Alternative Risk Premia in CTA–Trend Following

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Firm Overview

ARP Investment's mission is to provide alternative risk premia products. ARP is one of the only firms exclusively focused on alternative risk premia. ARP seeks to capture these risk premia with a systematic trade or factor-based ("bottom up") investment process.

ARP product offering includes a comprehensive range of alternative risk premia factors. Currently, ARP invests in a number of market selection (momentum, valuation, carry, volatility and others) and security selection (valuation, momentum, event, volatility and others) risk premia across asset classes globally.

ARP has a unique and differentiated business model. In addition to the combined exposures to all risk premia factors, the firm also offers the underlying risk premia factors separately and in customized solutions for investors. Investors can get exposure to ARP's alternative risk premia factors through both Fund vehicles as well as Swap (unfunded) transactions with a highly rated bank counterparty.

ARP Investments leverages significant hedge fund experience to deliver alternative risk premia through a systematic investment process with appropriate liquidity, high transparency, and lower fees. ARP Investments is fully owned by its partners and focuses exclusively on risk premia products, to avoid internal conflicts with competing products.

Alternative Risk Premia in CTA-Trend Following

Deepak Gurnani*, Ludger Hentschel†

Executive Summary

The recent coincidence of high volatility in returns among CTA hedge funds and the arrival of Trend Following alternative risk premia products has provided an excellent early test for these alternative risk premia products. Although still relatively brief, the actual experience has borne out the main predictions of alternative risk premia providers: due to the absence of performance fees, the products can outperform hedge funds during periods of high strategy returns; with excellent risk management, the products can outperform the strategy on average. Hence, when implemented carefully, the products can provide the gross strategy returns at lower fees than hedge funds, leading to net-of-fee outperformance.

When selecting alternative risk premia products, choosing a provider with significant hedge fund experience but without conflicting hedge fund products may be the best way to obtain the strategy insight and risk management essential to successful alternative risk premia products.

Due to the strategy insights and risk management of the ARP team, the ARP Trend Following factor has delivered CTA strategy returns and outperformed the benchmarks at material fee savings during a period with large positive and negative CTA strategy returns.

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1. Introduction

Using the example of Trend Following, we show that the early experience with alternative risk premia products has been positive. Since the CTA strategy has experienced large positive and negative returns recently, the CTA example is a good test of the claim that alternative risk premia are an attractive alternative way to capture hedge fund strategy returns, despite the relatively short live history of alternative risk premia products. Our trend following risk premia product has clearly matched the CTA strategy returns and outperformed the benchmarks.

For many years, we have researched the existence of alternative risk premia factor exposures in hedge fund portfolios. For example, see Gurnani and Hentschel (2010).[1] Recently, several firms – ours among them – have launched alternative risk premia products that allow investors to benefit from these insights directly.

We define alternative risk premia products as systematic implementations of trading strategies offered at low, generally fixed fees. There currently are several competing alternative risk premia products with more to enter the market in the near future. When comparing these products, we show that hedge fund experience, risk management in particular, is an important ingredient in successful alternative risk premia products. Yet, alternative risk premia products offered by hedge funds create an internal conflict between the high-fee hedge fund and the low-fee alternative risk premia products. A natural way to avoid this conflict is to choose alternative risk premia products from asset managers without competing hedge fund products but with hedge fund experience.

2. Trend Following and CTA Returns

We define the Trend Following factor, at its core, as a collection of trend-following signals applied to a large set of diverse, liquid futures contracts, using careful risk management in order to ensure diversification across contracts, asset classes, and signals.

The ARP Trend Following process invests in more than 60 liquid futures contracts across the four major asset classes: commodities, equities, fixed income, and exchange rates. The trades for each contract are driven by a collection of 7 trend-following signals. These signals indicate long positions when recent prices are higher than previous prices and short positions when recent prices are lower than previous prices.[2] The signals consider prices at different points in time with comparison periods ranging from 1 month to 1 year. In addition, the signals use different measures of price increases, including direct comparisons of adjusted prices (time series momentum) and comparisons of average prices (moving average cross-overs).

