U.S. Bear Market Probability Indicator

Probability of -20% or More Market Drawdown Over the Next 12 Months

Key Topics Covered

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- Asset Allocation
- Market Trading Tools

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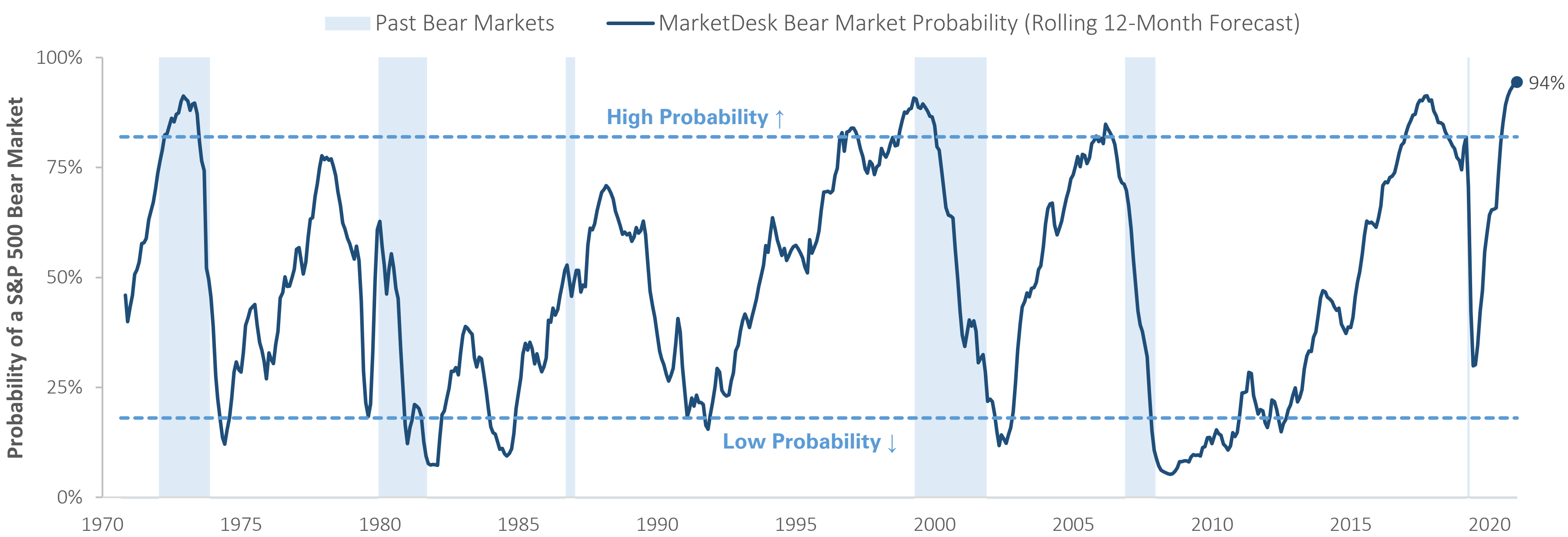
Indicator Overview

- The *U.S. Bear Market Probability Indicator* forecasts the probability of -20% or more market drawdown over the next 12 months
- Based on a composite of 12 macro inputs (labor markets, stock market valuation, interest rates, inflation, Federal Reserve monetary policy, etc.) that exhibit a high statistical correlation with the year-over-year change in S&P 500 earnings growth.
- The leading indicator (1) provides an early warning signal when the risk of a major market selloff is rising, and (2) allows investors to proactively manage portfolio risk by adjusting portfolio allocations.



Data as of 12/31/2021. Visit www.QuantPack.com/plans to see the indicator's latest forecast.

What is a Bear Market?

- Bear Market = A decline of 20% or more in the stock market (i.e., S&P 500 Index)

- Bear markets are an unavoidable part of investing. Historically a bear market occurs every 3-5 years and averages ~14 months in length. Bear markets are often associated with economic recessions, high unemployment rates, and a decline in consumer confidence, as investors worry about the future health of the economy.

- Market drawdowns can quickly erase years of investment gains over only a few short months. However, these inflection points also present opportunities for well-prepared investors.

