Macro Intelligence Report

October 2023

GAMMA INVESTMENT CONSULTING

Gamma Global Macro Model Highlights

- **The S&P 500 and Nasdaq Models remained neutral (in cash) for October**. Stocks returned to their normal September historical pattern with the S&P 500 down -4.9% and the Nasdaq dipping -5.8%. The major indexes remained under pressure in reaction to the largest one-month increase in bond yields in over a year.

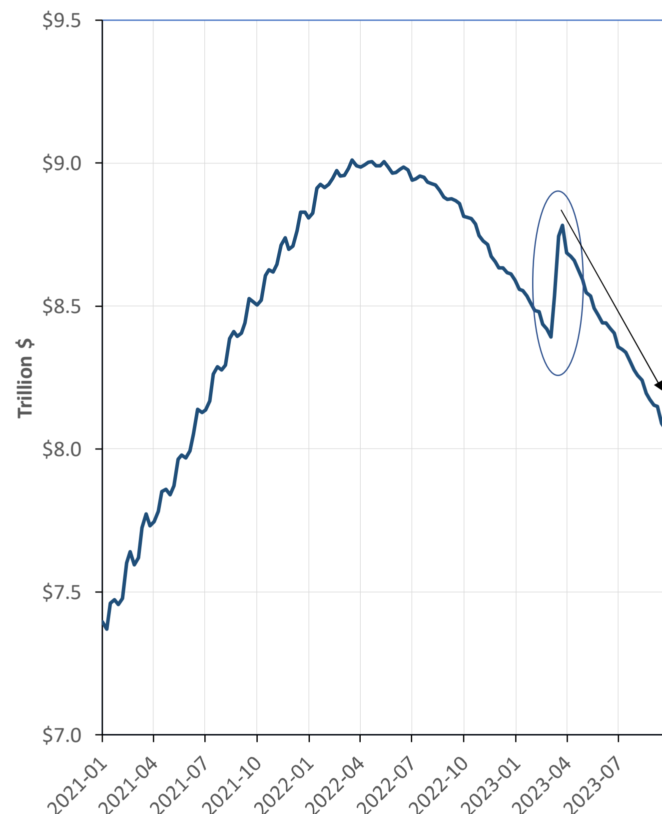
- **The 10-year Treasury, Investment Grade Corporate, and High Yield Bond Models all remained neutral for October. The 30-year Treasury Bond Model went long (lower yields).** The divergence suggests that the very long end of the bond market may be pricing in the end of the Fed's tightening, while the shorter maturities are still concerned over additional Fed rate hikes in the short-term.

- **The Gold Model remained neutral for October.** The metal continues to struggle against the headwind of higher interest rates despite attractive valuation that improved further in September.

- **The EUR/USD Model remained short euros (long USD) for October.** The dollar gained 2.6% during the month despite a surprise 25 basis point increase in the European Central Bank's key lending rate.

I. Equity Index Outlook

After bottoming in December 2022, stocks had been in a virtually one-way climb until July. The S&P 500 since then has shed -1.7% in August and another -4.9% in September. As we noted last month, the August-September selloff is much more consistent with economic fundamentals than the five-month rally earlier this year. We believe that the January-July rally was a consequence of the brief surge in liquidity provide by the Federal Reserve in reaction to the banking crisis in March (Chart 1) combining with the extreme bearish sentiment following last year's 25% selloff (Chart 2). The Fed's balance sheet has since absorbed that short-term surge in liquidity and has contracted. We believe that the underlying contraction in liquidity will continue to weigh on stock prices. For that reason, the Gamma S&P 500 and Nasdaq models remained neutral (in cash) for September as our Model's most reliable long-term indicators still remain bearish on equities (Chart 3 - Note that the forecast chart now shows the actual expected change in the index in percent. Subscribers have asked us to publish the actual forecast to get a better idea of the strength of the signal. For most



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investors, a negative expected return forecast means going to a cash position. More aggressive investors may consider shorting the index using futures or inverse ETFs).

Negative Factors

- **Liquidity remains weak**. The Gamma Composite Liquidity Indicator (CLI) remains solidly in negative territory despite a slight recovery over the past two months (Chart 4). This recovery, however, simply indicates that **the rate of deterioration has slowed** – not that liquidity is improving. In other words, the patient is still getting sicker but not as fast. Moreover, bottoms in the Liquidity Indicator often occur months or even years before equity prices bottom. For example, the Liquidity Indicator bottomed in June 2006, but stocks didn't bottom until February 2009 – 32 months later. Before that, liquidity bottomed in August 2000, but the collapse following the bursting of the dot-com bubble didn't end until February 2003 – 30 months later. Most recently, liquidity hit bottom in September 2018, but stocks only found a sustained bottom in March 2020 when the Fed opened the financial spigot in response to the Covid pandemic.

CHART 2

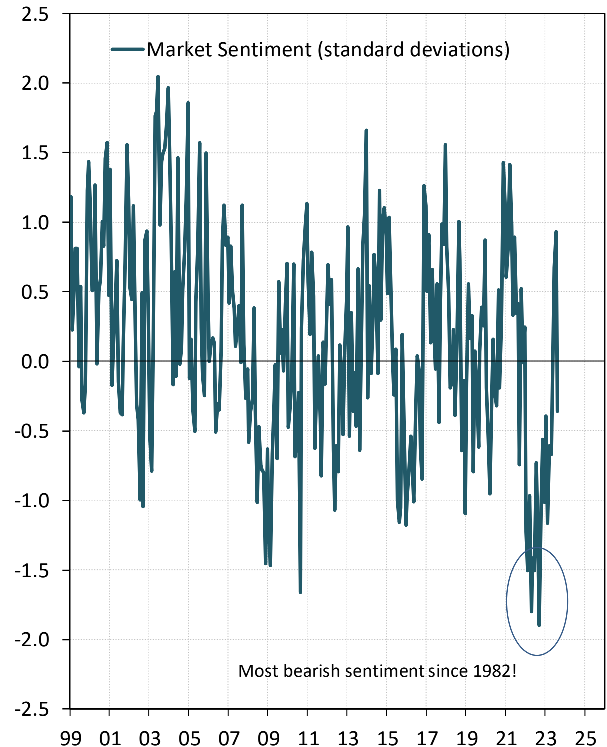


CHART 3

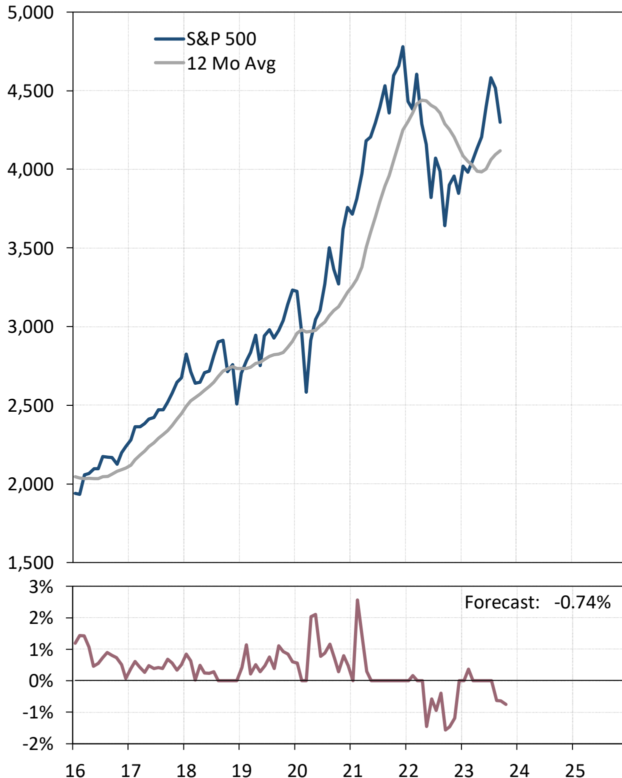
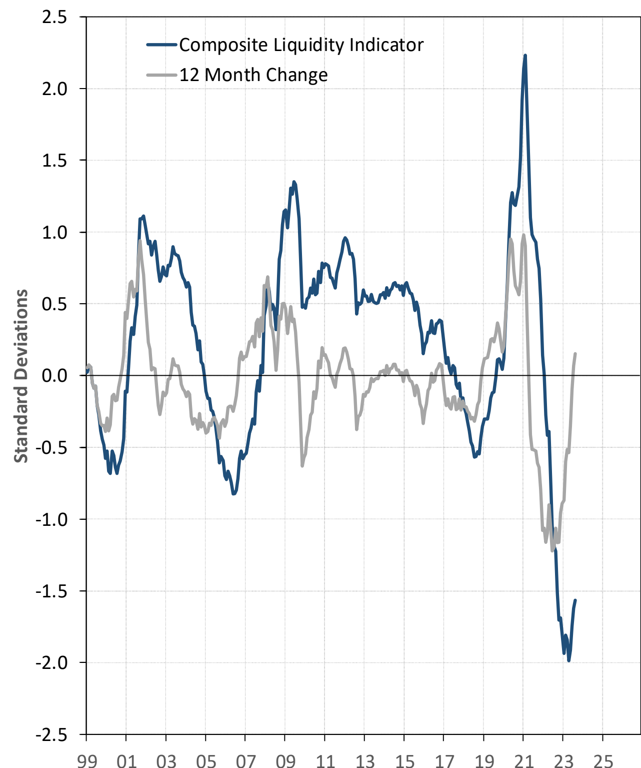


