Macro Intelligence Report

September 2023

GAMMA INVESTMENT CONSULTING

Gamma Global Macro Model Highlights

- **The S&P 500 and Nasdaq Models remained neutral (in cash) for September**. Stocks broke their five-month winning streak with the S&P 500 down -1.72% and the Nasdaq dipping -2.22%. The major indexes rallied from their mid-month lows on a weaker-than-expected employment report that investors hoped signaled at least a pause in the Fed's tightening cycle.

- **The 10-year and 30-year Treasury and the Investment Grade and High Yield Bond Models all remained short (higher yields) for September. Investment Grade Corporates continue to offer very favorable valuation.** Slightly softer employment data and lower headline inflation were offset by worsening core inflation. The implication is no rate hike in September but potentially "higher for longer" rates as the Fed waits to see if its 11 rate hikes are slowing the economy enough to justify easing.

- **The Gold Model covered its long position and went neutral for September.** Attractive valuation for gold and gold mining shares was again offset by higher long-term interest rates and a stronger dollar.

- **The EUR/USD Model remained short euros (long USD) for September.** The dollar slipped -1.7% against the euro last month on slower U.S. employment growth. The dollar continues to hold a substantial interest rate edge over the euro, however, and spreading European economic weakness may signal an ECB "pause" despite 5.3% yr/yr core inflation.

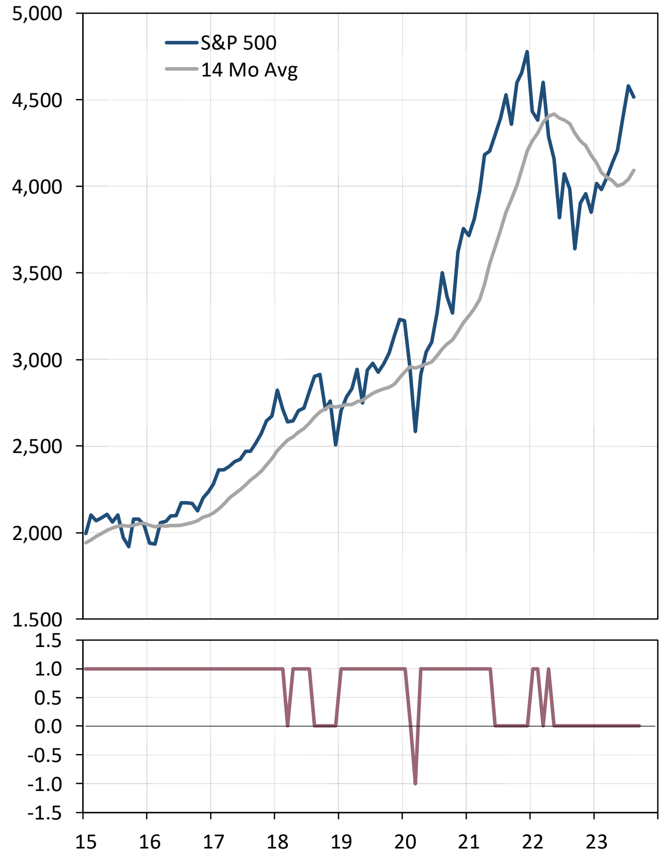
I. Equity Index Outlook

U.S. equity indexes broke their five-month winning streak in August with the S&P 500 and Nasdaq falling -1.72% and -2.22% respectively. While most market analysts point to the selloff as a correction in a budding bull market, we're not so sure. The Gamma S&P 500 and Nasdaq models remained neutral (in cash) for September as our Model's most reliable long-term indicators still remain bearish on equities (Chart 1).

In our opinion, the August selloff is much more consistent with economic fundamentals than the five-month rally earlier this year. Even with the benefit of hindsight, we have trouble identifying the economic events that justified the March to July rally in the first place. Stock prices peaked in December 2021 when the Fed Funds rate was 0.25%, the 10-year T-Note yielded 1.51%, the yield curve was steeply positively sloped, real money growth was up 29% yr/yr, and earnings were growing at a 50% yr/yr rate. Now, the Fed Funds rate is 5.50%, the 10-year yield is 4.10%, the yield curve is strongly inverted, the money supply

CHART 1

USA: S&P 500 Model Forecast



is down -8% from a year ago, and earnings are down -4% over the same period. Despite this, the S&P 500 and Nasdaq are flirting with their previous highs.

The view that this is the beginning of a new bull market is simply not consistent with historical experience. We readily acknowledge that this time could be different. As long-term forecasters we are all too aware that the future doesn't always follow from the past no matter how historically reliable certain leading indicators have been. Our experience has also been that the claim that "this time is different" usually resonates most strongly just about the time the bottom falls out.

We are willing to concede, however, that the bizarre circumstances of the last several years are simply unprecedented in our 40+ years' experience. The U.S. economy has never experienced a combination of a complete economic shutdown followed by record expansion in money supply, near-zero interest rates, and a $10 trillion increase in the national debt followed by surging inflation, a near-record jump in interest rates, and the collapse in money growth to its lowest rate since the 1930's all packaged into a three-year period. For those reasons, if any time really is different, this could be it.

If we believe that this time IS different, we still want to know WHY it's different. And that's where things get dicey. The indicators that have the longest and most accurate track record of predicting the equity market simply do not indicate that we have put in a major bottom. So why are we flirting with the previous all-time highs? There are three plausible explanations:

1) **Extremely bearish investor sentiment.** Investor sentiment hit a record low of -1.9 standard deviations in September 2022 (Chart 2). The market at that point may have already discounted an "end of the world" scenario of higher interest rates leading to a severe recession. Instead, by early 2023 investors became convinced that the Fed was done tightening due to peaking inflation while at the same time the economy remained surprisingly robust. The combination of extremely bearish sentiment plus expectations of improved fundamentals may have triggered the relief rally of the last several months.

   If that's the case, however, investors have not only discounted an end to the Fed's tightening, but they have also priced in the prospect of much lower interest rates AND a strong recovery in

CHART 2

Market Sentiment

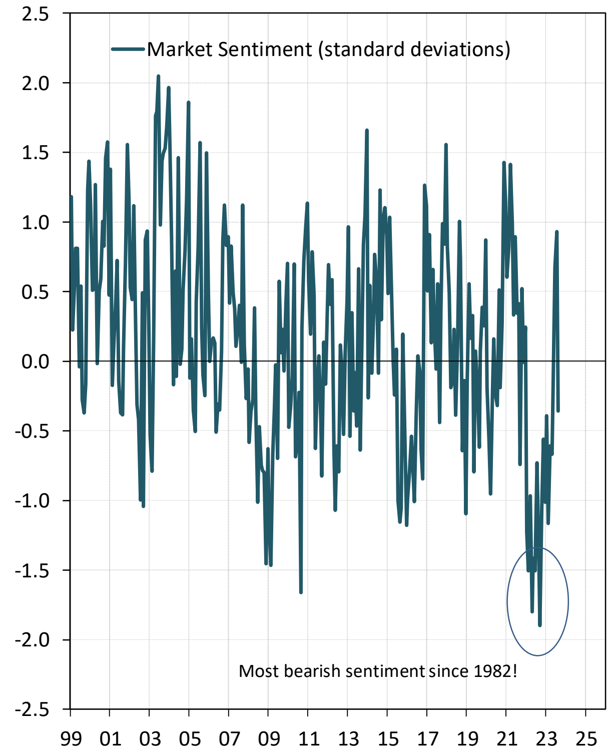
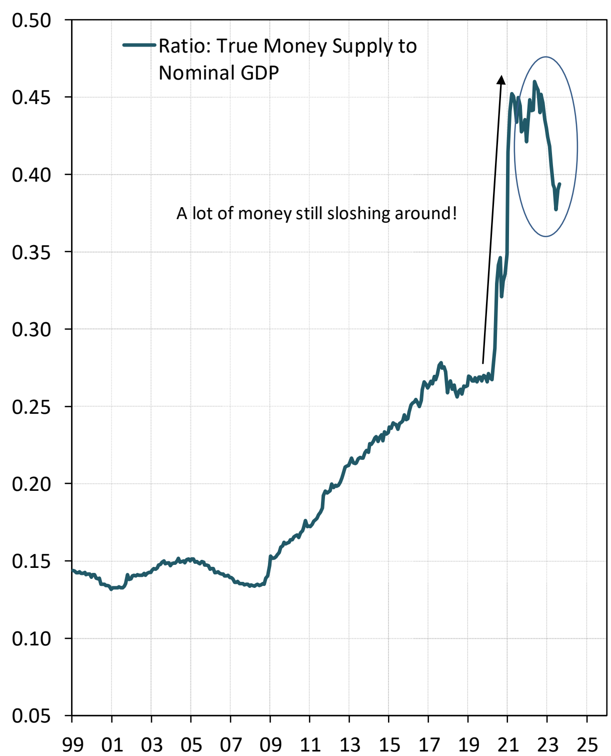


CHART 3

Ratio: True Money Supply to GDP



earnings. Investor sentiment, which had overestimated the chances of a collapse in 2022, has now driven valuation above its 2022 peak to levels not seen since before the dot com collapse in 2000-2002.

2) **The lingering effects of the Covid stimulus.** The second explanation is that the Fed's tightening since last year has not materially offset the effect of the massive fiscal and monetary stimulus of the 2020-2022 period. The ratio of money supply per unit of GDP exploded by 73% between the end of 2019 and mid-2022 (Chart 3). That ratio has since only retraced 25% of that 73% increase. In other words, almost 50% of the increase in liquidity (a whopping $5.6 trillion) is still sloshing around the economy bidding up prices, wages, and asset prices. And, while the Fed has raised interest rates 11 times since March 2022, the central bank's balance sheet (which more than doubled by $4.8 trillion) has only retraced $900 billion of that increase. The net effect is that inflation continues to run well above the Fed's 2% target rate while asset prices, especially equities (Chart 4) and real estate remain extremely overvalued (Chart 5).

