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INVESTMENT MANAGEMENT

How Alternative Risk Premia Can Hedge Equity Risk When Bonds Cannot: The ARP Hedge Edge

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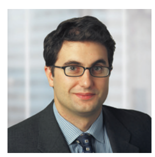

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- With the threats of inflation and tighter Fed monetary policy looming, we believe bonds are not likely to be as effective as an equity hedge in traditional diversified portfolios.
- Certain alternative risk premia (ARP) can, in our view, fill the role of bonds in a diversified portfolio without the need to take long-duration risk.
- New analysis by Morgan Stanley Investment Management's AIP Hedge Fund Solutions Group shows that an equal risk-weighted ARP portfolio has been an effective bond alternative, potentially delivering strong returns when equities sold off, while still preserving capital during bond bear markets.

For many decades, the classic portfolio allocation of 60% stocks and 40% bonds has been a mainstay for investors seeking to hedge equity risk. But our analysis of recent equity and bond performance calls into question how effective this approach is likely to be in coming years, as their correlation has steadily moved upward into positive territory *(Display 1)*.

The forces driving the positive correlation stem from the low yields that have been prevalent in government and investment-grade corporate bonds. But the threat of inflation and the more hawkish stance recently adopted by the U.S. Federal Reserve boost the likelihood that rates will rise and put downward pressure on bond prices, especially for long-duration sectors.

Thus, many investors are looking for alternatives that can substitute for at least a portion of their government and investment-grade bond portfolio. Alternative risk premia (ARP) deserve consideration because they can fill the role of bonds in a diversified portfolio: delivering positive expected returns with low or negative correlation to equities, but without the need to take long-duration risk.

However, ARP are a heterogeneous category, with about a dozen long-standing, well-known strategies (and many more niche and newer ones), spanning all asset classes including equities, rates, commodities, and currencies. ARP do not comprise a true asset class, but share the common trait of not being long-only traditional investments. Many ARP are countercyclical to equities, but some are very much pro-cyclical.

This report reviews how ARP have performed during different market environments, or regimes, both in the context of an equal risk-weighted portfolio of the most common strategies, and individually, based on risk-adjusted return.

Defining the Bond Regimes

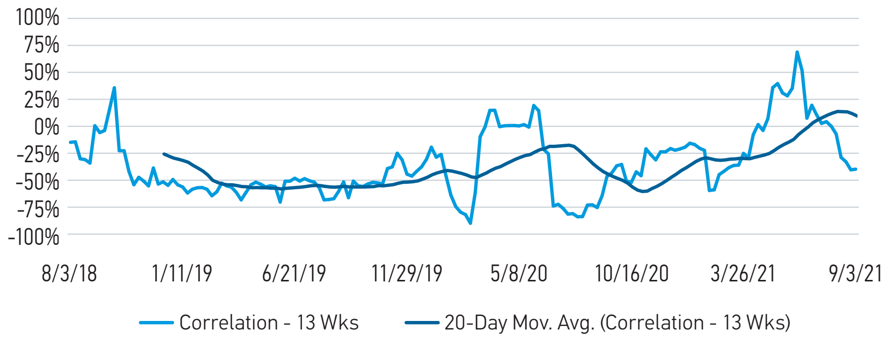
ARP factors behave differently from each other and across market regimes. So a fundamental consideration is to seek to avoid strategies likely to perform poorly at the same time as bonds, while at least preserving capital when equities sell off.

To define bond regimes, we use a well-known framework based on yield curve movement. We define the four regimes as combinations of bull/bear and steepener/flattener bond markets (described in *Display 2*). Bull/bear markets are defined based on the direction of shift of overall yield curve either upward or downward,

DISPLAY 1

Equities and Bonds Have Become Positively Correlated in Recent Years

Equity and bond correlation (13-week) with 20-day moving average (S&P 500 Total Return and Bloomberg US Treasury Index)



Sources: Morgan Stanley AIP, Bloomberg LLC, MSCI, from 12/31/18 through 9/3/21. The S&P 500 Total Return Index is a commonly accepted benchmark of large-cap U.S. stocks. The Bloomberg U.S. Treasury Index is a total return measure of long-term U.S. Treasury issues. You cannot invest directly in an index. Data is provided for informational purposes only. Past performance is no guarantee of future results. Sourced October 21, 2021.

DISPLAY 2

The Four Basic Bond Regimes and Related ARP Performance

10 Years ended 8/31/21

	BULL	BEAR
FLATTENER	Long-term rates decreasing faster than short-term rates, narrowing the spread with bond prices rising. Often a short-term bullish sign that is followed by rising equities and expectation of future economic growth.	Short-term rates increasing faster than long-term rates, narrowing the spread as bond prices fall. Often seen when investors expect poor economic conditions.
	Top: Rates Curve Carry, Equity Low Volatility, Equity Momentum Bottom: Equity Value, Trend (short-term), FX Carry	Top: Trend (long-term), FX Value, FX Carry Bottom: Rates Curve Carry, Trend (short-term), Equity Value
STEEPENER	Short-term rates decreasing faster than long-term rates, widening the spread but with bond prices rising. A bull steepener can occur when investors expect the Fed to lower rates.	Long-term rates increasing faster than short-term rates, widening the spread as bond prices fall. Often occurs when investors are concerned about inflation.
	Top: Rates Curve Carry, Commodity Curve Carry, Equity Momentum Bottom: Equity Value, Commodity Carry, Trend (Medium-term)	Top: Equity Value, Commodity Curve Carry, Trend (short-term) Bottom: Equity Low Volatility, Rates Curve Carry, Equity Momentum

