Year-End 2022 Market Commentary

Investing Into a Fog of Less Certainty

Key Benchmarks: Performance and Characteristics as of 12/31/2022

Equities	MTD	QTD	YTD	1-Yr Fwd P/E: Current vs 10-Yr Range		
				Current	10-Yr Low	10-Yr High
S&P 500	-5.8%	7.6%	-18.1%	16.7x	13.3x	22.9x
MSCI EAFE	0.1%	17.3%	-14.5%	12.1x	10.9x	17.6x
MSCI Emerging	-1.4%	9.7%	-20.1%	11.4x	9.8x	15.3x

Fixed Income	MTD	QTD	YTD	Real Assets	MTD	QTD	YTD
Bloomberg Barc U.S. Aggregate	-0.5%	1.9%	-13.0%	US REITs	-5.0%	4.2%	-25.0%
Bloomberg Barc US High Yield	-0.6%	4.2%	-11.2%	GSCI Commodities	-1.4%	3.4%	26.0%
Bloomberg Barc Global Agg ex U.S.	1.3%	6.8%	-18.7%	GSCI Prec Metals	4.8%	11.0%	-0.4%

Data Source: Bloomberg

December 2022 Highlights:

- The 4th quarter recovery in global equities stumbled somewhat in December, particularly U.S. equities, partially hurt by a more hawkish-than-expected Fed meeting (FOMC) in mid-December that pushed the benchmark overnight lending rate to 4.50%. An uneven economic lift-off from the end of Chinese COVID lockdown restrictions also contributed to market weakness, especially across Asia. In December, the MSCI All-Country World Index (ACWI) returned -3.9%.
- Across major regions, International Developed and Emerging Markets (equities and currencies) outperformed the

U.S. as investors bet that the worst has passed for Europe and broader Asia. In December, MSCI Japan (+0.3%) and MSCI Europe (0.0%) led major regions followed by MSCI Pacific ex-Japan (-0.5%) and MSCI Emerging Markets (-1.4%) while the S&P 500 ended down 5.8%.

- Within the U.S., small caps underperformed large caps amidst the broader sell-off in U.S. equities, while value stocks outperformed growth stocks, the former benefiting from energy and industrial cyclicals. The S&P 600 Index returned -6.7% versus -5.8% for the S&P 500. S&P Pure Value returned -5.5% versus -7.3% for S&P Pure Growth.
- Across sectors, defensive sectors (Utilities, Health Care, Staples) and traditional cyclical sectors (Energy, Industrials) outperformed while Growth Sectors (Communication Services, Technology, Consumer Discretionary) lagged.
- Major Risk Factors outperformed the S&P 500 although High Quality lagged the other factors as High Dividend and Minimum Volatility benefited from the exposure to defensive segments of the equity markets.
- Investment grade fixed income had benefited from a continued drop in long-term interest rates; however, a sharp rebound in interest rates following the December FOMC meeting weighed on overall U.S. fixed income. Investment grade sectors (mortgages, credit) continued to benefit from narrower credit spreads. The 10-Year U.S. Treasury yield ended the month at 3.88% off intra-quarter lows of 3.45% prior to the December FOMC meeting.
- The Bloomberg U.S. Aggregate Bond Index dropped 0.5% for the month while the Global ex-U.S Aggregate returned +1.3%, helped by a weaker U.S. dollar. The Bloomberg US High Yield Index returned -0.6% hurt by higher interest rates, while Bloomberg/Barclays Emerging Market Debt LC returned 2.1% as local currencies appreciated against the US Dollar.
- Within Equity Alternatives, S&P GSCI Commodities Index returned -1.4% as commodities recovered late in the quarter over prospects of China reopening but ended marginally down despite oil prices rallying late in the month. Precious metals continued to benefit from increased uncertainty over monetary policy and the economic outlook. S&P GSCI Precious Metals returned 4.8% for the month. U.S. REITs suffered from U.S. equity market weakness and higher interest rates with the Dow Jones REIT Index down 5% for the month.
- If the economic outlook continues to ‘flatten’ following the surge in post-pandemic demand, then investor and policymaker focus will likely shift towards the strength and resiliency of labor market conditions and whether rising wages represent an imbalanced labor market.
- 3D believes that investors should remain fully invested for the most part as part of a strategic asset allocation built on risk-based investment programs. Unlike the beginning of 2022 where we were more cautious due to rich valuations on both equities and fixed income, the current environment speaks to more attractive valuations across risk-based assets, reflecting the higher uncertainty of the macro environment heading into 2023.

Investing Into a Fog of Less Certainty

Source: istockphoto.com

"Markets are constantly in a state of uncertainty and flux, and money is made by discounting the obvious and betting on the unexpected."

– George Soros

"Not only don't I know what tomorrow will bring, I'm still not entirely certain what yesterday brought."

– Ashleigh Brilliant

Note to readers: we have sectioned the 2022 Year-End Market Commentary and 2023 Outlook accordingly:

1) Big picture overview and long-term capital market assumptions
2) 2022 calendar year asset class returns and quarter-by-quarter recap
3) December 2022 Monthly Review
4) 4Q and CY-2022 performance charts and notable exhibits

As we reflect on the events that drove this past year's sell-off in publicly traded equities and fixed income (the worst annual period for investment grade bonds over the past 70 years), we try to keep Soros' quote above in context and not be seduced by hindsight investing (i.e. woulda, coulda, shoulda). For instance, it should have been obvious to market strategists that rising interest rates would hurt rather than benefit equity market valuations, even though valuations were near historically rich levels as we pointed out in our 2021 Year-End Market Commentary: A Brave New Fed.

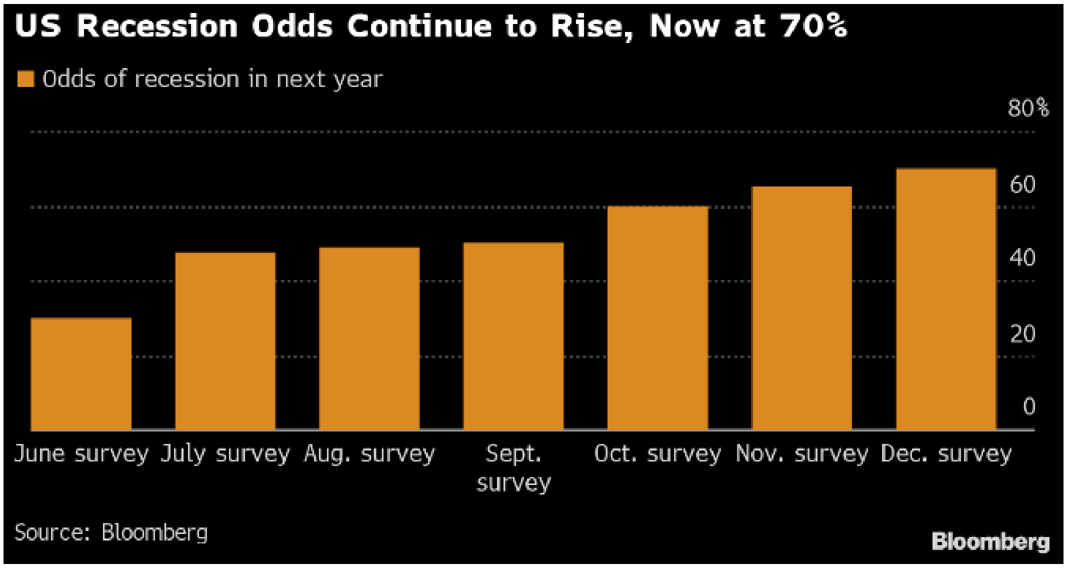
However, we also wrote that the Fed would "likely soft pedal rather than stomp its way into a new rate hike cycle…" which, 'in hindsight,' did not occur as expected as the Fed jacked up interest rates from 0% at the beginning of 2022 to 4.50% by year-end, marking one of the sharpest and quickest tightening cycles when compared to prior cycles. It should be of little surprise then that a sharp, rather than gradual, rate hike cycle would weigh heavily on asset valuations and investor risk appetite due to the potential disruptions and instabilities brought on by such steep, rapid tightening. Geopolitical eruptions also did not aid the macro picture such as Russia's invasion of Ukraine in February 2022 and renewed zero-COVID lockdowns across China over much of the year threatened to exasperate supply chains weakened by the pandemic.

But as implied by the Ashleigh Brilliant quote from above, we're not sure what exactly happened in 2022 in hindsight. We blame the COVID pandemic, which has upended much of the historical financial relationships associated with prior economic cycles. To wit:

1) U.S. Gross Domestic Product (GDP) is expected to grow 1.9% in 2022 based on Bloomberg Economic Consensus, but the growth felt uneven (2nd half strength vs 1st half weakness) and well below the 3.9% GDP

growth that was forecasted at the beginning of 2022. Yet, an increasing consensus is building around a U.S. recession in 2023 (**Figure 1**).

Figure 1 – Increasing Consensus of a U.S. Recession in 2023



2) Global interest rates (**Figure 2**) sharply rose in reaction to rising inflation but the U.S. yield curve sharply inverted (**Figure 3**) in anticipation of the recession that was surely(?) to follow from central bank tightening. Yet, long-term inflation expectations remain well-anchored around the Fed's long-term average target of 2%, and the U.S. economy continued to perform well on the strength of U.S. consumption and employment, even though 1st half real GDP contracted due to excess inventories and negative trade activity.

Figure 2 – Global Interest Rates Rose Sharply This Year in Reaction to Higher Inflation and Tighter Central Bank Policies

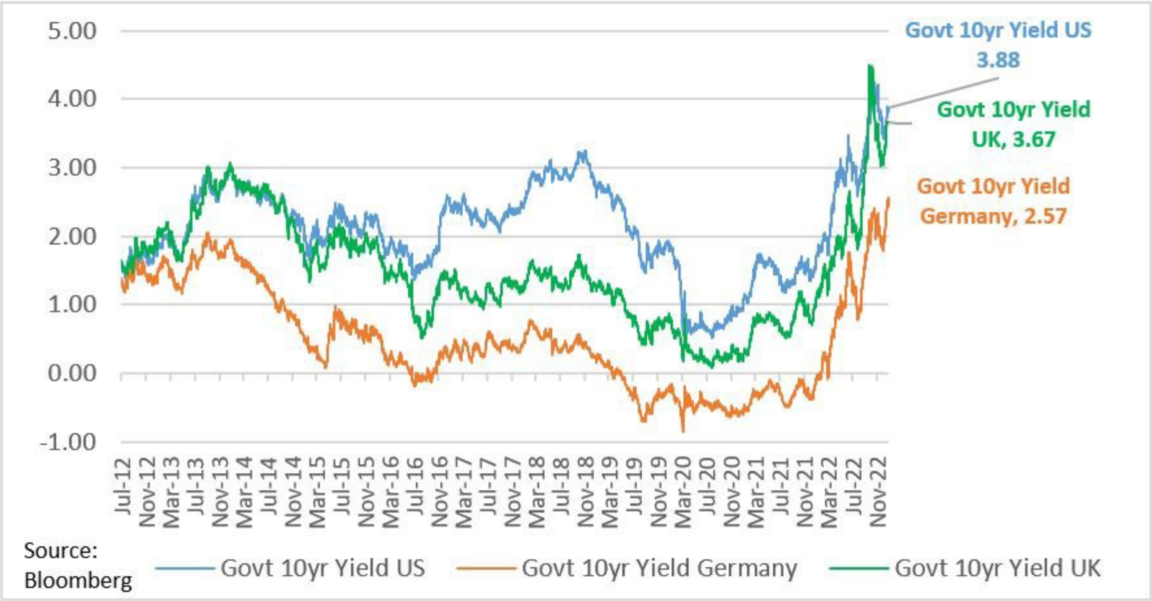
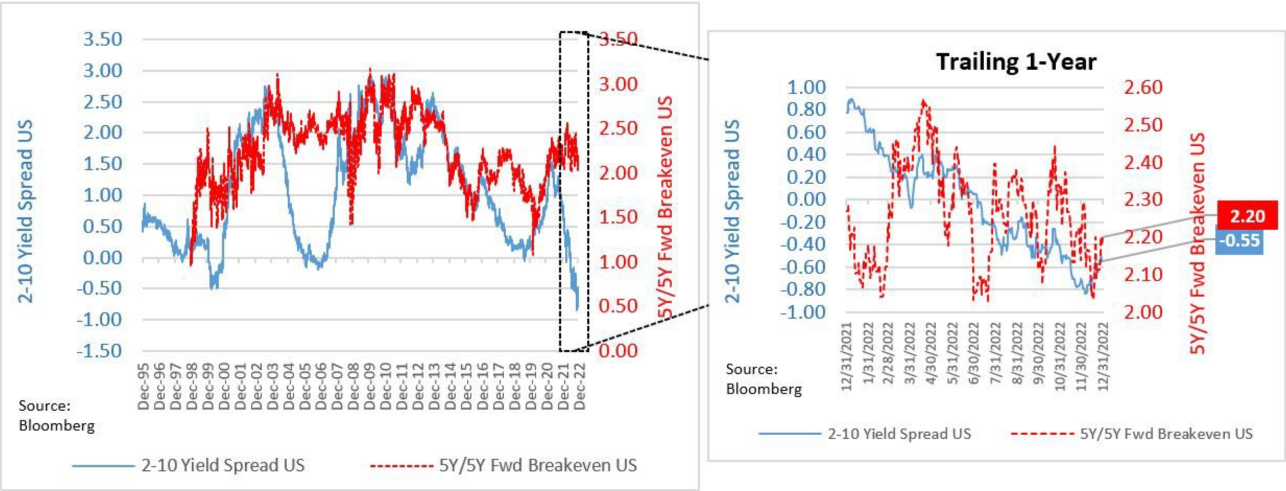
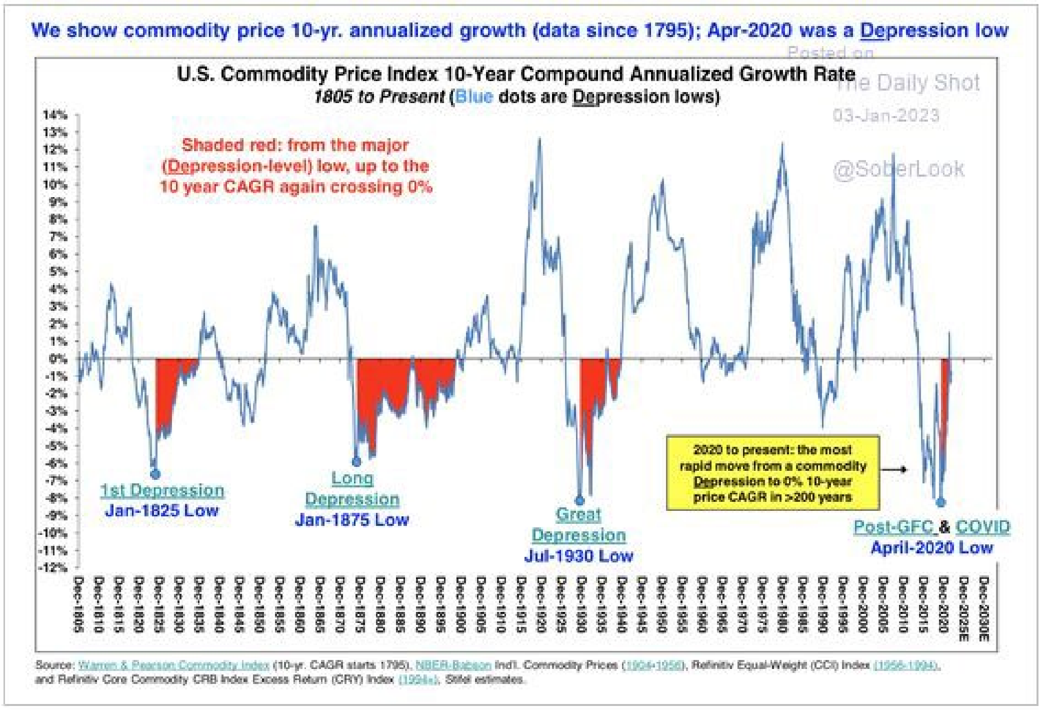


Figure 3 – The Yield Curve Saw Deep Inversion This Year Implying Fed Overtightening Yet Long-Term Inflation Expectations Remain 'Well-Anchored' Around Long-Term Target of 2%



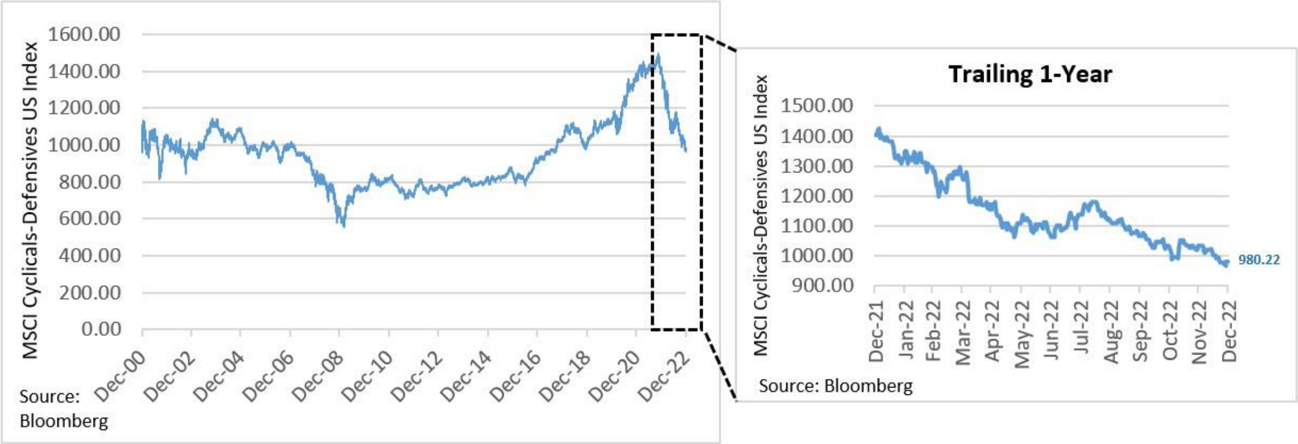
3) Commodity prices rose sharply in the first half of 2022 due to supply/demand imbalances but then markedly corrected during the 2nd half even though those imbalances will likely remain structural (particularly long-term supply production). As is likely to shape the coming year narrative of long-term mean reversion from prior decade laggards, the strong 2-year run of commodities reflects a mean reversion off extreme drawdown levels (**Figure 4**), but do commodities have further room to run?

Figure 4 – This Cycle's Commodity Run Has Been Impressive But Does It Have Further Room to Run as Long-Term Mean Reversion from COVID Depths Continues?



