



Fourth Quarter 2021

Time to diversify – but into what?

The case for diversifying out of equities, and the role of liquid alternatives

The last 10 years were exceptional for traditional stock/bond portfolios. But with stock market valuations near all-time highs and bond yields near all-time lows, prospective returns look bleak.

Many investors - though not all - are looking to diversify away from equity risk. We believe this should be viewed as a strategic rather than merely a tactical goal. Market timing is difficult, and expensive markets can keep rising, but better diversification is a worthy strategic aim, and if equity markets are riding high, so much the better.

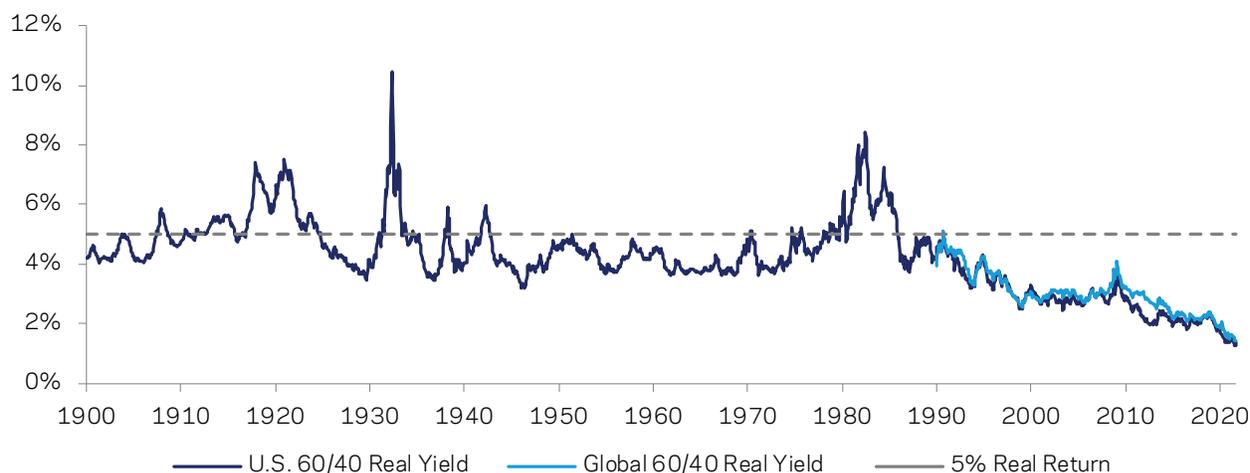
This begs the question, diversify into what? Many “alternatives” share the same underlying tail risks related to the state of the global economy, including private equity, real estate, credit, and anything with implicit exposure to equity and credit risks. The next market drawdown may not be as fleeting as the crash of March 2020, and the recovery may not be so rapid. *Liquid alternatives* can be powerful diversifiers in unfavorable market environments and may be a valuable addition to the investor’s diversification toolkit.

Living on borrowed time (and returns)

A simple yield-based measure of expected real return for a stock/bond portfolio (see **Exhibit 1**) averaged 5% in the 1900s, fell to around 2% over the last 30 years, and dived even further in 2020-21 as bond yields reached new record lows and equity markets regained record highs. Yield declines

generated high realized returns but this cannot go on forever. In effect, returns have been borrowed from the future, and eventually low expected returns will materialize for stock/bond investors, whether in a “slow pain” or “fast pain” scenario.

Exhibit 1: Yield-based expected real return of U.S. and global 60/40 stock/bond portfolios January 1, 1900 - September 30, 2021



Source: AQR, Bloomberg, Robert Shiller Data Library, Ibbotson Associates (Morningstar), Kozicki-Tinsley (2006), Federal Reserve Bank of Philadelphia, Blue Chip Economic Indicators, Consensus Economics. U.S. 60/40 portfolio is 60% U.S. equities, 40% long-dated Treasuries. Global 60/40 is 60% cap-weighted developed equities and 40% GDP-weighted 10-year government bonds. Real equity yield is simple average of two measures: $(0.5 * \text{Shiller E/P} * 1.075) + 1.5\%$ and $\text{Dividend/Price} + 1.5\%$. 1.5% term is assumed long term real earnings per share growth. 0.5 multiplier reflects long-term payout ratio; 1.075 multiplier accounts for EPS growth during 10-year earnings window. Universe of stocks is S&P 500. Real bond yield is yield minus long-term expected inflation.