Sources: Morgan Stanley AIP, Goldman Sachs, ICE BofA, Bloomberg, JP Morgan, Societe Generale, Macquarie, for the 10 years ended 8/31/21. Long-term yields are represented by the 10-year U.S. Treasury; short-term yields by the 2-year U.S. Treasury. Relative performance of the 10-year and 2-year Treasuries was evaluated for each of the 523 weeks during the 10-year performance period, and categorized as one of the four regimes described above. Overall performance of each regime was determined by summing the weekly returns. A fuller discussion of individual ARP construction and performance begins on p. 4. Data is provided for informational purposes only. Past performance is no guarantee of future results. Sourced October 21, 2021.

For illustrative purposes only. Not based on any specific portfolio advised or managed by Morgan Stanley Investment Management. No representation or warranty is being made that any proposed or actual portfolio will or is likely to achieve a performance record similar to that shown. In fact, there are frequently sharp differences between a hypothetical performance record and the actual record subsequently achieved.

DISPLAY 3

ARP Have Performed Well as Equity Hedges in All Regimes

09.2011 – 08.2021	BOND REGIMES	S&P 500 TR	BLOOMBERG US TREASURY INDEX	PORTFOLIO (5% VOLATILITY TARGET)
Ann. Return	Full Period	16.7%	2.5%	7.8%
Ann. Return	Bull	-13.8%	24.8%	15.9%
Ann. Return	Bear	62.5%	-17.4%	-0.3%
Ann. Return	Flattener	0.0%	17.6%	12.9%
Ann. Return	Steepener	44.1%	-15.1%	1.3%
Ann. Return	Bull Flattener	-13.0%	25.9%	14.7%
Ann. Return	Bull Steepener	-18.1%	19.3%	21.9%
Ann. Return	Bear Flattener	52.1%	-4.6%	7.6%
Ann. Return	Bear Steepener	67.2%	-22.4%	-3.5%
Return YTD 08.31.2021		23.7%	-1.4%	6.3%
Return 1YR 08.31.2021		31.3%	-1.9%	3.9%

Sources: Morgan Stanley AIP, Goldman Sachs, ICE BofA, Bloomberg, JP Morgan, Societe Generale, Macquarie, for the 10 years ended 8/31/21. The S&P 500 Total Return Index is a commonly accepted benchmark of large-cap U.S. stocks. The Bloomberg U.S. Treasury Index is a total return measure of long-term U.S. Treasury issues. The portfolio comprises equal risk-weighted positions of well-defined alternative risk premia in carry, value, and trend/momentum that are included in *Display 2*. The portfolio targets 5% annualized volatility, similar to a core bond portfolio or index. A fuller discussion of individual ARP construction and performance begins on p. 4. You cannot invest directly in an index. Data is provided for informational purposes only. Past performance is no guarantee of future results. Sourced October 21, 2021.

while steepener/flattener measures the change in yield curve slope. Below the description of bond regime in each quadrant, *Display 2* also highlights the best- and worst-performing ARPs for the 10 years ended August 31, 2021.

The Equal Risk-Weighted ARP Portfolio

To test the effectiveness of ARPs as an alternative to diversification[1] with bonds, we constructed an equal risk-weighted portfolio of well-defined strategies in carry, value, and trend/momentum that are included in *Display 2*. The portfolio targets 5% annualized volatility, similar to a core bond portfolio or index. Because a majority of our set are countercyclical (although certainly not all, such as equity value and FX carry), and given their equal risk-weighting, the portfolio is designed with a defensive equity tilt.

By adjusting the risk weightings away from equal, investors can tilt the portfolio to one regime or another, depending on their views, investment objectives and risk constraints.

The results showed that the diversified ARP has been an effective bond alternative, delivering strong returns during weak periods for equities (bond bull regimes). But, importantly, the ARP portfolio still preserved capital during bond bear markets. *Display 3* shows performance of the portfolio, the S&P 500 Total Return Index and Bloomberg U.S. Treasury Index by bond regime from September 2011 to August 2021. *Display 4* shows the same performance over the same dates in 12-month rolling periods.

Following are highlights of portfolio performance and constituent ARPs:

- The ARP portfolio performed best in bond bull markets, largely because both bonds and the portfolio tend to outperform when equities are struggling. However, the portfolio also helped preserve capital in bond bear environments, especially when flattening. For example, during bond bull regimes, when the S&P 500 was down by 13.8%, the Bloomberg Treasury Index was up 24.8%, while the ARP portfolio gained 15.9%. However, when the Bloomberg Treasury Index was down 18.6% in a bond bear market, the ARP portfolio was down just 0.3%.
- Bond bear markets hurt the curve carry strategy and are not a particularly rich environment for the equity strategies, but cross-market rates (duration neutral), currency strategies, and commodities performed well.

[1] Diversification to does not eliminate the risk of loss.