CHART 4



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The recent recovery has occurred due to the pause in Fed rate hikes and due to a slight steepening of the yield curve. **A steeping of the yield curve is normally a sign of improved liquidity when it is due to falling short term interest rates**. **The most recent steeping of the curve, however, has occurred due to a rise in long-term interest rates**. This is potentially a bearish sign for equities and the economy because higher long-term interest rates reflect an expectation of higher and/or higher for longer short-term interest rates. In other words, the rise in long-term rates (and the accompanying steepening of the curve) are likely due to market expectations that the Fed may raise rates further and keep them higher for longer to ensure that inflation returns to its 2% target rate (Chart 5).

Money growth also remains problematic. The collapse in real true money supply (TMS) showed signs of slowing last month. That recovery in hindsight was likely the result of short-term deposit distortions arising from the Treasury replenishing its working balances following the increase in the debt ceiling earlier this year. Yr/yr growth in real TMS improved to -8.1% in August but worsened to -11.1% in September. Real M2 had similarly improved to a -6.8% rate before falling to a -7.0% rate last month (Chart 5). Yr/yr growth in bank lending dropped to 4.8% from 12% just six months ago which suggests that money growth is unlikely to rebound any time soon.

CHART 5

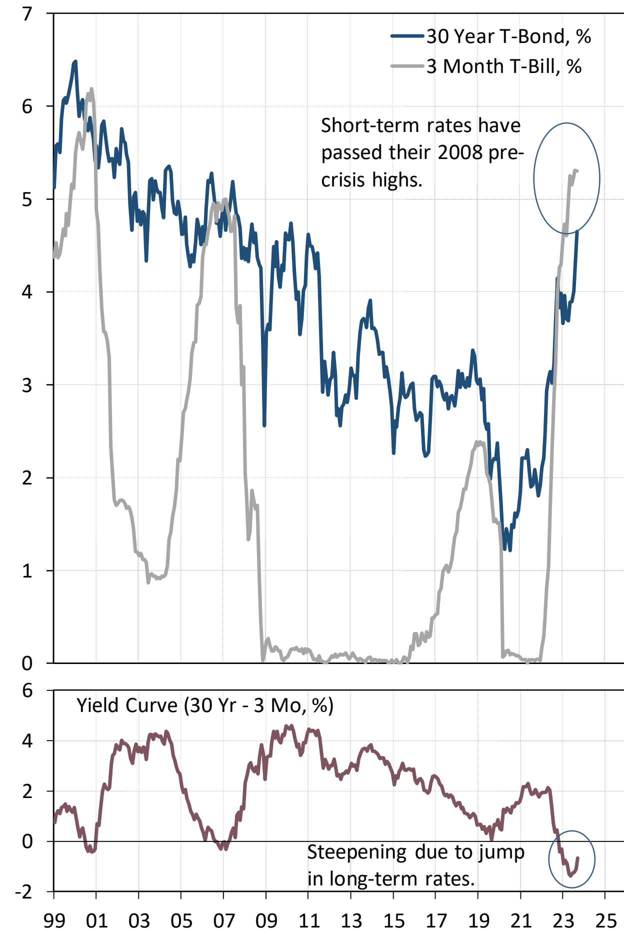
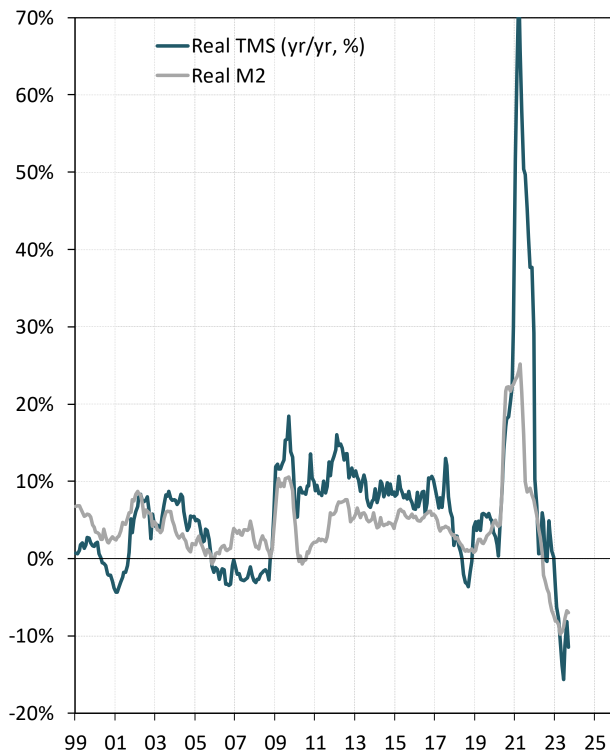


CHART 6



And to add one more interesting (and cautionary) tidbit, over the past 153 years, there have only been five instances where nominal M2 has declined by at least 2% on a year-over-year basis: the 1870s, 1893, 1921, 1931-1933, and 2023. **In order, these instances resulted in a depression, a bank panic, another depression, the Great Depression, and (fill in the blank if you care to guess). In the previous four instances, it was an ominous sign for equities. We suspect that this time will not be any better**.

• **The Federal Reserve's Balance Sheet continues to contract**. Since the introduction of so-called Quantitative Easing (QE) following the 2007-2008 financial crisis, changes in the Fed's balance sheet have had a disproportionately large impact on asset prices. The current process of Quantitative Tightening (QT) has resulted in the

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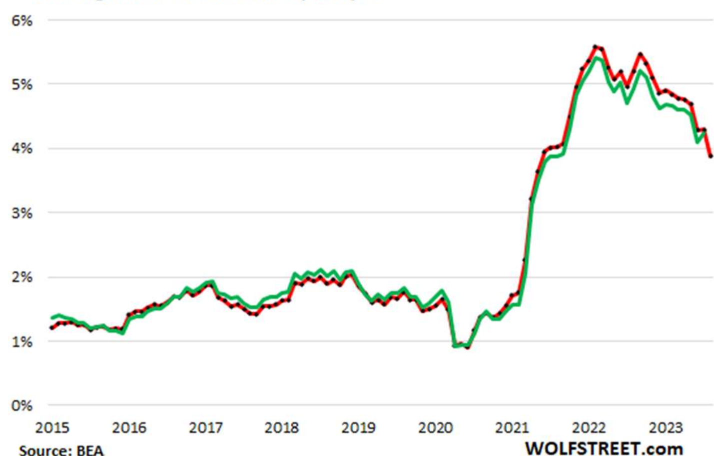
liquidation of an average of $90 billion a month in assets from the Fed's investment portfolio. The Fed's portfolio has shrunk by $1 trillion since the central bank started raising interest rates in May 2022. While $1 trillion may seem like a lot to any sane individual, investors need to remember that the Fed's balance sheet ballooned to $8 trillion at its peak in mid-2022. The $1 trillion decline is only a 23% reduction in the Fed's increase in assets which had more than doubled from $3.74 trillion in (pre-pandemic) December 2019 to the $8 trillion peak. While the Fed did not raise rates at its September meeting, the probability that the Fed will reverse the runoff of its investment portfolio anytime soon is low. The reason for this is that inflation continues to run stubbornly above the Fed's 2% target rate.

This past week the Bureau of Economic Analysis released its periodic revisions to its personal consumption expenditures data as part of its "comprehensive update of the National Economic Accounts." With these adjustments, the new versions of the PCE price index (the Fed's preferred inflation gauge), the "core" PCE price index, and the "core services" PCE price index were all revised higher across the board. In other words, inflation has actually been higher than was originally reported.

