Macro Intelligence Report
August 2023

GAMMA INVESTMENT CONSULTING

Gamma Global Macro Model Highlights

- **The S&P 500 and Nasdaq Models remained neutral (in cash) for August**. Despite a steady five-month climb in equity prices, the combination of the most extreme overvaluation since 2001 and the worst liquidity contraction since 1982 is keeping the Model out of the market.

- **The 10-year and 30-year Treasury and the Investment Grade and High Yield Bond Models all remained short (higher yields) for August. Investment Grade Corporates offer their most favorable valuation since 2010.** The combination of a strong labor market, only a slow improvement in core inflation, and a massive wave of government borrowing during the balance of the year are likely to keep upward pressure on bond yields.

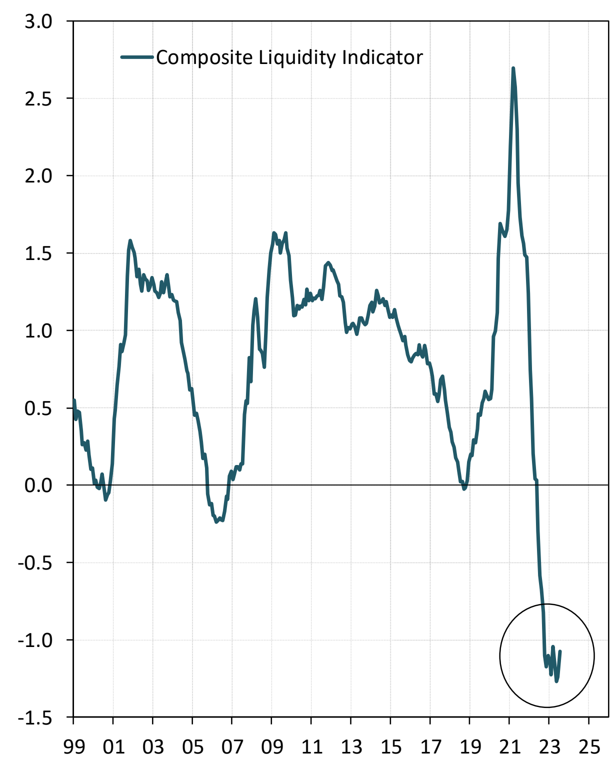
- **The Gold Model went long for August after being neutral in July.** Gold continues to benefit from favorable valuation and may increasingly attract support over concern that higher financing costs, Social Security and Medicare spending, and out-of-control discretionary spending could push the federal government into a fiscal crisis.

- **The EUR/USD Model remained short euros (long USD) for August.** The dollar continues to benefit from relatively stronger economic growth. The Fed's rate increases, however, have been matched by the European Bank (ECB), preventing a further widening of the interest rate differential in favor of the dollar.

I. Equity Index Outlook

Stocks and the economy continue to defy financial gravity. The S&P 500 rose 3.1% in July, the fifth consecutive monthly increase in a row. The index is now up 19.7% from its December 2022 low. The Nasdaq Composite index gained 4.1% last month, up 35.9% since bottoming seven months ago. Real GDP rose a healthy 2.4% in the second quarter, up from an upwardly revised 2.0% rate in the first quarter and the fourth consecutive quarter of >2% growth. All of these have occurred despite the most severe liquidity contraction in 40 years (Chart 1) and during the seasonally worst time of the year for equities. The combination of restricted liquidity and the most extreme overvaluation in stocks since 2001, however, is keeping the Gamma S&P 500 and Nasdaq Models neutral (in cash) for August (Chart 2).

CHART 1
Composite Liquidity Indicator



Normally I would discuss the reasons behind our Model's current positioning. Given the market's ability to stay afloat despite a near-record contraction in liquidity, we would like to start this month's Report with a discussion of how we got to where we are. We can then examine whether several alternatives to our predicted scenario of lower stock prices make sense.

Since my arrival in the financial markets in October 1979, I have seen numerous crises come and go, all of which were accompanied by cries that "this is the big one." To put this into perspective, the S&P 500 in September 1979 was at 85.5. It's now at 4,759.2 – a 5,470% increase (and that doesn't include dividends). All of this occurred despite the worst inflation in U.S. history, record high interest rates, the collapse of the Soviet Union, two middle east wars, the rise of China, the dot com and real estate market collapses, and a global pandemic. The point is that as long as productive capacity – people and capital – are not destroyed, growth continues and compounds.

For that reason, we at GIC are neither perpetually optimistic nor pessimistic. We prefer to let the data speak for itself. The data at the moment, however, is screaming "caution." Exploding federal debt combined with the Federal Reserve's monetizing large portions of that debt has created a Catch-22 which will likely require some combination of higher taxes, higher interest rates, serious budget cuts, and possibly a severe recession to resolve.

The last time the federal government ran close to a balanced budget was in 2001 under President Clinton and Speaker-of-the-House Newt Gingrich. Spending has since gone from merely irresponsible under George W. Bush to recklessly incompetent under Obama, Trump, and Biden (Chart 3). Under Bush's Iraq war and Afghanistan intervention, the deficit climbed by $5 trillion over eight years. The 2008-2009 financial crisis added $9.3 trillion largely due to bank bailouts and economic "stimulus," also over eight years. Under Trump, pandemic stimulus spending added a staggering $18.2 trillion in new debt in just four years. Under Biden's absurdly-named Inflation Reduction Act, debt has ballooned anther $5 trillion in only 30 months and is likely to top $7 trillion by year-end.

The massive expansion in deficit spending is more than enough reason for concern. We noted in a previous issue that this tsunami of borrowing has channeled huge amounts of capital from productive investment into current consumption. The result has been a decline in the real trend growth rate of the economy from over 3% a year in the 1970's to only 1% over the last ten years.

CHART 2

USA: S&P 500 Model Forecast

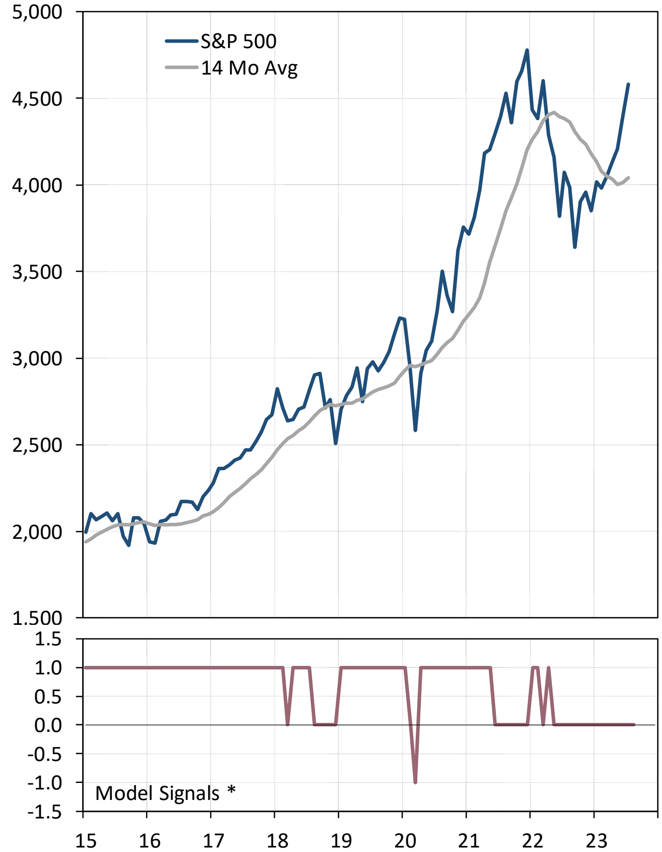
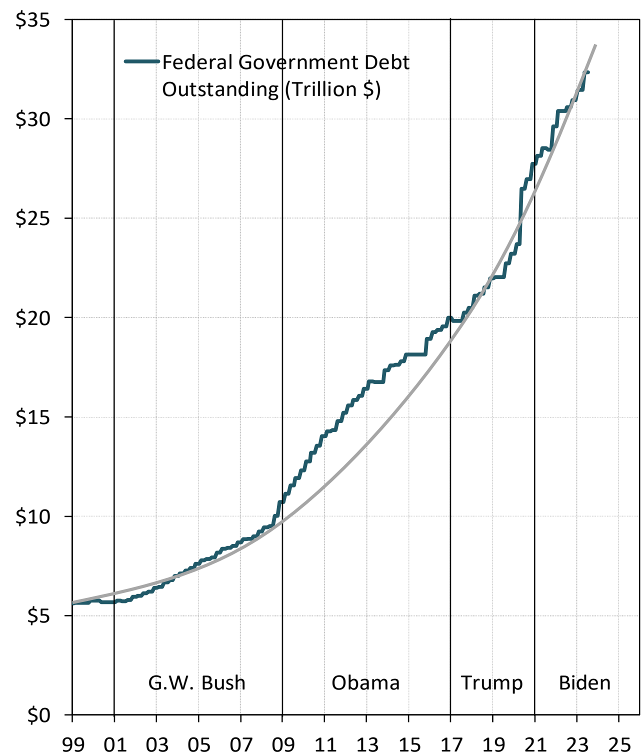


CHART 3

Federal Government Debt (Trillion $)



Even more disturbing is how much of this debt has been financed. Under a fiat monetary system (a system in which the currency is not convertible into a real tangible asset such as gold or silver), money is literally created out of thin air by the central bank. The Federal Reserve can indirectly "monetize" the federal government's debt by purchasing previously auctioned Treasury securities with newly-created paper (fiat) money.

CHART 4

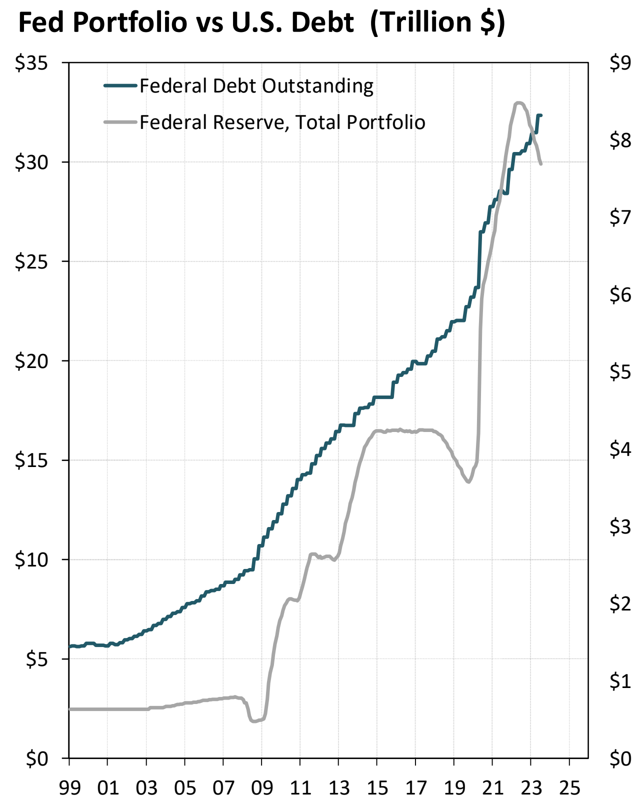


Chart 4 illustrates the relationship between growth in federal debt outstanding and the expansion of the Federal Reserve's holdings of Treasury securities and mortgages (MBS). Between 2009 and 2015, the Federal Reserve purchased over 45% of all the net new debt issued by the U.S. Treasury. In the past, such an expansion of the Fed's balance sheet would have set off a wave of inflation. Instead, CPI inflation in 2009-2015 averaged a paltry 1.4% a year.

The Fed was able to get away with this without a surge in inflation because most of the money from these Treasury purchases ended up recapitalizing banks and in bank reserves held at the Federal Reserve. The Fed instituted a program in which banks could earn interest on their reserves. By offering a competitive market rate on reserves, banks were incentivized to not lend the money out. Lending would have caused the money supply to expand leading to higher prices. During that period, many banks crippled by the 2008-2009 financial crisis had little desire to add additional loans to already impaired balance sheets. What lending that did take place was of low risk and often included loans for such things as corporate stock buybacks which tended to boost the value of the collateral for the loans. As a result, this huge expansion of the Fed's balance sheet tended to keep liquidity in the financial sector where it bid up the prices of financial assets rather than the prices of goods and services.