Do not expect a rerun of the 2010s in the 2020s

The 2010s were characterized by positive growth and low, stable inflation. Not only did equities and bonds both deliver unusually high excess returns, they were also unusually good diversifiers to each other. This gifted exceptional performance to traditional portfolios, with some 'diversifiers' lagging far behind. But now is not the time to abandon diversification.

Pandemic-related stimulus has been much larger than stimulus after the Financial Crisis, and the financial system is in a very different state, with more stimulus reaching real economies. The medium-term inflation outlook is unclear: a wide range of outcomes are possible, but the chances of another decade of low, stable inflation have fallen. Rising inflation would present a headwind for both

equities and bonds (first two bars in **Exhibit 2** below), and may also reduce the diversification benefits between them.

Elevated inflation risk provides additional motivation for diversification. Inflation-linked bonds have the ability to hedge inflation-linked liabilities but negative real yields make them difficult to hold. Real estate is another popular option, but historical analysis shows that while it may offer a little more resilience than equities or bonds, it too has tended to underperform when inflation rises (in the chart we show U.S. data but patterns are similar elsewhere). Among long-only assets, only commodities like rising inflation. Most portfolios have a downside inflation bias, which helped in the 2010s but may prove to be an Achilles heel.

Exhibit 2: Historical sensitivities of major asset classes to U.S. inflation

January 1, 1972 - June 30, 2021



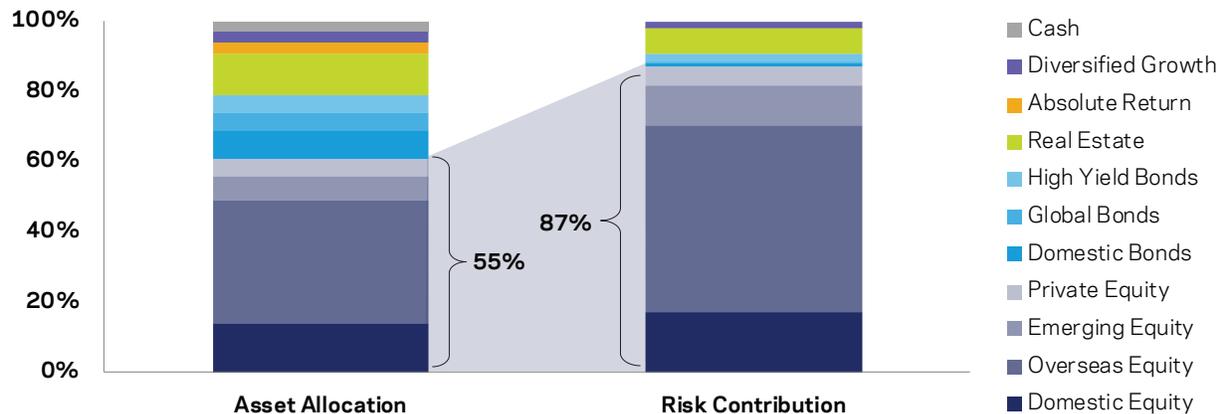
Source: AQR, Bloomberg, Survey of Professional Forecasters, U.S. Bureau of Labor Statistics. Inflation sensitivity metric is contemporaneous partial correlation to a composite metric of inflation changes and surprises, controlling for growth exposure. Domestic equities represented by MSCI USA, global fixed income by Bloomberg Barclays Global Aggregate, private equity by a simple average of Cambridge U.S. Buyout index and 1.2x levered Russell 2000, real estate by a simple average of FSTE Nareit All REITS and NCREIF Property indices, international equities by MSCI World ex US unhedged, risk parity by a hypothetical strategy that takes a risk-balanced allocation across equities, bonds and commodities, inflation-linked bonds by 10-year U.S. TIPS, gold and commodities by GSCI indices, and breakevens by a hypothetical strategy that is long 10-year U.S. TIPS, short 10-year U.S. Treasuries. Before March 1997, TIPS and breakevens are based on synthetic real yield series built by subtracting survey-based inflation expectations from nominal Treasury yields.