The revised PCE price index accelerated to a 3.5% yr/yr rate in August from the revised 3.4% in July. The original version shows that July reading had come in at 3.3%. The June revision was raised higher to 3.2% from the old version of 3.0%. The new version's peak in June 2022 was revised higher to 7.12% from 6.98% for the old version. Chart 7 shows the new revised index through August in red and the old data through July in green.



The revised "core" PCE price index (excluding food and energy) rose 3.9% year-over-year for August, still nearly double the Fed's target though it did decline from the previous month's revised 4.3% rate (Chat 8). The "core services" PCE price index (services excluding energy services), a crucial metric because it shows where underlying inflation has gotten entrenched, was revised substantially higher for the years back through 2020. The original version which peaked at 5.54% yr/yr rate in February 2023 was revised upward to a substantially higher 5.8% (red).

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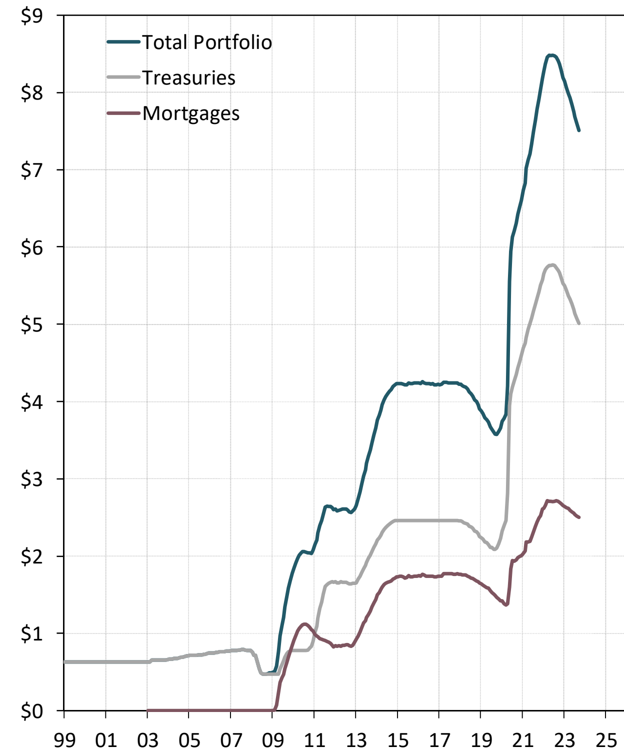
So, what does that mean for Federal Reserve policy? Any way you slice it, the core inflation rate is still running double the Fed's target. At a minimum it suggests that Fed officials will need to hold rates at current levels until they see additional improvement in inflation, especially core inflation. The CME's Fedwatch Tool currently predicts no more rate hikes through the middle of 2024. Recent comments by Fed officials, however, indicate that the bias is still towards at least one more 25 basis point rate hike. Even if the Fed decides to simply hold rates steady (as the Fedwatch Tool indicates), that implies a continued runoff of the Fed's balance sheet of another $800 billion – quite a headwind for a market already facing a sixteen-year high in interest rates (Chart 9).

CHART 9



- **Equities remain highly overvalued by historical standards**. Last month's stock market selloff helped improve valuation marginally, but the Gamma Valuation Model indicates that the S&P 500 and Nasdaq remain 1.3 (27%) and 1.6 (44%) standard deviations above fair value – near their highest levels since the collapse of the dot com bubble (Table 1). Earnings had been showing some signs of bottoming recently, but that trend reversed itself last month. 12-month trailing earnings for the S&P 500 dipped to -4.0% from -3.6% in August though that was still a sharp improvement from the -9.2% low hit in June. Nasdaq earning fell -5.8% yr/yr from -5.1% the previous month though they also were still much improved from their -15.5% yr/yr rate hit in February. **The improvement in earnings has prevented overvaluation for both indexes from completely soaring**. The effect of the relentless rise in long-term bond yields has been somewhat softened by better earnings. With the Index of Leading Economic Indicators (LEI) now down for seventeen consecutive months, the chances of earnings growth stalling are high. That would remove the one support that has prevented valuation from climbing back towards its dot com peaks.

TABLE 1

STOCK INDEX VALUATION

Index	Valuation (σ)	Valuation (%)
USA Total Market	+1.40	+28%
S&P 500	+1.29	+27%
Nasdaq	+1.58	+44%
S&P 600 Small Cap	-0.81	-14%

According to the Gamma Valuation Model, it would require either 1) a 25% drop in stock prices, 2) a 75% increase in corporate earnings, or 3) a drop in interest rates to 2% (or a combination of the above) to bring equity valuation back to neutral. For valuation to drop instantaneously to -1 standard deviations (a typical level for the beginning of a new bull market) would require either 1) a 40% drop in stock prices, 2) a 200% increase in earnings, or 3) interest rates falling to zero. The problem is that sharply lower interest rates would likely require a recession which would cause earnings to contract. Conversely, if earnings growth surges due to a strong economy, the Fed will likely have to raise interest rates even more to keep inflation headed to its 2% target rate. Our experience has been that small to moderate overvaluation can be remedied by changes in earnings and/or interest rates. **Substantial overvaluations, however, have invariably required major market corrections to get prices back to fair value.**

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II. Fixed Income Outlook

Fixed income signals were mixed for October indicating divergences in the factor inputs that may be signaling a possible reversal of the vicious fixed income selloff since April. The 10-year Treasury Note and Investment Grade Corporate Model remained neutral for October. The High Yield Corporate Model covered its long positions and went neutral, while the 30-year T-Bond Model went long (lower yields, Charts 10, 11).

CHART 10

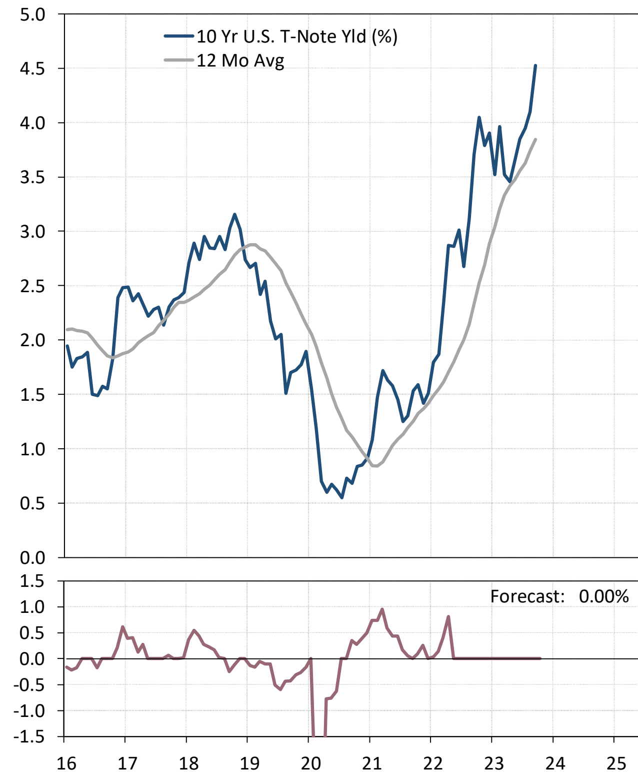
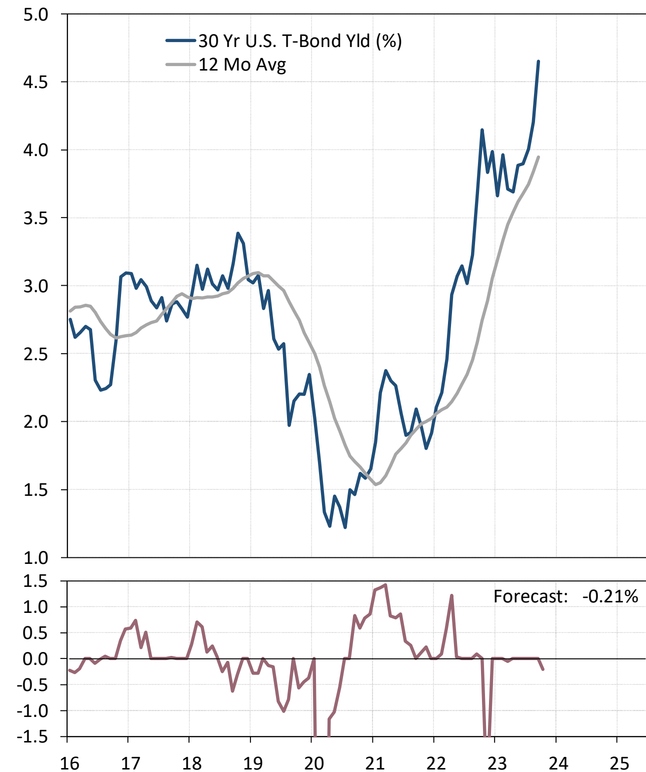


