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Certainly Uncertain

Macroeconomic conditions have been exceptionally volatile over the past three years. 2020 featured the onset of a global pandemic. Inflation emerged in 2021 after lying dormant for decades. Central banks responded to elevated inflation in 2022 by aggressively hiking interest rates. As of May 2023, inflation continues to be well above target, the federal funds rate is at its highest level since before the global financial crisis, and further rate hikes may be necessary. Meanwhile, economic activity remains resilient, and unemployment is at its lowest level in over 50 years, though the banking sector is beginning to reel from compressed margins (which show up today as losses if marked to market, and tomorrow as lower earnings) and a shrinking deposit base.

We certainly find ourselves in uncertain times—but how uncertain are they?

In short, quite uncertain. As I show below, macroeconomic uncertainty is currently high versus history when measured quantitatively. That said, the key question, which I aim to address in this note, is whether elevated uncertainty is likely to persist, or should we instead expect a return to the low uncertainty environment of the 2010s? As a logical follow-on to this question, I also address the implications for investors, both in terms of possible returns to traditional assets, and as to what alternatives might prosper or decline in such an environment.

We can quantify macroeconomic uncertainty by measuring the degree to which the economy has become more or less *predictable* over time. When data releases are close

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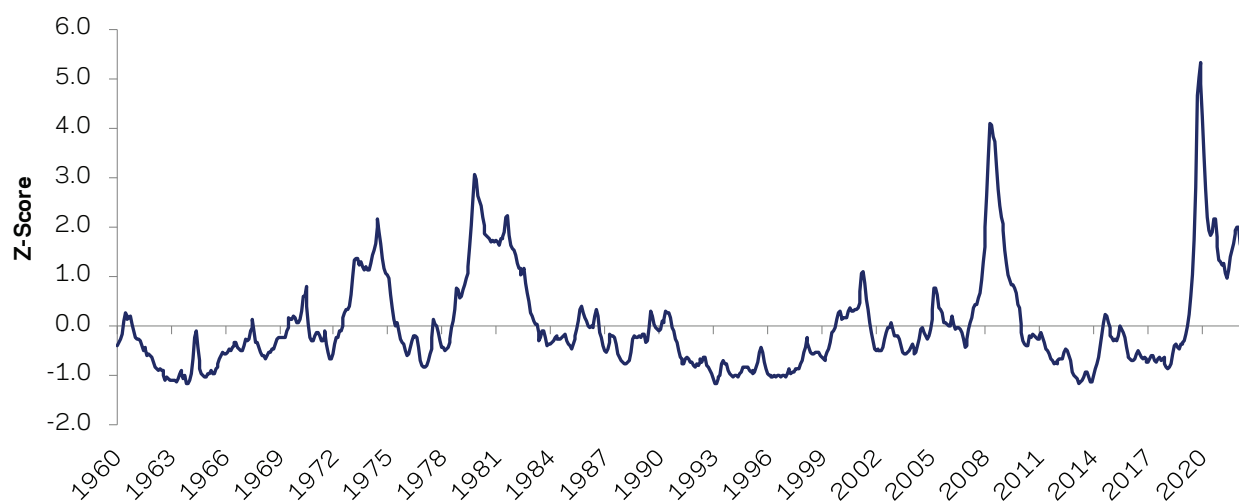
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Principal

to their predicted value, uncertainty is low; when prediction errors are large, uncertainty is high. Following this logic, Kyle Jurado, Sydney Ludvigson, and Serena Ng (JLN, 2015) use a large set of economic releases to build a comprehensive monthly “macro uncertainty index.”¹ **Figure 1** plots the JLN index from 1960-2022. Macro uncertainty has indeed been exceptionally elevated throughout the 2020s. It peaked in the first half of 2020 and is currently at levels not seen since the 1980s, save for during the global financial crisis.² The recent period stands in contrast to the 2010s,

a decade during which macro uncertainty was consistently, and often meaningfully, below average.³

Elevated macro uncertainty is associated with both high equity market volatility and negative equity market performance. During months in which the JLN index exceeds one, average annualized excess returns for U.S. equities is -16 percent and average annualized realized volatility is 21 percent, versus +6 percent average excess returns and 12 percent average realized volatility in all other months.