4) Equity market valuations compressed even though U.S. companies still grew earnings and revenue in 2022. Cyclically sensitive sectors hurt by the pandemic shutdowns did benefit from post-pandemic recovery as cashflow generation and disciplined capital allocation were rewarded by shareholders unlike the unprofitable, grab-all-market share business models that benefited in 2020. However, this past year has definitely seen defensive sectors (i.e. utilities, staples, healthcare) outperform cyclicals (particularly technology stocks such as hardware, software, and consumer discretionary) **(Figure 5**).

Figure 5 – Defensives Outperformed Cyclicals as Investors Fled High Beta-Sensitive Stocks (Apart from Energy)



5) The overall cost of borrowing rose with higher interest rates, particularly for more levered corporate borrowers, but the incremental cost (i.e. credit spread – **Figure 6**) did not blow out as would be expected from a sudden and sharp rise in borrowing costs. Yet overall banking standards continue to tighten (**Figure 7**), widening a disconnect between credit risk premiums and lower credit availability.

Figure 6 – Credit Spreads for Leveraged Corporate Borrowers Widened with Higher Interest Rates But Do Not Reflect Distressed Levels

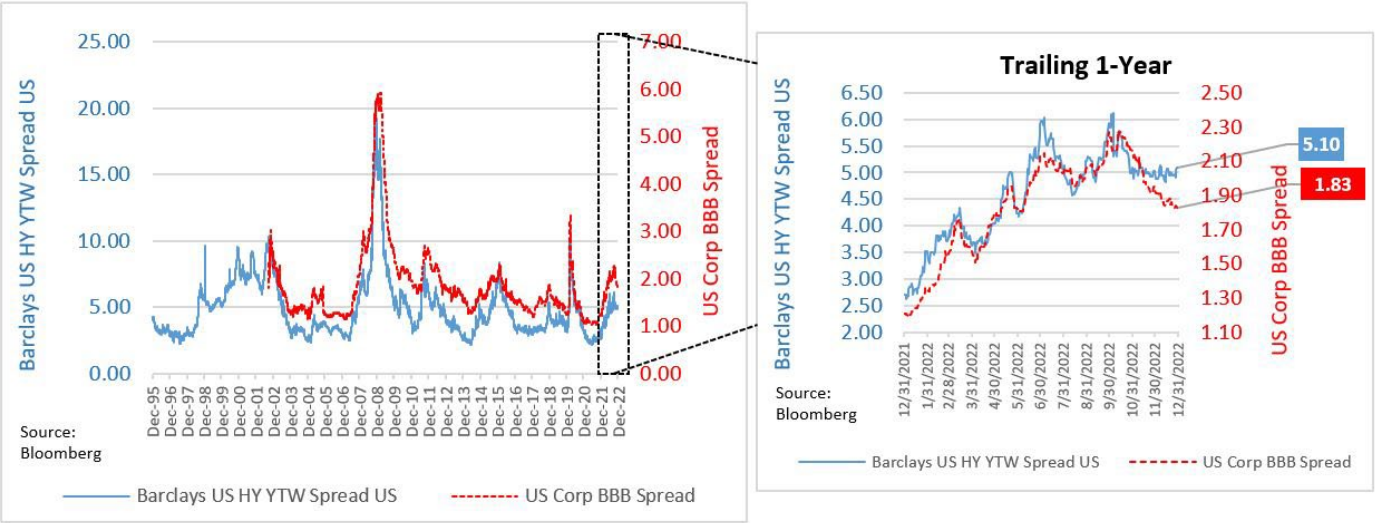
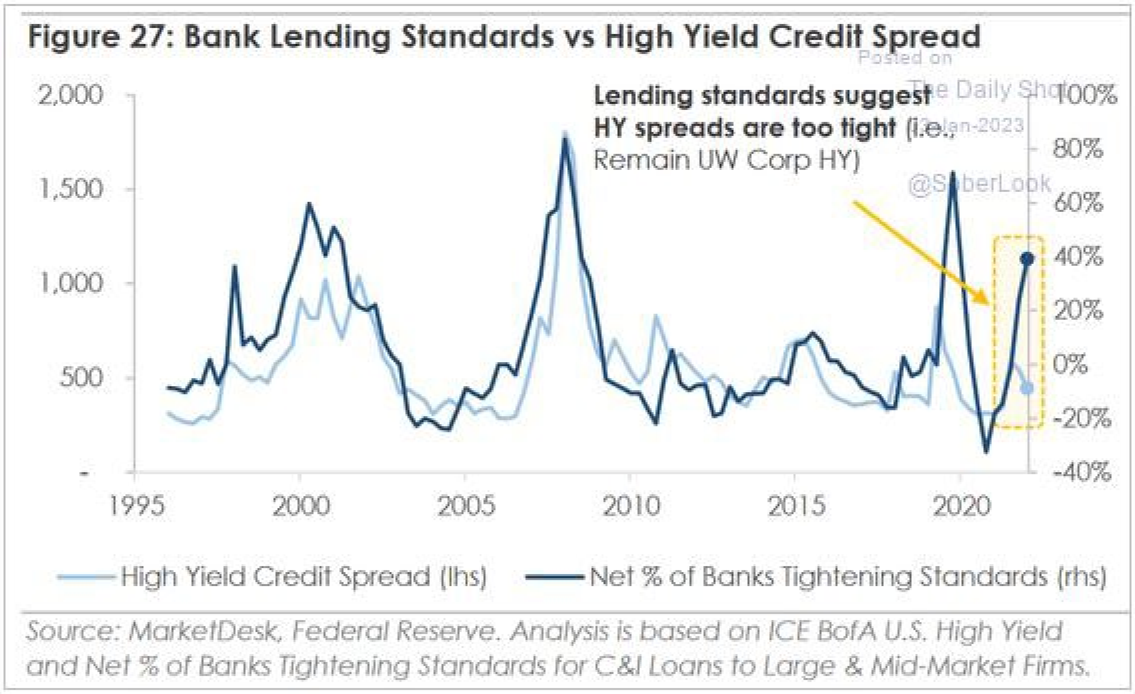
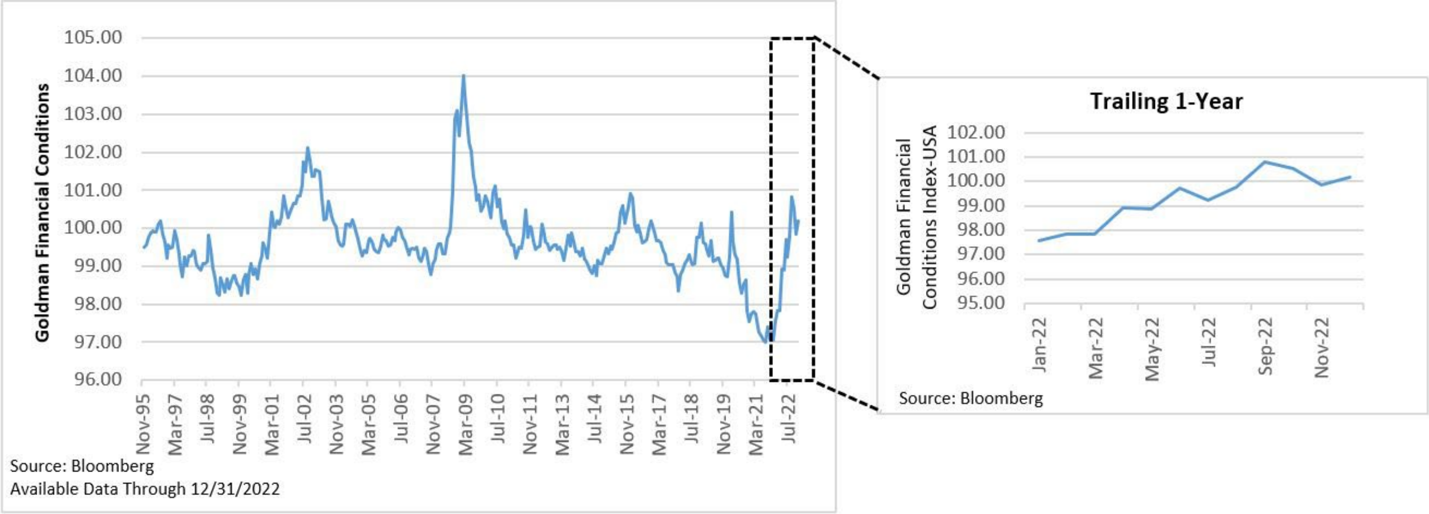


Figure 7 – Credit Spreads Diverge from Tightening Bank Lending Standards, Implying that Marginal Borrowing Will Likely Be Sourced from Non-Banking (i.e. Shadow Banking)



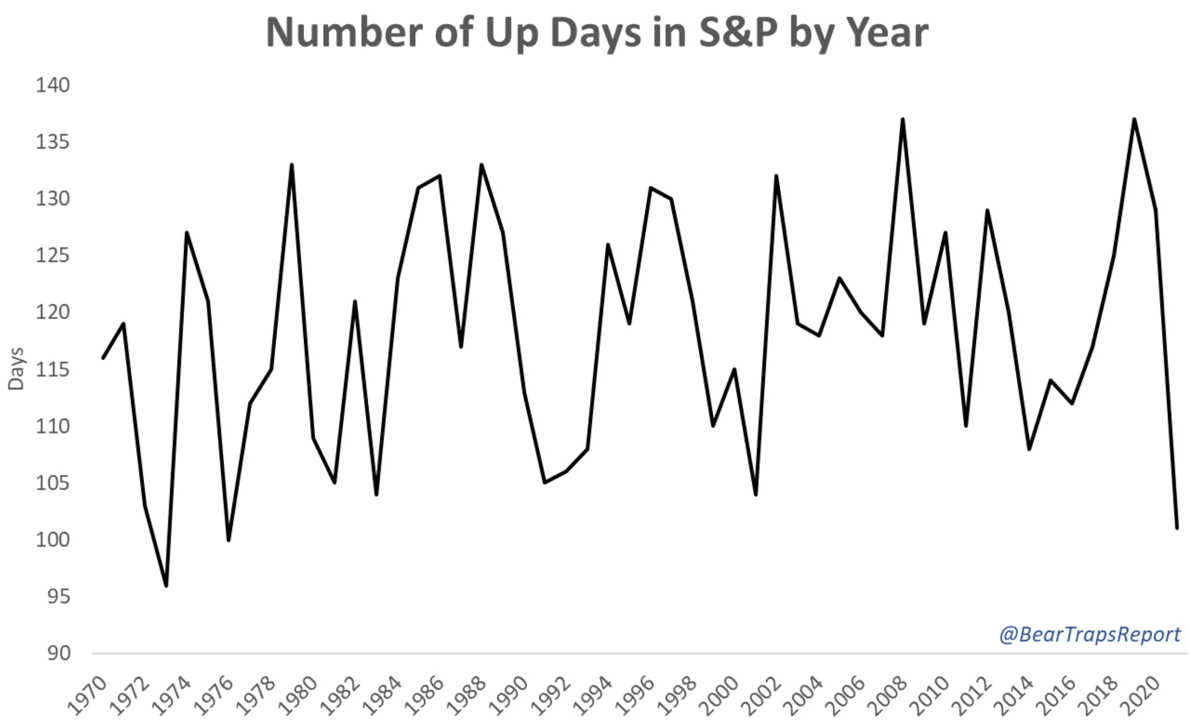
6) A marked slowdown in housing and goods consumption met with falling prices (homes, used autos, appliances) was not enough to offset strong demand for services as COVID revenge consumption shifted from goods to services (i.e. travel/leisure). Consumer spending (and the financing of that spending through labor and additional borrowing) remains stable. Despite higher borrowing costs, higher market volatility, and lower levels of liquidity, overall financial conditions remain near the relatively easy levels of the pre-COVID period (**Figure 8**).

Figure 8 – What Tightening? Overall Financial Conditions Are Near Pre-COVID Levels



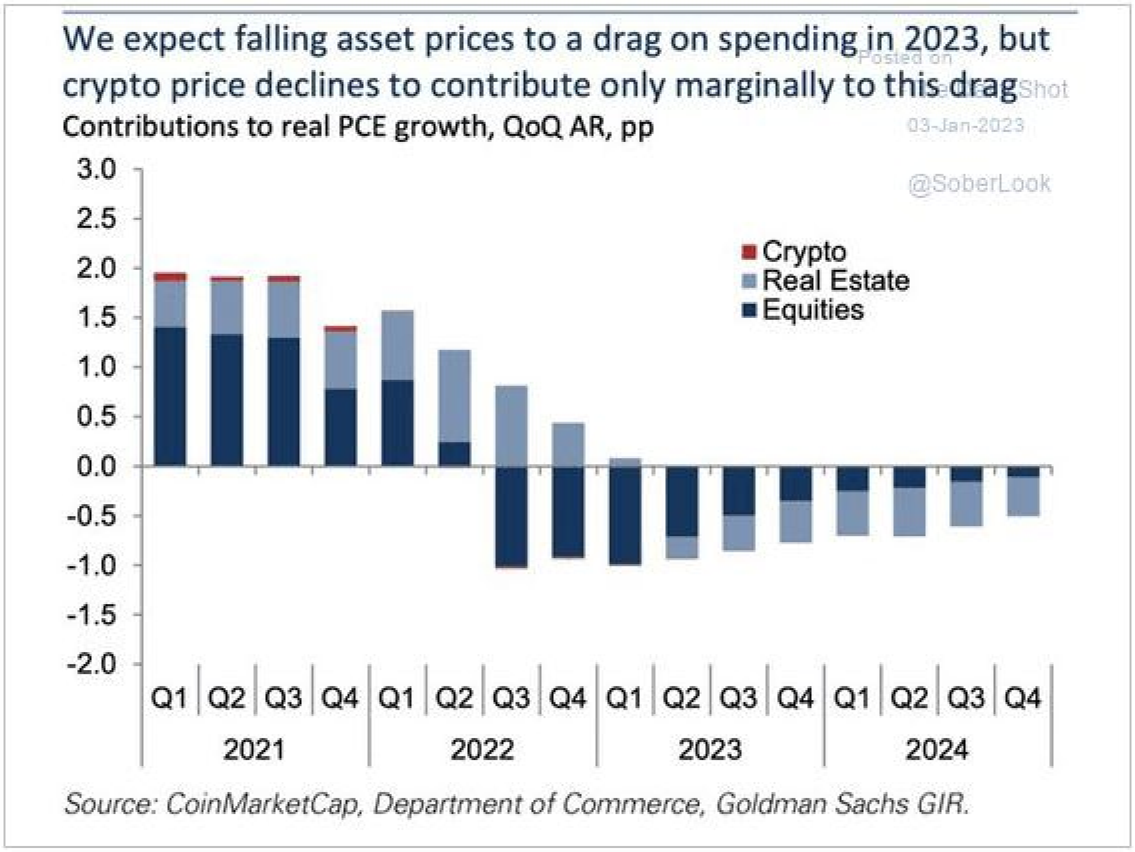
7) Despite sharp YTD losses in equities and fixed income, realized volatility exceeded implied volatility as priced through U.S. equity options, implying muted appetite for hedging against market volatility. Through a majority of periods, implied vol exceeded realized vol, reflecting a historical, rational-based relationship of risk premium pricing (option writers charge an 'insurance' premium to option buyers seeking insurance against market volatility), except during highly volatile periods when realized exceeds implied. Implied volatility remained depressed in a year where the number of up days in the S&P 500 Index reached a cycle low amidst the sell-off in equities (**Figure 9**).

Figure 9 – Number of Up Days in S&P 500 Reached a Cyclical Low in 2023



8) The wipeout of nearly $2 trillion in digital assets and cryptocurrencies barely caused a ripple across the regulated fiat-based financial ecosystem except for a few regional banks that had set up payment rails to centralized crypto-exchanges. In contrast to the drawdown in equities and real estate, the loss in crypto assets is expected to have de minimis impact on real consumer spending (**Figure 10**).

Figure 10 – Estimated Negative Impact on Consumer Spending Resulting from Drawdowns in Equites, Real Estate, and Fixed Income



Apart from the obvious trades of 1) holding cash over stocks and bonds and 2) being overweight Value/Dividend-Payers over Non-Profitable Growth Tech, 2022 also contained some unexpected tail-risk events that only investors with 'perfect hindsight' could have successfully captured. John Authers from Bloomberg penned a satirical article ("From Tesla to Turkey, a Perfect Year for Hindsight") summarizing these successful 2022 trades made by Hindsight Capital, a fictitious trading firm that made the right trading calls using perfect 2022 hindsight (if it wasn't obvious already, this is all fictitious and not indicative of actual realized outcomes):

1) The four main themes that unexpectedly moved markets (except in hindsight):
   - Russian President Vladimir Putin really would invade Ukraine;
   - China's economy would take a hit from the Omicron variant;
   - Inflation would prove intractable (aided in part by the first two factors); and
   - Low rates had left many securities around the world wildly overpriced.
2) And this is how Hindsight Capital would've successfully captured these themes (keeping in mind that correctly forecasting themes does not automatically translate to successfully trading those themes):
   - The All-Strongmen-Are-Not-Equal Trade - Long Borsa Istanbul 100 and Short Russia RTSI Index:

   - Refers to Turkey outperforming Russia when a conventional view held that the heterodox economic measures adopted by one authoritarian (Recep Tayyip Erdogan) that worsened inflation in Turkey should have had led to stock market underperformance versus the hard asset-backed balance sheet of another authoritarian (Vladimir Putin). However, Turkey's local investors saw an opportunity to shield themselves from the deterioration in the lira by investing in export-driven companies whose costs are in local currency but earn revenue in firmer currencies. And armed conflict is generally not a bullish catalyst for local assets, particularly a long, costly, drawn-out conflict met with disdain from the U.S. and Europe expressed through sanctions.

- The Fossil-Fuel-Revival Trade - Long S&P Integrated Oil & Gas and Short ISE Global Wind Energy:
   - Basically, conventional fuel plays (helped by a revival in energy prices) outperformed alternative green energy. The former is also bucking historical reactionary behavior to higher prices through greater capital discipline, imposed by shareholders as well as reflecting challenges tied to higher input costs and greater regulatory uncertainty.
- The Bet-Against-Duration Trade - Long Bloomberg China Aggregate and Short Austrian Century Bond:
   - In a nutshell: 2022 helped reacquaint us with the concept of bond duration or the total return sensitivity to changes in interest rates. The Austrian Sept 2117 issue is down ~54% for the year. Meanwhile, China's bond market bucked the broader global market weakness and is actually positive for the year.
- Bet on Rising Rates - Long Topix Banks Index and Short Solactive Roundhill Meme Stock Index:
   - A reframing of value outperforming growth stocks or how rising cost of capital negatively impacts long duration growth stocks that are generally unprofitable and whose total enterprise value is largely tied to its future success (well off into the future). Japanese banks performed exceptionally well partly because they started at much lower valuation levels relative to their developed market peers. This highlights the essence of the value thesis: fundamentals only need to go from bad to less bad for meaningful outperformance.