CHART 11



Yields in general have surged following a period of consolidation between October 2022 and April 2023. Since then, the 10-year T-Note yield has surged 1.29%, while the 30-year T-Bond yield has climbed 1.25%. **Since yields bottomed in April 2020, the price of a 30-year T-Bond has plummeted -47% - the largest drop since at least 1958. The magnitude of the decline rivals that of the equity selloff following the collapse of the dot com bubble in 2000 and real estate in 2008-2009.**

This collapse in bond prices directly contributed to the collapse of several major regional banks earlier this year. Bank runs forced them to liquidate their investment portfolios at a loss to meet liquidity demands. And the impact of this is not yet over. Banks in the second quarter held unrealized losses on their "safe" Treasury portfolios of $558.4bn. The continued selloff in bonds has caused that amount to swell by an additional $140 to a record $689.9bn in the third quarter. Securities held to maturity do not face price risk since the paper eventually gets repaid at par. If a bank is forced to sell a portion of its investment portfolio due to, for example, the need to increase liquidity, the entire investment portfolio must be marked-to-market. For many banks, this would likely deplete their capital and force them into bankruptcy.

Negative Factors

- **The looming fiscal crisis has arrived**. One of the things that has always fascinated me about markets is that they can ignore a critical issue for months or even years and then suddenly that issue becomes the sole focus

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of trading. We are faced with exactly this situation in bonds right now. Economists have been warning for over two decades that the unfunded gap (what is promised versus what money is actually available) in Social Security and Medicare spending is over $68 trillion over the next 60 years – almost three times the annual income of the United States (Table 2). That amount balloons to a mind-boggling $163 trillion – seven times national income - when the full future liability is taken into account. And just to make things more interesting, the estimated unfunded gap in Medicaid spending adds another $17 trillion.

TABLE 2

Estimated Present Value of Medicare and Social Security Unfunded Obligations

($ trillions)

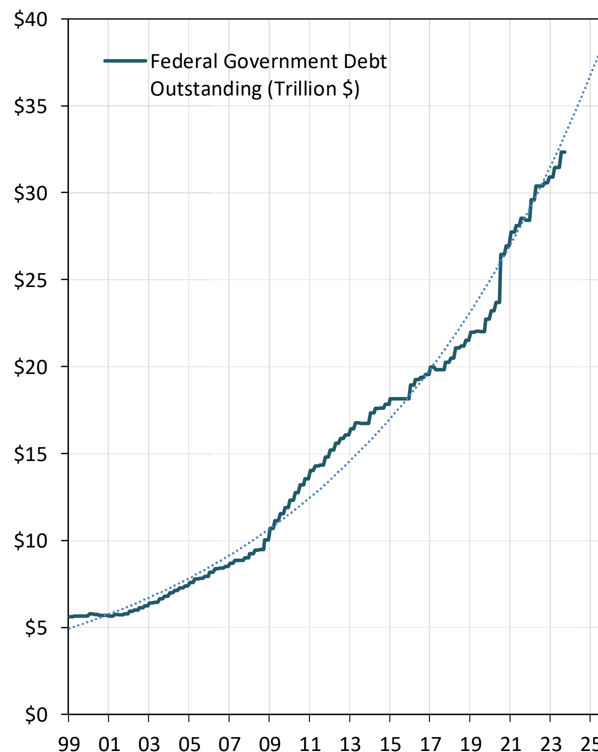
	Medicare:			Total	Social	
	Part A	Part B	Part D	Medicare	Security	Total
Through 2095	$5.1	$35.5	$7.7	$48.3	$19.8	$68.1
Infinite Horizon	$10.3	$87.6	$26.1	$103.4	$59.8	$163.2

Source: Congressional Research Service, "Medicare Financial Status: In Brief." October 21, 2021. Based on the 2021 Report of the Medicare Trustees, Tables V.F2, V.G1, V.G3, V.G5

But there's more. The unfunded mandates for Social Security, Medicare, and Medicaid do not take into account **actual debt**. The United States federal government just recently topped $33 trillion in debt outstanding (including adding almost $275 billion **in one day** last week) (Chart 12). While this is bad enough, what is even more disturbing is how rapidly the fiscal situation is deteriorating. Much of this is due to just plain irresponsible and corrupt economic policy. Prior to the Covid pandemic, federal government spending for the fiscal year 2019 was running at about $4.4 trillion. The government's massive fiscal and monetary response to the pandemic caused spending to swell to $6.5 trillion 2022. By 2022, any modestly rational individual would have said "look, the crisis is over, we have to get spending back to where it was before the pandemic." That, of course, is not how Washington works. The Biden Administration took advantage of the pandemic to push through additional Covid stimulus plus the so-called "Inflation Reduction Act" to establish the $6.5 trillion as the new baseline for spending. That has effectively institutionalized an additional $2 trillion a year in deficit spending into the foreseeable future.

CHART 12

Federal Government Debt (Trillion $)



But even that isn't the end of the story. The surge in Covid spending from $4.4 trillion a year to $6.5 trillion was heavily financed by issuing new debt. Total federal net debt outstanding surged by over $5.8 trillion between December 2019 and December 2022, of which over $4.5 trillion was purchased by the Federal Reserve. The result was a 78% increase in the money supply that was directly responsible for the spike in the inflation rate to its highest level since 1981. For the "best and the brightest" to engage in such irresponsible fiscal and monetary policy without considering the consequences smacks of either deep-seated corruption or abject stupidity.

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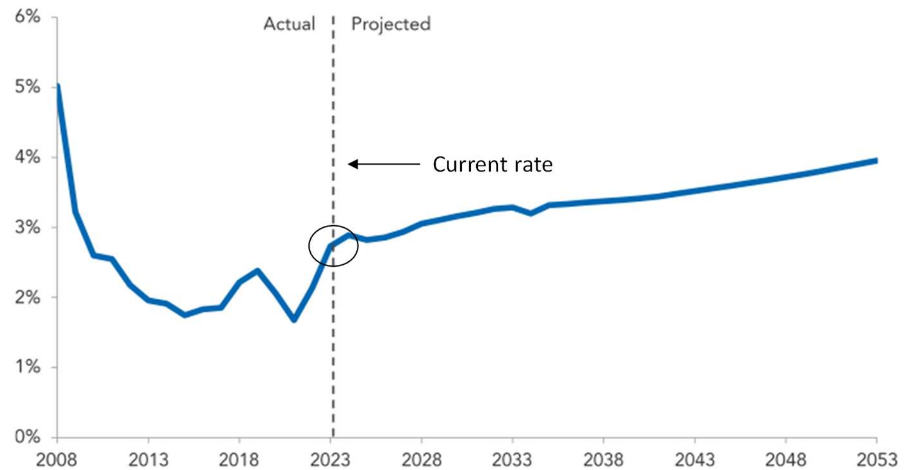
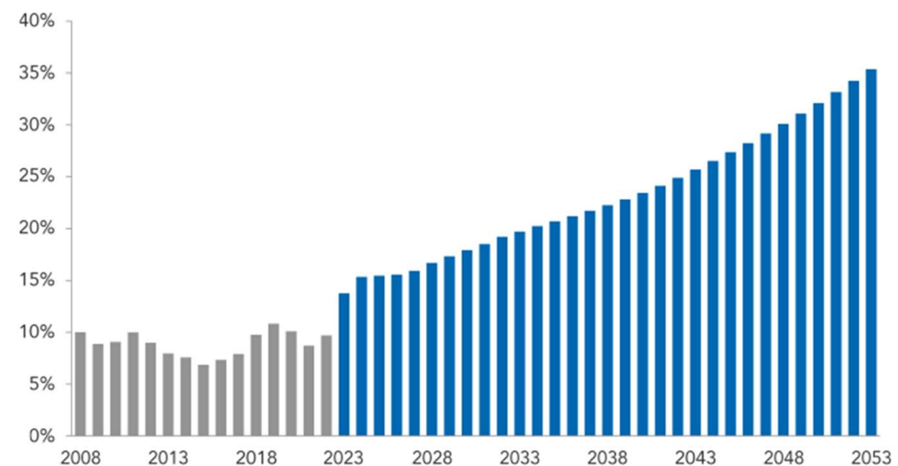
By March 2022, the Fed had realized the enormity of its mistake and started to aggressively tighten. Interest rates have since been hiked 11 times, and interest rates are now at their highest level in almost 17 years. While the inflation rate has gradually subsided, the hike in interest rates has indirectly created a major fiscal problem for the federal government. With over $33 trillion in debt outstanding and $2 trillion a year being added more and more debt is being added or refinanced at much higher rates than the Congressional Budget Office (CBO) had predicted as recently as June. Chart 13 shows the CBO's projected average interest rate paid on outstanding debt. For example, the average interest rate for 2023 is about 2.9%. The problem is that the average yield over the entire Treasury yield curve is over 4.5% - over 1.5% higher.