Market Impacts

Figure 1 – S&P 500 Performance

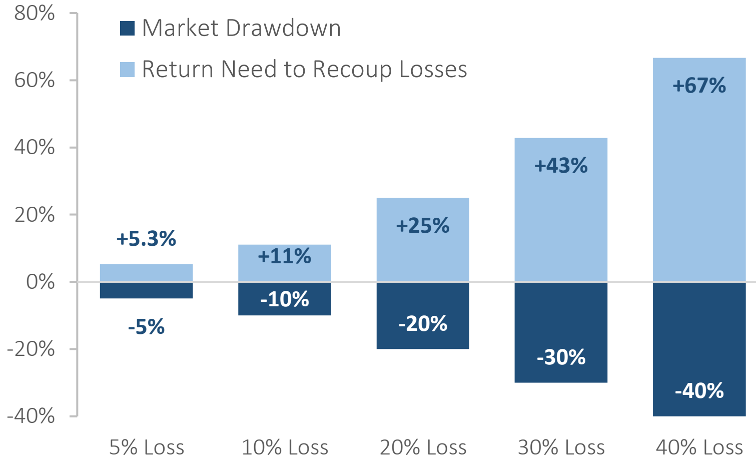
- The table shows historical forward returns for the S&P 500 based on the indicator's readings (see page 3).
- The data shows as the indicator's probability of a bear market increases, the S&P 500's forward returns and percentage of positive return outcomes both decrease well below the average. As the indicators' probability of a bear market decreases, the S&P 500's forward returns and percentage of positive return outcomes both increase.

Historical Forward S&P 500 Returns (%) Since 1970s

	Indicator Reading	6 Months		9 Months		12 Months		18 Months	
		Avg	Win %	Avg	Win %	Avg	Win %	Avg	Win %
Risk Off	> 90%	-6.3	21%	-9.7	23%	-10.1	26%	-5.4	29%
Risk Off	> 80%	-0.4	54%	-1.9	51%	-2.2	46%	-0.5	46%
Risk Off	> 70%	1.8	60%	2.6	64%	3.1	62%	5.5	61%
Risk Off	> 60%	2.7	63%	4.1	67%	5.1	66%	6.9	65%
All Past Events		4.3	70%	6.5	73%	8.8	74%	13.6	78%
Risk On	< 40%	6.3	76%	9.6	81%	12.8	84%	18.5	88%
Risk On	< 30%	8.0	83%	12.1	86%	15.7	92%	21.4	95%
Risk On	< 20%	9.5	83%	14.5	89%	18.9	96%	25.1	98%
Risk On	< 10%	11.6	83%	18.4	89%	21.9	100%	26.0	100%

Figure 2 – Time to Recoup Portfolio Losses

- Market drawdowns can quickly erase years of investment gains. The chart shows the forward return you would need for different levels of market drawdowns.
- A small loss of -5.0% would require a similar level of gains to recoup the loss. However, a larger loss of say -40% would require a return of +67% just to breakeven on your investment.

