

Investment Stance, Shifts, and Concerns

We have some significant, growing concerns at the end of the third quarter.

Broadly speaking, we believe that macro and economic data is becoming more relevant, after suggesting investors largely ignore datapoints for much of the past two years. Though it is impossible to identify precise points where reengagement should occur, many measures are normalizing and we may see relationships between data and outcomes normalize. However, some of the key risks we see are not fully captured in the data.

What are the main risks facing investors today?

- **Spiraling inflation**, with the possibility of hyperinflation. The Fed's reassurance that inflation will be transitory is, at best, wishful thinking. We do not know, no one *can* know, that this is true.
- While wages have increased, inflation has taken a bite out of any increases, and many earners are probably negative, on an inflation-adjusted basis, compared to pre-pandemic levels. Furthermore, we think that official measures of inflation may dramatically understate the experience of many consumers.
- **The strange disconnect in the labor market**—unemployment is still high, but labor shortages persist, even to the point of crippling some industries. We do not fully understand the drivers here, and suspect social factors are at work.
- **The ongoing COVID pandemic is disappointing**, to put it mildly. Most people probably expected a return to normal at the beginning of the summer, and now we are facing booster shots, new variants, and apparently no end in sight.
- **Social pressures are strong and represent a threat on many levels**—to the economy and perhaps even to our way of life. Though this is a larger discussion, the gap between perspectives, driven in no small part by politics and social media algorithms, could have long-lasting and catastrophic consequences.

We are perhaps less optimistic heading into the year than we were a few months ago. The idea that we are living in “full recovery” and that this is a “new normal” is disheartening, to say the least.

While we cannot capture the social risks in any economic datapoint, it's impossible to understate their significance. If current trends persist, we will be driven to ever-more extreme perspectives, and something will eventually break. As Yeats wrote, “Things fall apart; the center cannot hold.” And, at least right now, it does seem that “the best lack all conviction, while the worst are full of passionate intensity”. If we are not able to find that center, the next few lines of that poem may be prescient: “Mere anarchy is loosed upon the world...”

What are we to do with this from an investment standpoint? Well, prepare your hedges and have a plan for trading through increased volatility and a shift in equity market regime. However, and this is the most important line in this report: **do not anticipate. Wait for clear price action triggers. It is certainly possible that equity markets can continue to add to gains for some time to come.**

At the end of the quarter, we are only seeing the barest glimmers of technical factors that suggest a weakening of the trend. We stand ready to respond to these appropriately, but, for now, remain strongly focused on the long side of stocks and most risk assets.

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

Daily Update: Monday-Thursday (after close)

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

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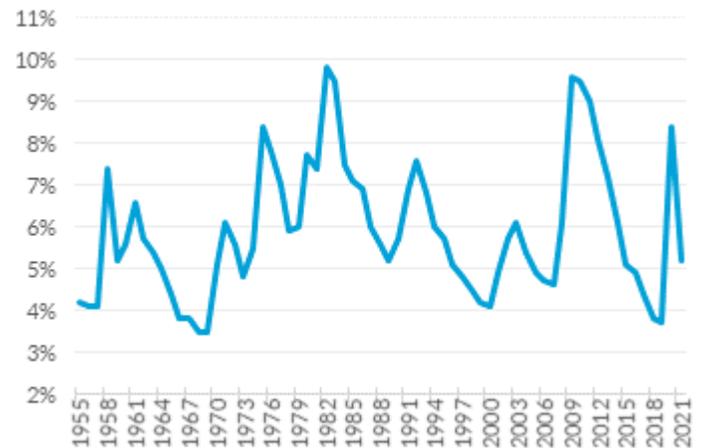
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Economy at a Glance & Scorecard

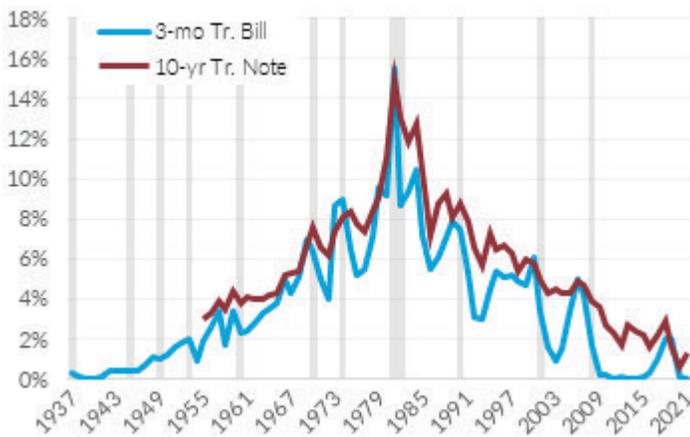
Real GDP (QoQ, Seasonally Adjusted)



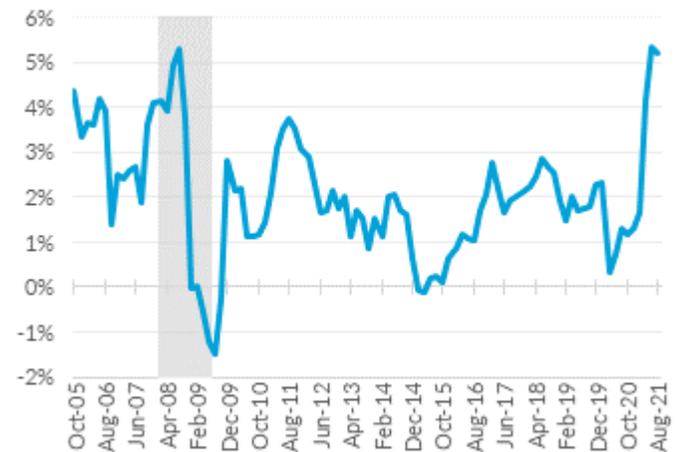
Civilian Unemployment Rate (% of Labor Force)



Interest Rates



CPI (YoY Percent Change, Seasonally Adjusted)



This page summarizes the most important high-level datapoints for the economy. These numbers do suffer from significant lag in some cases, but also present a strong “bottom line” perspective.

Global equity markets were flat for much of Q3 2021, even though many major indexes flirted with new highs. At the end of the quarter, we see more tactical divergence between markets, but few warning signs of outright weakness in major markets. China and several Asia indexes will need close attention in Q4.

GDP recovery has cooled off somewhat.

Unemployment is a bit of an enigma: the top-level measure on this page probably presents a more optimistic picture than realistic, as several other measures show a labor market still struggling.

Interest rates hover near zero, though higher rates appear to be broadly anticipated. We would not be surprised to see a long-term inflection here.

Inflationary pressures remain one of the real risks. The possibility of hyperinflation and currency deflation could do significant long-term damage. We are not reassured by the Fed’s parroting of the word “transitory” with every mention of inflation.

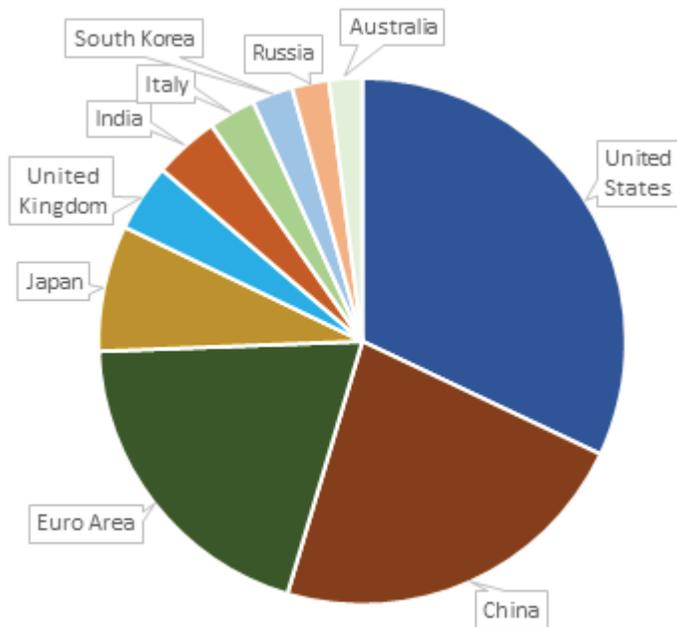
Quarterly Scorecard

	Neg	↔	Pos	Chg	Comment
Global GDP Growth	○ ● ○ ○ ○				
US GDP Growth	○ ○ ● ○ ○			↓	Cooling?
Production	○ ○ ● ○ ○			↓	Flat, but not declining
Transportation	○ ○ ○ ● ○				
Labor Market	○ ● ○ ○ ○				A real point of concern
Retail Sales	○ ○ ● ○ ○				
Personal Income	○ ○ ● ○ ○			↓	Inflation is eating any increases
Housing	○ ○ ● ○ ○				
Trade	○ ○ ● ○ ○				
Sentiment	○ ● ○ ○ ○				
Corporate Profits	○ ○ ○ ● ○				Resilient
Debt Levels	○ ○ ● ○ ○				Fed a concern. Private ok/good
Lending Conditions	○ ○ ○ ○ ●			↑	
Credit Spreads	○ ○ ○ ○ ●			↑	
Yield Curve	○ ○ ● ○ ○				
Inflation	○ ● ○ ○ ○				
Technical Factors	○ ○ ○ ● ○			↓	Some weakening
Market Internals	○ ○ ● ○ ○				
Volatility	○ ○ ○ ● ○				Coincident, not leading

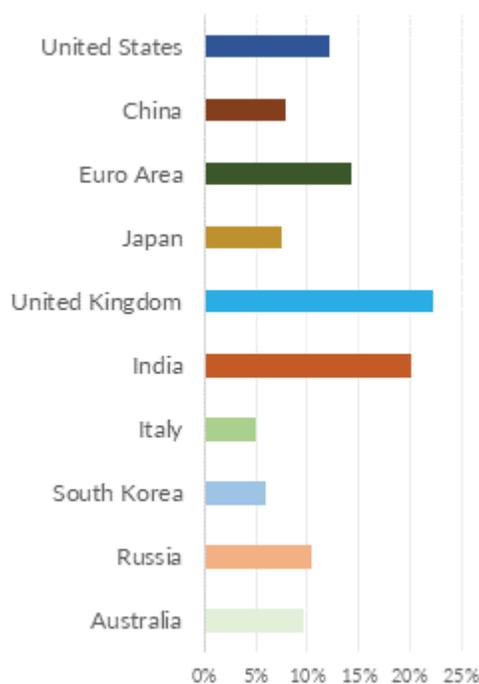
Global Comparisons: Major Economies

	GDP YoY	Interest Rate	Inflation	Jobless	Debt/GDP	1 Yr Perf	3 Yr Perf	Volatility	Trend
United States	12.2%	0.3%	5.3%	5.2%	107.6%	2.1%	37.7%	Avg	Down
China	7.9%	3.9%	0.8%	5.1%	66.8%	-7.5%	4.7%	Avg	Down
Euro Area	14.3%	0.0%	3.0%	7.6%	98.0%	-5.8%	10.8%	Avg	Down
Japan	7.6%	-0.1%	-0.4%	2.8%	266.2%	-6.0%	12.0%	High	Down
Germany	9.4%	0.0%	3.9%	3.6%	69.8%	-11.2%	3.7%	Avg	Down
United Kingdom	22.2%	0.1%	3.2%	4.6%	97.2%	-8.8%	0.2%	Avg	Down
India	20.1%	4.0%	5.3%	7.0%	69.6%	-2.6%	10.1%	Avg	Up
France	18.7%	0.0%	1.9%	8.0%	115.7%	-4.9%	26.0%	Avg	Down
Italy	5.0%	0.0%	2.0%	9.3%	155.8%	-3.9%	27.2%	Avg	Down
Canada	12.7%	0.3%	4.1%	7.1%	117.8%	0.5%	14.8%	High	Down
South Korea	6.0%	0.8%	2.6%	2.8%	42.6%	-17.8%	-3.4%	Avg	Down
Russia	10.5%	6.8%	6.7%	4.5%	17.8%	5.6%	23.8%	Avg	Up
Brazil	12.4%	6.3%	9.7%	14.1%	88.8%	22.6%	24.2%	Avg	Down
Australia	9.6%	0.1%	3.8%	4.5%	24.8%	0.6%	7.3%	High	Down

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	-26.8%	54.1%	2719.5%	6.4%	350.0%				
Sudan	-8.4%	19.6%	387.6%	17.7%	259.4%				
Lebanon	-20.3%	10.0%	137.8%	6.6%	171.7%				
Suriname	-13.4%	25.0%	58.9%	11.2%	111.4%				
Syria	4.8%	0.0%	52.4%	9.0%	30.0%				
Argentina	17.9%	38.0%	51.4%	9.6%	102.0%	-15.8%	-0.8%	Avg	Down
Zimbabwe	-4.1%	40.0%	50.2%	5.7%	77.2%				
Iran	-3.9%	18.0%	43.2%	9.4%	45.4%				
Ethiopia	6.1%	7.0%	30.4%	19.1%	59.0%				
Angola	-3.4%	20.0%	26.1%	31.6%	120.0%				

Highest interest Rates

	GDP YoY	Interest Rate	Inflation	Jobless	Debt/GDP	1 Yr Perf	3 Yr Perf	Volatility	Trend
Venezuela	-26.8%	54.1%	2719.5%	6.4%	350.0%				
Zimbabwe	-4.1%	40.0%	50.2%	5.7%	77.2%				
Argentina	17.9%	38.0%	51.4%	9.6%	102.0%	-15.8%	-0.8%	Avg	Down
Yemen	-0.5%	27.0%	0.8%	13.4%	81.7%				
Suriname	-13.4%	25.0%	58.9%	11.2%	111.4%				
Angola	-3.4%	20.0%	26.1%	31.6%	120.0%				
Liberia	-3.0%	20.0%	8.2%	2.7%	52.1%				
Sudan	-8.4%	19.6%	387.6%	17.7%	259.4%				
Iran	-3.9%	18.0%	43.2%	9.4%	45.4%				
Turkey	21.7%	18.0%	19.3%	12.0%	39.5%	11.2%	-31.0%	Low	Down

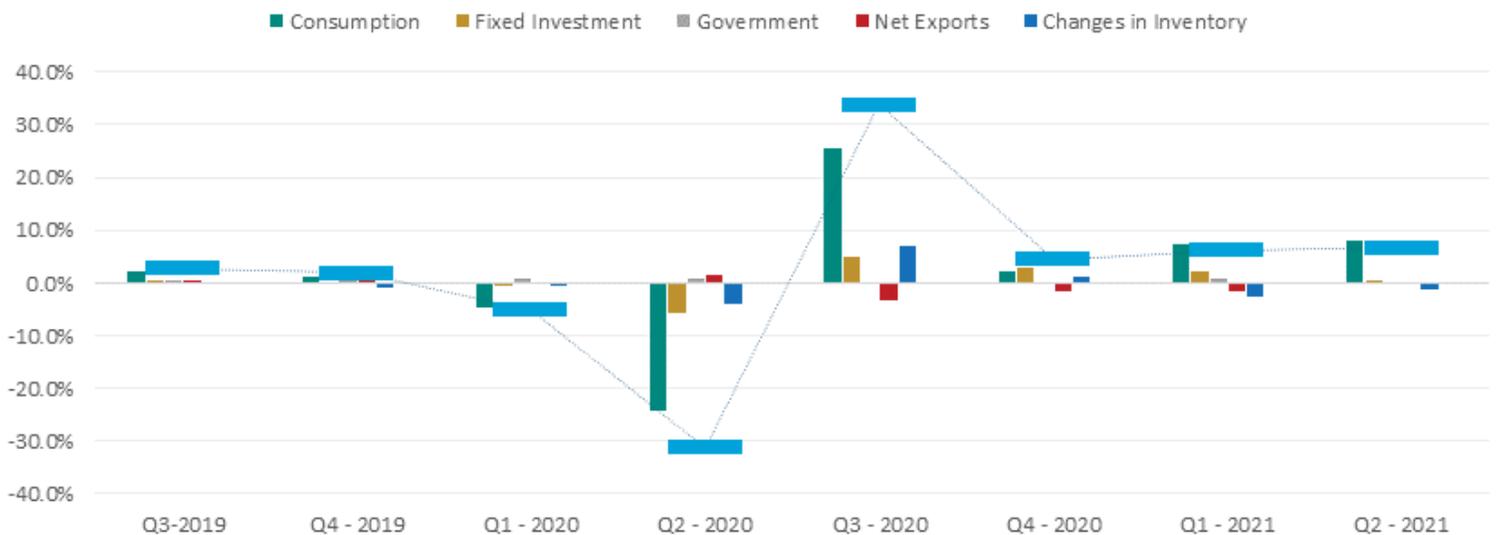
Largest GDP Losses

	GDP YoY	Interest Rate	Inflation	Jobless	Debt/GDP	1 Yr Perf	3 Yr Perf	Volatility	Trend
Libya	-60.3%	3.0%	2.1%	18.6%	155.0%				
Venezuela	-26.8%	54.1%	2719.5%	6.4%	350.0%				
Seychelles	-24.6%	2.0%	10.5%	4.0%	94.0%				
Bolivia	-21.7%	4.1%	0.2%	5.6%	67.3%				
Lebanon	-20.3%	10.0%	137.8%	6.6%	171.7%				
Fiji	-19.0%	0.3%	0.8%	4.8%	65.2%				
Bahamas	-14.8%	4.0%	2.7%	25.6%	83.8%				
Lesotho	-13.8%	3.5%	5.5%	24.7%	69.6%				
Suriname	-13.4%	25.0%	58.9%	11.2%	111.4%				
Kuwait	-11.2%	1.5%	3.1%	2.3%	11.5%	N/A	N/A	N/A	N/A

US GDP



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



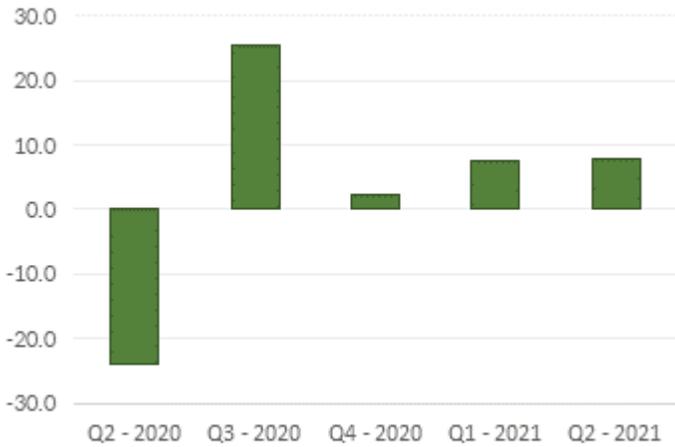
GDP growth is intact, and has cooled to a level that would, at least theoretically, be sustainable for several quarters.

(GDP numbers are usually discussion in quarter over quarter format. The first chart on this page shows the data as a year over year percent change.)

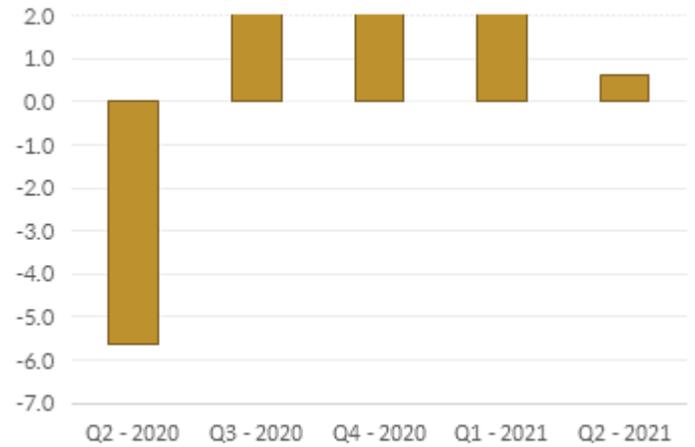
- Consumption continues to be the primary driver. We are, frankly, a bit confused at the strength of Consumer activity, especially given a labor market that appears fraught with uncertainty. We suspect there are factors not fully understood at this time in play.
- Investment played a relatively smaller role in this quarter and government spending was a slight negative. This latter is not surprising, given the significant Q1 contributions.
- Net exports have leveled off near zero this quarter and inventories were only a minor drag.
- We do not have strong expectations for GDP in coming quarters.
- We note that global GDP growth has normalized, with China reporting numbers roughly in-line with developed nations. UK and India show standout global strength.