CHART 13



The CBO's projections show interest costs rising from 1.9% of GDP in 2022 to 3.2% in 2030, which would be the highest since 1940. Interest costs would continue climbing over the following decades, reaching 6.7% of GDP by 2053. At that point, interest costs on the federal debt would account for 35% of federal revenues. Net interest on the debt will consume 35% of federal tax revenues by 2053 (Chart 14). These projections, however, do not reflect the current level of interest rates. At current rates, the percentage of the federal budget allocated to paying interest will start to climb exponentially if rates remain at current levels. The huge increase in debt since 2019 combined with higher interest rates since March 2022 has caused that percentage to climb from 8.1% in 2021 to 14.2% at the end of August. The CBO shows that number climbing to over 20% in 2032 **based on their interest rate forecasts – not**

CHART 14



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based on current interest rates which are 1.5% higher. In other words, within a decade one fifth of all taxes taken in by the government will be used to pay interest – not Social Security, not Medicare, not national defense, not general government services.

- **Inflation is slowing, but not fast enough**. The Fed and the government have created a vicious circle. If inflation remains at current levels, interest rates will not decline which will cause the percentage of the federal budget allocated to interest expenses to grow exponentially. Inflation as measured by the Fed's preferred inflation measure, the personal consumption expenditure deflator (PCED), has fallen steadily from a 7.6% yr/yr rate in June 2022 to a 3.5% rate last month (Chart 7). Core PCED has fallen from a 5.5% rate to a 3.9% rate last month (Chart 8). Both measures accelerated last month and are now 1.5% and 1.9%, respectively, above the Fed's target 2% rate. Add to this an economy that stubbornly refuses to slow despite 17 consecutive monthly declines in the Index of Leading Indicators and 11 rate hikes. In order to ensure a sustained decline in the inflation rate below 2%, the Fed may have no choice but to continue raising rates until the economy definitely enters recession.

- **Inverted yield curves**. The 3-30 and 2-10 yield curves remain strongly inverted (Chart 5). 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 stubbornly high inflation, the end of the Fed's tightening cycle is likely to be pushed further into the future. That will give bond investors little incentive to aggressively buy bonds especially since Treasury valuation is not nearly as attractive as it was several months ago.

- **"Quantitative Tightening" meets out-of-control government borrowing.** Total Federal Reserve assets dropped by $146 billion in September as the total runoff of assets topped $1 trillion for the first time since peaking at $7.96 trillion in June 2021 (Chart 9). Holdings of Treasury securities dropped by $58 billion in August to $4.93 trillion, down $840 billion from the June 2022 high. With inflation continuing to run above the Fed's target, there are no signs that quantitative tightening will not end any time soon even if rates remain steady. The problem for long-term rates is that shrinking the Fed's balance sheet is running headlong into the Treasury's seemingly insatiable demand for cash. Not only is the reduction in the Fed's balance sheet removing the central bank as a net buyer of Treasuries, but its actions are also draining liquidity from the system that would otherwise be available to purchase Treasuries. The Treasury is expected to raise an additional $1 trillion this year. Barring an actual recession that causes a contraction in private sector borrowing, this massive increase is likely to keep upward pressure on long-term interest rates including 30-year mortgages.

Positive Factors

- **Valuation has sharply improved**. Valuation of long-term bonds and notes had returned close to neutral before last month's surge in yields. Long-term valuation improved sharply last month. 30-year T-Bond undervaluation improved from 0.35 standard deviations to 1.05 standard deviations, the most attractive valuation since April 2022. 10-year T-Note valuation improved from 0.30 to 1.00 standard deviations. Investment grade corporate valuation, which had been running at over one standard deviation since March 2023, has improved to 1.33 standard deviations (Table 3).

- **Fixed income sentiment has turned extremely negative**. Commitment of Traders (COT) reports indicate that investors are extremely bearish on bonds. Comparable previous extremes were followed by major bond rallies.

TABLE 3

FIXED INCOME VALUATION

Country	Debt Instrument	Current Yield	Yield Valuation (σ)	Price Valuation (%)
USA	2 Yr T-Note	5.04	+0.35	-0.4%
USA	5 Yr T-Note	4.58	+0.69	-2.3%
USA	10 Yr T-Note	4.52	+1.01	-6.7%
USA	30 Yr T-Note	4.65	+1.05	-15.7%
USA	IG Corporate	6.21	+1.33	-5.6%
USA	HY Corporate	9.12	+0.67	-8.1%

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TABLE 4

PRECIOUS METALS VALUATION

Commodity (1)	Valuation (σ)	Valuation (%)
Gold	-1.43	-34%
Silver	-1.15	-40%
Platinum	-1.87	-55%
Palladium	-0.53	-22%

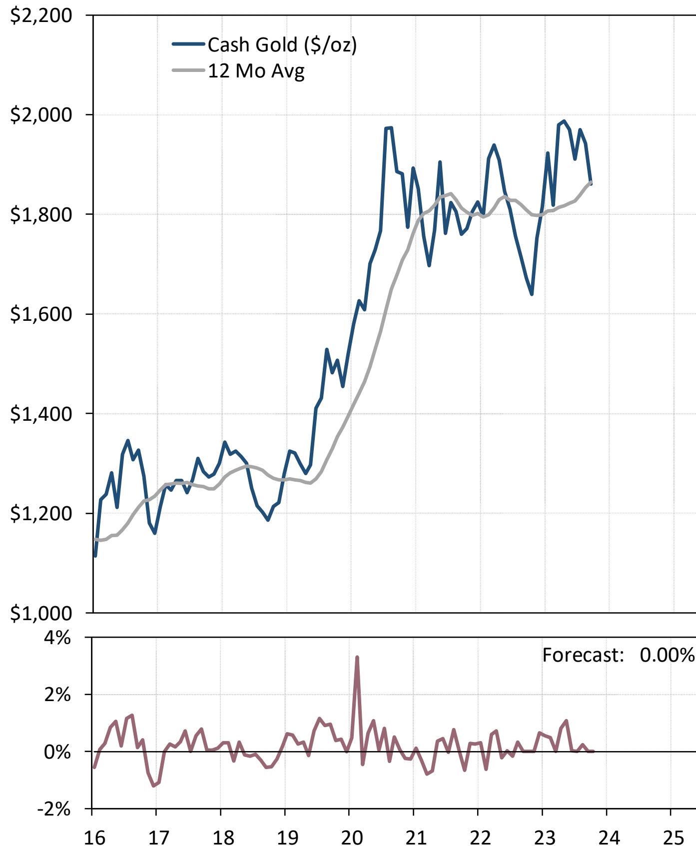
III. Gold and Precious Metals Outlook

The Gamma Gold Model remained neutral for October as the prospect of higher interest rates continues to weigh on the metal and offset very favorable valuation (Chart 15). Gold fell -4.2% last month after a -1.2% loss in August. After hitting a record $2,081/oz in May, the yellow metal has since fallen in four out of the last five months.

Positive Factors

- **<u>Precious metals are cheap</u>**. Valuation continues to improve as the price of gold has failed to match the rise in the overall price level. Since 1974, the overall price level as measured by the Consumer Price Index (CPI) has risen 563%. During the same period, the price of gold has risen 1,253% - beating the CPI by 2.2:1. Most recently, the ratio of gold prices to the CPI peaked in July 2020. Since then, the price of gold has fallen by -5.6% while the CPI has climbed 18.9% - a 25% divergence. Gold prices in October 2022 hit their cheapest level since 2001. This has created a situation where gold prices are now 34% undervalued. Valuation has improved from 44% undervaluation in October 2022, but the metal remains far below its fair value price of $2,500/oz. In the short term, the prospect of higher interest rates will realistically keep downward pressure on precious metals prices. The extreme level of undervaluation, however, is keeping the Gold Model from getting short and is also the reason why **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



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Neutral Factors

- **Positive seasonals**. Precious metals have historically performed strongly in the second half of the year. Starting in July, prices have generally risen through January, though October has on average been largely unchanged.

