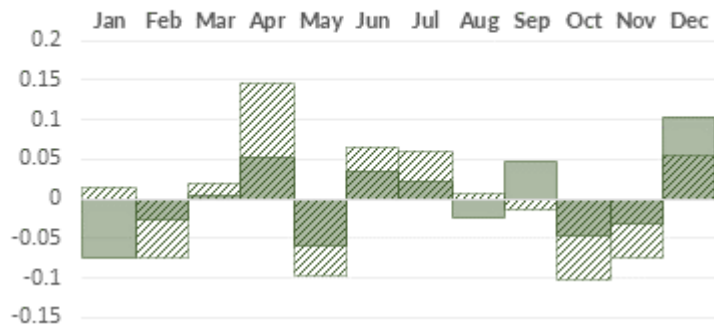


Seasonality of Realized Volatility

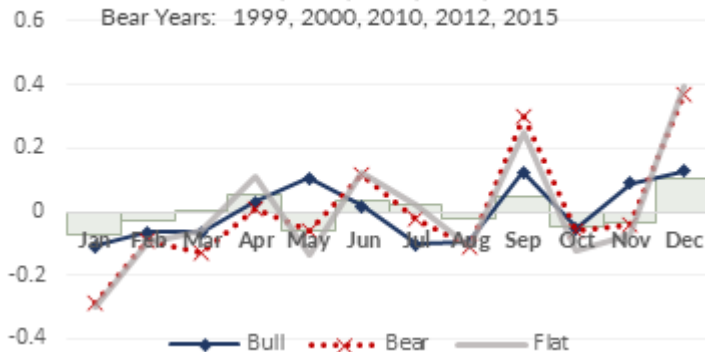


EUR/USD

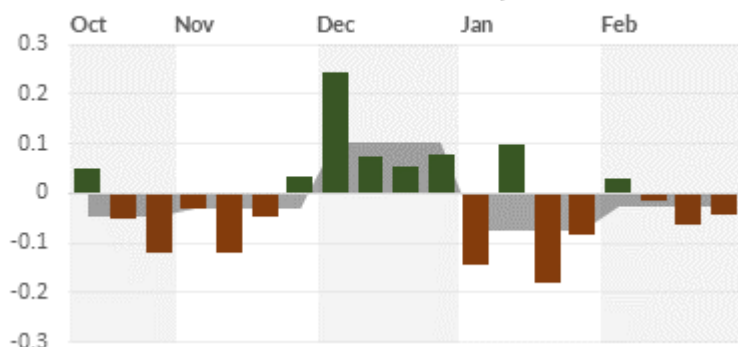
1998 - 2019 (Shaded: 2013 - 2018)



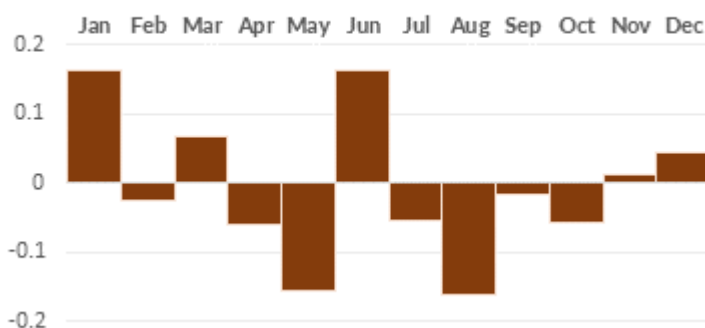
Bull Years: 2002, 2003, 2004, 2007, 2017
Bear Years: 1999, 2000, 2010, 2012, 2015



Forward Seasonality

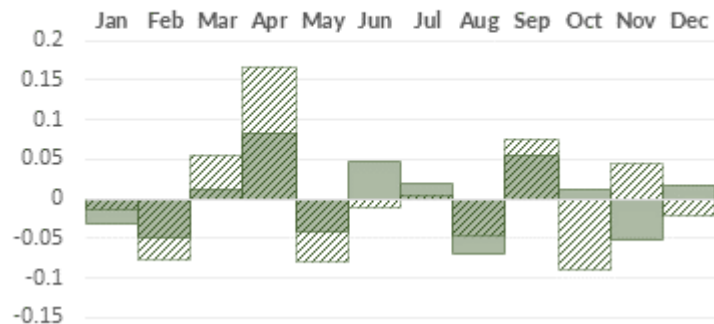


Seasonality of Realized Volatility

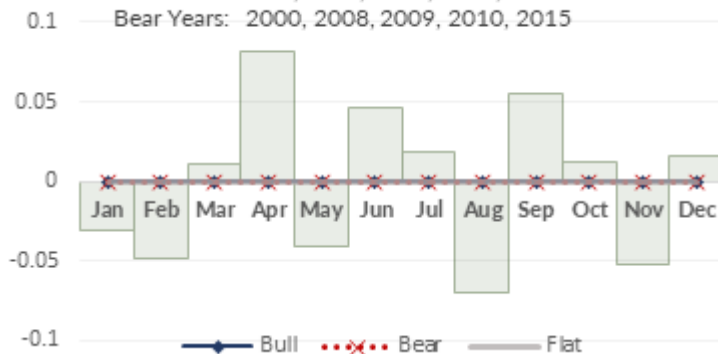


GBP/USD

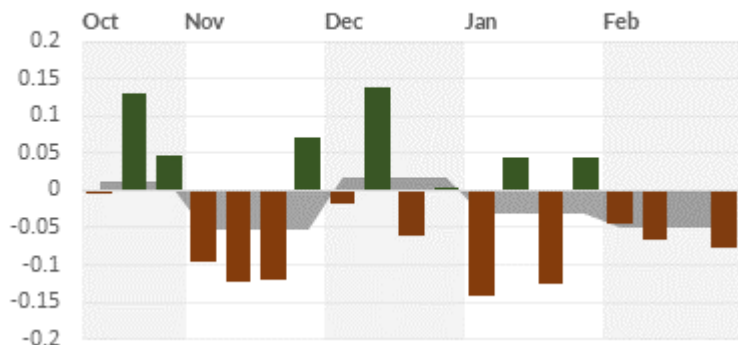
1994 - 2019 (Shaded: 2013 - 2018)