CHART 5

The Covid pandemic period is another story. Between March 2020 and March 2022 when the Fed began tightening, the Treasury issued $6.9 trillion in net new debt. The Fed dutifully purchased over $3.3 trillion of that debt as its balance sheet exploded by $4.6 trillion. By the end of 2021, almost 20% of total federal debt was paid for with newly-created money (Chart 5). Unlike the 2009-2015 period, when most of the Fed's liquidity creation remained within the financial sector, this time the bulk of the pandemic unemployment benefits, stimulus payments, and loans went directly to individuals and businesses. The result was an unprecedented 80% increase in the U.S. money supply that fueled a spending binge that caused the worst surge in inflation since the early 1980's.

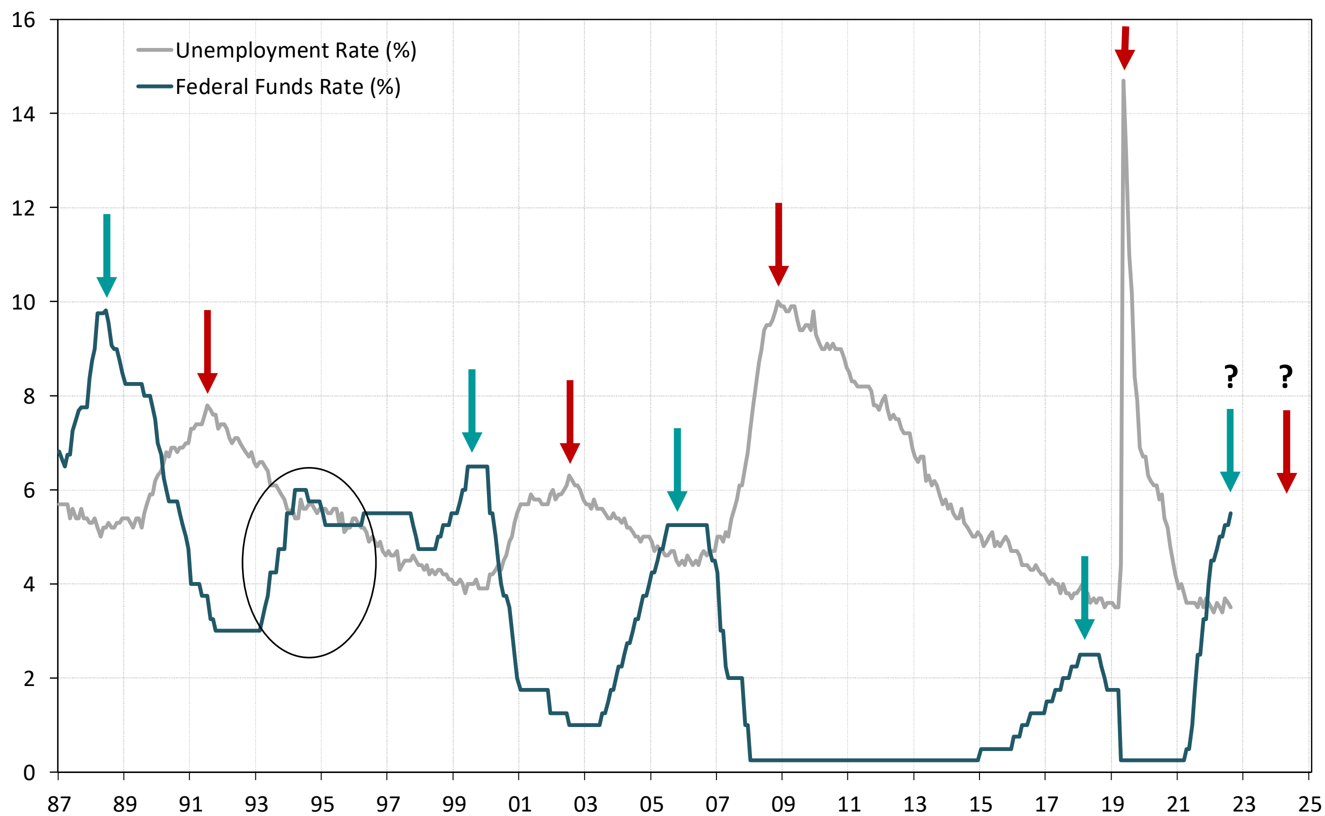
In order to bring worsening inflation under control, the Federal Reserve started raising interest rates in March 2022. The intention was to slow the economy enough to bring the inflation rate back to the Fed's 2% annual target which would eventually allow the Fed to reduce rates back to a 2-3% rate. The Fed has now raised rates 11 times for a total of 5.25%. To most everyone's surprise, however, the economy hasn't slowed and actually accelerated in the second quarter; the unemployment rate at 3.5% has remained just above the cycle low of 3.4% hit in April. The lack of recession, the temporary surge in Federal Reserve discount window borrowing during March's regional bank failures, and the belief that inflation would continue to fall allowing rates to peak and then fall seemed to signal that it was "safe to go back in the water." The result has been the stock rally since the end of last year. An increasing number of economists now anticipate a "soft landing" for the economy as the rally has extended and economic growth has stabilized. The reversal follows the announcement that the staff of the Federal Reserve is no longer forecasting a recession.

The problem we see with this "soft landing" scenario is that nothing has changed to indicate that a recession won't happen other than that a recession hasn't happened yet. In other words, all the preconditions for a recession - higher interest rates, weak money growth, an inverted yield curve, weakness in the index of leading economic indicators, above target inflation – have not changed. Because of that, we believe that the economy will slide into a full recession in 2024.

Historically, virtually every cyclical peak in equities has occurred months or even years after the Federal Reserve began tightening. For example, before the 1974 bear market - when the S&P 500 dropped -46% - the index peaked in December 1972 nine months after the Fed began raising rates. The Federal Reserve began raising interest rates in August 1977, but the S&P 500 did not peak until November 1980. Before the dot.com collapse, the Fed began raising rates in June 1999, but the peak in the S&P did not occur until August 2000. Most recently, the central bank began to raise rates in June 2004. The peak in the S&P 500 before the 2008-2009 financial crisis did not occur until 35 months later in October 2007. Not only did the market drop -53%

CHART 6

Fed Funds Rate vs Unemployment Rate



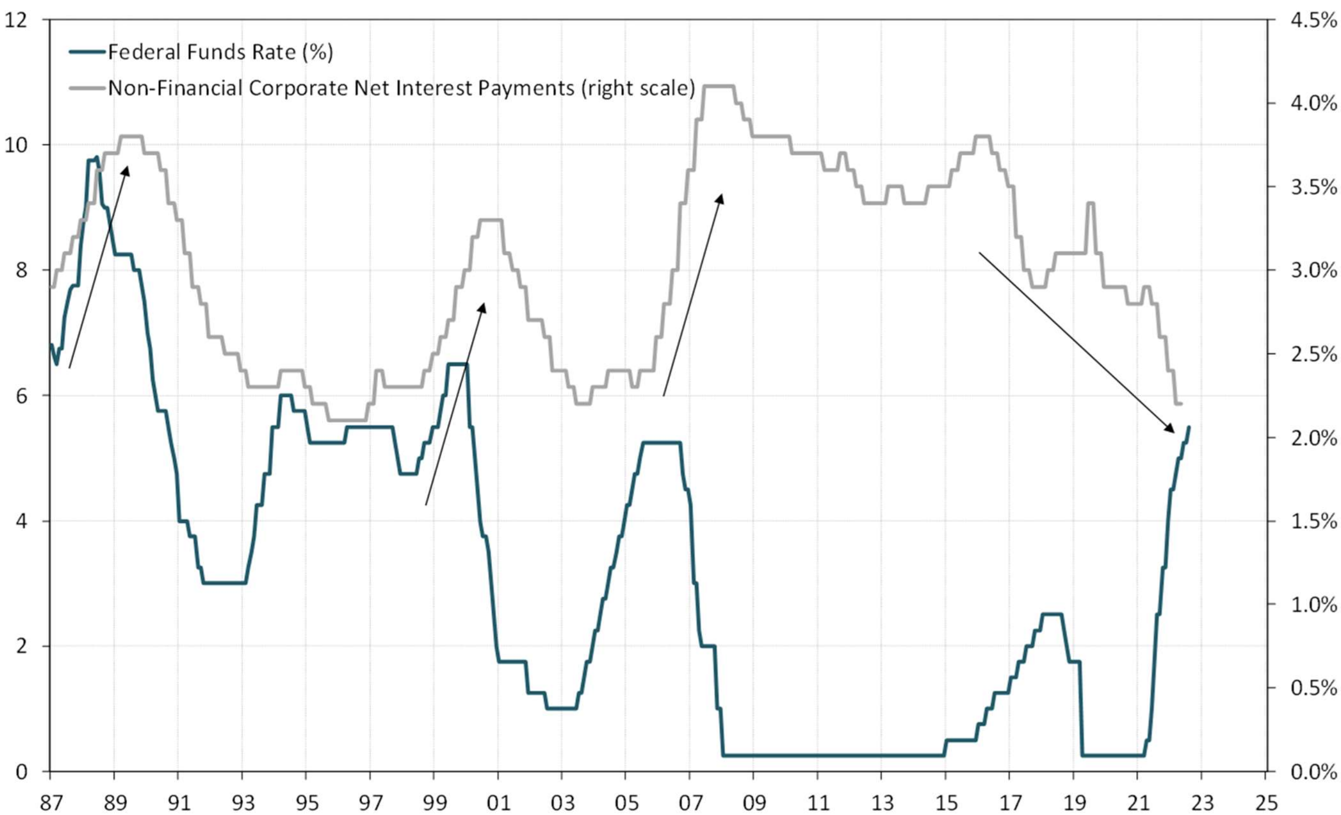
from its high, but it also dropped -34% below its level when the Fed began tightening. In the current cycle, equity prices peaked in December 2021 – three months before the Fed's first rate hike in March 2022.

Given these lags, the equity market may extend its recent gains as long as the labor market remains firm. We also believe, however, that the market is underestimating the time needed for tighter monetary policy to impact equity prices. Add to this our view that the Federal Reserve is not yet done tightening, and we continue to anticipate that equities have another major leg down before finding a floor.

- **The economy and labor market remain solid, BUT**. Investors routinely believe that lower interest rates and strong economic growth are inherently supportive of stock prices. History suggests otherwise. Chart 6 shows the lag between peaks in the Federal Funds rate and subsequent bottoms and peaks in the unemployment rate. The unemployment rate has almost always bottomed out near the top of a tightening cycle. The subsequent peak in unemployment has occurred on average 2.5 years after the Federal Reserve stops tightening. Many analysts, including ourselves, expected the speed and magnitude of the Fed's rate hikes to cause at least a moderate slowing in the economy by the mid-2024. We believe that the expansion of liquidity following the Covid pandemic was so extreme that it has delayed a recession and has created the illusion of a "soft landing." **If history is any guide, a "hard landing" is coming but its timing may not be until well into 2024.**
- **Corporate earnings *may* be bottoming, BUT**. We noted in last month's Report that corporate earnings may be showing signs of recovering from their sharp decline. Earnings growth in the S&P 500 has fallen from a record 68% yr/yr rate eighteen months ago to a -9.2% rate in July. The yr/yr rate improved to a -7.1% rate last month, and 12-month earnings momentum has recovered sharply since the beginning of the year. The sharp reversal in earnings growth has had only a modest negative effect on equity prices. While the size of the reversal has been large, the actual earnings decline is still well above the -24% rate in 2002 and the -33% drop in 2009.