How much equity risk do you have?

A typical return-seeking portfolio tends to be dominated by equity risk. In Exhibit 3, we take a sample asset allocation and translate it into risk exposures. Since equities tend to be more volatile than bonds and other asset classes, a

55% capital allocation to equities accounts for 87% of the risk in the portfolio. Notably, private equity only adds to the already dominant risk in the portfolio.

Exhibit 3: Even apparently diversified portfolios may be dominated by equity risk



Source: AQR. Capital allocation of typical risk-seeking portfolio. Risk contribution based on volatilities and correlations of proxy indices. Equities are represented by MSCI indices, private equity by a simple average of Cambridge U.S. Buyout index and 1.2 x Russell 2000; bonds by Bloomberg Barclays U.S. Aggregate, Global Aggregate and U.S. High Yield indices, real estate by a simple average of FSTE Nareit All REITS and NCREIF Property indices, absolute return by a simple hypothetical multi-asset multi-style portfolio, diversified growth by a simple hypothetical risk parity strategy and cash by 3-month T-Bills.

The equity market crash of March 2020 was very short-lived thanks to central bank action, but not all bear markets are limited to a 20% drop, and not all are short-lived. There were

three drawdowns exceeding 40% in the last half century, and worse in the half century before that.

What can investors do?

One response to low expected returns is to **take even more equity risk**. This may be justifiable for investors with high return objectives, constraints on leverage and exceptionally high tolerance for losses, but they should be wary of high valuations and inflation risks.

Another option is to employ option-based **tail protection strategies** to help insure against a large fall in equity markets. But such strategies tend to be costly to hold for long periods, and while they offer good protection against short, sharp crashes, they are not guaranteed to help in the case of sustained losses (see for example McQuinn et al. (2021)).

Perhaps the most popular response is to **raise allocations to illiquid private assets**. Many investors believe these offer attractive returns due to both alpha potential and illiquidity premia, as well as a degree of diversification. Recent analysis (see Ilmanen et al. (2020))

suggests all three of these benefits may be overstated.

While private assets may help to smooth short-term fluctuations in portfolio performance by avoiding mark-to-market losses, private equity is still equity, and private credit is still credit. They do not provide exposure to fundamentally different risks like, say, the rates risk in investment grade bonds. Private assets often have large economic exposures that tend to materialize in prolonged bear markets (“slow beta”). And their ability to smooth returns makes them popular, probably offsetting any illiquidity premium.

That said, private assets surely deserve a place in many long-term investors’ portfolios. They provide embedded leverage, and may allow investors to maintain higher exposure to equity and credit premia than would be possible in volatile public markets. But as diversifiers, they leave a gap to be filled.

The role of liquid alternatives

Liquid alternatives are active strategies designed to deliver positive long-term returns without concentrated passive market exposure. They may seek exposure to well-documented premia such as value, momentum and quality, sometimes combining these with proprietary signals and portfolio construction techniques.

They often pursue strategies across several asset classes, using financial tools such as leverage, shorting and derivatives to target and manage risk. Examples include multi-asset style premia strategies, risk parity, managed futures, long/short equity and corporate arbitrage strategies.

Exhibit 4: What do we mean by liquid alternatives?