- The weakest environment for the ARP portfolio has been bear steepening. Bear steepening tends to coincide with the strongest equity bull markets, which is the weakest environment for this set of strategies, given its aggregate defensive equity tilt. Nonetheless, it is a strong environment for equity value and most commodity strategies, which keeps the portfolio close to flat during these times.

- *Display 4* shows visually the strong correlation between the portfolio and long-term U.S. Treasuries over the past decade, with both providing hedging benefits for equity portfolios. However, as noted earlier, we believe U.S. Treasuries are vulnerable in a rising-rate environment due to their long duration, which is absent in the portfolio. Indeed, as shown in *Display 3*, for the 12 months ended 8/31/21, as the Bloomberg Treasury Index sold off by 1.9%, the portfolio returned 3.9%.

ARP Risk-Adjusted Returns[2]

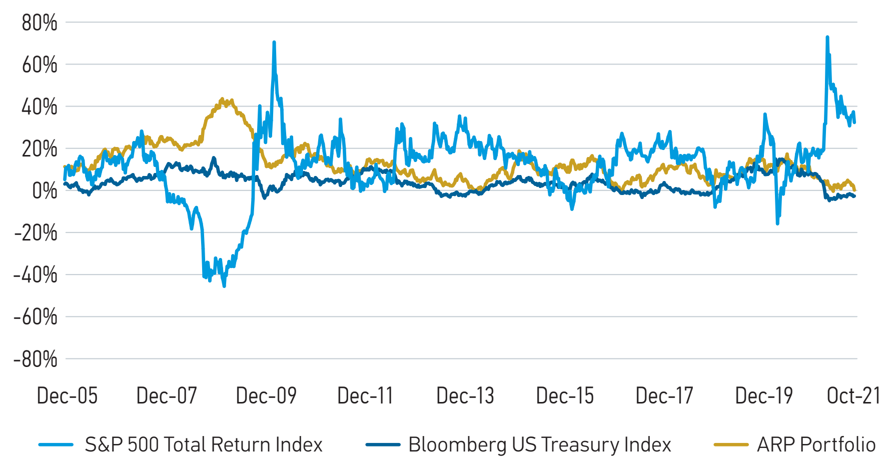
For another perspective on ARP performance, we analyzed the same strategies over the 2011-2021 period on a risk-adjusted basis, using information ratios (return per unit of volatility), broken into the same four bond regimes. Because information ratios scale the return of each ARP by its own volatility, this analysis offers investors additional insight that may be useful tilting their own portfolios. In contrast, the portfolio discussed above weighted each factor to our desired 5% volatility.

The third column from the right in *Displays 5A* through *5E* shows the

DISPLAY 4

Rolling Returns Show the Steady Performance of an ARP Portfolio

Rolling 1-year performance of stocks, bonds and an ARP portfolio.



Sources: Morgan Stanley AIP, Standard & Poor's, Bloomberg, for December 2005 through October 2021. ARP portfolio construction is detailed in *Display 3*, and a fuller discussion of individual ARP construction and performance begins on p. 4. You cannot invest directly in an index. Data is provided for informational purposes only. Past performance is no guarantee of future results. Sourced October 21, 2021.

DISPLAY 5A

EQ Low Volatility, EQ Momentum and EQ Quality (But not EQ Value): Historically Correlated with UST

INFORMATION RATIO (09.2011 – 08.2021)	EQ LOW VOL	EQ MOMENTUM	EQ QUALITY	EQ VALUE	PORTFOLIO	S&P 500 TR	BLOOMBERG US TREASURY INDEX
Bull Flattener	3.1	3.0	1.8	-3.2	2.9	-0.9	12.6
Bull Steepener	1.0	2.2	1.7	-2.5	3.8	-0.7	4.8
Bear Flattener	-0.9	0.7	0.5	-0.9	1.7	4.8	-3.3
Bear Steepener	-2.9	-2.0	-1.7	3.8	-0.7	4.5	-8.1

Source: Morgan Stanley AIP, Goldman Sachs, Bloomberg, for the 10 years ended 8/31/21. Equity low volatility, equity momentum, equity quality and equity value are alternative risk premia indexes published by Goldman Sachs. See *Display 1* for description of bull flattener, bull steepener, bear flattener and bear steepener regimes. You cannot invest directly in an index. Data is provided for informational purposes only. Past performance is no guarantee of future results. Sourced October 21, 2021.

[2] **For illustrative purposes only. Not based on any specific portfolio advised or managed by Morgan Stanley Investment Management.** No representation or warranty is being made that any proposed or actual portfolio will or is likely to achieve a performance record similar to that shown. In fact, there are frequently sharp differences between a hypothetical performance record and the actual record subsequently achieved.