CHART 7

Fed Funds Rate vs Corporate Net Interest Payments



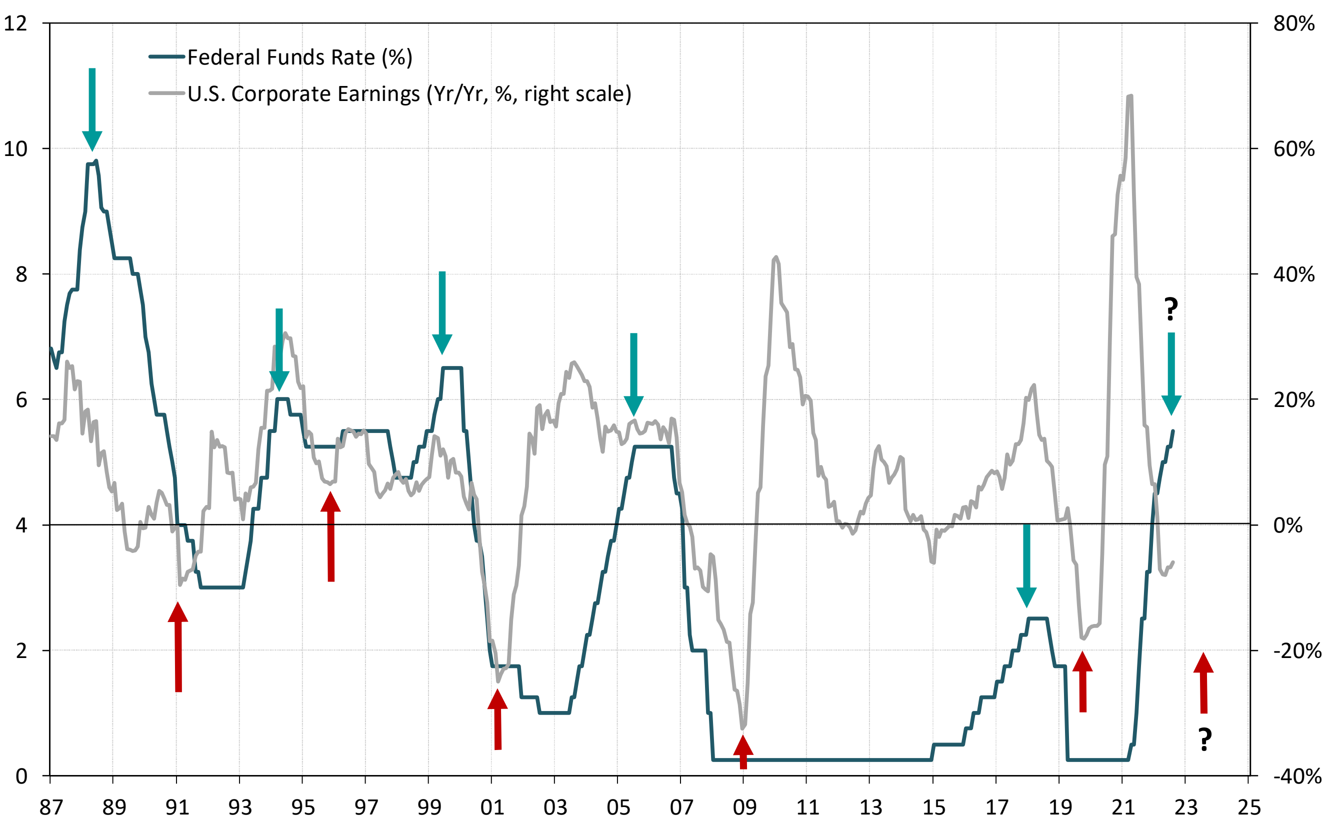
In addition, earnings which are normally depressed by rising interest rates due to the increased cost of borrowing, have actually been a positive contributor to earnings during this cycle. In contrast to previous cycles, since the Fed slashed interest rates to near zero in 2008 and again in 2020, corporations have taken advantage of the record low rates to lock in longer-term financing. Historically, a rise in interest rates has driven interest payments up for corporations which had adversely impacted earnings. In the last two cycles, however, companies have invested large portions of the borrowed cash into short-term instruments, thus earning more on their short-term cash than what they are paying on their long-term loans (Chart 7).

The maturity of corporate loans averages about 4-6 years. With the Fed only 17 months into their tightening cycle, only about 30% of long-term loans have repriced at higher interest rates. For that reason, weakness in corporate earnings may be mitigated until repriced loans reach over 50%. As this refinancing occurs and the lagged effect of monetary tightening becomes more pronounced, we believe that a further contraction in earnings is likely as the real recession sets in next year (Chart 8).

- **Core inflation is still well above the Fed's 2% target**. The inflation rate remains the prime motivator of Federal Reserve policy as long as economic growth remains robust. Headline inflation fell to a 4.1% yr/yr rate last month since peaking at 8.9% eleven months ago (Chart 9). The problem is that most of this decline has occurred due to a sharp drop in commodity prices. Energy and food prices have fallen -39% and -19%, respectively, from their highs. Excluding food and energy, "core" consumer prices were still up 4.9% yr/yr in July, and services inflation (a sector that accounts for over 2/3rds of the economy) was up a whopping 6.2%. In addition, announced production cuts in oil output by OPEC and Russia for the second half of 2023 are already impacting prices. Energy prices rose 2.5% last month, the first increase in six months. Food prices rose 5.3% after falling steadily since the end of 2022. Average hourly earnings of production and non-supervisory employees – the bulk of total employment – rose by 0.45% in July

CHART 8

Fed Funds Rate vs Corporate Earnings



from June, the biggest increase since last November. That translates into an annual rate of 5.5%, nearly double what the Fed wants to see to get inflation down to 2%. Year-over-year, average hourly earnings rose 4.8% in July, also an acceleration from June's 4.7%. Given these numbers, it would take only a moderate rise in food and energy prices to boost the inflation rate back above 5%.

- **Short-term interest rates will continue to rise**. The CME's FedWatch Tool indicates that the market expects that the Federal Reserve is done raising rates for this cycle and that the central bank will begin to cut rates by early 2024. Our belief is that the risk of an inflation surprise lies to the upside, and that any such surprise would prompt at least another interest rate hike. The Federal Reserve Bank of Atlanta's GDPNow model estimate for real GDP growth for the third quarter of 2023 was revised up this week from 3.5% to 3.9%. After the second quarter's surprisingly strong 2.4% increase in real GDP and the first quarter's upward revision to 2%, an increase anywhere close to 3.9% would likely trigger a new round of rate hikes. The current disconnect between growth expectations and current interest rate expectations leaves the equity market adversely exposed to any unexpected Fed rate hike.

CHART 9

Inflation Measures

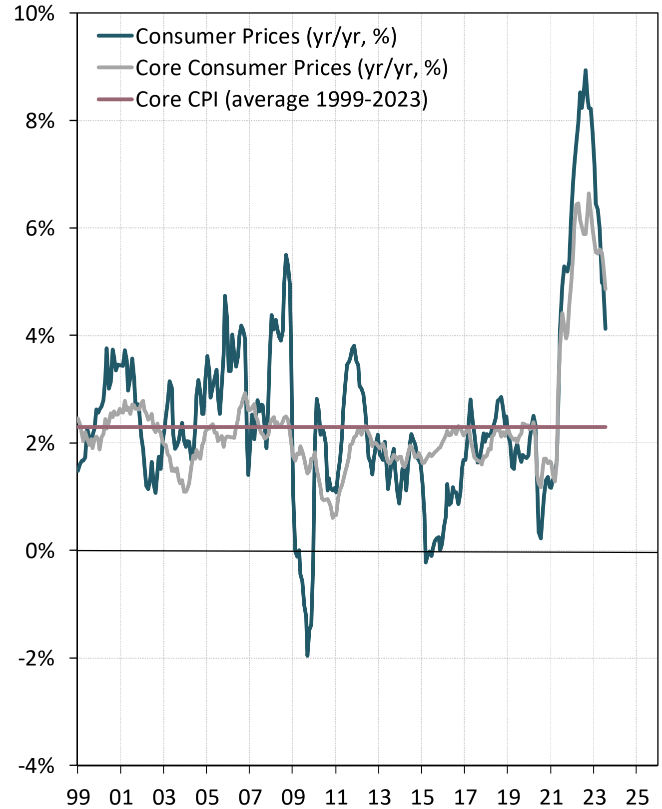
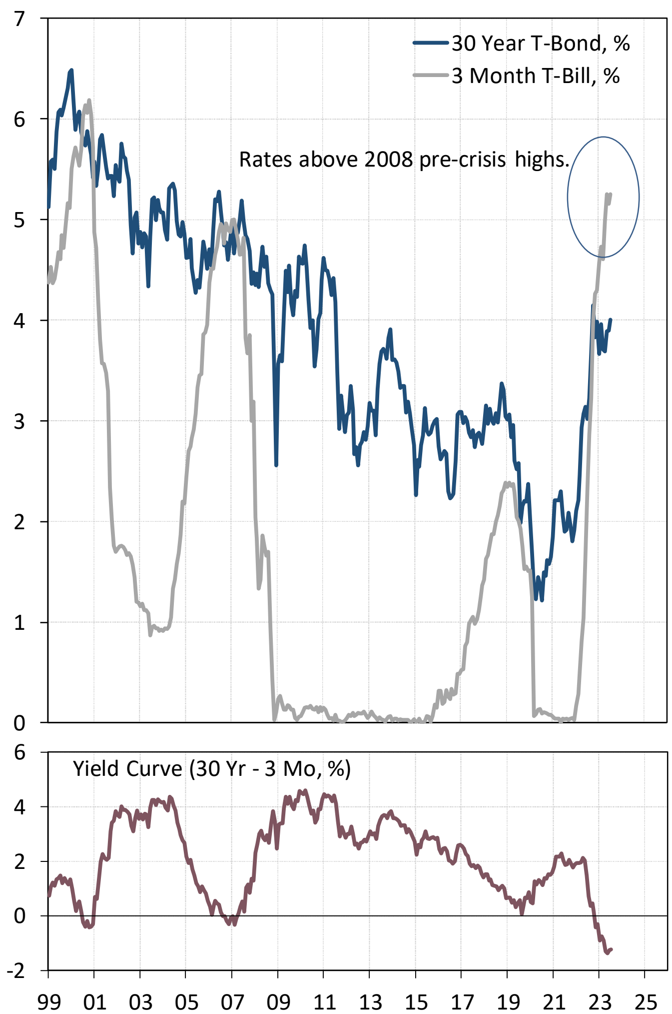


CHART 10

Interest Rates: United States

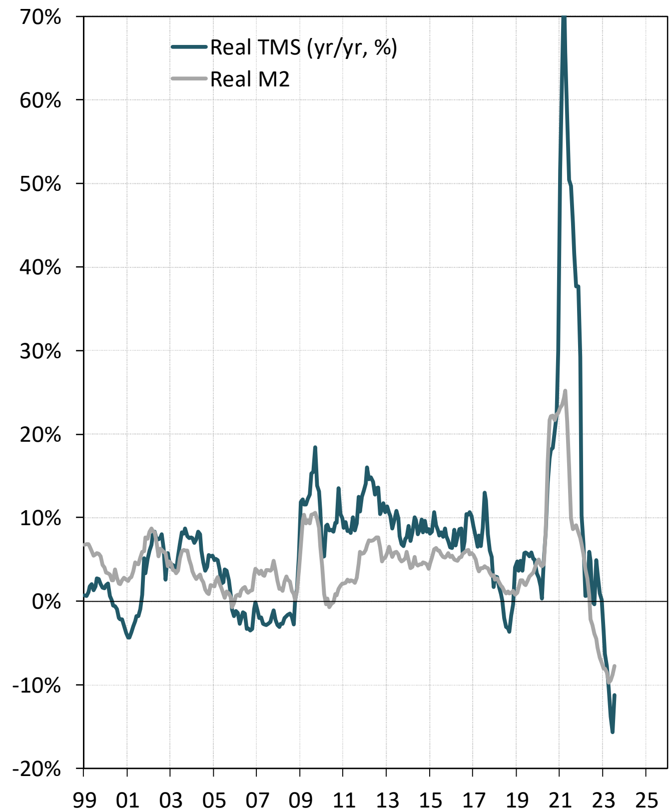


- **The yield curve remains extremely inverted.** The 2-10 Treasury yield remained strongly inverted at -0.93% last month as 2-year rates eased slightly following the previous month's GDP-fueled jump. The 2-10 curve remains close to its most extreme inversion since 1981. The 3-30 curve was largely unchanged at -1.24% (Chart 10). **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. If a recession fails to materialize, it will be the first time since WW II that an inverted yield curve has not preceded a recession and an equity bear market. While it is certainly possible that "this time is different," our experience has been that just about the time markets start to believe it is when reality comes crashing down.