GDP Components

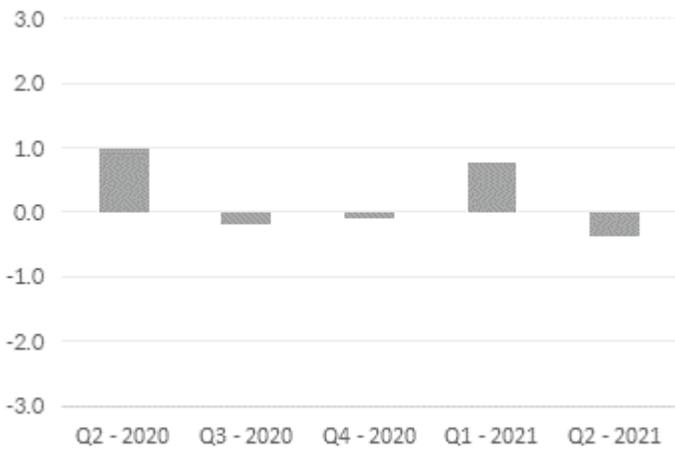
Consumption



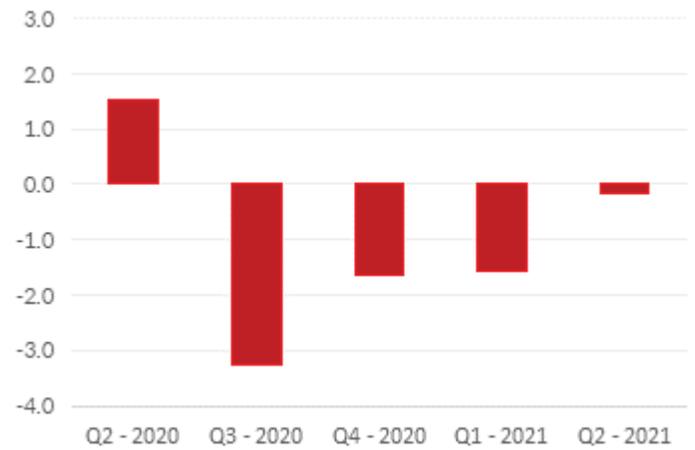
Investment



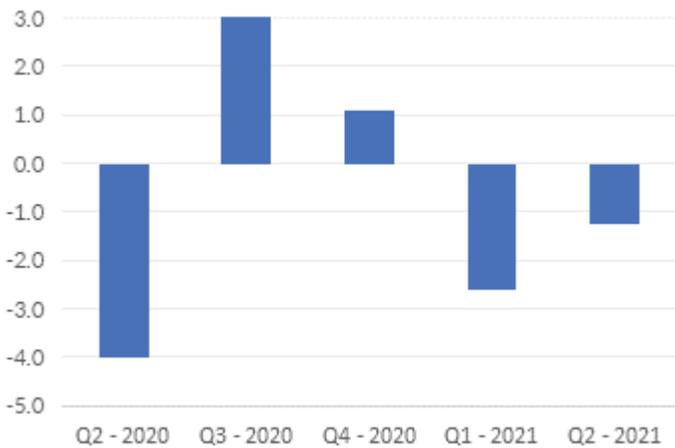
Government



Net Exports



Change in Inventories

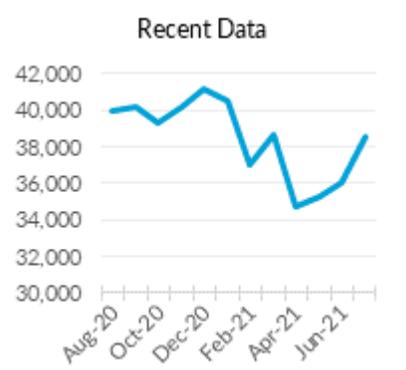
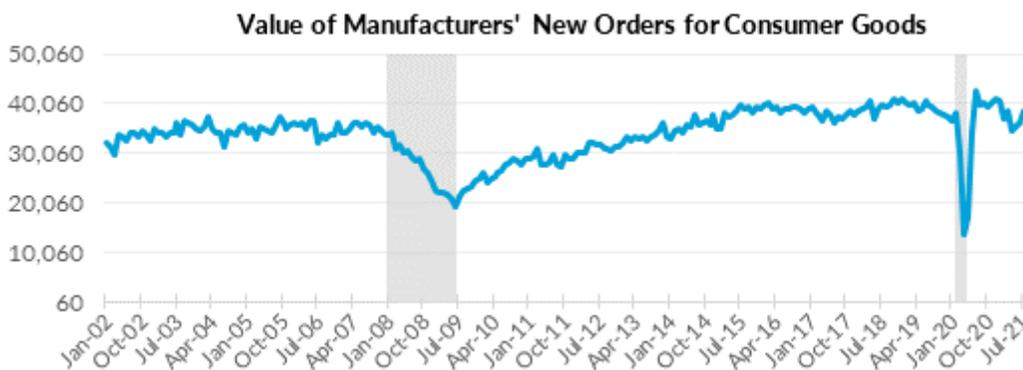
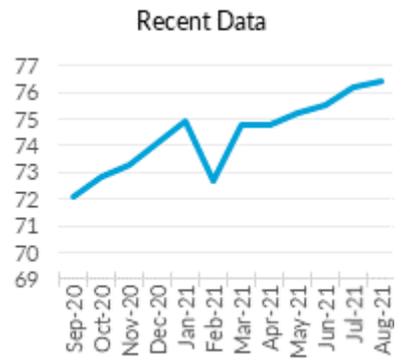
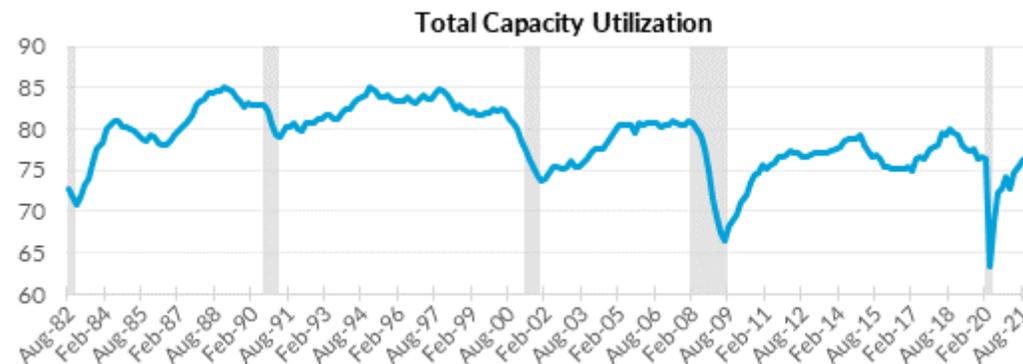
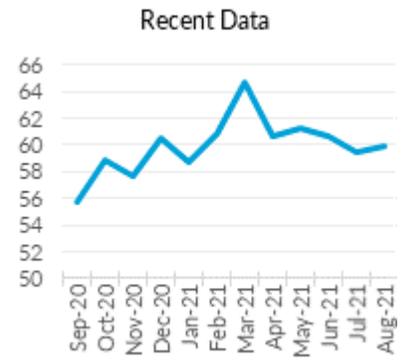
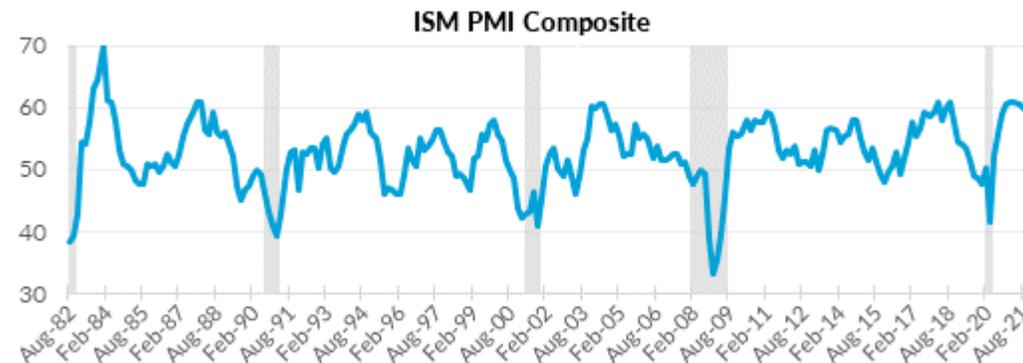
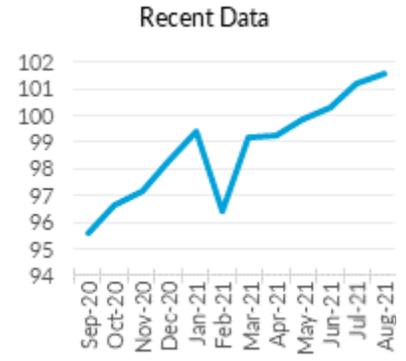
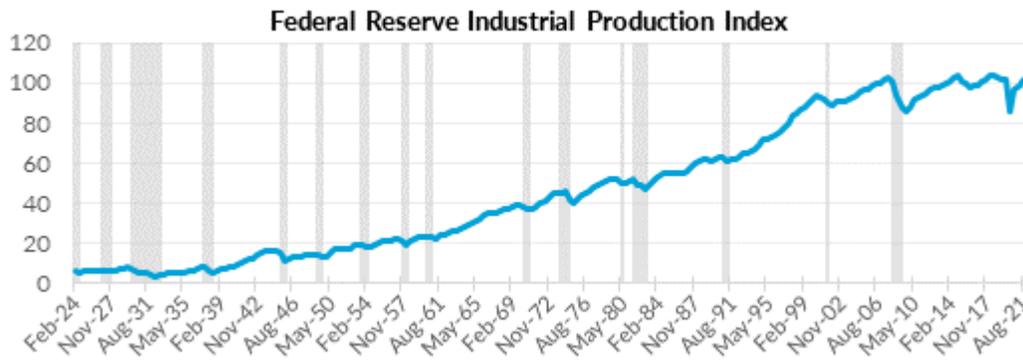


These charts show the individual components of GDP over the past five quarters.

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.

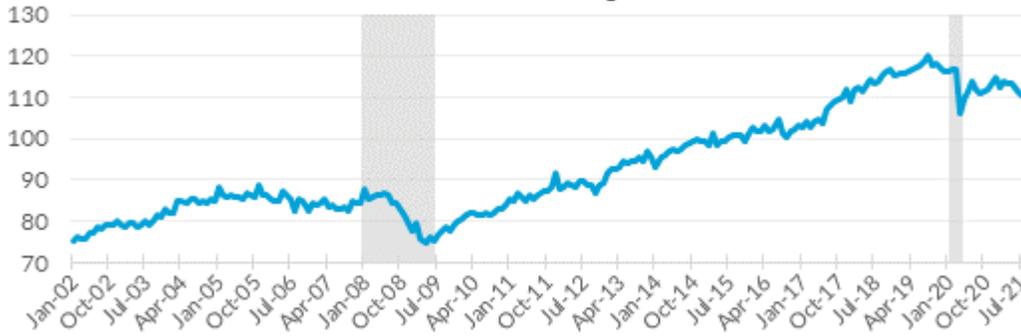
Production



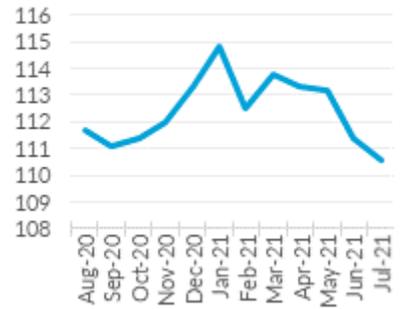
- After several quarters of irrelevance, we think more information is available in most economic measures.
- PMI has a strong cyclical component, which is due for a downturn. Note that this could be distorted by the recent sharp decline of the recession.
- All relevant production measures are essentially flat, with no obvious standouts. This is confirmation of an essentially sideways economy and a recovery that may have stalled.

Transportation

Truck Tonnage Index



Recent Data



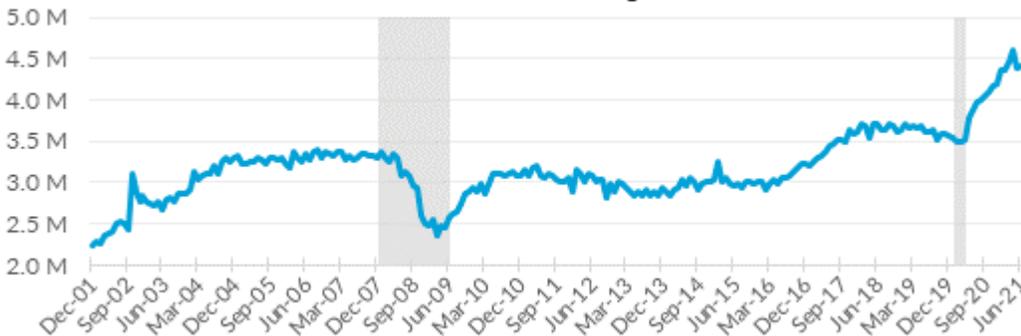
Rail Freight Carloads



Recent Data



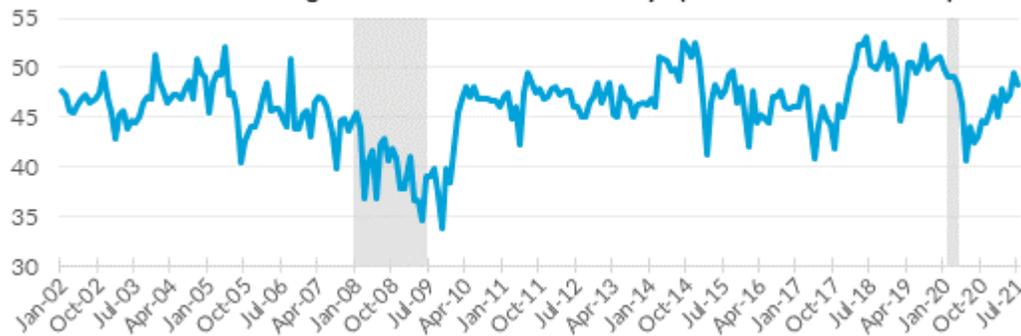
Air Revenue Ton Miles of Freight and Mail



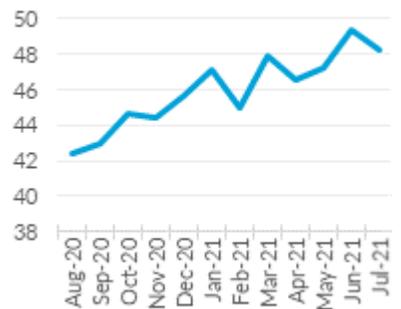
Recent Data



Tonnage for Internal U.S. Waterways (Millions of Short Tons)

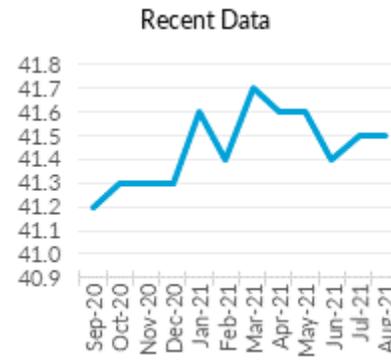
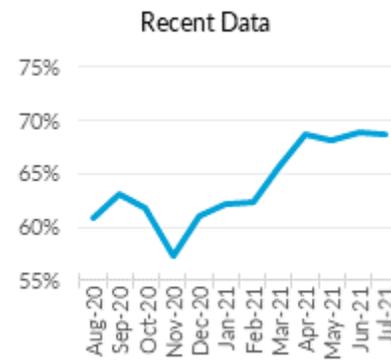
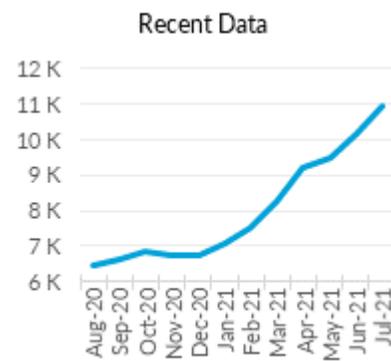
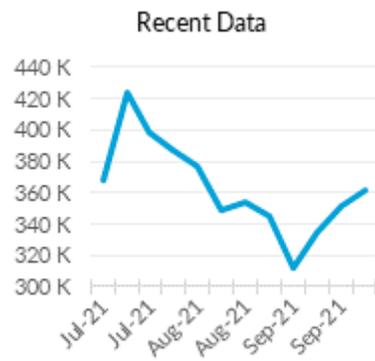


Recent Data

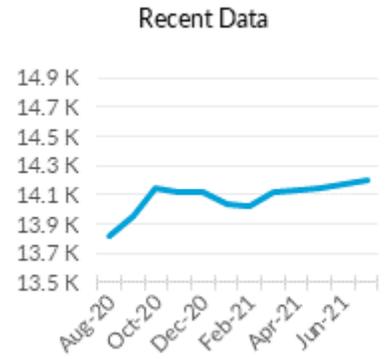
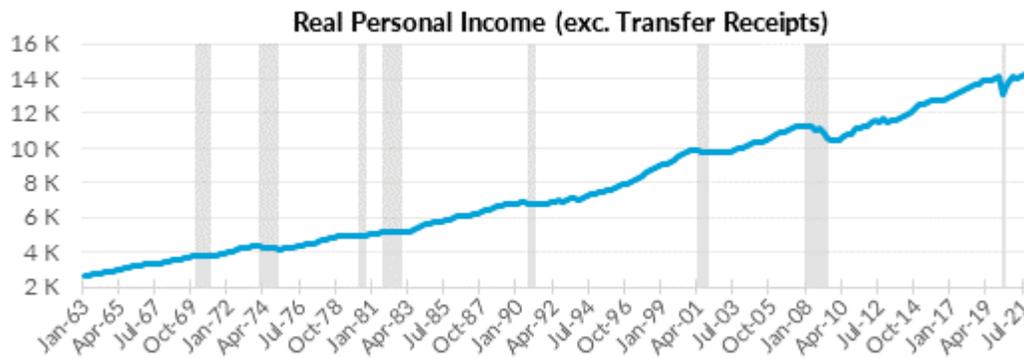


- Assessing movement of products gives further insight into economic conditions, as a key measure of what is actually happening on the ground and in the air.
- There is mixed information here, as we would expect from an economy showing robust consumption: air freight is strong (likely driven at least in part by ecommerce sales), but truck tonnage lags. We think that truck tonnage is probably the measure to watch, and see warning signs of a possible downside extension of the recent trends.

The Consumer: Employment



The Consumer: Income



- The labor market is one of the real unknowns, and points to a furthering of economic divides in America. Data show that the recovery has been solid for higher wage earnings, while low wage earners are still unemployed or struggling.
- Beware of attaching significance to individual employment reports. Politicians and talking heads love to seize on these when they fit the desired narrative, but there is so much noise that they are meaningless. (Making the noise from these fronts perhaps even more meaningless than usual.)
- We are hearing many reports of persistent labor shortages, at the same time many are unemployed, many are quitting jobs, and employers are offering higher salaries. What is going on here? Do workers have unrealistic expectations for wages? Are there ongoing concerns about some kinds of work in a pandemic environment? Neither of these explanations seems adequate, so are left with uncertainty. Perhaps the most interesting aspect of this is that few commentators are focusing on this mystery, and it's one that could hide significant risks.
- While Personal Income has increased fairly dramatically into the economic crisis, it has failed to keep up with inflation in recent months. We also believe official measures of inflation are understated, so there's likely a broad wage cut in effect.

The Consumer: Spending

Advance Real Retail and Food Services Sales



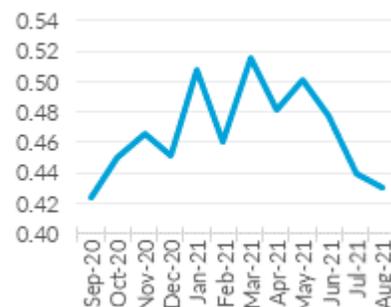
Recent Data



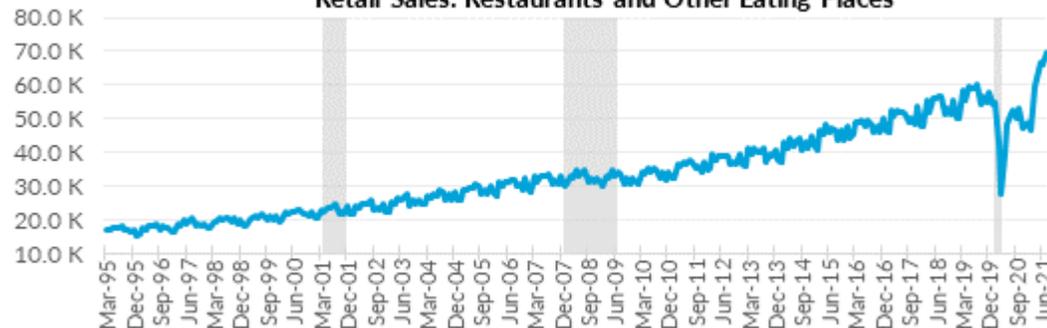
Heavy Truck Sales



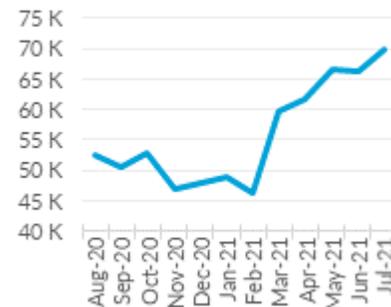
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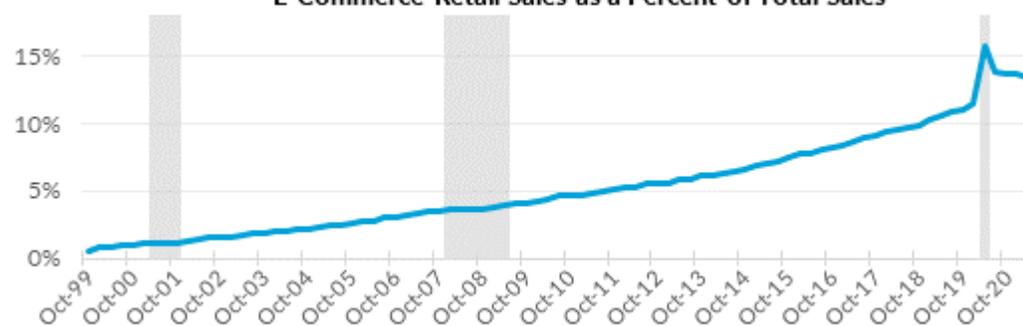
Retail Sales: Restaurants and Other Eating Places



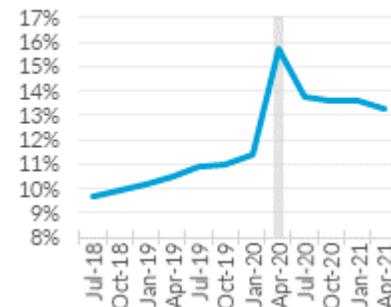
Recent Data



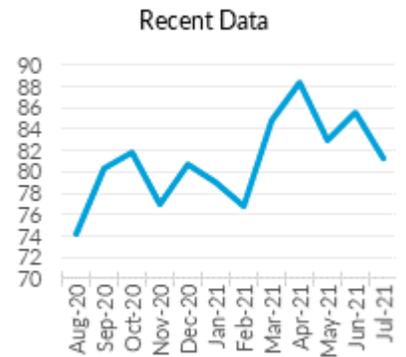
E-Commerce Retail Sales as a Percent of Total Sales



Recent Data



Consumer Sentiment



- So now we arrive at the crux of the matter—consumption. People are still buying “things” (ranging from meals at restaurants to houses) while unemployment is rampant and incomes are stagnant against inflation. Furthermore, consumers do not seem to be funding these purchases from debt. (More on that later in this report.) And...
- Perhaps critically, Consumption, at least currently, is *the* key support of GDP growth. There’s obviously a logical disconnect here, and it seems likely this situation is absolutely unsustainable.
- We are a bit surprised by the snapback in Restaurant sales and the overall resilience of Retail Sales. Recent data for the latter shows some softening. Watch this into next quarter.
- We continue to think measures of sentiment are largely meaningless, as they track the economy and stock market tightly, with a built-in lag. They are not predictive measures.

Housing

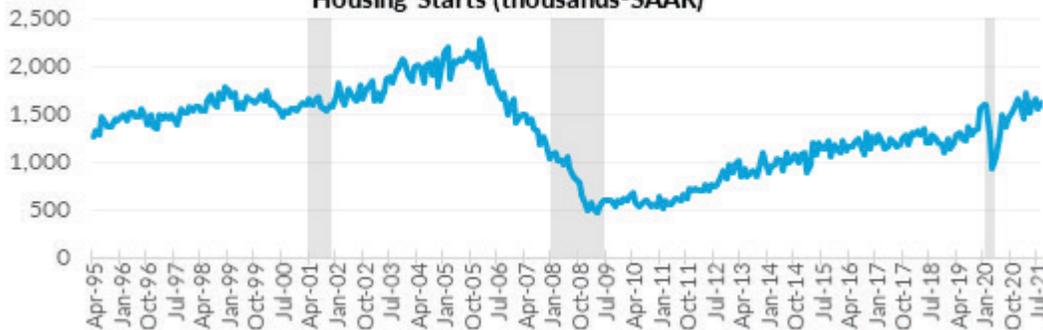
New Home Sales (thousands-SAAR)



Recent Data



Housing Starts (thousands-SAAR)



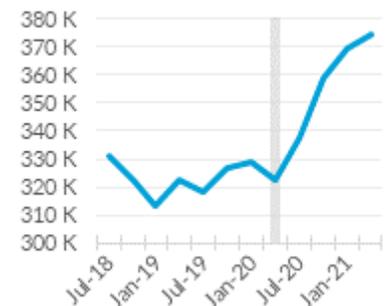
Recent Data



Median Sales Price of Houses Sold for the United States

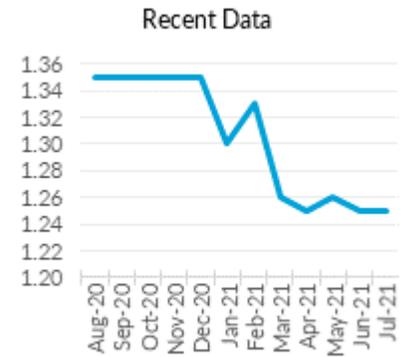
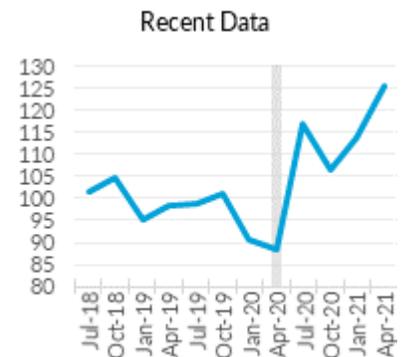
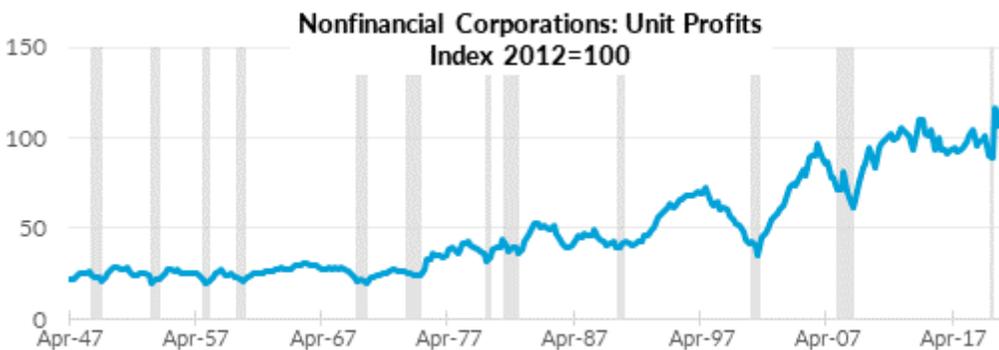
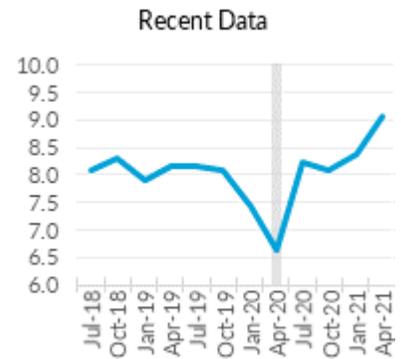
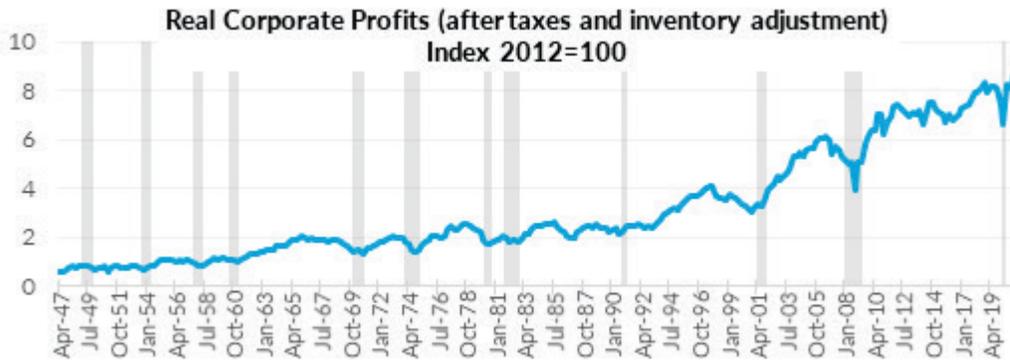


