



Gamma Investment Research[®]

Gamma Intelligence Reports[®]

Gamma Investment Consulting LLC

T: 203.429.0036

F: 772.408.8092

info@gammaic.com

www.gammaic.com

Gamma Investment Research

Gamma Global Macro Model

- **Gamma Investment Research (GIR) is our institutional suite of forecasting and analytical tools for the major developed and emerging economies covering stock indexes, individual equities, bonds, currencies, commodities, real estate, and economic conditions (Table 1).**
- **GIR is based on our Gamma Global Macro Model, a proprietary nonlinear econometric algorithm that uniquely combines fundamentals and investor bias.**
- **GIR has accurately predicted major trends and inflection points for 35 years.**
- **GIR delivers objective, unbiased, data-driven financial and economic forecasts, investment recommendations, analysis, and research tools needed to preserve and grow wealth.**

TABLE 1: Gamma Global Macro Model Markets

Country	Stock Indexes	Country	Fixed Income	FX Rates	Commodities	Country	Equity Index Constituents	Category	Country	Economic Indicators
USA	S&P 500	USA	2, 5, 10, 30 Yr Treas	USD/CAD	Gold	USA	S&P 500	Large Cap	USA	Interest Rates
USA	Nadaq Composite	USA	Invest Grade Corp	USD/MXN	Silver	USA	S&P 400	Mid-Cap	Canada	Stock Indexes
Canada	S&P/TSX 60	USA	High Yield Corp	USD/BRL	Platinum	USA	S&P 600	Small-Cap	Mexico	Commodity Indexes
Mexico	IPC	Canada	10 Yr Govt	USD/JPY	Palladium	Canada	S&P/TSX 60	Large Cap	Brazil	Exchange Rates
Brazil	Bovespa	Mexico	10 Yr Govt	AUD/USD	Aluminum	Japan	Nikkei 225	Large Cap	Japan	Money Supply
Japan	TOPIX	Brazil	10 Yr Govt	USD/KRW	Copper	Australia	S&P/ASX 200	Large, Mid-Cap	Australia	Output
Australia	S&P/ASX 200	Japan	10 Yr JGB	USD/CNY	Lead	Eurozone	STOXX 600	Large-Cap	S. Korea	Employment
S. Korea	KOSPI	Australia	10 Yr Govt	USD/INR	Nickel				China	Income
China	Hang Seng CEI	S. Korea	10 Yr Govt	USD/SGD	Tin				India	Consumption
China / HK	Hang Seng	China	10 Yr Govt	EUR/USD	Zinc				Eurozone	Housing
India	Nifty 500	India	10 Yr Govt	GBP/USD	Crude Oil				Germany	Capital Investment
Eurozone	STOXX 600	Germany	10 Yr Bund	USD/NOK	Natural Gas				France	Consumer Prices
Germany	DAX	France	10 Yr OAT	USD/SEK					Italy	Producer Prices
France	CAC 40	Italy	10 Yr BTP	USD/RUB					Switzerland	Housing Prices
Italy	FTSE/MIB 30	Switzerland	10 Yr Confederation	USD/ZAR					UK	Imports
Switzerland	Swiss Market	UK	15 Yr Gilt	BTC/USD					Russia	Exports
UK	FTSE 100	Russia	10 Yr Govt						S. Africa	
Russia	RTS 50	S. Africa	10 Yr Govt							
S. Africa	FTSE/JSE 40									

Gamma Investment Research

Indicators and Analysis

- **Gamma Macro and Real Estate Intelligence Reports[®]**
 - Concise monthly summary and analysis of Gamma Global Macro Model forecasts and investment recommendations.
- **Directional Forecast Indicator Tables and Charts**
 - Monthly expected return forecasts and recommended trade and position recommendations for all Gamma Global Macro Model markets and companies of the S&P 500, S&P 400, S&P 600, TSX 60, STOXX 600, Nikkei 225, and ASX 200.
- **Financial Liquidity Indicator Tables and Charts**
 - Proprietary measures of financial liquidity as measured by money supply, central bank balance sheets, interest rates, and credit spreads.
- **Valuation Indicator Tables and Charts**
 - Proprietary valuation indicators for all Gamma Global Macro Model markets including valuation-based expected return forecasts.
- **Behavioral and Sentiment Tables and Charts**
 - Sentiment-based expected return forecasts.
- **Seasonal Return Analysis**
- **Long-Term Economic and Financial Forecasts for Major G-10 and Emerging Market Countries**
- **Global Economic and Financial Reference Tables and Charts**
- **Open weekly Zoom meetings with our Chief Investment Officer.**

Gamma Intelligence Reports®

Macro and Real Estate

- The Gamma Intelligence Reports® provide a concise monthly summary and analysis of forecasts and investment recommendations from the Gamma Global Macro Model