CHART 4

USA: S&P 500 Valuation

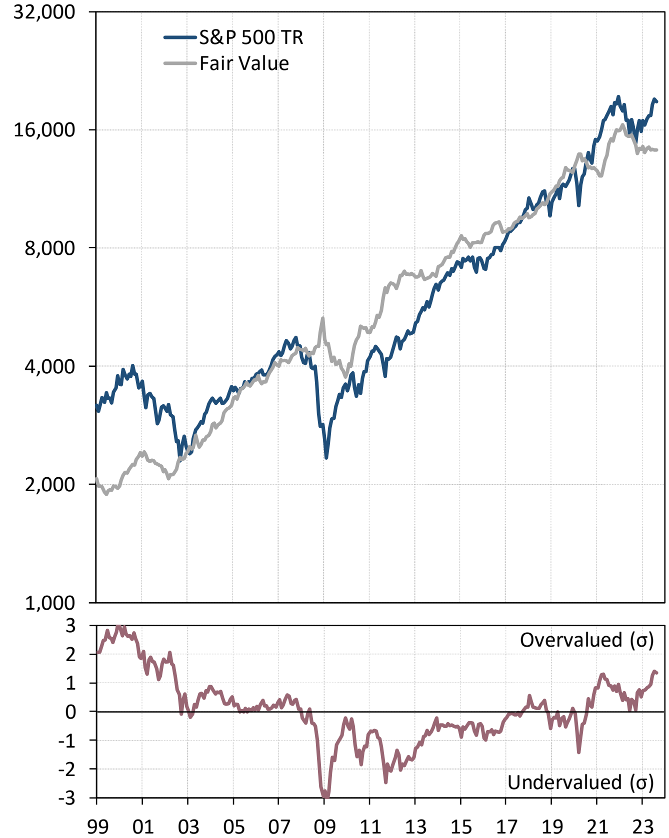
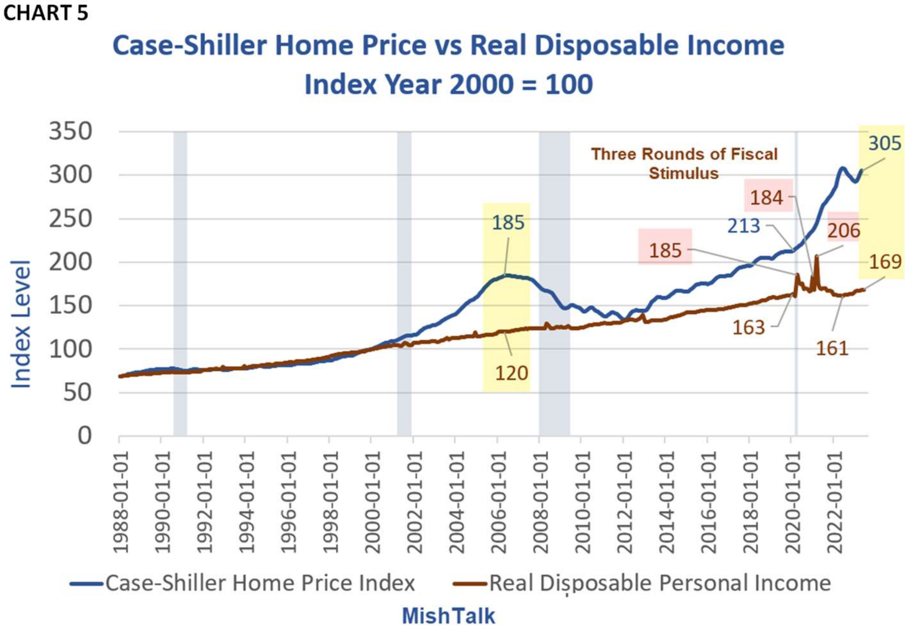


CHART 5



3) **Changing investor expectations.** Investor expectations about future changes in the economy and monetary policy are possibly being incorporated into market prices much faster than they were in the past. For example, the time between declines in real money growth, declines in leading economic indicators, rising interest rates, and yield curve inversions and the subsequent bottom in stock prices has historically averaged 14-15 months. The current cycle has seen the lag against all these indicators average only three months. It's possible that the market has become much more efficient (and correct) in discounting future influences on the market. Of these three

explanations, however, we find this one the least plausible. The reason is that the last two major "down" cycles – 2000-2002 and 2008-2009 – experienced the longest lead times of the post-WW II period. For example, the average lead time between these indicators turning bearish and the subsequent bottom in stocks was 25 months, almost a full year longer than average. A more likely explanation is that the lingering effects of the Covid stimulus are pushing the impact of the tighter monetary policy further into the future.

Regardless of which of these scenarios ends up being correct, the big question is this: is there a scenario in which core inflation declines to the Fed's 2% target rate while equity and real estate prices rise further from their already overvalued levels?

To play devil's advocate, such a scenario is certainly possible. The Fed could maintain interest rates at current levels until borrowing costs fully reflect the higher rates while continuing to drain liquidity at its current pace of $85 billion a month. Economic activity slows below its 2% trend growth allowing inflation to ease to the Fed's 2% target. Under this scenario, markets bid up asset prices by focusing on the long-term prospect of lower interest rates due to the lower inflation rate. Earnings growth remains positive but below trend due to slower economic growth but lower interest rates boost the present value of those earnings allowing higher stock prices.

While certainly possible, we do not believe that this scenario is realistic for several reasons.

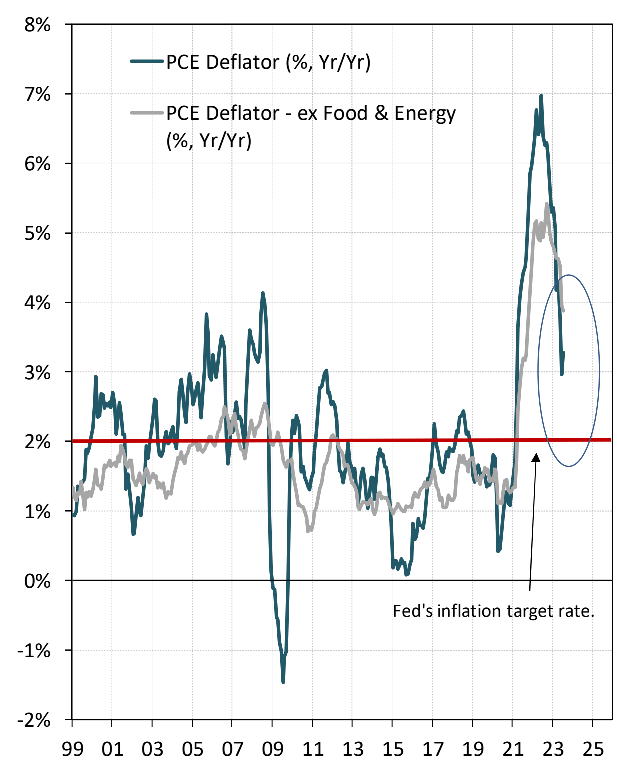
- **Equities are highly overvalued by historical standards**. Some analysts have argued that valuation has improved because the P/E ratio on the S&P 500 has fallen to 25 from its early 2021 peak of 33. The problem is that P/E alone doesn't take into account the effect of interest rates on the present value of those earnings. As we noted above, stocks have rallied back near their previous highs despite much higher interest rates and 10% lower corporate earnings. The Gamma Valuation Model indicates that the S&P 500 and Nasdaq remain 1.4 (28%) and 1.7 (46%) standard deviations above fair value – their highest levels since the collapse of the dot com bubble (Chart 4).

  According to the Gamma Valuation Model, it would require either 1) a 25% drop in stock prices, 2) a 75% increase in corporate earnings, or 3) a drop in interest rates to 2% (or a combination of the above) to bring equity valuation back to neutral. The problem is that sharply lower interest rates would likely require a recession which would cause earnings to contract. Conversely, if earnings growth continues to recover due to a strong economy, the Fed will likely have to raise interest rates further to keep inflation headed to its 2% target rate.

- **Short-term interest rates have not peaked**. The inflation rate using the Fed's preferred personal consumption expenditure (PCE) deflator measure fell to a 3.3% yr/yr rate last month from nearly a 7% rate in June 2022 (Chart 6). But the yr/yr rate worsened from a 3% rate the previous month. Moreover, virtually all of the improvement in the last year has been due to a drop in goods prices, especially food and energy. The PCE deflator excluding food and energy has

CHART 6

Headline vs "Core" PCE Inflation



fallen much more modestly from a 5.3% rate to 3.9%. Energy prices are down -15% from their year ago levels, while food prices are down -8%. These prices are threatening to add to inflation going forward. Energy prices have surged 22% since bottoming in May, and food prices have been largely unchanged since May after declining sharply from their mid-2022 peak (Chart 7). The much "stickier" PCE services inflation was 5.2% last month and has hardly budged from its 5.8% peak. **Our view is that the Federal Reserve will need to raise rates further or will need to keep interest rates at current levels for an extended period of time to slow the economy enough to reduce inflation to 2%. The prospect of "higher for longer" and the need for a possible recession precludes a "Goldilocks" scenario which doesn't end with another significant pullback in equity prices.**