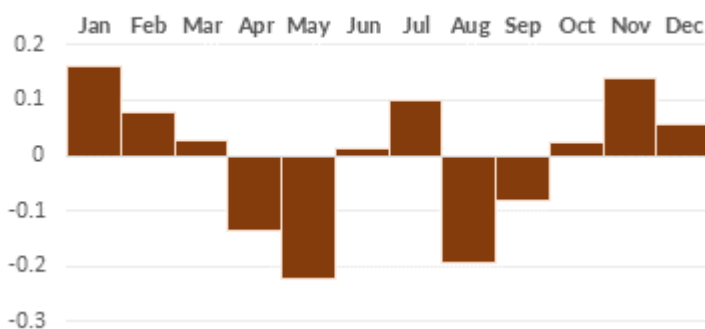
Bull Years: 2002, 2003, 2004, 2006, 2007
Bear Years: 2000, 2008, 2009, 2010, 2015



Forward Seasonality

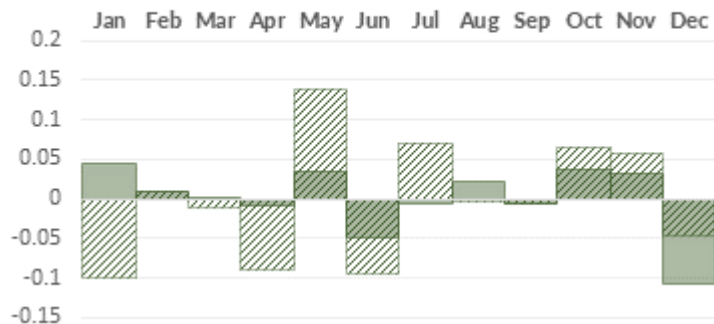


Seasonality of Realized Volatility

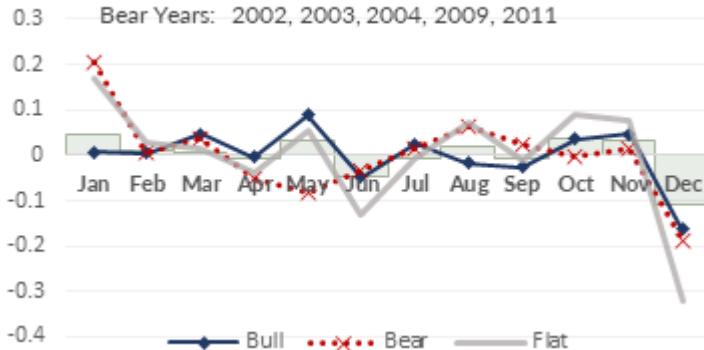


USD/CHF

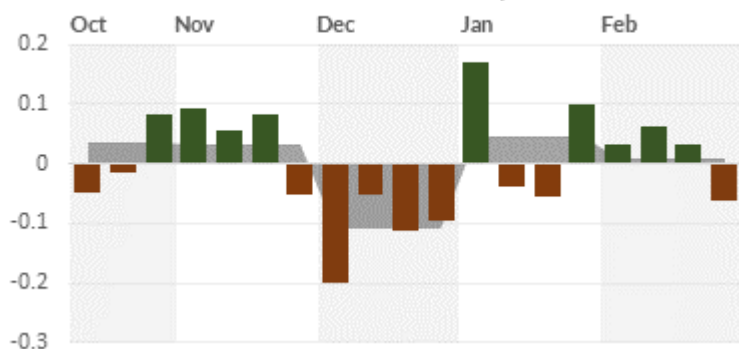
1998 - 2018 (Shaded: 2012 - 2017)



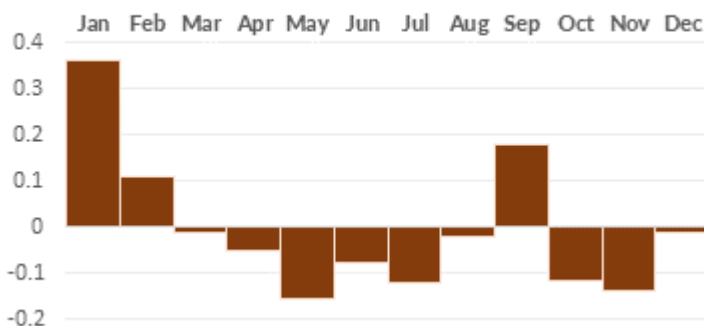
Bull Years: 1999, 2000, 2005, 2012, 2015
Bear Years: 2002, 2003, 2004, 2009, 2011