The ARP Trend Following process sizes these long and short positions with a collection of risk management techniques that consider the volatility of signals, contracts, and asset classes, as well as their correlations. The goal is to avoid portfolio concentration on any one signal or contract.

Recent Performance

We launched the ARP Trend Following factor on December 19, 2014. Table 1 shows performance statistics from inception until Dec 31, 2015, a period slightly more than a year. The table also includes information for the HFRX Systematic Diversified CTA index and the Newedge Trend Indicator. The HFRX index measures returns for CTA hedge funds net of fees and transactions costs. In contrast, the Newedge Trend Indicator is a frequently cited simulated systematic implementation of a trend following strategy. Returns on the Newedge Trend Indicator do not account for fees.

[1] Fung and Hsieh (2001), Moskowitz, Ooi, and Pedersen (2012), and Hurst, Ooi, and Pedersen (2013) describe similar ideas for CTA-trend following strategies.

[2] Due to the expiration of individual futures contracts, we adjust futures prices before comparing them across expiration dates.

Table 1: Realized Performance from 12/19/2014 to 12/31/2015

	ARP Trend	HFRX CTA	Newedge
Panel A: Summary Statistics			
Return	4.38	0.44	-6.34
Risk	9.99	8.74	15.59
Sharpe Ratio	0.44	0.05	-0.41
Panel B: Relative Performance			
ARP Alpha (% pa)		4.10	7.63
ARP Beta vs index		0.95	0.51
Panel C: Correlation			
ARP correlation vs index		0.79	0.84

The table shows summary statistics based on realized daily returns for the ARP Trend Following factor from December 19, 2014 to December 31, 2015. For comparison, the table shows summary statistics for two separate benchmarks: the HFRX Systematic Diversified CTA index and the Newedge Trend Indicator.

Panel A shows realized annualized returns, annualized risk, and annualized Sharpe ratios. The ARP and HFRX returns are net of fees and transaction costs.

Panel B shows the annualized realized alpha of the ARP Trend Following factor relative to the beta-adjusted benchmark returns. The panel also shows the betas.

Panel C shows the realized correlation of the ARP Trend Following factor with the 2 benchmark series, based on daily returns.

Reported actual returns are unaudited preliminary estimates, subject to revision and net of 0.75% per annum management fees. Returns for the factor are estimated by applying a notional capital allocation (and applicable expenses) to the P/L associated with the portion of the ARP Alternative Risk Premia Master Fund Ltd allocated to the Trend Following factor. Performance results reflect the reinvestment of income. Please note that the returns could be materially different from those stated above in case the Trend Following factor was managed in a dedicated standalone fund. The fee structure is for Day 1 Investor Share Class as outlined in "Key Terms" of the fund documents. Certain investors may have higher management and performance fees depending on applicable share class. Please see important disclosures at the end.

Overall, the live ARP Trend Following factor has generated strong returns and outpaced the indexes over this period.

The live ARP Trend Following factor returns have realized a beta very close to 1 with respect to the HFRX index. This is the result of a realized correlation of 0.79 between the two return series and a slightly higher risk for the ARP factor. These realized values for correlation and risk are very close to the long-term values for the simulated backtest.

Relative to the beta-adjusted benchmark returns, the ARP Trend Following factor has generated annualized alpha of 4.10% and 7.63% with respect to HFRX index and Newedge Trend Indicator respectively.

To approximate the higher risk level of a typical CTA hedge fund instead of the ARP Trend Following factor, we also show pro forma results for a levered version of the factor (ARP Trend 2x). The portfolio is levered by a factor of 2. As table 2 shows, the returns and risk from the levered factor were approximately twice those shown in table 1. This leaves Sharpe ratios and correlations nearly unchanged. As a consequence of the additional leverage, however, the betas with respect to the reference returns double, producing a beta close to 1 with respect to the Newedge Trend Indicator. Due to the higher returns, the annualized alphas are higher, 8.76% and 15.82% with respect to HFRX index and Newedge Trend Indicator respectively for the levered version of the Trend Following factor.