CHART 7

Energy and Food Price Inflation

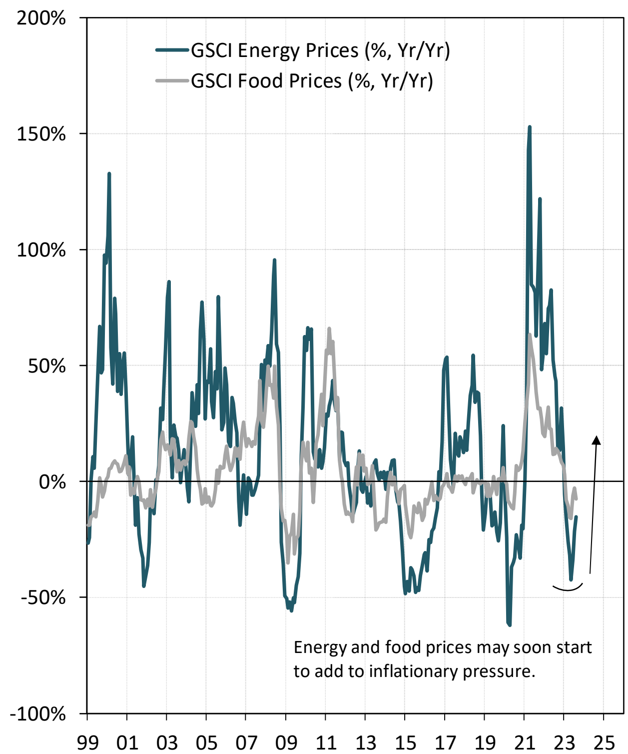
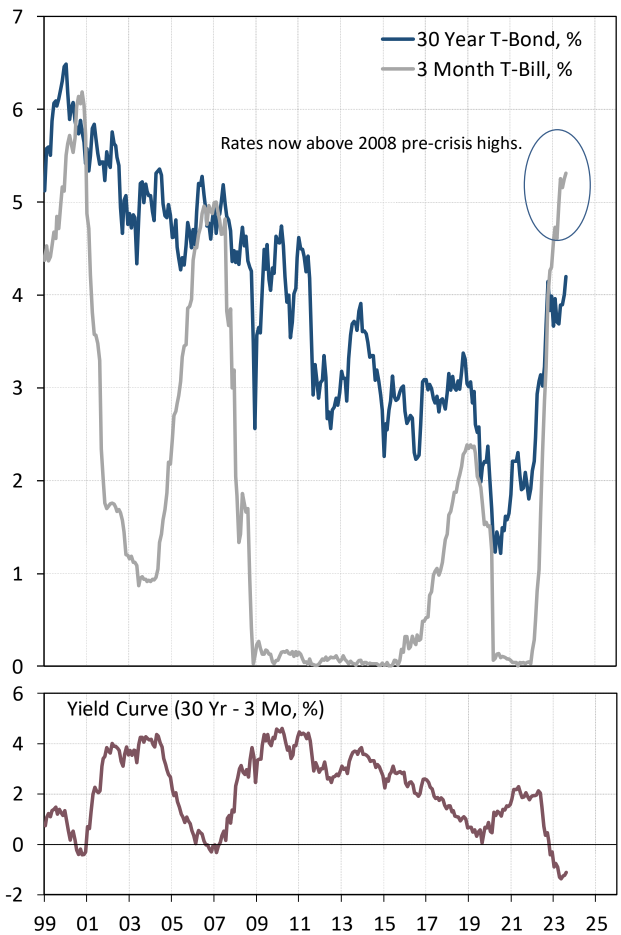


CHART 8

Interest Rates: United States



• **<u>Lower rates don't automatically mean higher stock prices</u>**. Investors since February have signaled an "all clear" just because the Fed MAY be close to the end of its tightening cycle. History shows us, however, that far from signaling "all clear," this is where the real fireworks begin. **Stock prices have historically bottomed on average ten months after the Fed has stopped tightening**. There have only been two instances since WW II in which stock prices bottomed before the Fed ended its tightening. One of these cases was in 1980 when the Fed implemented its unusual and short-lived Credit Restraint Program which caused a collapse in bank lending that triggered the 1980 recession. Given that we expect at least one more Fed rate hike this year, that would imply that a bottom in equity prices isn't likely before the middle of 2024.

• **<u>The yield curve remains strongly inverted.</u>** Despite the recent sharp rise in bond yields as a result of the surge in U.S. Treasury borrowing, both the 2-10 and 3-30 yield curves remain extremely inverted (Chart 8). The inverted curves are contributing to a sharp slowdown in bank lending which will feed through to slower money growth. Growth in bank credit slumped to a 5% yr/yr rate last month - with virtually no growth since April - compared to a 12% rate just six months ago. Both yield curves have typically steepened to a normal shape due to falling short-term interest rates ahead of any sustained recovery in stock prices.

- **Liquidity remains abysmal**. The Gamma Composite Liquidity Indicator (CLI) is showing signs of bottoming but remains just above an 80-year low dating back to the 1930's (Chart 9). The CLI has historically turned negative an average of 22 months before stock prices bottom. Moreover, despite recent signs that the worst of the liquidity squeeze may be over, stock prices have generally not begun new bull markets until the CLI has turned positive which is still a long way off from its current level especially with weaker bank lending likely to weigh on money growth.

- **The Fed will continue to reduce its balance sheet.** The Federal Reserve will likely continue to reduce the size of its balance sheet regardless of its interest rate policy. The Fed's balance sheet ballooned by $4.8 trillion during the Covid pandemic. Since starting it tightening cycle last year, the Fed has targeted a monthly reduction in its balance sheet of $85 billion. The central bank has trimmed $900 billion of the $4.8 trillion added and is expected to continue the process causing a steady drain of liquidity from the banking system (Chart 10).

- **A weaker economy may still sink corporate earnings.** Corporate earnings have been on a massive roller coaster ride since the Covid pandemic. Earnings growth jumped to a record 68% yr/yr rate in mid-2022 following the massive fiscal and monetary stimulus. Earnings subsequently collapsed to a -9.2% rate this past June as the Fed moved into tightening mode. Earnings have since shown signs of recovering with 12-month trailing earnings having risen the past four month in a row including a surprisingly strong 1.8% gain last month. Sustained recoveries in earnings growth have historically begun 3-6

CHART 9

Composite Liquidity Indicator

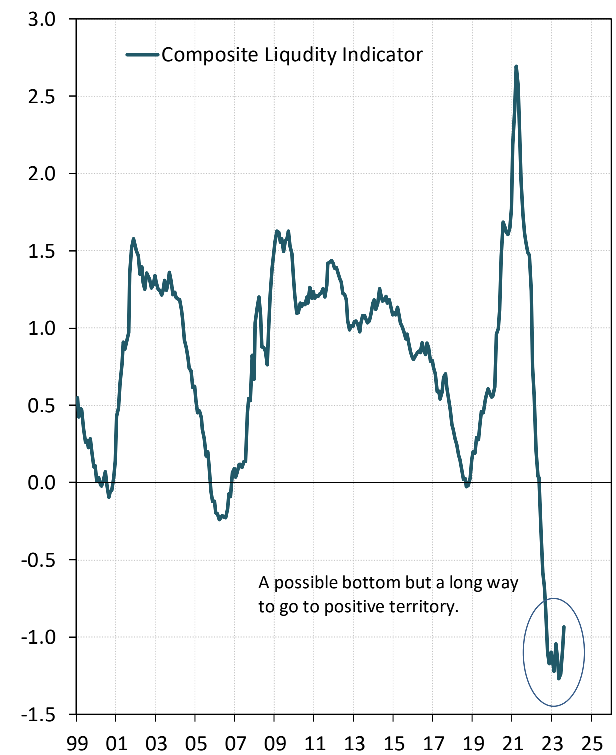
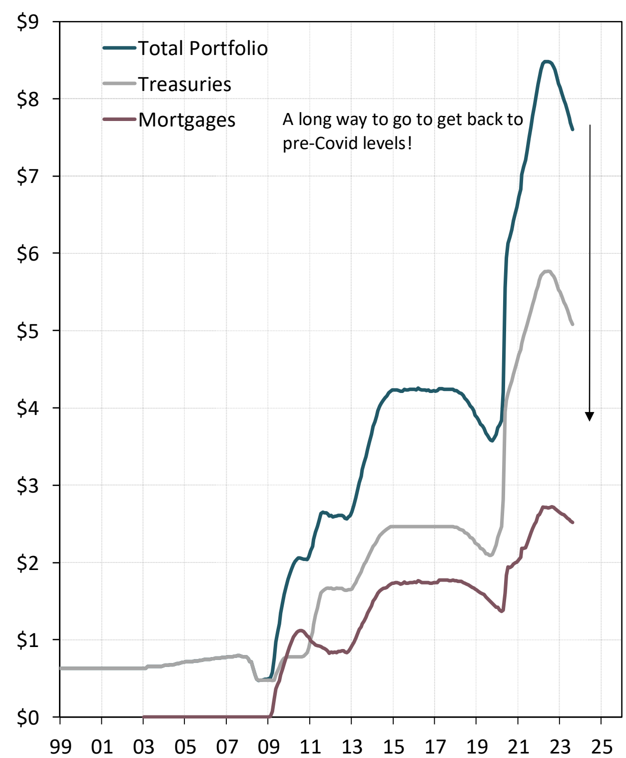


CHART 10

Federal Reserve Balance Sheet (Trillion $)



months after the 12-month change in the Conference Board's Index of Leading Indicators (LEI) turns positive (Chart 11). The LEI, however, is currently nowhere near turning positive. **The LEI has dropped 16 months in a row and was down -7.7% yr/yr at the end of August.** Despite this the economy has managed to avoid the most widely anticipated recession in decades. A strong labor market driving strong consumer spending has kept the economy afloat despite the second sharpest rise in interest rates in 60 years.

There are signs however, that the good times may be coming to an end. Second quarter GDP growth was revised down to 2.1% from a preliminary 2.4%. Even more interesting is the divergence between real GDP growth and growth in real domestic income (Chart 12). These two series are normally about 85% correlated with each other since growth in output is directly related to growth in income. Over the last three quarters, however, GDP has registered a surprising average annual growth of 2.2%. In contrast, real gross domestic income has declined at a -1.5% annual rate in the same period. Based on real income rather than real GDP, the economy actually entered a recession in the fourth quarter 2022. This discrepancy may help explain why the "most widely anticipated recession" hasn't occurred: it actually has based on income growth.