Forward Seasonality

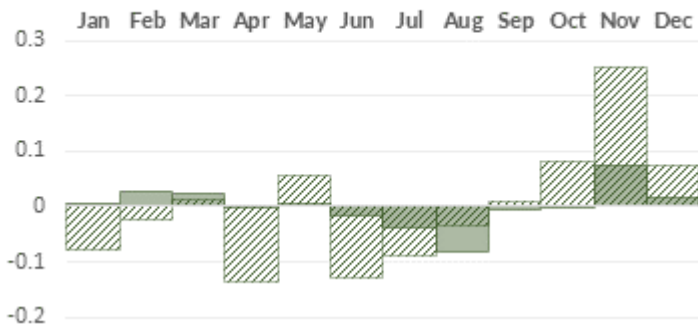


Seasonality of Realized Volatility

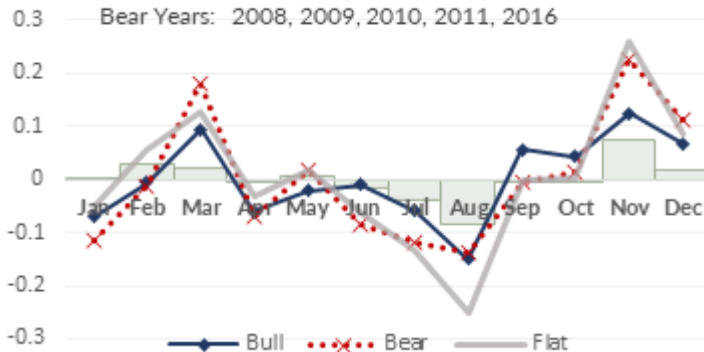


USD/JPY

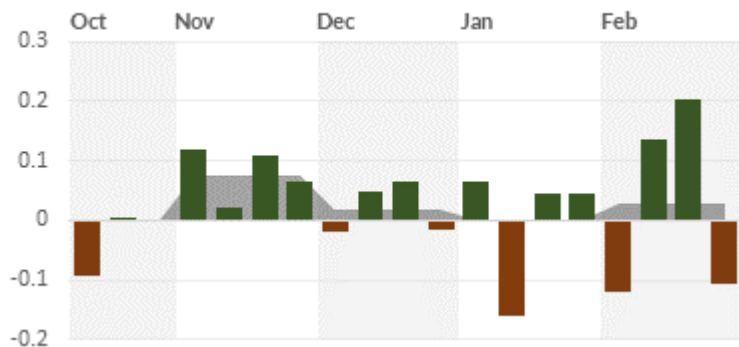
1998 - 2018 (Shaded: 2012 - 2017)



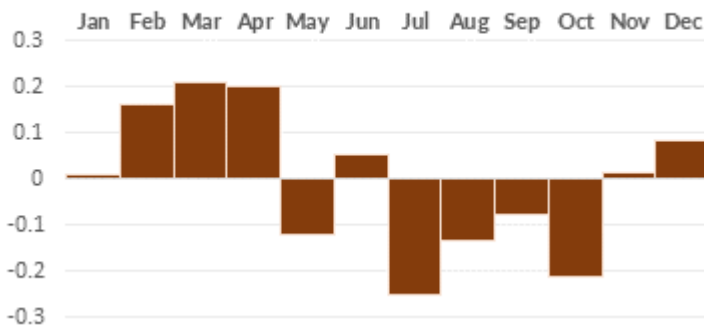
Bull Years: 2001, 2013, 2014, 2015, 2017
Bear Years: 2008, 2009, 2010, 2011, 2016



Forward Seasonality

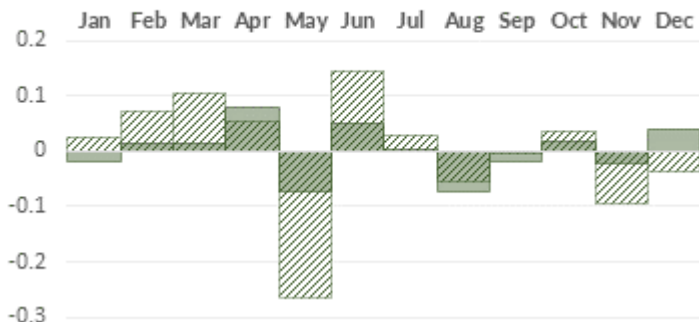


Seasonality of Realized Volatility

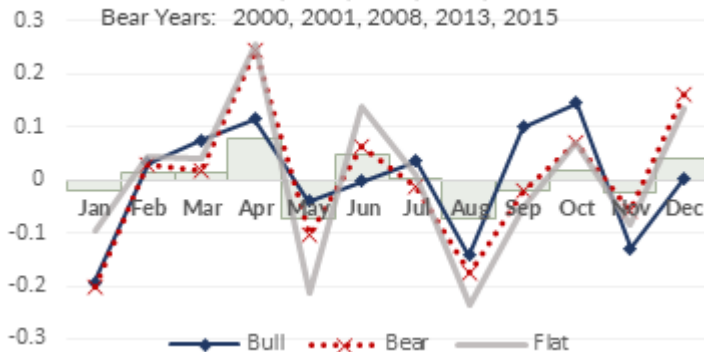


AUD/USD

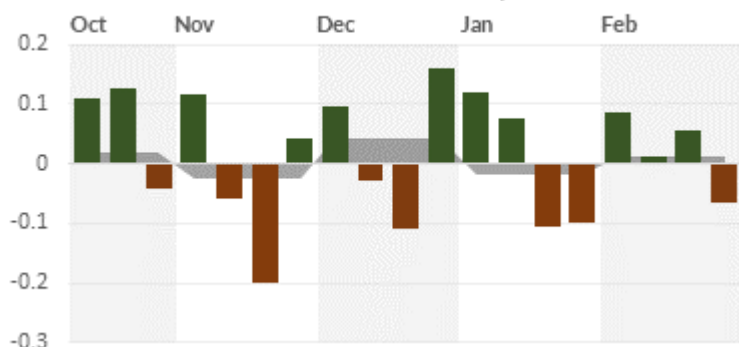
1998 - 2018 (Shaded: 2012 - 2017)



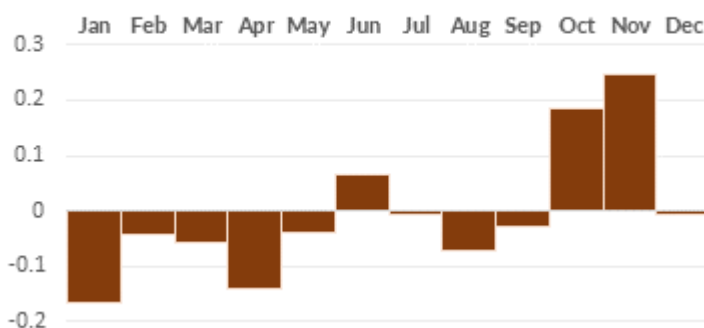
Bull Years: 2003, 2007, 2009, 2010, 2011
Bear Years: 2000, 2001, 2008, 2013, 2015