Macro Intelligence Report

July 2022

GAMMA
INVESTMENT
CONSULTING

Gamma Global Macro Model Highlights

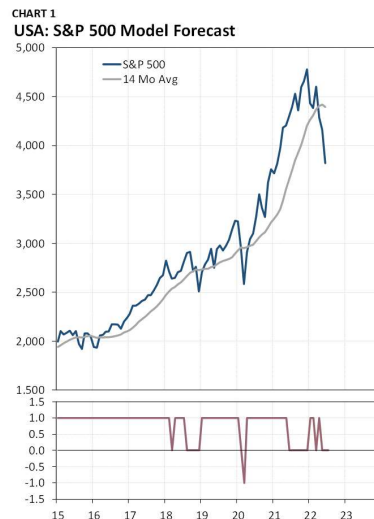
- The S&P 500 and Nasdaq Models remained neutral for July in response to expectations of a further rise in US interest rates. Unchanged from June, all 19 international stock index models also remained neutral as central banks around the world hike rates to bring inflation under control. The European Central Bank (ECB), in particular, has hinted that it will hike rates in July for the first time since 2011.
- The 10- and 30-Year Treasury Models remained long (lower yields) for July. The long-term Treasury Models were joined by the Investment Grade Corporate Model which had been generally short since September 2020. As has been the case for several months, the forecast is supported by favorable valuation, a strong dollar, and clearer signs that inflation is peaking despite the recent Ukraine-induced spike in food and energy prices.
- The Gold Model covered its long position and went short for July joining the other precious metals which have been short the past several months. Favorable valuation and geopolitical cross-currents have failed to offset the negative impact of rising interest rates and the recent collapse in cryptocurrencies.
- The EUR/USD Model remained short the Euro as the Federal Reserve continues to lead the ECB in raising rates. The ECB, despite surging Eurozone inflation, has been constrained by an economy weakened by the imposition of trade restrictions on Russia as a result of its invasion of Ukraine.

I. Equity Index Outlook

The Gamma S&P 500 and Nasdaq Models remained neutral for July (Chart 1). US stocks rallied mid-month on hopes that the Fed would slow its pace of tightening. Those hopes faded on Fed Chairman Powell's comments that his primary concern was that inflation expectations would become embedded and eventually require even higher rates. The comments confirmed the market's expectation that rates would likely be hiked another 75 bps in July and again in September.

Neutral Factors

- Money growth has collapsed but is still painting a mixed picture of liquidity. The Fed's rate hikes have caused real M2 growth to turn negative (Chart 2). Real M2 has fallen four months in a row and is now down -1.7% *yr/yr*, the first time *yr/yr* growth has been negative since 2010. Offsetting this, however, is real True Money Supply (TMS) growth which continues to hover at a 4.9% *yr/yr* rate. TMS continues to be supported by growth in demand deposits which reflect a steady increase in bank lending. Bank credit



Equity Intelligence Report

July 2022

GAMMA
INVESTMENT
CONSULTING

Gamma Equity Model Highlights

- Individual equity recommendation top names are AVGO, KBH, ADBE, INCY, MTD, and FTL.
- The Energy and Real Estate sectors remained the only two sectors forecasting a positive return for July. The consumer discretionary and technology sectors were forecasted to be the worst performers for the month due to persistent overvaluation.
- The S&P 500 and Nasdaq Models remained neutral for July in response to expectations of a further rise in US interest rates. Unchanged from June, all 19 international stock index models also remained neutral as central banks around the world hike rates to bring inflation under control. The European Central Bank (ECB), in particular, has hinted that it will hike rates in July for the first time since 2011.

I. Stock Recommendations – prices as of the close on 6.30.22



1) AVGO Broadcom Inc. (\$485.81)

- Broadcom Inc. is a technology company that designs, develops and supplies various semiconductor and infrastructure software solutions.
- It trades at a forward P/E (NTM) of 12.30 and has a dividend yield of 3.37% (the company has been paying dividends for the past 12 years).
- AVGO is a top pick of Deutsche Bank analyst describing it as a "safe port" in the current "macro storm." "We believe Broadcom's combination of infrastructure-heavy, mission-critical semiconductor and software products with relatively minimal consumer-oriented exposure as offering desirable stability in an environment of rising macro/semi sector volatility and an attractive investment for those that value long-term returns."
- It is the preferred stock in the sector because of its defensive characteristics.
- Broadcom is well positioned with a steady offering of infrastructure-heavy, mission-critical semiconductor and related products.
- It is also listed as one of Wall Street's favorite dividend payers in the S&P 500 and a company that is winning the inflation battle and expanding margins.
- AVGO management is prioritizing shipping based on true-demand instead of aggregate bookings.

Gamma Directional Indicators

Expected Return Forecasts and Recommended Trades

- The Gamma Global Macro Model generates one-month-ahead expected return forecasts and investment recommendations for all the major asset classes. Forecasts are summarized in tables and charts showing the direction of the signal.



Equity Index Model Forecasts

February 2022

GAMMA
INVESTMENT
CONSULTING

TABLE 1
1 MONTH STOCK INDEX MODEL FORECASTS (%)

Country	Stock Index	Price	1 Mo Forecast	Previous Forecast	Position	Trade	Updated
USA	S&P 500	4,384.65	0.00%	0.39%	Neutral	Cover Long	2/28/22
USA	Nadaq	13,582.13	0.00%	0.55%	Neutral	Cover Long	2/28/22
Canada	S&P/TSX 60	1,273.49	0.00%	0.00%	Neutral	Hold	2/28/22
Mexico	IPC	52,176.71	0.20%	0.00%	Long	Buy	2/28/22
Brazil	Bovespa	113,141.94	7.61%	7.61%	Long	Hold	2/28/22
Japan	TOPIX	1,886.93	0.00%	1.13%	Neutral	Cover Long	2/28/22
Australia	S&P/ASX 200	7,049.10	0.00%	0.00%	Neutral	Hold	2/28/22
S. Korea	KOSPI	2,699.18	0.00%	0.00%	Neutral	Hold	2/28/22
China	Hang Seng CEI	8,023.93	0.00%	0.95%	Neutral	Cover Long	2/28/22
China / HK	Hang Seng	14,275.10	0.00%	0.00%	Neutral	Hold	2/28/22
India	Nifty 500	14,307.95	0.00%	0.31%	Neutral	Cover Long	2/28/22
Eurozone	STOXX 600	448.63	0.00%	0.00%	Neutral	Hold	2/28/22
Germany	DAX	14,275.10	0.00%	0.00%	Neutral	Hold	2/28/22
France	CAC 40	6,576.61	0.00%	0.00%	Neutral	Hold	2/28/22
Italy	FTSE/MIB 30	25,044.22	0.00%	0.00%	Neutral	Hold	2/28/22
Switzerland	Swiss Market	11,940.84	0.00%	0.00%	Neutral	Hold	2/28/22
UK	FTSE 100	7,399.37	0.00%	0.00%	Neutral	Hold	2/28/22
Russia	RTS 50	936.94	0.00%	0.00%	Neutral	Hold	2/28/22
S. Africa	FTSE/JSE 40	69,505.49	0.00%	2.32%	Neutral	Cover Long	2/28/22