Economists have argued that the economy's surprising strength has been due to a robust labor market. A few cracks appeared in that argument last month. The Department of Labor reported that job openings last month cratered from 9.582 million to just 8.827 million, the first sub-9 million report since March 2021. The consensus forecast had called for 9.5 million job openings. In addition, every report for the past five months was revised downward including a whopping 417,000 downward revision to July's number. Adding to this was nonfarm payrolls which, while increasing by 187,000 jobs last month, saw growth drop well below the monthly average gain of 271,000 over the past 12 months. The unemployment rate edged up to 3.8% from 3.5%, though most of that increase was due to an unexpectedly large 736,000 increase in new people

CHART 11

LEI vs Corporate Profits

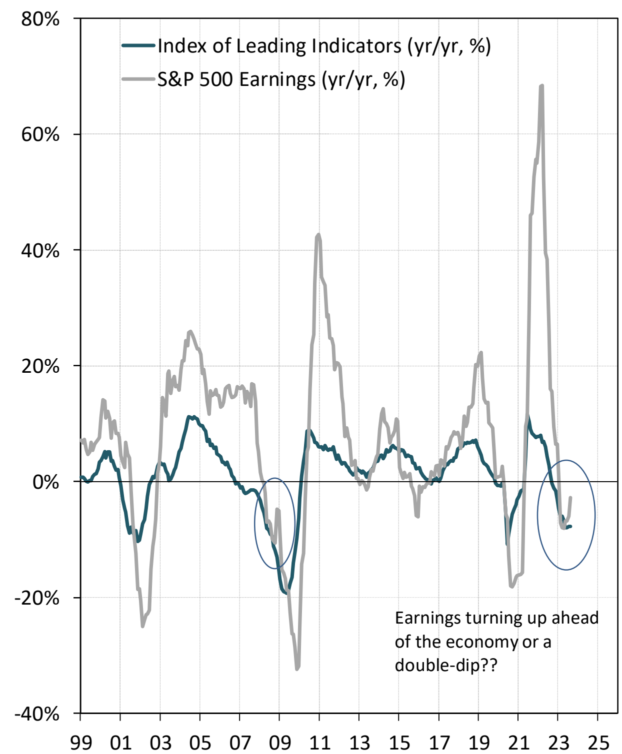
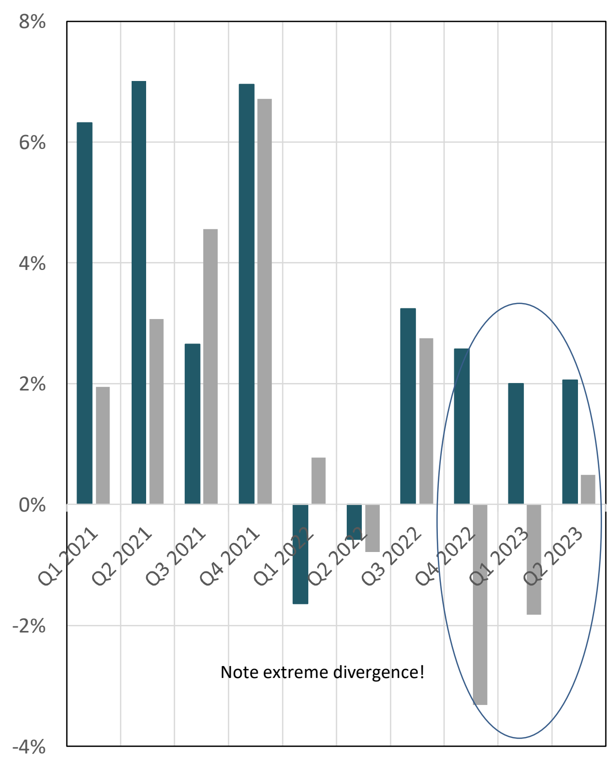


CHART 12

Real GDP vs GDI (annualized, %)



seeking jobs. These number bring the labor market largely back in line with its pre-Covid condition. The LEI suggests that further weakness in employment is likely to emerge putting downward pressure on the consumer sector that accounts for 68% of GDP. That would be expected to spill over to earnings growth.

II. Fixed Income Outlook

The 10-year and 30-year Treasury Bond, Investment Grade Corporate, and High Yield Corporate Models remained short for September (higher yields, Charts 13, 14). Yields surged early in the month on the combination of stronger economic growth, only slow improvement in inflation, and a deluge of government borrowing. Ten-year T-Note yields jumped as much as 40 basis points during August before easing in reaction to the somewhat weaker than expected employment data at the end of the month. The 10-year ended the month 15 basis points higher while 30-year yield climbed 19 basis points.

CHART 13

USA: 10 Yr T-Note Model Forecast

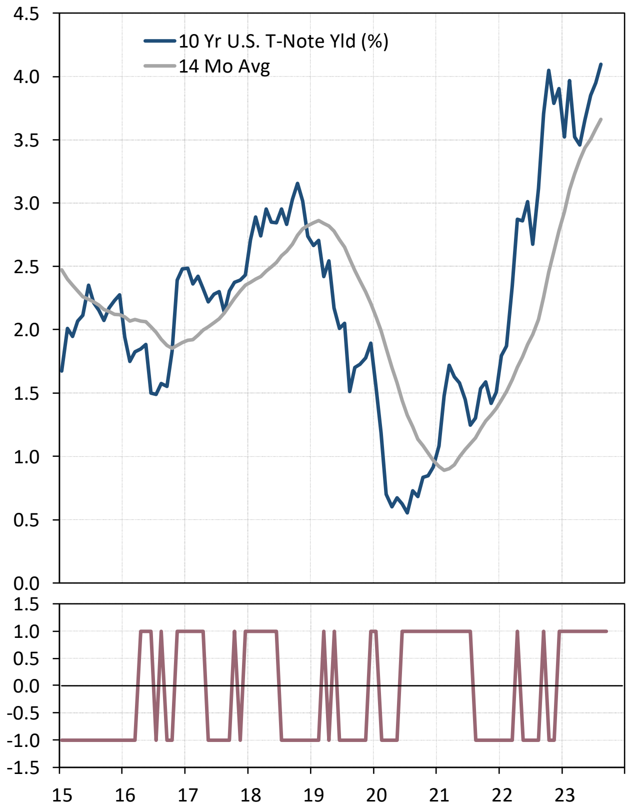
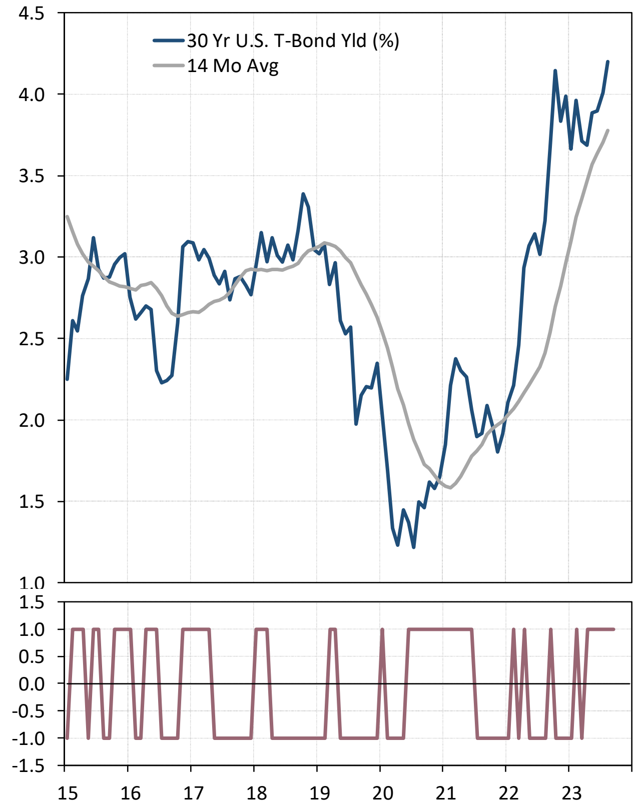


CHART 14

USA: 30 Yr T-Bond Model Forecast



Neutral Factors

- **<u>The economy is slowing but will not be a factor in Fed thinking for several months</u>**. Last month's sharp decline in job openings and slightly weaker-than-expected increase in nonfarm payrolls indicates that the slowdown predicted by the Index of Leading Indicators is finally arriving. The labor market now appears to have returned back to its pre-Covid condition with job openings, new hires, and employee turnover now comparable to 2019 levels (Charts 15, 16). The downside is that wage growth has stabilized around a 4.25% annual rate, well above its 3.25% pre-Covid level (Chart 17). For that reason, labor costs are likely to continue to fuel overall inflationary pressure. Last month's increase in the unemployment rate to 3.8% from 3.5% still left the measure below 4.0% - the Fed's estimate of full employment. The economy will

CHART 15

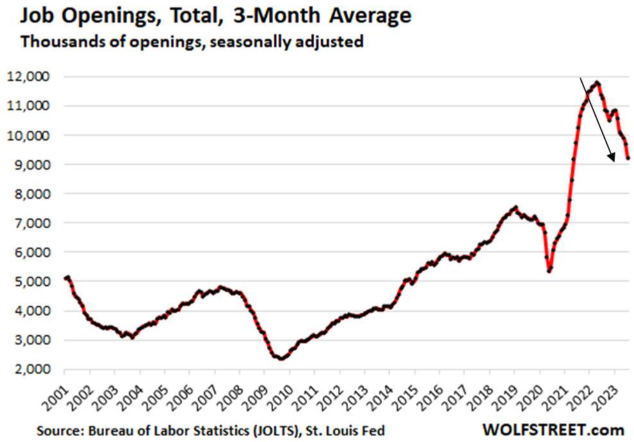
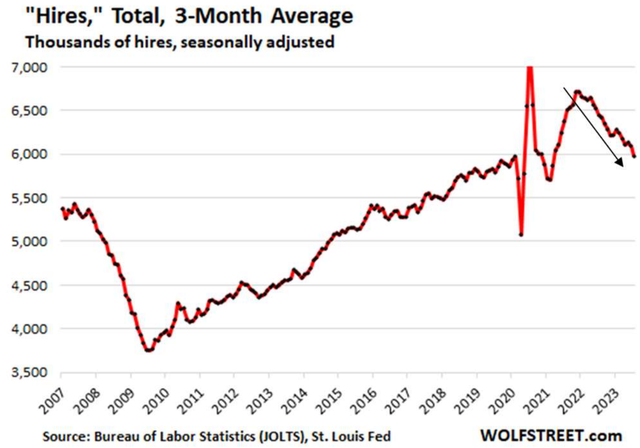


CHART 16



need to show additional signs of weakness before concerns over slower growth and rising unemployment begin to exceed inflation as the main concern of Fed policy.