DISPLAY 5B

Multi-asset trend: Fares Relatively Well in All Four Bond Regimes

INFORMATION RATIO (09.2011 – 08.2021)	TREND (LONG-TERM)	TREND (MEDIUM-TERM)	TREND (INTRA-DAY)	PORTFOLIO	S&P 500 TR	BLOOMBERG US TREASURY INDEX
Bull Flattener	2.4	1.2	0.0	2.9	-0.9	12.6
Bull Steepener	0.1	0.0	1.4	3.8	-0.7	4.8
Bear Flattener	3.3	0.6	-1.3	1.7	4.8	-3.3
Bear Steepener	-1.3	-0.9	0.3	-0.7	4.5	-8.1

Source: Morgan Stanley AIP, Bloomberg, JP Morgan, Macquarie, for the 10 years ended 8/31/21. Trend (long-term), trend (medium term) and trend (Intra-day) avg., are alternative risk premia indexes published by Bloomberg, JP Morgan and Macquarie. Data is provided for informational purposes only. You cannot invest directly in an index. Past performance is no guarantee of future results. Sourced October 21, 2021.

information ratio of the equal risk-weighted ARP portfolio, discussed above, for reference. In all regimes except the bear steepener, the portfolio had large information ratios.

Equity low volatility, equity momentum and equity quality strategies are historically highly correlated to U.S. Treasuries *(Display 5A)*. They have done particularly poorly during periods of bear steepening, when investors are anticipating inflation (and equities are often performing quite well). These strategies have no explicit duration risk (being long and short equities only), but like U.S. government rates, they tend to perform well in equity market selloffs and perform poorly in strong bull markets. Thus, high correlation to rates is driven more by the shared countercyclical tilt of the strategies than a common fundamental risk exposure.[3] This is evidenced by recent performance of quality and low volatility, which have done well this year despite the poor performance of duration risk.

Momentum has done poorly this year, not because of rates correlation, but rather the lack of a strong exploitable long-term trend in equities. Conversely, the equity value strategy exhibits negative correlation to rates and historically outperforms in yield widening and curve steepening environments. Value is the most pro-cyclical of our four equity factors. Value stocks, such as financials, utilities, etc., tend to outperform growth stocks in rising rates and steepening yield curve environments.

Multi-asset trend fares relatively well in all four bond regimes thanks in part to its diversification across different markets (equities, FX, rates, bonds) and across different time frames *(Display 5B)*. Long-term trend captures slow and steady

DISPLAY 5C

Commodities: Mixed Performance

INFORMATION RATIO (09.2011 – 08.2021)	CMDTY CURVE CARRY	CMDTY CARRY	CMDTY VALUE	PORTFOLIO	S&P 500 TR	BLOOMBERG US TREASURY INDEX
Bull Flattener	1.2	1.0	0.8	2.9	-0.9	12.6
Bull Steepener	3.0	-0.2	0.9	3.8	-0.7	4.8
Bear Flattener	0.7	1.1	0.4	1.7	4.8	-3.3
Bear Steepener	0.8	-0.5	0.3	-0.7	4.5	-8.1

Sources: Morgan Stanley AIP, ICE BofA, Bloomberg, for the 10 years ended 8/31/21. Commodities curve carry, commodities value, and commodities carry are alternative risk premia indexes published by BofA/Merrill Lynch. Data is provided for informational purposes only. You cannot invest directly in an index. Past performance is no guarantee of future results. Sourced October 21, 2021.

[3] This is a matter of some debate. A case can be made that low volatility and quality strategies tend to favor stocks that are defensive or dividend paying with a fundamental sensitivity to interest rates.

DISPLAY 5D

Rates curve: The Most Explicit Duration Risk

INFORMATION RATIO (09.2011 – 08.2021)	RATES CURVE CARRY	RATES CROSS-MARKET CARRY	PORTFOLIO	S&P 500 TR	BLOOMBERG US TREASURY INDEX
Bull Flattener	4.1	1.2	2.9	-0.9	12.6
Bull Steepener	3.9	0.6	3.8	-0.7	4.8
Bear Flattener	-3.0	1.8	1.7	4.8	-3.3
Bear Steepener	-2.7	0.0	-0.7	4.5	-8.1

Sources: Morgan Stanley AIP, Goldman Sachs, Bloomberg, Societe Generale, for the 10 years ended 8/31/21. Rates carry and rates cross market carry are alternative risk premia indexes published Goldman Sachs and Societe Generale. Data is provided for informational purposes only. You cannot invest directly in an index. Past performance is no guarantee of future results. Sourced October 21, 2021.

changes in rates and bond performance and generates strong performance during flattening yield curve regimes. Short-term trend has strong defensive characteristics during a steepening yield curve environment.

Commodities, as an asset class, are often expected to perform well in an inflationary environment benefiting from expected rise in commodity prices *(Display 5C)*. ARP commodity strategies, however, are market neutral (both long and short positions) and behave differently. Curve carry performs better in bull than bear markets while commodity carry performs better in yield curve flattening regimes. The commodity value strategy, which generally benefits from relative-price mean reversion between like commodities (such as Brent and WTI crude oil prices), produces persistent positive returns in all four bond regimes, as price dislocations can happen in both bull or bear regimes.

Rates curve carry is the ARP strategy that typically carries the most explicit duration risk *(Display 5D)*. It can be implemented in a variety of ways but generally has net long-duration risk. As a result, the strategy tends to perform better during bond bull markets. Cross-market carry is focused on spread differences in government bonds across countries, typically at the same tenor or in a duration-neutral manner (although, again, your mileage may vary depending on implementation). As a result, cross-market rates carry strategy delivers positive return both in bull and bear yield environments with better performance in flattener than steepener environments.