1-month expected return forecasts, previous month's forecasts, recommended positions, and recommended trades

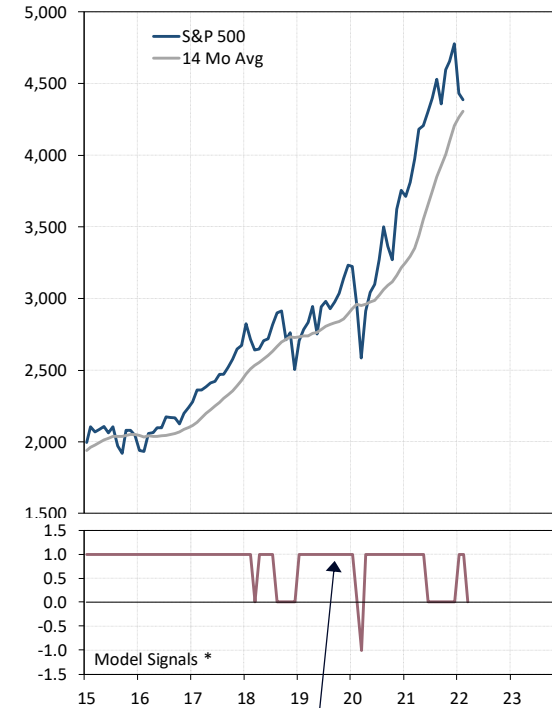


Equity Index Model Forecasts

February 2022

Country	Instrument	1 Mo Fcst	Position	Trade	Updated
USA	S&P 500	0.00%	Neutral	Cover Long	2/28/22

USA: S&P 500 Model Forecast



Graphic presentation of Gamma Macro Model directional forecast (1=bullish, -1=bearish, 0=neutral)

Gamma Equity Forecasts

Forecasts and Analysis of Companies, Sectors, and Indexes

- The Gamma Global Macro Model generates expected return forecasts for companies and sectors in the **S&P 500, S&P 400, S&P 600, TSX 60, STOXX 600, Nikkei 225, and ASX 200.**



S&P 500: Company Stock Model Forecasts

GAMMA INVESTMENT CONSULTING



Equity Sector Index Model Forecasts

April 2023

GAMMA INVESTMENT CONSULTING

S&P 500: LARGE CAP STOCKS

Forecast for: Apr 2023

1 Month Company Stock Price Forecasts (%)

Mar 31, 2023

Company	Ticker	Closing Price	1 Mo Forecast	Previous Forecast	Change	Factor Momentum
3M	MMM	\$105.11	0.41%	-0.08%	0.49%	Neutral
ABBOTT LABORATORIES	ABT	\$101.26	-0.24%	-0.23%	-0.01%	Neutral
ABBVIE	ABBV	\$159.37	0.28%	0.45%	-0.17%	Neutral
ACCENTURE CLASS A	ACN	\$285.81	-0.09%	0.78%	-0.87%	Neutral
ACTIVISION BLIZZARD	ATVI	\$85.59	0.30%	0.32%	-0.02%	Neutral
ADOBE (NAS)	ADBE	\$385.37	1.10%	-0.02%	1.12%	Neutral
ADV. AUTO PARTS	AAP	\$121.61	0.90%	0.19%	0.71%	Neutral
ADVANCED MICRO DEVICES	AMD	\$98.01	2.35%	1.10%	1.24%	Positive
AES	AES	\$24.08	0.20%	1.23%	-1.03%	Neutral
AFLAC	AFL	\$64.52	-0.19%	-0.61%	0.42%	Neutral
AGILENT TECHS.	A	\$138.34	-0.50%	-0.14%	-0.36%	Neutral
AIR PRDS. & CHEMS.	APD	\$287.21	-0.21%	-0.61%	0.40%	Neutral
AKAMAI TECHS.	AKAM	\$78.30	-0.22%	-0.90%	0.68%	Neutral
ALASKA AIR GROUP	ALK	\$41.96	-0.48%	-0.03%	-0.45%	Neutral
ALBEMARLE	ALB	\$221.04	0.70%	-0.12%	0.82%	Neutral
ALEXANDRIA RLST. EQTIES.	ARE	\$125.59	1.32%	-0.40%	1.72%	Neutral
ALIGN TECHNOLOGY	ALGN	\$334.14	1.36%	0.35%	1.00%	Positive
ALLEGION	ALLE	\$106.73	0.26%	0.01%	0.25%	Positive
ALLIANT ENERGY (KSC)	LNT	\$53.40	0.26%	1.11%	-0.85%	Neutral
ALLSTATE ORD SHS	ALL	\$110.81	0.91%	-0.96%	1.87%	Neutral
ALPHABET A	GOOGL	\$103.73	-0.39%	0.00%	-0.38%	Neutral
ALPHABET 'C'	GOOG	\$104.00	-0.59%	0.36%	-0.95%	Neutral
ALTRIA GROUP	MO	\$44.62	1.26%	1.04%	0.23%	Positive
AMAZON.COM	AMZN	\$103.29	-0.31%	-1.36%	1.05%	Neutral
AMER. ELEC. PWR.	AEP	\$90.99	0.50%	0.52%	-0.02%	Neutral
AMEREN	AEE	\$86.39	0.38%	0.67%	-0.30%	Neutral
AMERICAN AIRLINES GROUP	AAL	\$14.75	-0.04%	-0.36%	0.32%	Neutral
AMERICAN EXPRESS	AXP	\$164.95	-0.33%	-0.13%	-0.20%	Neutral
AMERICAN INTL. GP.	AIG	\$50.36	-1.20%	-1.81%	0.60%	Neutral
AMERICAN TOWER	AMT	\$204.34	-1.90%	-0.25%	-1.65%	Neutral