- **Valuation has returned to more neutral levels except for Investment Grade Corporates**. Long-term bonds and notes had offered moderately attractive valuation for months. With improvement in the inflation rate having slowed in recent months, valuation for the 10- and 30-year Treasuries has returned close to neutral. Investment Grade Corporates, however, still offer very attractive valuation with yields 1.2 standard deviations above their estimated fair value. The yield on Investment Grade Corporates ended August at 5.72%, well above the Gamma Valuation Model's fair value level of 5.10% (Table 1).

CHART 17

TABLE 1

FIXED INCOME VALUATION

Country	Debt Instrument	Yield Valuation (σ)	Price Valuation (%)
USA 2	2 Yr T-Note	-0.06	0.1%
USA 5	5 Yr T-Note	+0.10	-0.3%
USA 10	10 Yr T-Note	+0.32	-2.1%
USA 30	30 Yr T-Note	+0.37	-5.6%
USA IG	IG Corporate	+1.18	-5.0%
USA HY	HY Corporate	+0.77	-9.4%

Negative Factors

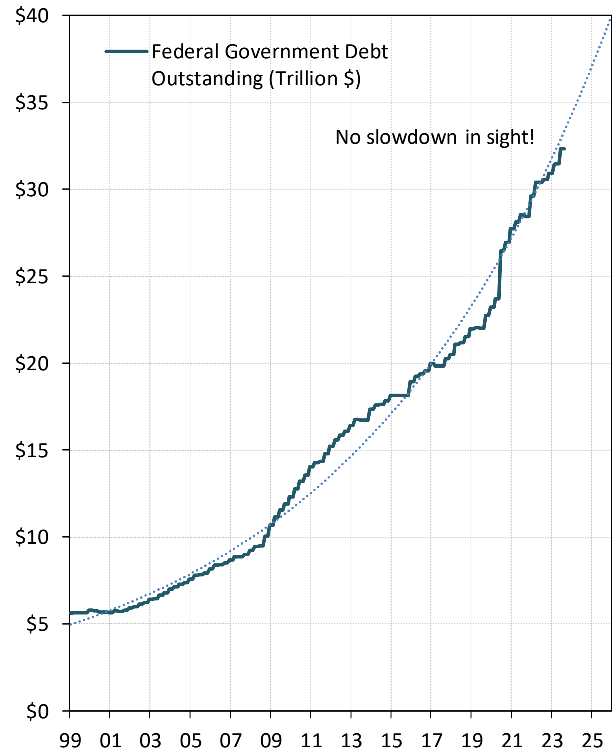
- **Inflation is slowing, but not fast enough**. Headline inflation has slowed but may be on the verge of reaccelerating in the short term. As noted earlier, inflation as measured by the Fed's preferred inflation measure, the personal consumption expenditure deflater (PCED), has fallen steadily from a 7.6% yr/yr rate in June 2022 to a 3.2% rate last month (Chart 6). The monthly number bottomed in March and has since been heading higher. The PCED excluding food and energy has only fallen from a 5.4% rate to a 3.9% rate last month. Energy prices have surged 22% since bottoming in May, and food prices have been largely unchanged since May after declining sharply from their mid-2022 peak. Energy analysts are calling for crude oil to test the $100/barrel level which will likely cause a short-term spike in headline inflation. In addition, the government's annual adjustment for healthcare costs will add additional upward pressure to the price index. Given that core inflation continues to run almost double the Fed's target, any increase in inflation that lasts more than a month or two is likely to be met with another rate hike.
- **Inverted yield curves**. The 3-30 and 2-10 yield curves remain strongly inverted (Chart 8). The inverted curves create an incentive to hold higher-yielding, shorter-term maturities over long-term securities which

should keep upward pressure on long-term interest rates. With possibly worsening of inflation in the near-term, the end of the Fed's tightening cycle is likely to be pushed further into the future. That will give bond investors little incentive to aggressively buy bonds especially since Treasury valuation is not nearly as attractive as it was several months ago.

- **"Quantitative Tightening" meets out-of-control government borrowing.** The Fed's balance sheet has contracted by $900 billion since April 2022, and there are no signs that quantitative tightening will end any time soon even if rates remain steady (Chart 10). The problem for long-term rates is that shrinking the Fed's balance sheet is running headlong into the Treasury's seemingly insatiable demand for cash. Not only is the reduction in the Fed's balance sheet removing the central bank as a net buyer of Treasuries, but its actions are also draining liquidity from the system that would otherwise be available to purchase Treasuries. Since the increase in the debt ceiling, the national debt has skyrocketed by over $1.2 trillion with outstanding debt hitting a record $32.6 trillion (Chart 18). The Treasury is expected to raise an additional $1.3 trillion this year. Barring an actual recession that causes a contraction in private sector borrowing, this massive increase is likely to keep upward pressure on long-term interest rates including 30-year mortgages.

CHART 18

Federal Government Debt (Trillion $)



III. Gold and Precious Metals Outlook

The Gamma Gold Model went neutral for September after being long last month (Chart 19). Even with last month's -1.4% dip, the price of gold is up a respectable 18.4% from its October 2022 low. Gold tested the $2,000 price level in May on the expectation that the Fed was through tightening. Instead, surprisingly strong growth and only slow inflation improvement has investors concerned that either rates will stay at current levels for an extended period or the Fed will be forced to raise rates again. Attractive valuation has allowed the metal to gradually work its way higher, but the prospect of higher rates has capped any attempt to breach the $2,000 barrier. Until the market becomes convinced that the Fed is through tightening, trading is likely to remain choppy as attractive valuation is offset by the prospect of higher interest rates. **We continue to encourage long-term investors to take advantage of weakness in the sector to add to long positions in both metals and gold mining shares.**

Positive Factors

- **Precious metals are still cheap**. Despite last month's correction, gold remained 1.3 standard deviations (-30%) below fair value (Table 2). According to the Gamma Valuation Model, the fair value price for the yellow metal has climbed to $2,625 from $2,550 last month. **Historically, when gold has rallied from substantial undervaluation, it has invariably overshot its fair value price by a**

TABLE 2

PRECIOUS METALS VALUATION

Commodity (1)	Valuation (σ)	Valuation (%)
Gold	-1.25	-30%
Silver	-0.91	-31%
Platinum	-1.58	-47%
Palladium	-0.59	-25%

large margin. The current 30% undervaluation should be considered the low end of the expected return in the metal once the market perceives rates have peaked.

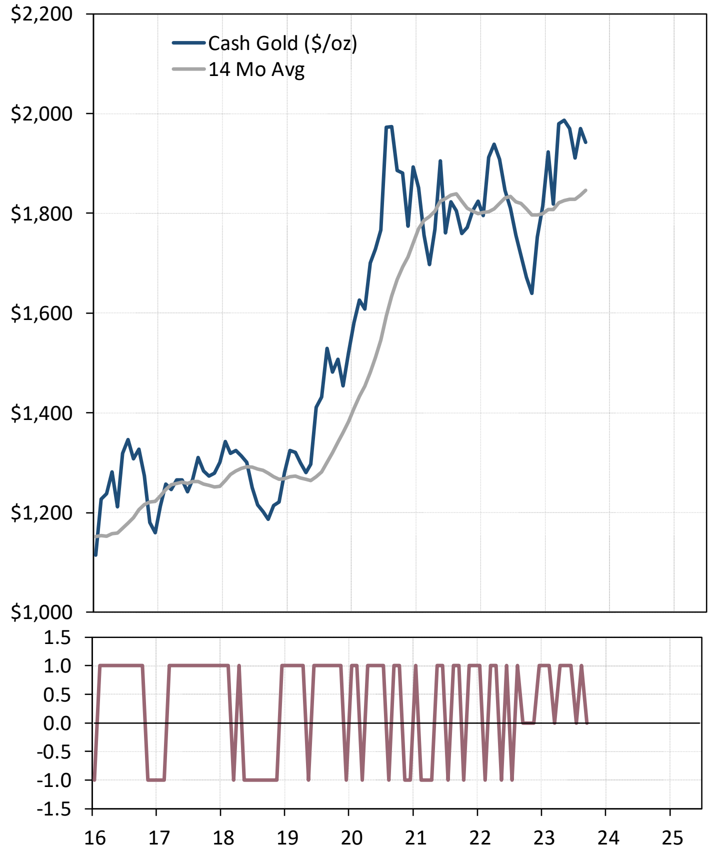
- **Positive seasonals**. Precious metals have historically performed strongly in the second half of the year. Starting in July, prices have generally risen through January with September (+1.6%) having especially good performance.

Negative Factors

- **Rising interest rates**. As mentioned earlier, the recent lack of progress in reducing core inflation suggests that the bias in interest rates is still to the upside. Add to this the prospect of higher long-term rates due to the size of the Treasury's financing needs, and the metal is still facing serious resistance. Weaker employment data last month suggest that the economy may start to slow below its 2% trend growth rate. Given that the Fed was fooled by this assumption earlier this year, the central bank will likely err on the side of additional tightening until clearer signs of weakness in the labor market emerge. **Gold may remain range-bound until rates peak, though as we noted above, selloffs should be used to add to long positions. Once the Fed starts to cut rates, we expect gold to rally strongly to its fair value level of $2,550 before overshooting even further to the upside.**

CHART 19

Gold Model Forecast



IV. Foreign Exchange Outlook

The Gamma EUR/USD Model remained short the euro (long USD) for September for the fourth month in a row (Chart 20). Relative growth, inflation, and interest rate developments continue to benefit the U.S. currency.