- **Every measure of real money growth remains strongly negative**. Both nominal and inflation-adjusted measures of True Money Supply (TMS) improved slightly last month due a surge in Treasury balances as the government rebuilds its cash following a hike in the debt ceiling. Nominal TMS was down -11.2% yr/yr last month compared to -15.6% in June. Real TMS was down -7.1% compared to -10.7% the previous month (Chart 11). **Despite the improvement, the decline in both measures is the second largest since the bank failures of the 1930's.** Real M2 was down -7.7% yr/yr. Nominal M2 contracted -3.6%, about unchanged from June. 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 and rapidly falling loan growth. Total banks loans declined -0.1% last month, the first monthly decline since February 2021. The Federal Reserve also released its quarterly Senior Loan Officers Opinion Survey on Bank Lending Practices (SLOOS) which showed that bank lending standards tightened across most products. It also showed that in the last 30 years, only during Covid and the 2008-2009 financial crisis have commercial and industrial loans been more difficult to get than now. We can't help but wonder how much longer economic growth can defy the gravity from the contraction in credit availability.

CHART 11

Real True Money Supply and M2



- **Equities have become even more overvalued**. Investors may be cheered by the rise in stock prices this year, but the rally in the face of rising interest rates has pushed valuation to its most extreme level since 2002 (Chart 12). 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. That was the highest level of overvaluation since October 2002 and came on the back end of the dot.com collapse. The drop in the S&P 500 from mid-2021 through late 2022 caused valuation to converge close to fair value. Since then, valuation has steadily worsened as stocks have risen despite weaker earnings and much higher interest rates. Overvaluation for the S&P 500 hit 1.43 standard deviations last month (30%), the second most extreme reading in the last twenty years. Nasdaq valuation hit an even more extreme level of 1.73 standard deviations (48%), the highest level since March 2002.

Table 1 illustrates the implication of this extreme valuation on future expected returns. The table shows what annualized returns have been in the past when valuations were at these levels. For example, when the

TABLE 1

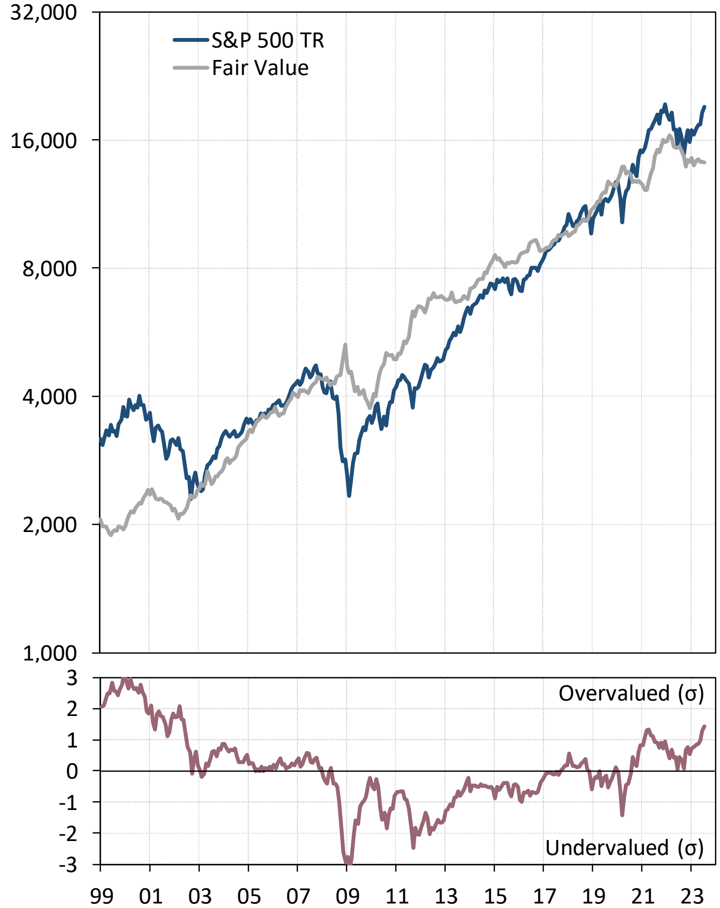
VALUATION vs FORWARD RETURN ANALYSIS - ANNUALIZED RETURNS **Updated: 07/31/23**

	Valuation	Valuation	Valuation-Based Forecast (Annualized, %)						
Country	(σ)	(%)	1 Mo	3 Mo	6 Mo	1 Yr	2 Yr	3 Yr	5 Yr
United States	+1.53	+30%	-2.4%	-1.1%	-1.0%	0.5%	3.7%	5.3%	6.1%
S&P 500	+1.43	+30%	1.1%	1.1%	1.1%	2.5%	5.3%	6.6%	6.9%
Nasdaq	+1.73	+48%	-6.1%	-6.1%	-5.8%	-5.3%	-0.5%	2.4%	3.0%
S&P 600 Small Cap	-0.44	-7%	19.1%	18.8%	18.3%	17.5%	15.1%	13.7%	13.2%

S&P 500 was 30% overvalued, the subsequent average one-year return was only 2.5%, well below the long-term average of 12% and well below current one-year interest rate. The outlook for the Nasdaq is even more stark. At the current 48% overvaluation, the Nasdaq has historically **lost** an average of -5.3% in the next year. Looking out further, such extremes of valuation have been followed by prolonged periods of underperformance. For example, the annual return over the next three years has averaged only 2.4%. Even the average five-year return has averaged only 3% - both well below current three- and five-year Treasury and corporate yields.

CHART 12

USA: S&P 500 Valuation



Over the last twenty years, the S&P 500 earnings yield has averaged about 1.2% higher than the yield on high-quality 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. Stocks would need to fall over 50% from current levels to reach that level of valuation.**

II. Fixed Income Outlook

The 10-year and 30-year Treasury Bond, Investment Grade Corporate, and High Yield Corporate Models remained short for August (higher yields, Charts 13, 14) as the fixed income market hit the trifecta for bad news. Economic growth accelerated, there was little or no progress towards the Fed's 2% target inflation rate, the market had to deal with an absolute tsunami of government debt issuance, and the Fed continued its "quantitative tightening" of reducing its securities portfolio.

CHART 13

USA: 10 Yr T-Note Model Forecast

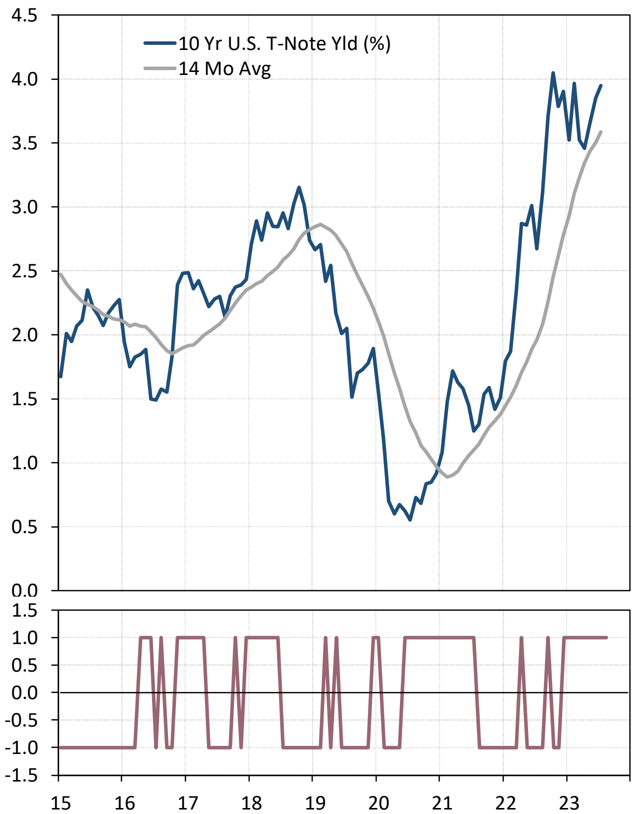
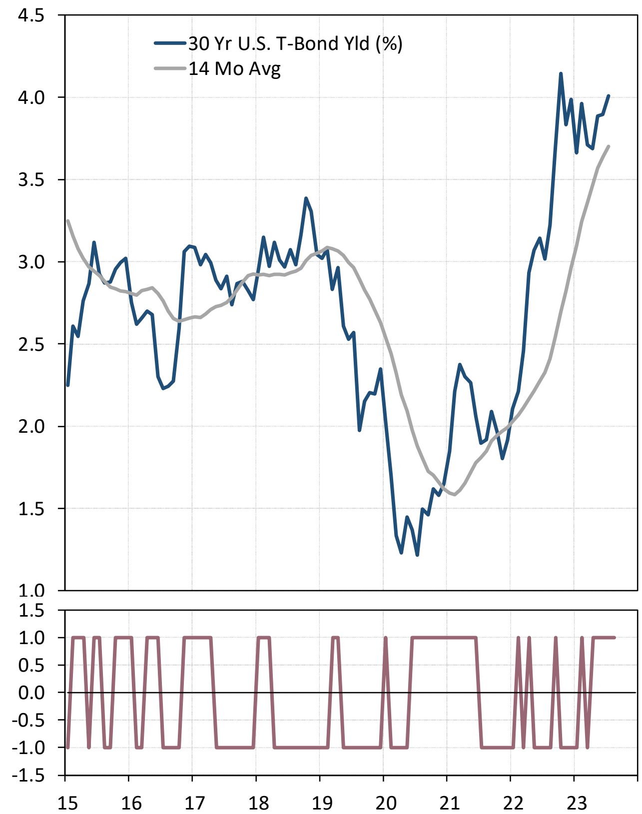


CHART 14

USA: 30 Yr T-Bond Model Forecast



Positive Factors

- **Bonds are undervalued**. Moderately favorable valuation is the only major support at the moment for the bond market (Table 2). All Treasury securities from 2-year notes to 30-year bonds are anywhere from 0.5 to 0.8 standard deviations undervalued. Investment grade corporates, however, are outright inexpensive at 1.44 standard deviations undervalued. Quality corporates are currently the cheapest they have been since the Covid spike in 2020 and the financial crisis in 2009. With corporates 1.44 standard deviations undervalued and the S&P 500 1.43 standard deviations overvalued, bonds offer a much more attractive return profile than equities based on valuation alone. High yield bonds offer decent valuation at 0.81 standard deviation undervaluation. Despite 17 months of tightening, however, financial stress levels, while elevated compared to their 2021 lows, are still well below their 2009 financial crisis highs. Additional worsening of credit conditions will be needed to push high yield bond valuation to a level similar to investment grade corporates.