Table 2: High-Vol Pro Forma Performance from 12/19/2014 to 12/31/2015

	ARP Trend 2x	HFRX CTA	Newedge
Panel A: Summary			
Return	8.61	0.44	-6.34
Risk	19.98	8.74	15.59
Sharpe Ratio	0.43	0.05	-0.41
Panel B: Relative			
ARP Alpha (% pa)		8.76	15.82
ARP Beta vs index		1.90	1.03
Panel C: Correlation			
ARP correlation vs		0.79	0.84

The table shows summary statistics based on levered daily returns for the ARP Trend 2x factor from December 19, 2014 to December 31, 2015. For comparison, the table shows summary statistics for two separate benchmarks: the HFRX Systematic Diversified CTA index and the Newedge Trend Indicator.

Panel A shows annualized returns, annualized risk, and annualized Sharpe ratios. The ARP and HFRX returns are net of fees and transaction costs.

Panel B shows the annualized realized alpha of the ARP Trend 2x factor relative to the beta-adjusted benchmark returns. The panel also shows the betas.

Panel C shows the realized correlation of the ARP Trend 2x factor with the 2 benchmark series, based on daily returns.

Certain hedge fund managers run the CTA strategy at 16-20% annualized volatility (approximately twice the volatility of the ARP Trend Following factor). ARP has generated pro forma results for running the Trend Following factor at 16-20% annualized volatility. There are no assurances however that the actual performance from running the Trend Following factor at higher volatility levels will be in line with the pro forma results shown above. In fact, the actual returns could be much lower than those shown above. ARP does not manage any capital using the ARP Trend 2x factor. Please see important disclosures at the end of the presentation.

The pro forma results for the ARP Trend 2x Strategy are estimated from the live performance of the Trend Following factor, using the process described below. The target volatility of the ARP Trend 2x Strategy is 16-20% annualized (twice that of the Trend Following factor). Each month the excess returns for the Trend Following factor are calculated by subtracting the 1-month US T-Bill return from the monthly total return. The excess strategy return for the month is then multiplied by 2 (the ratio of the volatilities of the two strategies) to arrive at the excess return for the ARP Trend 2x factor. The pro forma returns for the ARP Trend 2x factor are computed by adding the 1-month US T-Bill return to the excess returns for the month. This process is repeated for each month and has the net effect of increasing the profits in profitable months for the Trend Following factor and conversely increasing the losses during periods where Trend Following factor suffers losses. Pro forma returns are net of 1.50% per annum in management fees and reflect the reinvestment of income.

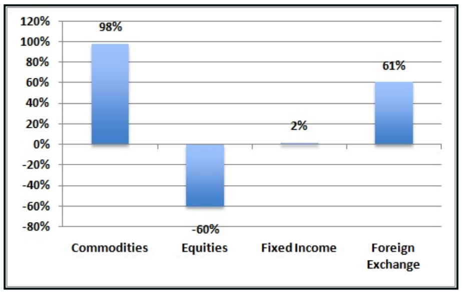
Figure 1 shows performance attribution for the ARP Trend Following factor from January 2015 to December 2015. Panel A shows performance attribution by four major asset classes. Commodities positions contributed 98% of the factor return in 2015, benefiting from fall in energy, base metal and precious metals during the year. Exchange rates also contributed positively, benefiting from strength of the dollar versus both developed and emerging currencies. Equities detracted from performance and contributed negatively during 2015.

Panel B shows performance attribution by trend horizon. Interestingly, long-term signals (six months to one year) contributed 75% of the factor return in 2015. Short-term signal contributions were modestly negative due to losses in Q2 and Q4 on sharp market reversals.