Negative Factors

- **Rising interest rates**. While gold is attractively valued, the reality is that precious metals are unlikely to start a sustained bull market until interest rates peak. Gold's primary financial value is as a store of value during uncertain times and as an inflation hedge over the long term. Unlike stocks, bonds, and cash, however, gold pays no dividend, coupon, or interest. As mentioned earlier, the recent lack of progress in reducing core inflation suggests that the bias in interest rates is still to the upside. Add to this the prospect of higher long-term rates due to the size of the Treasury's financing needs, and the metal is still facing serious resistance. Weaker employment data last month suggest that the economy may start to slow below its 2% trend growth rate. Given that the Fed was fooled by this assumption earlier this year, the central bank will likely err on the side of additional tightening until clearer signs of weakness in the labor market emerge. **Gold may remain range-bound until rates peak, though as we noted above, selloffs should be used to add to long positions. Once the Fed starts to cut rates, we expect gold to rally strongly to its fair value level of $2,550 before overshooting even further to the upside.**

IV. Foreign Exchange Outlook

The Gamma EUR/USD Model remained short the euro (long USD) for September for the fifth month in a row (Chart 16). Relative growth, inflation, and interest rate developments continue to benefit the U.S. currency.

Positive USD Factors

- **Stronger relative U.S. economic growth driving higher interest rates.** A stronger-than-expected employment report last month, 2.1% real GDP growth in the second quarter, and inflation running well above the Fed's 2% target indicate that the bias in short-term interest rates continues to be to the upside. The U.S. economy continues to outperform that of Europe which will likely result in a relative widening of the interest rate differential in favor of the dollar (Chart 17, 18).

- **The ECB is unlikely to match additional Fed rate hikes.** The European Central Bank (ECB) recently announced that "based on its current assessment, the Governing Council considers that the key ECB interest rates have reached levels that, maintained for a sufficiently long duration, will make a substantial contribution to the timely return

CHART 16
EUR/USD Model Forecast

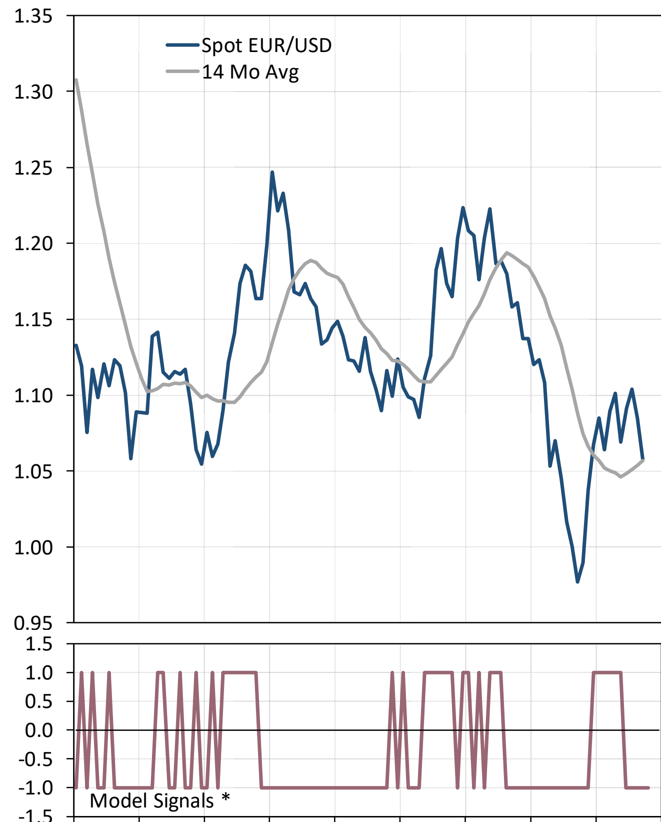

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CHART 17

3 Month Interest Rate Differential

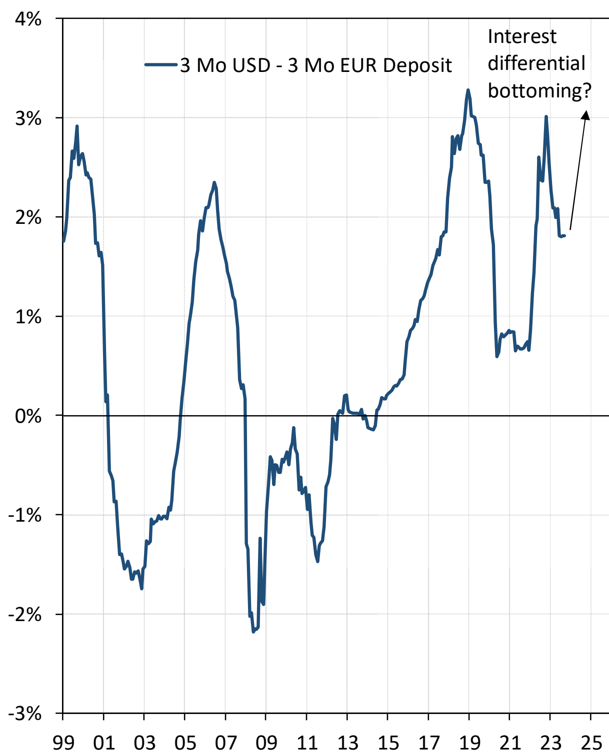

CHART 18

10 Yr Bond Yield Differential

of inflation to target." In centralbankese, that strongly suggests that European Central Bank (ECB) has halted its rate hiking cycle. The announcement followed a surprise rate hike from 4.25% to 4.50%. In contrast to the United States, the European economy has struggled as the ECB has cut its economic growth forecast for 2023 to +0.7% and has cut its 2024 forecast from +1.5% to +1.0%. The German economy is predicted to contract by -0.6% this year. The ECB appears comfortable that its tightening has slowed economic growth enough to keep inflation on its trajectory back to 2%. That view may be justified by recent inflation developments. German inflation fell in September to its lowest level since Russia launched its invasion of Ukraine. German consumer prices were up 4.3% yr/yr, better than economists' forecast of 4.5% and down sharply from August's 6.4% yr/yr rate. Germany's core inflation rate, which excludes food and energy, fell to a 4.6% yr/yr rate from 5.5% in August.

\- 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.

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Gamma Macro Model Forecasts for October 2023

1 MONTH STOCK INDEX MODEL FORECASTS (%)

Country	Stock Index	Price	1 Mo Forecast	Previous Forecast	Position	Trade	Updated
USA	S&P 500	4,299.70	-0.74%	-0.65%	Short	Hold	9/29/23
USA	Nasdaq	13,344.05	-1.92%	-0.66%	Short	Hold	9/29/23
USA	Russell 2000	na	na	na	Long	Hold	9/29/23
Canada	S&P/TSX 60	1,176.89	0.00%	0.00%	Neutral	Hold	9/29/23
Mexico	IPC	51,416.38	0.00%	+0.62%	Neutral	Cover Long	9/29/23
Brazil	Bovespa	116,592.18	0.00%	0.00%	Neutral	Hold	9/29/23
Japan	TOPIX	2,323.39	+0.72%	+1.16%	Long	Hold	9/29/23
China	Hang Seng CEI	6,148.33	0.00%	0.00%	Neutral	Hold	9/29/23
Hong Kong	Hang Seng	15,456.94	0.00%	0.00%	Neutral	Hold	9/29/23
S. Korea	KOSPI	2,465.07	-0.83%	-0.16%	Short	Hold	9/29/23
India	Nifty 500	17,292.60	+1.19%	0.00%	Long	Buy	9/29/23
Australia	S&P/ASX 200	7,048.60	0.00%	0.00%	Neutral	Hold	9/29/23
Europe	STOXX 600	451.91	0.00%	0.00%	Neutral	Hold	9/29/23
UK	FTSE 100	7,634.31	+0.50%	+0.75%	Long	Hold	9/29/23
Germany	DAX	15,456.94	0.00%	0.00%	Neutral	Hold	9/29/23
France	CAC 40	7,166.80	-0.38%	-0.88%	Short	Hold	9/29/23
Italy	FTSE/MIB 30	28,336.94	0.00%	0.00%	Neutral	Hold	9/29/23
Switzerland	Swiss Market	11,005.27	0.00%	0.00%	Neutral	Hold	9/29/23
Russia	RTS 50	1,005.04	0.00%	+0.01%	Neutral	Cover Long	9/29/23
S. Africa	FTSE/JSE 40	66,487.29	+3.33%	+1.55%	Long	Hold	9/29/23

