Macro Intelligence Report

July 2023

GAMMA INVESTMENT CONSULTING

Gamma Global Macro Model Highlights

- **The S&P 500 and Nasdaq Models remained neutral (in cash) for July**. Despite last month's 6%+ gains by the S&P 500 and Nasdaq, the combination of the most extreme overvaluation since 2002 and the worst liquidity contraction in 40 years is keeping the Model out of the market.

- **The 10-year and 30-year Treasury Models remained short (higher yields) for July. Investment- Grade Corporates offer their most favorable valuation since 2010.** The combination of a strong labor market, stubbornly high core inflation, and a surge in Treasury borrowing is keeping upward pressure on interest rates.

- **The Gold Model remained neutral for July.** Expectations of higher interest rates are keeping downward pressure on precious metals and gold mining share prices despite attractive valuation.

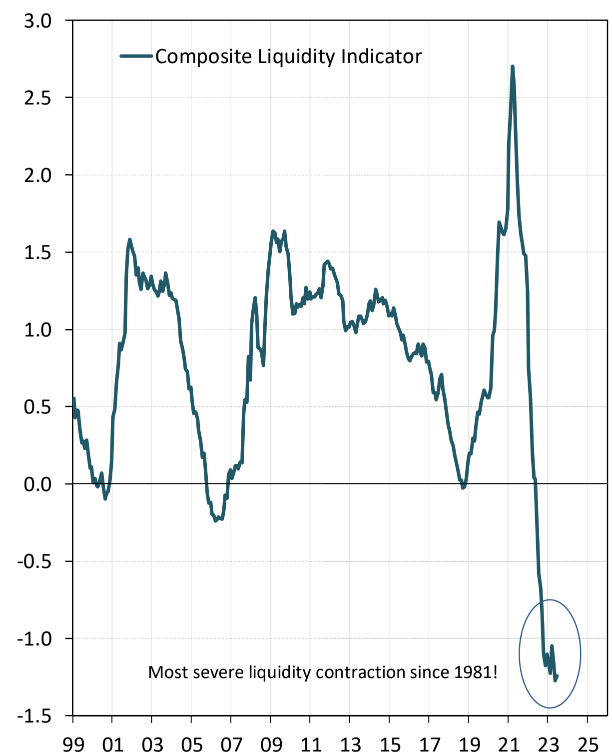
- **The EUR/USD Model remained short euros (long USD) for July.** The dollar continues to benefit from relatively stronger economic growth. US GDP rose 2% in the first quarter compared to 0.1% for the Eurozone. Rate increases by the European Central Bank are expected to, at best, match those by the Federal Reserve.

I. Equity Index Outlook

Stock prices continue to grind higher despite the most extreme overvaluation since 2010 and 2021 and the most severe liquidity contraction since 1981. The S&P 500 rallied 6.5% in June and ended the month up over 12% from its February low. The Nasdaq posted a 6.4% gain while ending up almost 20% from February. Equities and the economy continue to benefit from the lingering effects of the massive Covid-fueled surge in liquidity in 2020-21. Despite these gains, however, fundamentals for equities remain poor. US equities, especially technology stocks, remain extremely overvalued. The Gamma Liquidity Indicator is at its lowest level in 40 years and shows no signs of bottoming given the prospect of additional Federal Reserve rate hikes (Chart 1). For those reasons, the Gamma Equity Models remains neutral for the S&P 500 and the Nasdaq (Chart 2).

CHART 1

Composite Liquidity Indicator



Positive Factors

- **<u>The economy and labor market remain robust</u>**. First quarter 2023 GDP growth was revised up to a 2% annual rate from a 1.3% rate which itself was revised up from an initial 1.1% estimate. Consumer spending jumped 4.2%, the fastest growth rate since the Covid stimulus checks went out in Q1 2021. Spending continues to benefit from a tight labor market which is keeping upward pressure on wages and incomes. 339,000 jobs were created in May, the biggest increase since January. The economy has created over 1.57 million new jobs in the past twelve months. As a result, personal income is up 5.5% from a year ago while hourly earnings are up 5%. The growth in income has helped support personal consumption expenditures which are up 6% yr/yr. Strength in the economy will support earnings, though strong growth is also likely to encourage additional tightening by the Fed.

Neutral Factors

- **Corporate earnings *may* be bottoming**. 12-month trailing earnings still look awful, but measures for the total U.S. market, S&P 500, and Nasdaq indexes all improved in June (Chart 3). Total earnings for all U.S. stocks were down -6.8% yr/yr for the second month in a row, but this was an improvement from -8.0% two months ago. Earnings momentum (the 12-month change in 12-month earnings growth) also improved to –45.2% from its -60.6% bottom in April. Whether this improvement continues depends on whether the economy manages to avoid recession as the Fed raises rates further. Earnings have historically turned higher about six months after the Index of Leading Economic Indicators bottoms. The Index just put in a new cyclical low last month which suggests that further short-term deterioration may still be possible. With earnings momentum still negative, it is unlikely that earnings will provide much support for stocks for the balance of the year. It may, however, remove one of the major drags on stock prices over the last year.

CHART 2
USA: S&P 500 Model Forecast

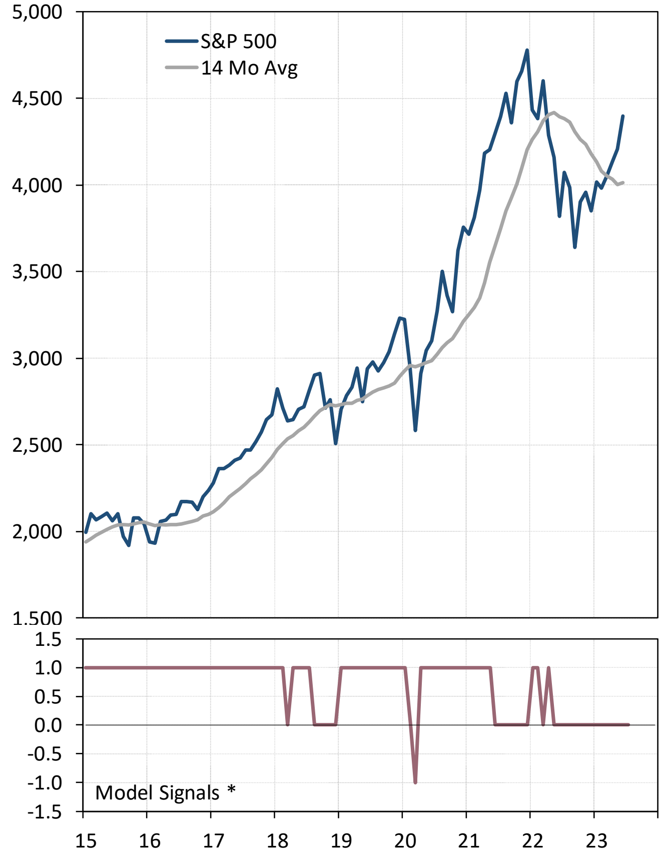
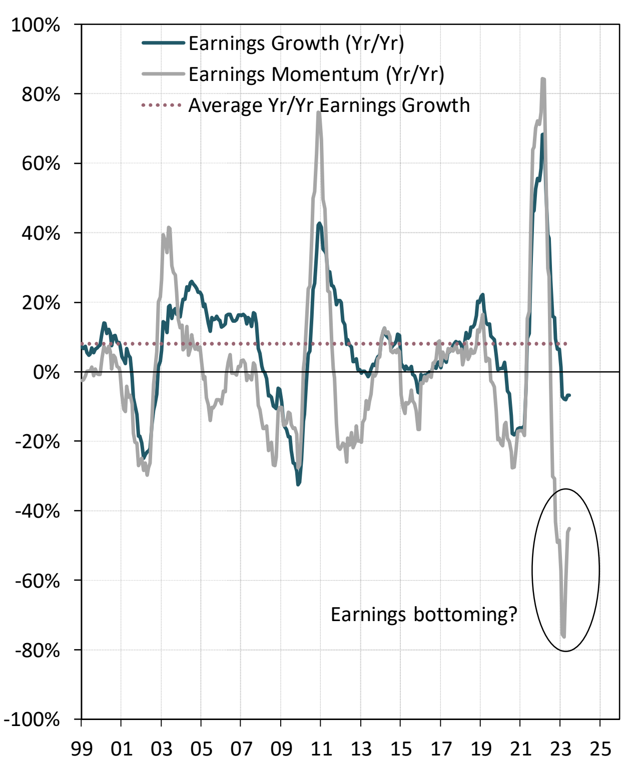