TABLE 2

FIXED INCOME VALUATION

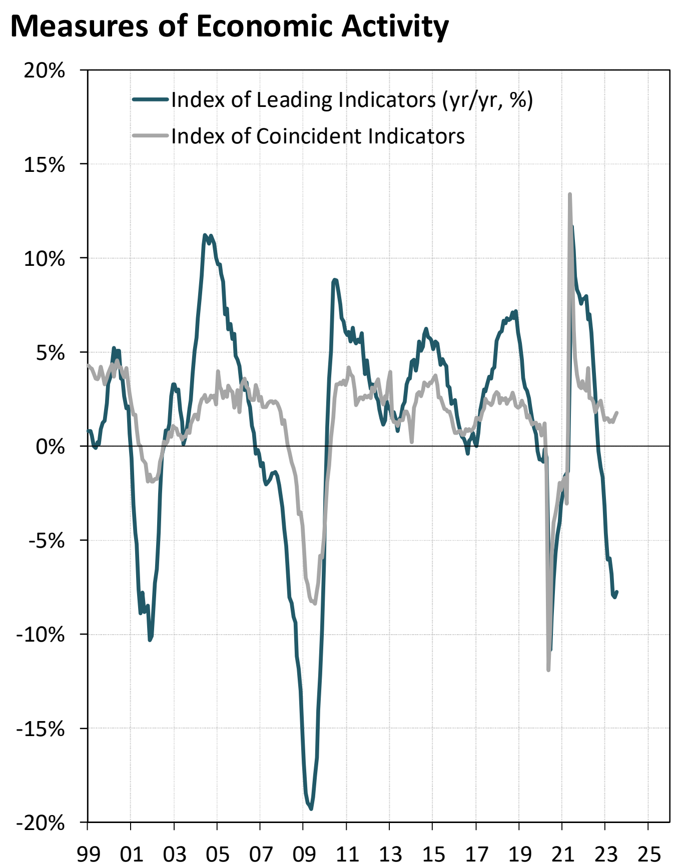
Country	Debt Instrument	Yield Valuation (σ)	Price Valuation (%)
USA 2	2 Yr T-Note	+0.48	-0.5%
USA 5	5 Yr T-Note	+0.59	-2.0%
USA 10	10 Yr T-Note	+0.82	-5.5%
USA 30	30 Yr T-Note	+0.83	-12.8%
USA IG	IG Corporate	+1.44	-6.1%
USA HY	HY Corporate	+0.81	-9.9%

Neutral Factors

- **The economy and labor market remain solid, but leading indicators are slowing**. We list the economy as neutral for bonds even though headline numbers point to moderate growth and robust employment which would normally drive bond yields higher. First quarter GDP has been revised upwards twice to 2.0%, and preliminary second quarter GDP was up 2.4%. Real GDP has now risen four quarters in a row since dropping -0.6% in the second quarter of 2022. Similarly, payrolls grew 187,000 last month and have averaged a 218,000 gain over the last three months. Unemployment at 3.5% continues to hover above its record-low 3.4% rate hit in April.

  We believe that these numbers are overestimating the economy's strength and, being backward looking, do not fully take into account the risk of an abrupt slowdown. Moreover, these numbers conflict with other indicators that the economy is not as strong as it seems. For example, while real GDP (an output-based measure) has been positive the last two quarters, real Gross Domestic Income (an income-based measure) actually fell -3.3% in the IVQ2022 and -1.8% in IQ2023. Employment, which appears healthy, may be the beneficiary of changes in the Bureau of Labor Statistic (BLS) employment surveys and seasonal adjustment methodologies. For example, despite strong initial release numbers since January, employment growth has been revised lower every month this year. Also, we continue to see substantial disagreements between the BLS's Household Survey and Establishment Survey. The discrepancy indicates that, while employment growth appears solid, that's because an increasing number of workers are now holding two jobs to make ends meet. The number of full-time jobs last month actually plummeted by -585,000, the biggest monthly drop since the Covid crash. Lastly, federal government receipts, which normally decline during a recession, have been negative eight months in a row on a yr/yr basis including -9.2% last month.

CHART 15



  We continue to see a major disconnect between leading indicators of economic activity and actual performance. The Conference Board's Index of Leading Indicators (LEI) fell another -0.6% last month, the 14th monthly drop in a row (Chart 15). The Index was down -7.7% yr/yr, yet the Index of Coincident Indicators (CEI) was still up 1.8%. We attribute most of that to the lingering effect of the massive fiscal and monetary stimulus during the Covid pandemic. At some point the reduction in liquidity through higher rates, a shrinking Fed

TABLE 3

Recession	GDP, First Qtr of Recession	GDP, Previous Qtr
1970	-1.9%	2.7%
1974	-3.4%	3.9%
1980	-8.0%	1.3%
1981-82	-4.3%	4.9%
1990	-3.6%	0.3%
2000-01	-1.3%	2.4%
2008-09	-1.6%	2.5%
2020	-4.6%	1.8%
Average:	-3.6%	2.5%

balance sheet, and contracting money supply will begin to offset the effects of the 2020-21 stimulus and the absurdly-named "Inflation Reduction Act." 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 economic activity slows abruptly rather than slowly. History has shown numerous times that economic growth can change rapidly as the economy moves into recession (Table 3). The first quarter of the last eight recessions saw on average a -3.6% drop in real GDP. The previous quarter averaged +2.5%. 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 remains stubbornly high (Chart 15). The yr/yr change in the CPI has fallen from a peak of 8.9% ten months ago to a 4.1% rate in July. Core inflation has only fallen from a 6.6% rate to a 4.9% rate. That leaves inflation a good 2% short of the Fed's inflation target rate. Energy and food prices both rose in July for the first time in eight months. The improvement in headline inflation has been heavily driven by the sharp drop in both from their 2021 highs (Chart 16). Barring an abrupt drop in economic growth – which is still a real possibility – a sustained rise in food and energy prices would almost certainly force the Fed to raise rates again.
- **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.

CHART 15

Inflation Measures

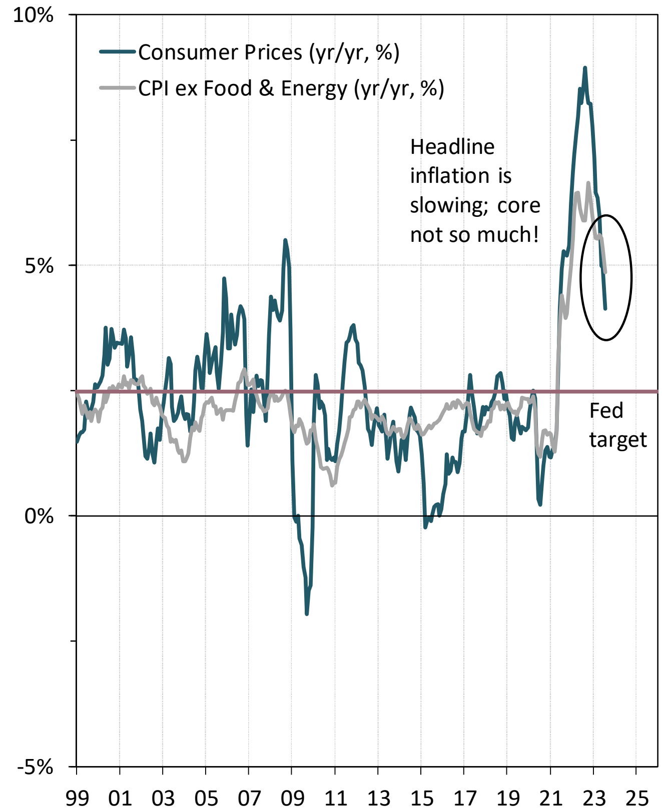
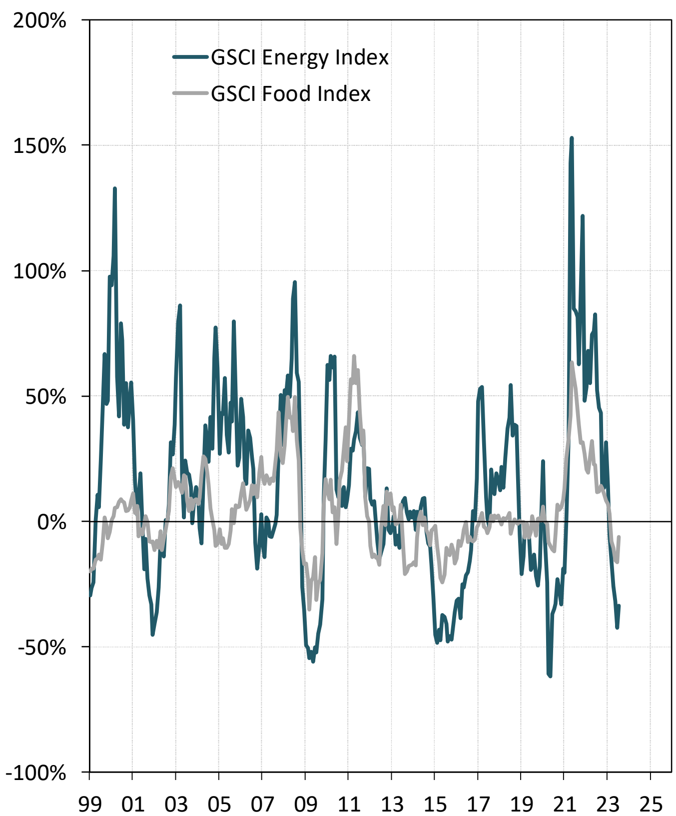


CHART 16

Leading Inflation Measures



- **<u>"Quantitative Tightening" continues.</u>** The Fed's balance sheet has contracted by $795 billion since April 2022, and there are no signs that quantitative tightening will end any time soon (Chart 17). The big problem is that shrinking the Fed's balance sheet is running headlong into the Treasury's seemingly insatiable demand for cash. Since the increase in the debt ceiling, the national debt has skyrocketed by $1.2 trillion with outstanding debt hitting a record $32.7 trillion (Chart 18). The Treasury is expected to raise $1.01 trillion in new cash in the third quarter and another $852 billion in the fourth quarter. This massive increase in borrowing needs sent bond yields soaring last month. Announcement of the Treasury's auction schedule has caused 10-year Treasury note yields to soar 55 basis points over just the last three weeks.

  The fiscal situation has become so dire that the Fitch rating agency cut its rating on U.S. debt to AA+ from AAA last week. Despite widespread hand-wringing over this, in practice the U.S. still retains its position as the lowest risk investment available, mostly because it always has the ability to print money to pay off its debt – albeit at the cost of higher inflation. The downgrade should be viewed as a warning that the country's finances are deteriorating to the point where serious changes in spending and taxes need to be made. The United States is facing a major fiscal challenge due to the combination of accelerating Medicare and Social Security spending and the rising cost of financing the debt.

  Chart 19 shows the demographic trends facing Medicare and Social Security and their implications for the deficit. Adding to this problem is the higher debt financing costs associated with higher interest rates. From 1982 to March 2022, the Treasury was in the enviable position of issuing new debt and rolling over existing debt at increasingly lower rates (Chart 20). Since March 2022 when the Federal Reserve started raising rates, the Treasury's cost of issuing debt has climbed by over 3%. This is creating a big issue for the Treasury. Given the government's massive borrowing needs, the Treasury is no longer auctioning debt at the 1% interest rate of 2018. Instead, the Treasury is now paying as much as 4x what it was paying four