Positive USD Factors

- **Stronger relative U.S. economic growth driving higher interest rates.** The dollar may rally further even if the European Central Bank matches any rate hikes by the Fed. The reason is that the interest differential, even if it doesn't widen further in favor of the dollar, already favors the U.S. currency by 1.85% (Chart 21). In addition, the ECB under the best of circumstances is still perceived to be more "dovish" than the Fed on monetary policy. Market expectations of an ECB rate hike have fallen from a 60% probability to 30% over the last few weeks. This is despite headline Eurozone inflation still running at a 5.3% yr/yr rate and core inflation running at an even higher 5.5% rate. To put this into perspective, the Federal Reserve is still leaning towards raising rates with inflation 1.3% above its target 2% rate, while the ECB is likely pausing with an inflation rate almost 3x above its target 2% rate. While we continue to anticipate a slowing in U.S. growth, the U.S. is still likely to maintain a growth edge over Europe. ECB President Christine Lagarde said in an interview that economic output in France, Germany and Spain is "quite encouraging" and that the data "support our scenario of GDP growth of 0.9% in the euro area this year." That would likely leave Eurozone growth at least one percent behind the U.S. where real GDP rose at a 2.1% annual rate in the first half of the year.

Will the ECB match the Fed's rate hikes? Part of the willingness of the Fed to hike rates is due to the growth differential between the two regions. U.S. growth, even with the slight slowing in employment growth last month, continues to run well ahead that of Europe. Eurozone growth has slowed sharply the last three months. The HCOB Germany Manufacturing Purchasing Managers Index (PMI) dropped to 38.8 in July, the lowest reading since May 2020 and down from 40.6 in June. The decline was driven by the sharpest drop in new factory orders in over three years amid weaker demand for all categories of goods. The HCOB Germany Composite PMI dropped to 44.7 in August from 48.5 in July, indicating the sharpest contraction in private sector activity since the Covid outbreak in 2020.

The ECB has raised rates from -0.5% to 3.75% over the last year to fight a record surge in inflation. Arguments in favor of a pause have risen as economic growth has visibly slowed. The ECB is clearly balancing concerns over weaker growth against concerns that inflation may stabilize at a level much higher than the central bank's desired target. This lack of commitment to containing inflation is likely to weigh on the euro.

- Karl Chalupa

Mr. Chalupa is the CIO and Co-Founder of Gamma Investment Consulting and Editor of the Gamma Intelligence Reports. He is also President of Gamma Capital LLC, a quantitative global macro investment firm. Mr. Chalupa developed the Gamma Investment Program used for previously trading the firm's $400 million global macro program. He was previously Director of Risk Management at Titan Advisors LLC, a $4.5 billion alternative investments firm. Mr. Chalupa was also Managing Director of the Currency and Alternative Investment Strategies Groups at State Street Global Advisors (SSGA) where he developed a $9 billion currency overlay program and launched SSGA's first hedge fund based on his Gamma Model. Mr. Chalupa spent 13 years at ABN Amro Bank where he traded interest rate and currency derivatives and was Manager of the Proprietary Trading and Economic Research Desk. He began his career as an economist for the Federal Reserve Bank of Chicago. Mr. Chalupa holds an MA in Economics from Brown University, graduated magna cum laude from Northern Illinois University with BAs in Economics and Political Science, and is Series 3 registered.

CHART 20

EUR/USD Model Forecast

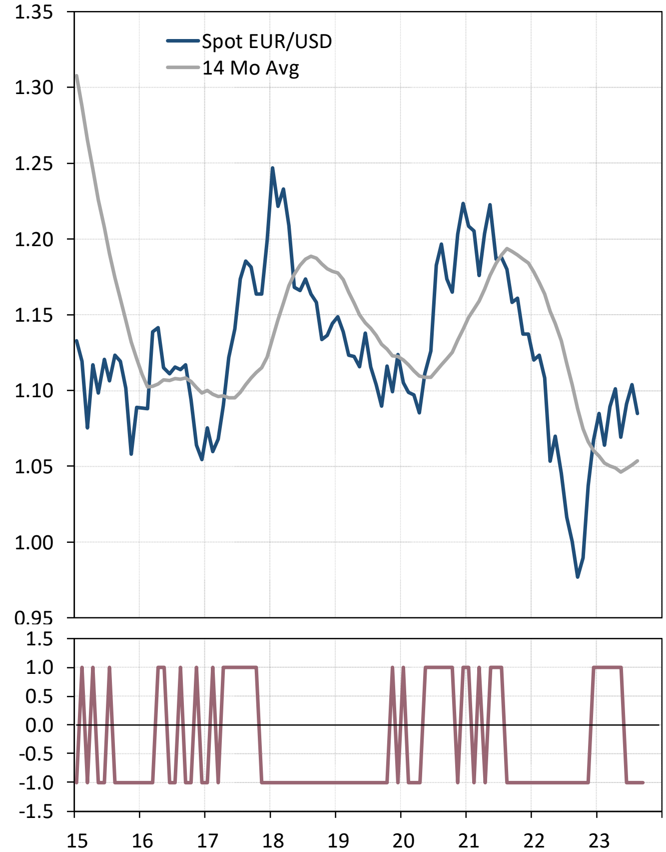
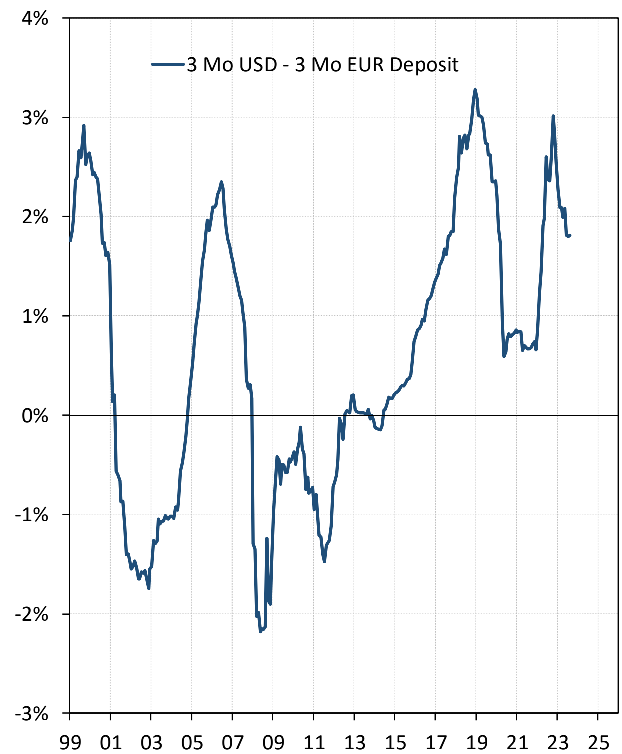


CHART 21

3 Month Interest Rate Differential



Gamma Macro Model Forecasts for September 2023

1 MONTH STOCK INDEX MODEL FORECASTS (%)

Country	Stock Index	Price	1 Mo Forecast	Previous Forecast	Position	Trade	Updated
USA	S&P 500	4,514.87	0.00%	0.00%	Neutral	Hold	8/31/23
USA	Nadaq	14,093.70	0.00%	0.00%	Neutral	Hold	8/31/23
Canada	S&P/TSX 60	1,221.82	0.00%	0.00%	Neutral	Hold	8/31/23
Mexico	IPC	54,223.96	0.67%	0.72%	Long	Hold	8/31/23
Brazil	Bovespa	116,370.37	0.00%	0.00%	Neutral	Hold	8/31/23
Japan	TOPIX	2,332.00	1.36%	1.33%	Long	Hold	8/31/23
Australia	S&P/ASX 200	7,305.30	0.00%	0.00%	Neutral	Hold	8/31/23
S. Korea	KOSPI	2,556.27	0.00%	0.00%	Neutral	Hold	8/31/23
China	Hang Seng CEI	6,332.42	0.00%	1.31%	Neutral	Cover Long	8/31/23
China / HK	Hang Seng	16,038.24	0.00%	0.00%	Neutral	Hold	8/31/23
India	Nifty 500	16,924.30	0.19%	1.11%	Long	Hold	8/31/23
Eurozone	STOXX 600	460.85	0.00%	0.00%	Neutral	Hold	8/31/23
Germany	DAX	16,038.24	0.00%	0.00%	Neutral	Hold	8/31/23
France	CAC 40	7,373.37	0.00%	0.00%	Neutral	Hold	8/31/23
Italy	FTSE/MIB 30	28,998.37	0.00%	0.00%	Neutral	Hold	8/31/23
Switzerland	Swiss Market	11,170.68	0.00%	0.00%	Neutral	Hold	8/31/23
UK	FTSE 100	7,477.47	-0.13%	0.00%	Short	Sell	8/31/23
Russia	RTS 50	1,058.18	0.00%	0.00%	Neutral	Hold	8/31/23
S. Africa	FTSE/JSE 40	69,305.93	0.00%	0.94%	Neutral	Cover Long	8/31/23