Chart 3
US Total Market Earnings Growth



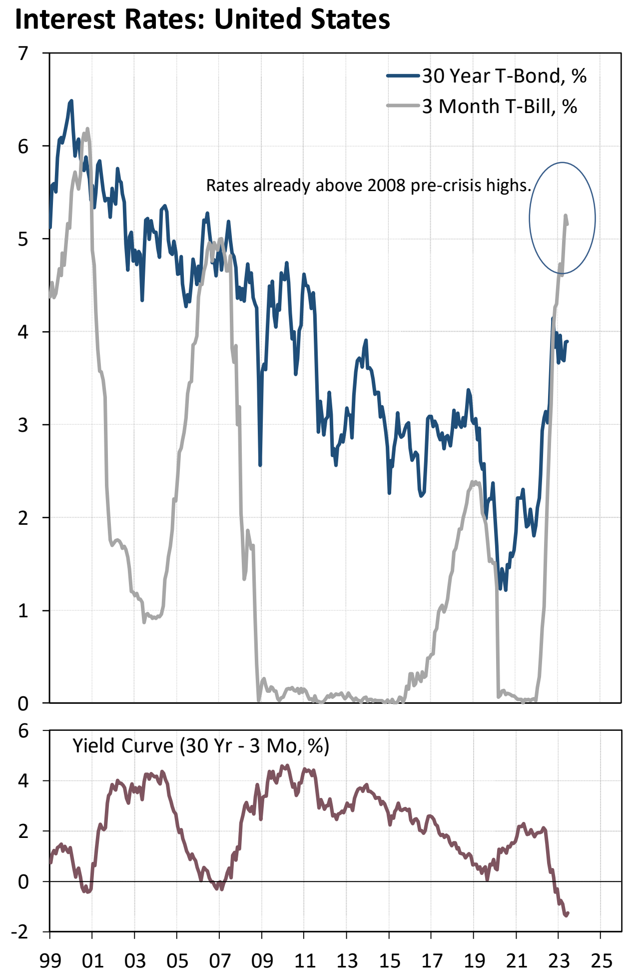
- **Seasonals: a July rally**? Stocks during the summer months have tended to post returns only 1/6 that of the rest of the year. July, however, is the major exception with an average gain of 1.1% since 1973. Investors should note, however, that most of those gains have tended to come following average-to-below average returns for June. With the S&P 500 up 6.5% in June (June averages a 0.8% gain), the odds of July posting a 1.1% or better return are well below their historical average especially in the face of likely another Fed rate hike.

Negative Factors

- **Core inflation is still short of the Fed's 2% goal**. Inflation continues to be a mixed bag. Headline consumer price inflation accelerated last month, rising 0.4% after only a 0.1% gain the previous month. At the same time, the yr/yr inflation rate remained unchanged at 5% which is down from an 8.9% peak ten months ago. Core inflation (excluding food and energy) was up 5.3% yr/yr, down only modestly from its 6.6% peak. Most of the improvement in inflation has been due to a decline in food and fuel prices. Services prices, however, have declined only very slowly to their current 5.3% rate. The overall picture is one of a very gradual slowing in inflation. The problem is that, assuming that this decline continues, inflation will remain well above the Fed's 2% target rate well into 2024.

- **Short-term interest rates continue to rise**. A firm labor market and the lack of recent progress in core inflation will keep upward pressure on interest rates (Chart 4). Market expectations previously called for rates to peak with the Fed's May FOMC meeting. Instead, recent comments by Fed officials have highlighted their concerns about inflation becoming entrenched at a 5% rate. Fed officials following the last FOMC meeting had indicated that they would "pause" in July to assess the impact of their ten rate hikes since February 2022 on the economy and the inflation rate. Instead, the CME FedWatch Tool, following the unexpectedly strong upward revision to 1Q2023 GDP, now calls for another 25 basis points hike at the July meeting followed by another 25 basis points in November. That would raise the Fed Funds rate to 5.75% - it's highest level since 2000.

CHART 4



- **The yield remains extremely inverted.** The 2-10 Treasury yield curve inverted to -1.03% last month as 2-year rates skyrocketed following the first quarter GDP revision. The 2-10 curve is now at its most extreme inversion since 1981. The 3-30 curve did not react as aggressively but at –1.28% still remained just shy of its most extreme inversion in 42 years (Chart 4). **Both curves remain indicative of a very restrictive monetary policy.** Both are likely to contribute to even weaker money growth which has already fallen at the most extreme rate since the 1930's.
- **Every measure of real money growth continues to deteriorate**. Both nominal and inflation-adjusted measures of True Money Supply (TMS) growth continue to plummet. Nominal TMS was down -15.3% yr/yr last month - its largest 12-month decline since WW II (Chart 5). Real TMS was down -10.3%. **The decline in both measures is the largest since the bank failures of the 1930's.** Real M2 was down -8.9% yr/yr. Nominal M2 contracted -4.0%, only the second time that the measure was negative since the 1930's. All the measures are indicative of a severe contraction in liquidity which is likely to worsen due to the persistent inversion of the yield curves which is likely to worsen as the Fed increases short-term rates further. It is highly unlikely that money growth will recover until interest rates have clearly peaked.

Normally such a severe liquidity contraction would already have sent the economy and the stock market into a tailspin. The massively irresponsible Covid-fueled surge in the money supply almost doubled the ratio of money to nominal GDP (Chart 6). Even after ten rate hikes, a $729 billion contraction in the Fed's balance sheet, and the sharpest drop in the money supply in 90 years, liquidity relative to GDP is still 43%

CHART 5

Real True Money Supply and M2

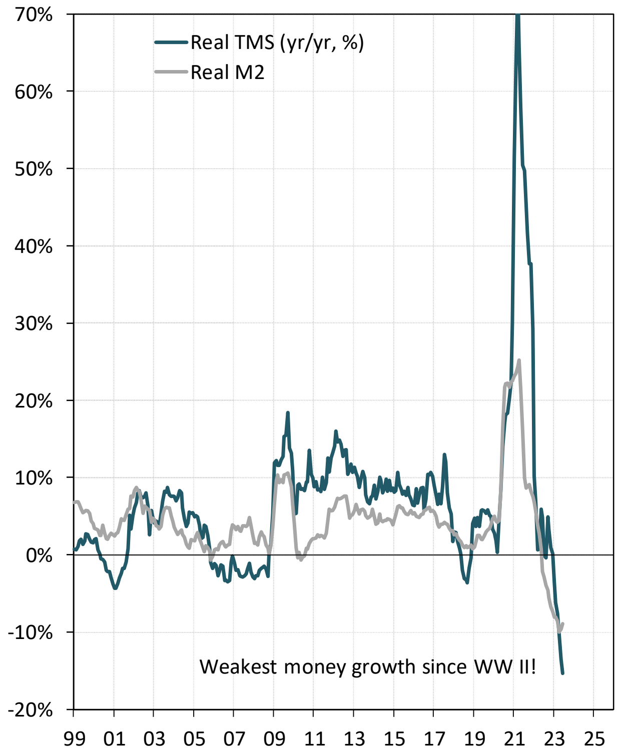
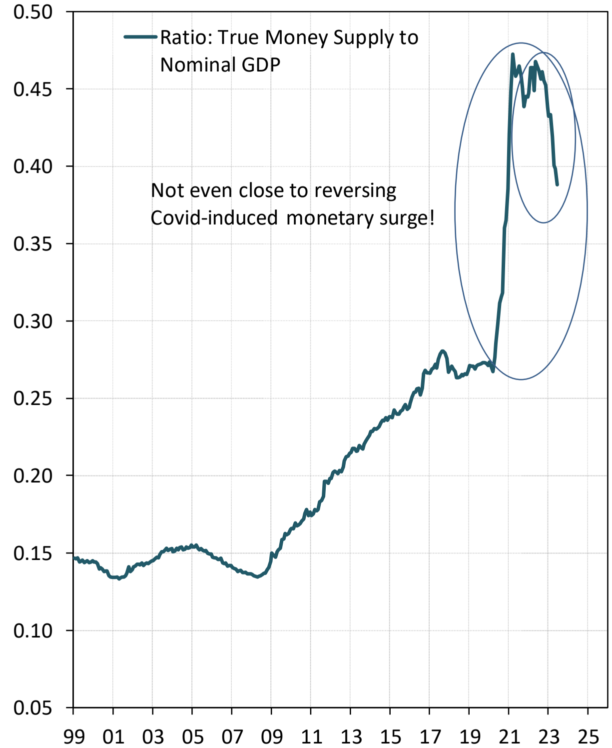


CHART 6

Ratio: True Money Supply to GDP

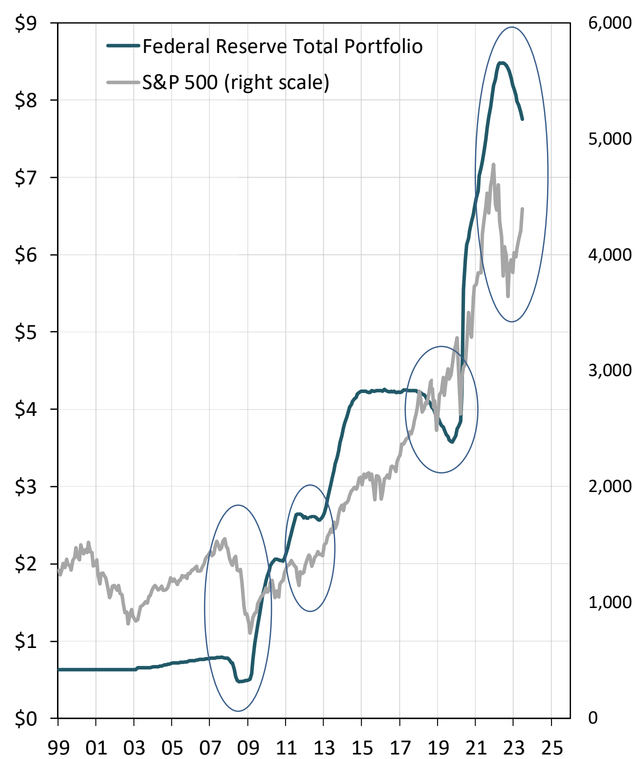


higher than it is was in December 1999. **Given these unusual circumstances, the Fed may need to raise rates even more aggressively to offset the lingering effects of a liquidity surge that pushed inflation to its highest level since the early 1980's**.