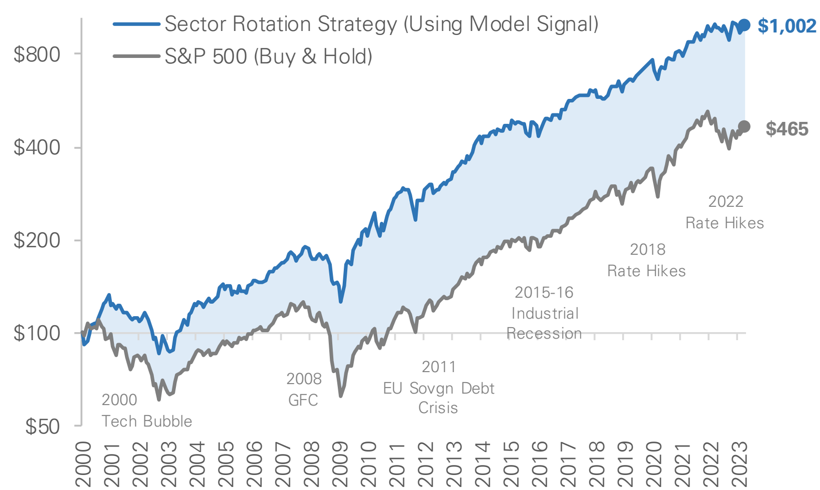


Data as of 4/30/2023

Model Signal #1 – Sector Rotation Strategy

- **Model Signal** – If the *U.S. Bear Market Probability Indicator* has been above 75% in the last 18 months (page 3), own Defensive Sector ETFs (XLU, XLV, XLP). If the indicator has not been above 75% in the last 18 months, own Cyclical Sector ETFs (XLB, XLI, XLY). The portfolio is rebalanced monthly to equal weight.
- Compared to a buy and hold S&P 500 strategy, the model signal produces a higher average annual return, higher percentage of positive returns, higher net capture ratio, lower down capture ratio, and higher max risk / reward ratio.

Total Returns – U.S. Sector Rotation Model



Source: MarketDesk Quant Pack. Defensive Sector ETFs: XLU, XLV, XLP. Cyclical Sector ETFs: XLB, XLI, XLY. The portfolio is rebalanced monthly to equal weight.

Performance Statistics – U.S. Sector Rotation Model

Annual Statistics of Returns & Risks	S&P 500 (Benchmark)	U.S. Sector Rotation Model
Average Return	8.2%	11.9%
Strategy CAGR	**6.8%**	**10.4%**
Max Drawdown	-51%	-35%
% of Positive Years	**73.9%**	**78.3%**
Up Capture	100%	104%
Down Capture	100%	23%
Net Capture	**-**	**+81%**
Max Positive Year	32%	47%
Max Negative Year	-37%	-22%
Max Risk / Reward	**0.88**	**2.14**

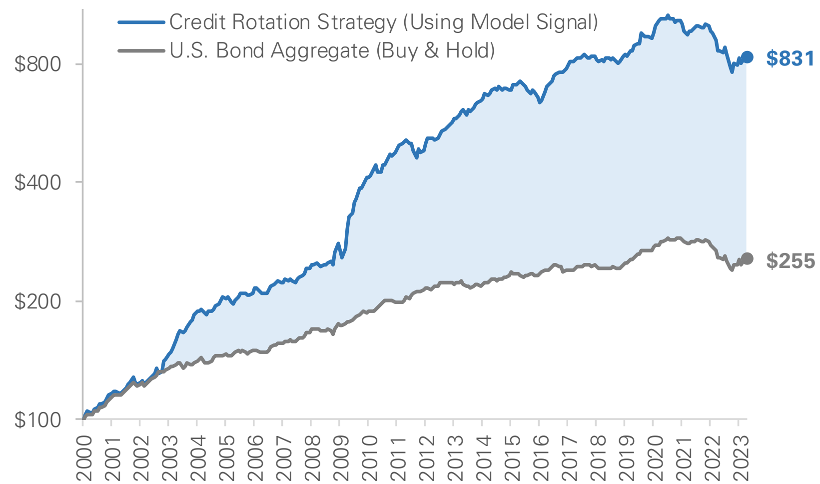
Source: MarketDesk Quant Pack. Based on annual calendar year returns.

Data as of 4/30/2023. Past performance does not guarantee future results. The performance information shown herein does not reflect the deduction of advisory and/or other fees normally incurred in the management of a portfolio. Hypothetical performance results are presented for illustrative purposes only.

Model Signal #2 – Credit Rotation Strategy

- **Model Signal** – If the *U.S. Bear Market Probability Indicator* has been above 75% in the last 18 months (see page 3), own High-Quality Credit Sectors (MBS and U.S. Treasuries). If it has not been above 75% in the last 18 months, own Low-Quality Credit Sectors (High Yield, Fallen Angels, and Convertible Bonds). The portfolio is rebalanced monthly to equal weight.
- Compared to a buy and hold Bond Aggregate strategy, the model signal produces a higher average annual return, higher net capture ratio, lower down capture ratio, and higher max risk / reward ratio.

Total Returns – Credit Sector Rotation Model



Source: MarketDesk Quant Pack. High-Quality Credit Sectors: 10Y U.S. Treasuries and Mortgage Backed Securities (MBS). Low-Quality Credit Sectors: High Yield, Fallen Angels, and Convertibles. The portfolio is rebalanced monthly to equal weight.