Hindsight being what it is, we would like to put 2022 behind us and look to the future, which looks even murkier than what we faced at the end of 2021.

Base Case Expectations – Flattish Growth and a Fed on Hold

Where we stand on the economic front is flattish – a theme we've highlighted in prior commentaries (see November 2022 and October 2022 Commentaries). As we enter 2023, here are the latest Bloomberg consensus forecasts for major market **2023 GDP growth/contraction**:

1) U.S. GDP: +0.3% (down from +2.5% projected at the beginning of 2022)
2) Europe GDP: -0.1% (down from +2.5% projected at the beginning of 2022)
3) Japan GDP: +1.2% (down from +1.4% projected at the beginning of 2022)
4) UK GDP: -1.0% (down from +2.4% projected at the beginning of 2022)

5) China GDP: +4.8% (down from +5.3% projected at the beginning of 2022)

U.S. consumer spending and non-U.S. trade (exports) are expected to offset weakness in global real estate, industrial activity, and global financial liquidity. Geopolitics such as the ongoing Russia/Ukraine conflict and China/U.S. relations remain the annual wildcard.

The optimistic outlook is summarized as follows (per Bloomberg):

- U.S. rate hike cycle has likely peaked with terminal Fed Funds expected to reach 4.75%-5.00% by February 2023 with a Fed pause likely to follow (**Figure 11**).

Figure 11 – Terminal Fed Funds Rate Expected to Peak at 5% With Rate Cuts in 4Q2023

Region: United States »		Instrument: Fed Funds Futures »	
Target Rate	4.50	Pricing Date	12/30/2022
Effective Rate	4.33	Cur. Imp. O/N Rate	4.332

Meeting	#Hikes/Cuts	%Hike/Cut	Imp. Rate Δ	Implied Rate	A.R.M.
02/01/2023	+1.326	+132.6%	+0.332	4.664	0.250
03/22/2023	+2.100	+77.4%	+0.525	4.857	0.250
05/03/2023	+2.532	+43.2%	+0.633	4.965	0.250
06/14/2023	+2.552	+2.0%	+0.638	4.970	0.250
07/26/2023	+2.330	-22.2%	+0.583	4.915	0.250
09/20/2023	+2.030	-30.0%	+0.507	4.840	0.250
11/01/2023	+1.564	-46.6%	+0.391	4.724	0.250
12/13/2023	+1.011	-55.3%	+0.253	4.585	0.250
01/31/2024	+0.350	-66.1%	+0.088	4.420	0.250

Source: Bloomberg World Interest Rate Probability 12/31/2022

- Global equity valuations reflect higher uncertainty but leave more room for margin-for-error (see Capital Market Projections Updated 2023 down below). China's expected recovery from COVID lockdowns and Europe surviving the winter could serve as catalysts for the rest of the world to catch up to the U.S. Already, U.S. Dollar Wrecking Ball Appreciation has subsided with the U.S. dollar weakening in 4Q2022 (**Figure 12**), especially against the yen and euro (**Figure 13**).

Figure 12 – U.S. Dollar Wrecking Ball Appreciation on Hold as USD Weakens in 4Q2022

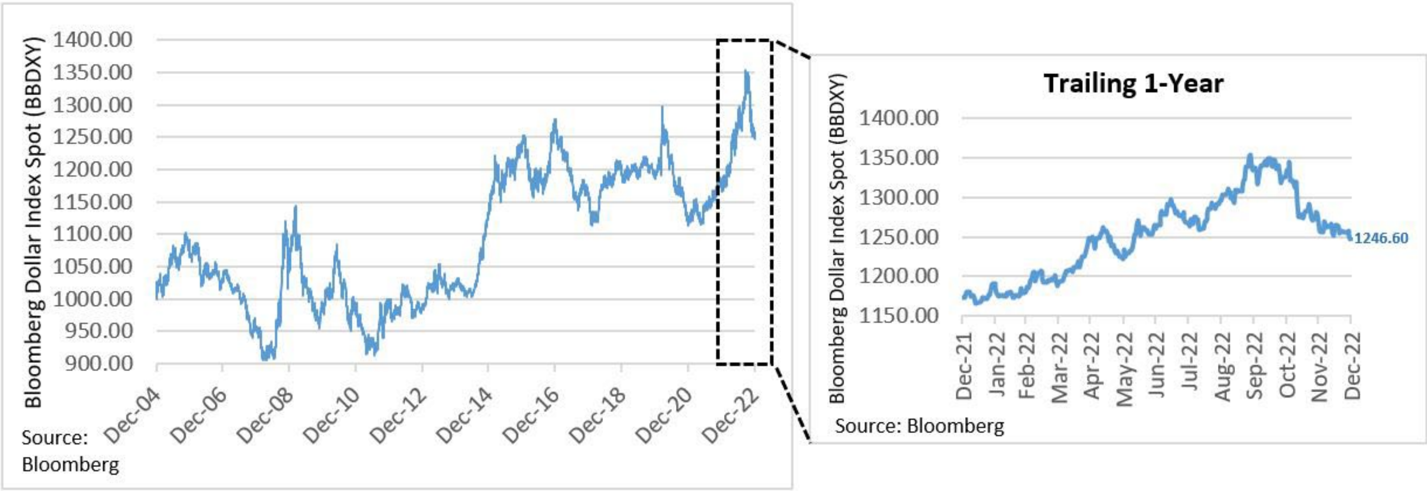
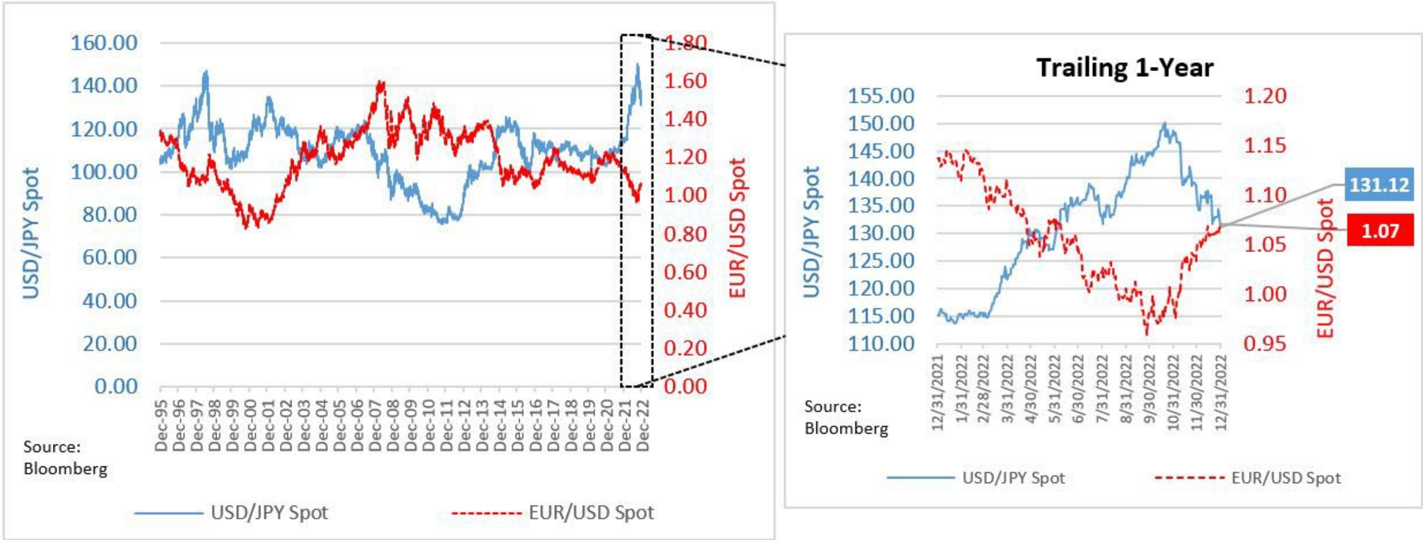


Figure 13 – Yen and Euro Strengthen Against USD



- The case for global recovery rests on mean reversion from deep cyclical lows. China's bond yield and currency suggest an upturn is taking place (**Figure 14**) as China's excess savings (**Figure 15**) provide potential fuel for its own Revenge COVID consumption, but Europe remains mired in a deep cyclical slowdown and liquidity withdrawal (**Figure 16**).

Figure 14 – China's Bond Yield and Currency Upturn Point Towards a Recovery Off Lockdown Lows

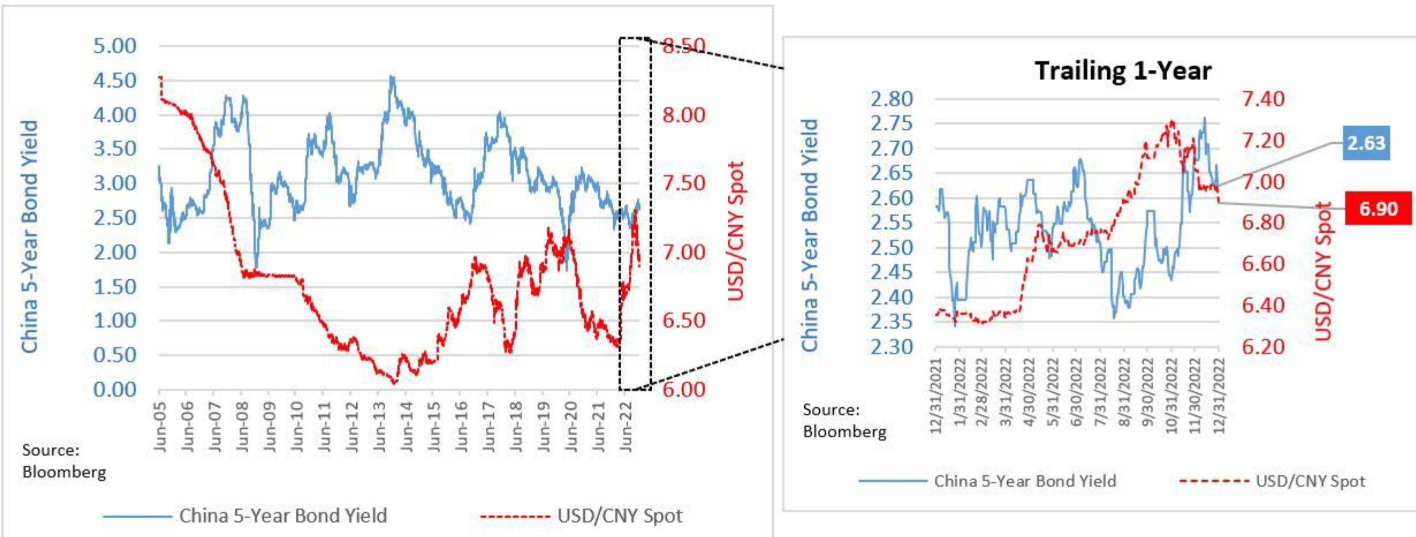


Figure 15 – China's Household Savings Could Provide the Fuel for Revenge COVID Consumption and Residential Investment

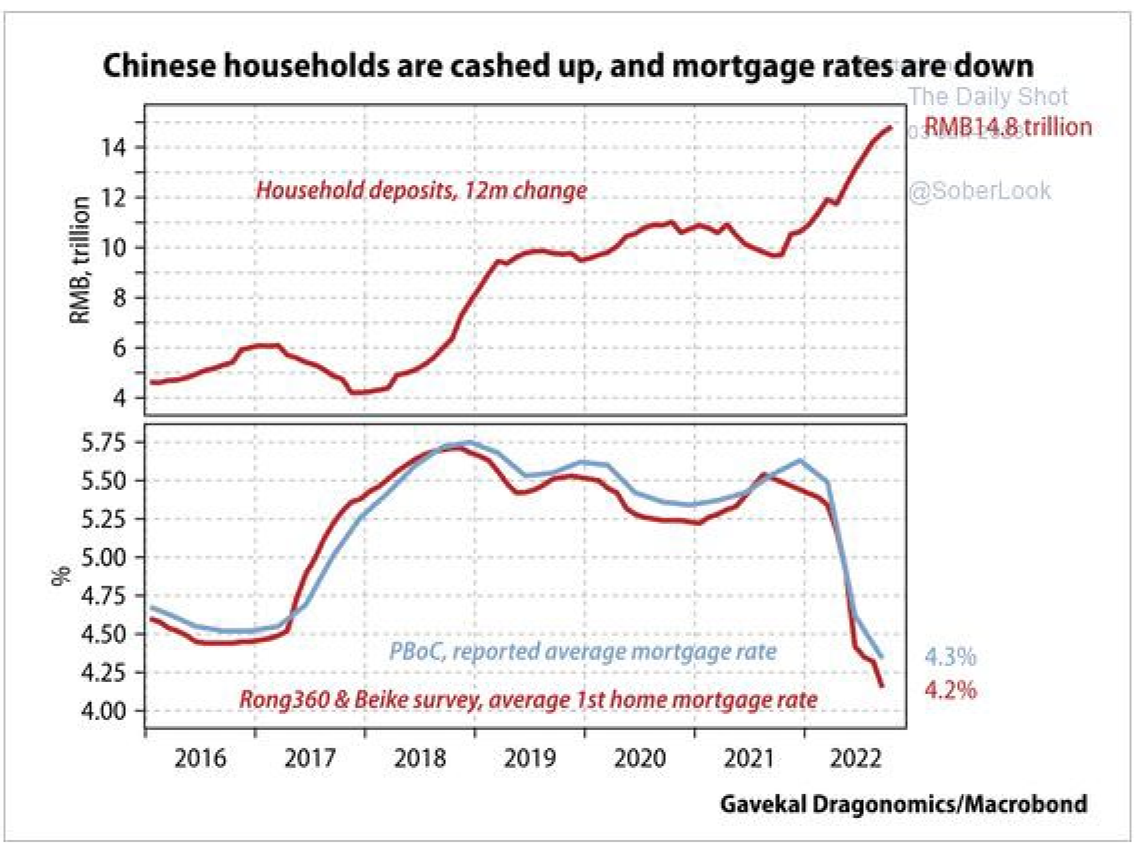
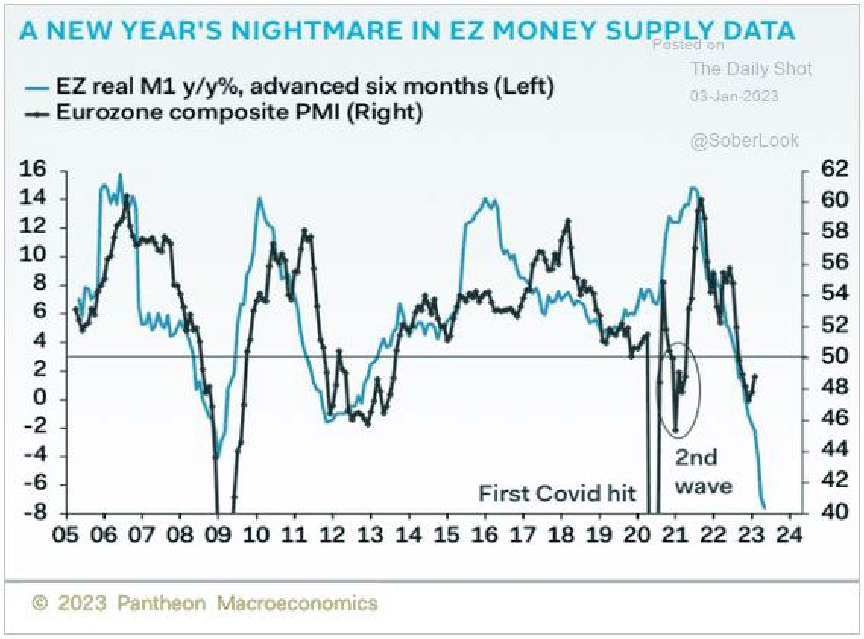
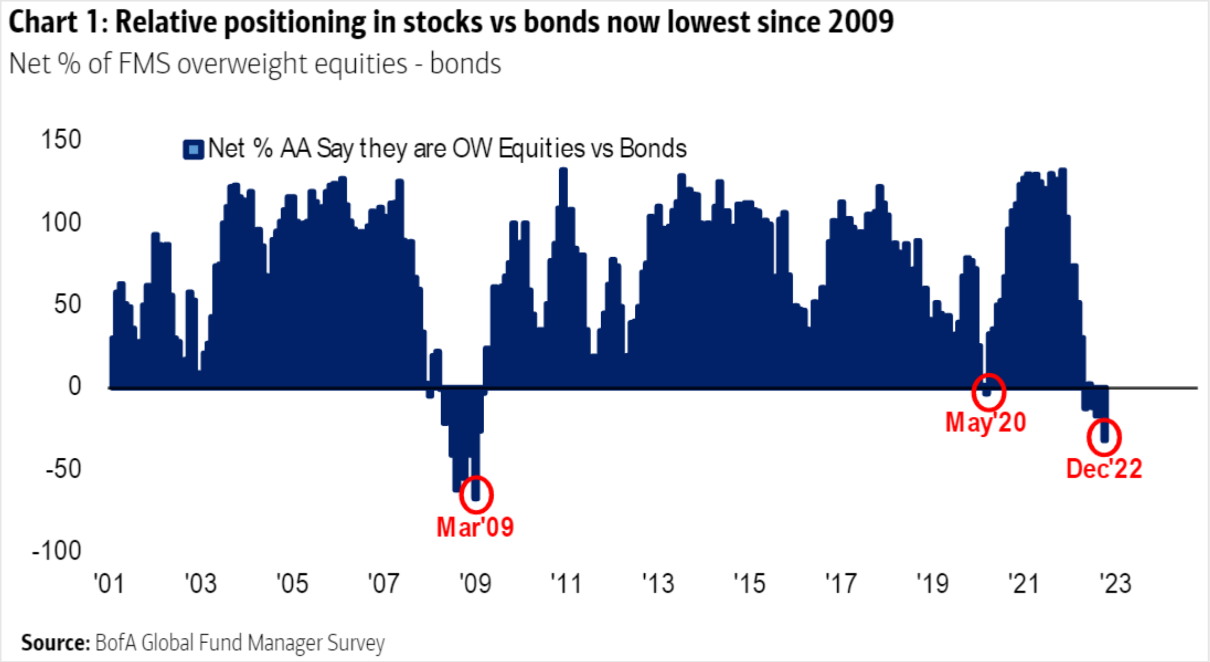


Figure 16 – Collapse in Eurozone Liquidity Could Exacerbate Industrial Slowdown



- There is a growing consensus for institutional investors to overweight bonds over equities (**Figure 17)** due to consensus 2023 outlook for muted growth, tighter Fed policy, and a recession. A contrarian take would be to overweight risk assets (i.e. equities and commodities) in the face of this consensus as the economic environment may come in better than expected

Figure 17 – Fund Managers Prefer Bonds Over Equities for the First Time Since 2009 (Excluding COVID Period)



The 60/40 portfolio cruise liner may find itself navigating in a fog of lesser certainty if slowing inflation intersects with a slowing economy and a weaker labor market. And given current valuations and positive real interest rates, the investment outlook appears to reflect equilibrium, perhaps, as lower valuations compensate investors with higher risk premiums in the face of lesser certainty.