- **The Federal Reserve's balance sheet continues to contract**. Even though the Fed injected almost $500 billion in reserves into the banking system in reaction to the flurry of regional bank failures, this occurred against a backdrop of ongoing tightening. The Federal Reserve's balance sheet has now contracted by $729 billion from its pre-tightening peak (though bank borrowing from the Fed is still $185 billion above is pre-Silicon Valley Bank failure level). Since the introduction of so-called "quantitative easing" after the 2008-2009 financial crisis, changes in the Fed's balance sheet have correlated strongly with movements in the stock market. Chart 7 shows that contractions in the Fed's balance sheet have since been predictably accompanied by flat or negative equity performance. With the Fed still in tightening mode, further contraction in its balance sheet should continue to weigh on stock prices.

CHART 7

Fed Portfolio (Trillion $) vs S&P 500



- **<u>Equities remain overvalued</u>**. The persistent overvaluation of equities despite a record liquidity contraction continues to be the biggest puzzle of the current cycle. The S&P 500 peaked at 1.32 standard deviations overvalued (28%) in April 2021 (Chart 8). That was the highest level of overvaluation since October 2002. The drop in the S&P 500 from mid-2021 through late 2022 caused valuation to converge close to fair value. Since then, however, valuation has steadily worsened. Stock prices have climbed in the face of rising interest rates and declining earnings. Overvaluation for the S&P 500 hit 1.30 standard deviations last month (27%), the third most extreme reading in the last twenty years. Valuation for the Nasdaq index has hit an even more extreme level of 1.60 standard deviations (44%), the highest level since March 2002.

  This extreme overvaluation has occurred despite a steady rise in the return on equity alternatives – bonds and cash – since the Fed began tightening in April 2002. Chart 9 shows the earnings yield on the S&P 500 compared to the yield on investment grade corporate bonds and money market accounts. Since 2004, the S&P 500 has averaged an earnings yield about 1.2% higher than the yield on corporate bonds. Since September 2022, however, the earnings yield - corporate bond yield spread has been negative and currently is at its most extreme level since 2008. We remain extremely concerned by the equity market's persistent overvaluation in the face of a sustained rise in interest rates and contraction of liquidity. **Despite interest rates 5% higher than April 2022, equities are more overvalued now than at the beginning of the current bear market. As we have repeatedly warned, no recovery from a major bear market low has occurred in the last 60 years when stocks were not at least fairly-valued. On average, new bull markets launched when stocks were 25% undervalued. <u>Stocks would need to fall over 50% from current levels to reach that level of valuation</u>.**

- **<u>The economic outlook continues to deteriorate</u>**. Despite the unexpectedly strong upward revision to first quarter GDP, the overall economic outlook continues to worsen. The Conference Board's index of leading economic indicators (LEI) dropped -0.7% last month to a new cycle low (Chart 10). The index

CHART 8

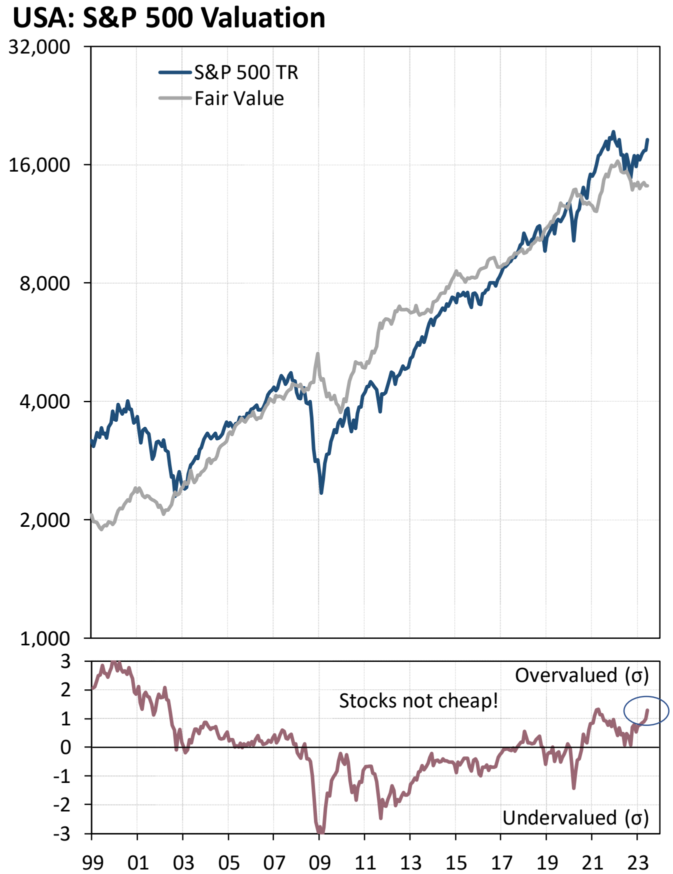
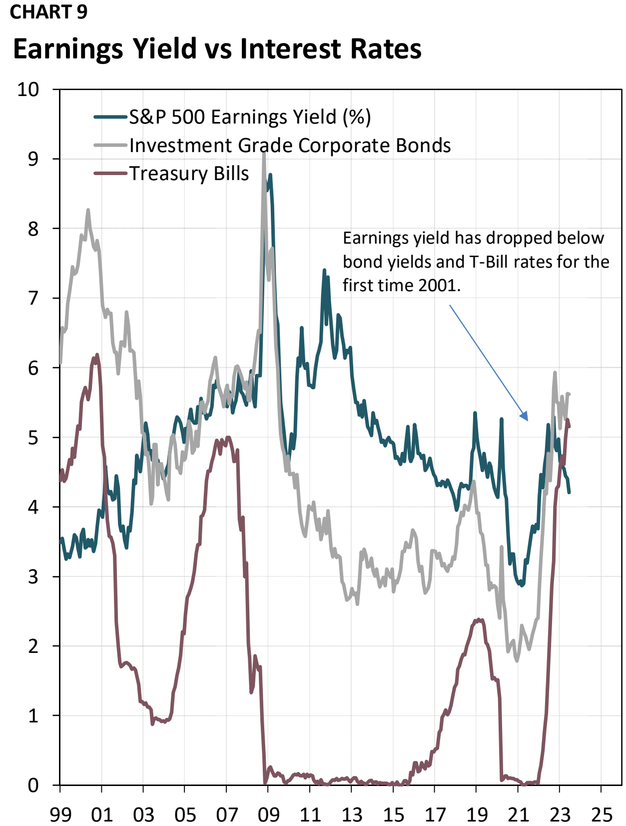


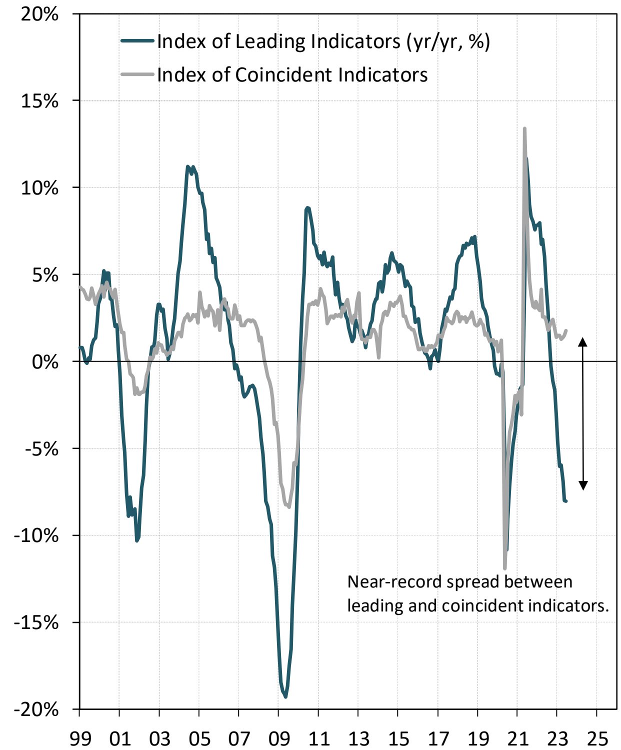
CHART 9



has now dropped fourteen months in a row. In contrast, the index of coincident indicators (CEI, a monthly proxy for real GDP) rose 0.2% to a record high. This discrepancy, along with equity valuation, is the other big puzzle of this tightening cycle. Peaks in the LEI since 1960 have occurred on average 10 months before the peak in the CEI, though the lag has varied from as short as three months to as long as 21 months. The LEI peaked 16 months ago in in February 2022 which makes the peak in the CEI overdue. The yr/yr change in the LEI has, on average, been 5% below the yr/yr change in the CEI at the time of the peak in the CEI. The spread currently is -10%. Unfortunately, wider spreads have preceded the more severe downturns. For example, the most extreme readings since 1960 predicted the severe 1980-82 recession and the 2008-09 financial crisis. We believe that the excessive Covid stimulus is keeping the economy afloat. We also believe that the Fed's focus on controlling inflation will eventually drain enough liquidity that previous relationships that appear to be broken will snap back with a vengeance.