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	5.04	-0.28%	-0.19%	Short	Hold	9/29/23
USA	5 Yr T-Note	4.58	-0.39%	-0.31%	Short	Hold	9/29/23
USA	10 Yr T-Note	4.52	0.00%	0.00%	Neutral	Hold	9/29/23
USA	30 Yr T-Note	4.65	+0.21%	0.00%	Long	Buy	9/29/23
USA	IG Corporate	6.08	0.00%	0.00%	Neutral	Hold	9/29/23
USA	HY Corporate	9.00	0.00%	+0.21%	Neutral	Cover Long	9/29/23
Canada	10 Yr Govt	4.00	-0.09%	-0.20%	Short	Hold	9/29/23
Mexico	10 Yr Cetes	9.96	0.00%	-0.19%	Neutral	Cover Short	9/29/23
Brazil	10 Yr Govt	11.87	0.00%	0.00%	Neutral	Hold	9/29/23
Japan	10 Yr JGB	0.76	0.00%	0.00%	Neutral	Hold	9/29/23
Australia	10 Yr Govt	4.44	0.00%	0.00%	Neutral	Hold	9/29/23
S. Korea	10 Yr Govt	4.01	0.00%	0.00%	Neutral	Hold	9/29/23
China	10 Yr Govt	2.72	-0.15%	0.00%	Short	Sell	9/29/23
India	10 Yr Govt	7.21	-0.17%	-0.06%	Short	Hold	9/29/23
Germany	10 Yr Bund	2.82	0.00%	0.00%	Neutral	Hold	9/29/23
France	10 Yr OAT	3.38	-0.33%	-0.09%	Short	Hold	9/29/23
Italy	10 Yr BTP	4.75	-0.77%	-0.01%	Short	Hold	9/29/23
Switzerland	10 Yr Conf	1.09	-3.60%	-0.01%	Short	Hold	9/29/23
UK	15 Yr Gilt	4.71	0.00%	0.00%	Neutral	Hold	9/29/23
Russia	10 Yr Govt	12.93	0.00%	0.00%	Neutral	Hold	9/29/23
S. Africa	10 Yr Govt	10.84	-0.22%	0.00%	Short	Sell	9/29/23

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Gamma Macro Model Forecasts for October 2023

1 MONTH FX MODEL FORECASTS (%)

Currency	Spot FX Rate	1 Mo Forecast	Previous Forecast	Position	Trade	Updated
EUR/USD	1.0572	-0.66%	-0.62%	Short	Hold	9/29/23
GBP/USD	1.2181	-0.21%	-0.21%	Short	Hold	9/29/23
USD/CHF	0.9154	0.61%	0.64%	Long	Hold	9/29/23
USD/NOK	10.6982	0.07%	0.30%	Long	Hold	9/29/23
USD/SEK	10.9066	0.47%	0.49%	Long	Hold	9/29/23
USD/JPY	149.34	0.85%	0.86%	Long	Hold	9/29/23
AUD/USD	0.6455	0.09%	-0.45%	Long	Cover Short & Buy	9/29/23
NZD/USD	0.6005	0.06%	-0.36%	Long	Cover Short & Buy	9/29/23
USD/KRW	1,346.09	0.47%	0.40%	Long	Hold	9/29/23
USD/CNY	7.3015	0.63%	0.75%	Long	Hold	9/29/23
US/INR	83.09	0.40%	0.30%	Long	Hold	9/29/23
USD/SGD	1.3656	-0.17%	0.28%	Short	Cover Long & Sell	9/29/23
USD/CAD	1.3504	0.00%	0.06%	Long	Hold	9/29/23
USD/BRL	5.0243	-2.44%	-1.53%	Short	Hold	9/29/23
USD/MXN	17.41	-0.41%	-0.51%	Short	Hold	9/29/23
USD/RUB	97.61	-1.34%	-0.63%	Short	Hold	9/29/23
USD/ZAR	18.88	0.14%	0.94%	Long	Hold	9/29/23
BTC/USD	26,770.50	-2.56%	0.80%	Short	Cover Long & Sell	9/29/23

1 MONTH COMMODITY PRICE FORECASTS (%)

Commodity	Cash / Futures Price ($)	1 Month Forecast	Previous Forecast	Position	Trade	Updated
Gold	$1,861.00	0.00%	0.00%	Neutral	Hold	9/29/23
Silver	$22.71	0.00%	0.00%	Neutral	Hold	9/29/23
Platinum	$913.98	0.00%	0.00%	Neutral	Hold	9/29/23
Palladium	$1,257.36	-1.17%	-1.41%	Short	Hold	9/29/23
Aluminum	$2,251.51	+0.51%	0.00%	Long	Buy	9/29/23
Copper	$8,103.00	0.00%	0.00%	Neutral	Hold	9/29/23
Lead	$2,064.75	0.00%	0.00%	Neutral	Hold	9/29/23
Nickel	$20,865.50	0.00%	0.00%	Neutral	Hold	9/29/23
Tin	$25,867.00	0.00%	0.00%	Neutral	Hold	9/29/23
Zinc	$2,287.77	+1.05%	0.00%	Long	Buy	9/29/23
LME COMPOSITE	---	0.00%	0.00%	Neutral	Hold	9/29/23
WTI Crude Oil	$90.75	+0.39%	0.00%	Long	Buy	9/15/23
HH Natural Gas	$2.73	-1.15%	0.00%	Short	Sell	9/20/23

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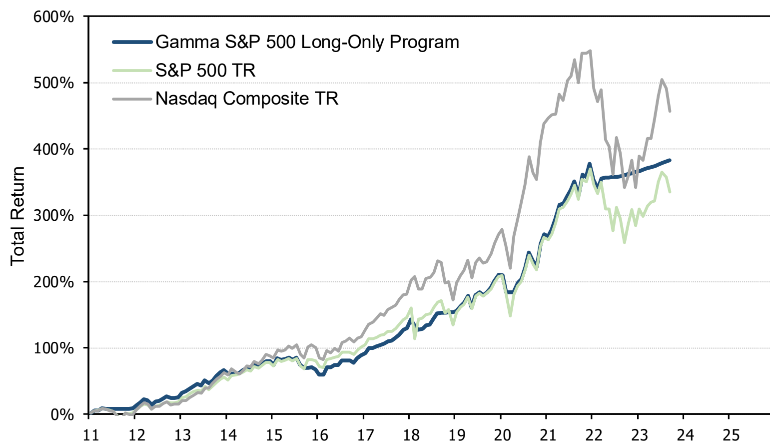
Gamma Model Performance Summary – September 2023

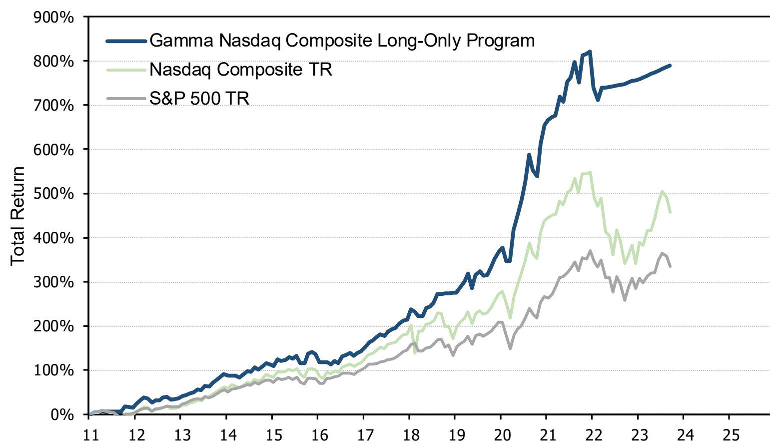
Gamma S&P 500 Long-Only Program — Jan 2011 - Sep 2023



Historical Performance	Program	BM1	BM2
Compound ROR	13.2%	12.2%	14.4%
Cumulative Return	483.2%	335.6%	457.4%
Cumulative VAMI	$4,832	$4,356	$5,574
Best Month	10.9%	13.9%	20.7%
Worst Month	-8.2%	-17.7%	-20.9%
% Positive Months	79.1%	69.9%	65.4%
Historical Risk	**Program**	**BM1**	**BM2**
Standard Deviation	9.8%	15.7%	18.7%
Sharpe Ratio (1.0% RFR)	1.24	0.72	0.72
Sortino Ratio (1.0% RFR)	1.69	1.10	1.20
Downside Deviation	7.2%	10.2%	11.2%
Maximum Drawdown	-14.1%	-23.8%	-31.8%
Months In Maximum Drawdown	18	21	21