Risk Parity	Long/Short Equity	Trend and Macro Strategies	Corporate Arbitrage Strategies	Multi-Asset Alternative Risk Premia
<p>Seek risk-balanced exposures across market risk premia</p> <ul style="list-style-type: none"> • Better macro-economic diversification than traditional portfolios • Includes inflation-sensitive assets, e.g., commodities 	<p>Seek to take advantage of market inefficiencies that cause specific stocks to be mispriced</p> <ul style="list-style-type: none"> • Target equity-like returns with substantially lower beta and milder macro exposures • ESG features, e.g., net zero 	<p>Seek to profit from dislocations in global equity, bond, currency and commodity markets</p> <p>Have tended to:</p> <ul style="list-style-type: none"> • Perform well during sustained market drawdowns • Thrive on macro-economic volatility 	<p>Seek to capture relative mispricing or risk premia associated with two related assets</p> <ul style="list-style-type: none"> • Merger Arbitrage • Event Driven • Convertible Arbitrage 	<p>Seek to harvest well-documented premia across several asset classes</p> <ul style="list-style-type: none"> • Value, momentum, carry, defensive themes • Seek near-zero beta

Source: AQR. For illustrative purposes only. Diversification does not eliminate the risk of experiencing investment losses. Please read important disclosures in the Appendix.

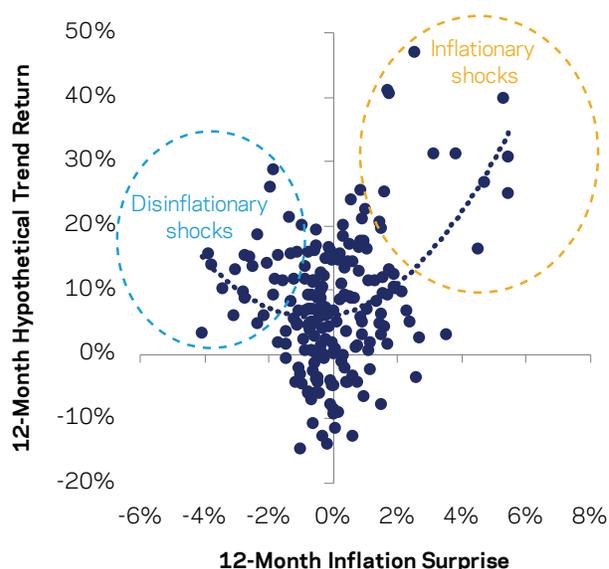
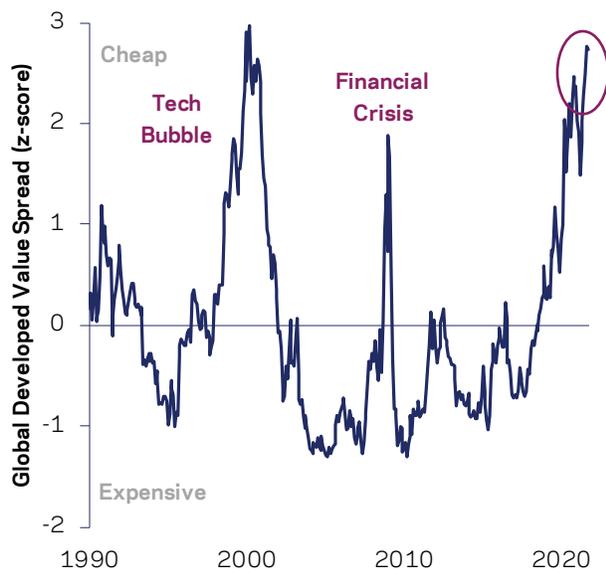
While some liquid alternatives have performed strongly, others have disappointed investors in recent years. Equity value strategies suffered from 2018 to 2020 as growth stocks outperformed, and managed futures underwhelmed in the 2010s (after delivering strong returns during the Financial Crisis) as central banks curtailed market trends.

But the case for such strategies is based on many decades of empirical evidence, and economic intuition that remains valid.

And because they take both long and short positions, many liquid alternatives can both hedge macroeconomic exposures (like inflation risk), and mitigate the pervasive impact of low yields on expected returns. Indeed, some strategies, such as equity value, are looking particularly attractive in late 2021 (see **Exhibit 5a**). Others, such as managed futures or trend following, may thrive if the next decade sees greater macroeconomic turmoil than the last (**Exhibit 5b**).