CHART 10

Measures of Economic Activity



II. Fixed Income Outlook

The 10-year and 30-year Treasury Bond, Investment Grade Corporate, and High Yield Corporate Models remained short for July (higher yields, Charts 11, 12). Bond yields surged higher during the month in reaction to the upward revision to first quarter GDP. 10-year Treasury yields rose 20 basis points. The yield on 2-year T-Notes surged a whopping 0.5 percent – the biggest one-month jump since September 2022 when the Fed was in major tightening mode. The unexpected strength in the economy along with persistently high core inflation has caused bond investors to push expectations of a peak in interest rates to at least the end of 2023. In addition, the CME's FedWatch Tool indicates that markets do not expect a cut in rates before spring 2024. Add to this the clash between the Fed selling securities ("quantitative tightening") and the Treasury's post-debt-ceiling plans to sell billions more in debt and you have a prescription for potentially even higher long-term rates.

Positive Factors

- **Bonds are undervalued**. Last month's sharp rise in bond yields caused bond valuation to improve further. Higher yields caused valuation to improve to 0.75 standard deviations undervalued, the cheapest level in six months (Table 1). Valuation on investment grade corporates hit bargain basement levels in May and remained at a cheap 1.46 standard deviation level last month.

TABLE 1

FIXED INCOME VALUATION

Country	Debt Instrument	Current Yield	Yield Valuation (σ)	Price Valuation (%)
USA	2 Yr T-Note	4.89	+0.60	-0.6%
USA	5 Yr T-Note	4.15	+0.61	-2.0%
USA	10 Yr T-Note	3.85	+0.74	-5.0%
USA	30 Yr T-Note	3.90	+0.75	-11.7%
USA	IG Corporate	5.59	+1.46	-6.2%
USA	HY Corporate	8.60	+0.76	-9.2%

CHART 11

USA: 10 Yr T-Note Model Forecast

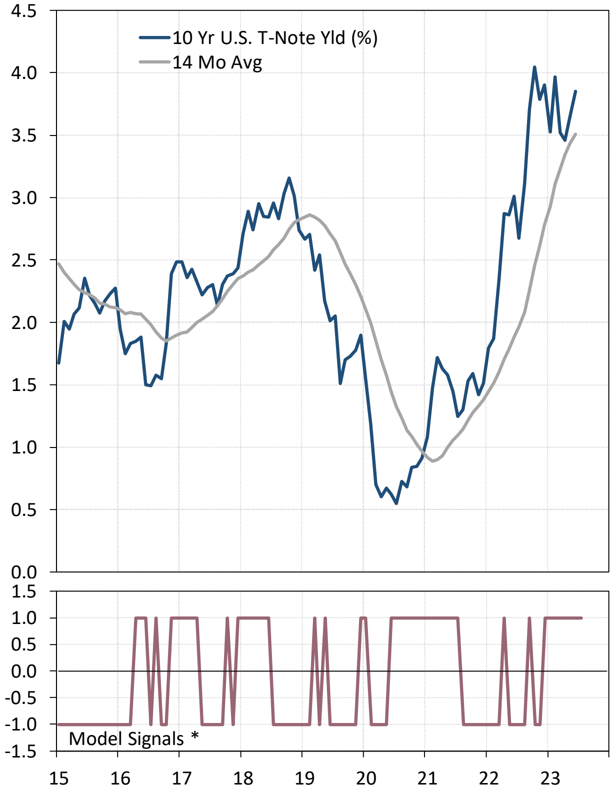
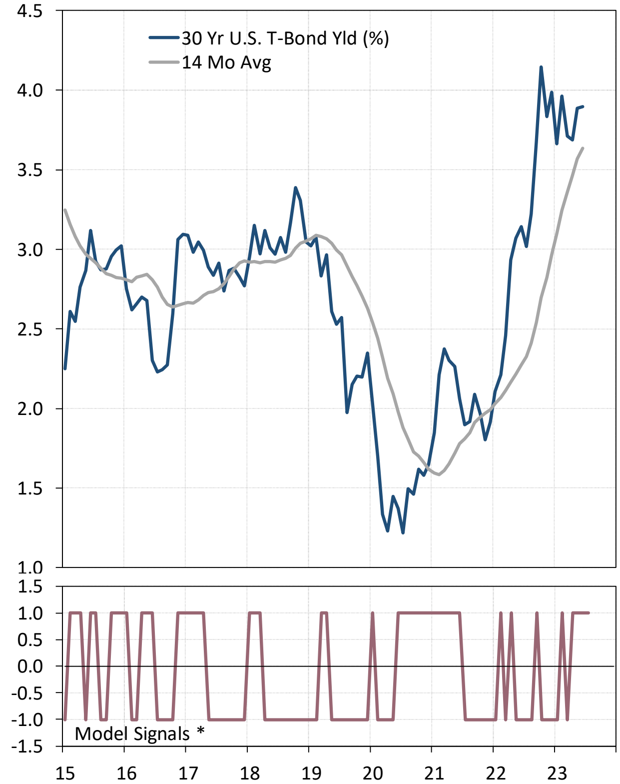


CHART 12

USA: 30 Yr T-Bond Model Forecast



- **Bullish seasonals**. Long-term Treasury yields have historically fallen in the second half of the year, though July has been a mixed bag depending on the maturity. Both investment grade and high yield corporate yields have historically fallen sharply in July.

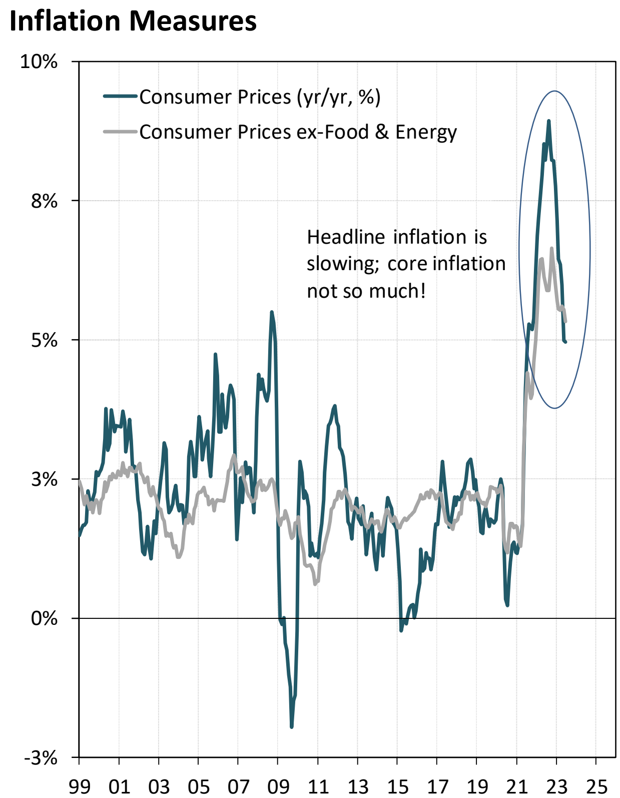
Neutral Factors

- **Leading indicators are slowing but the labor market remains robust**. As noted above, there has been a major disconnect between leading indicators of economic activity and actual performance. We attribute most of that to the lingering effect of the massive fiscal and monetary stimulus during the Covid pandemic. With the core inflation rate essentially unchanged from six months ago, the Fed has been forced back into tightening mode. At some point the reduction in liquidity through higher rates, a declining Fed balance sheet, and contracting money supply will begin to offset the effects of the 2020-21 Covid stimulus and the absurdly-named "Inflation Reduction Act" that boosted spending and subsidies by as much as $1.7 trillion. **It is our belief that a slowdown in the economy has only been delayed**. Given the unprecedented size of the Covid stimulus it is unclear how much tightening will be needed to introduce some slack into the labor market. Our concern is that each rate hike brings the economy closer to an inflection point at which point economic activity slows abruptly rather than slowly. As we have noted in the past, **the index of leading economic indicators has never been down over 2% yr/yr without being followed by a recession**. We don't expect this time to be different, though the timing may be drawn out more than historical precedent.