Currency value and carry strategies have presented relatively good performance during all four bond regimes *(Display 5E)*. While currency valuations are tied to rates and can be affected by changes in the U.S. rate curve, like cross-market rates carry, the driver of performance is driven by changes in rate differentials across countries, not within tenors of the U.S. rate curve. Both strategies have delivered positive returns during bear markets for bonds.

Year-to-Date ARP Performance

We began this report with the observation that ARP strategies are

DISPLAY 5E

Currency value: Fares Relatively Well in All Four Bond Regimes

INFORMATION RATIO (09.2011 – 08.2021)	FX VALUE	FX CARRY	PORTFOLIO	S&P 500 TR	BLOOMBERG US TREASURY INDEX
Bull Flattener	0.9	0.1	2.9	-0.9	12.6
Bull Steepener	1.1	1.4	3.8	-0.7	4.8
Bear Flattener	2.5	2.0	1.7	4.8	-3.3
Bear Steepener	-0.1	-0.1	-0.7	4.5	-8.1

Sources: Morgan Stanley AIP, Goldman Sachs and ICE BofA for the 10 years ended 8/31/21. Currency value and currency carry are alternative risk premia indexes published by Goldman Sachs and ICE BofA. Data is provided for informational purposes only. You cannot invest directly in an index. Past performance is no guarantee of future results. Sourced October 21, 2021.

DISPLAY 6

In a Difficult Year for Bonds, ARP More Than held Their Own

Information Ratios

	EQ LOW VOL	EQ MOMENTUM	EQ QUALITY	EQ VALUE	TREND (LONG-TERM)	TREND (MEDIUM-TERM)	TREND (INTRA-DAY)	CMDTY CURVE CARRY
Information ratio (YTD 08.2021)	0.8	-0.7	1.1	0.3	1.0	1.6	-2.6	0.6

	CMDTY CARRY	CMDTY VALUE - AVG	RATES CURVE CARRY	RATES CARRY	FX VALUE	FX CARRY	PORTFOLIO	S&P 500 TR	BLOOMBERG US TREASURY INDEX
Information ratio (YTD 08.2021)	1.2	-0.8	-0.1	0.2	0.4	1.9	1.7	3.1	-0.7

Sources: Morgan Stanley AIP, Goldman Sachs, ICE BofA, Bloomberg, JP Morgan, Societe Generale, Macquarie, for the 12 months ended 8/31/21. A fuller discussion of individual ARP construction and performance begins on p. 4. Data is provided for informational purposes only. Past performance is no guarantee of future results. You cannot invest directly in an index. Sourced: October 21, 2021.

likely to hold up better than bonds as rates come under pressure from Fed policy and inflation. So far, this year has underscored the validity of that view, as the equal risk-weighted portfolio discussed above would have returned 6.3% through August 31. In contrast, U.S. government bonds recently suffered through one of the worst performance periods in decades, including a sharp bear steepening to start 2021.

The drawdown in the Bloomberg U.S. Treasury Index (the Index) was its largest since 1994, with a loss of 6% from August 2020 through March 2021. Year-to-date through August 31, the Index is down -1.4%. The U.S. Treasury 10-year yield rose from 0.9% at beginning of the year to 1.3% at the end of August.

During this difficult period for bonds, many ARP delivered positive returns, including equity low volatility and equity quality. This year so far, investors have gravitated to lower volatility stocks and stocks with good earnings quality (which were cheap headed into 2021.) Trend, commodity carry, curve carry, FX value and FX carry strategies are all also positive. Only equity momentum and commodity value strategies have struggled. *Display 6* shows 2021 YTD information ratios for ARP factors, U.S. Treasuries, and the S&P 500.

The ARP Hedge Edge

Investors are rightly concerned that bonds may no longer be a suitable hedge for equities in today's environment. We have shown that a well-designed diversified portfolio of ARP can serve as a viable alternative. This hypothetical portfolio would have delivered positive expected returns with low or negative correlation to equities, but without forcing investors to assume the duration risk embedded in much of the bond market.

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Alternative investments are speculative and include a high degree of risk. Investors could lose all, or a substantial amount of, their investment. Alternative investments are suitable only for long-term investors willing to forgo liquidity and put capital at risk for an indefinite period of time. Alternative investments are typically highly illiquid—there is no secondary market for private funds, and there may be restrictions on redemptions or the assignment or other transfer of investments in private funds. Alternative investments often engage in leverage and other speculative practices that may increase volatility and risk of loss. Alternative investments typically have higher fees and expenses than other investment vehicles, and such fees and expenses will lower returns achieved by investors.

This is a summary of various risks associated with investing in alternative risk premia. This summary is not, and is not intended to be, a complete enumeration or explanation of the risks involved. The recipient should consult with its own advisors before deciding whether to invest in these strategies. In addition, to the extent that the investment program of such a portfolio changes and develops over time, additional risk factors not described here may apply. Only a recipient who understands the nature of the investment, does not require more than limited liquidity in the investment and has sufficient resources to sustain the loss of its entire investment should consider making the kind of investments described herein.

Global Pandemics. Portfolios are subject to market risk, which is the possibility that the market values of securities owned by the portfolio will decline and that the value of portfolio shares may therefore be less than what you paid for them. Market values can change daily due to economic and other events (such as natural disasters, epidemics and pandemics, terrorism, conflicts and social unrest) that affect markets generally, as well as those that affect particular regions, countries, industries, companies or governments. It is difficult to predict when events may occur, the effects they may have (e.g. adversely affect the liquidity of the portfolio), and the duration of those effects.