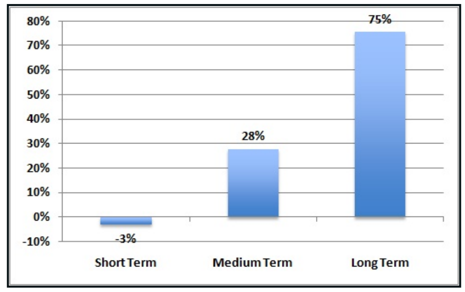
As mentioned earlier, the ARP Trend Following process uses risk management techniques to avoid portfolio concentration on any one signal or asset class or contract.

Figure 1: Performance Attribution from 1/1/2015 to 12/31/2015

Panel A: Attribution by Asset Class



Panel B: Attribution by Trend Horizon



The figure shows performance attribution for the ARP Trend Following factor from January 2015 to December 2015. Panel A shows performance attribution by four major asset classes: commodities, equities, fixed income, and exchange rates. Panel B shows performance attribution by trend horizon: short-term, medium-term and long-term. Returns used for performance attribution are gross of transaction cost, expenses and fees.

Simulated Historical Performance

Our longer-term simulated backtests confirm that our trend following process clearly captures the main characteristics of the hedge fund strategy returns measured by CTA hedge fund indexes. For the longer history, we use the Barclay CTA index before the HFRX daily returns became available. Both indexes are widely followed averages of CTA hedge fund returns but are not directly investable. Importantly, the index returns are net of the hedge fund fees charged by the constituent funds. Unfortunately, we do not know exactly what those fees were.

Table 3 shows summary statistics for the simulated historical returns to our systematic implementation of the Trend Following factor and compares these returns to a benchmark return series. The benchmark returns start with the Barclay CTA index and switch to the HFRX Systematic Diversified CTA index in January 2009, when daily HFRX returns become available. In the backtest, the ARP Trend Following factor returned 13.4% per annum net of estimated transaction costs and 75bps in fees, compared with realized returns of 4.9% for the benchmark net of transaction costs and fees. The strategy achieved this return at a risk level of 9.7%, compared to 8.4% for the benchmark. In order to generate the strategy gross returns, an alternative risk premia factor should operate at slightly higher risk than a strategy index net of performance fees.

Table 3: Simulated Performance

	ARP CTA	Benchmark
Panel A: Summary Statistics		
Arithmetic Mean	13.4	4.9
Geometric Mean	13.7	4.6
Median	14.3	2.4
Risk	9.7	8.4
Sharpe Ratio	1.06	0.17
Max Drawdown	11.3	16.7
Panel B: Relative Performance		
ARP Alpha (% pa)		9.5
ARP Beta vs index		0.79

The table shows summary statistics based on simulated monthly returns for the ARP Trend Following factor from January 1990 to 18th December 2014. For comparison, the table shows summary statistics for a benchmark that consists of the Barclay CTA index from January 1990 to December 2008 and the HFRX Systematic Diversified CTA index from January 2009 to December 2014. All statistics except for drawdowns and betas are annualized. Returns for the simulated ARP Trend Following factor are net of estimated transaction costs and 75bps in annual management fees.

Hypothetical performance results have many inherent limitations, some of which are described below. No representation is being made that any account will or is likely to achieve profits or losses similar to those shown. In fact, there are frequently sharp differences between hypothetical performance results and the actual results subsequently achieved 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 adhere to a particular trading program in spite of trading losses are material points which can also 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 and all of which can adversely affect trading results.

Panel B in Table 3 illustrates the relation between the ARP Trend Following returns and the benchmark CTA index returns. The ARP Trend Following has a beta of 0.79 with respect to the benchmark index. Net of the beta-adjusted benchmark CTA index return, the ARP Trend Following have generated an annualized alpha of 9.5%. Part of this alpha clearly stems from the fee advantage of the alternative risk premia product relative to hedge funds. At a list price of 2/20, hedge funds with a gross return of 8.25%, would have charged 3.25% in fees and returned 5% net of fees. This fee represents 43% of the average spread between the simulated ARP Trend Following returns and the benchmark CTA index returns.