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

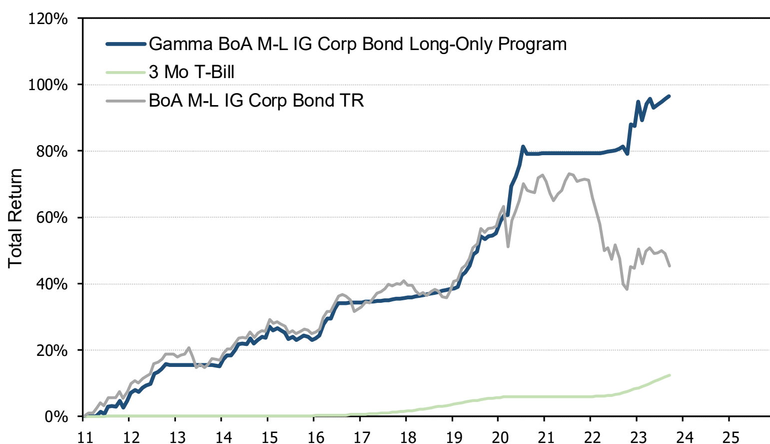
Gamma Nasdaq Composite Long-Only Program — Jan 2011 - Sep 2023



Historical Performance	Program	BM1	BM2
Compound ROR	18.7%	14.4%	12.2%
Cumulative Return	889.6%	457.4%	335.6%
Cumulative VAMI	$8,896	$5,574	$4,356
Best Month	15.5%	20.7%	13.9%
Worst Month	-9.0%	-20.9%	-17.7%
% Positive Months	77.8%	65.4%	69.9%
Historical Risk	**Program**	**BM1**	**BM2**
Standard Deviation	12.8%	18.7%	15.7%
Sharpe Ratio (1.0% RFR)	1.38	0.72	0.72
Sortino Ratio (1.0% RFR)	2.11	1.20	1.10
Downside Deviation	8.4%	11.2%	10.2%
Maximum Drawdown	-12.0%	-31.8%	-23.8%
Months In Maximum Drawdown	21	21	21

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

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



Historical Performance	Program	BM1	BM2
Compound ROR	5.4%	0.9%	3.0%
Cumulative Return	196.5%	12.4%	45.4%
Cumulative VAMI	$1,965	$1,124	$1,454
Best Month	5.3%	0.4%	5.3%
Worst Month	-2.9%	0.0%	-7.5%
% Positive Months	83.7%	100.0%	60.8%
Historical Risk	**Program**	**BM1**	**BM2**
Standard Deviation	3.8%	0.4%	6.0%
Sharpe Ratio (1.0% RFR)	1.16	---	0.33
Sortino Ratio (1.0% RFR)	1.86	---	0.40
Downside Deviation	2.4%	---	4.9%
Maximum Drawdown	-3.3%	0.0%	-20.1%
Months In Maximum Drawdown	27	0	26

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

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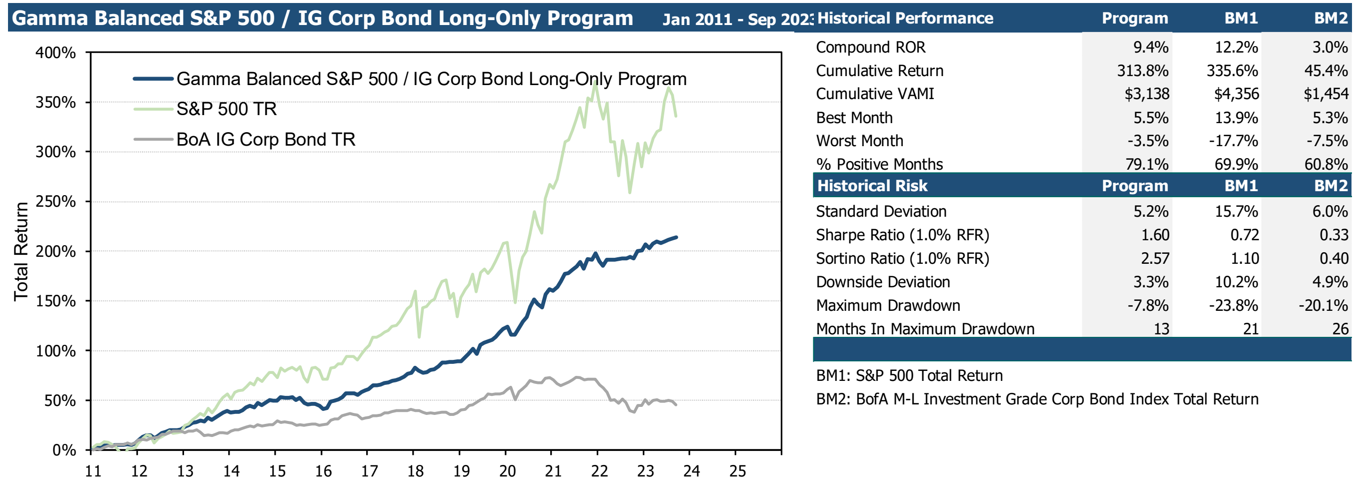
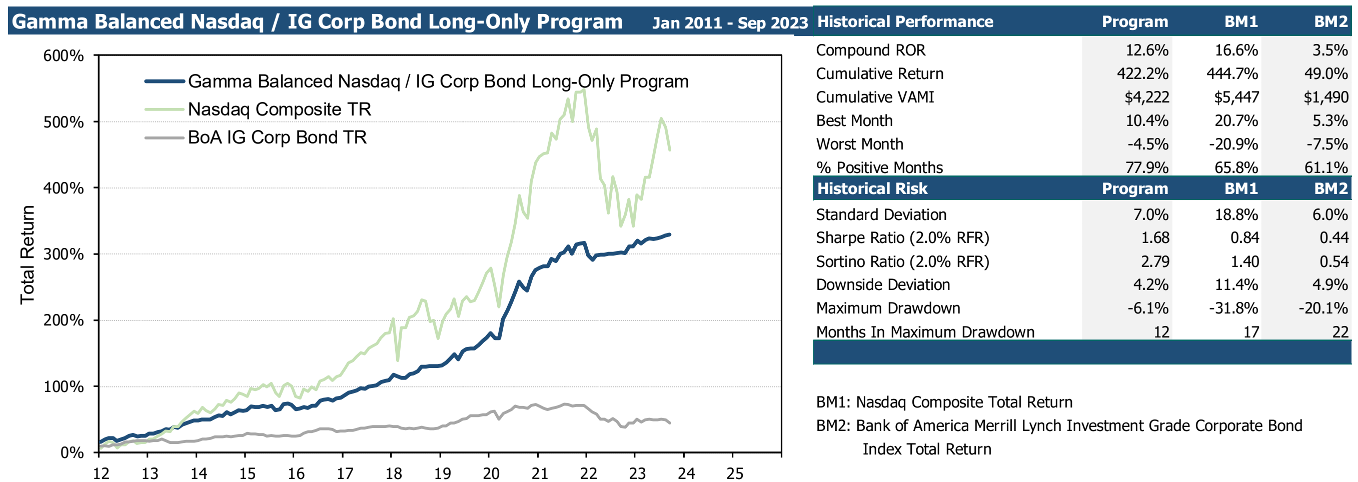
Gamma Model Performance Summary – September 2023



Historical Performance	Program	BM1	BM2
Compound ROR	9.4%	12.2%	3.0%
Cumulative Return	313.8%	335.6%	45.4%
Cumulative VAMI	$3,138	$4,356	$1,454
Best Month	5.5%	13.9%	5.3%
Worst Month	-3.5%	-17.7%	-7.5%
% Positive Months	79.1%	69.9%	60.8%
Historical Risk	**Program**	**BM1**	**BM2**
Standard Deviation	5.2%	15.7%	6.0%
Sharpe Ratio (1.0% RFR)	1.60	0.72	0.33
Sortino Ratio (1.0% RFR)	2.57	1.10	0.40
Downside Deviation	3.3%	10.2%	4.9%
Maximum Drawdown	-7.8%	-23.8%	-20.1%
Months In Maximum Drawdown	13	21	26

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



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

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

Past performance is not indicative of future results

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