Forward Seasonality

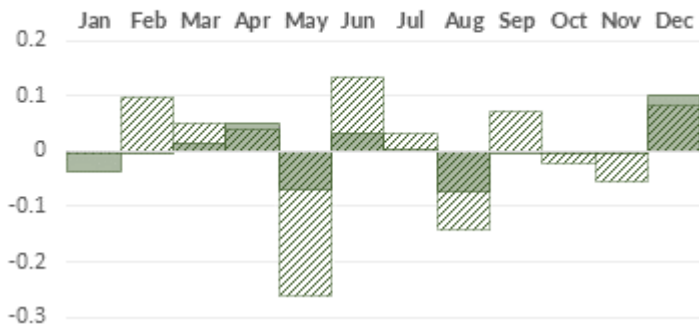


Seasonality of Realized Volatility

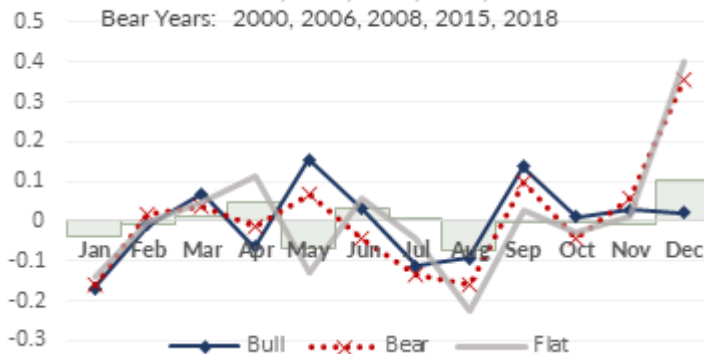


NZD/USD

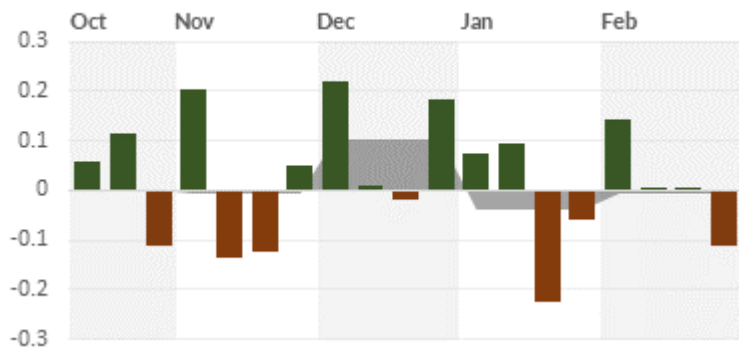
1998 - 2018 (Shaded: 2012 - 2017)



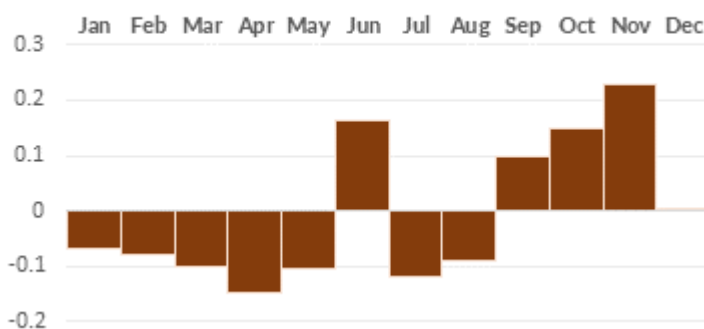
Bull Years: 2002, 2003, 2004, 2007, 2009
Bear Years: 2000, 2006, 2008, 2015, 2018



Forward Seasonality

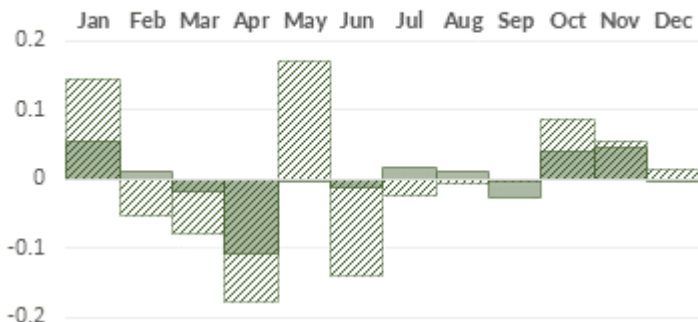


Seasonality of Realized Volatility

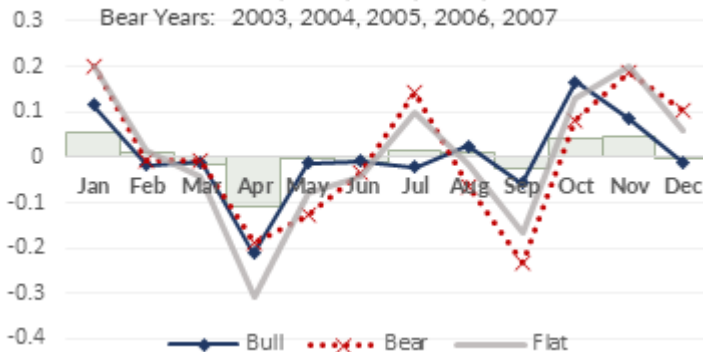


USD/CAD

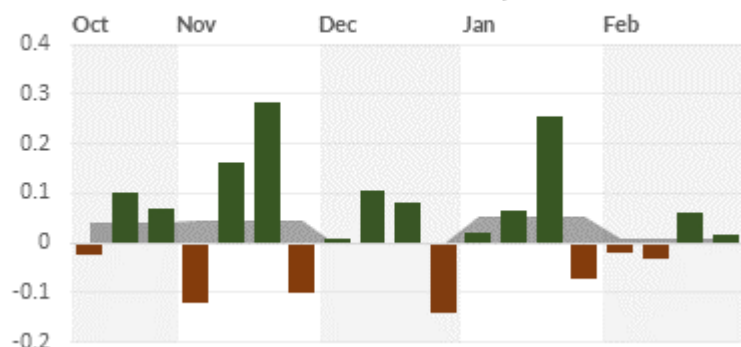
1998 - 2018 (Shaded: 2012 - 2017)