Performance Statistics – Credit Sector Rotation Model

Annual Statistics of Returns & Risks	Bond Aggregate (Benchmark)	Credit Sector Rotation Model
Average Return	4.1%	10.1%
Strategy CAGR	**4.1%**	**9.5%**
Max Drawdown	-17%	-28%
% of Positive Years	**87.0%**	**82.6%**
Up Capture	100%	217%
Down Capture	100%	57%
Net Capture	**-**	**+160%**
Max Positive Year	12%	46%
Max Negative Year	-13%	-20%
Max Risk / Reward	**0.92**	**2.26**

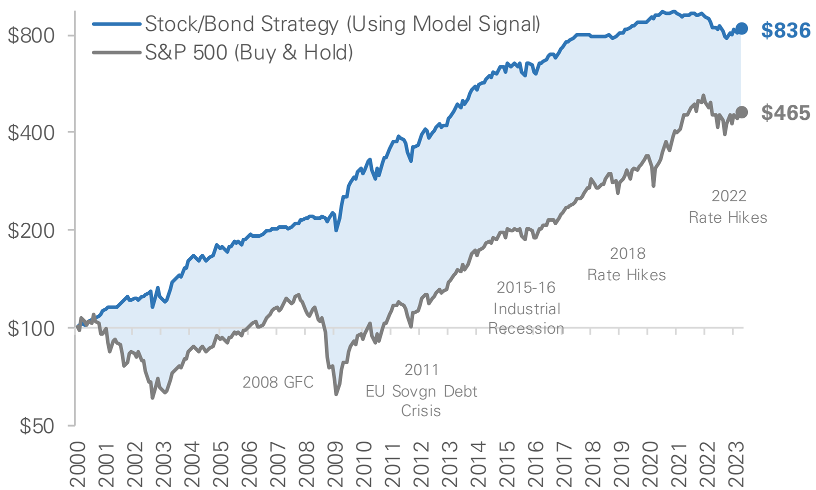
Source: MarketDesk Quant Pack. Based on annual calendar year returns.

Data as of 4/30/2023. Past performance does not guarantee future results. The performance information shown herein does not reflect the deduction of advisory and/or other fees normally incurred in the management of a portfolio. Hypothetical performance results are presented for illustrative purposes only.

Model Signal #3 – Stock / Bond Rotation Strategy

- **Model Signal** – If the *U.S. Bear Market Probability Indicator* has been above 75% in the last 18 months (see page 3), own 100% Stock Exposure (SPY ETF). If the indicator has not been above 75% in the last 18 months, own 100% Bond Exposure (AGG ETF). The portfolio is rebalanced monthly.
- Compared to a buy and hold S&P 500 strategy, the model signal produces a higher average annual return, higher percentage of positive returns, higher up capture ratio, lower down capture ratio, and higher max risk / reward ratio.

Total Returns – Stock/Bond Rotation Model



Source: MarketDesk Quant Pack. Stock exposure: S&P 500 (SPY ETF). Bond exposure: U.S. Bloomberg Bond Aggregate (AGG ETF). The portfolio is rebalanced monthly.

Performance Statistics – Stock/Bond Rotation Model

Annual Statistics of Returns & Risks	S&P 500 (Benchmark)	Stock / Bond Rotation Model
Average Return	8.2%	10.0%
Strategy CAGR	**6.8%**	**9.6%**
Max Drawdown	-51%	-17%
% of Positive Years	**73.9%**	**91.3%**
Up Capture	100%	75%
Down Capture	100%	-16%
Net Capture	**-**	**+91%**
Max Positive Year	32%	37%
Max Negative Year	-37%	-13%
Max Risk / Reward	**0.88**	**2.84**

Source: MarketDesk Quant Pack. Based on annual calendar year returns.

Data as of 4/30/2023. Past performance does not guarantee future results. The performance information shown herein does not reflect the deduction of advisory and/or other fees normally incurred in the management of a portfolio. Hypothetical performance results are presented for illustrative purposes only.