Recent Data



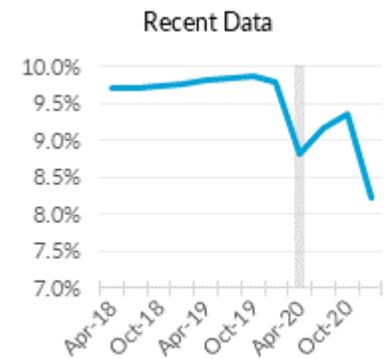
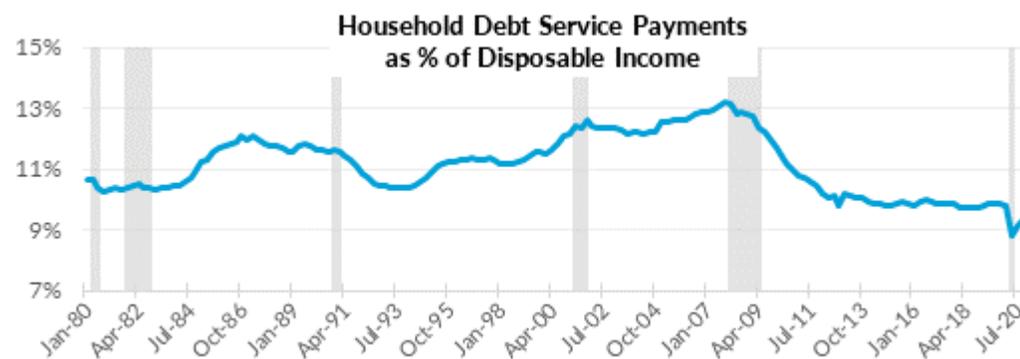
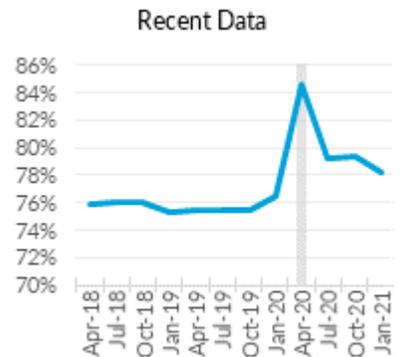
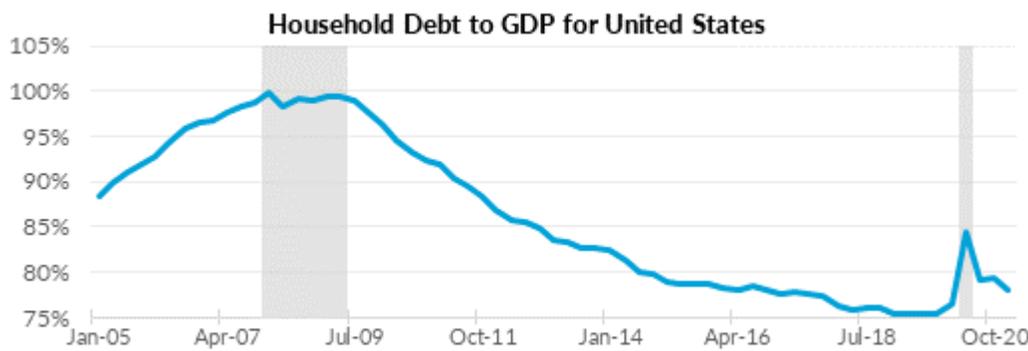
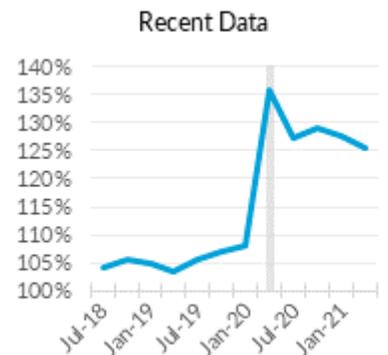
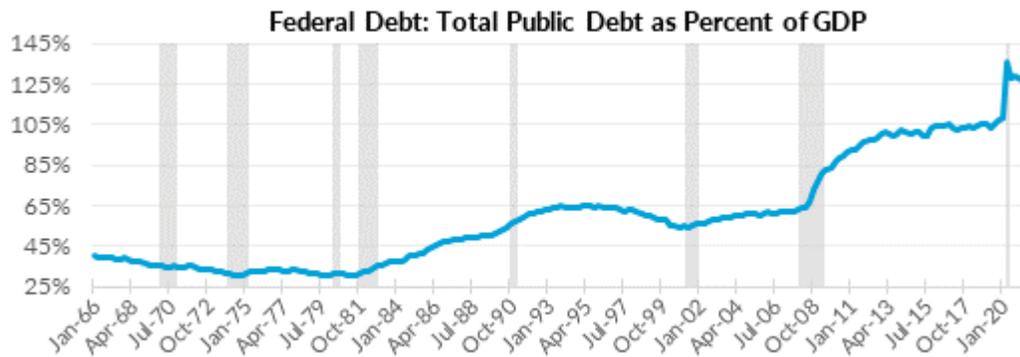
- The housing market has cooled slightly, but remains strong overall.
- Very likely, a key driver here is low interest rates—rising rates could certainly take a piece out of the housing market.
- From a quantitative perspective, we see no objective warning signs, but have to wonder if buyers have shouldered debt that would not be sustainable in another downturn. Could we be laying the seeds of another economic crisis today? (The answer to that question, in a generic sense, is of course always yes, but there are issues here to be considered more deeply.)

Corporate Profits



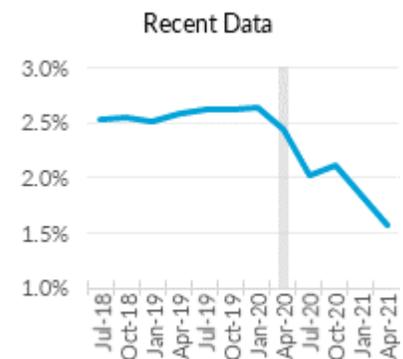
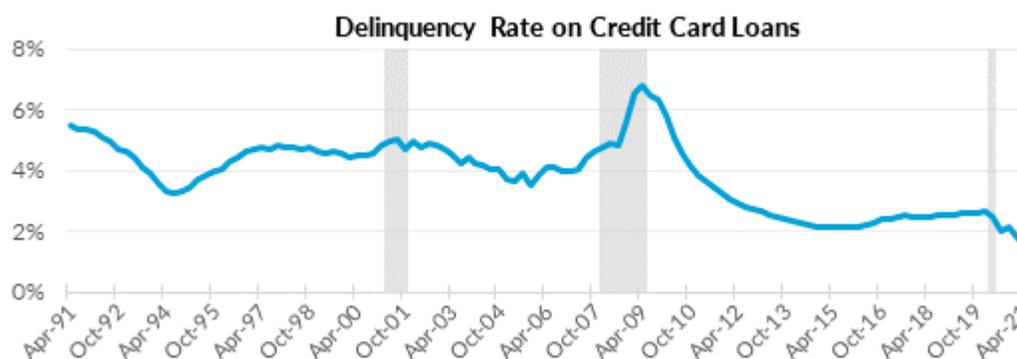
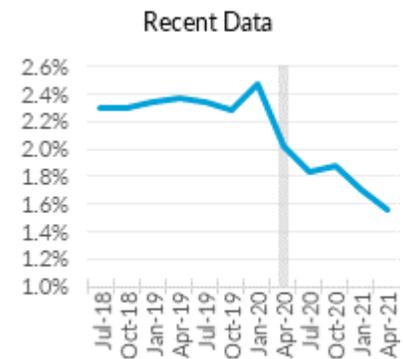
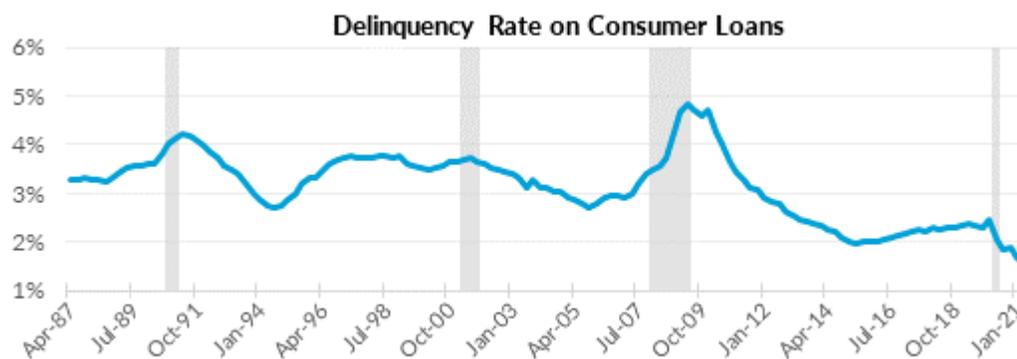
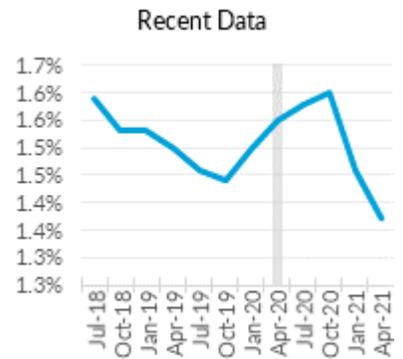
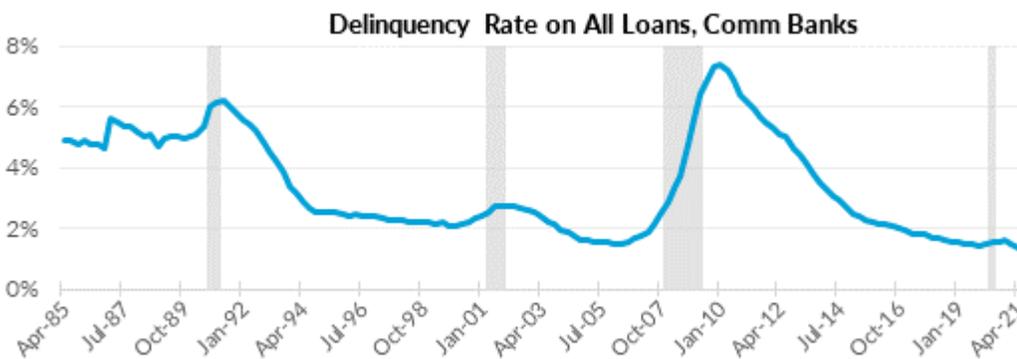
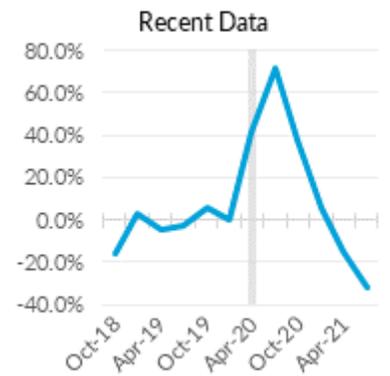
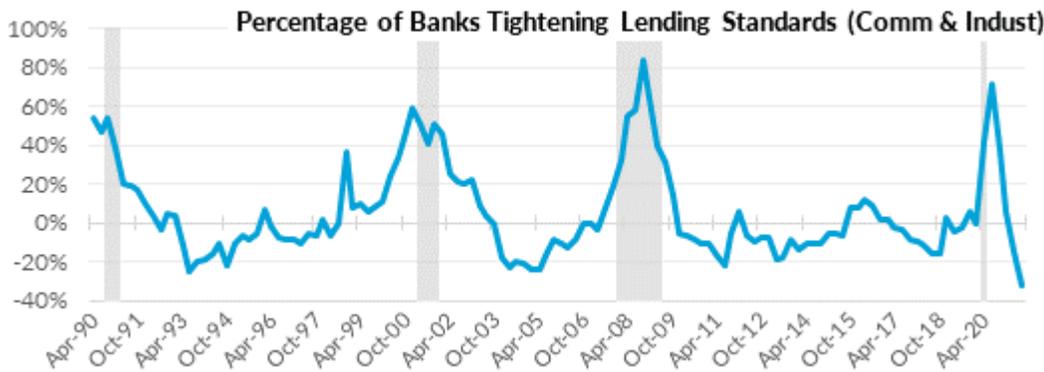
- Who's doing well in this economy? Corporations, that's who. (And this is not a bad thing.)
- Corporate profits have continued to increase post-recession, on-trend with data pre-Covid.
- Unit profits have increased substantially, and inventories have fallen significantly.
- We view this as a broad positive, but note that this could provide fuel for ill-considered socialist/Marxist commentary from some quarters. This may matter more than usual because some of the "black swan" threats to the economy come from social issues and stresses—though unlikely, there are risks of further unrest that could destabilize economic and social structures in this country.

Debt & Lending

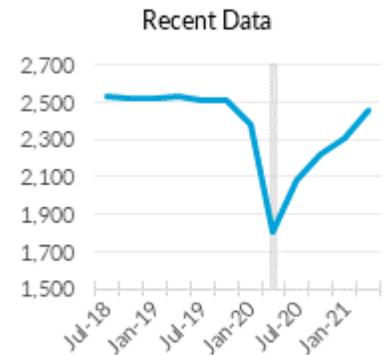
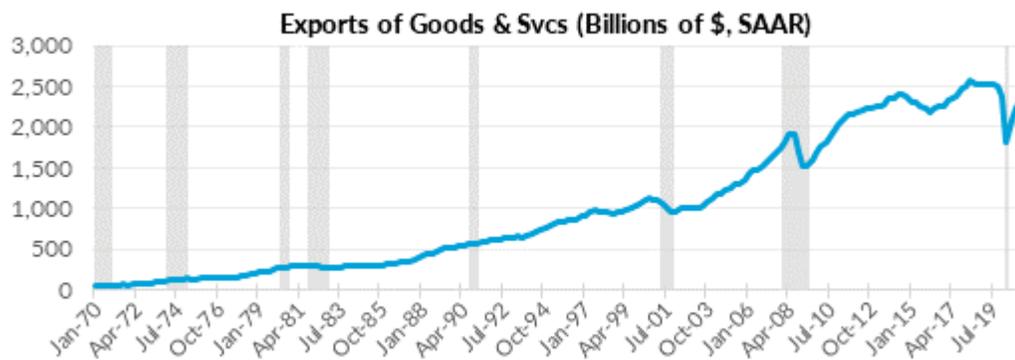
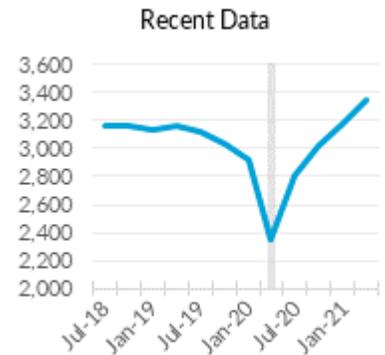
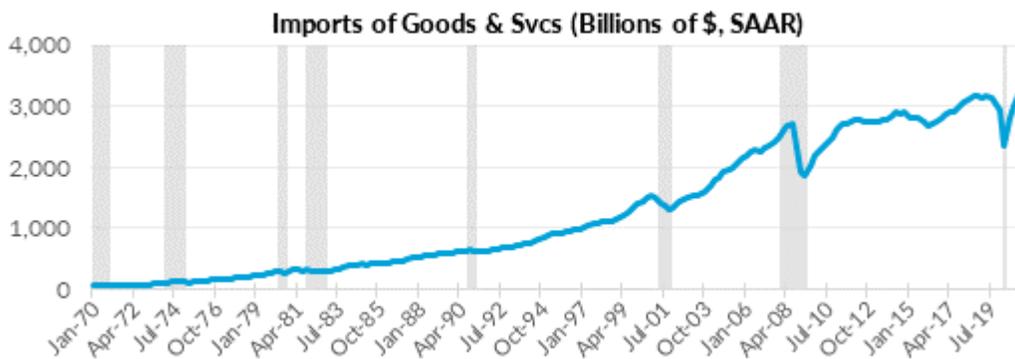
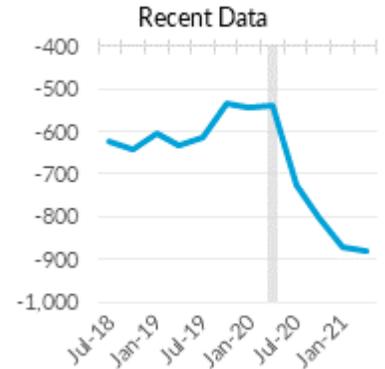
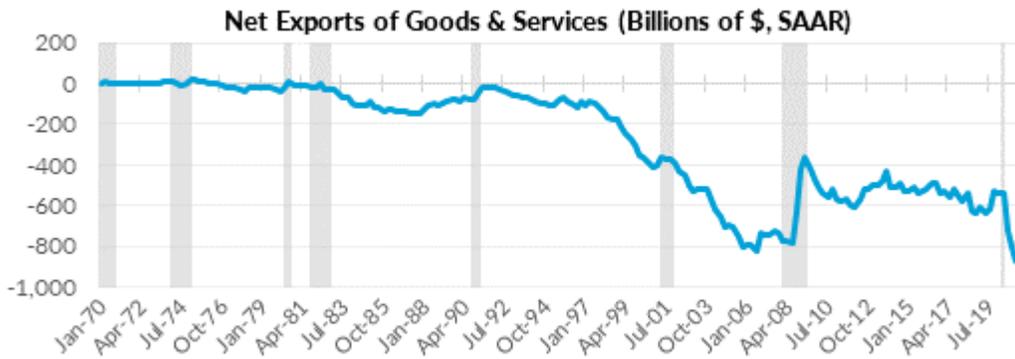


- Federal debt is ugly, make no mistake about it. The standard answer is that this is not much of an issue, and perhaps no issue at all, but the alarming increase in Federal Debt is something to consider carefully.
- Household debt, however, appears to be handily under control. One key measure is the % of Disposable Income allocated to servicing debt, and this measure is at a multi-decade low.
- Measures of debt-related economic stress (next page) also show no cause for concern. Watch these carefully when they do start to uptick.

Debt & Lending



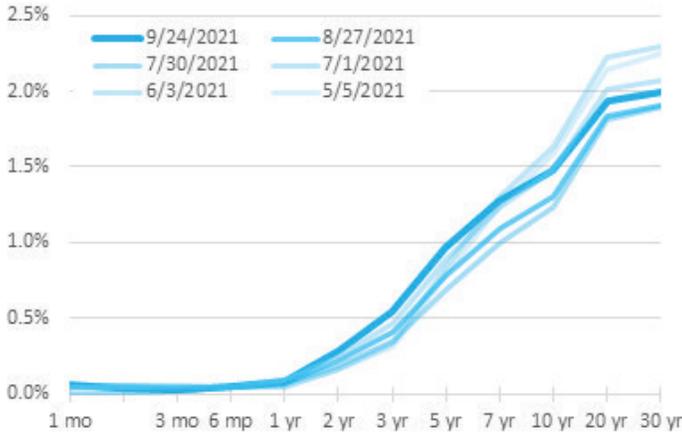
Trade: Exports



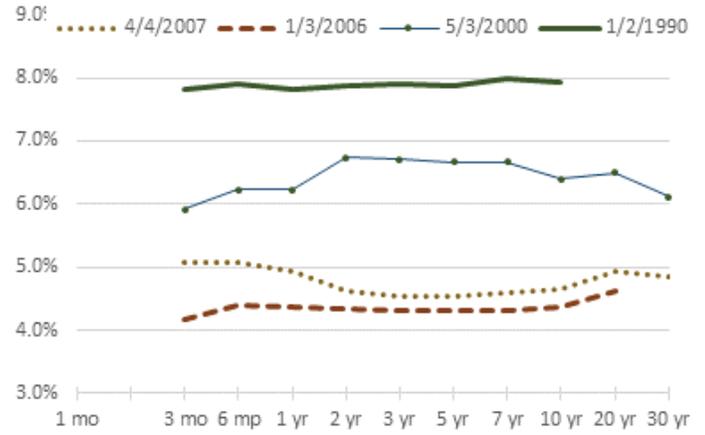
- Many measures of trade are showing strength, but shipping bottlenecks have been a significant constraint to international trade in recent weeks.
- We never shared many of the concerns about “imbalance” between imports and exports—there’s a very real sense in which a nation’s exports exist to fund its imports.

Yield Curve

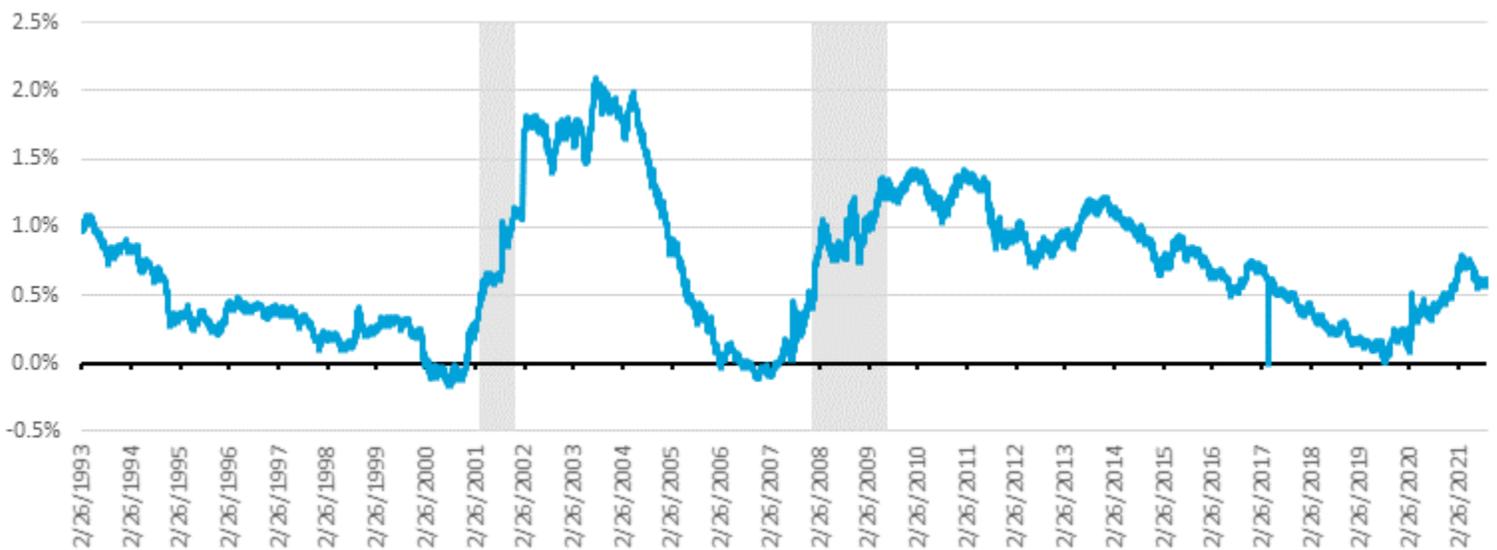
Yield Curve, Current



Historical Examples: Curves Under Stress



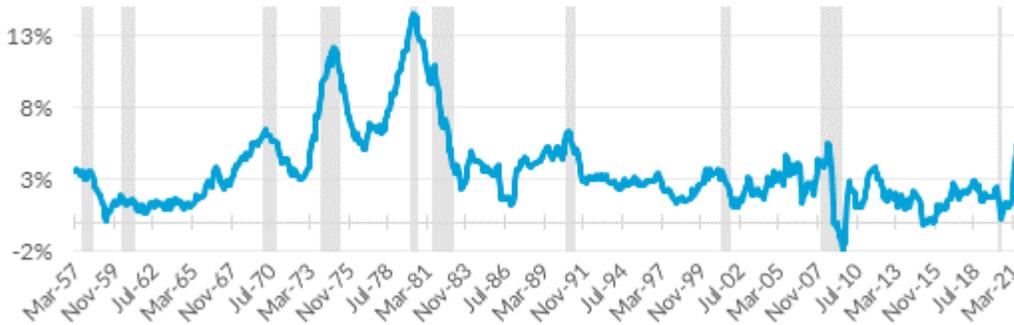
Yield Curve History (Regression Line Slope)



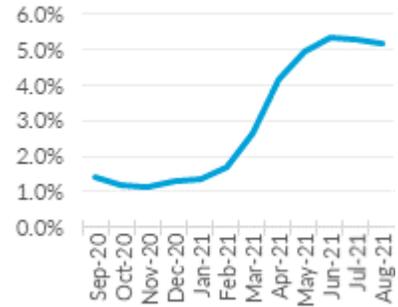
- We suggest keeping a careful perspective on both the long-term history of interest rates and the history of the shape of the curve.
- The curve offers no particular insight at this time; most of its power comes from the warnings associated with inversion. Following the stress of 2020, the curve's shape has normalized.
- Rates continue to hold at very low levels, following a bear market in rates stretching back to the early 1980's. Remember, this is a trend and trends can shift or abort. Strength in rates could lead to much higher rates, with potential cascade effects. Watch Fed tapering closely.