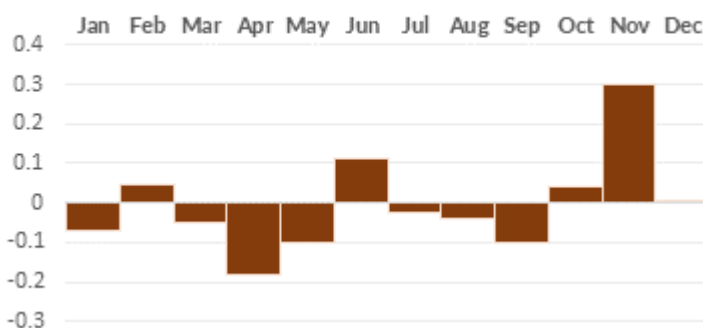
Bull Years: 2008, 2013, 2014, 2015, 2018
Bear Years: 2003, 2004, 2005, 2006, 2007



Forward Seasonality

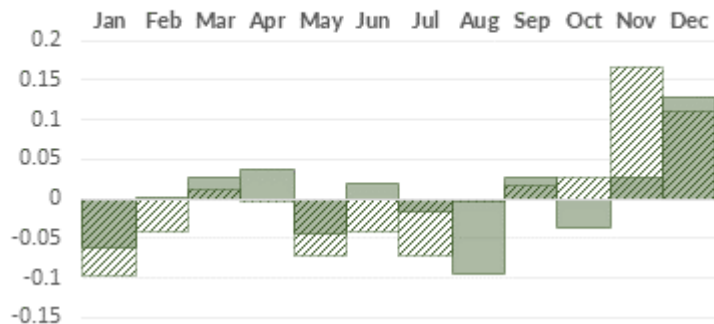


Seasonality of Realized Volatility

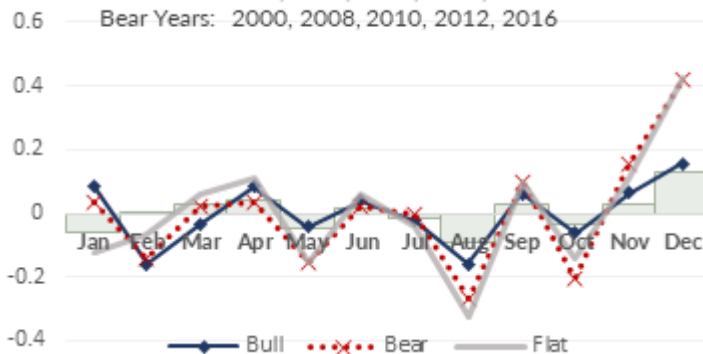


EUR/JPY

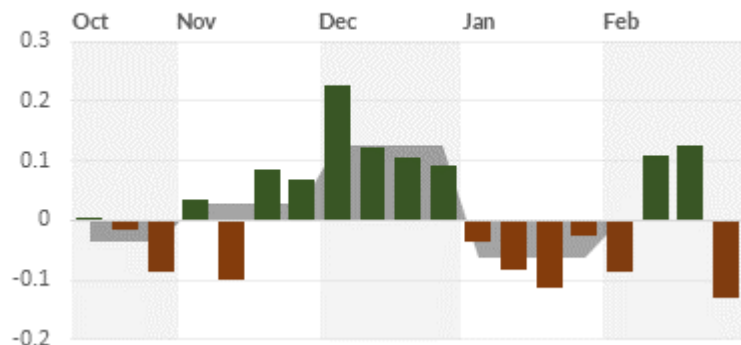
1999 - 2018 (Shaded: 2012 - 2017)



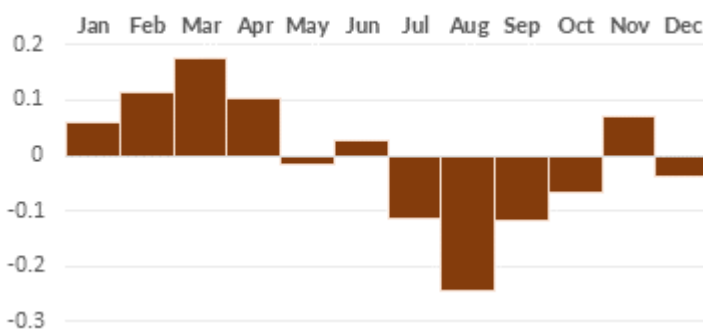
Bull Years: 2001, 2002, 2003, 2013, 2017
Bear Years: 2000, 2008, 2010, 2012, 2016