Figure 1: JLN Macro Uncertainty Index
July 1960 - December 2022



Source: Kyle Jurado, Sydney Ludvigson, and Serena Ng (2015)

The evidence strongly suggests macro uncertainty is likely to remain elevated for some time. Historically, macro uncertainty tends to be very persistent—on the scale of quarters and years, not weeks and

months—with high and low uncertainty periods clustering together. Beyond sheer statistics, however, the current monetary policy and market backdrop strongly supports the premise uncertainty is here to stay.

- 1 The JLN uncertainty index is publicly available on Sydney Ludvigson’s [website](#). The authors use a high-dimensional statistical factor model to produce one-month-ahead forecasts of 132 macroeconomic series. The uncertainty index is the common component of the conditional volatility of the forecast errors at each point in time. It is standardized to have a mean of zero and standard deviation of one.
- 2 To confirm the reasonableness of JLN, I compare their uncertainty index to a simple measure that is constructed by taking the absolute value of the difference between actual and forecasted values for year-on-year real GDP growth, CPI inflation, and industrial production growth, and averaging across these three releases each quarter. By virtue of equating uncertainty to the conditional volatility of forecast errors, as opposed to the magnitude of realized forecast errors, JLN is more theoretically appealing. It is also more empirically appealing, utilizing a much larger set of economic releases. Nevertheless, the two indices track each other well, with a correlation 0.7.
- 3 This [note](#) discusses the drivers of subdued macroeconomic volatility during the 2010s, and links it to the below average performance of trend following strategies during that decade.

Macro Uncertainty Tends to be Highly Persistent

Let's start with the data. While asset returns are notoriously difficult to forecast, asset volatility tends to be persistent and, therefore, much more predictable. If stock market volatility is high this month, it is a good bet it will be high next month. Perhaps the same is true for macro uncertainty. Let's use the current month's JLN to predict next month's JLN:

$$JLN(t+1) = 0.98 \times JLN(t), R^2 = 97\%^4$$

Macro uncertainty is indeed extremely persistent. If the JLN index is 1.0 this month, our best prediction is it will be 0.98 next month, and $0.98^{12} \approx 0.8$ next year. The half-life of shocks to macro uncertainty is around 4 years.

As of the end of 2022, the JLN macro uncertainty index stands at 1.27, which is the 88th percentile relative to history (though a far cry from the highest spikes). Based on its

historical persistence, it is likely to remain elevated for some time. The one-year forecast is 1.06 (85th percentile), and the two-year forecast is 0.89 (84th percentile).

Statistical forecasts are far from sure things. Perhaps “this time is different” and macro uncertainty will rapidly recede? Unfortunately, the economic backdrop suggests this time is unlikely to be an exception. There are two key catalysts supporting elevated macroeconomic volatility moving forward:

1. The impact of aggressive rate hikes is only starting to be felt, and central banks are facing tradeoffs between employment and inflation for the first time in decades.
2. Market-implied expectations of key economic variables disagree materially with policymaker and economist forecasts, and even disagree across markets.

Monetary Policy Backdrop: Rate Hikes and Trade-Offs

The impact of aggressive monetary policy tightening on the economy is only beginning to be felt. Monetary policy influences economic activity primarily through its impact on interest rate-sensitive components of demand—e.g., business and housing investment, demand for consumer durables,

etc. It also influences bank lending, with higher interest rates and a flattening yield curve typically compressing net interest margins, leading banks to reduce the availability of credit. These effects take time to work their way through the economy. This shouldn't be news. Milton Friedman observed

⁴ Don't be shocked by the extremely high R^2 . In this simple time series model the R^2 is simply the slope coefficient squared. So, the high R^2 simply means the JLN measure is very persistent.

long ago “monetary actions affect economic conditions only after a lag that is both long and variable.”⁵

Beyond the delayed impact of ongoing rate hikes, for the first time since the early 1990s central banks are beginning to face tradeoffs between their employment and inflation objectives.⁶ For the past few decades there was little ambiguity in whether monetary policy should be accommodative or contractionary: when inflation was running hot, economic activity was typically quite strong; when inflation was languishing below target, economic activity was typically weak. Ambiguity in degree, yes. But not in direction. With the Federal Reserve and other central banks hiking interest rates into high inflation, it is overwhelmingly likely they will face the prospect of weakening economic conditions while inflation remains well above target.