1 MONTH FIXED INCOME MODEL PRICE CHANGE FORECASTS (%)

Country	Debt Instrument	Current Yield (%)	Price Change Forecasts (%) 1 Month	Previous	Bond Position	Trade	Updated
USA	2 Yr T-Note	4.89	-0.12%	-0.41%	Short	Hold	8/31/23
USA	5 Yr T-Note	4.26	-0.22%	-0.47%	Short	Hold	8/31/23
USA	10 Yr T-Note	4.10	-0.33%	-0.64%	Short	Hold	8/31/23
USA	30 Yr T-Note	4.20	-0.31%	-0.81%	Short	Hold	8/31/23
USA	IG Corporate	5.72	-0.25%	-0.60%	Short	Hold	8/31/23
USA	HY Corporate	8.46	0.30%	-0.63%	Long	Cover Short & Buy	8/31/23
Canada	10 Yr Govt	3.57	0.07%	-0.27%	Long	Cover Short & Buy	8/31/23
Mexico	10 Yr Cetes	9.37	0.27%	-0.05%	Long	Cover Short & Buy	8/31/23
Brazil	10 Yr Govt	11.05	0.93%	1.01%	Long	Hold	8/31/23
Japan	10 Yr JGB	0.64	-0.02%	-0.17%	Short	Hold	8/31/23
Australia	10 Yr Govt	4.00	-0.11%	-0.22%	Short	Hold	8/31/23
S. Korea	10 Yr Govt	3.82	0.00%	-0.31%	Long	Cover Short & Buy	8/31/23
China	10 Yr Govt	2.59	0.10%	0.12%	Long	Hold	8/31/23
India	10 Yr Govt	7.17	-0.48%	-0.61%	Short	Hold	8/31/23
Germany	10 Yr Bund	2.47	-0.20%	-0.41%	Short	Hold	8/31/23
France	10 Yr OAT	2.99	0.24%	0.08%	Long	Hold	8/31/23
Italy	10 Yr BTP	4.11	0.68%	0.53%	Long	Hold	8/31/23
Switzerland	10 Yr Conf	0.92	0.09%	0.21%	Long	Hold	8/31/23
UK	15 Yr Gilt	4.58	-0.31%	-0.50%	Short	Hold	8/31/23
Russia	10 Yr Govt	12.03	-2.36%	-1.07%	Short	Hold	8/31/23
S. Africa	10 Yr Govt	10.27	0.33%	0.13%	Long	Hold	8/31/23

Gamma Macro Model Forecasts for September 2023

1 MONTH FX MODEL FORECASTS (%)

Currency	Spot FX Rate	1 Mo Forecast	Previous Forecast	Position	Trade	Updated
EUR/USD	1.0851	-0.62%	-0.01%	Short	Hold	8/31/23
GBP/USD	1.2664	-0.21%	0.18%	Short	Cover Long & Sell	8/31/23
USD/CHF	0.8830	0.64%	0.30%	Long	Hold	8/31/23
USD/NOK	10.6470	0.30%	0.07%	Long	Hold	8/31/23
USD/SEK	10.9122	0.49%	0.40%	Long	Hold	8/31/23
USD/JPY	146.10	0.86%	0.63%	Long	Hold	8/31/23
AUD/USD	0.6471	-0.45%	-0.34%	Short	Hold	8/31/23
NZD/USD	0.5940	-0.36%	-0.28%	Short	Hold	8/31/23
USD/KRW	1,324.20	0.40%	0.09%	Long	Hold	8/31/23
USD/CNY	7.2588	0.75%	0.45%	Long	Hold	8/31/23
US/INR	82.67	0.30%	0.32%	Long	Hold	8/31/23
USD/SGD	1.3516	0.28%	0.39%	Long	Hold	8/31/23
USD/CAD	1.3539	0.06%	-0.05%	Long	Cover Short & Buy	8/31/23
USD/BRL	4.9459	-1.53%	-1.40%	Short	Hold	8/31/23
USD/MXN	16.76	-0.51%	-0.44%	Short	Hold	8/31/23
USD/RUB	95.37	-0.63%	-0.45%	Short	Hold	8/31/23
USD/ZAR	18.81	0.94%	0.00%	Long	Cover Short & Buy	8/31/23
BTC/USD	27,103.00	0.80%	-2.23%	Long	Cover Short & Buy	8/31/23

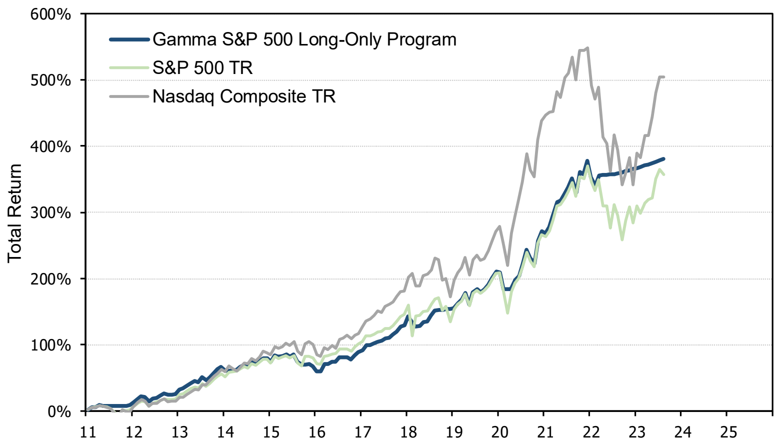
1 MONTH COMMODITY PRICE FORECASTS (%)

Commodity	Cash / Futures Price ($)	1 Month Forecast	Previous Forecast	Position	Trade	Updated
Gold	1,942.90	0.00%	0.23%	Neutral	Cover Long	8/31/23
Silver	24.58	0.00%	0.00%	Neutral	Hold	8/31/23
Platinum	973.17	0.00%	0.02%	Neutral	Cover Long	8/31/23
Palladium	1,225.51	0.00%	0.00%	Neutral	Hold	8/31/23
Aluminum	2,251.51	0.00%	0.00%	Neutral	Hold	8/31/23
Copper	8,103.00	0.00%	0.99%	Neutral	Cover Long	8/31/23
Lead	2,064.75	0.00%	0.00%	Neutral	Hold	8/31/23
Nickel	20,865.50	0.00%	0.88%	Neutral	Cover Long	8/31/23
Tin	25,867.00	0.00%	0.00%	Neutral	Hold	8/31/23
Zinc	2,287.77	0.00%	0.17%	Neutral	Cover Long	8/31/23
WTI Crude Oil	80.99	0.00%	0.00%	Neutral	Hold	8/15/23
HH Natural Gas	2.62	0.00%	-1.21%	Neutral	Cover Short	8/18/23

Gamma Model Performance Summary – August 2023

Gamma S&P 500 Long-Only Program

Jan 2011 - Aug 2023

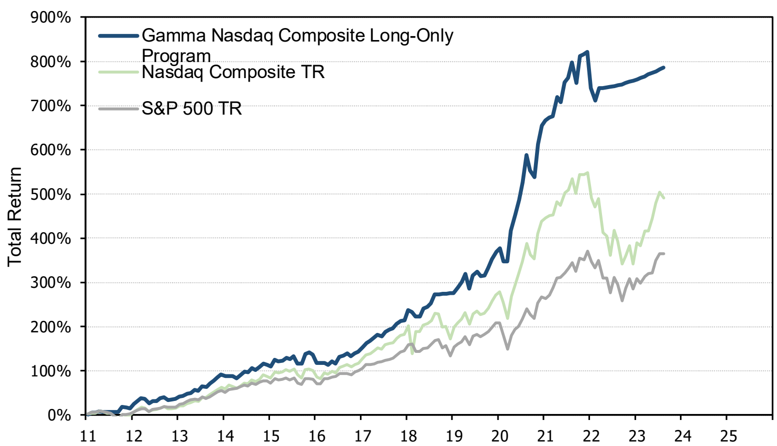


Historical Performance	Program	BM1	BM2
Compound ROR	13.2%	12.8%	15.3%
Cumulative Return	481.1%	357.4%	504.3%
Cumulative VAMI	$4,811	$4,574	$6,043
Best Month	10.9%	13.9%	20.7%
Worst Month	-8.2%	-17.7%	-20.9%
% Positive Months	78.9%	70.4%	66.4%
Historical Risk	**Program**	**BM1**	**BM2**
Standard Deviation	9.8%	15.7%	18.7%
Sharpe Ratio (1.0% RFR)	1.24	0.75	0.76
Sortino Ratio (1.0% RFR)	1.70	1.14	1.26
Downside Deviation	7.2%	10.3%	11.4%
Maximum Drawdown	-14.1%	-23.8%	-31.8%
Months In Maximum Drawdown	18	20	20

BM1: S&P 500 Total return
BM2: Nasdaq Composite Total Return

Gamma Nasdaq Composite Long-Only Program

Jan 2011 - Aug 2023

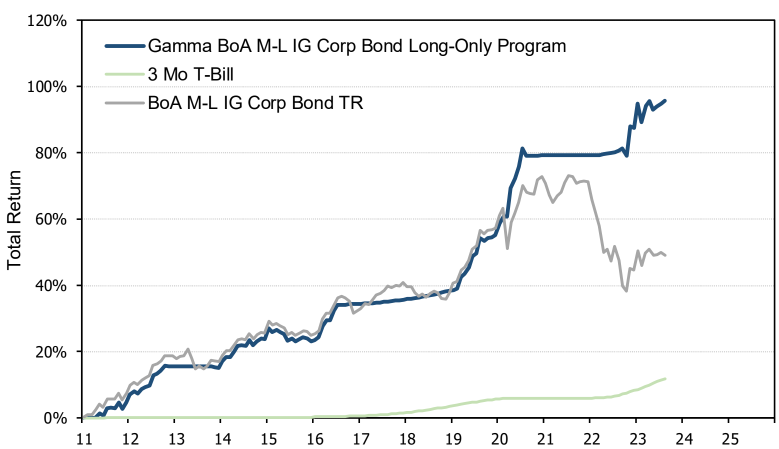


Historical Performance	Program	BM1	BM2
Compound ROR	18.8%	15.1%	12.9%
Cumulative Return	885.7%	491.3%	364.8%
Cumulative VAMI	$8,857	$5,913	$4,648
Best Month	15.5%	20.7%	13.9%
Worst Month	-9.0%	-20.9%	-17.7%
% Positive Months	77.6%	65.8%	71.1%
Historical Risk	**Program**	**BM1**	**BM2**
Standard Deviation	12.8%	18.7%	15.6%
Sharpe Ratio (1.0% RFR)	1.39	0.75	0.76
Sortino Ratio (1.0% RFR)	2.12	1.25	1.15
Downside Deviation	8.4%	11.3%	10.3%
Maximum Drawdown	-12.0%	-31.8%	-23.8%
Months In Maximum Drawdown	20	20	20