Negative Factors

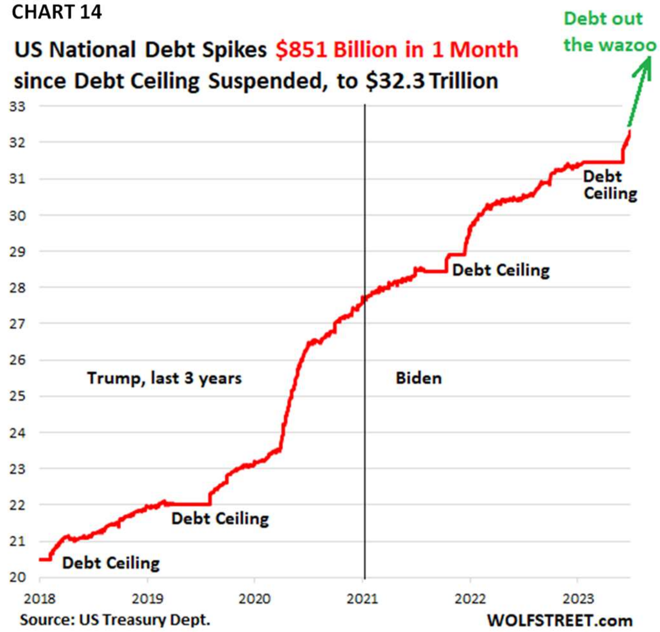
- **Inflation is slowing, but not fast enough**. Headline inflation continues to fall, but core inflation excluding food and energy has been uncomfortably "sticky" due to a robust labor market and solid gains in personal income and wages (Chart 13). The yr/yr change in the CPI has fallen from a peak of 8.9% ten months ago to a 5% rate in June. Core inflation in the same period has only fallen from a 6.6% rate to a 5.3% rate. That leaves inflation a good 2-3% short of the Fed's inflation target rate. The Fed has clearly communicated that additional rate hikes will be necessary to bring inflation completely under control even if the cost is a recession. A recession would be an unpleasant but necessary consequence of tighter monetary policy. Persistent inflation of 5% would prevent any reduction in interest rates. The higher interest rates since the Fed began tightening are already wreaking havoc on the cost of government borrowing. As more and more low-interest debt matures and is replaced with current higher-yielding debt, the cost of financing the Treasury's $32 trillion in debt starts to rise exponentially. Interest alone on the federal debt is expected to top $800 billion next year – almost equal to the entire defense budget. With Social Security and Medicare spending ramping up, persistently high interest rates will simply move up the date of a serious fiscal crisis. For that reason, the Fed is willing to risk a short-term recession in order to ensure a more robust reduction in interest rates.

CHART 13



- **"Quantitative Tightening" and Treasury borrowing needs.** The Fed's balance sheet has contracted by $729 billion since April 2022, and there are no signs that quantitative tightening will end any time soon. The problem is that the Treasury is expected to raise over $700 billion in new cash over the next three months (Chart 14). The clash between the two is likely to keep upward pressure on long-term interest rates. The Fed's policy will eventually allow for lower interest rates as inflation declines, but in the short run reduced demand by the Fed and increased supply by the Treasury will likely require higher yields to entice buyers.

CHART 14

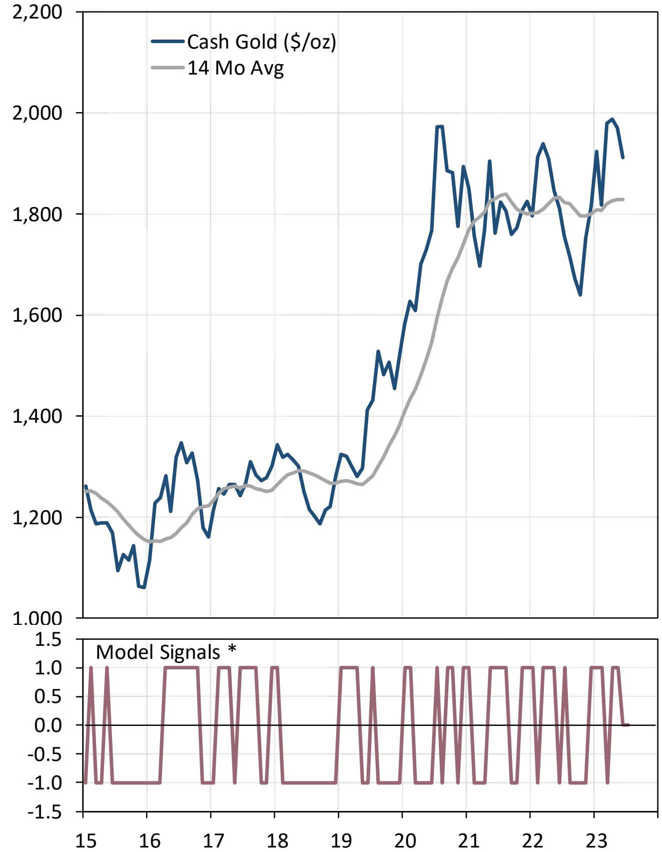


- **Inverted yield curves**. The 3-30 and 2-10 yield curves remain strongly inverted. The inverted curves create an incentive to hold higher-yielding, shorter-term maturities over long-term securities which should keep upward pressure on long-term interest rates. With the end of the Fed's tightening cycle being pushed further into the future, bond investors have little incentive to aggressively buy bonds.

III. Gold and Precious Metals Outlook

The Gamma Gold Model remained neutral (no net position) for July (Chart 15). The prospect of higher interest rates continues to act as a headwind to precious metals prices and gold mining shares despite attractive valuation levels. **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.**

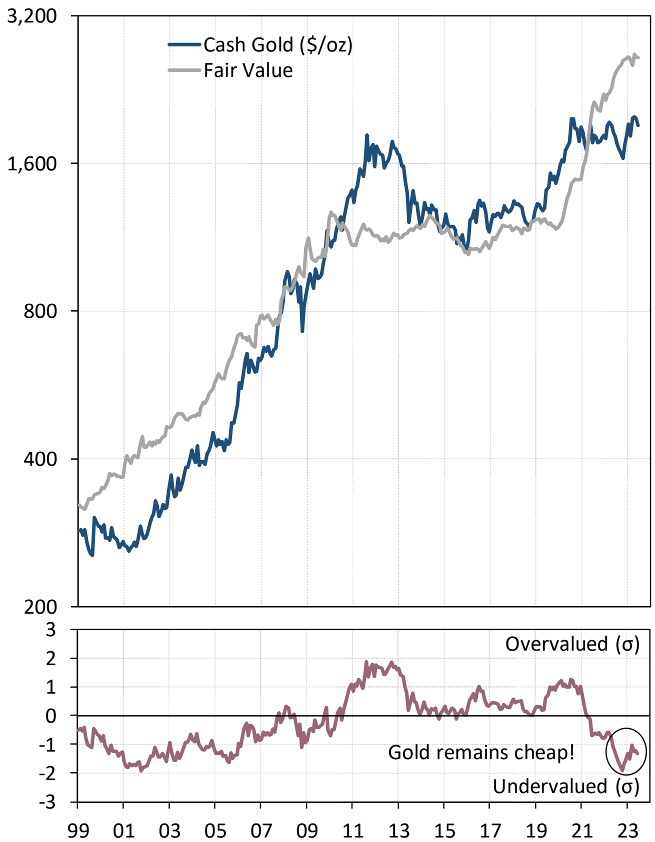
CHART 15
Gold Model Forecast



Positive Factors

- **Precious metals are still cheap**. Gold remains 1.3 standard deviations below fair value (Chart 16). The Gamma Valuation Model shows fair value for gold to be around $2,550 – about 32% above its current price. Silver remains even more undervalued at -45%. Gold mining shares dropped -9.4% last month which pushed their undervaluation to -36%.
- **Positive seasonals**. Precious metals have historically struggled in the first half of the year. Starting in July, however, gold prices have historically risen steadily for the balance of the year. July has averaged a 0.7% gain in July since 1975 with the July-December period averaging a 5.2% gain (Chart 17).

CHART 16
Gold Valuation



Negative Factors

- **Still-rising interest rates**. Gold prices rallied 21% between October 2022 and April 2023 on expectations that the Fed would end its tightening cycle with a final rate hike in March (and then May). Instead, a resilient labor market is helping support income growth which in turn is driving consumer spending. The Fed is increasingly concerned that higher wages and service prices, which tend to be "stickier" than goods prices, will require additional interest rate hikes to bring under control. That expectation is preventing gold from making much headway given that nominal interest rates are now at their highest levels since 2000 and real (inflation-adjusted) interest rates are

CHART 17
Avg Mo Change: Cash Gold (1975 - Present)