1-month expected return forecasts, previous month's forecasts, and factor momentum

TABLE 2

1 MONTH STOCK SECTOR MODEL FORECASTS (%)

Sector	Ticker	1 Mo Forecast	Previous Forecast	Updated
Consumer Staples	XLP	0.84%	-0.10%	3/31/23
Energy	XLE	0.72%	1.06%	3/31/23
Health Care	XLV	0.58%	-0.13%	3/31/23
Gold Miners	---	0.50%	-1.29%	3/31/23
Utilities	XLU	0.31%	0.17%	3/31/23
Real Estate	XLRE	0.11%	-1.02%	3/31/23
Materials	XLB	0.02%	-0.12%	3/31/23
Communications Services	XLC	-0.22%	-1.41%	3/31/23
Technology	XLK	-0.29%	-1.47%	3/31/23
Industrials	XLI	-0.37%	-0.65%	3/31/23
Consumer Discretionary	XLY	-1.16%	-2.20%	3/31/23
Financials	XLF	-1.16%	-1.14%	3/31/23

Gamma Valuation Indicators

Valuation Measures and Valuation-Based Expected Return Forecasts

- Proprietary measures of market valuation and 1-month to 5-year expected return forecasts based on current valuations. Measures and forecasts are summarized in tables and charts.



Equity Index Valuation vs Forward Return Analysis

July 2022

GAMMA INVESTMENT CONSULTING

TABLE 1

VALUATION vs FORWARD RETURN ANALYSIS - ANNUALIZED RETURNS

Updated: 06/30/22

Country	Valuation		Valuation-Based Forecast (Annualized, %)						
	(σ)	(%)	1 Mo	3 Mo	6 Mo	1 Yr	2 Yr	3 Yr	5 Yr
United States	+0.28	+6%	9.4%	9.5%	9.9%	10.5%	11.2%	11.5%	11.8%
S&P 500	+0.16	+3%	11.0%	10.9%	11.3%	11.7%	12.1%	12.3%	12.5%
Nasdaq	+0.47	+13%	8.4%	8.3%	9.0%	10.0%	11.3%	11.9%	12.1%
S&P 600 Small Cap	-1.57	-26%	39.3%	38.1%	35.6%	31.1%	21.9%	18.0%	16.6%
Canada	-1.75	-29%	25.8%	25.3%	25.5%	25.0%	20.0%	17.1%	17.3%
Brazil	-2.74	-55%	92.2%	86.1%	75.7%	58.8%	45.0%	39.1%	31.7%
Mexico	-1.57	-23%	33.1%	32.2%	34.9%	30.9%	27.3%	27.0%	24.6%
Australia	-1.99	-46%	28.4%	27.8%	27.5%	27.5%	24.0%	20.5%	19.9%
Japan	-0.16	-7%	7.8%	7.8%	8.2%	8.6%	8.9%	9.2%	9.4%
China	-0.82	-30%	27.6%	27.0%	25.0%	22.2%	18.5%	18.5%	22.0%
S. Korea	-1.24	-28%	38.3%	37.1%	35.2%	35.5%	25.4%	19.3%	14.9%
India	-1.10	-20%	35.9%	34.9%	37.4%	37.1%	28.5%	25.3%	23.8%
Europe	-1.96	-44%	22.0%	21.6%	25.1%	24.5%	21.4%	19.5%	18.9%
Germany	-2.38	-50%	22.4%	22.0%	23.7%	23.4%	20.9%	19.7%	18.3%
France	-1.09	-23%	21.3%	20.9%	22.7%	22.1%	20.0%	18.4%	17.2%
Italy	-1.63	-39%	13.9%	13.7%	17.0%	19.2%	17.8%	15.7%	16.7%
Switzerland	-2.29	-44%	12.0%	11.9%	15.1%	14.5%	12.8%	11.9%	14.0%
UK	-0.61	-15%	18.4%	18.1%	18.7%	17.8%	15.9%	16.1%	15.7%
Russia	-1.49	-55%	61.1%	58.2%	72.8%	66.6%	56.0%	43.3%	43.6%
S. Africa	-1.98	-32%	36.2%	35.1%	37.5%	36.0%	34.0%	32.9%	24.5%

1-month to 5-year annualized expected returns based on current valuation

Current over/under-valuation in standard deviations (σ) and percentage terms.



Equity Index Valuation Analysis

July 2022

Country	Index	Valuation	Valuation	Annual Forecast (%)		Updated
		(σ)	(%)	1 Yr	3 Yr	
USA	S&P 500	+0.16	+3%	11.3%	12.1%	6/30/2022

USA: S&P 500 Valuation



Graphic presentation of market valuation in standard deviations (σ)

Gamma Liquidity Indicators

Country Measures of Financial Liquidity

- Proprietary measures of financial liquidity for major developed and emerging markets (tables and charts) as measured by money supply, central bank balance sheet, interest rates, and credit spreads.