Forward Seasonality

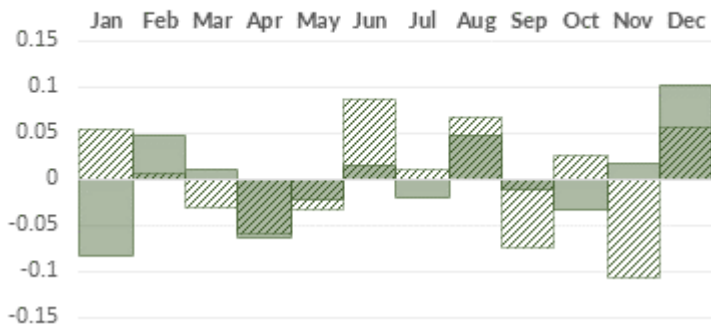


Seasonality of Realized Volatility

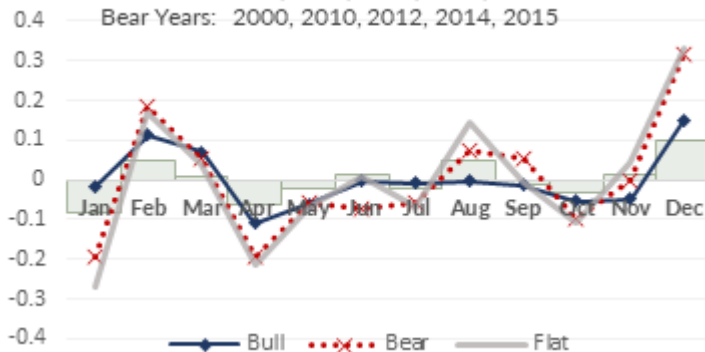


EUR/GBP

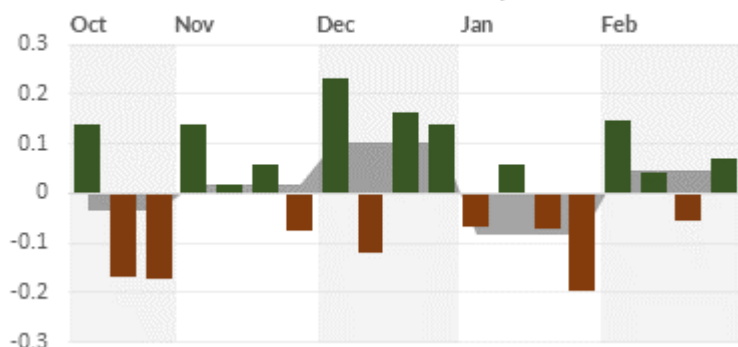
1999 - 2018 (Shaded: 2012 - 2017)



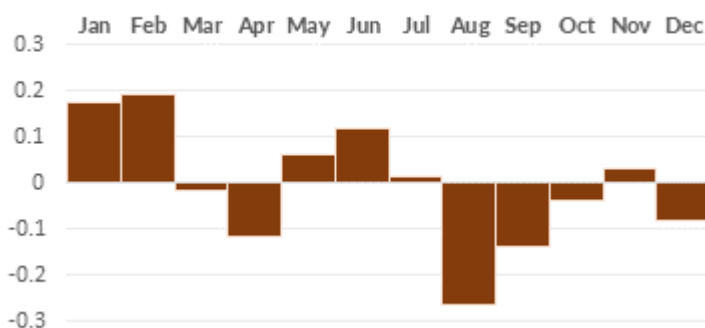
Bull Years: 2003, 2008, 2009, 2013, 2016
Bear Years: 2000, 2010, 2012, 2014, 2015



Forward Seasonality

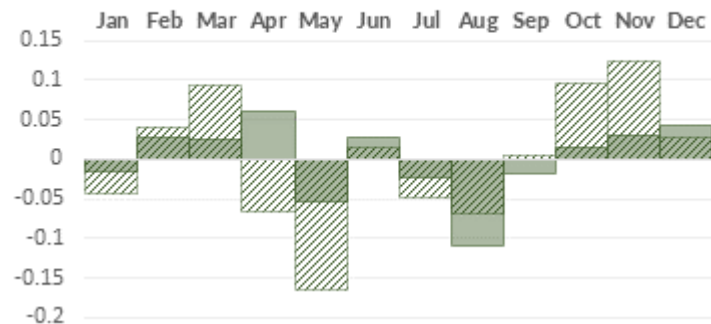


Seasonality of Realized Volatility

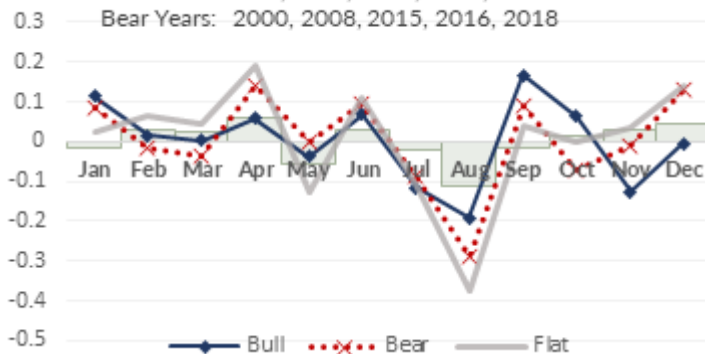


AUD/JPY

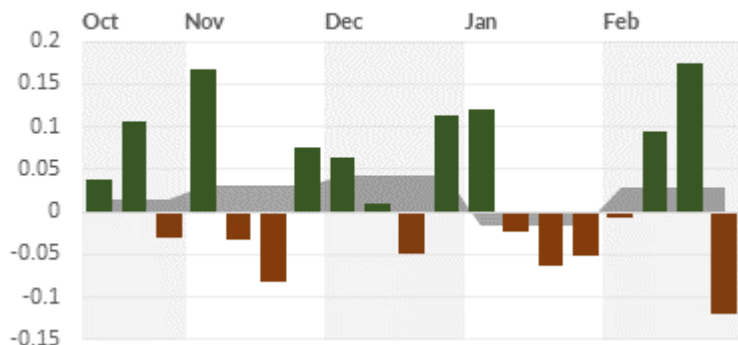
1998 - 2018 (Shaded: 2012 - 2017)