Table 4 shows correlations between the ARP Trend Following factor returns and several common benchmarks, starting in January 2005 when all 3 of the benchmark returns become available. As the table shows, the correlation between the ARP Trend Following factor returns and any of the benchmarks is very similar to the correlations between the benchmarks. In that sense, the ARP Trend Following factor captures the CTA strategy returns. In part because there is no consensus strategy index, we make no explicit attempt to maximize correlation or minimize tracking error with a benchmark index. The high correlation presumably is a result of capturing the basic CTA trading style with our trend-following signals and risk management techniques.

Table 4: Return Correlations

	ARP CTA	Barclay	HFRX	Newedge
ARP CTA	1.00	0.79	0.82	0.79
Barclay	0.79	1.00	0.83	0.73
HFRX	0.82	0.83	1.00	0.69
Newedge	0.79	0.73	0.69	1.00

The table shows the correlation matrix for the monthly returns of the simulated the ARP Trend Following factor, the Barclay CTA index, the HFRX Systematic Diversified CTA index, and the Newedge Trend Indicator. The returns cover the period from January 2005 to December 2014, when all four series are available.

Figure 2 compares simulated cumulative returns for the ARP Trend Following factor and the benchmark index. The graph illustrates the outperformance of the systematic implementation in the backtest. To simplify the graphical comparison, we levered our strategy returns to have the same realized risk as the index returns.

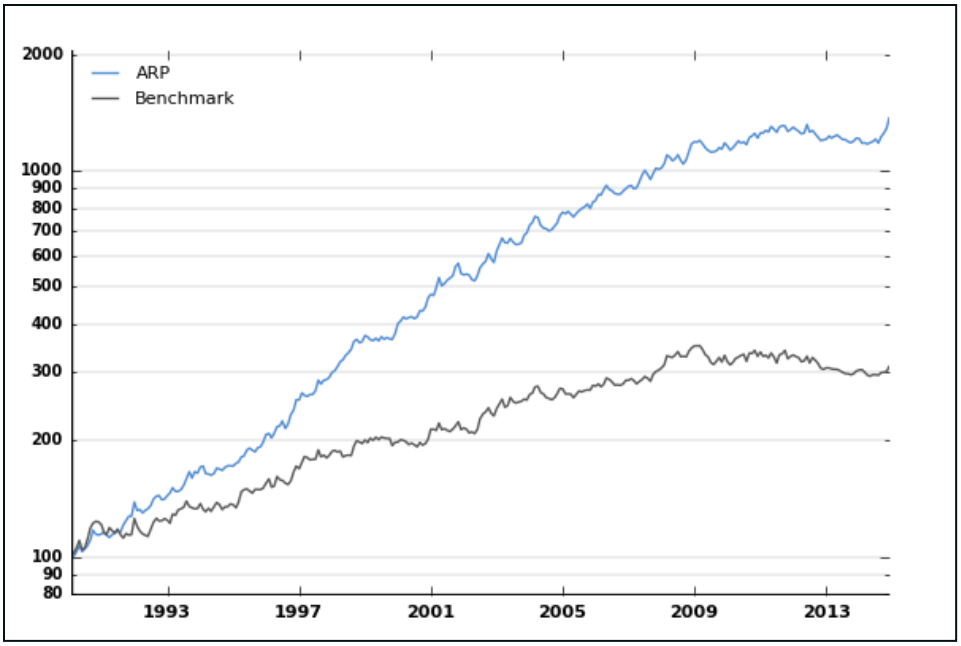


Figure 2: Simulated Performance

The figure shows cumulative performance for the simulated ARP Trend Following factor and a benchmark. The benchmark consists of the Barclay CTA index from January 1990 to December 2008 and the HFRX Systematic Diversified CTA index from January 2009 to December 2014. The latter index is not available for earlier periods. Returns for the simulated ARP Trend Following factor are net of estimated transaction costs and 75bps in annual management fees.