CHART 17

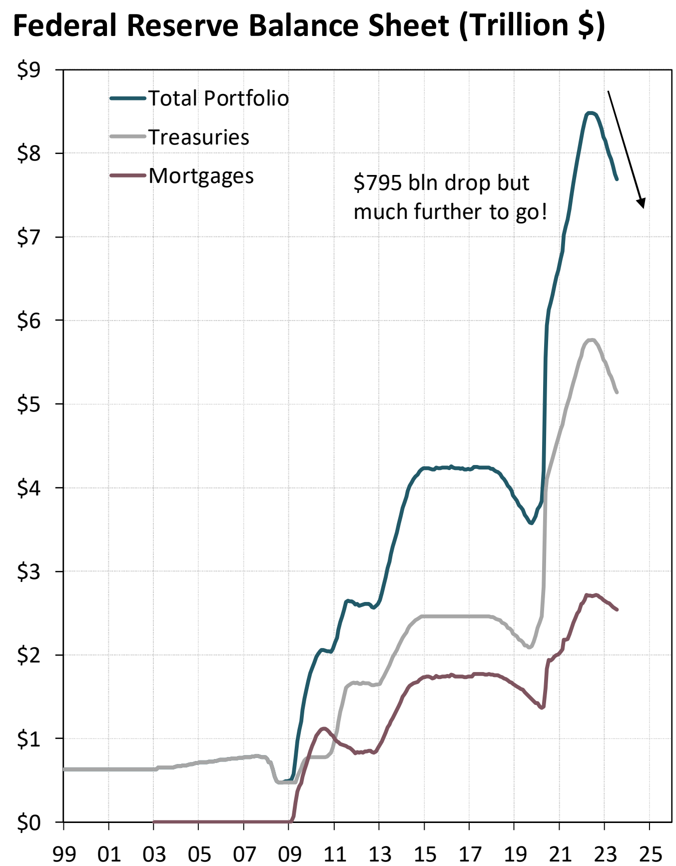


CHART 18

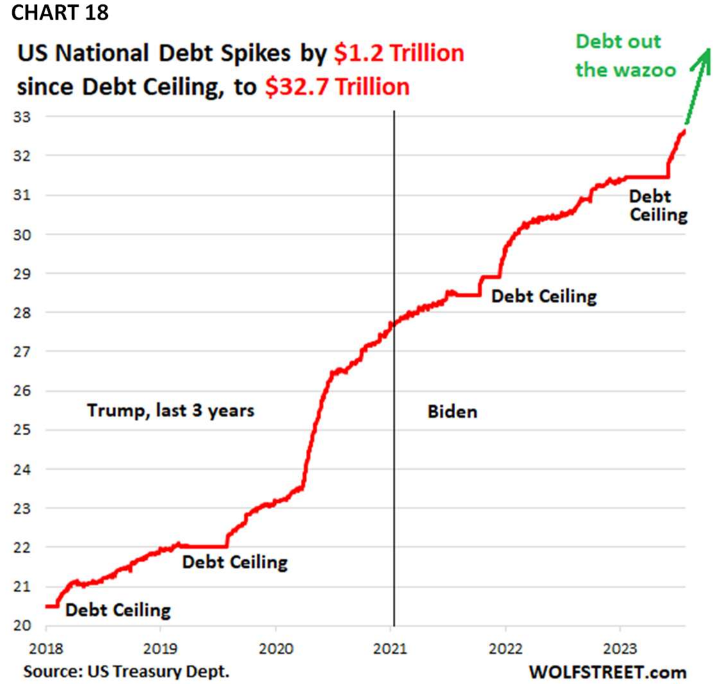
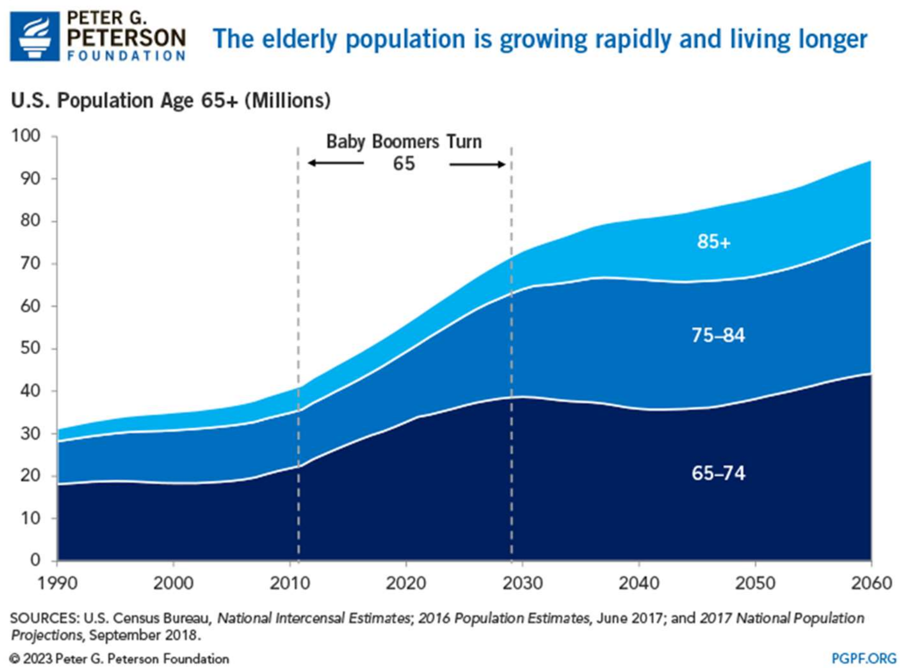


CHART 19

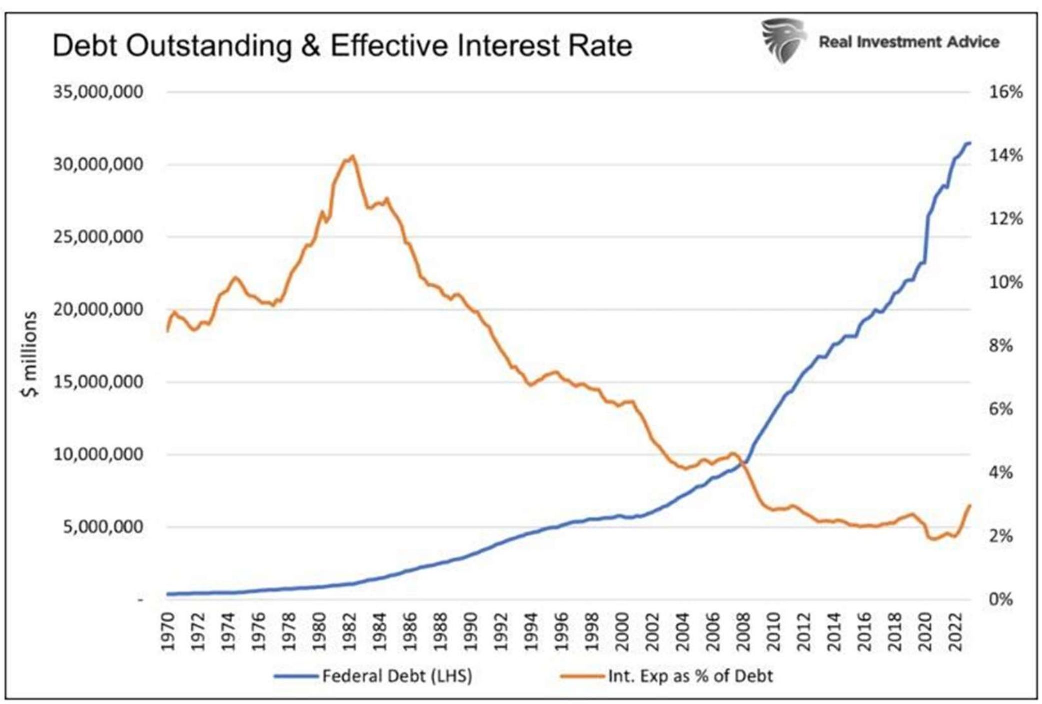


years ago. The result is that interest expense on the federal debt has ballooned. Interest on the national debt hit almost $1 trillion in the second quarter 2023 – 17% of this year's $5.8 trillion budget and up from $648 billion just a year ago. Based on the Treasury's projected borrowing, interest payments on the national debt will exceed the entire defense budget within the next year (Chart 21).

This tsunami of borrowing is driving interest rates higher which creates several problems beyond just their impact on bond yields. First, those companies that need to borrow or refinance loans will be doing so at higher rates which will hurt earnings. Second, higher rates imply lower stock prices because higher long-term rates reduce the present value of future earnings. Third, the burden of bringing rates down falls entirely on the Federal Reserve since fiscal sanity appears to have completely deserted Washington, D.C.

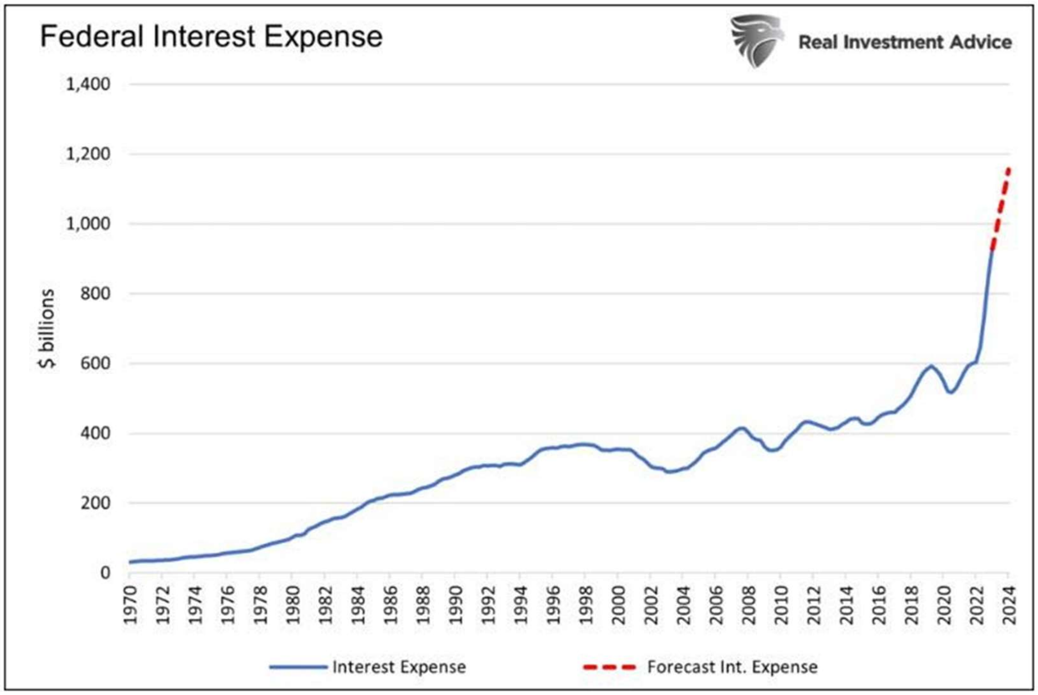
<u>The Fed has no choice but to reduce inflation in order to be able to cut rates which would help reduce the Treasury's financing costs</u>. If inflation stays at or above current levels, rates will not decline and the cost of financing the government's debt will rise exponentially (Chart 21). The problem is the current level of tightening does not appear to be enough to bring inflation down to the Fed's 2% target. If the Fed raises rates further, the short-term effect is to raise the Treasury's financing costs even more. If the Fed raises rates too aggressively, the result

CHART 20



would be a recession which would then reduce government tax revenues. Lower tax receipts would mean higher borrowing needs. The ideal scenario would be the "soft landing" in which inflation converges to the Fed's target without inducing a recession and without requiring additional rate hikes. The problem is the Fed has rarely, if ever, managed this.

CHART 21



III. Gold and Precious Metals Outlook

The Gamma Gold Model went long for August after being neutral last month. (Chart 22). While the Model managed to squeak into a long position this month, the headwind of high and potentially higher rates is still preventing the metal from breaking out to new highs. 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 additional rate hikes are still to come. We continue to expect that gold will break decisively above $2,000 when the Fed is done tightening. Until then, gold may rally but gains are likely to be limited for the time being. **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.**

TABLE 4

PRECIOUS METALS VALUATION

Commodity (1)	Valuation (σ)	Valuation (%)
Gold	-1.30	-31%
Silver	-1.06	-37%
Platinum	-1.70	-50%
Palladium	-0.00	-0%

Positive Factors

- **Precious metals are still cheap**. Despite last month's 3% rise in the price of gold, the metal remained 1.3 standard deviations below fair value (Table 4). The Gamma Valuation Model shows fair value for gold to be around $2,550 – about 31% above its current price. Silver remains even more undervalued at -37%. Gold mining shares rose 3.8% last month, but they remained -35% undervalued.