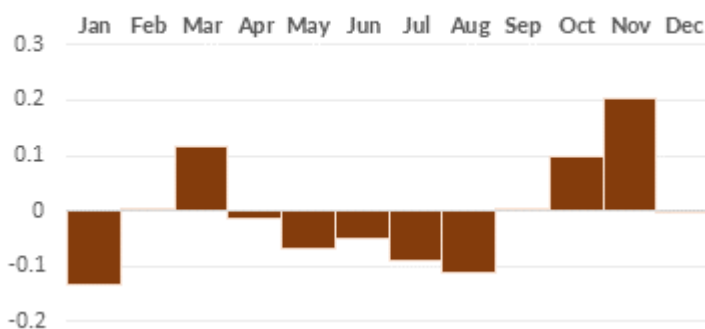
Bull Years: 2003, 2005, 2007, 2013, 2017
Bear Years: 2000, 2008, 2015, 2016, 2018



Forward Seasonality

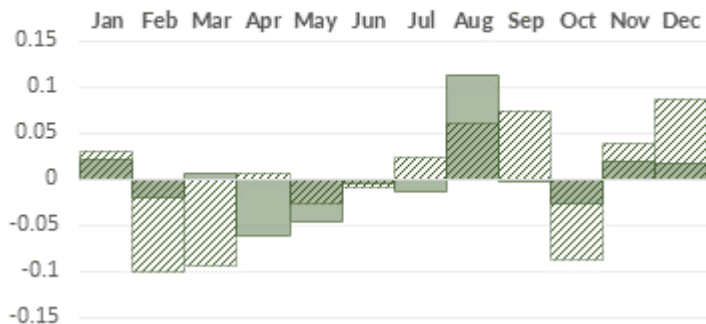


Seasonality of Realized Volatility



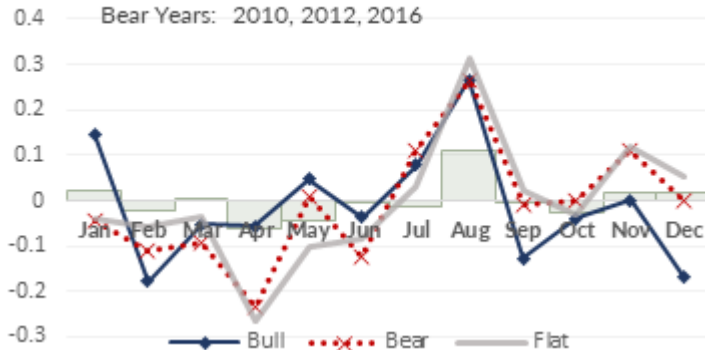
EUR/TRY

2007 - 2018 (Shaded: 2012 - 2017)

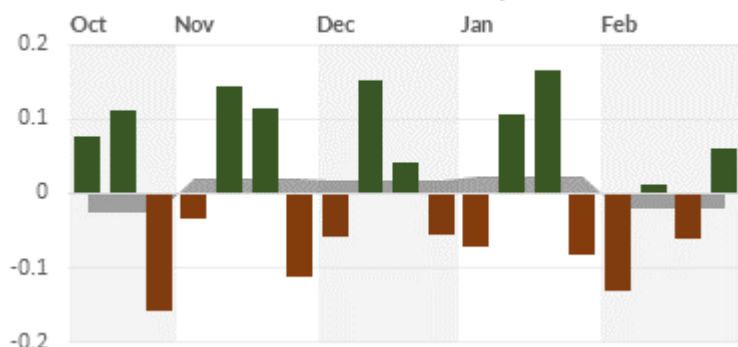


Bull Years: 2011, 2017, 2018

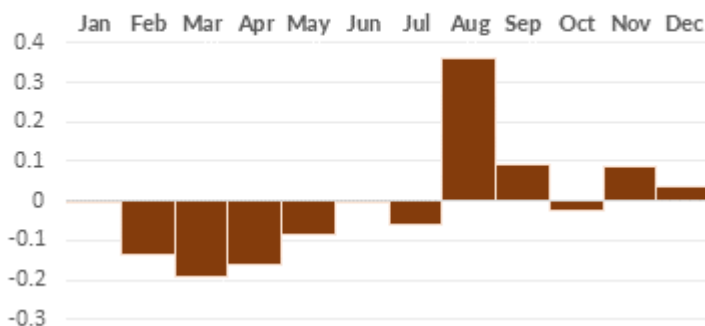
Bear Years: 2010, 2012, 2016



Forward Seasonality

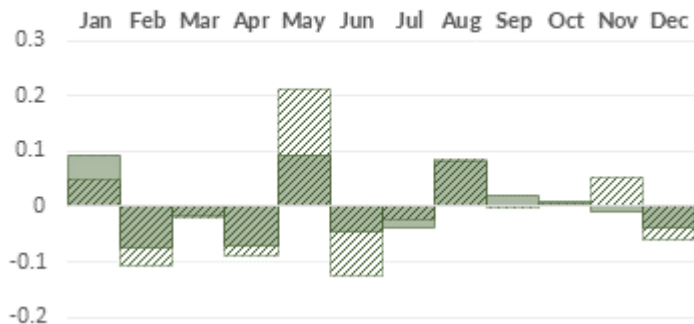


Seasonality of Realized Volatility



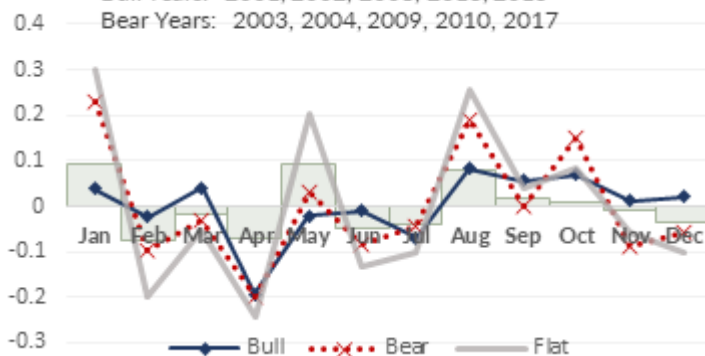
USD/ZAR

1998 - 2018 (Shaded: 2012 - 2017)