Rates

Consumer Price Index for All Urban Consumers: All Items



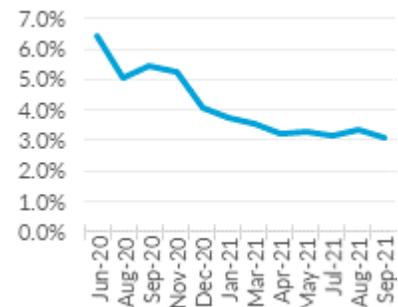
Recent Data



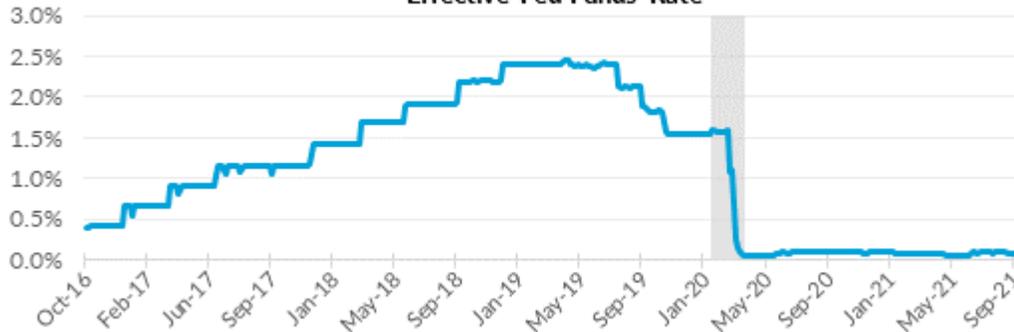
High Yield (CCC or Below) Credit Spread



Recent Data



Effective Fed Funds Rate



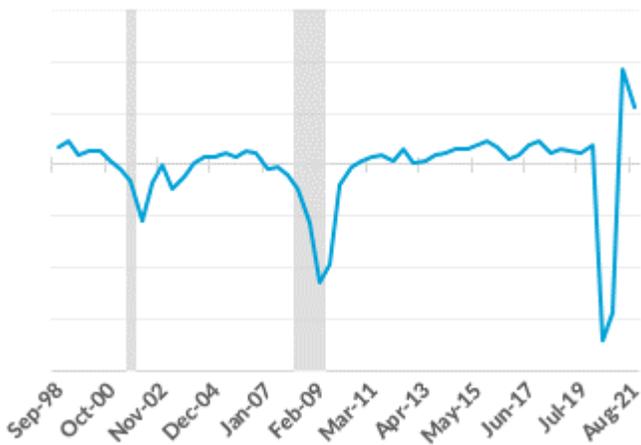
Recent Data



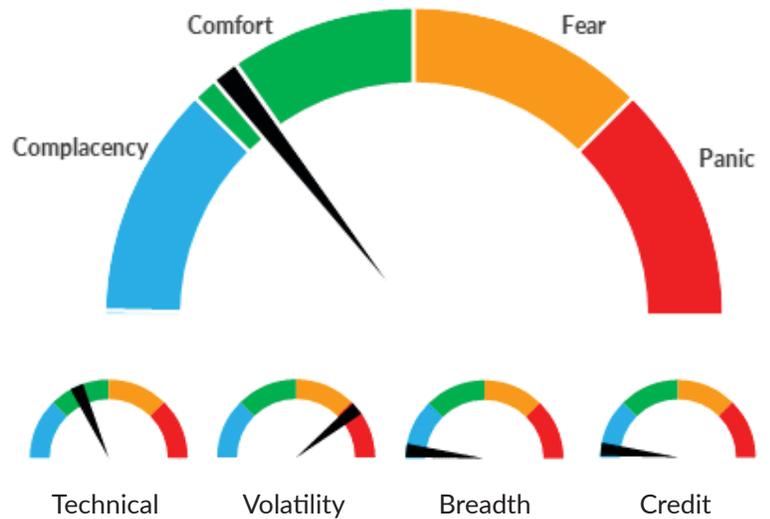
- We think inflation, and potentially catastrophic inflation, has emerged as one of the key threats to financial markets on a long time horizon (~5 years).
- Recent data shows a significant uptick in inflation, and some measures suggest inflation far beyond the official measures.
- Narrative from the Fed has been consistent, essentially hoping that inflation will prove to be transitory. It could be transitory, but we cannot stress this enough: no one knows! The Fed's constant use of that word is either propaganda or hope, and we aren't sure which is worse—one is manipulative and the other is short-sighted.
- We expect higher rates in 2022.

Our Models

Employment Recession Indicator



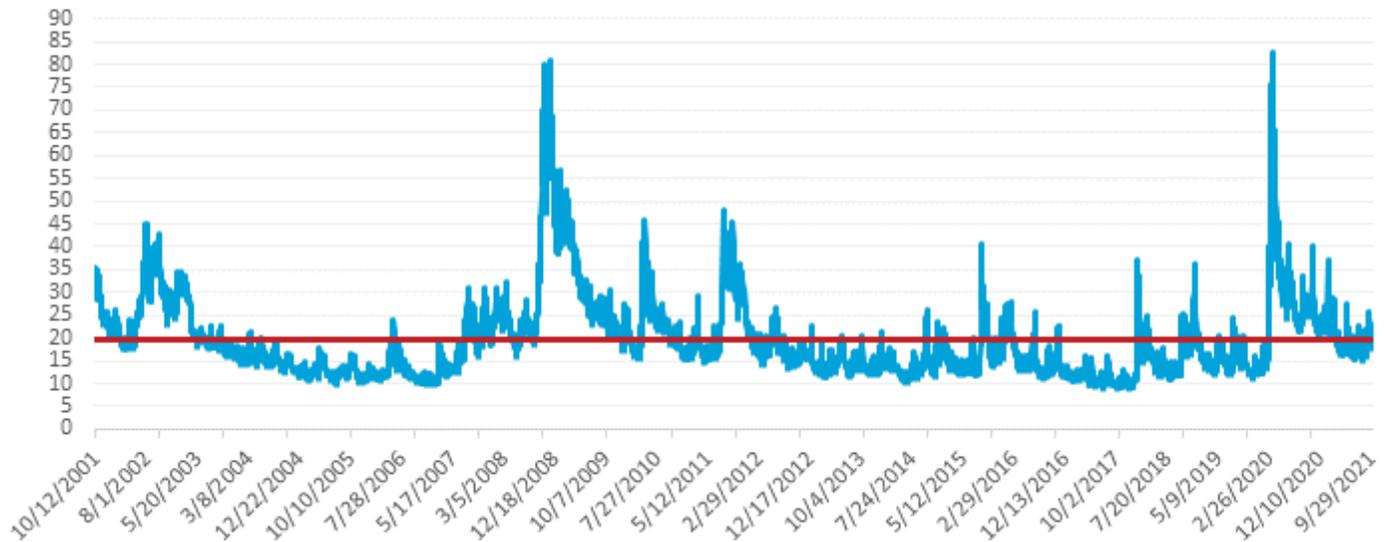
Market Stress Index (MSI)



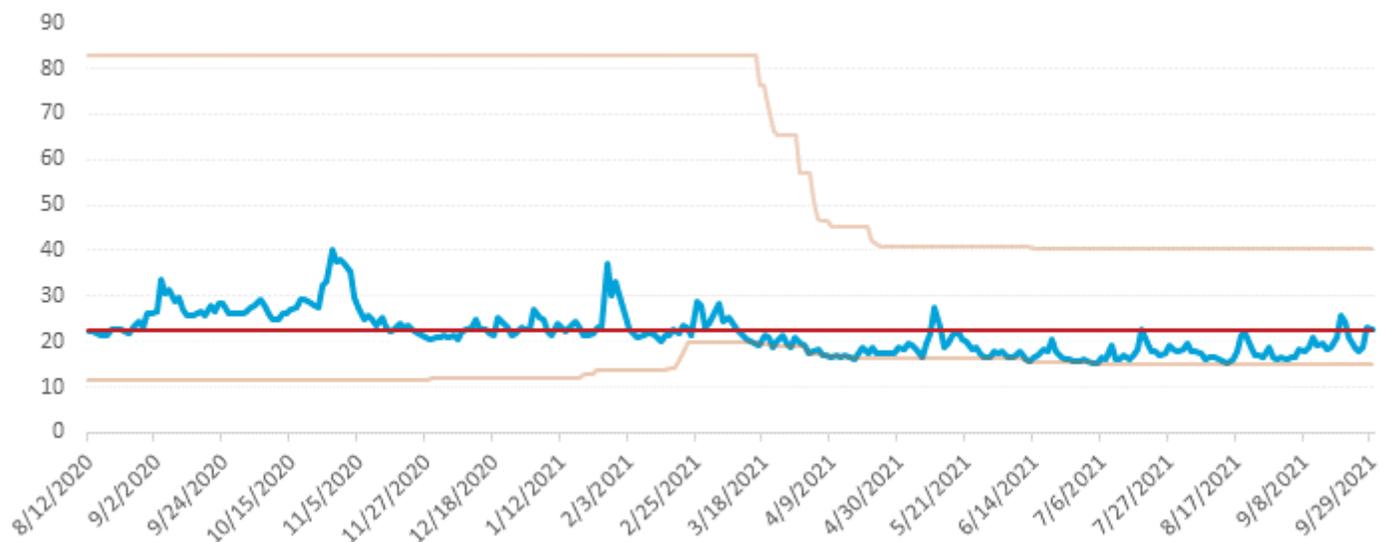
- The Market Stress Index (MSI) is a proprietary tool composed of three components, two of which are illustrated on this page, along with the composite measure.
- The MSI has moved into Complacency, and touched this zone several times near the end of the quarter.
- This is an area from which markets have seen significant and volatile downturns—treat this as a risk factor.
- Our Employment Recession Indicator measures the relationship between trends in several measures of employment. It is a binary indicator, either giving warning of recessionary pressures or not. There is currently no warning from this model.

Stock Market Volatility

VIX (20 Year History with 20 Year Average Level)



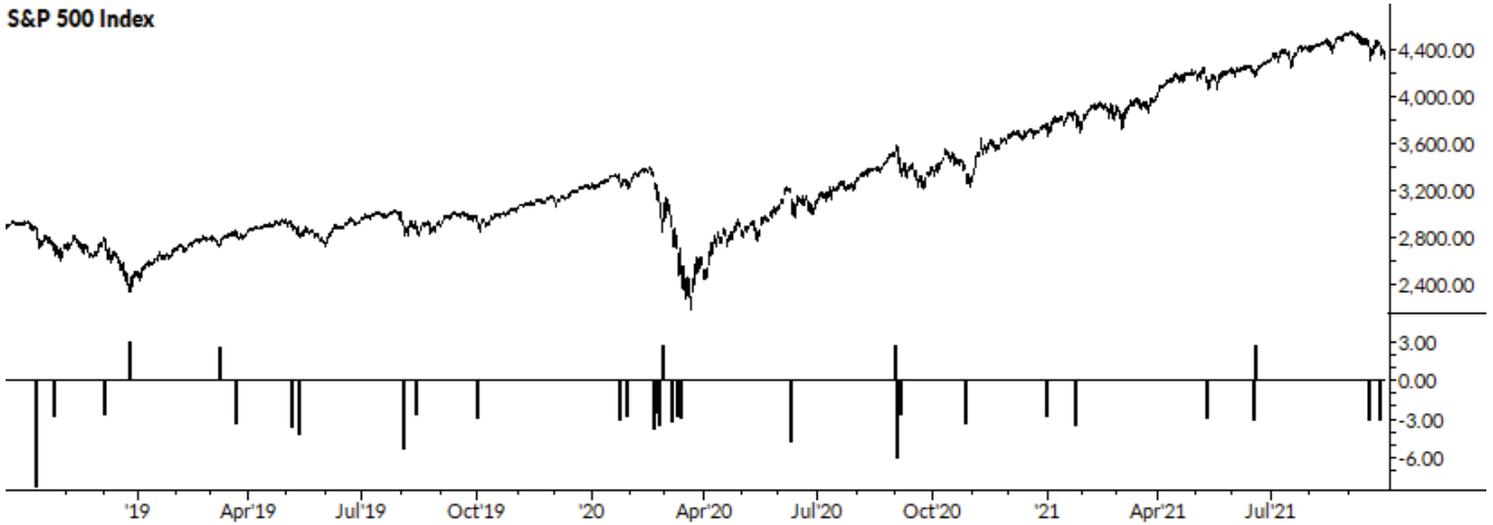
VIX (1 Year History with Trailing 1 Year Max, Min, and 1 Year Average)



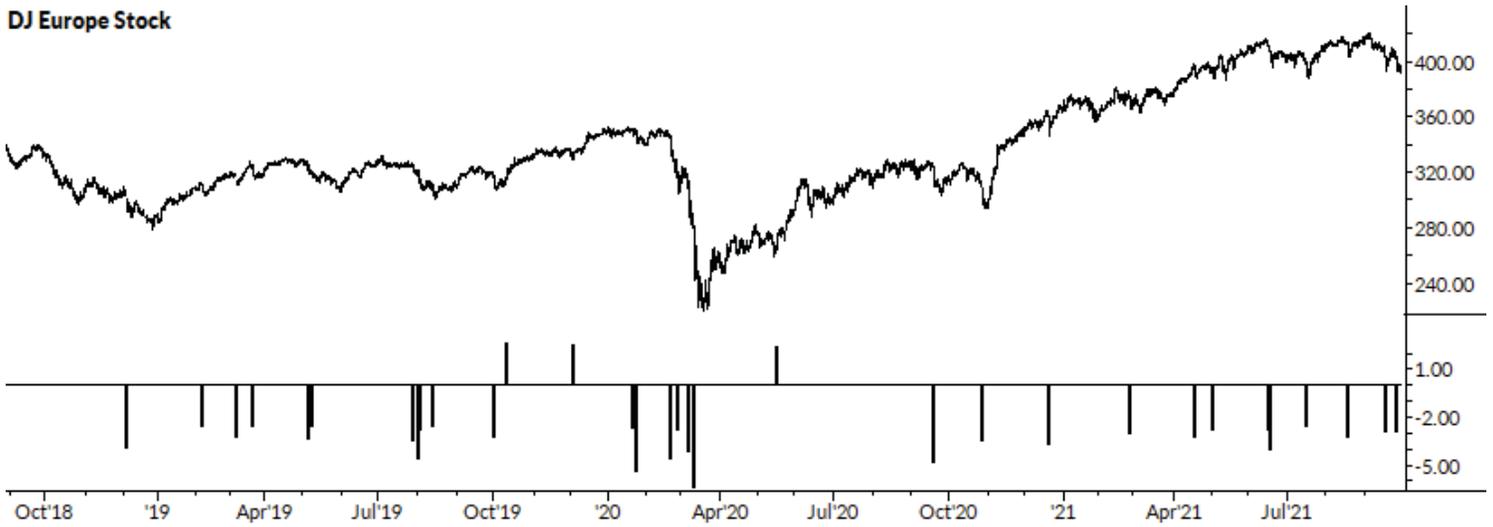
- Volatility has contracted and is hovering near the low end of the historical range. (2012-2019 volatility was abnormally low. Current levels are more typical.)
- Low volatility conditions can persist longer than anyone would expect. Avoid thinking a breakout “must” happen on any timeframe.
- However, low volatility conditions do set up markets for clear directional moves. Any large move is likely to see followthrough, perhaps lasting months to quarters.

Market Shocks and Stability

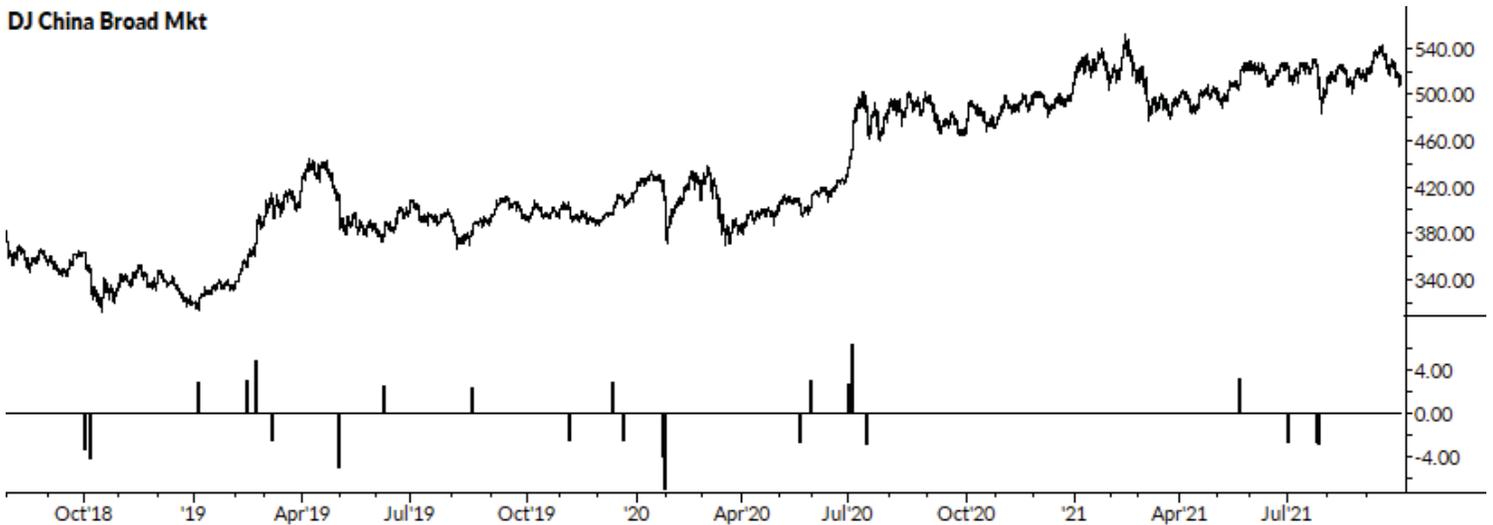
S&P 500 Index



DJ Europe Stock

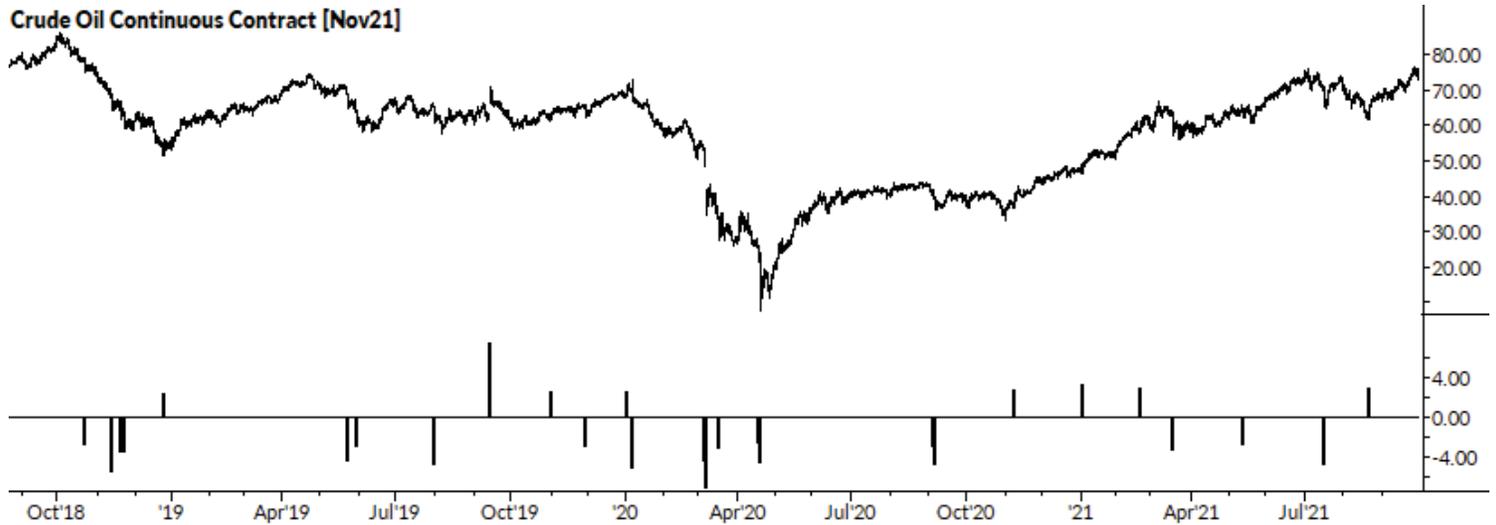
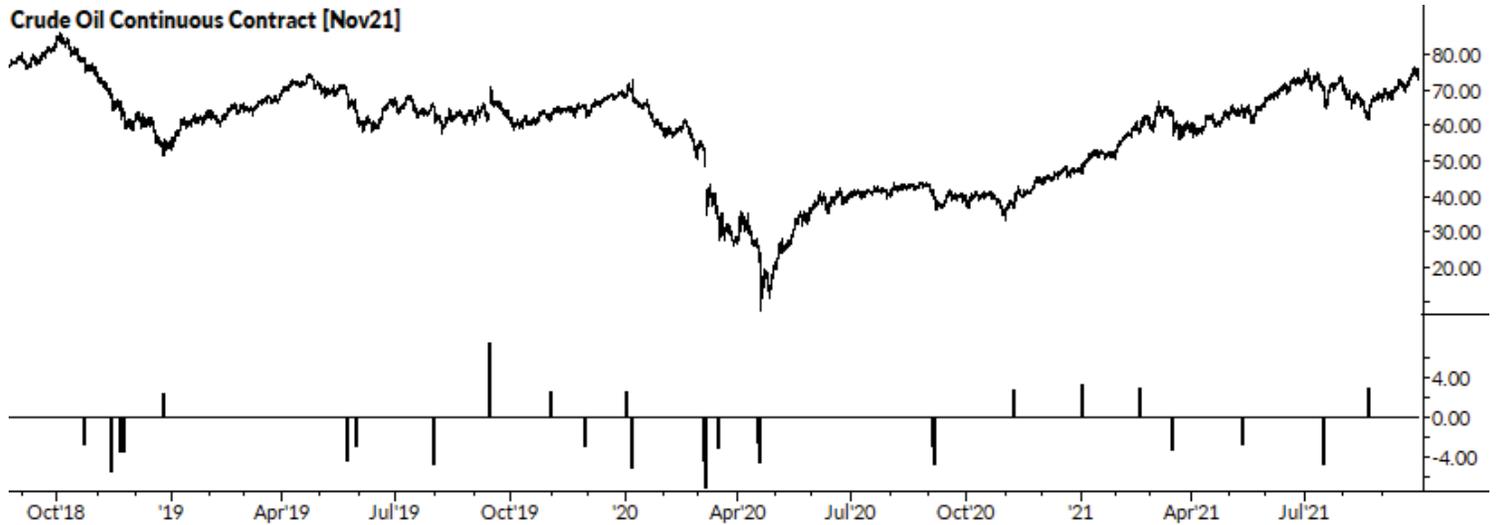
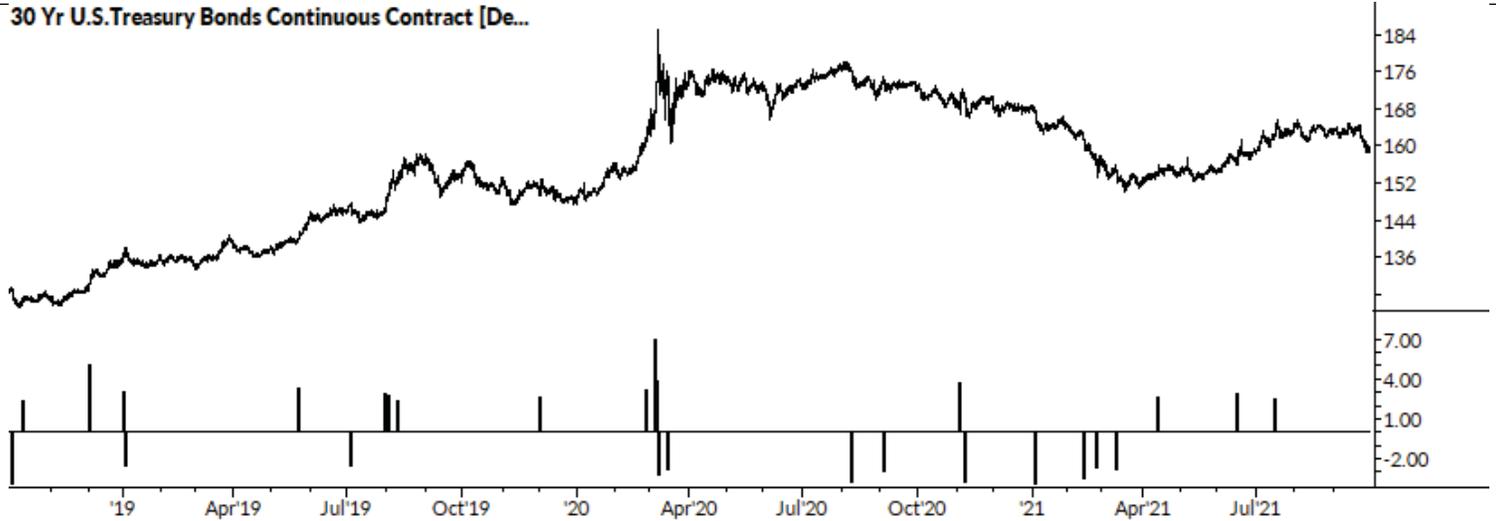


DJ China Broad Mkt



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.)