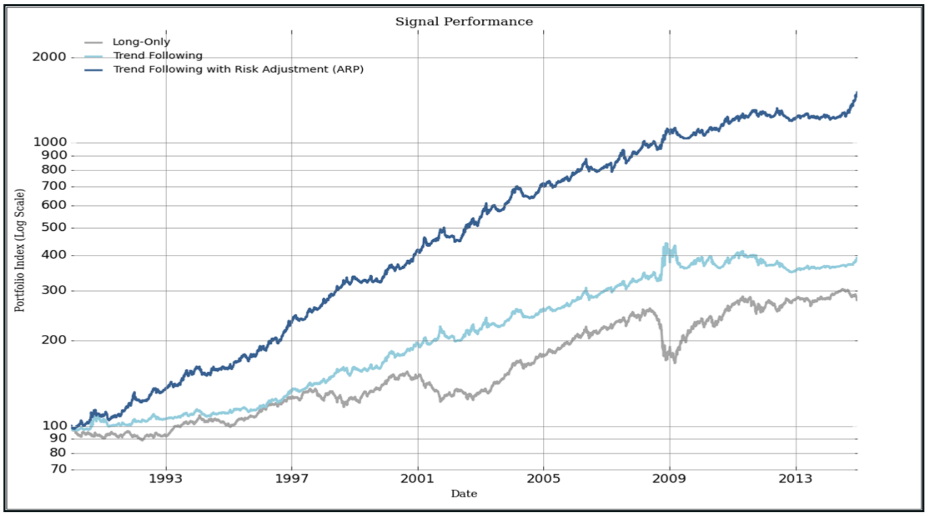
Hypothetical performance results have many inherent limitations, some of which are described below. No representation is being made that any account will or is likely to achieve profits or losses similar to those shown. In fact, there are frequently sharp differences between hypothetical performance results and the actual results subsequently achieved 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 adhere to a particular trading program in spite of trading losses are material points which can also 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 and all of which can adversely affect trading results.

Risk Management Adds Value

An important finding is that risk management is a crucial feature of a successful implementation of the Trend Following factor.

Figure 3 compares cumulative returns (in simulated backtests) from 3 different investment processes using the same investable universe of 71 liquid futures contracts. The grey line at the bottom shows the cumulative returns from investments in 71 futures contracts with equal dollar allocations to sectors, equal dollar allocations to subsectors within sectors, and finally equal dollar allocations to contracts within subsectors. For brevity, we refer to this as "equal dollar" allocations. These allocations ensure a basic level of diversification. All of the positions are long.



The light blue line in the middle shows the cumulative returns from similar equal dollar investments in all 71 futures contracts based on the trend-following signals. Depending on the signal, however, these positions can be long or short. Finally, the dark blue line at the top of the chart shows the cumulative returns from risk-managed investments in all 71 futures contracts based on the same trend following signals. These trades have the same direction as those generating the light blue line, but they differ in size depending on the riskiness of the trades.

Figure 3: The Value of Risk Management (Simulated Performance)

The figure shows cumulative performance for simulated investment strategies in 71 liquid futures contracts. The contracts are rolled systematically, prior to expiration. The grey line is based on long-only investments with equal weights to sectors, equal weights to subsectors within sectors, and equal weights to contracts within subsectors. The light-blue line represents equal-weighted long or short investments in the same futures contracts based on a collection of trend-following signals. The dark-blue line represents risk-managed positions in the same futures contracts, based on the same trend-following signals. For comparison, all 3 return series have been levered up or down to a common risk level of 8%. All of the returns are gross of transaction costs and fees.

Hypothetical performance results have many inherent limitations, some of which are described below. No representation is being made that any account will or is likely to achieve profits or losses similar to those shown. In fact, there are frequently sharp differences between hypothetical performance results and the actual results subsequently achieved 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 adhere to a particular trading program in spite of trading losses are material points which can also 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 and all of which can adversely affect trading results.

The effect of risk management is twofold. First, it reduces overall risk, allowing the portfolio to run with higher leverage in order to enhance returns. Second, risk management directly adds to returns. The combination of the two results in the dramatic performance increase shown in figure 3. To fully appreciate the magnitude of this improvement, it is important to recognize that the vertical axis uses a logarithmic scale to make the lines fit on the same chart.