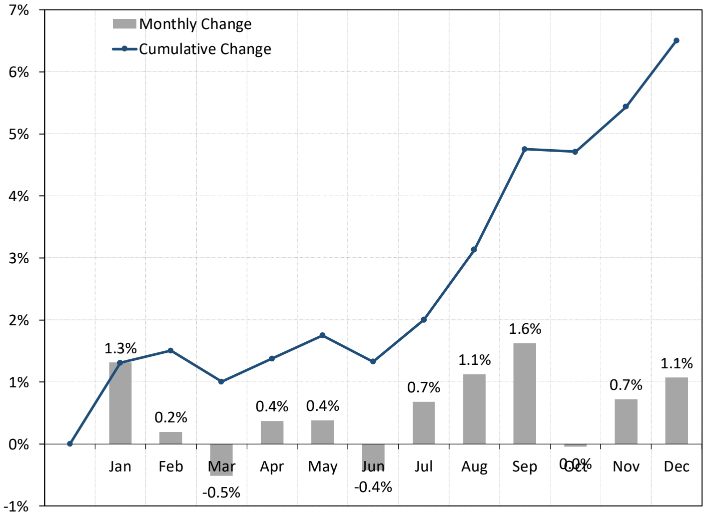
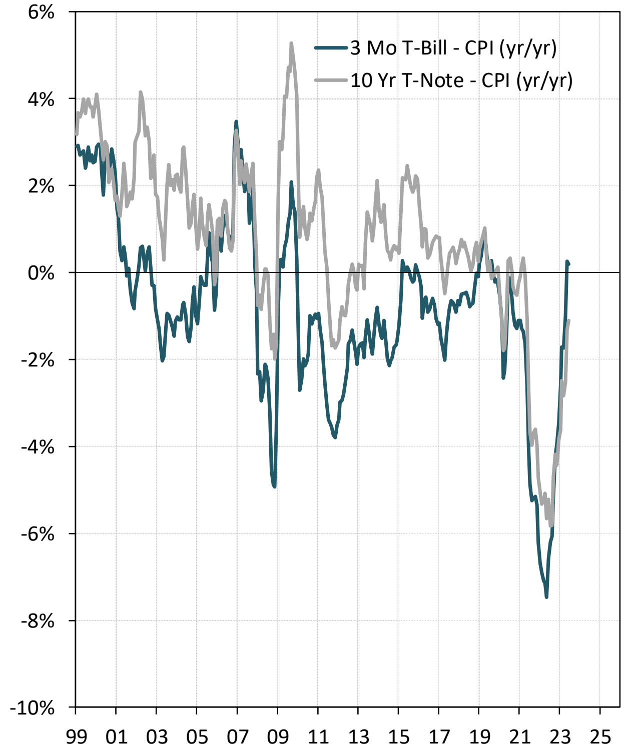


CHART 18
Real Interest Rates



positive for the first time in five years (Chart 18). Since gold doesn't yield interest or a dividend, higher interest rates create a strong disincentive to hold the metal. The Fed's rate hikes will at some point reach a tipping point where economic activity slows. At that point, rates will likely come down quickly. Gold may remain range-bound until then, though as we noted above, selloffs should be used to add to long positions.

- **Dollar strength**. The Gamma EUR/USD Model remained short the euro (long USD) for July. The persistent strength in the US economy compared to Europe will keep the dollar bid even though ECB interest hikes are likely to keep pace with Fed rate increase. That implies a steady-to-higher dollar which should keep downward pressure on gold prices.

IV. Foreign Exchange Outlook

The Gamma EUR/USD Model remained short the euro (long USD) for July (Chart 19). After briefly going long the euro due to a series of aggressive interest rate hikes by the European Central Bank (ECB), the Model has returned to a short euro position as US economic growth has remained surprisingly robust while the European economy was flat in the first quarter 2023.

Positive USD Factors

- **Strong relative economic growth.** Despite the most anticipated recession in recent memory, US economic growth remains robust compared to Europe. First quarter 2023 real GDP growth in the US was revised upward from 1.3% to 2.0%. In contrast, Eurozone growth slumped to a barely positive 0.1% annual rate in the same period.
- **French social unrest.** Widespread rioting broke out in France following the shooting of an Algerian Uber driver by French police. France's Interior Ministry said Islamist rioters set fire to 1,350 vehicles and 235 buildings nationwide with 200 police officers injured and 1,300 people arrested. The government mobilized 45,000 police officers to quell the violence. French police unions, who said they were "at war" with "savage hordes of vermin," threatened to protest if the government refuses to clamp down hard on the rioting. France has allowed millions of Muslims to immigrate from Algeria and Morocco over the last several

decades. Their slow assimilation has created a dual culture in France and in other Western European countries. The already simmering situation could worsen if the ECB's interest policy aimed at controlling inflation results in slower growth and rising unemployment.

Neutral USD Factors

- **Relative inflation rates**. US core (excluding food and energy) PCE inflation, the Fed's preferred measure, eased lower to a 4.6% yr/yr rate in down, down from a 4.7% rate in April. On the plus side, the index rose only 0.1% in May. On the minus side, the yr/yr rate has remained stubbornly stuck in a 4.6-4.7% range for the last six months, well short of the Fed's 2% target rate. In contrast, Eurozone core consumer price inflation ticked higher to 5.4% yr/yr rate last month, up from 5.3% rate and still well above the ECB's 2% target rate.

  This stubbornly high core inflation in both regions reflects the respective strength in the labor market in both areas. Unemployment in the U.S. and the Eurozone is running near record lows. The effect is a persistent rise in income that is spilling over into services prices which show little sign of slowing. U.S services inflation eased to a 5.3% yr/yr rate last month from a 5.8% rate peak in February was UP from a 4.9% rate a year ago. Eurozone services inflation jumped to a record 5.2% yr/yr rate last month. Most of the decline in US and Eurozone inflation since mid-2022 has occurred due to a drop in food and energy prices. Core services inflation is proving a much more resistant to the Fed and ECB's rate hikes which likely ensures that more rate hikes are coming from both central banks.

- **Relative interest rates**. With core inflation remaining frustratingly high in both the US and Europe, the Fed and ECB are likely to match each other's interest rate hikes until clear signs of slack in their respective labor markets emerge. As a result, neither currency is likely to gain or lose much due to the activities of either central bank (Chart 20).

Negative USD Factors

- **Equity valuation**. US stocks (especially technology) continue to outperform European stocks. The S&P 500 and Nasdaq rose 6.5% and 6.4% respectively last

CHART 19

EUR/USD Model Forecast

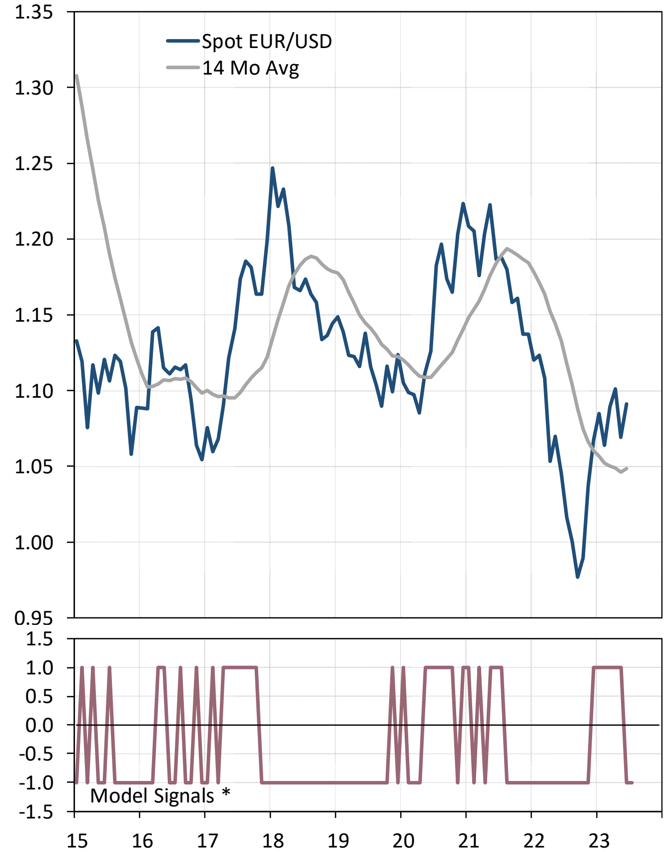
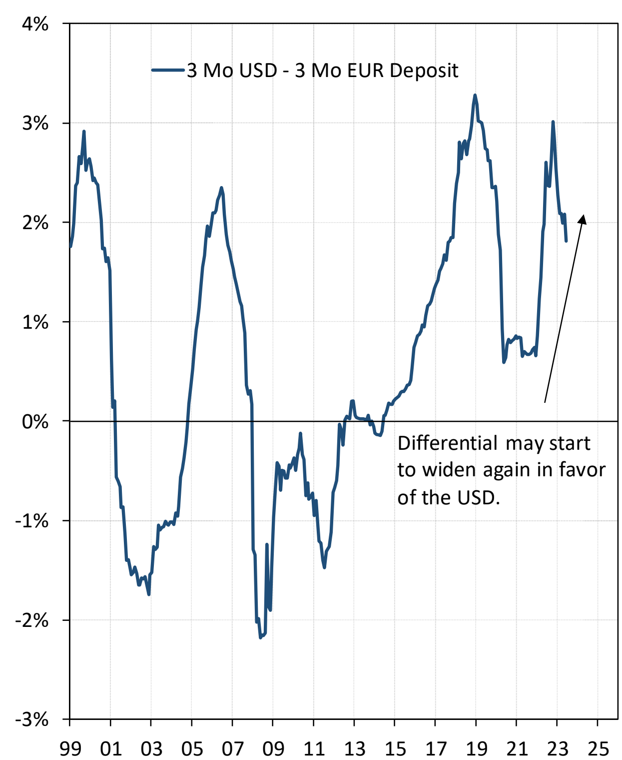


CHART 20

3 Month Interest Rate Differential



month compared to 4.4% for the Euro STOXX 600. **This outperformance in the face of rising interest rates, however, has pushed US equity valuation to a dangerously high level compared to Europe**. The S&P 500 was 27% overvalued in June compared to the Euro STOXX 600 which we estimate was -27% undervalued (Table 2). A continued rise in interest rates that triggers a stock market correction is likely to have a disproportionately negative effect on US stock prices.