- In stocks, China is coming off an exceptional placid quarter of trading (note absence of significant shocks on previous page). The US and Europe have seen some minor volatility to the downside, but nothing of any real significance.
- Trends in Treasuries and most commodities have also been fairly well-contained, with few volatile disruptions across the board.
- These conditions could shift and change at any time...

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.

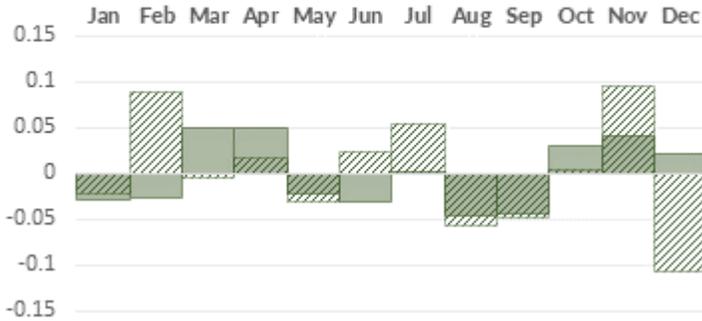
The last panel shows the seasonality of volatility for the instrument. This is an oft-neglected aspect of price behavior, and there is solid evidence that many instruments exhibit more predictable seasonal variation in volatility than in price direction.

CONCLUSION

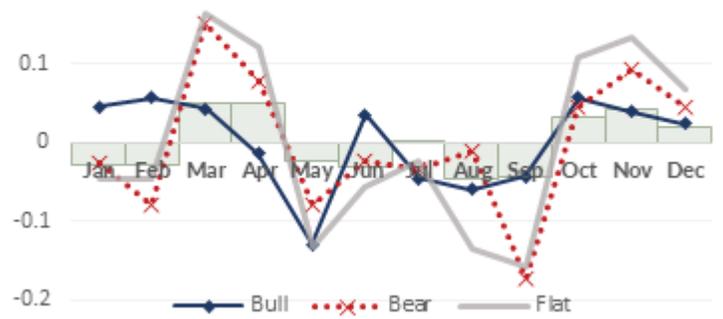
These tools can be useful for active traders, for investors who wish to consider potential seasonal inflections, or for anyone who wishes to “fact check” the facile market statistics that are so common today. The pages that follow will give deep insight and will help to put seasonal influences in context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

S&P 500

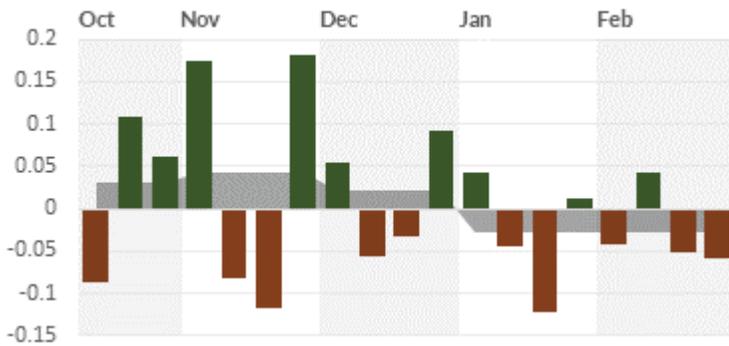
1997 - 2019 (Shaded: 2014 - 2019)



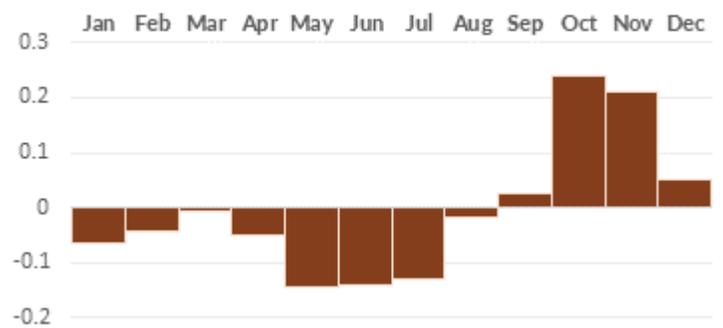
Bull Years: 1999, 2012, 2013, 2014, 2017
Bear Years: 2000, 2001, 2002, 2008, 2009



Forward Seasonality

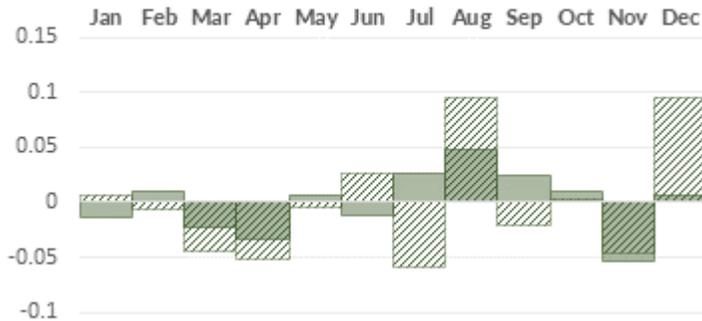


Seasonality of Realized Volatility



VIX Index

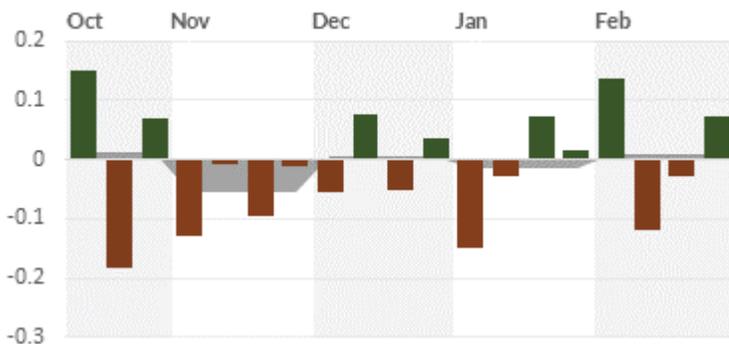
1995 - 2019 (Shaded: 2014 - 2019)



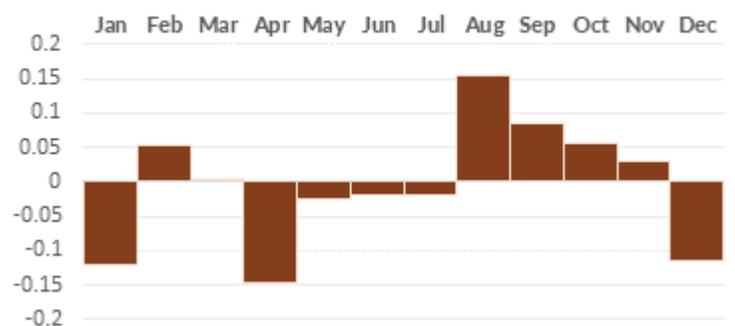
Bull Years: 2002, 2007, 2008, 2011, 2018
Bear Years: 1999, 2003, 2004, 2012, 2017



Forward Seasonality

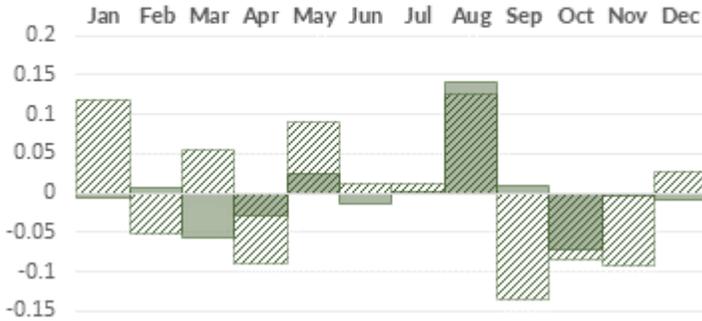


Seasonality of Realized Volatility

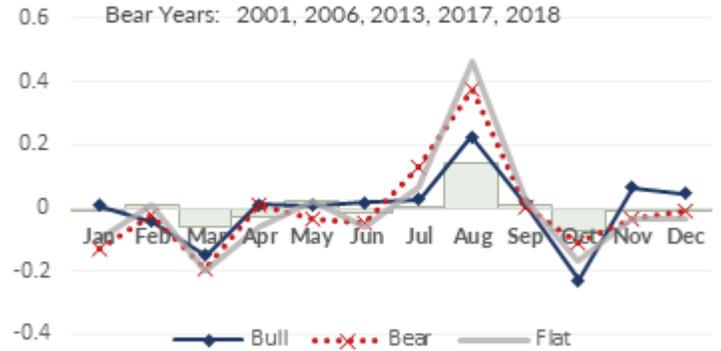


30 Year Treasury Bond Futures

2001 - 2019 (Shaded: 2014 - 2019)



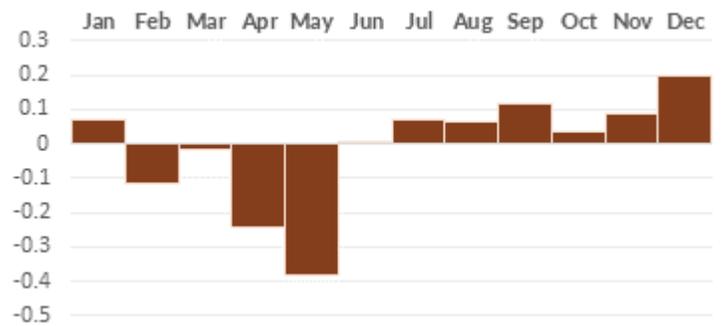
Bull Years: 2002, 2008, 2010, 2011, 2019
Bear Years: 2001, 2006, 2013, 2017, 2018



Forward Seasonality

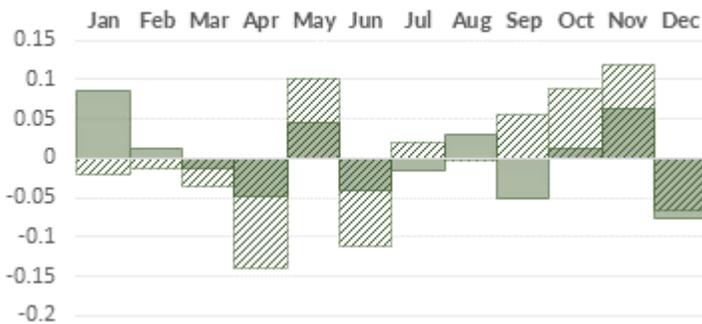


Seasonality of Realized Volatility

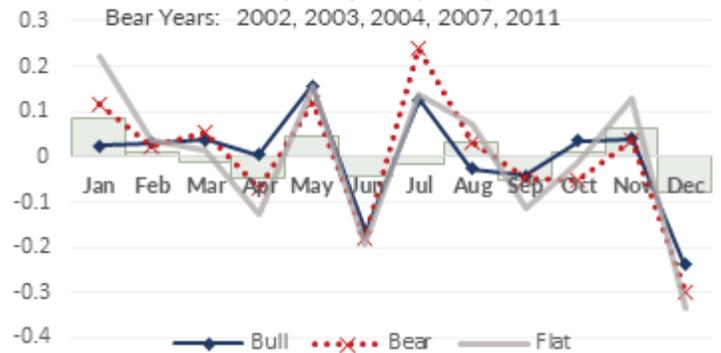


US Dollar Index

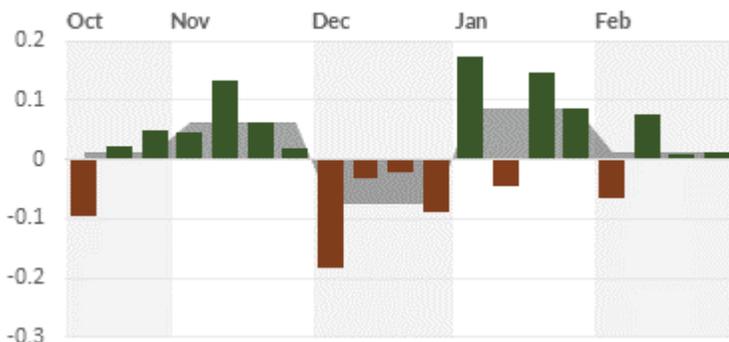
1995 - 2019 (Shaded: 2014 - 2019)



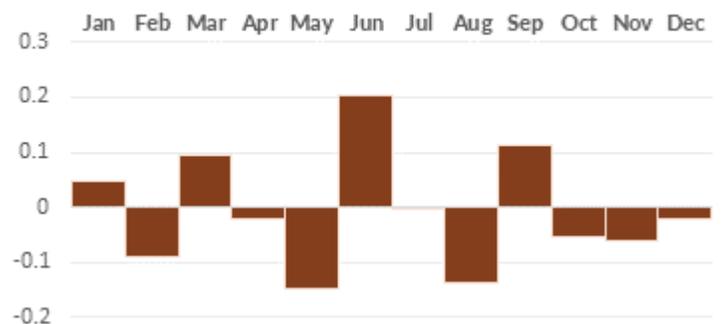
Bull Years: 2000, 2012, 2015, 2018, 2019
Bear Years: 2002, 2003, 2004, 2007, 2011



Forward Seasonality

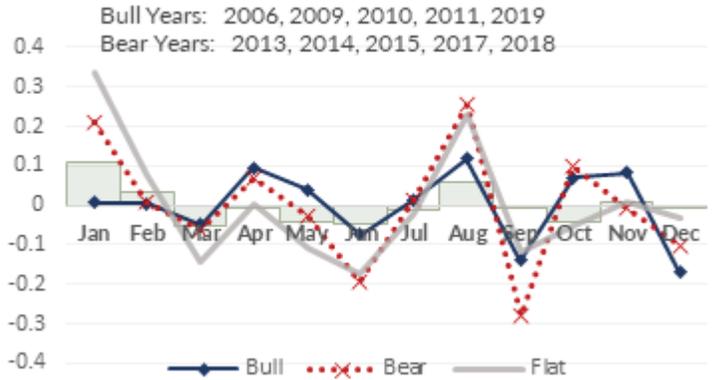
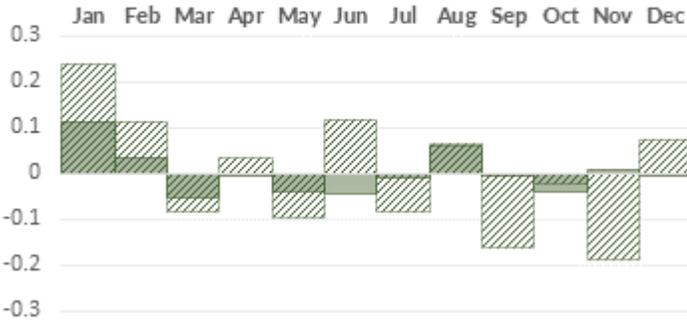


Seasonality of Realized Volatility



Gold

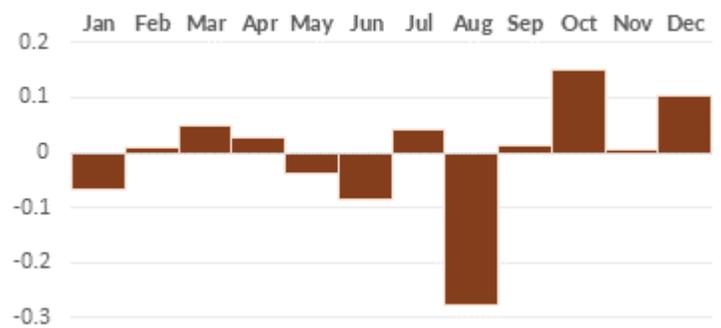
2001 - 2019 (Shaded: 2014 - 2019)



Forward Seasonality

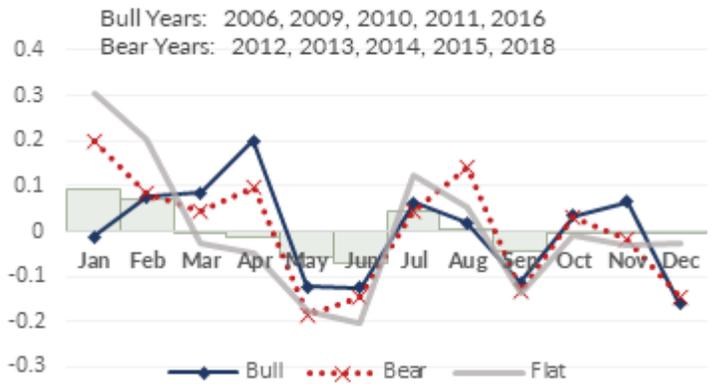
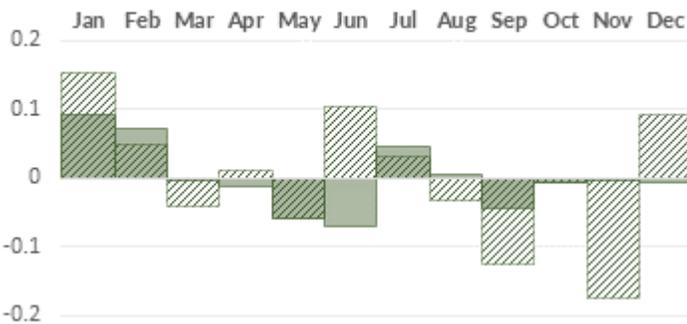


Seasonality of Realized Volatility



Silver

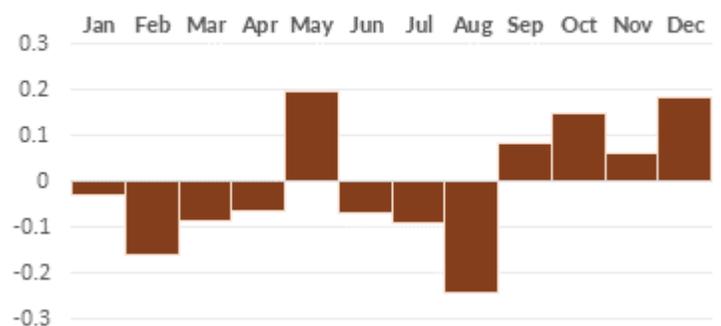
2001 - 2019 (Shaded: 2014 - 2019)



Forward Seasonality

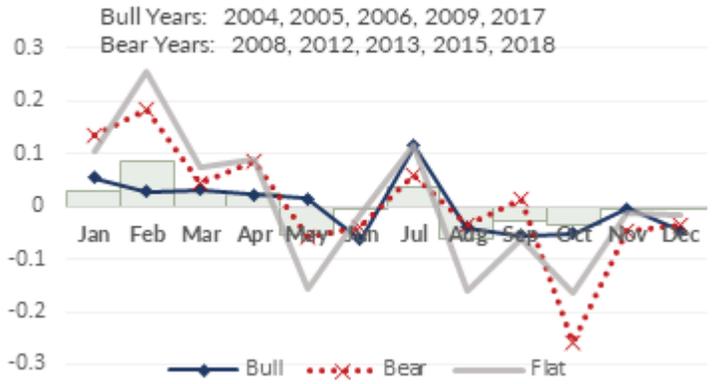
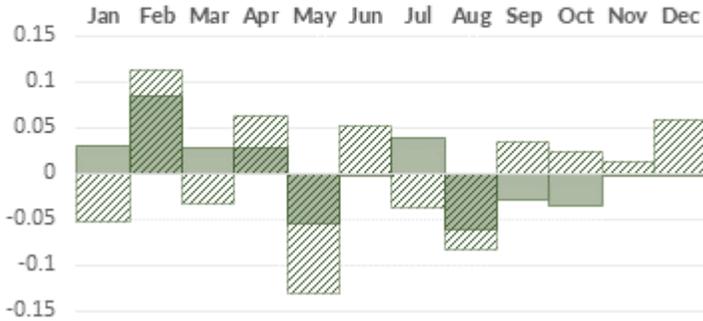


Seasonality of Realized Volatility



Copper

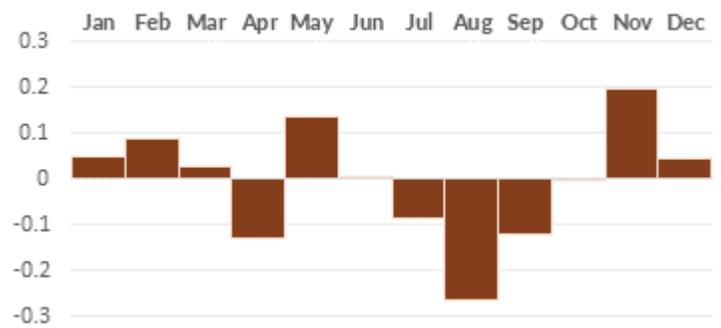
2001 - 2019 (Shaded: 2014 - 2019)



Forward Seasonality

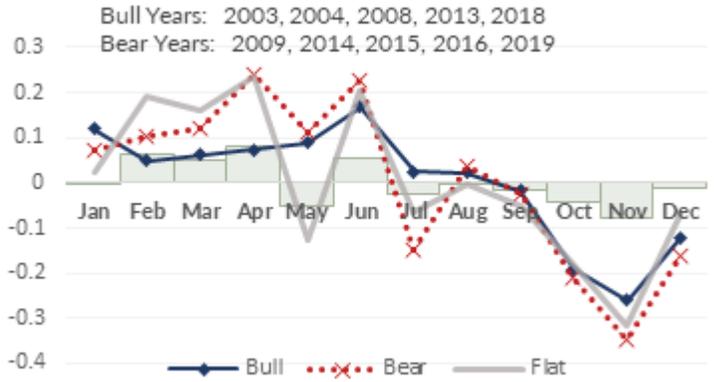
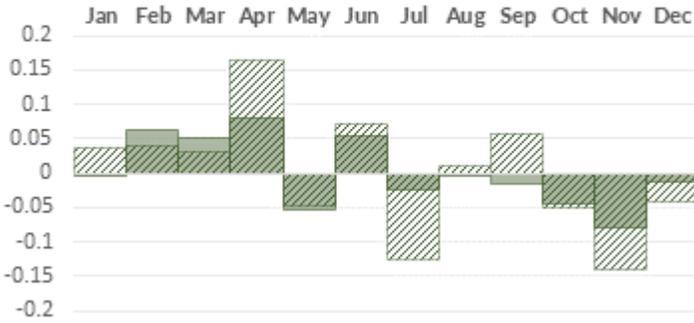