Composite Liquidity Indicators

September 2023



Composite Liquidity Indicator

September 2023

TABLE 1

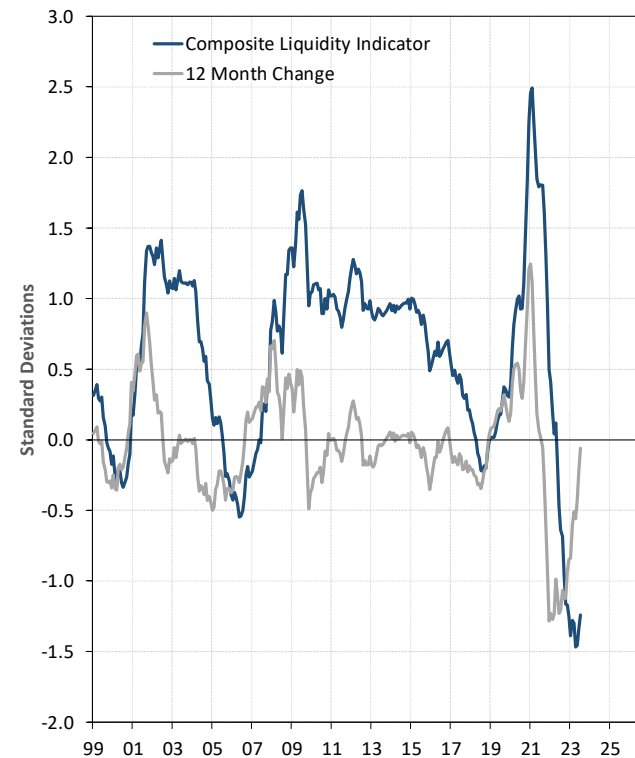
COMPOSITE LIQUIDITY INDICATORS ¹

Country	Liquidity Indicator	12 Mo Change	Updated
USA	-1.24	-0.06	8/31/23
Canada	-1.12	0.02	8/31/23
Mexico	-0.71	0.32	8/31/23
Brazil	0.76	1.07	8/31/23
Japan	-0.25	-0.13	8/31/23
Australia	-0.76	-0.03	8/31/23
S. Korea	-0.84	-0.13	8/31/23
China	-0.76	-0.56	8/31/23
India	-0.21	0.14	8/31/23
Germany	-1.59	-0.23	8/31/23
France	-1.21	-0.35	8/31/23
Italy	-1.18	-0.50	8/31/23
Switzerland	-0.95	-0.25	8/31/23
UK	-1.63	0.10	8/31/23
Russia	-0.48	0.62	8/31/23
S. Africa	-0.17	0.06	8/31/23
G-7	-1.44	-0.13	8/31/23

¹ Standard Deviations

Financial liquidity measured in standard deviations (σ) vs 12-month change.

United States



Graphic presentation of financial liquidity vs 12-month rate-of-change.

Gamma Seasonal Analysis

Seasonal Measures of Monthly and Annual Price Changes

- Charts of average monthly changes and their effect on cumulative annual returns.

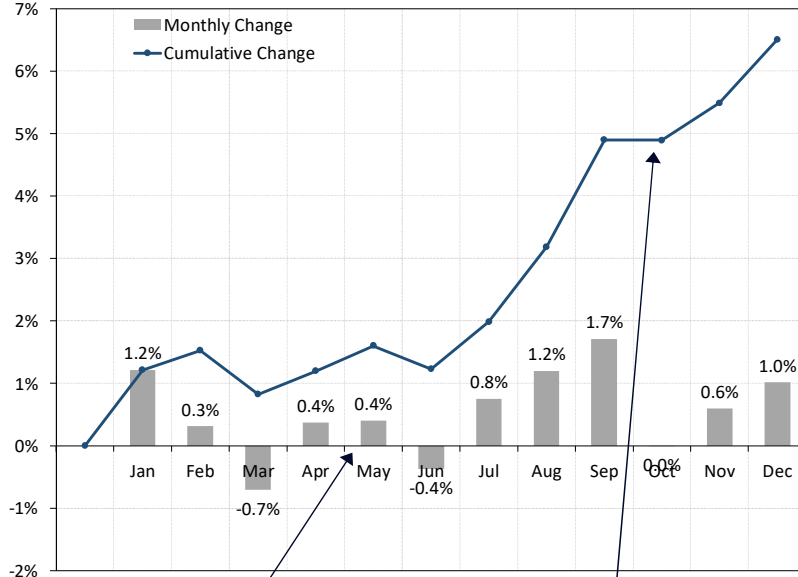


Commodity Seasonal Analysis - Precious Metals

July 2022

GAMMA
INVESTMENT
CONSULTING

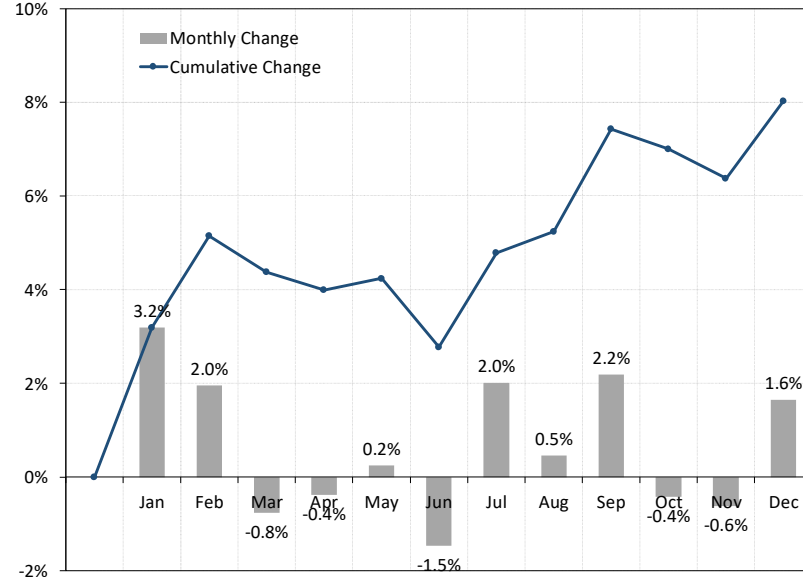
Avg Mo Change: Cash Gold (1975 - Present)



Average historical monthly % change in price/return.