Based on our Capital Market Projections for 2023, 3D remains cautiously optimistic on equities and fixed income due to lower valuations from prior peak levels despite the greater uncertainty over Fed policy, economic growth and earnings. We continue to emphasize strategic asset allocation as a core investment discipline and that time horizons should be properly matched with the inherent riskiness of underlying investments.

Capital Market Projections Updated 2023

We enter 2023 with a much higher interest rate backdrop than we entered 2022 where real interest rates (inflation-adjusted) across the U.S. maturity curve are positive for the first time in the post-pandemic period based on implied inflation expectations priced between U.S. TIPS vs nominal Treasuries. Higher real rates have introduced real competition for investor dollars as the cost of financing business activity and household consumption has risen alongside higher inflation. Cash is no longer trash with short-term cash vehicles yielding around 4% as opposed to 0% at the beginning of the year. Higher real rates have contributed to a compression in asset valuations as the 12-month forward price/earnings multiple of the S&P 500 dropped from 21.4x at the beginning of 2022 to 16.7x to end the year.

The earnings outlook for 2022 looked more muted vs the torrid recovery of 2021 with sell-side analysts expecting +9% earnings growth for S&P 500 companies at the beginning of 2022 only to raise projections to +10% throughout the first half of the year before succumbing to economic reality with outlooks revised down to +5% (as of 12/15/2022 according to Factset Earnings Insight) on top of revenue growth of 10.4%, led by Energy, Industrials, and Real Estate partially offset by earnings declines across Financials and Communication Services. The aggregate profit margin is expected to end the year around 12%. For CY 2023, analysts expect S&P earnings growth of 5.3% on top of revenue growth of 3.3% - a much more flattish outlook but one that does not project a recession. So positive earnings growth could help put a floor underneath equity valuations, but where interest rates move in 2023 could continue to be more influential on equity valuations over corporate earnings as was the case for much of 2022. And the 2023 earnings outlook may prove to be too optimistic if margins come under pressure due to higher input costs and/or a U.S. recession cuts meaningfully into revenues, as institutional fund managers hold a more downbeat view of earnings than the sell-side consensus (**Figure 18**).

Figure 18 – Will Corporations Experience an Earnings Recession?

3D believes that price matters over the long run and that what you pay today will influence the returns you realize over the long-term. Price can exert a long-term gravitational pull on expected returns. We do believe that investors should remain fully invested for the most part as part of a strategic asset allocation built on risk-based investment programs. Unlike the beginning of 2022 where we were more cautious due to rich valuations on both equities and fixed income, the current environment speaks to more attractive valuations across risk-based assets, reflecting the higher uncertainty of the macro environment heading into 2023. Investors should temper their return expectations looking forward in relation to potentially higher volatility, being mindful of the potential risks that could derail the post-COVID recovery and pose risks to financial stability.

What follows are a series of forecasts for long-term expected returns across various asset classes. In the spirit of Fama/French and Jeremy Siegel ("Stocks for the Long Run") from University of Pennsylvania's Wharton School, 3D derives its long-term forecasts from valuations currently priced into equity and fixed income assets.

3D Capital Management Long-Term Equity and Fixed Income Asset Return Forecasts

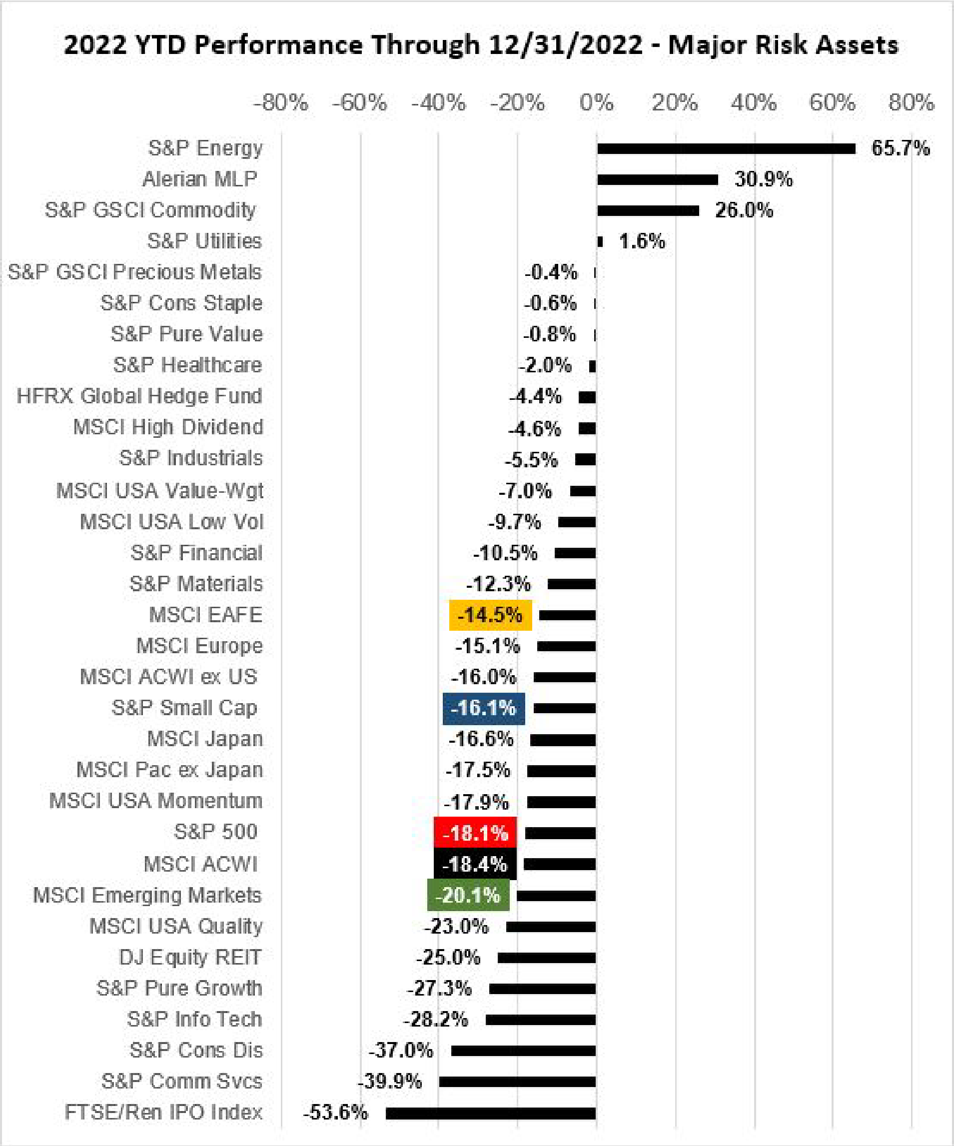
1. Start with MSCI All-Country World Index (ACWI) (Global Equities) and S&P 500 (US Equities) Price/Earnings Multiple Based on Consensus Next 12-Months Earnings (12/31/2022): 14.5x (S&P 500 P/E at 16.7x) (down from 18x and 21x last year, respectively).
2. Invert the MSCI ACWI P/E multiple to arrive at an earnings yield to generate a long-term real (inflation-adjusted) return forecast: 6.9% (S&P 500 earning yield 6.0%) (up from 5.6% and 4.7% last year, respectively).
3. Long-term inflation expectations implied by 5-year/5-year breakeven rates between U.S. Treasury Inflation Protected Securities (TIPS) versus Nominal Treasuries: 2.2% (down from 2.3% last year).
4. Long-Term Nominal Expected Nominal Rate of Return for Global Equities: **9.1%** (6.9% + 2.2%). For the S&P 500: **8.2%** (6.0%+2.2%)
5. U.S. Fixed Income: Projected Yield-to-Worst on Bloomberg/Barclays US Aggregate Bond Index is **4.6%** (up from 1.7% last year) and +2.4% on a long-term inflation-adjusted basis.
6. Projected Yield-to-Worst on Bloomberg/Barclays US High Yield Index: **8.3%** (6.1% on an inflation-adjusted basis). S&P Global Ratings Credit Research is projecting a 3.75% default rate in 2023, more than double the current rate.

Hence, a 60/40 portfolio consisting of Global Stocks and US Investment Grade Bonds is projected to return approximately **7.3%** nominal return (**5.1%** inflation-adjusted) over the long run based on year-end valuations. One can potentially increase returns by investing in riskier asset classes such as small caps and high yield, but one would also be introducing more risk into the portfolios, even when accounting for diversification benefits.

2022 Asset Class Performance

Figure 19 displays the 2022 calendar year returns across risk-focused assets. Once again Energy and Commodities were among the top performers in 2022 (a year with few positive performers among risk-focused assets) following their leadership in 2021, a reversal from 2020. 2022 saw Value outperform Growth and Small Caps outperform Large Caps as well as International Developed Markets (MSCI EAFE) outperforming the U.S. market (S&P 500) for the first time in quite some time, helped by a weakening U.S. dollar late in the year. However, Emerging Markets and broader Asian markets continued to underperform developed markets, in particular China, whose economy and industrial activity was weighed down by Zero-COVID lockdowns throughout much of the year. Precious metals outperformed despite global central bank tightening and real interest rates rising as a result.

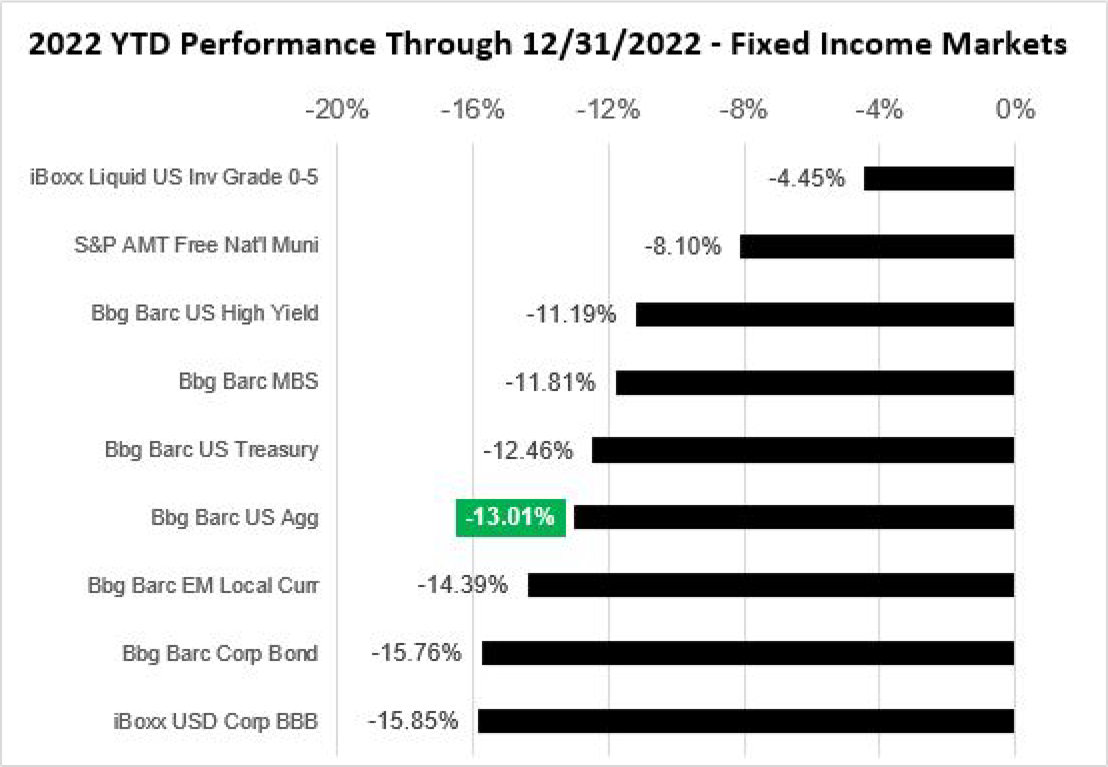
Figure 19 – 2022 Calendar Year Returns for Risk-Focused Asset Classes



Source: Bloomberg

Figure 20 displays the 2022 calendar year returns across fixed income market sectors. Global fixed saw one of its worst calendar year performances in at least the past 70 years as interest rates rose sharply throughout the year. International fixed income and emerging market debt outperformed as foreign currencies strengthened against the U.S. dollar late in the year following strong USD appreciation through the first nine months. Municipal bonds outperformed as the borrowing costs of state/local issuers narrowed versus federal-issued debt. U.S. Treasuries and Investment Grade Corporates underperformed riskier fixed income sectors, such as high yield, which is not as rate sensitive due to shorter maturities.

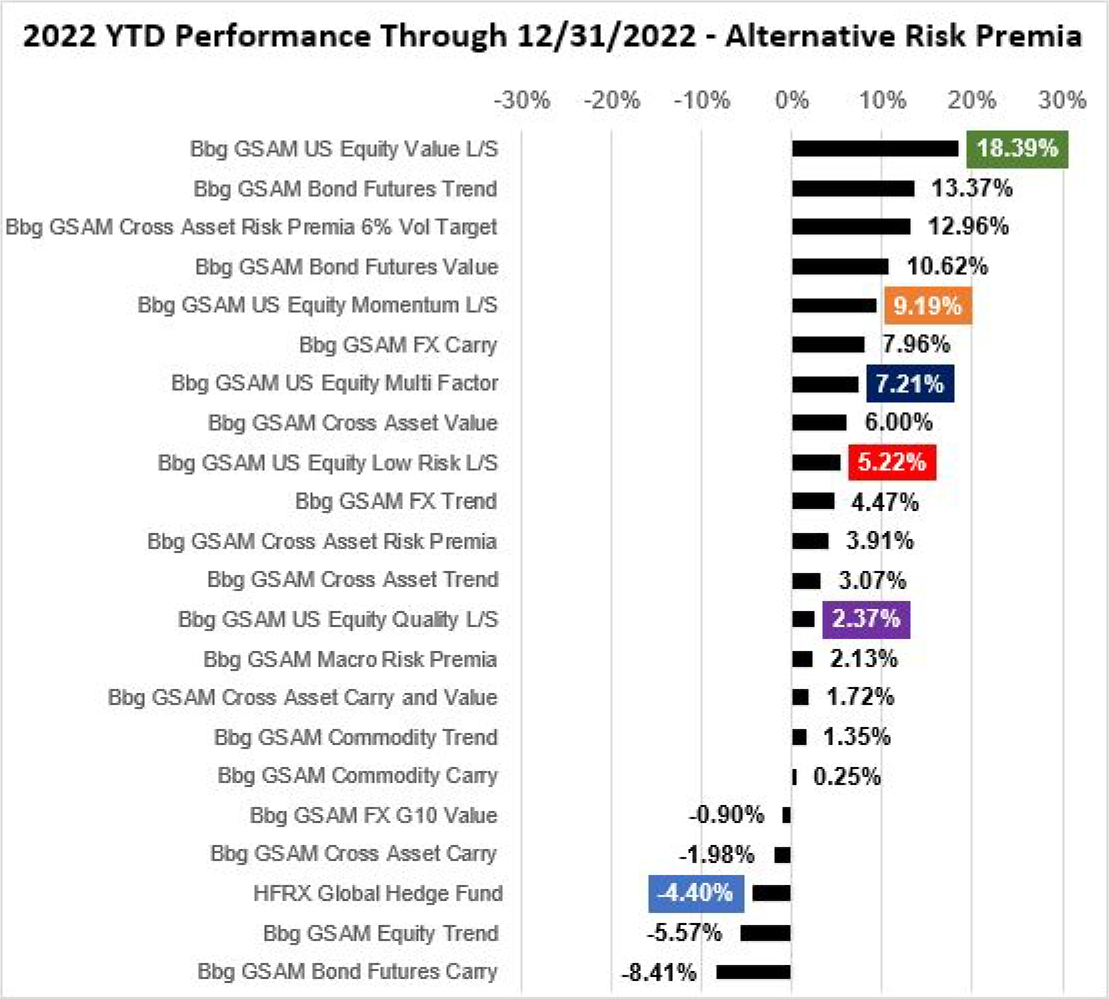
Figure 20 – 2022 Calendar Year Returns Across Fixed Income Markets



Source: Bloomberg

Figure 21 displays the 2022 calendar year returns for alternative risk premiums (value, carry, trend, and factors calculated by Bloomberg/Goldman Sachs Asset Management) compared to the HFRI hedge fund index. As a broad category, hedge funds performed poorly relative to most alternative risk premiums, as long/short factors, especially value and momentum, along with fixed income and currency factors posted strong positive returns. Strategies focused on equity trend (notably volatility-focused strategies) and bond futures carry (yield curve inversion hurt) struggled this year.

Figure 21 – 2022 Calendar Year Returns Across Alternative Risk Premia



Source: Bloomberg

Calendar Year 2022 Recap

1st Quarter 2022: Crosscurrents and Mixed Signals as U.S. Equities Rally in the Face of An Inverted Yield Curve

Following a strong run for financial risk assets amidst pent-up post-COVID lockdown demand, financial markets started 2022 on a rougher note. As equities and fixed income returns turned negative, investors had realized that a new central bank policy regime was descending upon financial markets that would have significant implications for equity and fixed income valuations as headline inflation was proving to be less than transitory. Although institutional fund managers identified a hawkish Fed as a primary risk heading into 2022 (as we noted in our January 2022 Market Commentary), little did we all appreciate how magnified that risk would intensify throughout the year. Fed Funds Futures were only pricing in three rate hikes (0.25% each) throughout the year; by March, the Fed would hike rates by nearly that amount in one meeting (from 0% to 0.50%) with expectations that plenty more would come.

In January, the stock market started to pull back from its strong CY2021 finish as prospects for tighter central bank policies responding to high headline inflation metrics and geopolitical risks (rising Ukraine/Russia tensions) prompted investors to take financial asset risk off the table. A significant laggard throughout the initial pandemic recovery, U.S. energy stocks bucked the market sell-off as the sector benefited from a sharp rise in energy prices (~30% in the quarter for the 3-month generic oil futures contract) as it became more apparent that supply/demand imbalances that built up during the pandemic would persist.

After telegraphing a significant military buildup near Eastern Ukraine, Russia formally invaded Ukraine proper near the end of February. In response, the U.S., United Kingdom, Canada, and European Union imposed financial and commercial sanctions on Russia and restricted Russian trade apart from energy. In addition, European corporations, such as BP and Shell, began divesting Russian-based assets and joint ventures. With few signs of a ceasefire, global stocks then experienced significant selling pressure throughout the remainder of the quarter before rallying at quarter-end well off the intra-quarter lows. Emerging markets bore the brunt of the sell-off (both markets and currencies). Investors had become optimistic over China's recovery prospects as the National Party Congress would be convening over the spring following the Winter Olympics, but the country would reinstate zero-COVID lockdowns due to a resurgence in COVID infections that would weigh on economic activity and investor sentiment throughout the remainder of the year.