Seasonality of Realized Volatility

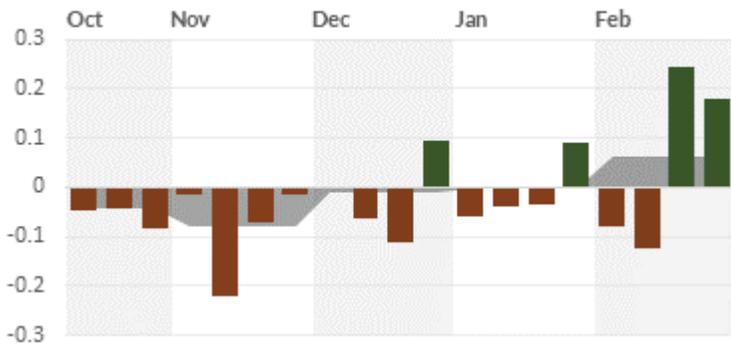


Crude Oil

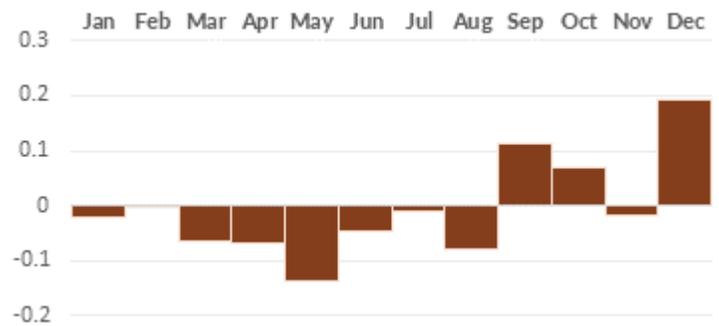
2001 - 2019 (Shaded: 2014 - 2019)



Forward Seasonality

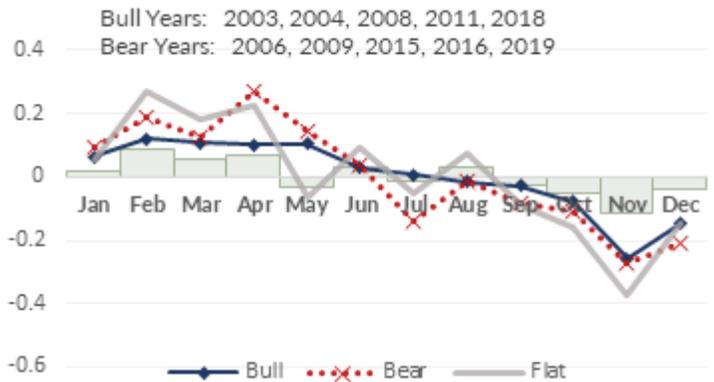
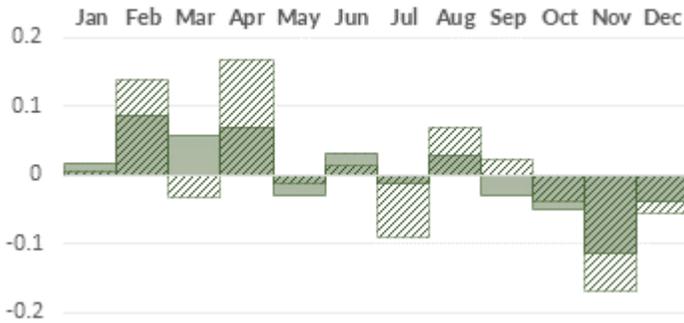


Seasonality of Realized Volatility

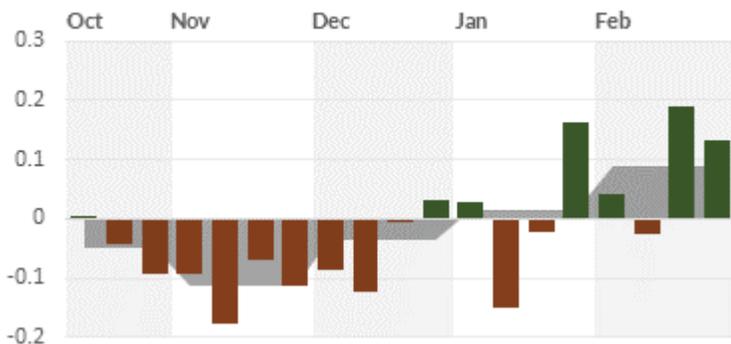


Heating Oil

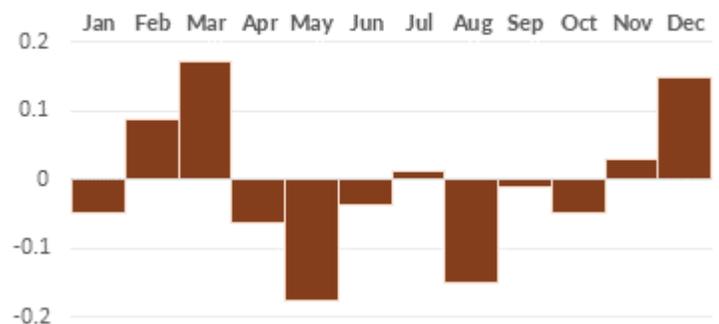
2001 - 2019 (Shaded: 2014 - 2019)



Forward Seasonality

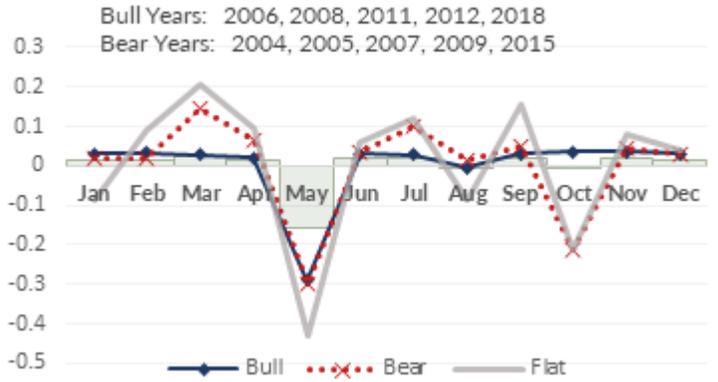
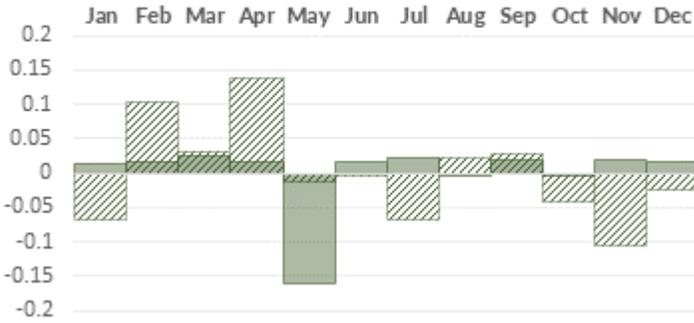


Seasonality of Realized Volatility

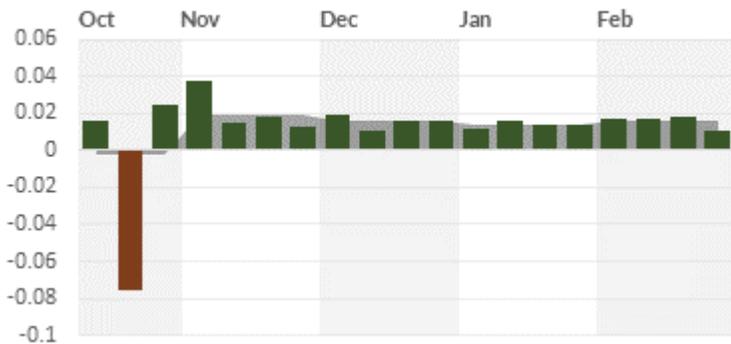


Gasoline

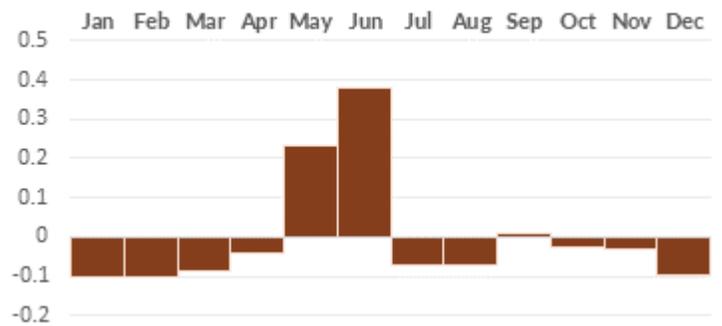
2001 - 2019 (Shaded: 2014 - 2019)



Forward Seasonality

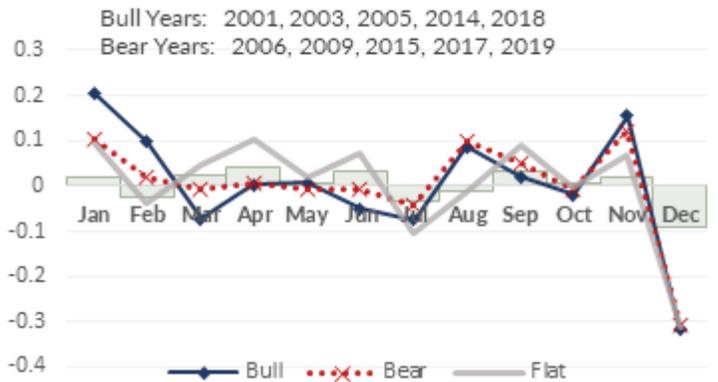
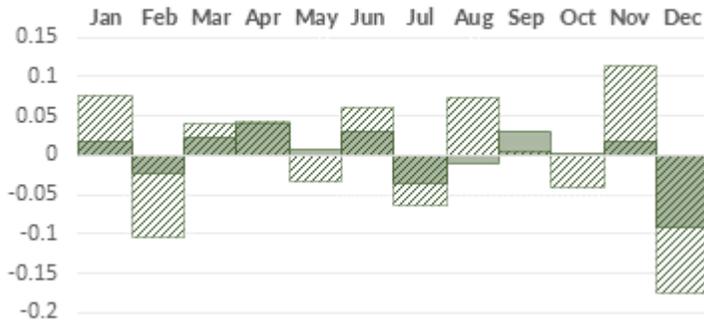


Seasonality of Realized Volatility

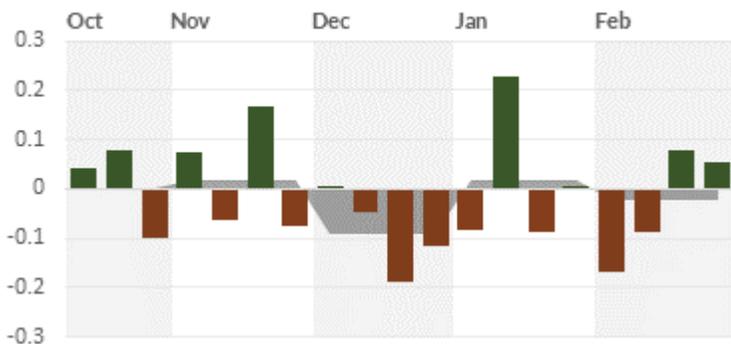


Natural Gas

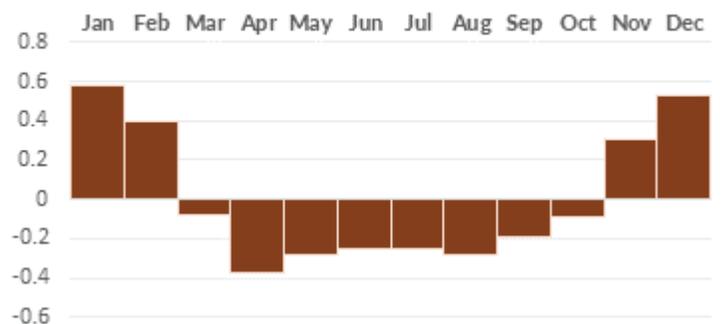
2001 - 2019 (Shaded: 2014 - 2019)



Forward Seasonality

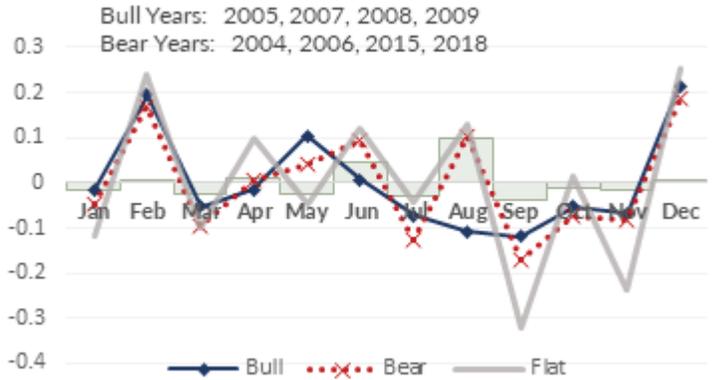
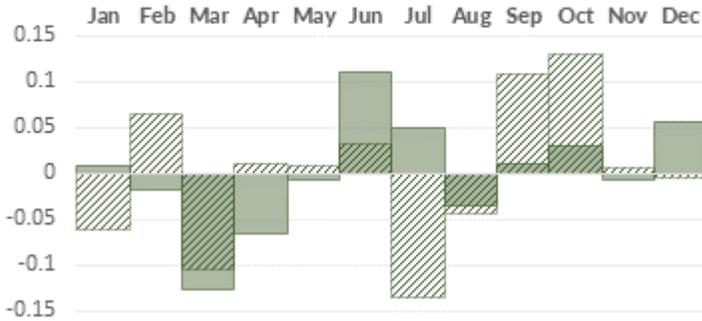


Seasonality of Realized Volatility



Sugar

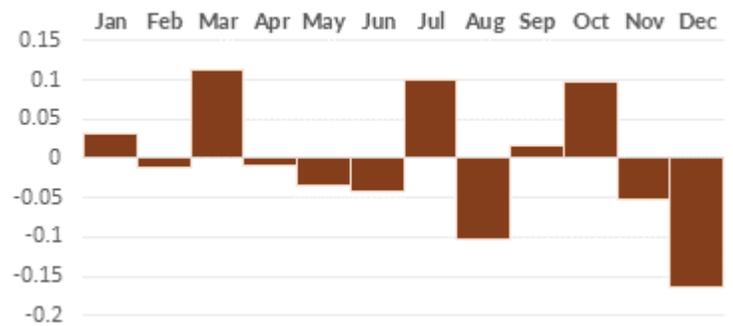
1995 - 2019 (Shaded: 2014 - 2019)



Forward Seasonality

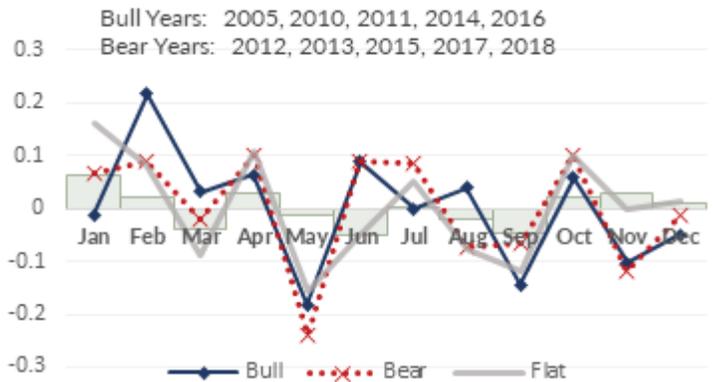
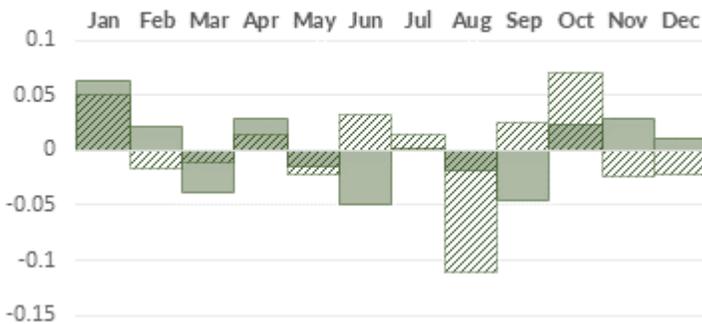


Seasonality of Realized Volatility

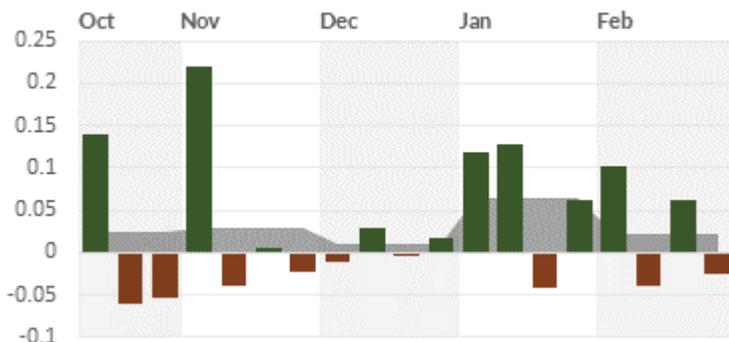


Coffee

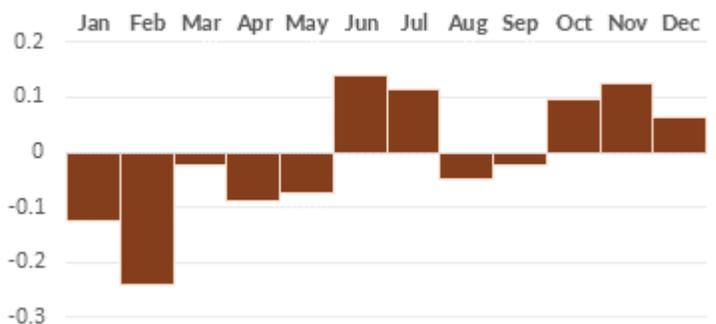
1995 - 2019 (Shaded: 2014 - 2019)



Forward Seasonality

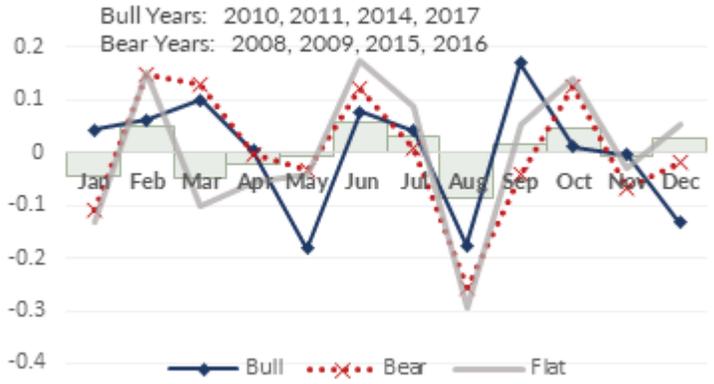
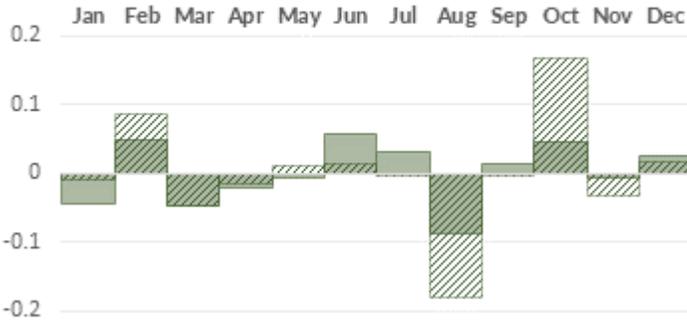


Seasonality of Realized Volatility



Live Cattle

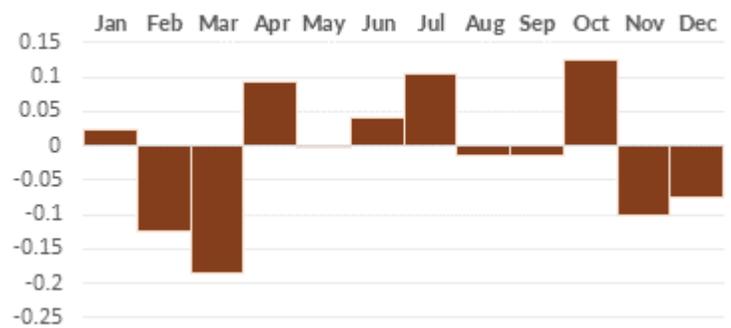
2005 - 2019 (Shaded: 2014 - 2019)



Forward Seasonality

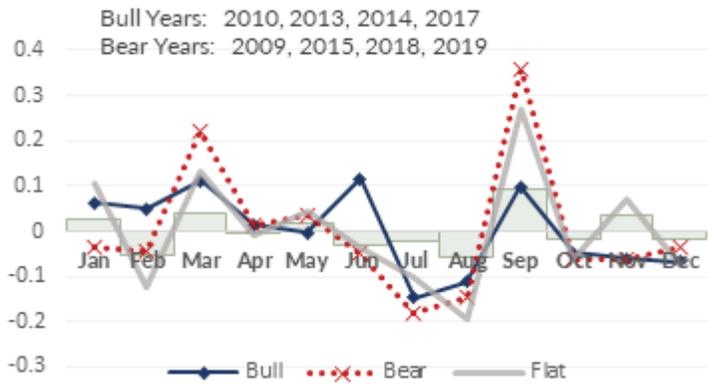
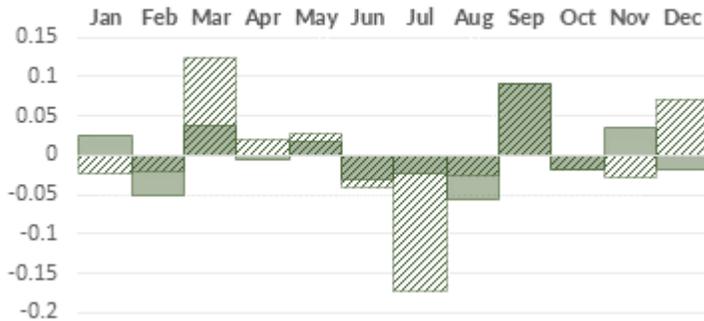


Seasonality of Realized Volatility

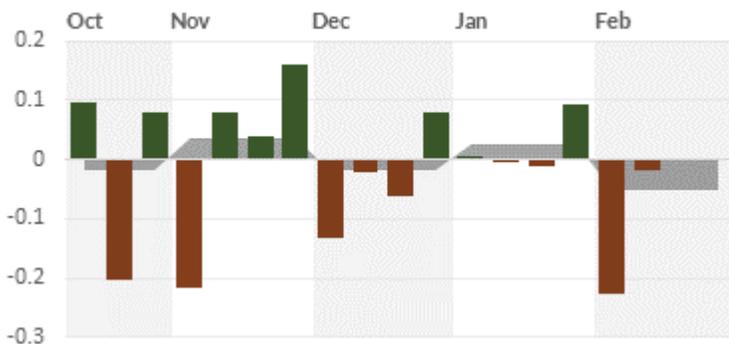


Live Hogs

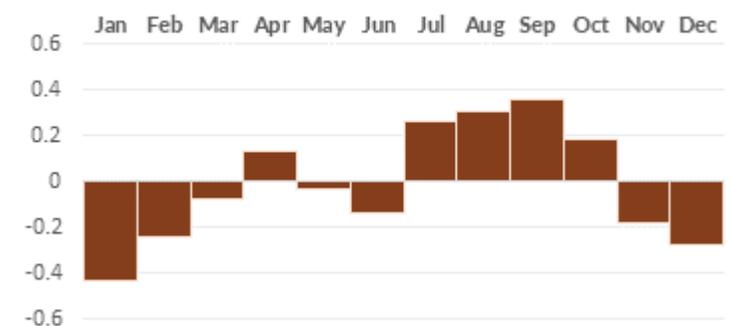
2004 - 2019 (Shaded: 2014 - 2019)