Cumulative annual change due to seasonals

Avg Mo Change: Cash Silver (1975 - Present)



Gamma Sentiment Indicators

Sentiment Measures and Sentiment-Based Expected Return Forecasts

- Behavioral measures of investor sentiment and 1-month to 5-year expected return forecasts based on current sentiment. Sentiment is measured by market surveys, market diffusion, and CoT reports. Measures and forecasts are summarized in tables and charts.



Equity Index Sentiment vs Forward Return Analysis

December 2023

TABLE 1

SENTIMENT vs FORWARD RETURN ANALYSIS - ANNUALIZED RETURNS Updated: 11/30/23

Country	Sentiment	Sentiment-Based Forecast (Annualized, %)						
	(σ) ¹	1 Mo	3 Mo	6 Mo	1 Yr	2 Yr	3 Yr	5 Yr
United States	+0.56	14.3%	11.3%	12.0%	11.1%	11.5%	11.8%	11.9%
Canada	+0.30	10.4%	9.5%	9.8%	9.8%	9.5%	9.7%	10.7%
Mexico	-0.02	13.4%	15.5%	16.6%	16.9%	17.1%	17.6%	16.9%
Brazil	+0.65	17.1%	17.6%	18.9%	16.1%	14.0%	15.6%	16.3%
Australia	-0.01	15.2%	16.0%	13.3%	14.2%	13.2%	13.5%	12.4%
Japan	+1.00	19.4%	13.7%	12.0%	8.9%	8.0%	8.4%	6.9%
China	-0.49	-9.4%	3.2%	9.2%	11.8%	12.9%	12.0%	15.7%
Hong Kong	-0.52	9.0%	12.4%	16.0%	19.8%	19.5%	18.8%	17.7%
S. Korea	+0.33	1.8%	2.5%	5.8%	5.5%	6.0%	7.3%	7.2%
India	+1.16	48.4%	37.7%	28.2%	15.3%	13.8%	15.0%	12.7%
Europe	+0.35	12.9%	11.8%	12.1%	11.1%	12.0%	12.2%	11.4%
Germany	+0.36	15.0%	12.0%	10.8%	10.0%	9.6%	9.2%	8.7%
France	+0.43	15.8%	14.3%	14.3%	13.1%	13.9%	13.7%	13.0%
Italy	+0.59	16.7%	17.5%	16.3%	16.6%	16.0%	14.8%	13.1%
Switzerland	+0.29	15.1%	12.6%	12.5%	10.6%	10.8%	10.7%	10.7%
UK	+0.19	15.5%	12.6%	12.1%	11.3%	11.9%	12.1%	12.4%
Russia	+0.26	11.7%	9.8%	9.6%	12.8%	13.7%	13.4%	14.0%
S. Africa	+0.20	22.1%	19.9%	17.6%	17.8%	19.3%	19.7%	19.5%
AVERAGE	+0.31	14.7%	13.9%	13.7%	12.9%	12.9%	13.1%	12.8%

¹ positive = bullish; negative = bearish

1-month to 5-year annualized expected returns based on current sentiment

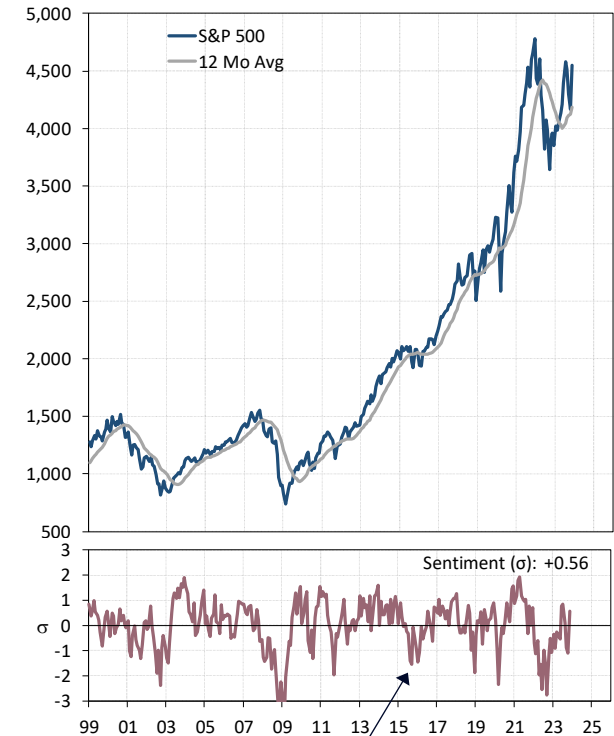
Current sentiment and value in standard deviations (σ)



Equity Index Sentiment Analysis

December 2023

USA: S&P 500 Sentiment



Graphic presentation of investor sentiment

Gamma Real Estate Indicators

Projections and analysis of residential real estate conditions

- The Gamma Real Estate Intelligence Report provides detailed forecasts and analysis of current housing market conditions, housing demand, housing affordability and valuation, housing prices, inventory and supply, and construction costs.