Exhibit 5: Cometh the hour? Liquid alternatives offer bright spots in a gloomy market landscape

- A. Value spread for hypothetical value portfolio: extreme spreads have historically preceded strong value performance
- B. Hypothetical trend following vs. inflation surprises: trend has tended to thrive on macroeconomic volatility



Source: AQR. Chart A: Period January 1990 to September 2021. Hypothetical value composite includes four value measures: book-to-price, earnings-to-price, forecast earnings-to-price, and sales-to-enterprise value; spreads are measured based on ratios. Spreads are constructed to be industry-neutral by comparing the value measures within each industry, then aggregating to represent an entire portfolio. Chart B: Period January 1972 to June 2021. Hypothetical trend following strategy as described in *A Century of Evidence on Trend Following* (Hurst, Ooi and Pedersen, 2017), net of transaction costs and 2 & 20 fees. Inflation surprise is realization minus forecast from Fed Survey of Professional Forecasters. Quarterly data. Hypothetical data has inherent limitations, some of which are disclosed in the Appendix.

The role of liquid alternatives in achieving sustainability and climate goals

As asset owners look to transition their portfolios to lower their carbon footprint and reflect ESG goals, they are increasingly looking beyond their equity portfolios. Liquid alternatives offer unique possibilities for addressing ESG objectives.

Firstly, long/short equity and risk premia strategies allow investors to more fully express negative investment views on companies with poor ESG characteristics. While a long-only portfolio is restricted to divesting from such companies, going short achieves greater impact (raising the company's cost of capital) as well as improving risk and return characteristics.

Secondly, liquid alternatives may have an important role to play in reaching net zero emissions targets. Traditional portfolios rely on screening or tilting away from heavy carbon emitters, but this can only be taken so far without impairing diversification and incurring substantial tracking error to benchmarks. Long-short strategies, however, can be constructed to target net zero or even a negative carbon footprint, by netting the carbon exposure of shorts in heavy emitters. Moreover, they allow for a larger carbon budget on the long side, so investors can retain positions in more companies where engagement is preferable to divestment.

A diversified approach to diversifying

Some investors with a ‘rearview mirror’ perspective took the wrong lessons from the exceptionally benign last decade. Equity and bond market valuations will make it very difficult for such strong performance to be repeated in the 2020s, reinforcing the case for diversifiers.

For investors looking to diversify, private assets have some role to play. But an allocation to liquid alternatives is also worthy of

consideration, as they provide exposure to complementary and fundamentally different sources of return. Investors must balance the desire to reduce market risk against the risk of failing to meet long term return objectives. For many potential investments, lower equity beta means lower expected return. Well-crafted liquid alternative strategies have the potential to be powerful diversifiers in less favorable market environments, while also maintaining attractive long-term expected returns.

Disclosures

This document has been provided to you solely for information purposes and does not constitute an offer or solicitation of an offer or any advice or recommendation to purchase any securities or other financial instruments and may not be construed as such. The factual information set forth herein has been obtained or derived from sources believed by the author and AQR Capital Management, LLC (“AQR”) to be reliable but it is not necessarily all-inclusive and is not guaranteed as to its accuracy and is not to be regarded as a representation or warranty, express or implied, as to the information’s accuracy or completeness, nor should the attached information serve as the basis of any investment decision. This document is intended exclusively for the use of the person to whom it has been delivered by AQR, and it is not to be reproduced or redistributed to any other person. The information set forth herein has been provided to you as secondary information and should not be the primary source for any investment or allocation decision. Past performance is not a guarantee of future performance.

This material is not research and should not be treated as research. This paper does not represent valuation judgments with respect to any financial instrument, issuer, security or sector that may be described or referenced herein and does not represent a formal or official view of AQR. The views expressed reflect the current views as of the date hereof and neither the author nor AQR undertakes to advise you of any changes in the views expressed herein.