3. A Complement to Hedge Funds

Given these results from the early live performance and the simulated backtest, many investors should ask themselves why they should pay the “2/20” list price for CTA hedge funds. The answer to this question depends crucially on whether the investor has found an exceptional CTA manager. Truly exceptional CTA managers deserve high fees. Yet, finding such managers and developing conviction that they will remain exceptional CTA managers is quite difficult.

For many investors, especially those with large CTA hedge fund allocations, it seems sensible to consider core strategy investments via low-cost alternative risk premia products. Almost by definition, a strategy allocation spread across several managers earns close to the strategy return – a return that can be earned at lower fees via alternative risk premia products.

These core allocations can be scaled up when the investor thinks the strategy will perform relatively well and scaled down when the investor thinks the strategy will perform relatively poorly. The liquidity of alternative risk premia products facilitates such tactical asset allocation. Moreover, the absence of performance fees means that alternative risk premia products are much cheaper than hedge funds during periods of high strategy returns. For example, when strategy returns are 22% before fees, a 2/20 fund leaves 16% return net of fees to the investor. At a 1% fixed fee, an alternative risk premia product would return 21% to the investor, an additional 5 percentage points!

Of course, core allocations to risk premia products can be complemented with allocations to exceptional managers when investors find them. Interestingly, however, there have been media stories that even the largest, brand-name CTA managers did not outperform the CTA indexes during the live performance period we analyze.

To allow investors to make these types of asset allocation decisions across strategies, ARP Investments offers individual factors. For investors who prefer to invest in a fully diversified portfolio of factors with managed allocations, ARP Investments offers a customized multi-factor portfolio.

4. Conclusions

Early experience with Trend Following alternative risk premia has confirmed the main findings from backtests: a well-managed alternative risk premia product can match or outperform CTA strategy returns. While the alternative risk premia match the main characteristics of the returns during positive and negative periods, the large fee savings during periods of strong strategy returns have produced higher average returns net of fees for investors.

In addition to the attractive fees, alternative risk premia offer enhanced liquidity and transparency.

When evaluating alternative risk premia products, it seems especially important to consider the risk management built into the product. As for hedge funds, such risk management should minimize incidental, undesired exposures other than those directly associated with the alternative risk premia. Generally speaking, it would be very difficult for the investor to implement such risk management outside of the product.

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The index returns are provided for purposes of comparison and include dividends and/or interest income and, unlike the returns presented for the various strategies, do not reflect fees or expenses. Unlike the various strategies presented, which are actively managed and periodically may maintain cash positions, an index is unmanaged and fully invested. The comparison of the performance of the various strategies presented to these indices may be inappropriate because the various strategies are not as diversified as the indices, may be more or less volatile than the indices, and may include securities which are substantially different than the securities in the indices. Although information and analysis contained herein has been obtained from sources the Adviser believes to be reliable, its accuracy and completeness cannot be guaranteed.

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The **HFRX Macro: Systematic Diversified CTA Index** includes managers employing the Systematic Diversified CTA strategy. Systematic Diversified CTA managers typically employ an investment process designed to identify opportunities in markets exhibiting trending or momentum characteristics across individual instruments or asset classes. Strategies utilize quantitative processes which focus on statistically robust or technical patterns in the return series of the asset, and typically focus on highly liquid instruments.

The **Barclays CTA Index** (BARCCTA Index**)** provides a benchmark of representative performance of commodity trading advisors (CTAs). In order to qualify for inclusion in the Index, a CTA must have four years of prior performance history. Refer to www.barclayhedge.com for more details on index construction methodology.

A combination of HFRX Macro: Systematic Diversified CTA Index and BARCCTA Index is used as the benchmark index for the CTA Trend Following risk premia strategy returns. BARCCTA Index (monthly) returns are used for the period January 1990 to December 2008. HFRX Macro: Systematic Diversified CTA Index (daily) returns are used from January 2009 onwards. Combination index used due to availability of daily return data from HFRX Macro: Systematic Diversified CTA index (from January 2009 onwards).