Historically, central banks facing tradeoffs has been a catalyst for elevated macro uncertainty. Tradeoffs can cause central banks to abruptly change policy—the Volcker Fed cut interest

rates in 1980 when unemployment rose, only to begin a hiking cycle shortly thereafter inducing a prolonged recession. And tradeoffs foster heightened uncertainty about the future course of policy—note the enormous volatility at the front end of the yield curve in March 2023 as a case-in-point, with banking sector concerns leading to sharp downward revisions monetary in policy expectations.

Beyond these anecdotes, we observe a meaningful effect in the data. During months in which the Federal Reserve faced tradeoffs—defined as months in which core PCE inflation exceeded four percent (twice the Fed’s target) and unemployment was above the Congressional Budget Office estimate of NAIRU—JLN averaged 0.6 vs. -0.1 in all other months. All else equal, when the Fed faces tradeoffs, macro uncertainty is meaningfully above average; when they do not face tradeoffs, macro uncertainty is below average. For the statistically curious, the difference-in-means is highly significant, with a t-stat in excess of seven.

Market Backdrop: Disagreement

An additional catalyst for sustained elevated macro uncertainty is the degree to which markets and policymaker and economist forecasts disagree on the evolution of key macroeconomic variables: interest rates, inflation, and growth.

The front end of the yield curve is the most dramatic example. **Figure 2** (LHS) plots the May 3 fed funds futures curve, along with the latest FOMC Survey of Economic Projections (SEP) fed funds rate forecasts. The futures market is currently pricing the May 3 rate hike was the final of this cycle. The Fed will begin cutting interest rates in September

5 The fallacy the monetary transmission mechanism works quicker nowadays likely stems from the observation that monetary policy actions are rapidly incorporated into liquid asset prices like stocks and bonds. But since asset prices tend to be quite volatile, and since their ownership is concentrated among wealthier households, the impact of changes in liquid asset wealth on consumption is pennies on the dollar, and this “wealth effect” is not a key channel through which monetary policy actions influence economic outcomes.

6 All central banks, *de facto* if not *de jure*, strive for full employment and low inflation. The European Central Bank, for example, is not indifferent between two percent inflation / five percent unemployment and two percent inflation / ten percent unemployment, despite officially having only a price stability mandate.

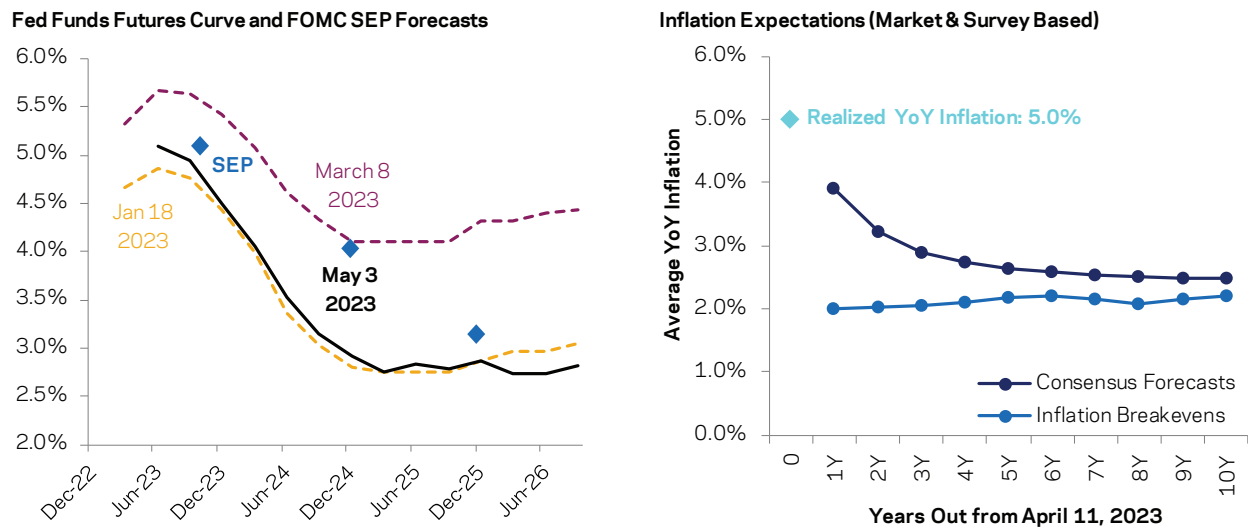
and will cumulatively slash interest rates by roughly 2.25 percent over the next 18 months, culminating with a funds rate of around 3 percent at end of 2024. Futures market pricing has been enormously volatile. At the beginning of March, it was pricing a peak funds rate of nearly 6 percent, and a funds rate of 4.25 percent at the end of 2024.⁷