Bond prices dropped as interest rates rose in response to inflation pressures and the expected tightening from central banks in response to inflation. The year began with short-term interest rates near 0% and the 10-Year U.S. Treasury Rate near 1.5%. By the end of the 1st quarter, the 10-year rate rose sharply to 2.3% as it became clear that the U.S. Federal Reserve would be raising rates at a faster and greater pace than was initially expected at the end of 2021. To also help contextualize the shock of a higher rate regime (something the market had not contended with since 2018), the amount of global aggregate debt priced with negative yields dropped from a pandemic peak of $18 trillion down to $8 trillion by the end of January. That number would drop to nearly zero by the end of 2022.

Sell-side consensus outlook on S&P 500 companies was much more sanguine at the beginning of the year as Wall Street analysts had been raising their CY2022 earnings growth outlook following 4th quarter releases. At the beginning of the year, S&P 500 companies reported earnings growth for CY2021 had been tracking around 46%, while analysts raised growth expectations for CY2022 with earnings growth projected at 9.5% (revenue growth of 7.9%). And according to Factset, analyst 'Buy' ratings were at the highest level since at least 2010 with bottom-up price targets that implied a 16% rise in the S&P 500 over the next 12 months. Wall Street had little inkling what was to come for the rest of 2022.

2nd Quarter 2022: ‘E’asy Does It

After having rallied at the end of Q1, global stocks renewed their weakness at the beginning of Q2 and had reached correction territory by the end of April. Renewed COVID lockdowns across key Chinese port cities, notably Shanghai, and heightened prospects of central bank tightening drove much of the early quarter sell-off as well as ongoing concerns over supply disruptions as a fallout of the Russia/Ukraine conflict. China’s COVID lockdowns had gummed up market sentiment already reeling from global inflationary pressures, the Russia/Ukraine conflict (contributing to the former) and tightening central bank policies trying to stay ahead of the inflation curve even as central banks were thrown one supply-side shock after another (akin to what happened during the 1970s). Risk assets were caught in a macro tug-of-war between geopolitical headwinds and positive U.S. company earnings backdrop as sell-side analysts continued to raise their forecasts for earnings growth for the rest of CY2022.

Homebuyers and homeowners were beginning to feel the pinch of higher interest rates with the benchmark 30-year conventional mortgage rate exceeding 5%, well above most of the mortgages taken out over the last several years. Based on lower housing affordability (a.k.a. home price appreciation) and higher mortgage borrowing rates, the proportion of household income taken up by the monthly mortgage payment had risen to 25% - the highest proportion since the 2008 Great Financial Crisis. This pinch would only get tighter as mortgage rates would eventually reach 6-7% even as housing appreciation continued along with increasing rental/lease rates.

May saw a bit of a respite from the YTD sell-off. Ongoing COVID lockdowns, heightened prospects of central bank tightening, and poor 1Q2022 earnings releases from retailers drove much of the selling pressure, but then equities had recovered from oversold conditions, over prospects that the Fed may engage in less tightening despite inflationary pressures (that did not turn out to be the case as the Fed would raise its benchmark rate by 0.75% at the May, June, and July FOMC meetings). Market and political pundits had entered recession watch as geopolitical instability and tighter monetary policies seemed to be chipping away at the pandemic recovery. Although investors were surprised by the hit to profit margins from key retailers, many of these retailers also reported growth in top-line revenue and foot traffic – it’s just that consumer spending habits suddenly shifted from discretionary goods and durables (appliances, toys, furniture, etc) to essentials such as food and gas. Second quarter is when we started to see the shift from goods to services as demand for discretionary ‘stuff’ started to wane.

June is when we started to see sell-side analyst sentiment start to buckle with analyst estimates for CY2022 earnings growth rolling over following downbeat releases. Yet, analysts maintained an air of confidence (perhaps reflective of company management optimism) that U.S. corporate profitability would remain resilient despite inflationary pressures on margins as well as a potential slowdown. The progression of estimate projections for CY 2022 and 2023 had not followed the typical pattern of where estimates drop, as opposed to a rise, as the year progresses. That positive sentiment would change later in the year.

It had become clear that the Fed would be tightening policy much greater than what was anticipated earlier in the year. By the end of 2nd quarter, the benchmark rate had been raised to 1.75% with expectations that the Fed would raise rates to 3.5% by the end of the year (the Fed would eventually raise rates to 4.5% by December). In addition to staying ahead of the inflation curve, the Fed was likely monitoring with upmost vigilance whether tightening financial conditions were putting too much stress on the financial system. Following an expected 0.75% rate hike at the July meeting, we argued the Fed may want to it easy and pause for the remainder of the year while seeing the effects of current policy tightening on economic demand and employment conditions. The Fed thought otherwise.

3rd Quarter 2022: Financial Instability Risk > Inflation Risk

The countertrend rally and renewed optimism over a Fed Pivot from the 2nd quarter carried over into the first half of the 3rd quarter before markets sold off in reaction to Fed Chair Jerome Powell's Jackson Hole speech and the sell-off in UK Gilts following a disastrous fiscal programs proposed by the short-lived Truss government. Global markets came under pressure as prospects of Federal Reserve tightening increased the risks of financial instability even as global inflation pressures remained elevated. Global equity markets and risk assets took a turn for the worse towards the end of September as the energy crisis across Europe weighed on government and consumer finances as well as private bank balance sheets experiencing a markdown in collateral values.

Broader Asia also came under pressure over concerns of a currency contagion stemming from a U.S. dollar wrecking ball, a slowdown in global trading activity, and ongoing domestic growth pressures in China, grappling with the fallout of the collapse across its property sectors. China came under pressure as the USD/CNY currency ratio crossed the psychological barrier of 7.0 even as Chinese government bond yields rose as Asian bond yields struggle to keep up with rising European and U.S. yields.

The 3rd quarter started off promising with a sharp rally in global equities and fixed income following the 1st half selling pressures. The U.S. equity markets and bond markets both rallied sharply following comments from Fed chair Jerome Powell's press conference where he made unscripted remarks suggesting the Fed may be very close to 'pivoting' from its tightening campaign (to be refuted later by the Jackson Hole speech).

The U.S. economy contracted the first half of 2022 as overall GDP has declined for two straight quarters. However, the contraction was mostly driven by 1) high inflation (nominal vs real economic activity), 2) inventory correction, 3) a bigger-than-normal negative trade balance (likely driven by zero COVID lockdowns across China during 1Q), and 4) decline in business investment. Consumption and labor market strength continued to support the broader economy. The 3rd quarter also saw downward revisions to sell-side analyst estimates for CY 2022 S&P 500 earnings growth following weakening trends across key consumer.

August saw a continued counterrally in beaten up MEME stocks only to sharply reverse mid-August following some inauspicious insider selling and capital raises. The meme stock phenomenon, that started in July, was driven by option-driven gamma squeezes in retail darlings. Meme stock monkey business aside, investors had been hopeful that the countertrend rally in risk assets that began in July, led by U.S. large cap growth stocks, would affirm an economic and inflation outlook not quite as gloomy as what prevailed throughout the first half of 2022. However, Fed official comments following the July Fed meeting seemed to push back the more benign interpretation of Jerome Powell's press conference – the off-script reference of the benchmark rate close to neutral levels strongly hinting of a Fed pause or even pivot in the rate hike campaign to quell inflationary pressures. Powell essentially abandoned the soft landing narrative as he warned of growing recession risks as a consequence of the Fed's efforts to combat inflation that increasingly looked structural rather than transitory as had been characterized by the Fed in 2020-2021.

September saw a steep sell-off in global risk assets catalyzed by the collapse in UK Gilt prices and the British Pound in negative reaction to the proposed fiscal program by the short-lived Truss government. In the aftermath of the sudden sell-off and subsequent recovery in the British Pound, we learned that UK institutional investors, notably pension plans committed to liability-driven investment (LDI) programs, were forced to sell assets and raise collateral to maintain their LDI positions. It would become clear to central bankers that they would have to carefully navigate between tightening financial conditions and staying ahead of the inflation curve.

4th Quarter 2022: Investing into a Fog of Less Certainty

The first two months of the fourth quarter started with a recovery in U.S. risk assets, first with the U.S. market (October outperformance) and then international (November outperformance). A combination of 1) global central bank intervention to arrest U.S. dollar strength, 2) stronger-than-expected earnings growth from U.S. cyclicals/financials, and 3) expectations the Federal Reserve would follow other central banks (notably Canada and Australia) in slowing down rate hikes contributed to the counterrally from the third quarter sell-off. China's equity markets sold off sharply in October but then recovered in November as the government signaled a relaxing of zero COVID lockdown restrictions.

Federal Reserve officials were sending mixed signals on what level and how fast the Fed would achieve its terminal policy rate, or peak Fed Funds Rate that would bring inflationary pressures down to the Fed's long-term target. The Fed has been facing criticism that it's too reliant on backward-looking data and is extrapolating current labor market strength to continue into the future, regardless of the lagged detrimental impact on the economic activity from higher rates. Higher interest rates and higher inflation are already starting to affect end demand. Despite post-pandemic highs reached in consumer borrowing (i.e. credit card balances), consumers are responding to higher inflation by reducing purchases on household goods and durables (i.e. appliances). Business sentiment also seems to be indicating that input cost pressures have already peaked and are expected to decline as the year rolls on.

What may give the Fed pause on shifting to a pause in hiking rates further is that overall financial conditions have recovered from the September swoons and have reverted back to easier levels that may discomfort Fed officials as they try to dampen speculative spirits from inflating asset prices with headline inflation still elevated. This would create a risk of pivot-and-reverse on the part of central banks as any preemptive easing could manifest itself in renewed inflation. Federal Reserve comments remain focused on the resilient labor market as wages continue to rise alongside core inflation readings while excess household savings, albeit primarily upper income cohorts, represent more fuel for further spending. To his credit, in a speech to the Brookings Institute, Fed Chair Jerome Powell did acknowledge that the Fed is monitoring more real-time data, having faced repeated criticism that it's too reliant on backward-looking data. The Fed remains confident that its policy setting can strike the right balance to engineer a soft landing or at least a landing that is not hard enough to break the financial system and broader economy.

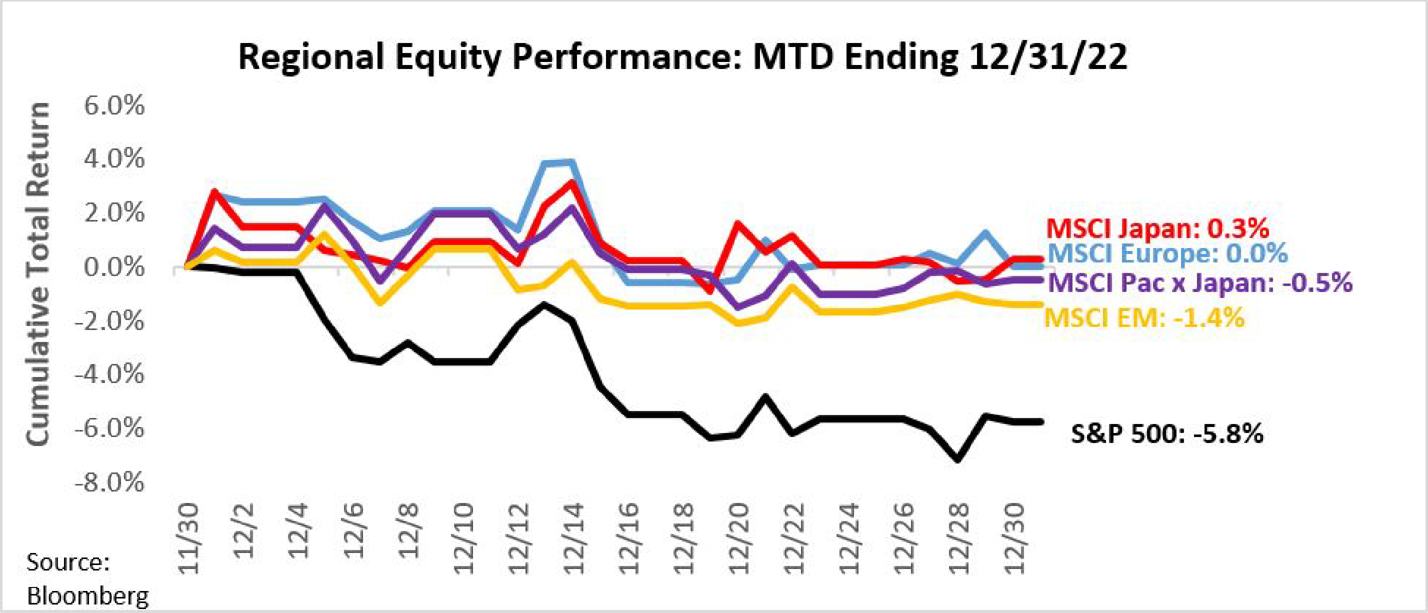
If the economic outlook continues to 'flatten' following the surge in post-pandemic demand, then investor and policymaker focus will likely shift towards the strength and resiliency of labor market conditions and whether rising wages represent an imbalanced labor market. And if price signaling from fixed income markets (i.e. inverted yield curves) and economic consensus outlooks point towards a U.S. recession, it's not being reflected in Wall Street analyst projections for U.S. company earnings (yet). For CY2022, the projected earnings growth continues to be revised down to +5% (versus +8% before 3Q22 earnings season and +10% at the beginning of 2022) while CY2023 is now projected to grow at 5.7% (on top of revenue growth of only 3.4%). Profit margins are expected to decline with higher input costs and a slowdown in revenue, but analysts are not projecting a deep earnings recession even in the face of an economic slowdown.

December 2022 Market Review

The 4th quarter recovery in global equities stumbled somewhat in December, particularly U.S. equities, partially hurt by a more hawkish-than-expected Fed meeting (FOMC) in mid-December that pushed the benchmark overnight lending rate to 4.50%. An uneven economic lift-off from the end of Chinese COVID lockdown restrictions also contributed to market weakness, especially across Asia. In December, the MSCI All-Country World Index (ACWI) returned -3.9%.

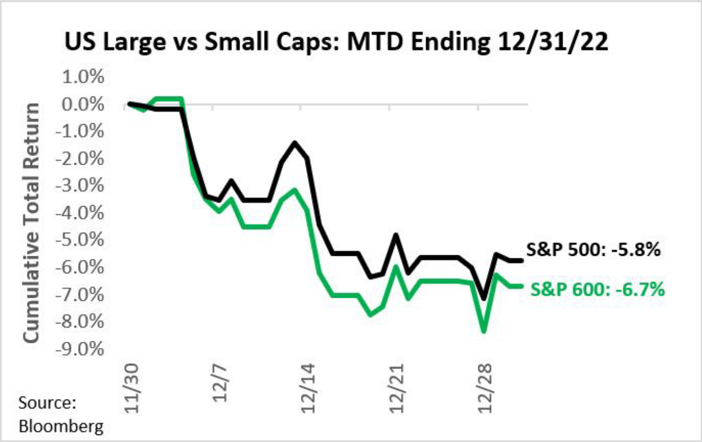
Across major regions (**Figure 22**), International Developed and Emerging Markets (equities and currencies) outperformed the U.S. as investors bet that the worst has passed for Europe and broader Asia. In December, MSCI Japan (+0.3%) and MSCI Europe (0.0%) led major regions followed by MSCI Pacific ex-Japan (-0.5%) and MSCI Emerging Markets (-1.4%) while the S&P 500 ended down 5.8%.

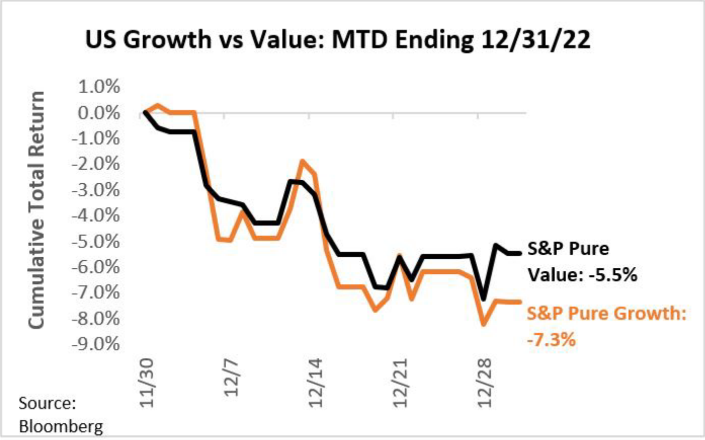
Figure 22 – Ex-U.S. Developed and Emerging Markets Outperform the U.S. in December



Within the U.S., U.S. smalls caps underperformed large caps amidst the broader sell-off in U.S. equities, while value stocks outperformed growth stocks, the former benefiting from energy and industrial cyclicals. The S&P 600 Index returned -6.7% versus -5.8% for the S&P 500. S&P Pure Value returned -5.5% versus -7.3% for S&P Pure Growth (**Figure 23**).