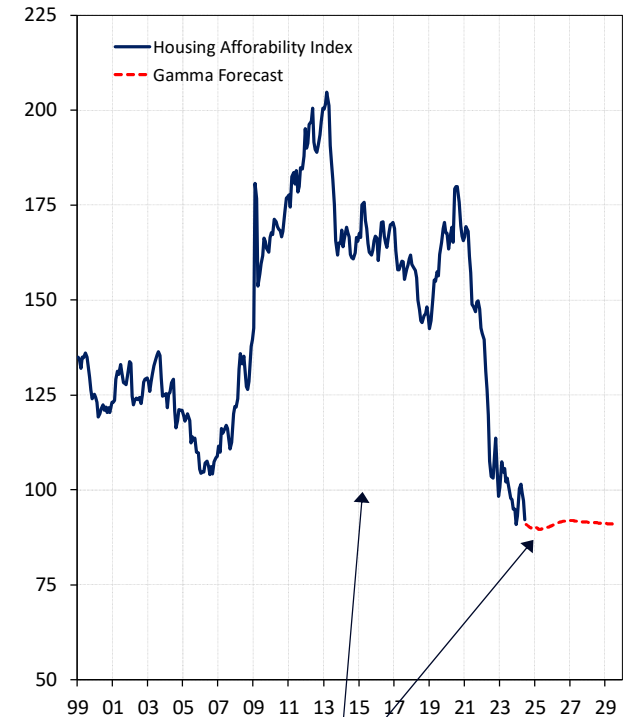
Housing Market Indicators and Gamma Model Forecasts

Housing Demand	Measure	Current	Year	Change	Gamma Housing Model Forecast				
		Value	Ago		3 Mo	6 Mo	1 Yr	2 Yr	3 Yr
Index of Leading Economic Indicators	Yr/Yr % Change	-5.3%	-8.2%	2.8%	-3.7%	-0.5%	3.6%	3.2%	3.2%
Disposable Personal Income (DPI)	Yr/Yr % Change	3.7%	9.2%	-5.4%	4.5%	5.1%	6.2%	6.8%	6.8%
Unemployment Rate	Percent	4.00	3.70	0.30	3.93	3.83	3.63	3.38	3.37
Population Growth	Thousands	338,016	336,550	1,466	338,390	338,765	339,513	340,970	342,385
5-Year Adjustable Rate Mortgage (ARM)	Percent	6.60	5.56	1.04	6.34	6.17	5.88	5.66	5.56
30-Year Fixed Rate Mortgage (FRM)	Percent	7.03	6.57	0.46	6.84	6.71	6.53	6.42	6.32
Consumer Debt Ratio (% of DPI)	Percent	5.78	5.88	-0.10	5.76	5.74	5.67	5.61	5.62
Mortgage Debt Ratio (% of DPI)	Percent	4.02	4.02	0.00	4.00	3.97	3.89	3.79	3.79
Household Debt Delinquency Rate (>90 days)	Percent	0.18	0.13	0.05	0.17	0.17	0.16	0.15	0.14
Mortgage Debt Delinquency Rate (>90 days)	Percent	1.02	1.24	-0.22	1.04	1.00	0.86	0.61	0.58
Mortgage Originations	Billion \$	\$374.4	\$376.0	-\$1.6	\$364.9	\$367.9	\$360.1	\$371.9	\$373.7
	Yr/Yr % Change	-0.4%	-51.7%	51.3%	-16.7%	-13.0%	-3.8%	3.3%	0.5%

Housing Inventory & Supply	Measure	Current	Year	Change	Gamma Housing Model Forecast				
		Value	Ago		3 Mo	6 Mo	1 Yr	2 Yr	3 Yr
Private Housing Under Construction (SF + Multi)	Thousands	1,593	1,692	-99	1,592	1,597	1,608	1,639	1,645
Private Housing Units Under Construction (SF)	Thousands	679	693	-14	677	680	689	713	728
Housing Starts	Thousands	1,277	1,583	-306	1,295	1,301	1,280	1,281	1,277
Building Permits	Thousands	1,386	1,532	-146	1,382	1,390	1,377	1,400	1,399
Ratio: Housing Completions to Starts	Ratio	1.19	0.95	0.24	1.20	1.19	1.21	1.21	1.20
Months' Supply of Existing Single Family Homes	Months	3.8	2.9	0.9	3.8	3.7	3.7	3.3	2.9
Number of Existing Single Family Homes for Sale	Thousands	1,176	906	270	1,173	1,167	1,138	1,060	1,007
Days on Market: Existing Single-Family Homes	Days	25	36	-12	22	21	21	22	22

← 3-month to 3-year forecasts →

Housing Affordability Index



Graphic presentation of historical economic data and model forecast

Gamma Economic Indicators

International Economic Forecasts

- Long-term economic forecasts covering interest rates, stock indexes, exchange rates, price indexes, output, employment, consumption, and investment for the major developed and emerging economies. Measures and forecasts are summarized in tables and charts.