Forward Seasonality

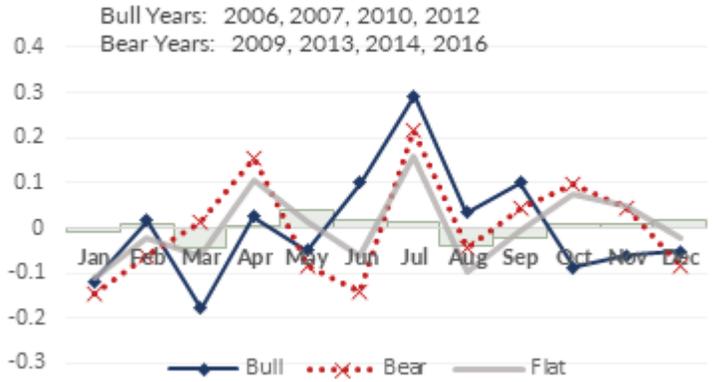
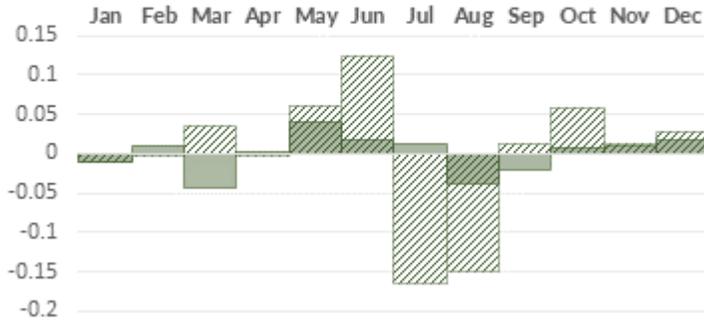


Seasonality of Realized Volatility

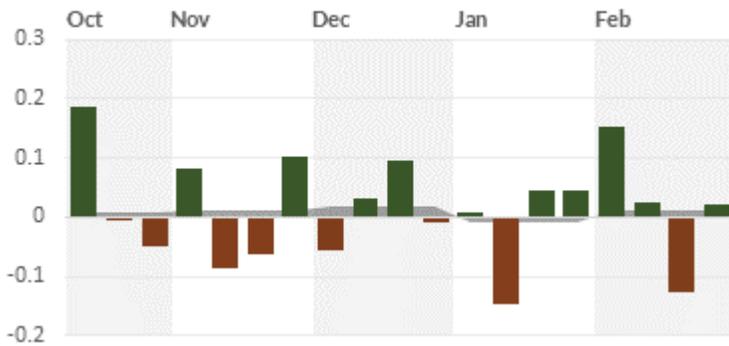


Wheat

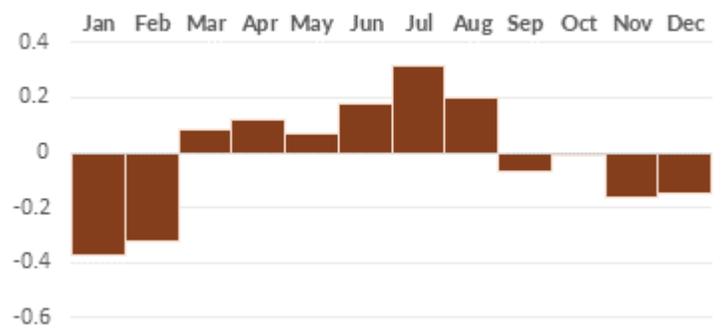
2002 - 2019 (Shaded: 2014 - 2019)



Forward Seasonality

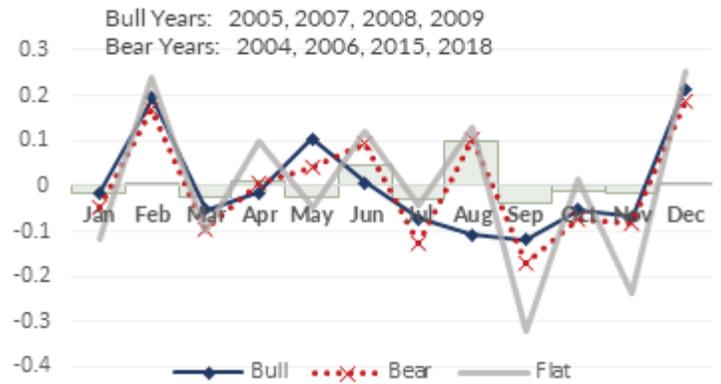
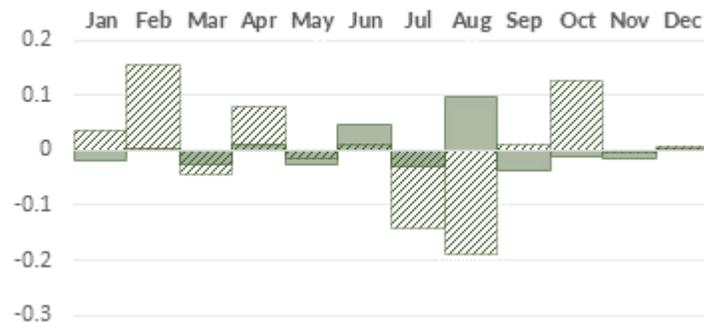


Seasonality of Realized Volatility

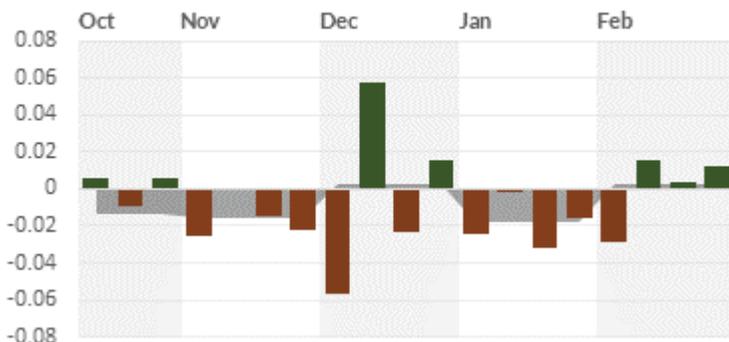


Soybeans

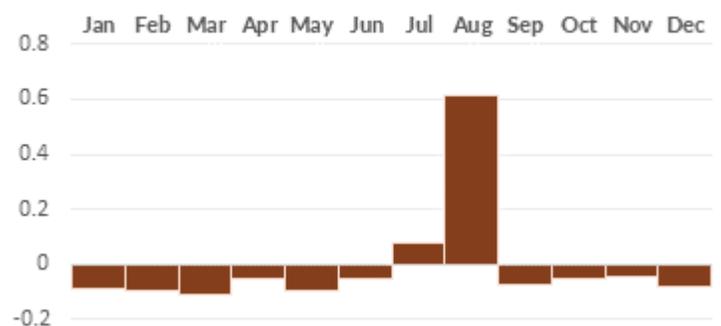
2003 - 2019 (Shaded: 2014 - 2019)



Forward Seasonality

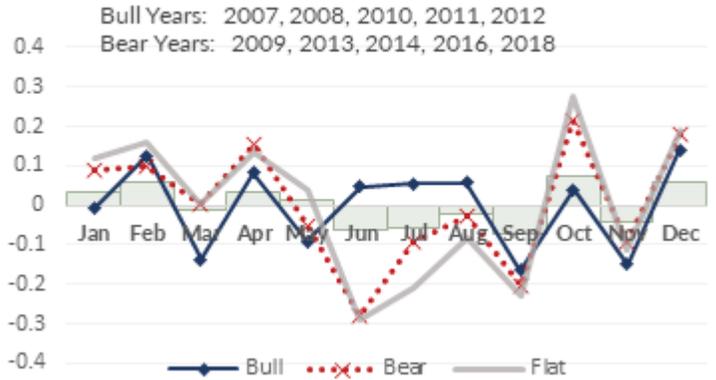
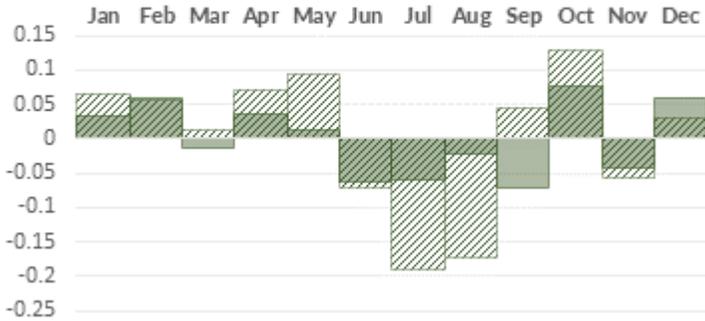


Seasonality of Realized Volatility

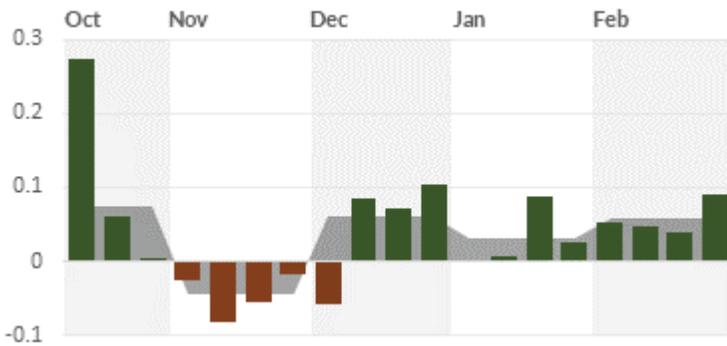


Corn

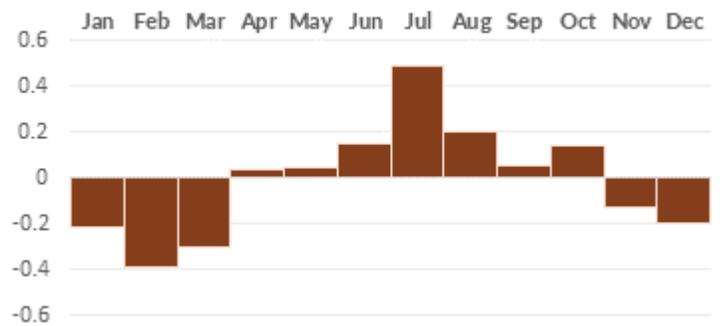
1995 - 2019 (Shaded: 2014 - 2019)



Forward Seasonality

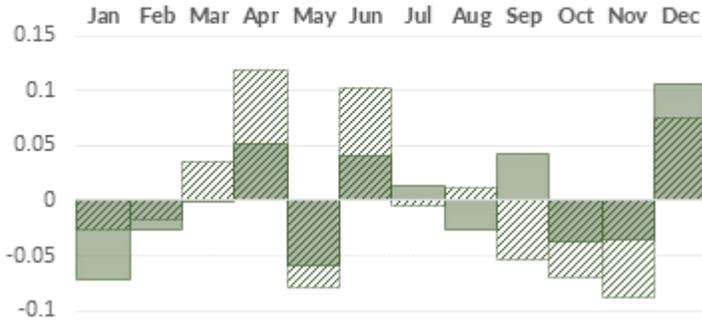


Seasonality of Realized Volatility

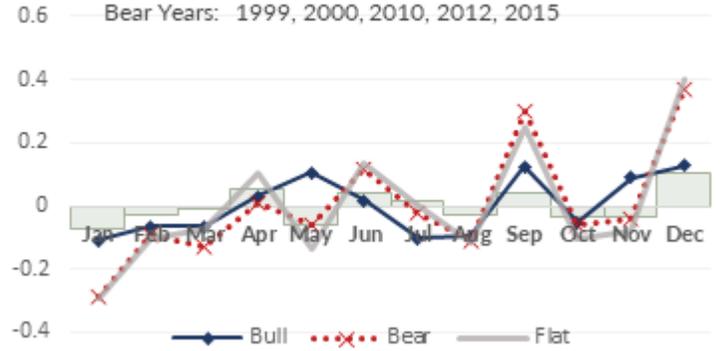


EUR/USD

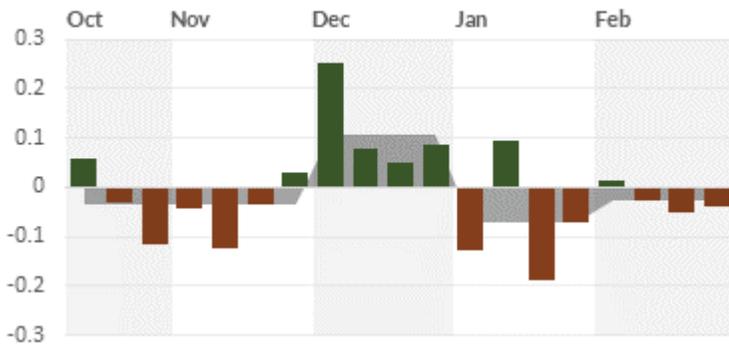
1998 - 2019 (Shaded: 2014 - 2019)



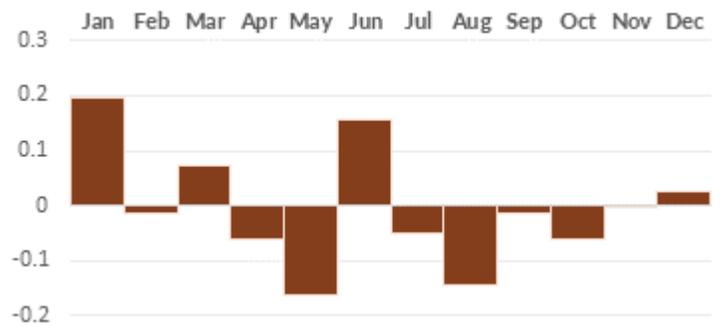
Bull Years: 2002, 2003, 2004, 2007, 2017
Bear Years: 1999, 2000, 2010, 2012, 2015



Forward Seasonality

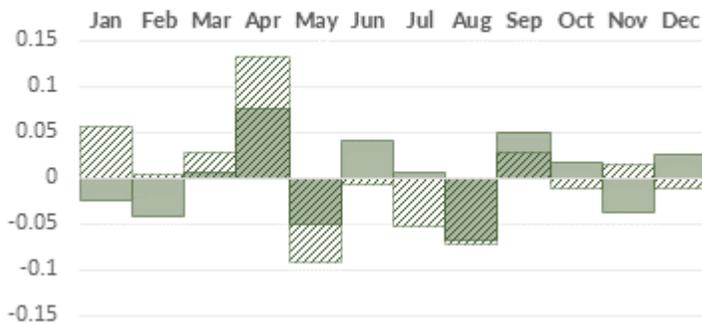


Seasonality of Realized Volatility

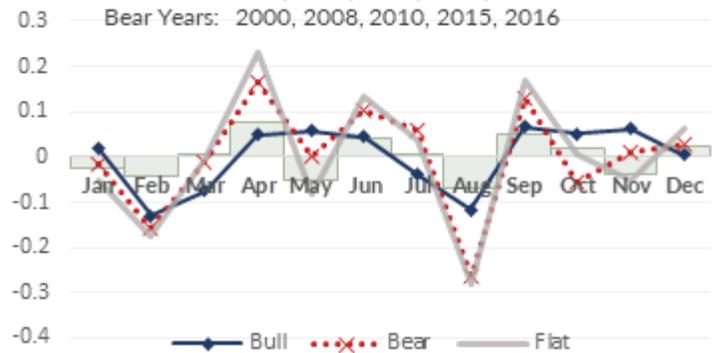


GBP/USD

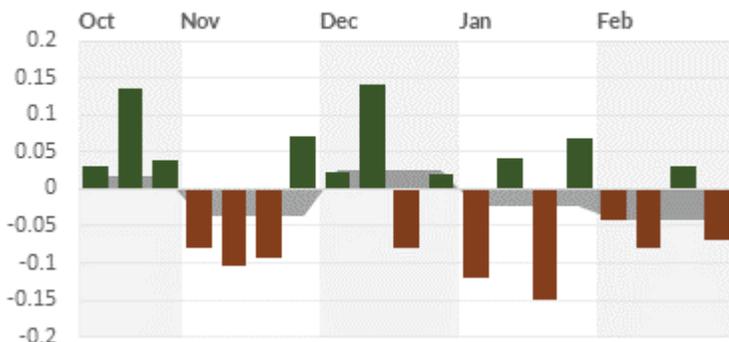
1995 - 2019 (Shaded: 2014 - 2019)



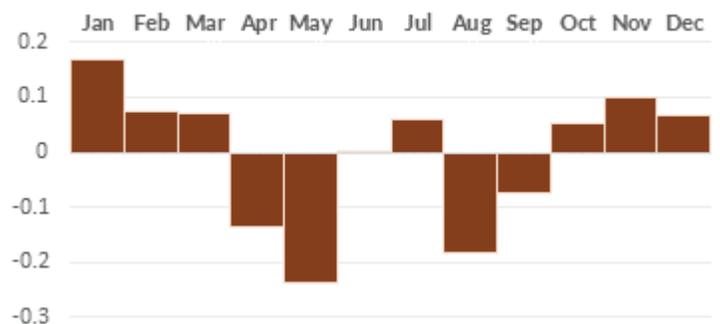
Bull Years: 2002, 2003, 2004, 2006, 2007
Bear Years: 2000, 2008, 2010, 2015, 2016



Forward Seasonality

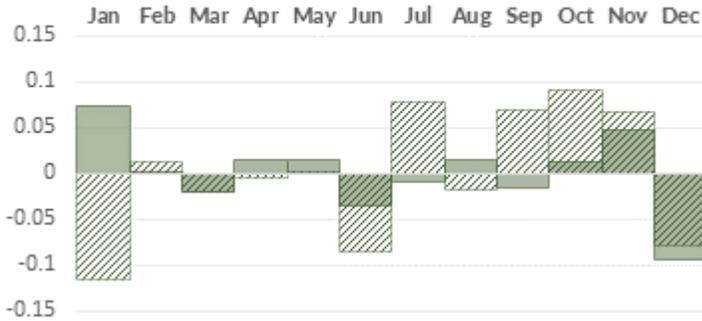


Seasonality of Realized Volatility

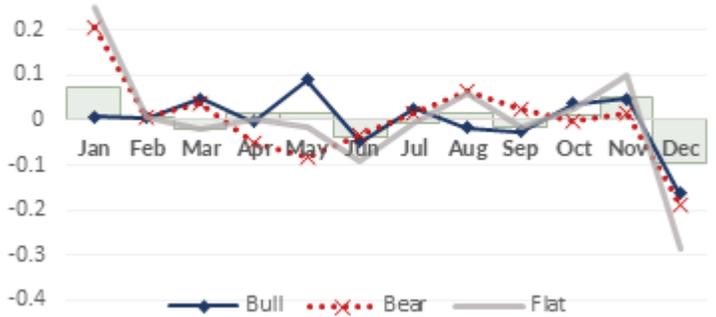


USD/CHF

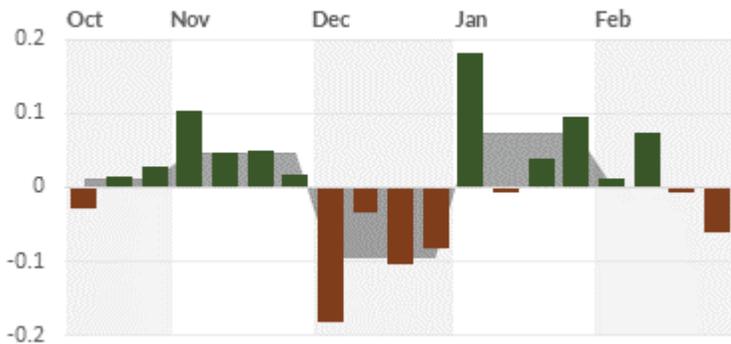
1995 - 2019 (Shaded: 2014 - 2019)



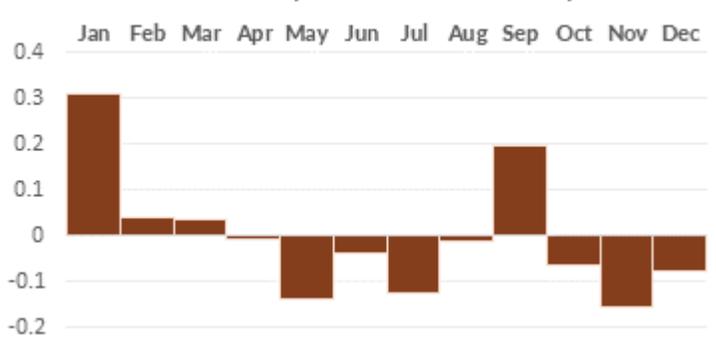
Bull Years: 1999, 2000, 2005, 2012, 2015
Bear Years: 2002, 2003, 2004, 2009, 2011



Forward Seasonality

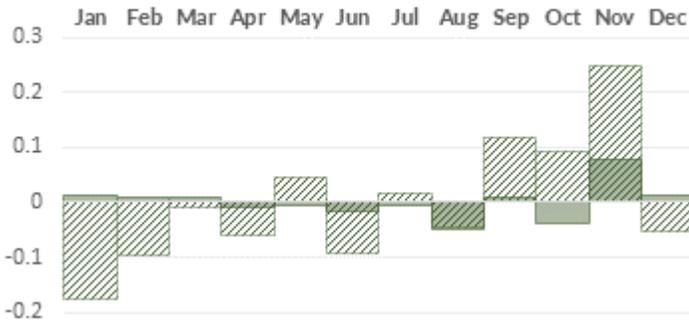


Seasonality of Realized Volatility

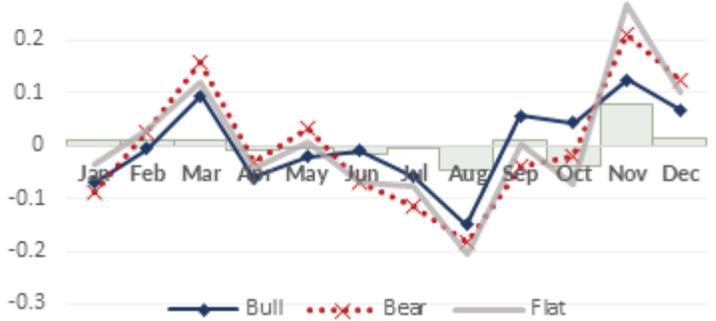


USD/JPY

1995 - 2019 (Shaded: 2014 - 2019)



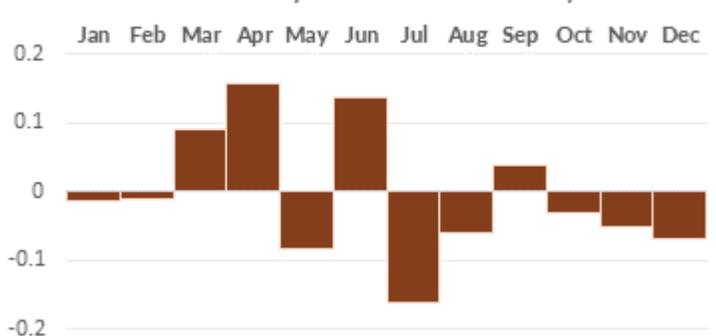
Bull Years: 2001, 2013, 2014, 2015, 2017
Bear Years: 1999, 2008, 2009, 2010, 2016



Forward Seasonality

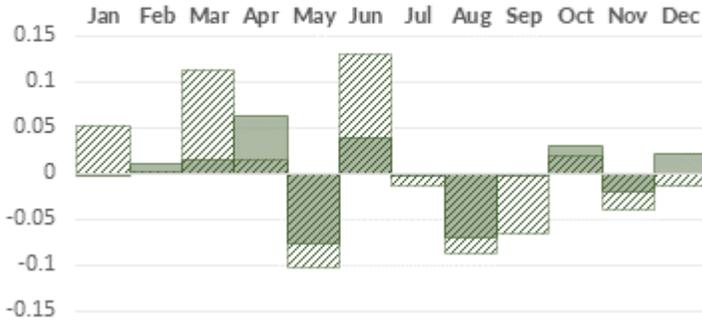


Seasonality of Realized Volatility

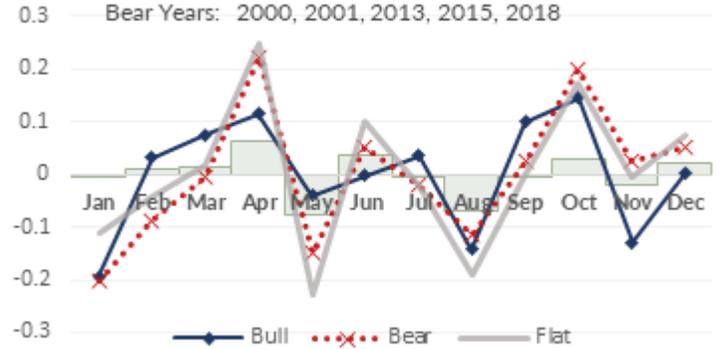


AUD/USD

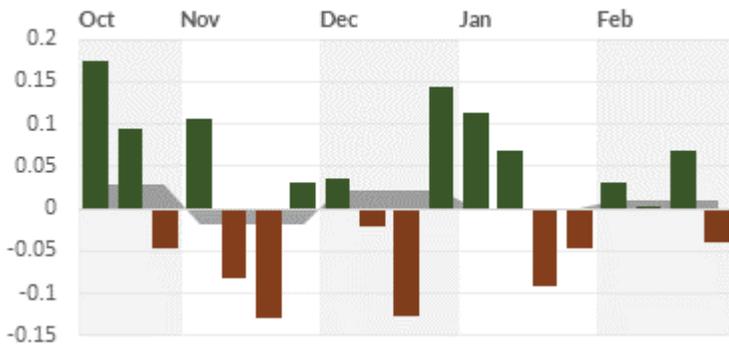
1995 - 2019 (Shaded: 2014 - 2019)