TABLE 5

SEASONAL ANALYSIS - PRECIOUS METALS

	Average Monthly Change (1975 - Present, %)											
Commodity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Gold	1.31%	0.20%	-0.51%	0.37%	0.38%	-0.42%	0.72%	1.13%	1.62%	-0.04%	0.73%	1.07%
Silver	3.13%	1.67%	-0.43%	-0.30%	0.12%	-1.51%	2.12%	0.24%	2.27%	-0.42%	-0.35%	1.80%
Platinum	3.47%	2.73%	-1.28%	0.53%	0.49%	-1.59%	1.20%	0.50%	-1.37%	0.56%	0.30%	0.68%
Palladium	4.82%	3.89%	0.77%	1.01%	-1.59%	-0.82%	2.18%	-2.14%	-0.49%	0.80%	1.36%	2.16%

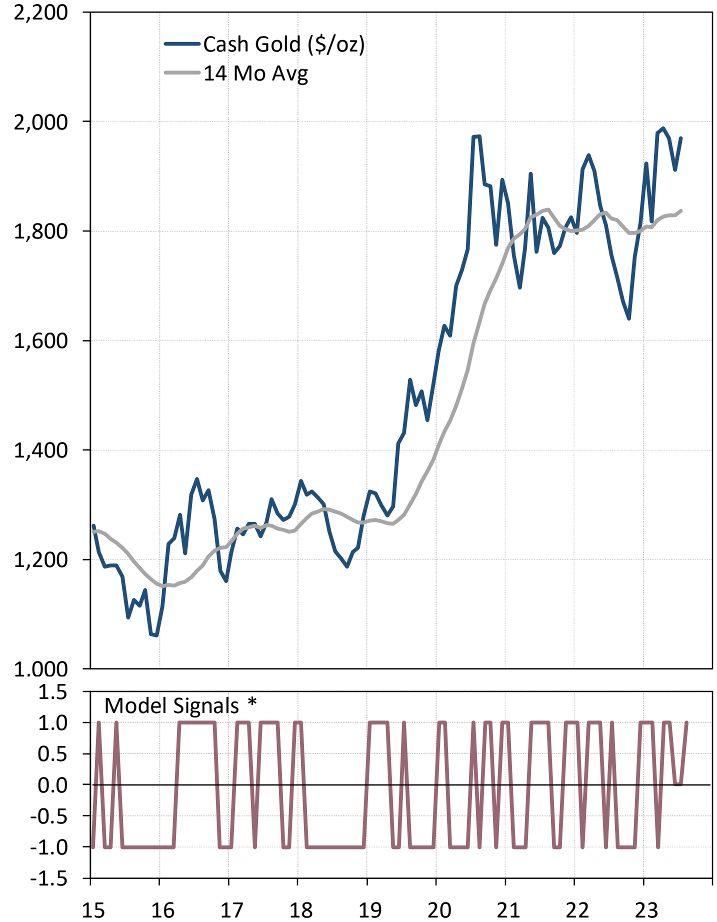
- **Positive seasonals**. Precious metals have historically performed strongly in the second half of the year. Starting in July, prices have generally risen through January with August (+1.1%) and September (+1.6%) having especially good performance (Table 5).

Negative Factors

- **Rising interest rate bias**. Gold has been rising steadily, with a couple corrections, since bottoming in October 2022. Most of that rise had been fueled by expectations that the Fed was done raising rates first in March and then in May. Instead, the Fed hiked rates again in July as inflation – especially core and services inflation – has shown signs of stabilizing at an unacceptably high 5% annual rate. Recent comments by Fed officials are sending a mixed message to markets. Several regional bank presidents have hinted that the Fed has done enough, while Federal Reserve Bank Governor Michelle Bowman said she "believes rates have further ground to climb to bring inflation to target." We have discussed above that the economy may be nearing an inflection point where economic activity slows enough to introduce some slack into the tight labor market. At that point, core inflation and services inflation are likely to head lower which will give the Fed the room they need to ease interest rates. Until then, the expectation of higher rates will prevent gold from making much headway. Since gold doesn't yield interest or a dividend, higher interest rates create a strong disincentive to hold the metal. **Gold may remain range-bound until rates peak, though as we noted above, selloffs should be used to add to long positions. Historically, corrections from extremes tend not to stop when a market returns to fair value. 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 22

Gold Model Forecast



IV. Foreign Exchange Outlook

The Gamma EUR/USD Model remained short the euro (long USD) for August for the third month in a row (Chart 23). While the Model remains long the dollar, the exchange rate is likely to remain range-bound as long as the European Central Bank (ECB) matches the Fed's rate hikes.

Positive USD Factors

- **Stronger relative economic growth.** 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 2.0% and 2.4% in the first and second quarters respectively.
- **Will the ECB match the Fed's rate hikes?** European Central Bank board member Fabio Panetta argued recently for keeping the ECB's interest rates at their current high level for longer, rather than raising them further and risking having to quickly reverse course if economic activity slows abruptly. The ECB recently raised rates for the ninth time in a year but signaled it may take a break at its next meeting in September as inflation continues to fall and growth weakens. The ECB's rate hikes have helped provide the euro with support by narrowing the interest gap versus the U.S. The differential on three-month deposits has fallen from over 3% in October 2022 to a new low of 1.80% last month as the ECB has caught up with the Fed's rate hikes (Chart 24). To what extent this continues will determine how much the dollar appreciates against the euro.

CHART 23

EUR/USD Model Forecast

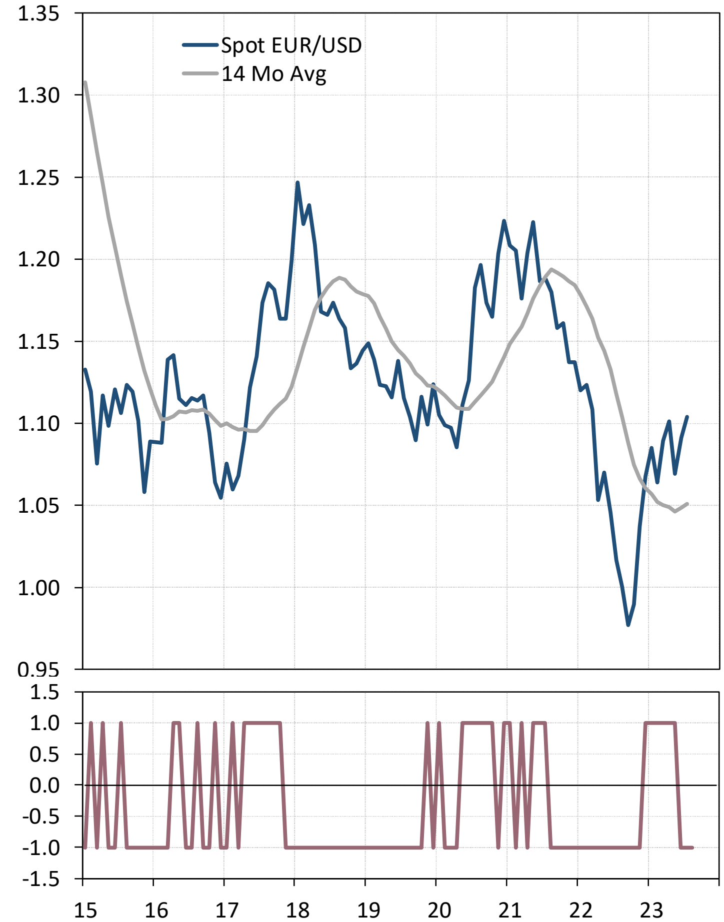
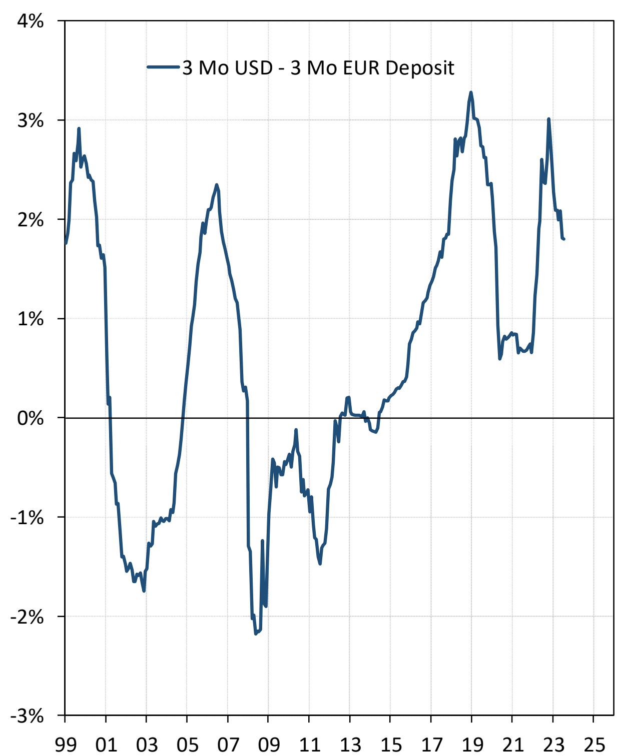


CHART 24

3 Month Interest Rate Differential



Panetta, who has previously called for a cautious approach to raising rates, argued "persistence" in keeping rates high would allow the ECB to bring inflation to its 2% target without unduly hurting the economy or jeopardizing financial stability. Panetta noted that "emphasizing persistence may be particularly valuable in the current situation, where the policy rate is around the level necessary to deliver medium-term price stability, the risk of a de-anchoring of inflation expectations is low, inflation risks are balanced and economic activity is weak." Euro zone inflation fell further in July to a 5.3% yr/yr rate, but the far "stickier" services inflation accelerated to a 5.6% rate, up from a 5.4% rate in June, and a 5.0% rate in May. But a survey published last week showed that even services industry activity was slowing, compounding a slump in manufacturing.

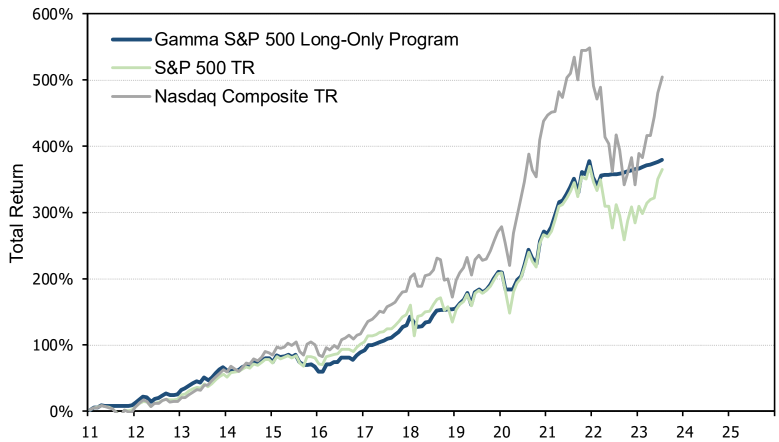
Weakness in both the manufacturing and services sectors may strengthen the hand of ECB policymakers calling for a pause in rate hikes at the September 14 meeting, which would leave the ECB's official rate at its current 23-year high of 3.75%. A move by the Federal Reserve to hike rates at its September meeting without a matching ECB hike would likely lead to a more aggressive round of euro weakness.

-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 Summary – July 2023

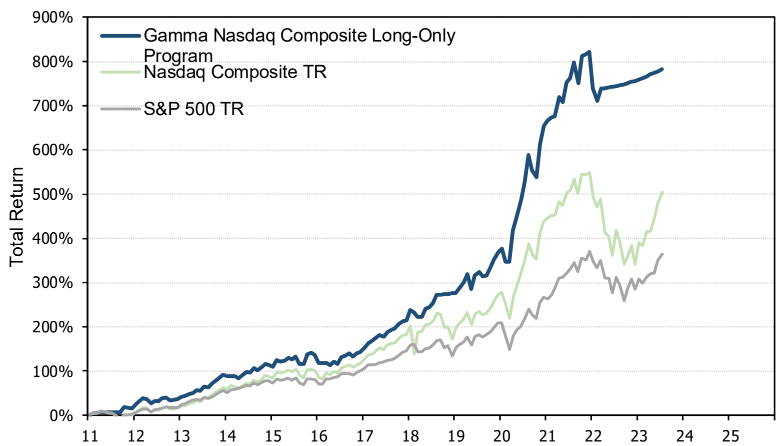
Gamma S&P 500 Long-Only Program — Jan 2011 - Jul 2023



Historical Performance	Program	BM1	BM2
Compound ROR	13.3%	13.0%	15.4%
Cumulative Return	479.0%	364.8%	504.3%
Cumulative VAMI	$4,790	$4,648	$6,043
Best Month	10.9%	13.9%	20.7%
Worst Month	-8.2%	-17.7%	-20.9%
% Positive Months	78.8%	70.9%	66.2%
Historical Risk	**Program**	**BM1**	**BM2**
Standard Deviation	9.8%	15.7%	18.7%
Sharpe Ratio (1.0% RFR)	1.24	0.76	0.77
Sortino Ratio (1.0% RFR)	1.71	1.16	1.27
Downside Deviation	7.2%	10.3%	11.4%
Maximum Drawdown	-14.1%	-23.8%	-31.8%
Months In Maximum Drawdown	18	19	19