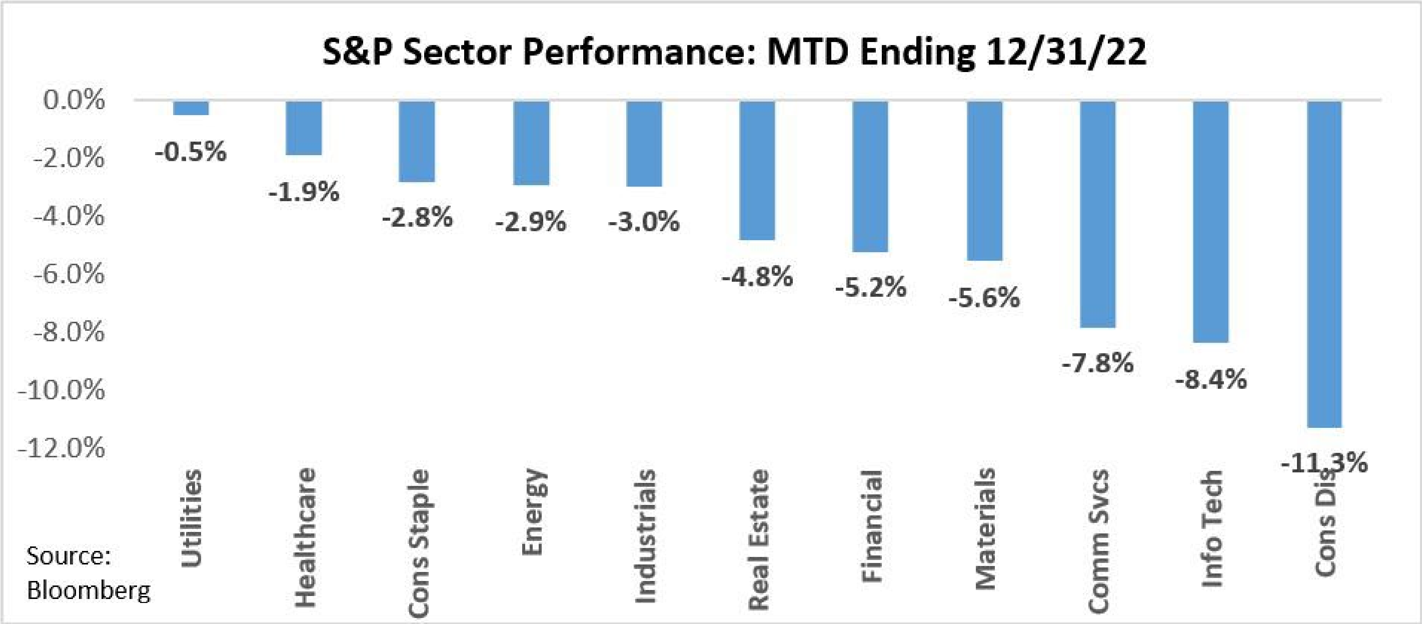
Figure 23 – Small Caps Underperformed Large Caps While Value Outperformed Growth





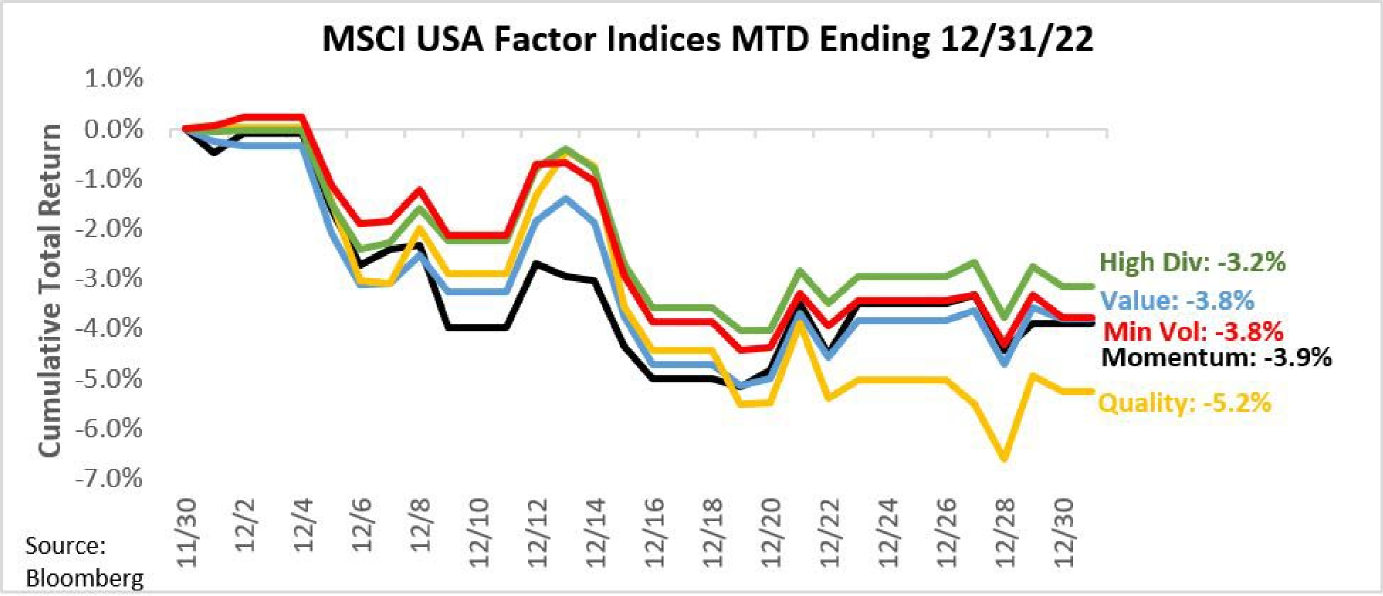
Across sectors (**Figure 24**), defensive sectors (Utilities, Health Care, Staples) and traditional cyclical sectors (Energy, Industrials) outperformed while Growth Sectors (Communication Services, Technology, Consumer Discretionary) lagged.

Figure 24 – Traditional Cyclicals (Materials, Industrials) and Financials Outperformed As Did Interest Rate Sensitive Sectors (Utilities, Real Estate)



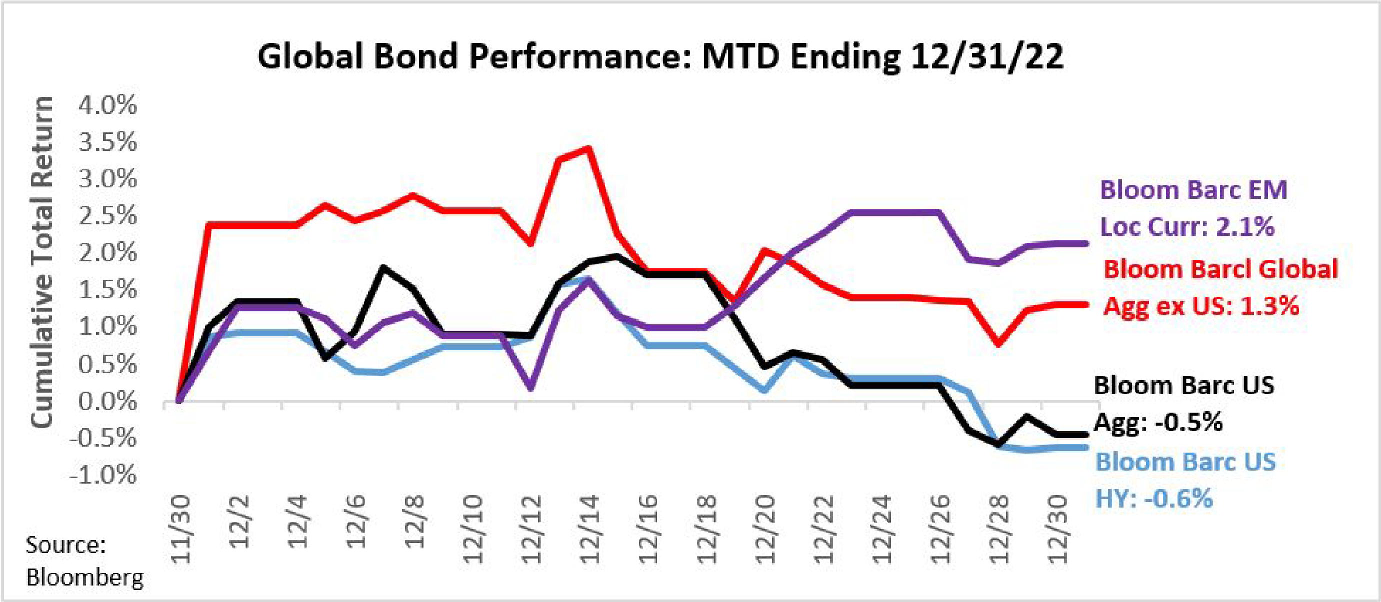
Major Risk Factors outperformed the S&P 500 although High Quality lagged the other factors (**Figure 25**) as High Dividend and Minimum Volatility benefited from the exposure to defensive segments of the equity markets.

Figure 25 – High Quality Underperforms Other Risk Factors



Investment grade fixed income had benefited from a continued drop in long-term interest rates; however, a sharp rebound in interest rates following the December FOMC weighed on overall U.S. fixed income. Investment grade sectors (mortgages, credit) continued to benefit from narrower credit spreads. The 10-Year U.S. Treasury Yield ended the month at 3.88% off intra-quarter lows of 3.45% prior to the December FOMC meeting. The Bloomberg U.S. Aggregate Bond Index dropped 0.5% for the month (**Figure 26**) while the Global ex-U.S Aggregate returned +1.3%, helped by a weaker U.S. dollar. The Bloomberg US High Yield Index returned -0.6% hurt by higher interest rates, while Bloomberg/Barclays Emerging Market Debt LC returned 2.1% as local currencies appreciated against the US Dollar.

Figure 26 – Non-U.S. Fixed Income Benefited from a Weakening U.S. Dollar



Within Equity Alternatives (**Figure 27**), S&P GSCI Commodities Index returned -1.4% as commodities recovered late in the quarter over prospects of China reopening but ended marginally down despite oil prices rallying late in the month (**Figure 28**). Precious metals continued to benefit from increased uncertainty over monetary policy and the economic outlook. S&P GSCI Precious Metals returned 4.8% for the month. U.S. REITs suffered from U.S. equity market weakness and higher interest rates with the Dow Jones REIT Index down 5% for the month.

Figure 27 – Commodities Recovered from Steep Early Month Losses While Precious Metals Continued to Benefit Over Increased Economic and Monetary Policy Uncertainty

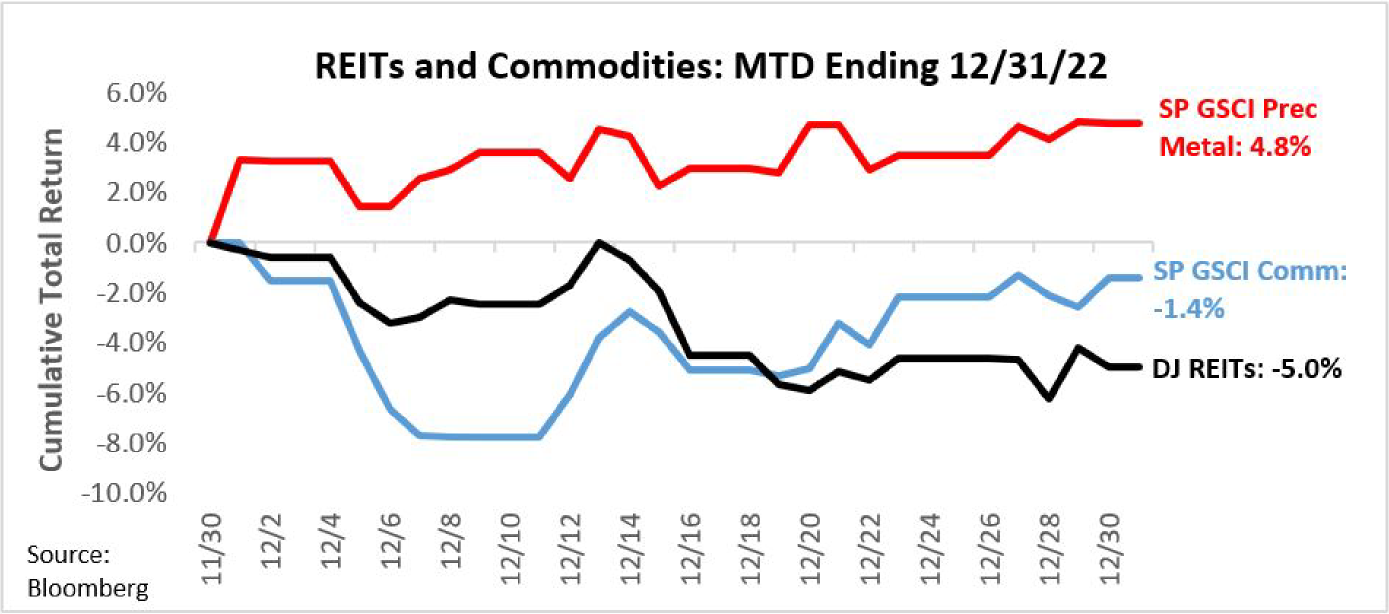
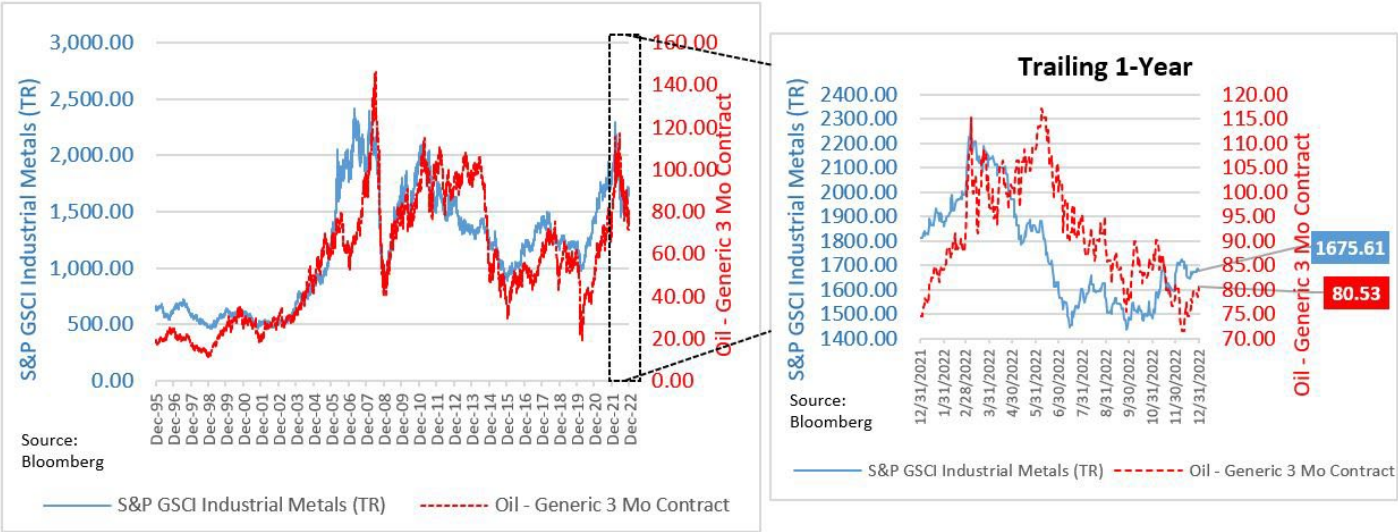
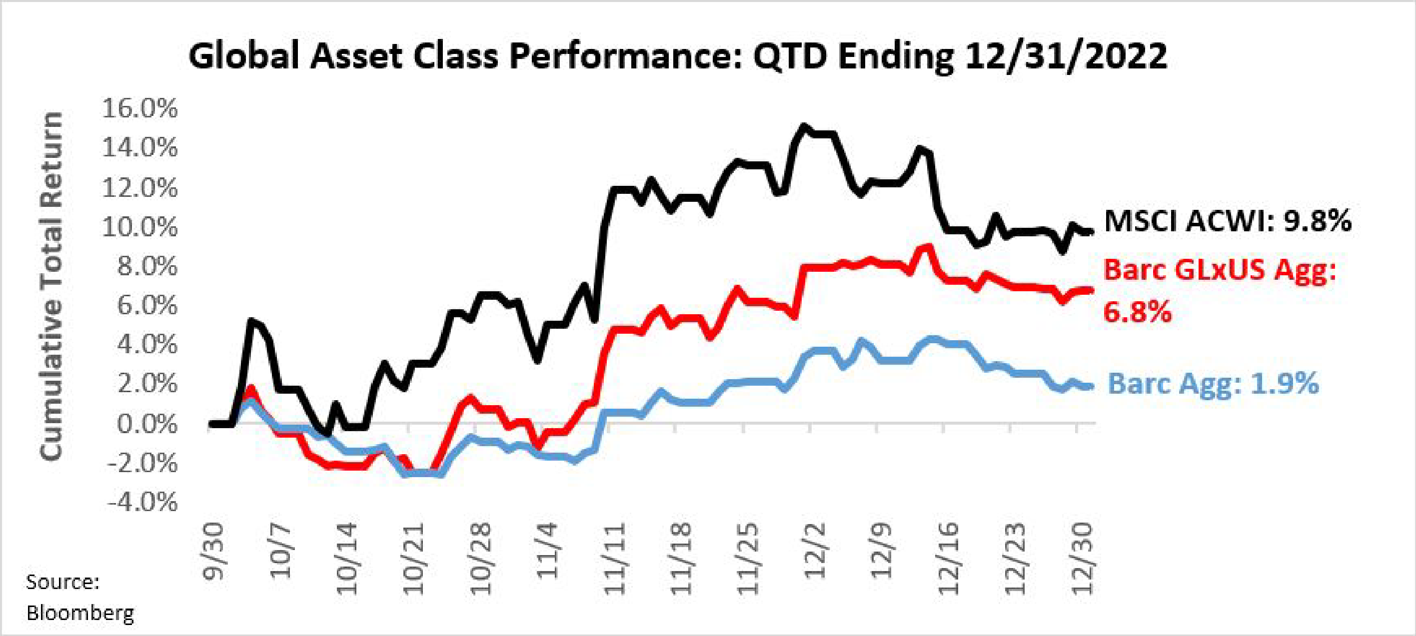
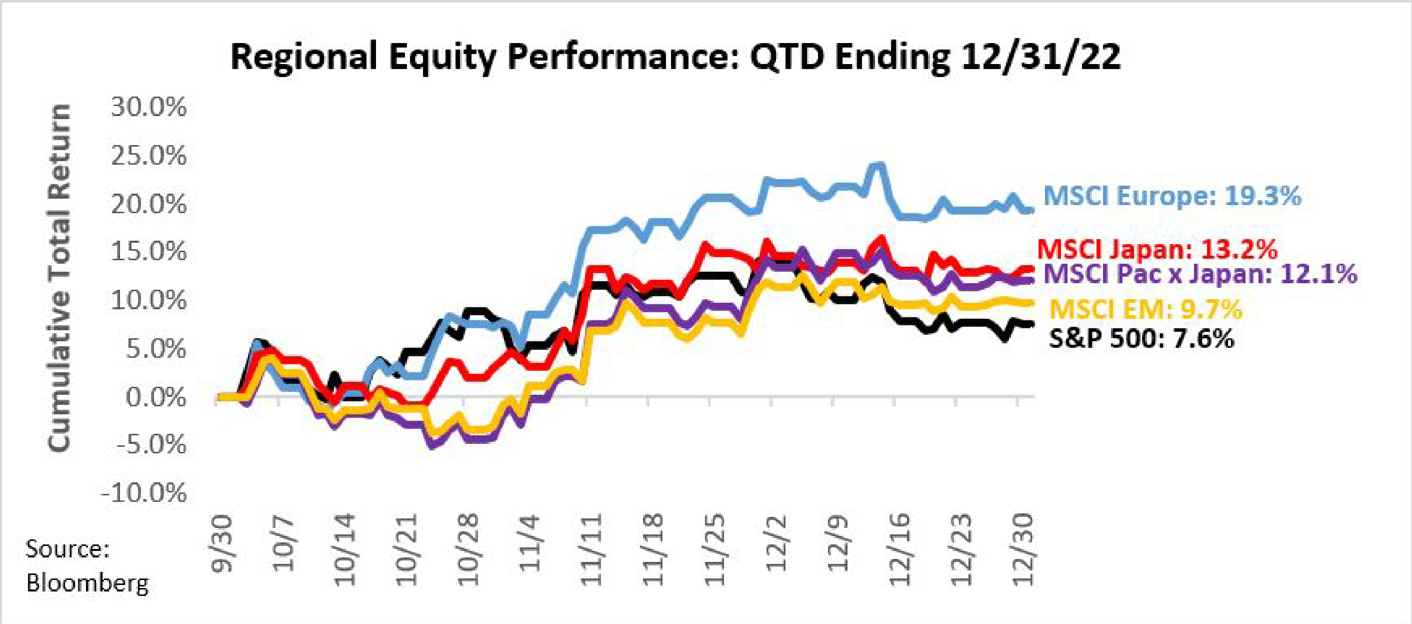