BM1: Nasdaq Composite Total Return
BM2: S&P 500 Total Return

Gamma BoA M-L IG Corp Bond Long-Only Program

Jan 2011 - Aug 2023



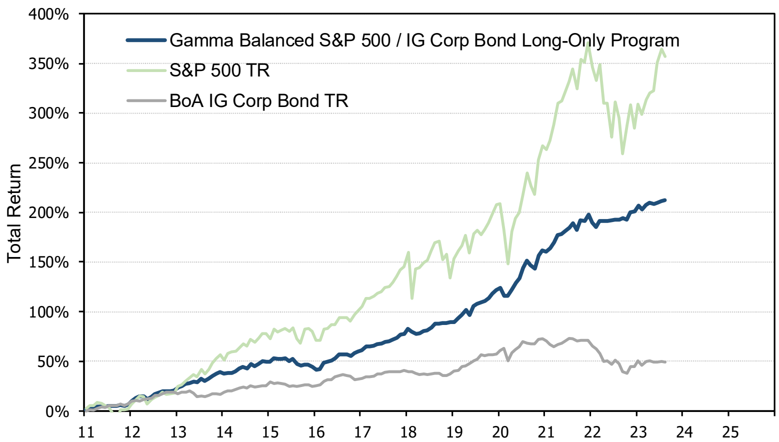
Historical Performance	Program	BM1	BM2
Compound ROR	5.4%	0.9%	3.2%
Cumulative Return	195.7%	11.9%	49.0%
Cumulative VAMI	$1,957	$1,119	$1,490
Best Month	5.3%	0.4%	5.3%
Worst Month	-2.9%	0.0%	-7.5%
% Positive Months	83.6%	100.0%	61.2%
Historical Risk	**Program**	**BM1**	**BM2**
Standard Deviation	3.9%	0.4%	6.0%
Sharpe Ratio (1.0% RFR)	1.15	---	0.37
Sortino Ratio (1.0% RFR)	1.86	---	0.45
Downside Deviation	2.4%	---	4.9%
Maximum Drawdown	-3.3%	0.0%	-20.1%
Months In Maximum Drawdown	27	0	25

BM1: 3 Mo T-Bill
BM2: BofA M-L Investment Grade Corp Bond Index

Past performance is not indicative of future results

Gamma Model Performance Summary – August 2023

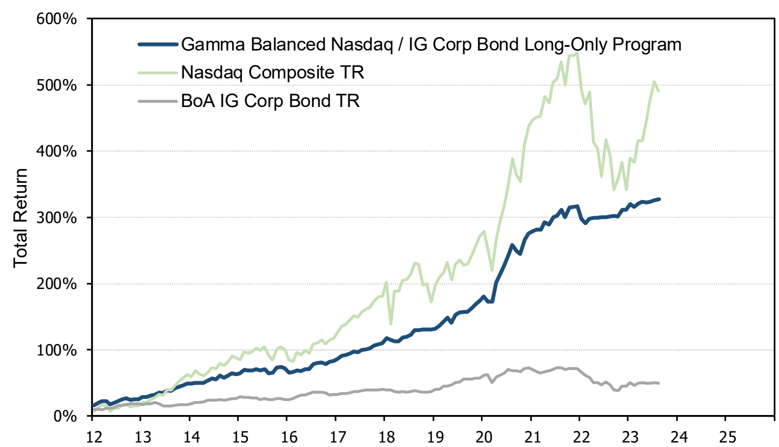
Gamma Balanced S&P 500 / IG Corp Bond Long-Only Program Jan 2011 - Aug 2023



Historical Performance	Program	BM1	BM2
Compound ROR	9.4%	12.8%	3.2%
Cumulative Return	312.4%	357.4%	49.0%
Cumulative VAMI	$3,124	$4,574	$1,490
Best Month	5.5%	13.9%	5.3%
Worst Month	-3.5%	-17.7%	-7.5%
% Positive Months	78.9%	70.4%	61.2%
Historical Risk	**Program**	**BM1**	**BM2**
Standard Deviation	5.3%	15.7%	6.0%
Sharpe Ratio (1.0% RFR)	1.60	0.75	0.37
Sortino Ratio (1.0% RFR)	2.58	1.14	0.45
Downside Deviation	3.3%	10.3%	4.9%
Maximum Drawdown	-7.8%	-23.8%	-20.1%
Months In Maximum Drawdown	13	20	25

BM1: S&P 500 Total Return
BM2: BofA M-L Investment Grade Corp Bond Index Total Return

Gamma Balanced Nasdaq / IG Corp Bond Long-Only Program Jan 2011 - Aug 2023



Historical Performance	Program	BM1	BM2
Compound ROR	12.6%	16.6%	3.5%
Cumulative Return	422.2%	444.7%	49.0%
Cumulative VAMI	$4,222	$5,447	$1,490
Best Month	10.4%	20.7%	5.3%
Worst Month	-4.5%	-20.9%	-7.5%
% Positive Months	77.9%	65.8%	61.1%
Historical Risk	**Program**	**BM1**	**BM2**
Standard Deviation	7.0%	18.8%	6.0%
Sharpe Ratio (2.0% RFR)	1.68	0.84	0.44
Sortino Ratio (2.0% RFR)	2.79	1.40	0.54
Downside Deviation	4.2%	11.4%	4.9%
Maximum Drawdown	-6.1%	-31.8%	-20.1%
Months In Maximum Drawdown	12	17	22

BM1: Nasdaq Composite Total Return
BM2: Bank of America Merrill Lynch Investment Grade Corporate Bond Index Total Return

Past performance is not indicative of future results

GIC will use its reasonable best efforts to provide accurate and informative Information Services to Subscriber, but GIC cannot guarantee the accuracy, relevance and/or completeness of the Information Services, or other information used in connection therewith. GIC, its affiliates, shareholders, directors, officers, and employees shall have no liability, contingent or otherwise, for any claims or damages arising in connection with (i) the use by Subscriber of the Information Services and/or (ii) any errors, omissions or inaccuracies in the Information Services. The Information Services are provided for the benefit of the Subscriber. It is not to be used or otherwise relied on by any other person.

Some of the data contained in this publication may have been obtained from Refinitiv USA LLC ("Refinitiv"). Refinitiv USA LLC nor any other party involved in or related to compiling, computing or creating the Refinitiv data makes any express or implied warranties or representations with respect to such data (or the results to be obtained by the use thereof), and all such parties hereby expressly disclaim all warranties of originality, accuracy, completeness, merchantability or fitness for a particular purpose with respect to any of such data. Without limiting any of the foregoing, in no event shall Refinitiv, any of its affiliates or any third party involved in or related to compiling, computing or creating the data have any liability for any direct, indirect, special, punitive, consequential or any other damages (including lost profits) even if notified of the possibility of such damages. No further distribution, dissemination, reproduction of any information, opinions, views, data or material, including ratings ("Content") in any form is prohibited without Refinitiv's express written consent.

Gamma Investment Consulting LLC may also obtain data from other sources ("Content Providers"). Such party(s) and their affiliates and suppliers do not guarantee the accuracy, adequacy, completeness, timeliness or availability of any Content and are not responsible for any errors or omissions (negligent or otherwise), regardless of the cause, or for the results obtained from the use of such Content. In no event shall Content Providers be liable for any damages, costs, expenses, legal fees, or losses (including lost income or lost profit and opportunity costs) in connection with any use of the Content. A reference to a particular investment or security, a rating or any observation concerning an investment that is part of the Content is not a recommendation to buy, sell or hold such investment or security, does not address the suitability of an investment or security and should not be relied on as investment advice. Credit ratings are statements of opinions and are not statements of fact.

Important Disclaimer

This communication reflects our analysts' current opinions and may not be updated as views or information change. Past results do not guarantee future performance. Business and market conditions, laws, regulations, and other factors affecting performance all change over time, which could change the status of the information in this publication. Using any graph, chart, formula, model, or other device to assist in making investment decisions presents many difficulties and their effectiveness has significant limitations, including that prior patterns may not repeat themselves and market participants using such devices can impact the market in a way that changes their effectiveness. GIC believes that no individual graph, chart, formula, model, analysis or other device should be used as the sole basis for any investment decision.

GIC and its affiliated companies or their respective shareholders, directors, officers and/or employees, may have long or short positions in the securities discussed herein and may purchase or sell such securities without notice.

Neither Gamma Investment Consulting LLC nor the author is rendering investment, tax, or legal advice, nor offering individualized advice tailored to any specific portfolio or to any individual's particular suitability or needs. Investors should seek professional investment, tax, legal, and accounting advice prior to making investment decisions.

GIC's publications do not constitute an offer to sell any security, nor a solicitation of an offer to buy any security. They are designed to provide information, data and analysis believed to be accurate, but they are not guaranteed and are provided "as is" without warranty of any kind, either express or implied.

GIC DISCLAIMS ANY AND ALL EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTIES OF MERCHANTABILITY, SUITABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE.

Gamma Investment Consulting LLC, its affiliates, officers, or employees, and any third-party vendors or data providers shall not have any liability for any loss sustained by anyone relying on the information contained in any GIC publication, and they shall not be liable to any party for any direct, indirect, incidental, exemplary, compensatory, punitive, special or consequential damages, costs, expenses, legal fees, or losses (including, without limitation, lost income or lost profits and opportunity costs in connection with any use of the information or opinions contained in their publications even if advised of the possibility of such damages.