The information contained herein is only as current as of the date indicated, and may be superseded by subsequent market events or for other reasons. Charts and graphs provided herein are for illustrative purposes only. The information in this presentation has been developed internally and/or obtained from sources believed to be reliable; however, neither AQR nor the author guarantees the accuracy, adequacy or completeness of such information. Nothing contained herein constitutes investment, legal, tax or other advice nor is it to be relied on in making an investment or other decision. There can be no assurance that an investment strategy will be successful. Historic market trends are not reliable indicators of actual future market behavior or future performance of any particular investment which may differ materially, and should not be relied upon as such.

The information in this paper may contain projections or other forward-looking statements regarding future events, targets, forecasts or expectations regarding the strategies described herein, and is only current as of the date indicated. There is no assurance that such events or targets will be achieved, and may be significantly different from that shown here. The information in this document, including statements concerning financial market trends, is based on current market conditions, which will fluctuate and may be superseded by subsequent market events or for other reasons.

Performance of all cited indices is calculated on a total return basis with dividends reinvested. Broad-based securities indices are unmanaged and are not subject to fees and expenses typically associated with managed accounts or investment funds. Investments cannot be made directly in an index.

Index Definitions:

The **MSCI U.S. Index** is a free float-adjusted market capitalization index that is designed to measure the performance large and mid cap equities in the United States.

The **MSCI World ex U.S. Index** is a free float-adjusted market capitalization index that is designed to measure the large and mid cap equity market performance of 22 developed countries excluding the United States.

The **Bloomberg Barclays U.S. Aggregate Bond Index** is a broad-based flagship benchmark that measures the investment grade, U.S. dollar-denominated, fixed-rate taxable bond market. It includes Treasuries, government-related and corporate securities, MBS, ABS and CMBS.

The **Bloomberg Barclays Global Aggregate Index** is an unmanaged index that is comprised of several other Bloomberg Barclays indexes that measure fixed income performance of regions around the world.

The **Bloomberg Barclays U.S. Corporate High Yield Index** measures the USD-denominated, high yield, fixed-rate corporate bond market. Securities are classified as high yield if the middle rating of Moody’s, Fitch and S&P is Ba1/BB+/BB+ or below.

The **Cambridge Associates Private Equity U.S. Buyout Index** is a pooled horizon internal rate of return (IRR)-based index compiled from the Cambridge Associates database of U.S. private equity buyout funds.

The **Russell 2000 Index** is a market capitalization weighted index representing the 2,000 smallest companies in the Russell 3000 Index.

The **FTSE Nareit All REITs Index** is a market capitalization-weighted index that includes all tax-qualified real estate investment trusts (REITs) that are listed on the New York Stock Exchange, the American Stock Exchange or the NASDAQ National Market List.

The **NCREIF Property Index** measures the performance of real estate investments on a quarterly basis and evaluates the rate of returns in the market. It covers properties that are acquired in place of institutional investors that are exempted from taxes in the fiduciary environment.

The **S&P GSCI®** is a composite index of commodity sector returns representing an unleveraged, long-only investment in commodity futures that is broadly diversified across the spectrum of commodities.

HYPOTHETICAL PERFORMANCE RESULTS HAVE MANY INHERENT LIMITATIONS, SOME OF WHICH, BUT NOT ALL, ARE DESCRIBED HEREIN. NO REPRESENTATION IS BEING MADE THAT ANY FUND OR ACCOUNT WILL OR IS LIKELY TO ACHIEVE PROFITS OR LOSSES SIMILAR TO THOSE SHOWN HEREIN. IN FACT, THERE ARE FREQUENTLY SHARP DIFFERENCES BETWEEN HYPOTHETICAL PERFORMANCE RESULTS AND THE ACTUAL RESULTS SUBSEQUENTLY REALIZED BY ANY PARTICULAR TRADING PROGRAM. ONE OF THE LIMITATIONS OF HYPOTHETICAL PERFORMANCE RESULTS IS THAT THEY ARE GENERALLY PREPARED WITH THE BENEFIT OF HINDSIGHT. IN ADDITION, HYPOTHETICAL TRADING DOES NOT INVOLVE FINANCIAL RISK, AND NO HYPOTHETICAL TRADING RECORD CAN COMPLETELY ACCOUNT FOR THE IMPACT OF FINANCIAL RISK IN ACTUAL TRADING. FOR EXAMPLE, THE ABILITY TO WITHSTAND LOSSES OR TO ADHERE TO A PARTICULAR TRADING PROGRAM IN SPITE OF TRADING LOSSES ARE MATERIAL POINTS THAT CAN ADVERSELY AFFECT ACTUAL TRADING RESULTS. THERE ARE NUMEROUS OTHER FACTORS RELATED TO THE MARKETS IN GENERAL OR TO THE IMPLEMENTATION OF ANY SPECIFIC TRADING PROGRAM, WHICH CANNOT BE FULLY ACCOUNTED FOR IN THE PREPARATION OF HYPOTHETICAL PERFORMANCE RESULTS, ALL OF WHICH CAN ADVERSELY AFFECT ACTUAL TRADING RESULTS.