TABLE 2
STOCK INDEX VALUATION

Country	Valuation (σ)	Valuation (%)
United States	+1.35	+27%
S&P 500	+1.29	+27%
Nasdaq	+1.60	+44%
S&P 600 Small Cap	-0.81	-14%
Europe	-1.18	-27%
Germany	-1.49	-32%
France	+0.48	+10%
Italy	-1.30	-32%
Switzerland	-0.09	-2%
UK	-0.02	-0%

IV. Asset Allocation and Gamma Model Performance Analysis

This month we are adding a new section to the Report that will track the performance of the Program's major investment recommendations. We will monitor the performance of the long-only S&P 500, Nasdaq Composite, and Investment Grade Corporate Bond Model portfolios plus a long-only balanced portfolio that invests 50% in the S&P 500 and 50% in Investment Grade Corporate Bonds.

These portfolios are long-only - they are either fully 100% invested in the underlying index (such as the S&P 500) when a Model is "long" or are invested in Treasury Bills when the Model is "neutral" or "short." We plan to add additional portfolios based on our Models for gold and energy products. We will also track, for more aggressive investors, the performance of our diversified macro portfolio that invests in all the major asset classes on both the "long" and "short" side. Portfolios are rebalanced at the end of each month when the Gamma Model generates new one-month expected return forecasts.

The portfolios for the S&P 500, Nasdaq Composite, Investment Grade Corporate Bond, and balanced portfolios are structured so that any investor can replicate their performance by investing in mutual funds or exchange traded funds (ETFs) that replicate the returns of the underlying indexes. The performance data is based on end-of-month forecasts from the Models as of the time that they occurred. Updated forecasts are typically available around 11:00 AM EST on the last business day of each month. Portfolio rebalancing occurs at the daily closing price of these indexes on the last business day of the month so investors have time to implement the signals.

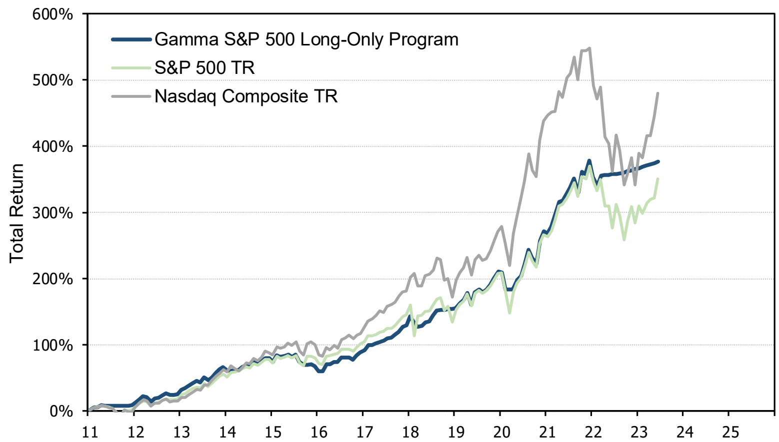
The Gamma Program has been run since the early 1980's, but not all of the forecasts have been used for actual trades. For that reason, the performance records are based on the updated forecasts when they occurred, but they do necessarily represent actual trades. The performance history also makes no adjustments for execution costs, management fees, or other associated expenses. The Gamma Model's prior performance is also not a guarantee of future results.

-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.

Gamma Model Performance Analysis

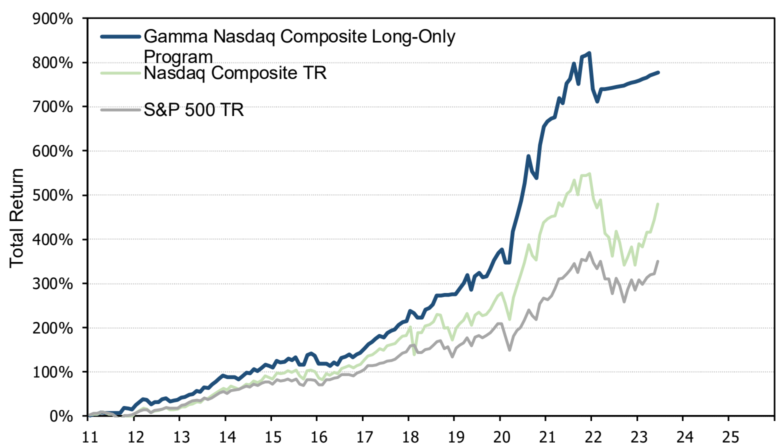
Gamma S&P 500 Long-Only Program — Jan 2011 - Jun 2023



Historical Performance	Program	BM1	BM2
Compound ROR	13.3%	12.8%	15.1%
Cumulative Return	476.9%	350.4%	480.2%
Cumulative VAMI	$4,769	$4,504	$5,802
Best Month	10.9%	13.9%	20.7%
Worst Month	-8.2%	-17.7%	-20.9%
% Positive Months	78.7%	70.7%	66.0%
Historical Risk	**Program**	**BM1**	**BM2**
Standard Deviation	9.9%	15.7%	18.8%
Sharpe Ratio (1.0% RFR)	1.25	0.75	0.75
Sortino Ratio (1.0% RFR)	1.71	1.14	1.24
Downside Deviation	7.2%	10.3%	11.4%
Maximum Drawdown	-14.1%	-23.8%	-31.8%
Months In Maximum Drawdown	18	18	18

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

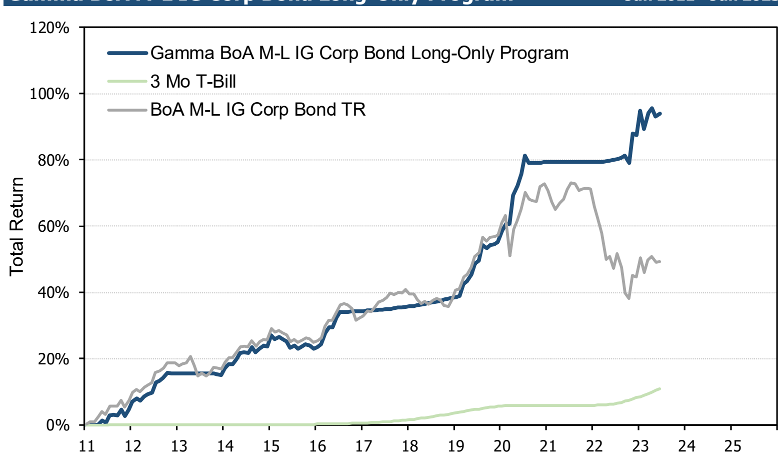
Gamma Nasdaq Composite Long-Only Program — Jan 2011 - Jun 2023



Historical Performance	Program	BM1	BM2
Compound ROR	19.0%	15.1%	12.8%
Cumulative Return	878.0%	480.2%	350.4%
Cumulative VAMI	$8,780	$5,802	$4,504
Best Month	15.5%	20.7%	13.9%
Worst Month	-9.0%	-20.9%	-17.7%
% Positive Months	77.3%	66.0%	70.7%
Historical Risk	**Program**	**BM1**	**BM2**
Standard Deviation	12.9%	18.8%	15.7%
Sharpe Ratio (1.0% RFR)	1.39	0.75	0.75
Sortino Ratio (1.0% RFR)	2.15	1.24	1.14
Downside Deviation	8.4%	11.4%	10.3%
Maximum Drawdown	-12.0%	-31.8%	-23.8%
Months In Maximum Drawdown	18	18	18

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

Gamma BoA M-L IG Corp Bond Long-Only Program — Jan 2011 - Jun 2023



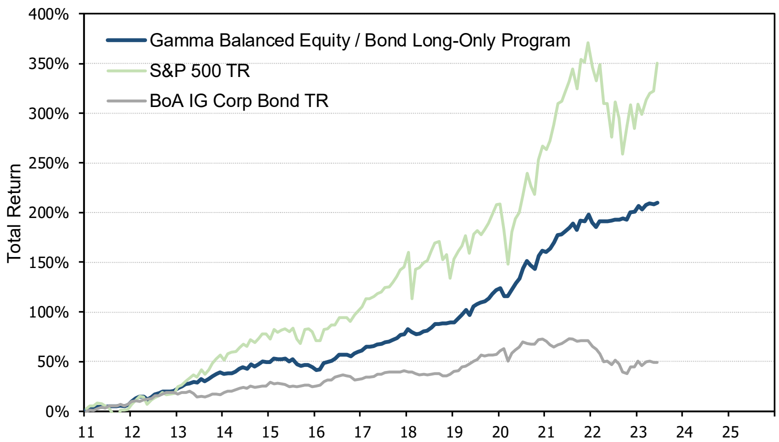
Historical Performance	Program	BM1	BM2
Compound ROR	5.4%	0.8%	3.3%
Cumulative Return	193.9%	10.9%	49.4%
Cumulative VAMI	$1,939	$1,109	$1,494
Best Month	5.3%	0.4%	5.3%
Worst Month	-2.9%	0.0%	-7.5%
% Positive Months	83.3%	100.0%	61.3%
Historical Risk	**Program**	**BM1**	**BM2**
Standard Deviation	3.9%	0.4%	6.0%
Sharpe Ratio (1.0% RFR)	1.15	---	0.38
Sortino Ratio (1.0% RFR)	1.86	---	0.46
Downside Deviation	2.4%	---	4.9%
Maximum Drawdown	-3.3%	0.0%	-20.1%
Months In Maximum Drawdown	27	0	23