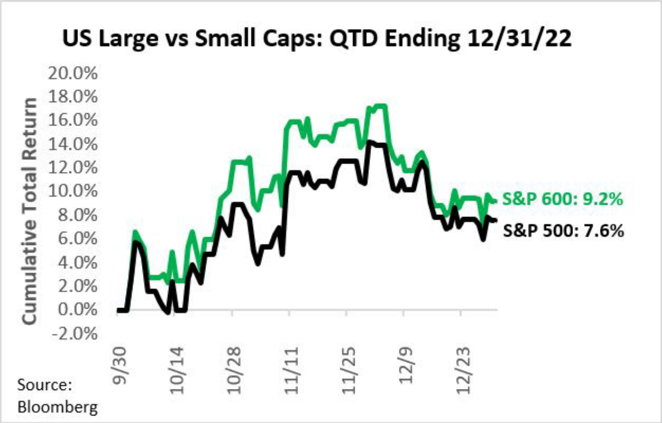
Figure 28 – Oil Prices and Industrial Metals Recovered Late in the Month Over Prospects of China Reopening from Zero COVID Lockdowns

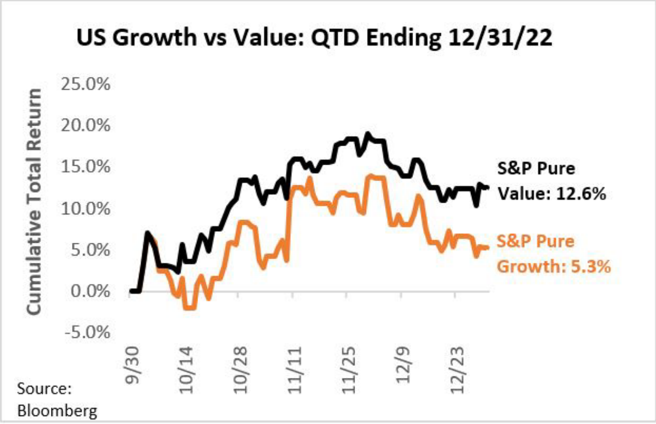


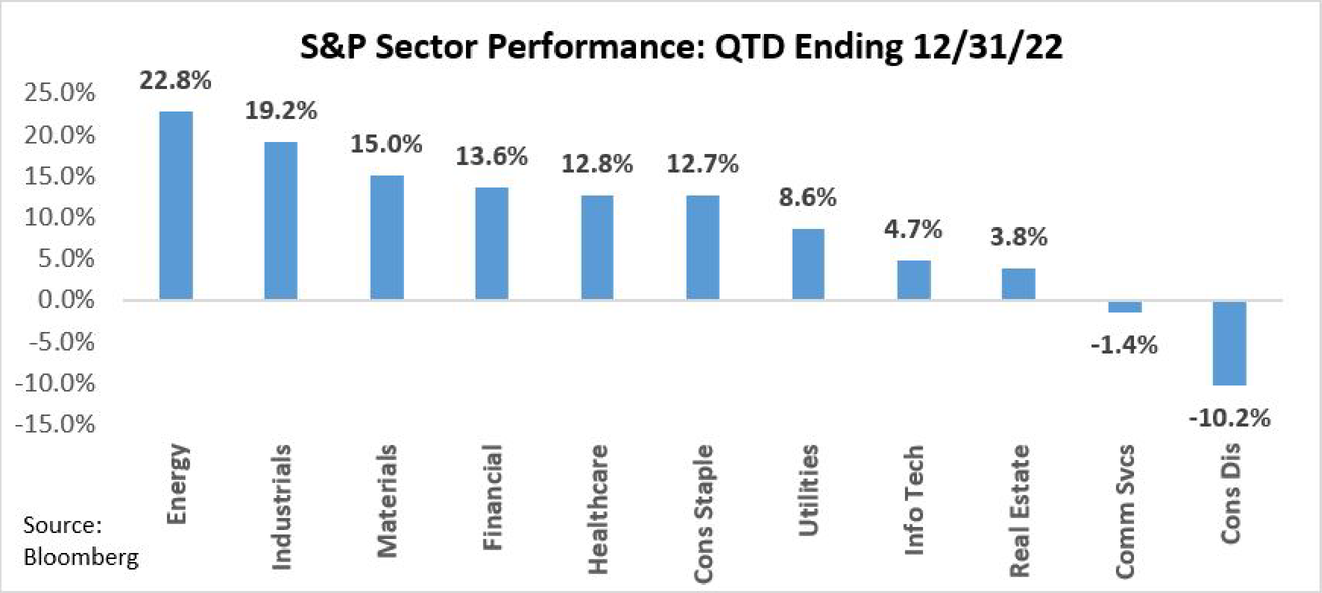
4th Quarter 2022 Performance Charts

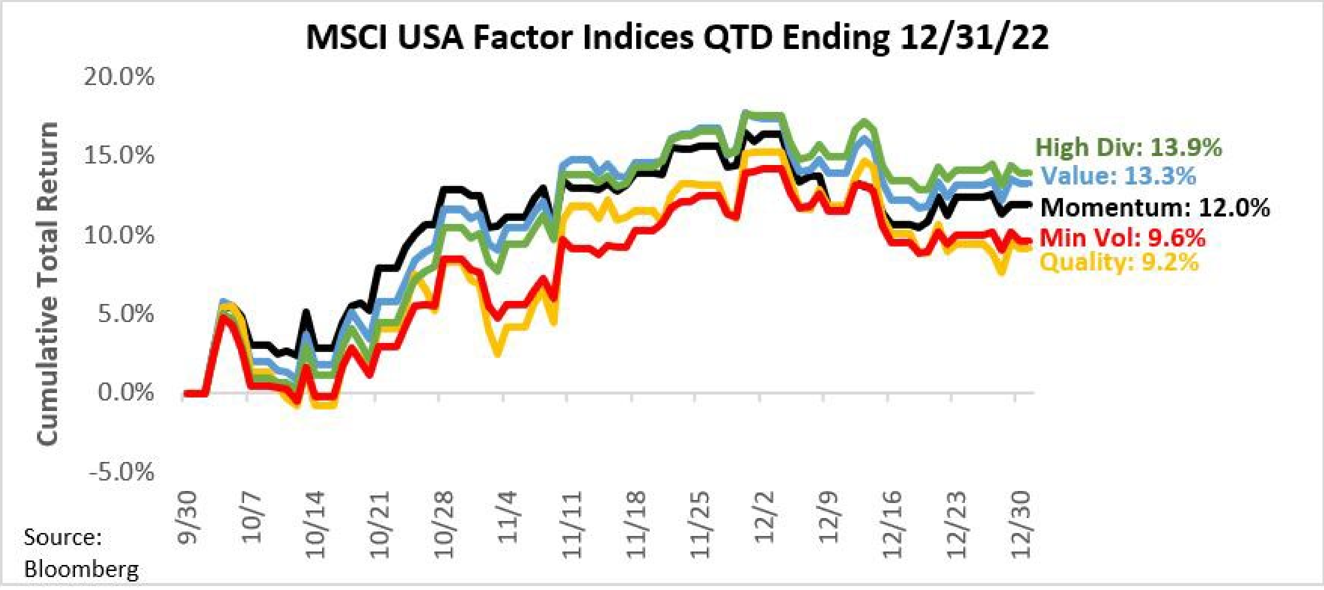


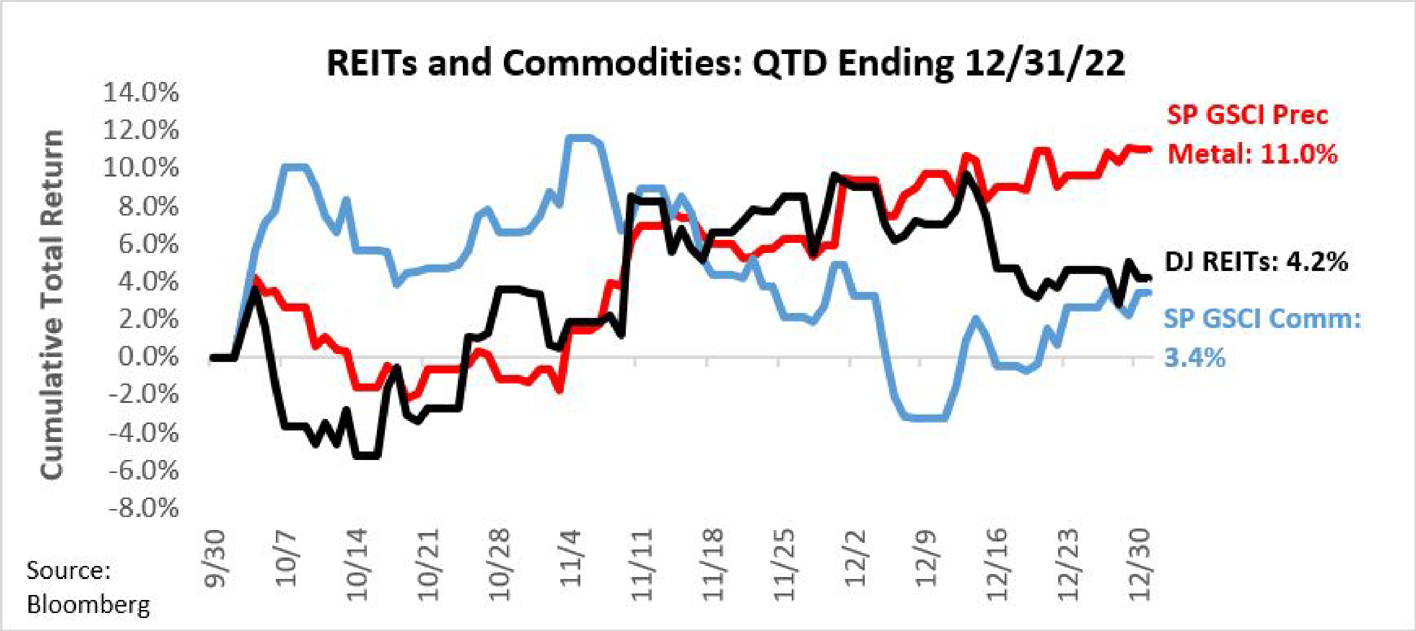


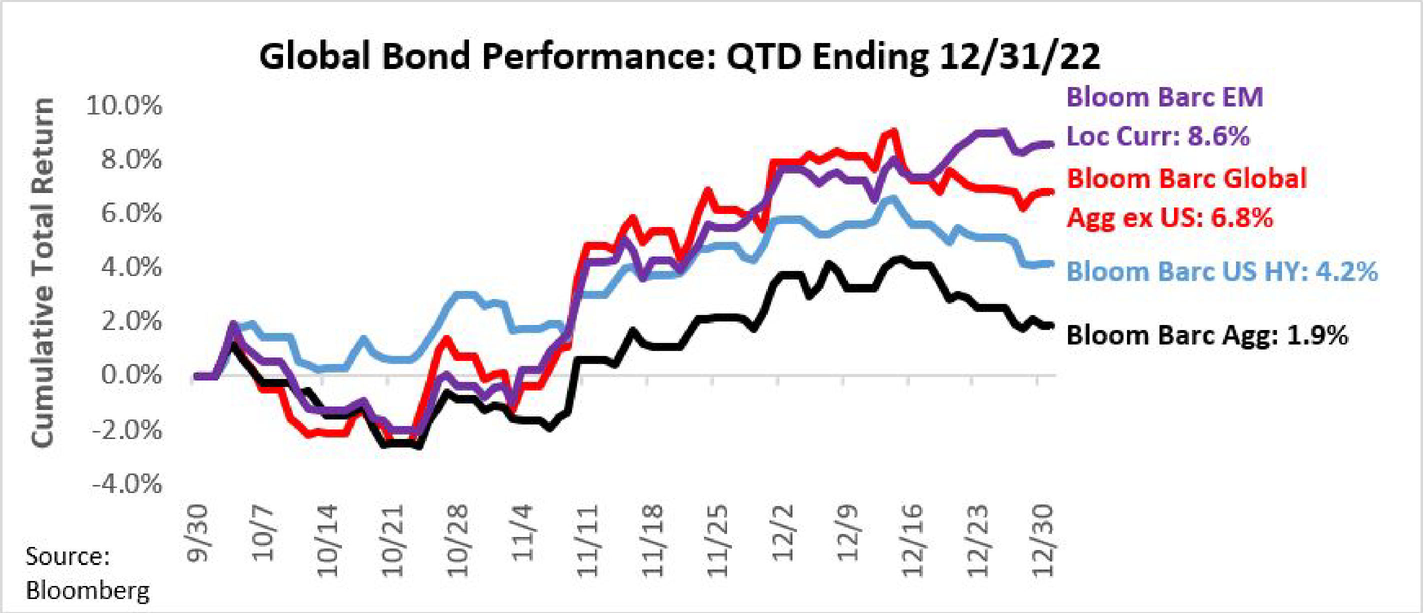

US Large vs Small Caps: QTD Ending 12/31/22
Cumulative Total Return
20.0%
18.0%
16.0%
14.0%
12.0%
10.0%
8.0%
6.0%
4.0%
2.0%
0.0%
-2.0%
9/30
10/14
10/28
11/11
11/25
12/9
12/23
S&P 600: 9.2%
S&P 500: 7.6%
Source: Bloomberg


US Growth vs Value: QTD Ending 12/31/22
Cumulative Total Return
25.0%
20.0%
15.0%
10.0%
5.0%
0.0%
-5.0%
9/30
10/14
10/28
11/11
11/25
12/9
12/23
S&P Pure Value: 12.6%
S&P Pure Growth: 5.3%
Source: Bloomberg

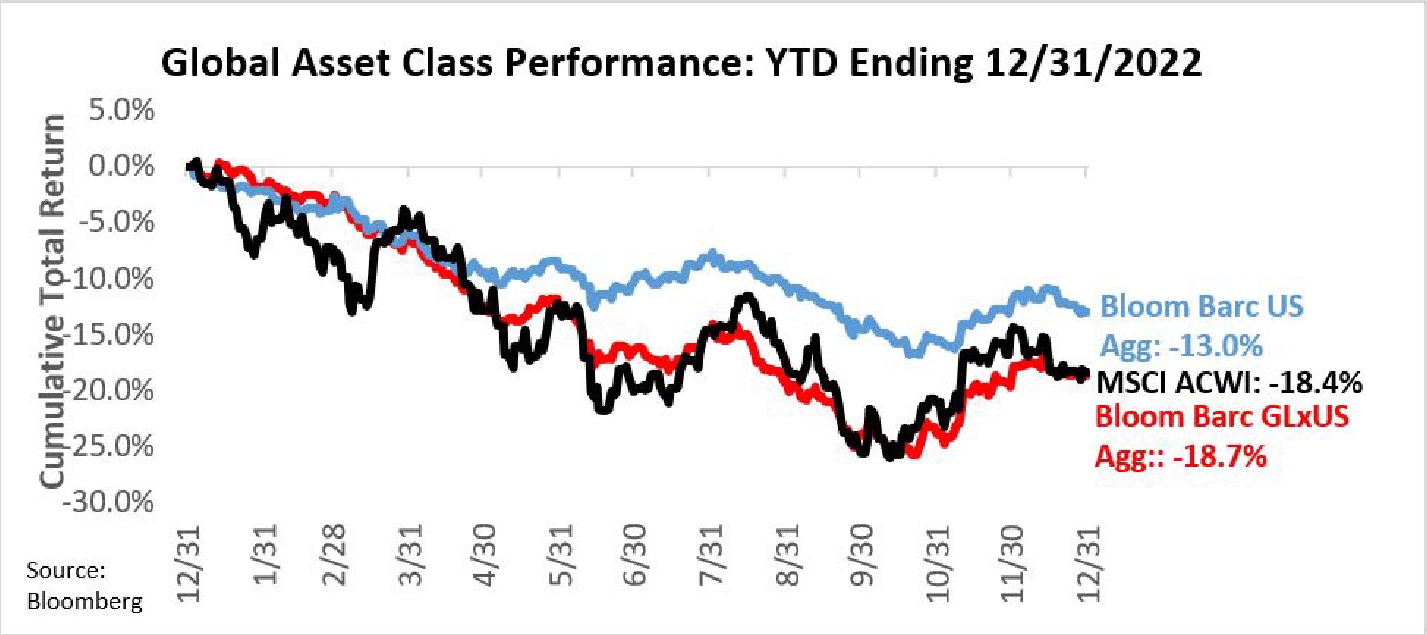

S&P Sector Performance: QTD Ending 12/31/22
25.0%
20.0%
15.0%
10.0%
5.0%
0.0%
-5.0%
-10.0%
-15.0%
Energy 22.8%
Industrials 19.2%
Materials 15.0%
Financial 13.6%
Healthcare 12.8%
Cons Staple 12.7%
Utilities 8.6%
Info Tech 4.7%
Real Estate 3.8%
Comm Svcs -1.4%
Cons Dis -10.2%
Source: Bloomberg