The hypothetical performance results contained herein represent the application of the quantitative models as currently in effect on the date first written above, and there can be no assurance that the models will remain the same in the future or that an application of the current models in the future will produce similar results because the relevant market and economic conditions that prevailed during the hypothetical performance period will not necessarily recur. Discounting factors may be applied to reduce suspected anomalies. This backtest's return, for this period, may vary depending on the date it is run. Hypothetical performance results are presented for illustrative purposes only. In addition, our transaction cost assumptions utilized in backtests, where noted, are based on AQR Capital Management LLC's, ("AQR's") historical realized transaction costs and market data. Certain of the assumptions have been made for modeling purposes and are unlikely to be realized. No representation or warranty is made as to the reasonableness of the assumptions made or that all assumptions used in achieving the returns have been stated or fully considered. Changes in the assumptions may have a material impact on the hypothetical returns presented. Actual advisory fees for products offering this strategy may vary.

There is a risk of substantial loss associated with trading commodities, futures, options, derivatives, and other financial instruments. Before trading, investors should carefully consider their financial position and risk tolerance to determine whether the proposed trading style is appropriate. Investors should realize that when trading futures, commodities, options, derivatives, and other financial instruments, one could lose the full balance of their account. It is also possible to lose more than the initial deposit when trading derivatives or using leverage. All funds committed to such a trading strategy should be purely risk capital.

Sustainable investing is qualitative and subjective by nature, and there is no guarantee that the environmental, social and governance ("ESG") criteria utilized, judgment exercised, or techniques employed, by AQR will be successful, or that they will reflect the beliefs or values of any one particular investor. Certain information used to evaluate ESG factors or a company's commitment to, or implementation of, responsible practices is obtained through voluntary or third-party reporting, which may not be accurate or complete. ESG investing can limit the investment opportunities available to a portfolio, such as the exclusion of certain securities or issuers for nonfinancial reasons and, therefore, the portfolio may perform differently than or underperform other similar portfolios that do not apply ESG factors.