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 Analysis

Gamma Balanced Equity / Bond Long-Only Program Jan 2011 - Jun 2023



Historical Performance	Program	BM1	BM2
Compound ROR	9.5%	12.8%	3.3%
Cumulative Return	309.6%	350.4%	49.4%
Cumulative VAMI	$3,096	$4,504	$1,494
Best Month	5.5%	13.9%	5.3%
Worst Month	-3.5%	-17.7%	-7.5%
% Positive Months	78.7%	70.7%	61.3%
Historical Risk	**Program**	**BM1**	**BM2**
Standard Deviation	5.3%	15.7%	6.0%
Sharpe Ratio (1.0% RFR)	1.60	0.75	0.38
Sortino Ratio (1.0% RFR)	2.60	1.14	0.46
Downside Deviation	3.3%	10.3%	4.9%
Maximum Drawdown	-7.8%	-23.8%	-20.1%
Months In Maximum Drawdown	13	18	23

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

Past performance is not indicative of future results

Gamma Macro Model Forecasts for July 2023

1 MONTH STOCK INDEX MODEL FORECASTS (%)

Country	Stock Index	Price	1 Mo Forecast	Previous Forecast	Position	Trade	Updated
USA	S&P 500	4,396.44	0.00%	0.00%	Neutral	Hold	6/30/23
USA	Nadaq	13,754.11	0.00%	0.00%	Neutral	Hold	6/30/23
Canada	S&P/TSX 60	1,209.19	0.00%	0.00%	Neutral	Hold	6/30/23
Mexico	IPC	53,518.95	0.50%	0.00%	Long	Buy	6/30/23
Brazil	Bovespa	119,125.20	0.00%	0.00%	Neutral	Hold	6/30/23
Japan	TOPIX	2,288.60	1.82%	1.48%	Long	Hold	6/30/23
Australia	S&P/ASX 200	7,203.30	0.00%	0.00%	Neutral	Hold	6/30/23
S. Korea	KOSPI	2,564.28	0.00%	0.00%	Neutral	Hold	6/30/23
China	Hang Seng CEI	6,424.88	2.13%	0.00%	Long	Buy	6/30/23
China / HK	Hang Seng	16,150.44	0.00%	0.00%	Neutral	Hold	6/30/23
India	Nifty 500	16,430.00	1.15%	0.65%	Long	Hold	6/30/23
Eurozone	STOXX 600	462.26	0.00%	0.00%	Neutral	Hold	6/30/23
Germany	DAX	16,150.44	0.00%	0.00%	Neutral	Hold	6/30/23
France	CAC 40	7,408.94	0.00%	0.00%	Neutral	Hold	6/30/23
Italy	FTSE/MIB 30	28,246.08	0.00%	0.00%	Neutral	Hold	6/30/23
Switzerland	Swiss Market	11,301.85	0.00%	0.00%	Neutral	Hold	6/30/23
UK	FTSE 100	7,544.51	0.00%	0.00%	Neutral	Hold	6/30/23
Russia	RTS 50	984.82	0.00%	0.00%	Neutral	Hold	6/30/23
S. Africa	FTSE/JSE 40	70,706.48	1.36%	1.85%	Long	Hold	6/30/23

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	-0.23%	-0.08%	Short	Hold	6/30/23
USA	5 Yr T-Note	4.15	-0.38%	-0.13%	Short	Hold	6/30/23
USA	10 Yr T-Note	3.85	-0.48%	-0.25%	Short	Hold	6/30/23
USA	30 Yr T-Note	3.90	-0.67%	-0.17%	Short	Hold	6/30/23
USA	IG Corporate	5.62	-0.47%	-0.61%	Short	Hold	6/30/23
USA	HY Corporate	8.68	-0.23%	-0.82%	Short	Hold	6/30/23
Canada	10 Yr Govt	3.33	0.13%	0.36%	Long	Hold	6/30/23
Mexico	10 Yr Cetes	8.71	0.15%	0.09%	Long	Hold	6/30/23
Brazil	10 Yr Govt	10.88	1.47%	1.06%	Long	Hold	6/30/23
Japan	10 Yr JGB	0.40	0.01%	0.00%	Long	Cover Short & Buy	6/30/23
Australia	10 Yr Govt	4.03	-0.23%	-0.09%	Short	Hold	6/30/23
S. Korea	10 Yr Govt	3.70	-0.10%	0.04%	Short	Cover Long & Sell	6/30/23
China	10 Yr Govt	2.68	0.18%	0.35%	Long	Hold	6/30/23
India	10 Yr Govt	7.11	0.02%	0.58%	Long	Hold	6/30/23
Germany	10 Yr Bund	2.44	-0.05%	0.04%	Short	Cover Long & Sell	6/30/23
France	10 Yr OAT	2.99	0.30%	0.35%	Long	Hold	6/30/23
Italy	10 Yr BTP	4.12	0.87%	0.95%	Long	Hold	6/30/23
Switzerland	10 Yr Conf	0.96	0.26%	0.39%	Long	Hold	6/30/23
UK	15 Yr Gilt	4.56	-0.35%	-0.20%	Short	Hold	6/30/23
Russia	10 Yr Govt	11.18	-1.67%	-1.88%	Short	Hold	6/30/23
S. Africa	10 Yr Govt	10.51	0.26%	0.32%	Long	Hold	6/30/23

Gamma Macro Model Forecasts for July 2023

1 MONTH FX MODEL FORECASTS (%)

Currency	Spot FX Rate	1 Mo Forecast	Previous Forecast	Position	Trade	Updated
EUR/USD	1.0914	-0.38%	-0.75%	Short	Hold	6/30/23
GBP/USD	1.2700	-0.10%	-0.44%	Short	Hold	6/30/23
USD/CHF	0.8960	0.69%	0.78%	Long	Hold	6/30/23
USD/NOK	10.7101	0.45%	0.55%	Long	Hold	6/30/23
USD/SEK	10.8083	0.51%	0.67%	Long	Hold	6/30/23
USD/JPY	144.44	0.97%	0.79%	Long	Hold	6/30/23
AUD/USD	0.6651	-0.49%	-0.38%	Short	Hold	6/30/23
NZD/USD	0.6116	-0.38%	-0.35%	Short	Hold	6/30/23
USD/KRW	1,317.44	0.48%	0.19%	Long	Hold	6/30/23
USD/CNY	7.2585	0.83%	0.82%	Long	Hold	6/30/23
US/INR	82.05	0.23%	0.47%	Long	Hold	6/30/23
USD/SGD	1.3533	0.48%	0.45%	Long	Hold	6/30/23
USD/CAD	1.3239	0.21%	0.22%	Long	Hold	6/30/23
USD/BRL	4.8165	0.03%	-0.52%	Long	Cover Short & Buy	6/30/23
USD/MXN	17.06	-0.01%	-0.52%	Short	Hold	6/30/23
USD/RUB	89.61	0.17%	-0.04%	Long	Cover Short & Buy	6/30/23
USD/ZAR	18.85	1.21%	0.01%	Long	Hold	6/30/23
BTC/USD	29,856.00	2.36%	-0.34%	Long	Cover Short & Buy	6/30/23

1 MONTH COMMODITY PRICE FORECASTS (%)

Commodity	Cash / Futures Price ($)	1 Month Forecast	Previous Forecast	Position	Trade	Updated
Gold	1,911.59	0.00%	0.00%	Neutral	Hold	6/30/23
Silver	22.48	0.00%	0.00%	Neutral	Hold	6/30/23
Platinum	891.94	0.07%	-1.00%	Long	Cover Short & Buy	6/30/23
Palladium	1,239.80	-1.73%	-1.24%	Short	Hold	6/30/23
Aluminum	2,119.59	0.00%	-1.44%	Neutral	Cover Short	6/30/23
Copper	8,177.00	0.00%	-1.80%	Neutral	Cover Short	6/30/23
Lead	2,094.50	0.00%	-1.13%	Neutral	Cover Short	6/30/23
Nickel	20,458.00	0.00%	-2.57%	Neutral	Cover Short	6/30/23
Tin	26,766.00	0.00%	-2.39%	Neutral	Cover Short	6/30/23
Zinc	2,336.00	0.00%	-3.88%	Neutral	Cover Short	6/30/23
WTI Crude Oil	70.62	0.21%	0.00%	Long	Buy	6/15/23
HH Natural Gas	2.49	0.00%	0.00%	Neutral	Hold	6/20/23