General Risks of Derivatives. An alternative risk premia portfolio could use various derivatives and related investment strategies, as described below. Derivatives may be used for a variety of purposes including hedging, risk management, portfolio management or to earn income. Any or all of the investment techniques described herein may be used at any time and there is no particular strategy that dictates the use of one technique rather than another, as the use of any derivative by a portfolio is a function of numerous variables, including market conditions.

A derivative is a financial instrument the value of which depends upon (or derives from) the value of another asset, security, interest rate or index. Derivatives may relate to a wide variety of underlying instruments, including equity and debt securities, indices, interest rates, currencies and other assets. Certain derivative instruments that a portfolio may use and the risks of those instruments are described in further detail below. A portfolio may also utilize derivatives techniques, instruments and strategies that may be newly developed or permitted as a result of regulatory changes, to the extent such techniques, instruments and strategies are consistent with a portfolio's investment objective and policies. Such newly developed techniques, instruments and strategies may involve risks different than or in addition to those described herein. No assurance can be given that any derivatives strategy employed by a portfolio will be successful.

The risks associated with the use of derivatives are different from, and possibly greater than, the risks associated with investing directly in the instruments underlying such derivatives. Derivatives are highly specialized instruments that require investment techniques and risk analyses different from other portfolio investments. The use of derivative instruments requires an understanding not only of the underlying instrument but also of the derivative itself. Certain risk factors generally applicable to derivative transactions are described below.

Derivatives are subject to the risk that the market value of the derivative itself or the market value of underlying instruments will change in a way adverse to a portfolio's interests. A portfolio bears the risk that the adviser may incorrectly forecast future market trends and other financial or economic factors or the value of the underlying security, index, interest rate or currency when establishing a derivatives position for a portfolio.

Derivatives may be subject to pricing (or mispricing) risk. For example, a derivative may become extraordinarily expensive (or inexpensive) relative to historical prices or corresponding instruments. Under such market conditions, it may not be economically feasible to initiate a transaction or liquidate a position at an advantageous time or price.

Many derivatives are complex and may be valued subjectively. The pricing models used by a portfolio to value derivatives may not produce valuations that are consistent with the values a portfolio realizes when it closes or sells an over-the-counter ("OTC") derivative. Valuation risk is more pronounced when a portfolio enters into OTC derivatives with specialized terms because the market value of those derivatives in some cases is determined in part by reference to similar derivatives with more standardized terms. Improper valuations can result in increased payment requirements to counterparties, over-and/or under-collateralization, and/or a loss of value to a portfolio.

Using derivatives as a hedge against a portfolio investment subjects a portfolio to the risk that the derivative will have imperfect correlation with the portfolio investment, which could result in a portfolio incurring substantial losses. This correlation risk may be greater in the case of derivatives based on an index or other basket of securities, as the portfolio securities being hedged may not duplicate the components of the underlying index or the basket may not be of exactly the same type of obligation as those underlying the derivative. The use of derivatives for "cross hedging" purposes (using a derivative based on one instrument as a hedge on a different instrument) may also involve greater correlation risks.

While using derivatives for hedging purposes can reduce a portfolio's risk of loss, it may also limit a portfolio's opportunity for gains or result in losses by offsetting or limiting a portfolio's ability to participate in favorable price movements in portfolio investments.

Use of derivatives for non-hedging purposes may result in losses which would not be offset by increases in the value of portfolio securities or declines in the cost of securities to be acquired. In the event that a portfolio enters into a derivatives transaction as an alternative to purchasing or selling the underlying instrument or in order to obtain desired exposure to an index or market, a portfolio will be exposed to the same risks as are incurred in purchasing or selling the underlying instruments directly as well as additional risks associated with derivatives transactions, such as counterparty credit risk.

The use of certain derivatives transactions, including OTC derivatives, involves the risk of loss resulting from the insolvency or bankruptcy of the counterparty to the contract or the failure by the counterparty to make required payments or otherwise comply with the terms of the contract. In the event of default by a counterparty, a portfolio may have contractual remedies pursuant to the agreements related to the transaction, but there is no guarantee that the portfolio will be able to enforce such contractual remedies in a timely manner, or at all.

While some derivatives are cleared through a regulated central clearinghouse, many derivatives transactions are not entered into or traded on exchanges or in markets regulated by the CFTC or the SEC. Instead, such bi-lateral OTC derivatives are entered into directly by a portfolio and a counterparty. OTC derivatives transactions can only be entered into with a willing counterparty that is approved by the adviser. Where no such counterparty is available, a portfolio will be unable to enter into a desired OTC transaction.

A portfolio may be required to make physical delivery of portfolio securities underlying a derivative in order to close out a derivatives position or to sell portfolio securities at a time or price at which it may be disadvantageous to do so in order to obtain cash to close out or to maintain a derivatives position.

As a result of the structure of certain derivatives, adverse changes in, among other things, interest rates, volatility or the value of the underlying instrument can result in losses substantially greater than the amount invested in the derivative itself. Certain derivatives have the potential for unlimited loss, regardless of the size of the initial investment.