Note to readers in Australia: AQR Capital Management, LLC, is exempt from the requirement to hold an Australian Financial Services License under the Corporations Act 2001, pursuant to ASIC Class Order 03/1100 as continued by ASIC Legislative Instrument 2016/396, ASIC Corporations (Amendment) Instrument 2021/510 and ASIC Corporations (Amendment) Instrument 2022/623. AQR is regulated by the Securities and Exchange Commission ("SEC") under United States of America laws and those laws may differ from Australian laws. **Note to readers in Canada:** This material is being provided to you by AQR Capital Management, LLC, which provides investment advisory and management services in reliance on exemptions from adviser registration requirements to Canadian residents who qualify as "permitted clients" under applicable Canadian securities laws. No securities commission or similar authority in Canada has reviewed this presentation or has in any way passed upon the merits of any securities referenced in this presentation and any representation to the contrary is an offence. **Note to readers in Europe:** AQR in the European Economic Area is AQR Capital Management (Germany) GmbH, a German limited liability company (Gesellschaft mit beschränkter Haftung; "GmbH"), with registered offices at Maximilianstrasse 13, 80539 Munich, authorized and regulated by the German Federal Financial Supervisory Authority (Bundesanstalt für Finanzdienstleistungsaufsicht, "BaFin"), with offices at Marie-Curie-Str. 24-28, 60439, Frankfurt am Main und Graurheindorfer Str. 108, 53117 Bonn, to provide the services of investment advice (Anlageberatung) and investment broking (Anlagevermittlung) pursuant to the German Securities Institutions Act (Wertpapierinstitutsgesetz; "WpIG"). The Complaint Handling Procedure for clients and prospective clients of AQR in the European Economic Area can be found here: <https://ucits.aqr.com/Legal-and-Regulatory>. **Note to readers in Hong Kong:** The contents of this presentation have not been reviewed by any regulatory authority in Hong Kong. AQR Capital Management (Asia) Limited is licensed by the Securities and Futures Commission ("SFC") in the Hong Kong Special Administrative Region of the People's Republic of China ("Hong Kong") pursuant to the Securities and Futures Ordinance (Cap 571) (CE no: BHD676). **Note to readers in China:** This document does not constitute a public offer of any fund which AQR Capital Management, LLC ("AQR") manages, whether by sale or subscription, in the People's Republic of China (the "PRC"). Any fund that this document may relate to is not being offered or sold directly or indirectly in the PRC to or for the benefit of, legal or natural persons of the PRC. Further, no legal or natural persons of the PRC may directly or indirectly purchase any shares/units of any AQR managed fund without obtaining all prior PRC's governmental approvals that are required, whether statutorily or otherwise. Persons who come into possession of this document are required by the issuer and its representatives to observe these restrictions. **Note to readers in Singapore:** This document does not constitute an offer of any fund which AQR Capital Management, LLC ("AQR") manages. Any fund that this document may relate to and any fund related prospectus that this document may relate to has not been registered as a prospectus with the Monetary Authority of Singapore. Accordingly, this document and any other document or material in connection with the offer or sale, or invitation for subscription or purchase, of shares may not be circulated or distributed, nor may the shares be offered or sold, or be made the subject of an invitation for subscription or purchase, whether directly or indirectly, to persons in Singapore other than (i) to an institutional investor pursuant to Section 304 of the Securities and Futures Act, Chapter 289 of Singapore (the "SFA") or (ii) otherwise pursuant to, and in accordance with the conditions of, any other applicable provision of the SFA. **Note to readers in Korea:** Neither AQR Capital Management (Asia) Limited or AQR Capital Management, LLC (collectively "AQR") is making any representation with respect to the eligibility of any recipients of this document to acquire any interest in a related AQR fund under the laws of Korea, including but without limitation the Foreign Exchange Transaction Act and Regulations thereunder. Any related AQR fund has not been registered under the Financial Investment Services and Capital Markets Act of Korea, and any related fund may not be offered, sold or delivered, or offered or sold to any person for re-offering or resale, directly or indirectly, in Korea or to any resident of Korea except pursuant to applicable laws and regulations of Korea. **Note to readers in Japan:** This document does not constitute an offer of any fund which AQR Capital Management, LLC ("AQR") manages. Any fund that this document may relate to has not been and will not be registered pursuant to Article 4, Paragraph 1 of the Financial Instruments and Exchange Law of Japan (Law no. 25 of 1948, as amended) and, accordingly, none of the fund shares nor any interest therein may be offered or sold, directly or indirectly, in Japan or to, or for the benefit, of any Japanese person or to others for re-offering or resale, directly or indirectly, in Japan or to any Japanese person except under circumstances which will result in compliance with all applicable laws, regulations and guidelines promulgated by the relevant Japanese governmental and regulatory authorities and in effect at the relevant time. For this purpose, a "Japanese person" means any person resident in Japan, including any corporation or other entity organised under the laws of Japan. **Note to readers in United Kingdom:** This material is being provided to you by AQR Capital Management (Europe) LLP, a UK limited liability partnership with its office at Charles House 5-11, Regent St., London, SW1Y 4LR, which is authorised and regulated by the UK Financial Conduct Authority ("FCA").



www.aqr.com