Economic Forecasts - USA
September 2022

GAMMA
INVESTMENT
CONSULTING



Economic Forecasts - USA
September 2022

TABLE 1

Updated: 08/15/22

Indicator	Measure	End of	Current Value	Model Forecast					
				1 Mo	3 Mo	6 Mo	1 Yr	2 Yr	3 Yr
3 Mo T-Bill	Yield, %	July	2.34	2.51	2.71	2.88	2.33	1.86	1.88
5 Yr T-Note	Yield, %	July	2.70	2.76	2.83	2.84	2.59	2.06	1.87
10 Yr T-Note	Yield, %	July	2.64	2.70	2.77	2.80	2.65	2.20	2.01
30 Yr T-Bond	Yield, %	July	2.98	3.04	3.12	3.17	3.09	2.70	2.53
S&P 500 Index	Level	July	4,130.29	4,090.98	4,030.52	3,951.54	3,991.85	4,381.60	4,857.55
S&P/GSCI Commodity Index	Yr/Yr, %	July	28.0%	29.7%	14.3%	5.9%	-7.6%	-2.7%	3.6%
Raw Industrials Materials	Yr/Yr, %	July	-3.2%	-4.6%	-9.7%	-11.3%	-7.7%	-1.5%	4.3%
EUR/USD	Spot	July	0.9950	0.9940	0.9930	0.9920	0.9910	0.9900	0.9890
USD/JPY	Spot	July	132.00	132.13	132.26	132.40	132.53	132.66	132.79
USD/CAD	Spot	July	1.2933	1.2946	1.2959	1.2972	1.2985	1.2998	1.3011
USD/MXN	Spot	July	19.934	19.954	19.974	19.994	20.014	20.034	20.054
AUD/USD	Spot	July	0.6960	0.6953	0.6946	0.6939	0.6932	0.6925	0.6918
USD/CNY	Spot	July	6.852	6.8591	6.8659	6.8728	6.8796	6.8865	6.8934
Gold	Cash, \$/oz	July	\$1,764	\$1,772	\$1,803	\$1,868	\$2,056	\$2,371	\$2,672
True Money Supply {TMS}	Yr/Yr, %	July	8.4%	10.0%	11.8%	8.5%	3.3%	8.8%	9.6%
M1	Yr/Yr, %	July	5.2%	4.4%	3.7%	2.5%	7.0%	9.8%	9.0%
M2	Yr/Yr, %	July	5.3%	4.6%	4.2%	3.2%	7.0%	9.2%	8.6%
C&I Loans and Leases	Yr/Yr, %	July	10.5%	12.8%	16.0%	16.7%	13.1%	5.1%	7.6%
Index of Leading Indicators	Yr/Yr, %	July	0.0%	-1.5%	-3.5%	-6.3%	-7.9%	0.4%	3.5%
Index of Coincident Indicators	Yr/Yr, %	July	2.1%	2.0%	1.1%	-0.2%	-2.0%	0.2%	2.8%
Industrial Production	Yr/Yr, %	July	3.9%	3.6%	2.2%	-0.3%	-5.6%	-1.3%	2.7%
Nonag Payrolls	Yr/Yr, %	July	4.2%	4.0%	3.4%	2.3%	0.4%	0.3%	2.1%
Unemployment Rate	Level, %	July	3.5%	3.6%	3.7%	3.9%	4.2%	4.2%	3.5%
Personal Income	Yr/Yr, %	June	5.7%	4.8%	6.6%	6.3%	7.3%	7.6%	7.7%
PCE	Yr/Yr, %	June	8.4%	9.0%	8.5%	9.4%	7.5%	7.5%	7.9%
Retail Sales	Yr/Yr, %	July	10.3%	9.4%	6.9%	5.6%	0.8%	1.4%	3.0%

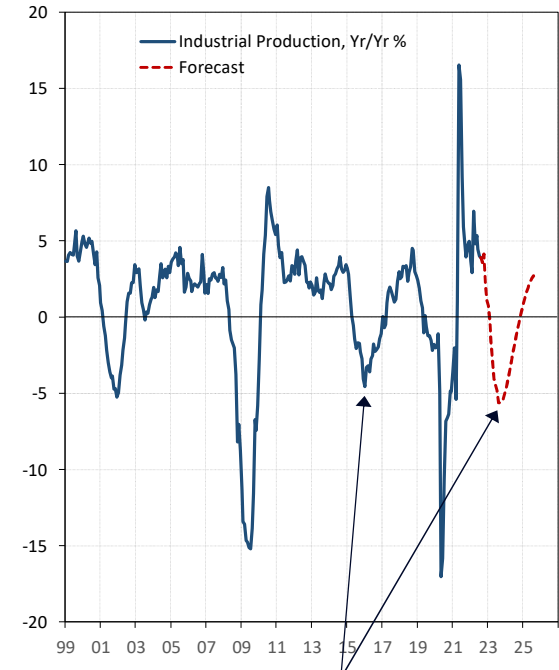


1-month to 3-year forecasts

OUTPUT, EMPLOYMENT, AND INCOME INDICATORS

Indicator	Measure	End of	Value	1 Yr Fcst	Change
Industrial Production	Yr/Yr %	July	3.9%	-5.6%	-9.5%

Industrial Production Forecast



Graphic presentation of historical economic data and model forecast

Gamma Investment Consulting Principals

Karl V. Chalupa is the CEO 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.

Nicholas "Claude" Colabella is the Chief Operating Officer and Co-Founder of Gamma Investment Consulting and Co-Editor of the Gamma Equity Intelligence Report. He was previously Director of Communications and Investor Relations at Titan Advisors, LLC, a \$4.5 billion alternative assets solutions firm. Mr. Colabella has equity research experience working at Petroleum Research Group, Inc. (Rye, NY), an independent energy equity research boutique and at John S. Herold, Inc., a leading petroleum research and consulting firm. He was a Managing Partner at Alpha Beta Alternative Investments, Inc., an alternative investment boutique that managed Alpha Beta Partners, LP, a multi-strategy "fund of funds ." Mr. Colabella holds an MBA in Finance from Duke University, Fuqua School of Business. He graduated *magna cum laude* from Manhattan College with a BS BA in Economics and is Series 7 and 63 registered.