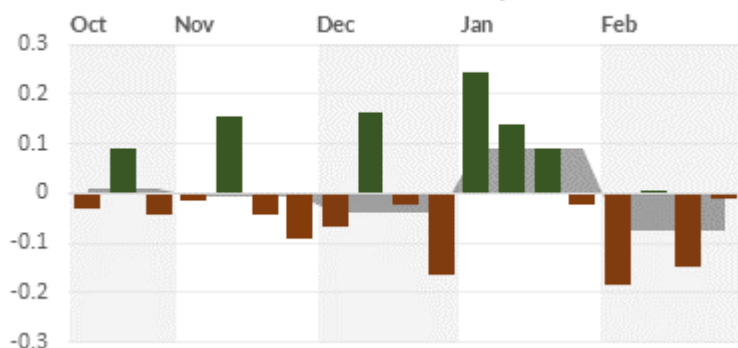


Bull Years: 2001, 2002, 2008, 2013, 2015

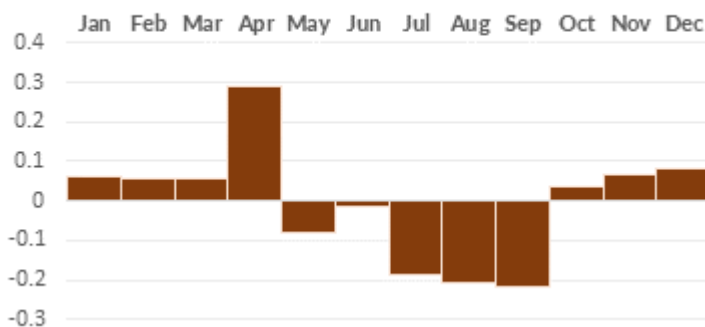
Bear Years: 2003, 2004, 2009, 2010, 2017



Forward Seasonality



Seasonality of Realized Volatility



About this Report

This report is designed to do two things. First, it is a reference, to be kept close at hand, for trends and levels in major economic indicators. Second, it provides quantitative measures of potential market stresses and recessionary probabilities. Trades and asset allocation decisions can be informed by this context and data.

A few principles guide the production and perspective of this report:

- We believe that simple is usually better.
- The point of macroeconomic analysis is to avoid major periods of systemic stress such as recessions.
- Economic data is full of noise. It is important to use tools that separate valid signal from random noise, and to not attempt to comment on every fluctuation of every economic indicator.
- We use models and algorithms essentially as “advisors”, to give input into a discretionary/quantitative framework. The models you see in this report have largely kept us on the right side of the market for decades.
- It is easy to demonstrate that the stock market is a clear leading indicator for the business cycle.

A little more on these points:

SIMPLICITY AND MODELS

Simplicity is not a goal in itself, but long experience has taught us that parsimonious models (i.e., with fewer moving parts) work better than complex models. Over the years, we’ve built our share of complex models—some which included two dozen factors in various lags and transformations. Adding more factors to a model will often help it to explain past data better (increased R^2), but these models fail spectacularly going forward.

Though there is a place for higher math, models built from a few factors with simple transformations have held up well in practice. We share the outputs of a few proprietary models in this report: our Market Stress Index, which considers technical factors in combination with measures of stress from the credit markets, and our Employment Recession Indicator.

These models are only as complex as they need to be, and they have proven their worth in years of practical use.

AVOIDING RECESSIONS

One of the problems with economic commentary is that people writing it must comment on every inflection in the data; otherwise, there is nothing to say! The problem with this is that we all know the fluctuations are meaningless noise. In fact, some data series are so notoriously noisy that we often discuss moving averages of those series rather than the month to month data-point.

One of the advantages we have in this work is that we are not obliged to comment on the data unless it is important. This

allows us to point out those few inflections each year where we might need to pay attention.

It is also worth remembering that the purpose of macroeconomic analysis is to dodge the big boulders—the type of major market stress that comes about once in a decade. These are not effective tools for timing the smaller fluctuations. (For that purpose, our technical tools reign supreme.)

STOCKS LEAD

Traditionally, people will use economic measures to try to predict stock market direction. While it’s easy to see why we wish to do this, there is one fatal flaw: stocks lead the business cycle! Charles Dow, the first editor of the *Wall Street Journal*, knew this when he created a technical framework to use the movements of the newly-minted stock indexes to predict fluctuations in the business cycle. Read that again: Charles Dow, often considered the father of technical analysis, created technical analysis to predict the business cycle, not the stock market.

Today, many people try to turn this upside down. Fundamental analysis, resting as it does on a logical foundation of accounting and knowledge of how the world “should work”, has a ready appeal that, until recent years, technical tools could not match. So, we’ve had a few generations of commentators trying to predict market direction with the economy—and everyone acknowledges the track record of this approach has been dismal: how many (mostly unfair) jokes are there about economists making predictions?

We understand the importance of price action in major asset classes, and that price actions can themselves shape fundamentals at times. This is why some of our models include technical factors.

ANALYTICAL FRAMEWORK

If there is a “secret” to this work, it is in knowing how to manipulate the data. When are levels important, and when should we be looking at trends? What are the best ways to measure trends? (We measure trends differently for different data series: sometimes, a simple rate of change (return) is most useful. Sometimes a difference is better, and sometimes the slope of a regression line is the cleanest measure of trend. The question of what time period to consider also has different answers depending on the frequency and amount of noise in the data series.)

As you work through the pages of this report, you will see different series presented with an emphasis on recent or longer-term data, on trends, and on where levels fall in longer-term perspectives. None of this is by accident; these are what we believe to be the ideal ways to evaluate each of these data series.

This report is produced at the end of each quarter, using economic data releases available at that time. Data is sourced primarily from the FRED database at the Federal Reserve of St. Louis (<https://fred.stlouisfed.org>).



Contact sales: info@talonadvisors.com

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