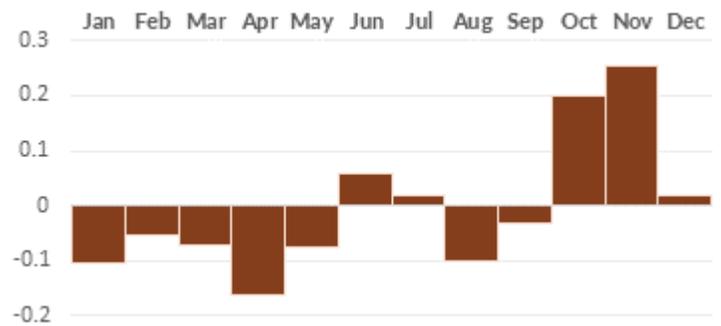
Bull Years: 2003, 2007, 2009, 2010, 2011
Bear Years: 2000, 2001, 2013, 2015, 2018



Forward Seasonality

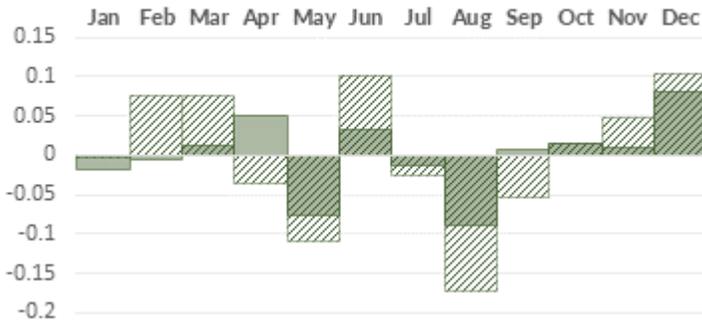


Seasonality of Realized Volatility

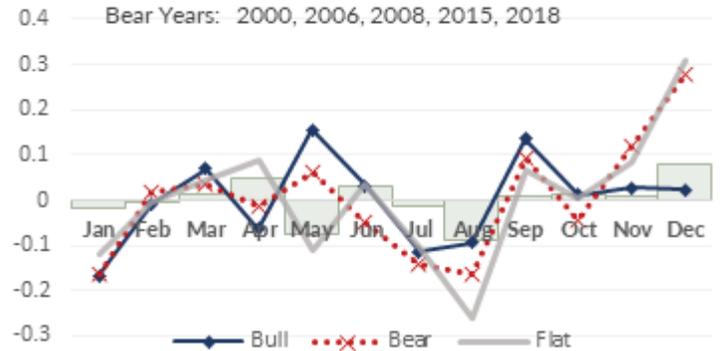


NZD/USD

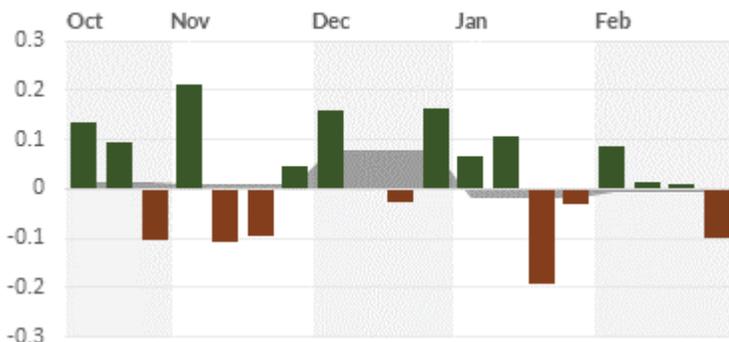
1995 - 2019 (Shaded: 2014 - 2019)



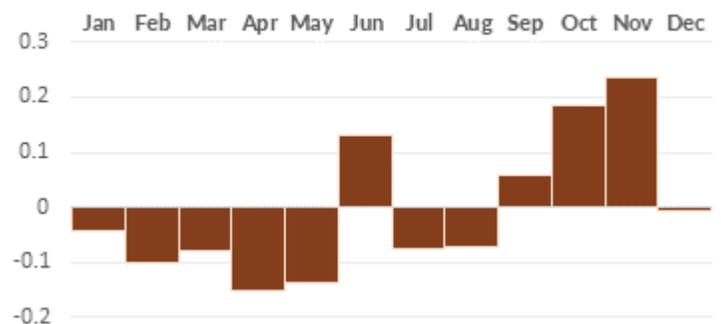
Bull Years: 2002, 2003, 2004, 2007, 2009
Bear Years: 2000, 2006, 2008, 2015, 2018



Forward Seasonality

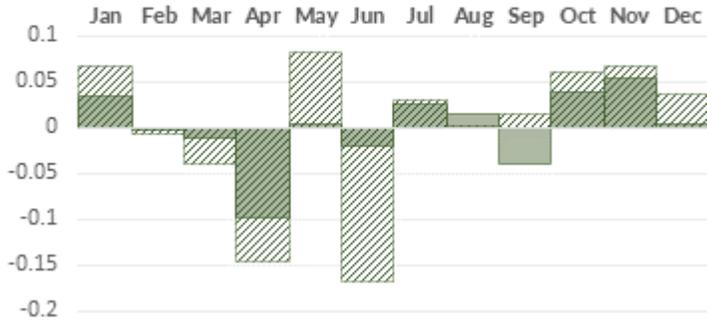


Seasonality of Realized Volatility

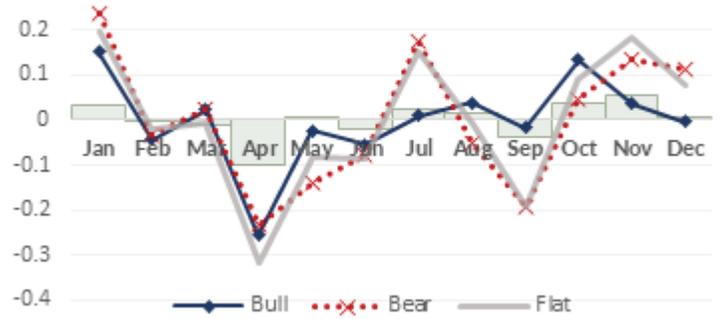


USD/CAD

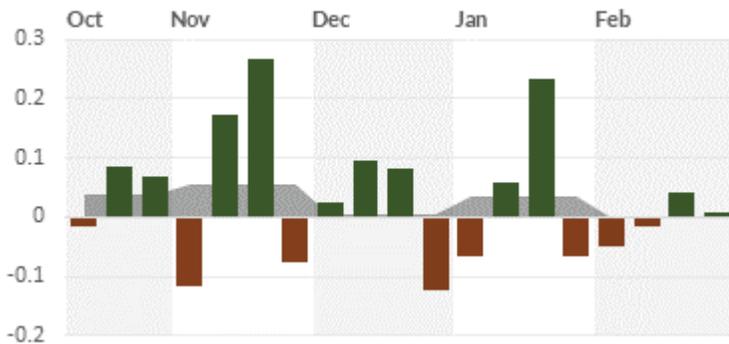
1995 - 2019 (Shaded: 2014 - 2019)



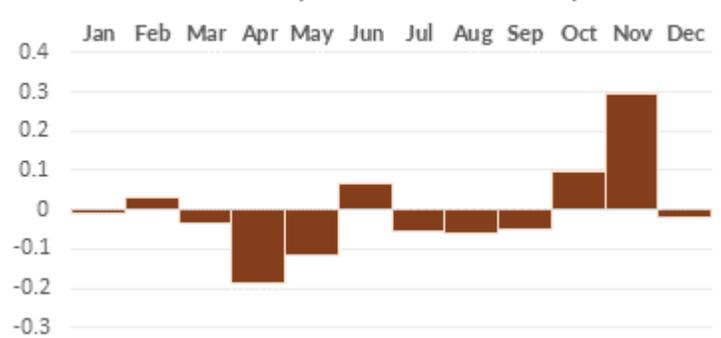
Bull Years: 2001, 2008, 2013, 2014, 2015
Bear Years: 2003, 2004, 2005, 2006, 2007



Forward Seasonality

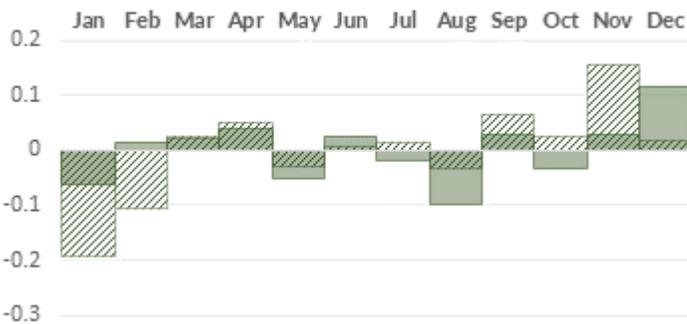


Seasonality of Realized Volatility

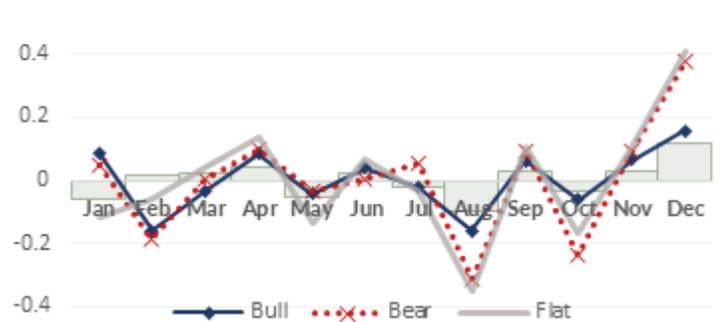


EUR/JPY

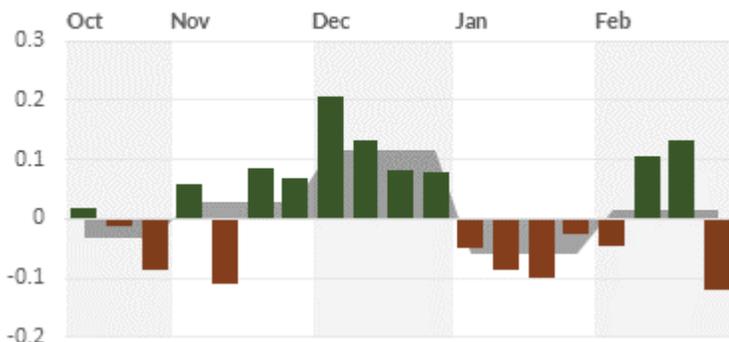
1999 - 2019 (Shaded: 2014 - 2019)



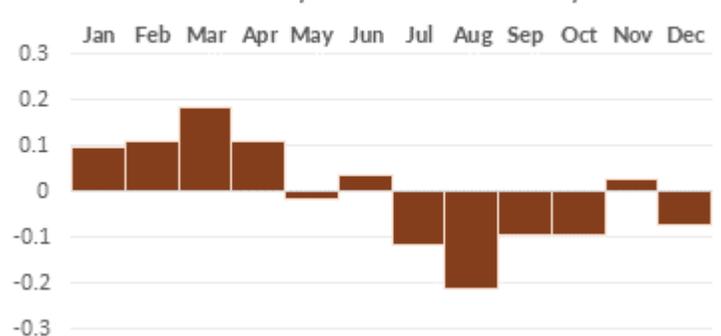
Bull Years: 2001, 2002, 2003, 2013, 2017
Bear Years: 1999, 2000, 2008, 2010, 2016



Forward Seasonality

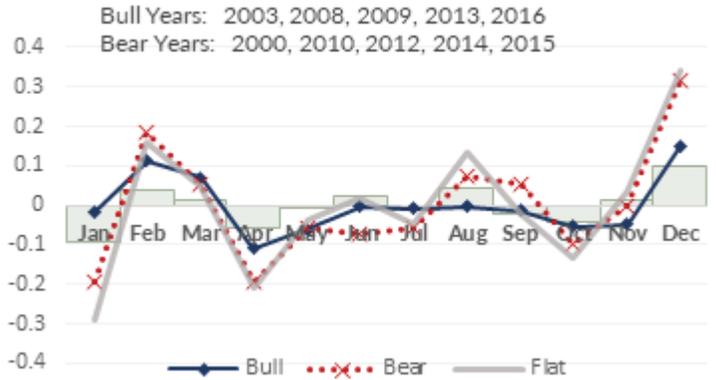
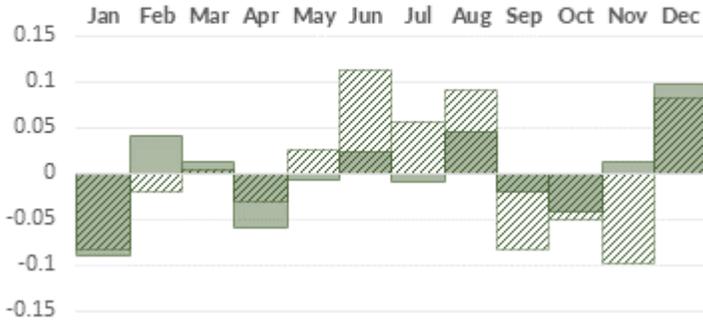


Seasonality of Realized Volatility

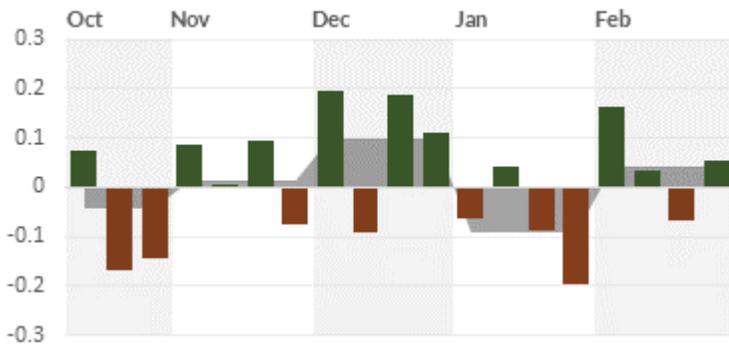


EUR/GBP

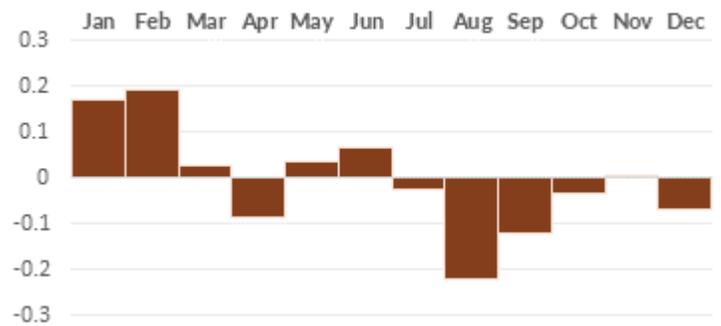
1999 - 2019 (Shaded: 2014 - 2019)



Forward Seasonality

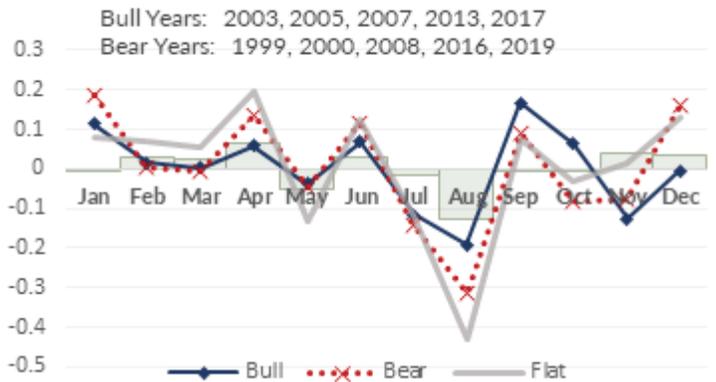
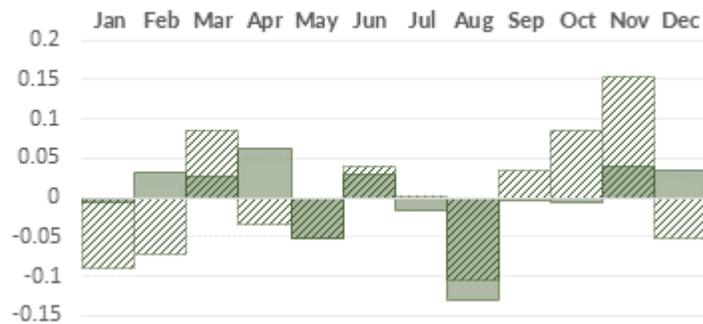


Seasonality of Realized Volatility

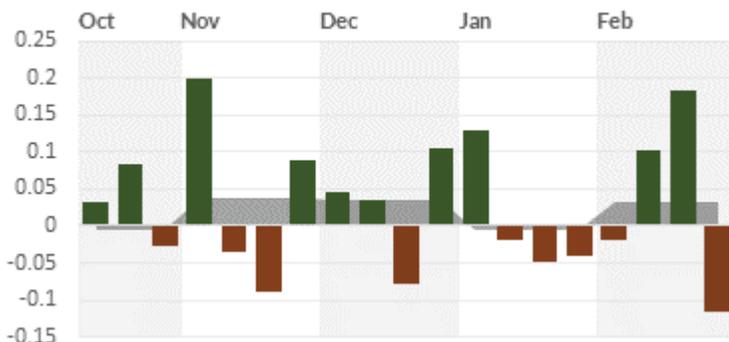


AUD/JPY

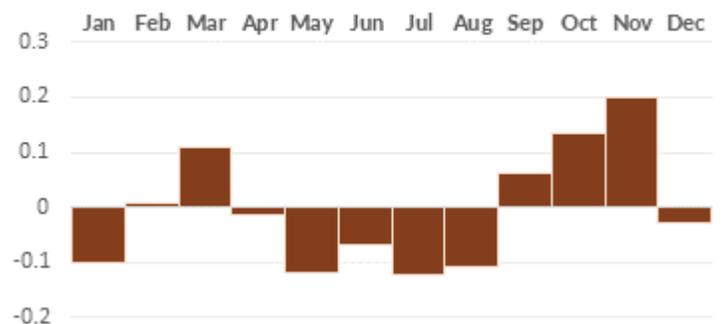
1998 - 2019 (Shaded: 2014 - 2019)



Forward Seasonality

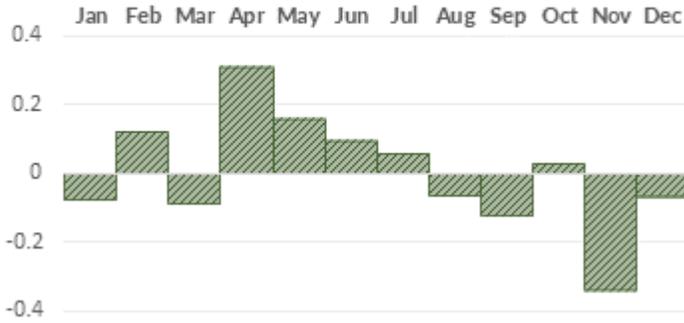


Seasonality of Realized Volatility

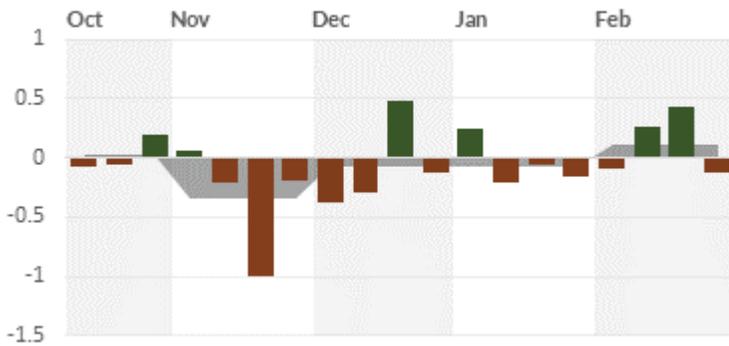


BTC/USD

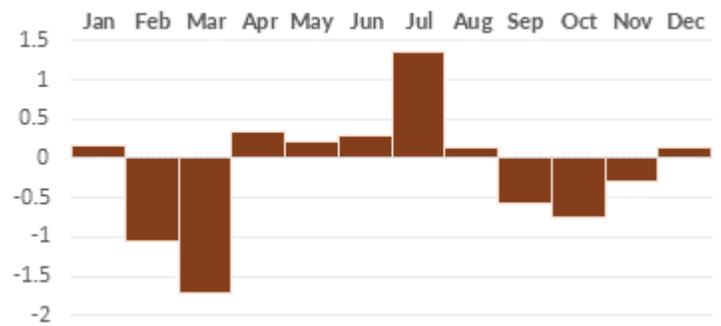
2018 - 2019 (Shaded: 2018 - 2019)



Forward Seasonality

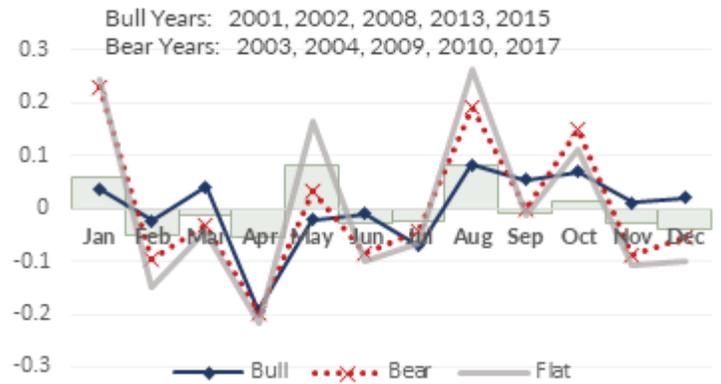
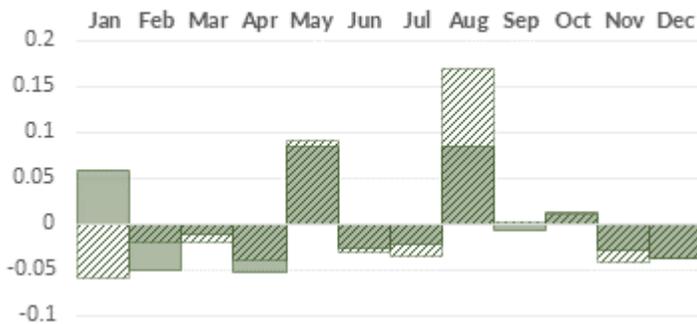


Seasonality of Realized Volatility



USD/ZAR

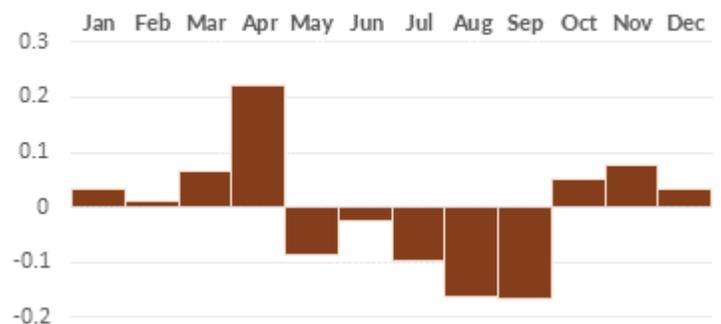
1995 - 2019 (Shaded: 2014 - 2019)



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>).



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