Volatility at the front end of the curve is indicative of elevated economic uncertainty. Even more alarming, however, is the degree of disagreement between the market-implied path of the federal funds rate and what FOMC members and economists forecast. While the market believes the tightening cycle is over and rate cuts are imminent, all FOMC members and over 70 percent of economists surveyed by the Financial Times⁸ forecast

zero rate cuts in 2023. The disparity between FOMC projections and futures market pricing is the largest observed since the SEP began in 2012.⁹ How is this disagreement resolved? Either the FOMC and forecasters are right and interest rate expectations get re-priced, or the futures market is right and Federal Reserve credibility erodes. Either scenario is likely to contribute to financial market volatility and continued elevated macro uncertainty.

The front end of the yield curve is not alone in its dissonance. Inflation-linked bond markets forecast inflation returning to two percent over the next year and staying there for the next decade. FOMC and economist forecasts foresee disinflation, but at a more gradual pace (see **Figure 2** RHS).¹⁰

Figure 2: Expectations of Interest Rates and Inflation



Source: AQR, Federal Reserve, Bloomberg, Consensus Economics. SEP forecasts are as of March 22, 2023. Consensus forecasts and inflation breakevens are as of May 3, 2023. Forecasts are subject to change without notice.

7 This is not the first time this hiking cycle futures markets have dramatically piled on bets of lower rates. Last June's surprisingly high inflation print and the first sign of disinflation last Fall led to similar, albeit less dramatic, front-end rallies.

8 See Financial Times: "Economists Think Fed Will Keep Raising Interest Rates Despite Bank Turmoil," March 19, 2023.

9 The difference between the futures market-implied path of the funds rate and surveys may be partially explained by a negative risk premium in futures pricing. If investors wish to insure themselves against a state of the world in which interest rates are lower (as might occur in a recession), they may be willing to pay a premium to hold a long futures position.

10 Both market-based and survey-based long-run inflation expectations have remained quite well anchored during the recent inflation experience. Should core inflation continue to run meaningfully above central bank targets, or if inflation re-emerges after a monetary policy pivot, we cannot count on this confidence persisting. Inflation expectations are a key driver of actual inflation, so a de-anchoring of long-term inflation expectations would make disinflation much more challenging, likely requiring a steeper cost in terms of economic weakness and unemployment. In addition, a de-anchoring could prompt nominal bondholders to demand a significant inflation risk premium as in the 1980s. See Brooks (2021) and Ilmanen (2011, ch. 9).

We can square this circle. Perhaps interest rate futures and inflation markets are forecasting an imminent and dramatic slowdown in economic activity. This would likely put downward pressure on inflation and could cause the Fed to shift from focusing on inflation to employment. But a deep recession would be very painful for equities, which show no evidence of pricing in a slowdown. Not only is there stark disagreement between market-based and survey expectations, but there is

also material disagreement across different asset classes.

To be sure, I am not arguing policymakers and economists have it right and markets wrong, or vice versa. Things still must play out. But the large amount of disagreement indicates that the economy is on a knife's edge, and dissonant market pricing is a powder keg for higher volatility.¹¹