Certain derivatives may be considered illiquid and therefore subject to a portfolio's limitation on investments in illiquid securities.

Derivatives transactions conducted outside the United States may not be conducted in the same manner as those entered into on U.S. exchanges, and may be subject to different margin, exercise, settlement or expiration procedures. Brokerage commissions, clearing costs and other transaction costs may be higher on foreign exchanges. Many of the risks of OTC derivatives transactions are also applicable to derivatives transactions conducted outside the United States. Derivatives transactions conducted outside the United States are subject to the risk of governmental action affecting the trading in, or the prices of, foreign securities, currencies and other instruments. The value of such positions could be adversely affected by foreign political and economic factors, lesser availability of data on which to make trading decisions, delays in a portfolio's ability to act upon economic events occurring in foreign markets, and less liquidity than U.S. markets.

Currency derivatives are subject to additional risks. Currency derivatives transactions may be negatively affected by government exchange controls, blockages and manipulations. Currency exchange rates may be influenced by factors extrinsic to a country's economy. There is no systematic reporting of last sale information with respect to foreign currencies. As a result, the available information on which trading in currency derivatives will be based may not be as complete as comparable data for other transactions. Events could occur in the foreign currency market that will not be reflected in currency derivatives until the following day, making it more difficult for a portfolio to respond to such events in a timely manner.

OTC Options. Unlike exchange-traded options, which are standardized with respect to the underlying instrument, expiration date, contract size and strike price, the terms of OTC options generally are established through negotiation between the parties to the options contract. Unless the counterparties provide for it, there is no central clearing or guaranty function for an OTC option. Therefore, OTC options are subject to the risk of default or non-performance by the counterparty to a greater extent than exchange-traded options.

Additional Risks of Options Transactions. The risks associated with options transactions are different from, and possibly greater than, the risks associated with investing directly in the underlying instruments. Options are highly specialized instruments that require investment techniques and risk analyses different from those associated with other portfolio investments. Options may be subject to the risk factors generally applicable to derivatives transactions described herein, and may also be subject to certain additional risk factors, including:

- The exercise of options written or purchased by a portfolio could cause a portfolio to sell portfolio securities, thus increasing a portfolio's portfolio turnover.
- A portfolio pays brokerage commissions each time it writes or purchases an option or buys or sells an underlying security in connection with the exercise of an option. Such brokerage commissions could be higher relative to the commissions for direct purchases of sales of the underlying securities.
- A portfolio's options transactions may be limited by limitations on options positions established by the SEC, the CFTC or the exchanges on which such options are traded.
- The hours of trading for exchange-listed options may not coincide with the hours during which the underlying securities are traded. To the extent that the options markets close before the markets for the underlying securities, significant price and rate movements can take place in the underlying securities that cannot be reflected in the options markets.
- Index options based upon a narrower index of securities or other assets may present greater risks than options based on broad market indexes, as narrower indices are more susceptible to rapid and extreme fluctuations as a result of changes in the values of a small number of securities or other assets.
- A portfolio is subject to the risk of market movements between the time that an option is exercised and the time of performance thereunder, which could increase the extent of any losses suffered by a portfolio in connection with options transactions.

Foreign Currency Forward Exchange Contracts and Currency Futures. A portfolio may enter into foreign currency forward exchange contracts. Unanticipated changes in currency prices may result in losses to a portfolio and poorer overall performance for a portfolio than if it had not entered into foreign currency forward exchange contracts. At times, a portfolio may also enter into "cross-currency" hedging transactions involving currencies other than those in which securities are held or proposed to be purchased are denominated. Forward contracts may limit gains on portfolio securities that could otherwise be realized had they not been utilized and could result in losses. The contracts also may increase a portfolio's volatility and may involve a significant amount of risk relative to the investment of cash. While a portfolio seeks to hedge against its currency exposures, there may be occasions where it is not viable or possible to ensure that the hedge will be sufficient to cover a portfolio's total exposure.

Additional Risk of Futures Transactions. The risks associated with futures contract transactions are different from, and possibly greater than, the risks associated with investing directly in the underlying instruments. Futures are highly specialized instruments that require investment techniques and risk analyses different from those associated with other portfolio investments. Futures may be subject to the risk factors generally applicable to derivatives transactions described herein, and may also be subject to certain additional risk factors, including:

- The risk of loss in buying and selling futures contracts can be substantial. Small price movements in the commodity underlying a futures position may result in immediate and substantial loss (or gain) to a portfolio.
- Buying and selling futures contracts may result in losses in excess of the amount invested in the position in the form of initial margin. In the event of adverse price movements in the underlying commodity, security, index, currency or instrument, a portfolio would be required to make daily cash payments to maintain its required margin. A portfolio may be required to sell portfolio securities, or make or take delivery of the underlying securities in order to meet daily margin requirements at a time when it may be disadvantageous to do so. A portfolio could lose margin payments deposited with a futures commodities merchant if the futures commodities merchant breaches its agreement with a portfolio, becomes insolvent or declares bankruptcy.