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

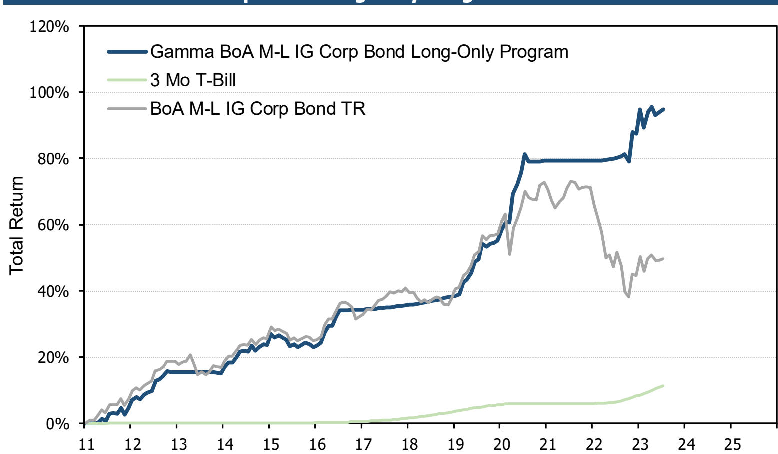
Gamma Nasdaq Composite Long-Only Program — Jan 2011 - Jul 2023



Historical Performance	Program	BM1	BM2
Compound ROR	18.9%	15.4%	13.0%
Cumulative Return	881.8%	504.3%	364.8%
Cumulative VAMI	$8,818	$6,043	$4,648
Best Month	15.5%	20.7%	13.9%
Worst Month	-9.0%	-20.9%	-17.7%
% Positive Months	77.5%	66.2%	70.9%
Historical Risk	**Program**	**BM1**	**BM2**
Standard Deviation	12.9%	18.7%	15.7%
Sharpe Ratio (1.0% RFR)	1.39	0.77	0.76
Sortino Ratio (1.0% RFR)	2.13	1.27	1.16
Downside Deviation	8.4%	11.4%	10.3%
Maximum Drawdown	-12.0%	-31.8%	-23.8%
Months In Maximum Drawdown	19	19	19

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

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



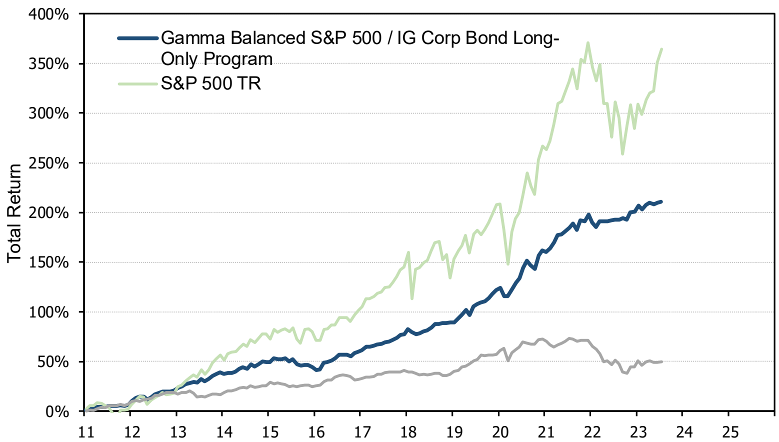
Historical Performance	Program	BM1	BM2
Compound ROR	5.4%	0.9%	3.3%
Cumulative Return	194.8%	11.4%	49.8%
Cumulative VAMI	$1,948	$1,114	$1,498
Best Month	5.3%	0.4%	5.3%
Worst Month	-2.9%	0.0%	-7.5%
% Positive Months	83.4%	100.0%	61.6%
Historical Risk	**Program**	**BM1**	**BM2**
Standard Deviation	3.9%	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	24

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 – July 2023

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



Historical Performance	Program	BM1	BM2
Compound ROR	9.4%	13.0%	3.3%
Cumulative Return	311.0%	364.8%	49.8%
Cumulative VAMI	$3,110	$4,648	$1,498
Best Month	5.5%	13.9%	5.3%
Worst Month	-3.5%	-17.7%	-7.5%
% Positive Months	78.8%	70.9%	61.6%
Historical Risk	**Program**	**BM1**	**BM2**
Standard Deviation	5.3%	15.7%	6.0%
Sharpe Ratio (1.0% RFR)	1.60	0.76	0.38
Sortino Ratio (1.0% RFR)	2.59	1.16	0.46
Downside Deviation	3.3%	10.3%	4.9%
Maximum Drawdown	-7.8%	-23.8%	-20.1%
Months In Maximum Drawdown	13	19	24

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 August 2023

1 MONTH STOCK INDEX MODEL FORECASTS (%)

Country	Stock Index	Price	1 Mo Forecast	Previous Forecast	Position	Trade	Updated
USA	S&P 500	4,582.23	0.00%	0.00%	Neutral	Hold	7/31/23
USA	Nadaq	14,307.39	0.00%	0.00%	Neutral	Hold	7/31/23
Canada	S&P/TSX 60	1,238.78	0.00%	0.00%	Neutral	Hold	7/31/23
Mexico	IPC	55,140.47	0.72%	0.50%	Long	Hold	7/31/23
Brazil	Bovespa	121,700.86	0.00%	0.00%	Neutral	Hold	7/31/23
Japan	TOPIX	2,322.56	1.33%	1.82%	Long	Hold	7/31/23
Australia	S&P/ASX 200	7,410.40	0.00%	0.00%	Neutral	Hold	7/31/23
S. Korea	KOSPI	2,632.58	0.00%	0.00%	Neutral	Hold	7/31/23
China	Hang Seng CEI	6,899.31	1.31%	2.13%	Long	Hold	7/31/23
China / HK	Hang Seng	16,474.68	0.00%	0.00%	Neutral	Hold	7/31/23
India	Nifty 500	17,059.00	1.11%	1.15%	Long	Hold	7/31/23
Eurozone	STOXX 600	471.66	0.00%	0.00%	Neutral	Hold	7/31/23
Germany	DAX	16,474.68	0.00%	0.00%	Neutral	Hold	7/31/23
France	CAC 40	7,509.46	0.00%	0.00%	Neutral	Hold	7/31/23
Italy	FTSE/MIB 30	29,679.08	0.00%	0.00%	Neutral	Hold	7/31/23
Switzerland	Swiss Market	11,324.21	0.00%	0.00%	Neutral	Hold	7/31/23
UK	FTSE 100	7,718.35	0.00%	0.00%	Neutral	Hold	7/31/23
Russia	RTS 50	1,051.61	0.00%	0.00%	Neutral	Hold	7/31/23
S. Africa	FTSE/JSE 40	73,550.27	0.94%	1.36%	Long	Hold	7/31/23

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	4.88	-0.41%	-0.23%	Short	Hold	7/31/23
USA	5 Yr T-Note	4.17	-0.47%	-0.38%	Short	Hold	7/31/23
USA	10 Yr T-Note	3.95	-0.64%	-0.48%	Short	Hold	7/31/23
USA	30 Yr T-Note	4.01	-0.81%	-0.67%	Short	Hold	7/31/23
USA	IG Corporate	5.57	-0.60%	-0.47%	Short	Hold	7/31/23
USA	HY Corporate	8.44	-0.63%	-0.23%	Short	Hold	7/31/23
Canada	10 Yr Govt	3.52	-0.27%	0.13%	Short	Cover Long & Sell	7/31/23
Mexico	10 Yr Cetes	8.88	-0.05%	0.15%	Short	Cover Long & Sell	7/31/23
Brazil	10 Yr Govt	10.99	1.01%	1.47%	Long	Hold	7/31/23
Japan	10 Yr JGB	0.61	-0.17%	0.01%	Short	Cover Long & Sell	7/31/23
Australia	10 Yr Govt	4.00	-0.22%	-0.23%	Short	Hold	7/31/23
S. Korea	10 Yr Govt	3.76	-0.31%	-0.10%	Short	Hold	7/31/23
China	10 Yr Govt	2.70	0.12%	0.18%	Long	Hold	7/31/23
India	10 Yr Govt	7.17	-0.61%	0.02%	Short	Cover Long & Sell	7/31/23
Germany	10 Yr Bund	2.47	-0.41%	-0.05%	Short	Hold	7/31/23
France	10 Yr OAT	3.03	0.08%	0.30%	Long	Hold	7/31/23
Italy	10 Yr BTP	4.11	0.53%	0.87%	Long	Hold	7/31/23
Switzerland	10 Yr Conf	1.00	0.21%	0.26%	Long	Hold	7/31/23
UK	15 Yr Gilt	4.51	-0.50%	-0.35%	Short	Hold	7/31/23
Russia	10 Yr Govt	11.51	-1.07%	-1.67%	Short	Hold	7/31/23
S. Africa	10 Yr Govt	10.21	0.13%	0.26%	Long	Hold	7/31/23

Gamma Macro Model Forecasts for August 2023

1 MONTH FX MODEL FORECASTS (%)

Currency	Spot FX Rate	1 Mo Forecast	Previous Forecast	Position	Trade	Updated
EUR/USD	1.1041	-0.01%	-0.38%	Short	Hold	7/31/23
GBP/USD	1.2857	0.18%	-0.10%	Long	Cover Short & Buy	7/31/23
USD/CHF	0.8685	0.30%	0.69%	Long	Hold	7/31/23
USD/NOK	10.1168	0.07%	0.45%	Long	Hold	7/31/23
USD/SEK	10.4935	0.40%	0.51%	Long	Hold	7/31/23
USD/JPY	142.36	0.63%	0.97%	Long	Hold	7/31/23
AUD/USD	0.6718	-0.34%	-0.49%	Short	Hold	7/31/23
NZD/USD	0.6214	-0.28%	-0.38%	Short	Hold	7/31/23
USD/KRW	1,276.71	0.09%	0.48%	Long	Hold	7/31/23
USD/CNY	7.1450	0.45%	0.83%	Long	Hold	7/31/23
US/INR	82.27	0.32%	0.23%	Long	Hold	7/31/23
USD/SGD	1.3285	0.39%	0.48%	Long	Hold	7/31/23
USD/CAD	1.3170	-0.05%	0.21%	Short	Cover Long & Sell	7/31/23
USD/BRL	4.7471	-1.40%	0.03%	Short	Cover Long & Sell	7/31/23
USD/MXN	16.74	-0.44%	-0.01%	Short	Hold	7/31/23
USD/RUB	91.80	-0.45%	0.17%	Short	Cover Long & Sell	7/31/23
USD/ZAR	17.77	0.00%	1.21%	Short	Cover Long & Sell	7/31/23
BTC/USD	29,345.94	-2.23%	2.36%	Short	Cover Long & Sell	7/31/23

1 MONTH COMMODITY PRICE FORECASTS (%)

Commodity	Cash / Futures Price ($)	1 Month Forecast	Previous Forecast	Position	Trade	Updated
Gold	1,969.49	0.02%	0.00%	Long	Buy	7/31/23
Silver	24.77	0.00%	0.00%	Neutral	Hold	7/31/23
Platinum	956.65	0.38%	0.07%	Long	Hold	7/31/23
Palladium	1,274.86	0.00%	-1.73%	Neutral	Cover Short	7/31/23
Aluminum	2,251.51	0.00%	0.00%	Neutral	Hold	7/31/23
Copper	8,103.00	0.99%	0.00%	Long	Buy	7/31/23
Lead	2,064.75	0.00%	0.00%	Neutral	Hold	7/31/23
Nickel	20,865.50	0.88%	0.00%	Long	Buy	7/31/23
Tin	25,867.00	0.00%	0.00%	Neutral	Hold	7/31/23
Zinc	2,287.77	0.17%	0.00%	Long	Buy	7/31/23
WTI Crude Oil	75.32	0.00%	0.21%	Neutral	Cover Long	7/14/23
HH Natural Gas	2.76	0.00%	0.00%	Neutral	Hold	7/20/23

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.