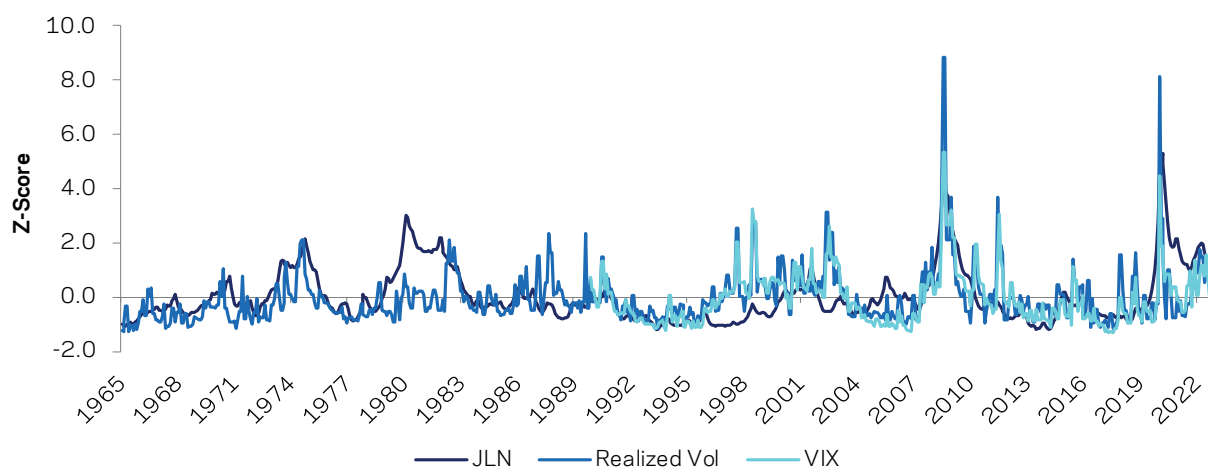
Implications for Investors

Why should investors care about elevated macroeconomic uncertainty?

First, macro uncertainty tends to be associated with financial market volatility. **Figure 3** plots JLN against 22-day realized equity market volatility and the VIX index (all series

standardized). There is a strong association between the measures—JLN is 0.6 correlated with VIX and 0.5 correlated with realized volatility. If macro uncertainty remains elevated, financial market volatility is likely to be high as well.

Figure 3: Macro Uncertainty and Stock Market Volatility



Source: AQR, U.S. Bureau of Labor Statistics, Federal Reserve, Bloomberg, Kyle Jurado, Sydney Ludvigson, and Serena Ng (2015)

¹¹ Although it is too soon for a full retrospective, the events of March conform to this narrative. Tighter monetary policy in the form of higher short-term interest rates and long-maturity yields caused a pair of banks, which mismanaged their balance sheets into one giant interest rate bet, to fail. While markets are rightly questioning banking sector profitability and the viability of some regional banks, the fallout from the failures of Silicon Valley Bank and Signature Bank are unlikely to spark a widespread financial crisis. (This is my opinion, of course. But there is scant evidence of widespread expectations for an impending economic calamity—since the end of February, real GDP growth forecasts were revised up by an average of 40 basis points, according to data from Consensus Economics.) The policy response of the Fed and Treasury ensures banks will have the liquidity to meet deposit demand, knowledge of which should stave off further runs. And systemic bank failures and financial crises have typically been the result of deteriorating asset quality on bank balance sheets, not the composition of their deposits or duration mismatches. Yet, the level of uncertainty at the front end of the yield curve led the Silicon Valley Bank shock to cause to a massive re-pricing of monetary policy expectations and a spike in macro and market volatility more broadly.

Second, as periods of high macro uncertainty often correspond to periods of surprisingly high inflation or surprisingly weak growth, equity markets have tended to do poorly when macro uncertainty is elevated. More generally, the performance of traditional assets over intermediate horizons is closely linked to economic developments. **Figure 4** displays the Sharpe ratios of stocks, bonds, and commodities since 1970. Their performance varies significantly across decades, and it is not uncommon to realize negative ten-year excess returns when faced with macroeconomic headwinds. For example, stocks were negative in both the 1970s (stagflation) and the 2000s (tech bust and global financial crisis). High macro uncertainty means we are especially unsure as to which economic environment we will end up in. It is possible we experience a stagflation redux, and stocks deliver meager performance. Or perhaps a productivity boom is on the horizon, and we will see a repeat of the “new economy” of the 1990s. We simply don’t

know. We never *know*. But elevated macro uncertainty means our collective ignorance about the future performance of markets is today greater than average.

Faced with the prospect of persistent macro uncertainty, investors should diversify, at least partially, away from simple equity risk. Bonds and commodities in a strategic allocation can help mitigate poor equity market performance due to negative growth shocks (bonds) or positive inflation shocks (commodities). **Figure 4** shows an “equal risk” portfolio of stocks, bonds, and commodities—a simple “risk parity” portfolio in which the weight on each asset class is inversely proportional to its realized volatility—delivers much more consistent performance across macroeconomic environments than equities (or any single asset class). In addition, many long-short liquid alternative strategies have little sensitivity to the macroeconomic backdrop and can provide strong performance across a range of market environments.