- Most exchanges limit the amount of fluctuation permitted in futures contract prices during any single trading day. Once the daily limit has been reached in a particular futures contract, no trades may be made on that day at prices beyond that limit. If futures contract prices were to move to the daily limit for several trading days with little or no trading, a portfolio could be prevented from prompt liquidation of a futures position and subject to substantial losses. The daily limit governs only price movements during a single trading day and therefore does not limit a portfolio's potential losses.
- Index futures based upon a narrower index of securities may present greater risks than futures based on broad market indexes, as narrower indexes are more susceptible to rapid and extreme fluctuations as a result of changes in value of a small number of securities.

Warrants. Warrants are equity securities in the form of options issued by a corporation that give the holder the right, but not the obligation, to purchase stock, usually at a price that is higher than the market price at the time the warrant is issued. A purchaser takes the risk that the warrant may expire worthless because the market price of the common stock fails to rise above the price set by the warrant.

Rights. A portfolio may purchase rights for equity securities. If a portfolio purchases a right, it takes the risk that the right might expire worthless because the market value of the common stock falls below the price fixed by the right.

General Risks of Swaps. A portfolio may enter into swaps directly or indirectly (including through Risk Premia Investments). The risks associated with swap transactions are different from, and possibly greater than, the risks associated with investing directly in the underlying instruments. Swaps are highly specialized instruments that require investment techniques and risk analyses different from those associated with other portfolio investments. The use of swaps requires an understanding not only of the underlying instrument but also of the swap contract itself. Swap transactions may be subject to the risk factors generally applicable to derivatives transactions described above, and may also be subject to certain additional risk factors. In addition to the risk of default by the counterparty, if the creditworthiness of a counterparty to a swap agreement declines, the value of the swap agreement would be likely to decline, potentially resulting in losses.

In addition, the U.S. government has enacted legislation that provides for new regulation of the derivatives market, including clearing, margin, reporting and registration requirements, which could restrict a portfolio's ability to engage in derivatives transactions or increase the cost or uncertainty involved in such transactions. The European Union (and some other countries) are implementing similar requirements, which will affect a portfolio when it enters into a derivatives transaction with a counterparty organized in that country or otherwise subject to that country's derivatives regulations.

For example, the U.S. government and the European Union have adopted mandatory-minimum margin requirements for OTC derivatives. The AIP Hedge Fund Team expects that a portfolio's transactions will become subject to variation margin requirements under such rules in 2017 and initial margin requirements under such rules in 2020. Such requirements could increase the amount of margin a portfolio needs to provide in connection with its derivatives transactions and, therefore, make derivatives transactions more expensive.

These and other new rules and regulations could, among other things, further restrict a portfolio's ability to engage in, or increase the cost to a portfolio of, derivatives transactions, for example, by making some types of derivatives no longer available to a portfolio or otherwise limiting liquidity. A portfolio may be unable to execute its investment strategy as a result. The costs of derivatives transactions are expected to increase as clearing members raise their fees to cover the costs of additional capital requirements and other regulatory changes applicable to the clearing members become effective. These rules and regulations are new and evolving, so their potential impact on a portfolio and the financial system are not yet known. While the new rules and regulations and central clearing of some derivatives transactions are designed to reduce systemic risk (i.e., the risk that the interdependence of large derivatives dealers could cause them to suffer liquidity, solvency or other challenges simultaneously), there is no assurance that they will achieve that result, and in the meantime, as noted above, central clearing and related requirements expose a portfolio to new kinds of costs and risks.

Interest Rate Swaps, Caps, Floors and Collars. A portfolio may enter into interest rate swaps, which do not involve the delivery of securities, other underlying assets or principal. Accordingly, the risk of loss with respect to interest rate and total rate of return swaps includes the net amount of interest payments that a portfolio is contractually obligated to make. A portfolio may also buy or sell interest rate caps, floors and collars, which may be less liquid than other types of swaps.

Currency Swaps. Currency swap agreements may be entered into on a net basis or may involve the delivery of the entire principal value of one designated currency in exchange for the entire principal value of another designated currency. In such cases, the entire principal value of a currency swap is subject to the risk that the counterparty will default on its contractual delivery obligations.

Credit Default Swaps. A portfolio may be either the buyer or seller in a credit default swap. As the buyer in a credit default swap, a portfolio would pay to the counterparty the periodic stream of payments. If no default occurs, a portfolio would receive no benefit from the contract. As the seller in a credit default swap, a portfolio would receive the stream of payments but would be subject to exposure on the notional amount of the swap, which it would be required to pay in the event of default. The use of credit default swaps could result in losses to a portfolio if the adviser fails to correctly evaluate the creditworthiness of the issuer of the referenced debt obligation.

Combined Transactions. Combined transactions involve entering into multiple derivatives transactions instead of a single derivatives transaction in order to customize the risk and return characteristics of the overall position. Combined transactions typically contain elements of risk that are present in each of the component transactions. Because combined transactions involve multiple transactions, they may result in higher transaction costs and may be more difficult to close out.

Other Instruments and Future Developments. A portfolio may take advantage of opportunities in the area of swaps, options on various underlying instruments and swaptions and certain other customized "synthetic" or derivative investments in the future. In addition, a portfolio may take advantage of opportunities with respect to certain other "synthetic" or derivative instruments that are not presently available but that may be developed to the extent such opportunities are both consistent with a portfolio's investment objective and legally permissible for a portfolio.

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