Key Takeaways

- A bear market is a decline of 20% or more in the stock market

- Key Market Impacts:
  1. Unavoidable part of investing; Bear markets historically occur every 3-5 years
  2. Market drawdowns can quickly erase years of investment gains
  3. Cyclical sectors tend to underperform while defensive sectors and higher quality assets outperform during bear markets

- Model Signals Average Annual Returns:
  1. Sector Rotation Strategy +11.9% (vs S&P 500 8.2%)
  2. Credit Rotation Strategy +10.1% (vs Bond Aggregate +4.1%)
  3. Stock/Bond Rotation Strategy +10.0% (vs S&P 500 8.2%)

- The *U.S. Bear Market Probability Indicator* forecasts the probability of a -20% or more market drawdown over the next 12 months, allowing you to proactively manage risk and optimize portfolio positioning. The *Quant Pack* is a data subscription with access to 20+ proprietary leading indicators built to guide asset allocation decisions, eliminate guesswork, enhance investment returns, and decrease your research workload.

[BONUS] Free Copy of the U.S. Macro Regime Indicator

MarketDesk U.S. Macro Regime Indicator (USMRI)

A Framework for Managing Portfolios Throughout Economic Cycles

Primer Report

What is a "Macro Regime"?

Macro regime refers to the prevailing set of macroeconomic trends within a particular time frame. It represents the broader market environment, which is characterized by factors such as economic growth, inflation, interest rates, fiscal and monetary policy, and global trade. Macro regimes hold significance for investment committees, as they influence how various asset classes perform and provide a roadmap to guide asset allocation decisions.

Understanding Macro Regimes is Key to Portfolio Management

Macro regimes are classified as either "Risk-On" (i.e., increase portfolio beta) and "Risk-Off" (i.e., decrease portfolio beta). The two regime styles impact markets in different ways, including which asset classes outperform, the degree of market volatility, and the risk of a major market sell-off. The MarketDesk U.S. Macro Regime Indicator (USMRI) allows investors to manage the portfolio beta exposure of their equity (i.e., large vs small, cyclical vs defensive) and credit (i.e., investment grade vs high yield corporate bonds) allocations in response to changes in the macro regime. Aligning portfolios with the correct macro regime improves risk-adjusted returns and decreases portfolio drawdown risk, while mismanaging betas produces lower risk-adjusted returns and is the equivalent of swimming against the current. This primer explains the USMRI, discusses how the two regime styles impact financial markets, and provides a portfolio guide for each regime.

How is the USMRI Framework Different from my Current Process?

The reality is most investors incorporate data that is already known by the majority of market participants (i.e., therefore also largely priced into markets), which means its holds little to no explanatory power regarding future performance. Regardless of your investment style (i.e., Growth, Value, Momentum, or Technicals), the USMRI framework is built to be additive to your process as it solves for the above flaws. USMRI is fundamentally different in that only uses 6- to 12-month leading indicators, which have a proven track record since 1980 of accurately forecasting the trajectory of the U.S. economy. History doesn't repeat, but it often rhymes, and the USMRI's data-driven approach provides a robust, repeatable framework to manage portfolios throughout business cycles.

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Figure 1 – MarketDesk U.S. Macro Regime Indicator (USMRI)

Indicator Components (Equal-Weighted)	Reading	Status
Business & Consumer Demand	-1.28	Risk-Off
Manufacturing Activity	-0.87	Risk-Off
Corporate Earnings	-0.80	Risk-Off
Labor Market	-0.67	Risk-Off
Interest Rates	-0.82	Risk-Off

Source: MarketDesk Quant Pack. As of 4/9/2023.

Figure 2 – Historical U.S. Macro Regime Indicator (USMRI)

Historical USMRI Since 1980 and Next 12-Month Forecast

Source: MarketDesk Quant Pack. As of 4/9/2023. Refer to the next page for key dates.

April 14, 2023 **MarketDesk Quant Pack** | USMRI Primer | . 1

Report Overview

This primer provides an overview of the macro regime indicator and how to implement it into your portfolio management process.

MarketDesk U.S. Macro Regime Indicator

The MarketDesk U.S. Macro Regime Indicator (USMRI) utilizes a data-driven process to (1) define the current macro environment and (2) forecast the trajectory of the U.S. economy over the next 12 months. It aggregates 20+ Quant Pack indicators to produce one straightforward signal to increase or decrease your portfolio risk.

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