Figure 4: Sharpe Ratios of Traditional Assets



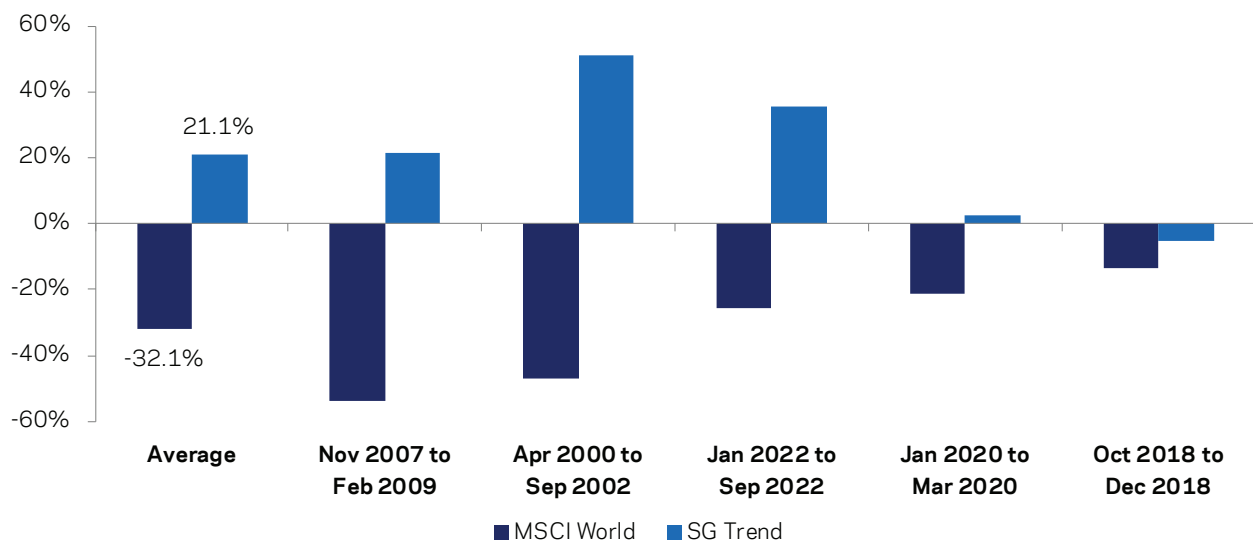
Source: AQR, Barclays Live, Bloomberg, Ibbotson Associates (Morningstar). As of March 31, 2023. Excess returns are in excess of cash proxied by the ICE BofAML U.S. 3-Month T-Bill Index. Stocks are defined as the MSCI World Index. Bonds are defined as the Bloomberg Barclays U.S. Government Bond Index and, prior to 1973, the Ibbotson U.S. Intermediate Government Bond Index. Commodities are defined as the Bloomberg Commodity Index.

Some investment strategies may actually capitalize on elevated macro uncertainty. Trend-following strategies, which at their core profit from the systematic tendency of markets to gradually incorporate new information, tend to outperform when economic shocks are large and markets experience stress. The SG Trend index, an equal weighted average of the performance of the ten largest trend-following managers, has posted positive returns in the three largest equity market drawdowns since the inception of the index in 2000 (**Figure 5**). A more comprehensive approach to trend following that includes economic trends¹² and alternative markets¹³ may provide even more robust tail protection, as well as superior average returns. While Global Macro is a highly heterogeneous category, the abundance

of economic catalysts and cross-market dispersion associated with high macro uncertainty can make the opportunity set more attractive for some strategies.¹⁴

Admittedly, we'd recommend this kind of diversification unconditionally. Diversification and risk mitigation should be key considerations in any strategic allocation. Timing when you need diversification is a fool's errand, and investors that do so typically find themselves the proverbial, "day late, dollar short." But with macro uncertainty elevated and likely to remain so for some time, it is an opportune moment for investors to take stock and ensure their portfolios are resilient to a wide range of outcomes.

Figure 5: Performance of SG Trend Index in Equity Market Drawdowns



Source: AQR, Bloomberg. Figures shown are based on monthly returns. Past performance is not a guarantee of future performance. Please read important disclosures in the disclosures.

¹² See Brooks et al (2023).

¹³ See Babu et al (2020).

¹⁴ Brooks (2017) presents a systematic approach to global macro investing that has historically delivered attractive and positively convex returns.

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