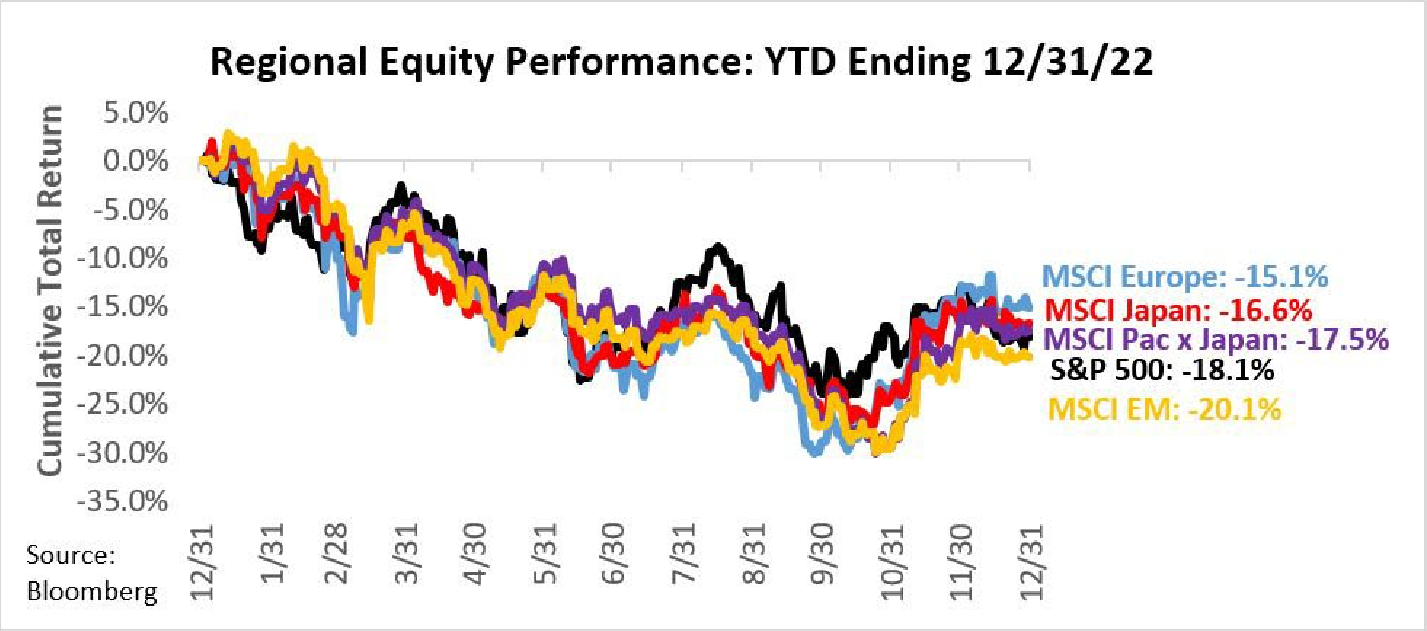

MSCI USA Factor Indices QTD Ending 12/31/22
Cumulative Total Return
20.0%
15.0%
10.0%
5.0%
0.0%
-5.0%
9/30
10/7
10/14
10/21
10/28
11/4
11/11
11/18
11/25
12/2
12/9
12/16
12/23
12/30
High Div: 13.9%
Value: 13.3%
Momentum: 12.0%
Min Vol: 9.6%
Quality: 9.2%
Source: Bloomberg

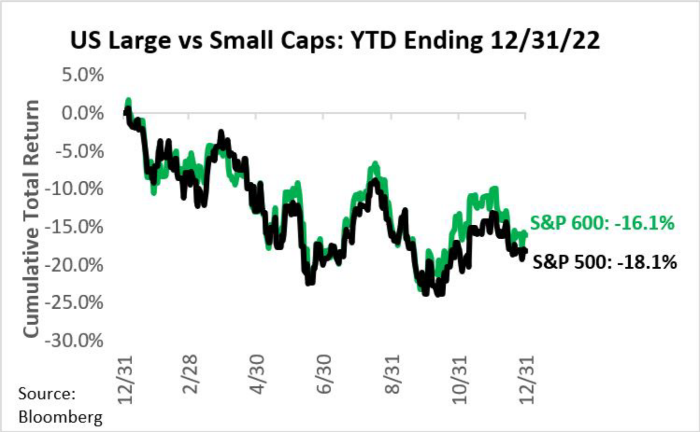

REITs and Commodities: QTD Ending 12/31/22
Cumulative Total Return
14.0%
12.0%
10.0%
8.0%
6.0%
4.0%
2.0%
0.0%
-2.0%
-4.0%
-6.0%
-8.0%
9/30
10/7
10/14
10/21
10/28
11/4
11/11
11/18
11/25
12/2
12/9
12/16
12/23
12/30
SP GSCI Prec Metal: 11.0%
DJ REITs: 4.2%
SP GSCI Comm: 3.4%
Source: Bloomberg


Global Bond Performance: QTD Ending 12/31/22
Cumulative Total Return
10.0%
8.0%
6.0%
4.0%
2.0%
0.0%
-2.0%
-4.0%
9/30
10/7
10/14
10/21
10/28
11/4
11/11
11/18
11/25
12/2
12/9
12/16
12/23
12/30
Bloom Barc EM Loc Curr: 8.6%
Bloom Barc Global Agg ex US: 6.8%
Bloom Barc US HY: 4.2%
Bloom Barc Agg: 1.9%
Source: Bloomberg

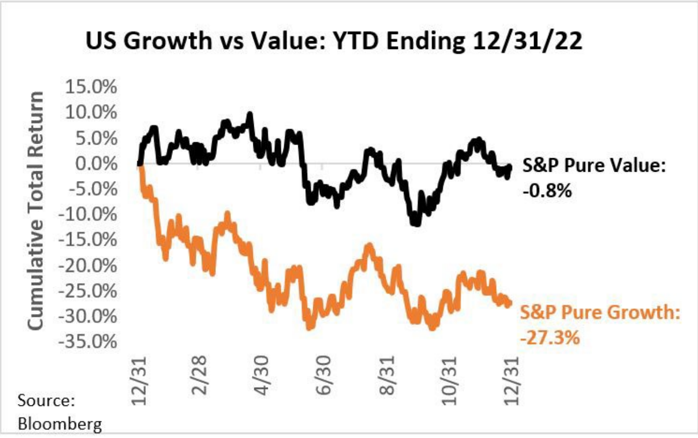
Year-to-Date 2022 Performance Charts



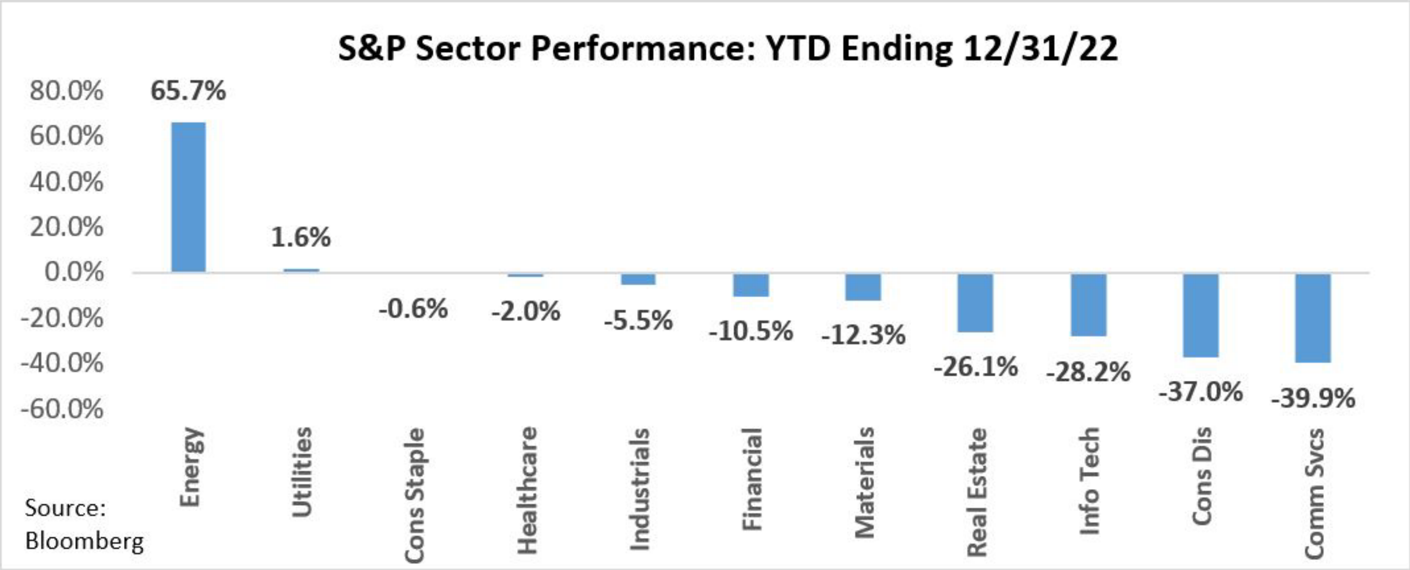




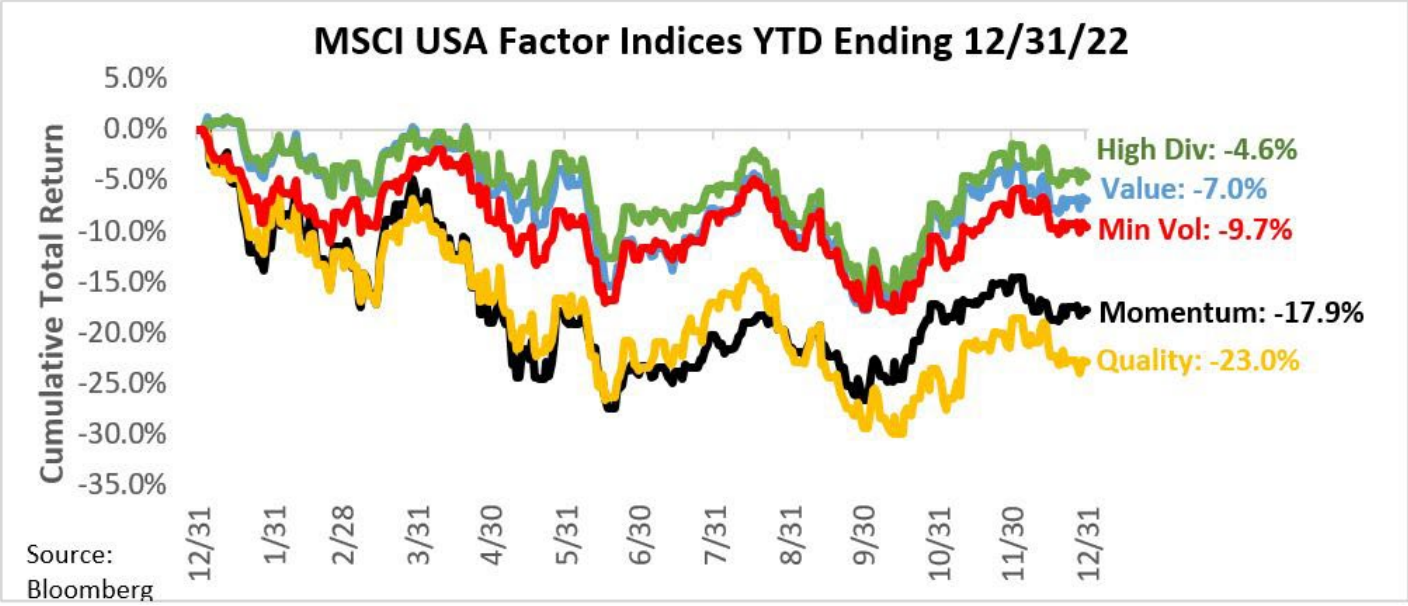
US Large vs Small Caps: YTD Ending 12/31/22
Cumulative Total Return
5.0%
0.0%
-5.0%
-10.0%
-15.0%
-20.0%
-25.0%
-30.0%
12/31
2/28
4/30
6/30
8/31
10/31
12/31
S&P 600: -16.1%
S&P 500: -18.1%
Source: Bloomberg



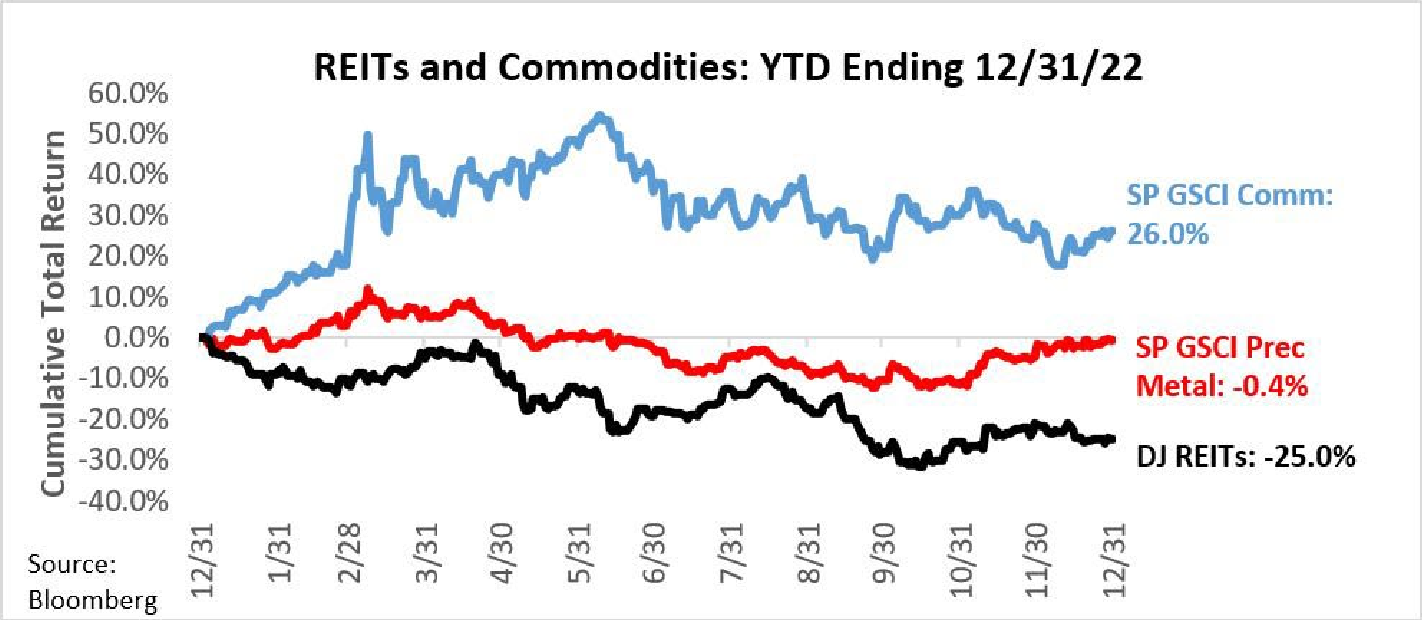
US Growth vs Value: YTD Ending 12/31/22
Cumulative Total Return
15.0%
10.0%
5.0%
0.0%
-5.0%
-10.0%
-15.0%
-20.0%
-25.0%
-30.0%
-35.0%
12/31
2/28
4/30
6/30
8/31
10/31
12/31
S&P Pure Value: -0.8%
S&P Pure Growth: -27.3%
Source: Bloomberg

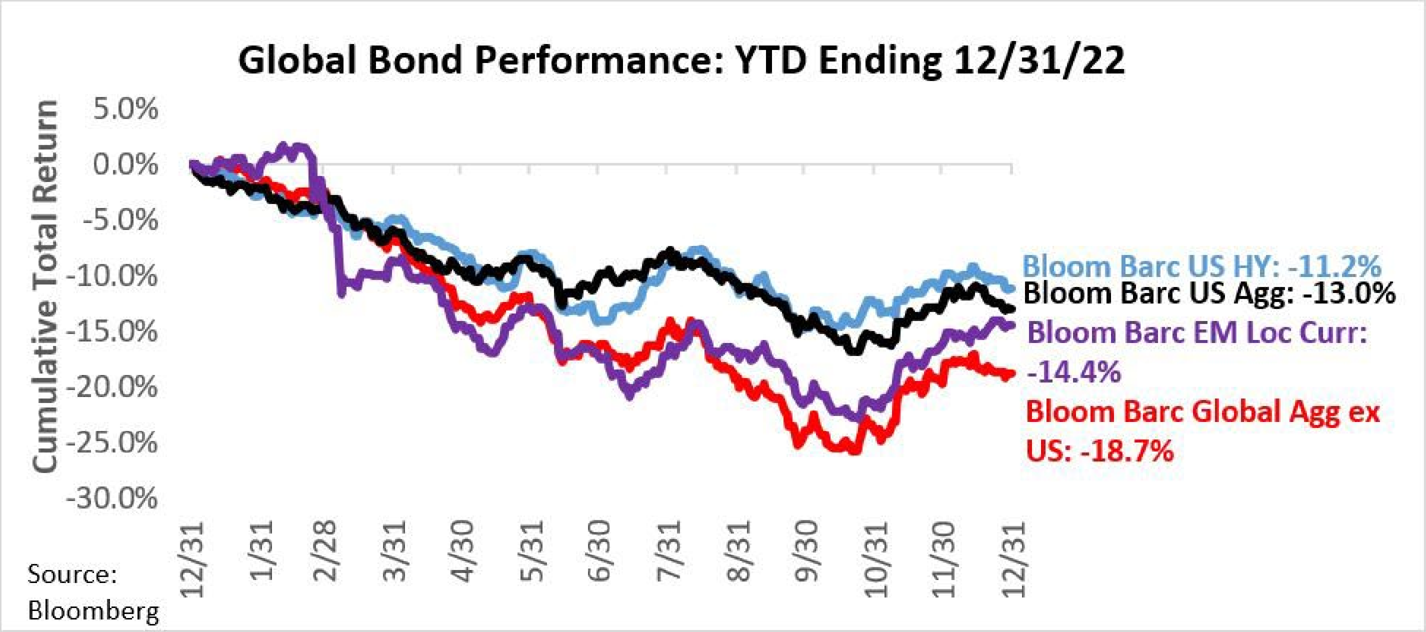


S&P Sector Performance: YTD Ending 12/31/22
80.0%
60.0%
40.0%
20.0%
0.0%
-20.0%
-40.0%
-60.0%
65.7%
1.6%
-0.6%
-2.0%
-5.5%
-10.5%
-12.3%
-26.1%
-28.2%
-37.0%
-39.9%
Energy
Utilities
Cons Staple
Healthcare
Industrials
Financial
Materials
Real Estate
Info Tech
Cons Dis
Comm Svcs
Source: Bloomberg



MSCI USA Factor Indices YTD Ending 12/31/22
Cumulative Total Return
5.0%
0.0%
-5.0%
-10.0%
-15.0%
-20.0%
-25.0%
-30.0%
-35.0%
12/31
1/31
2/28
3/31
4/30
5/31
6/30
7/31
8/31
9/30
10/31
11/30
12/31
High Div: -4.6%
Value: -7.0%
Min Vol: -9.7%
Momentum: -17.9%
Quality: -23.0%
Source: Bloomberg


REITs and Commodities: YTD Ending 12/31/22
Cumulative Total Return
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
-10.0%
-20.0%
-30.0%
-40.0%
12/31
1/31
2/28
3/31
4/30
5/31
6/30
7/31
8/31
9/30
10/31
11/30
12/31
SP GSCI Comm: 26.0%
SP GSCI Prec Metal: -0.4%
DJ REITs: -25.0%
Source: Bloomberg


Global Bond Performance: YTD Ending 12/31/22
Cumulative Total Return
5.0%
0.0%
-5.0%
-10.0%
-15.0%
-20.0%
-25.0%
-30.0%
12/31
1/31
2/28
3/31
4/30
5/31
6/30
7/31
8/31
9/30
10/31
11/30
12/31
Bloom Barc US HY: -11.2%
Bloom Barc US Agg: -13.0%
Bloom Barc EM Loc Curr: -14.4%
Bloom Barc Global Agg ex US: -18.7%
Source: Bloomberg

3D

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Disclosure:

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