Diversification—still the only free lunch?

Alternative building blocks for risk parity portfolios

October 2012

IN BRIEF

Risk parity has gained recognition over the past decade—buoyed by its performance relative to that of other allocation approaches. However, this outperformance has occurred during a period of declining rates, an environment ideally suited for traditional risk parity portfolios with their typically large leveraged exposure to fixed income assets. *But, can risk parity maintain its stature in an environment of rising rates and increasing correlations among asset classes?*

We believe that replacing the traditional *asset class* building blocks of risk parity portfolios with a broader spectrum of low correlation *risk factors* can result in a more robust risk parity solution—one that can be effective across market cycles and despite rising asset class correlations.

Using data from 1927 to the present, our analysis compares the performance of factor risk parity portfolios to that of traditional asset class risk parity as well as traditional balanced portfolios. Results show factor risk parity to consistently outperform both traditional risk parity and balanced portfolios across all time periods studied, inclusive of both rising and falling yield environments.

Risk parity has recently garnered significant attention, due in large part to its strong performance over the last decade relative to more traditional asset allocation approaches. This paper seeks to shed light on the risk parity framework, outline its main advantages and address key concerns on the minds of investors using or exploring risk parity—namely, leveraged exposure to fixed income assets at this point in the interest rate cycle and a need to enhance diversification at a time of increasing correlation among asset classes.

J.P.Morgan
Asset Management

> **"One should always divide his wealth into three parts: a third in land, a third in merchandise, and a third ready to hand."**
> *Rav Isaac (Babylonian Talmud: Tractate Bava Mezi'a 42a)*

The premise of risk parity as an approach to strategic asset allocation is based on maximal diversification of beta (or risk premia), as it emphasizes the balanced contribution of various risk exposures to overall portfolio risk. One should, the approach holds, essentially remain agnostic to return forecasts on the basis that volatility is a much more stable estimate than return.

Much has been made of the increasing correlation among asset classes and the resulting difficulty of achieving diversification—particularly at times of crisis arising from systemic risk. A number of recent studies have examined the benefits of factor diversification versus asset class diversification. The difference is subtle because when one refers to asset classes, one is also referring to compensated risk premia, i.e., asset classes themselves are factors. Equities can be thought of as a growth factor, Treasuries as a deflation factor and commodities as an inflation factor. However, risk premia go much further than these traditional factors, as argued in a previous J.P. Morgan Asset Management white paper on alternative beta.[1] Indeed, risk premia encompass a much broader and more orthogonal set of factors that can be taken advantage of, including the equity value premium, the size premium, the forward rate bias and the merger arbitrage premium, among others. The literature is clear that factor diversification is generally more appealing than asset class diversification. Ilmanen and Kizer[2] go further and point out that factor diversification has been more effective, particularly during periods of crisis.

This paper illustrates how using factor premia as the building blocks of risk parity can help address the core concerns around traditional risk parity and offer a very attractive approach to strategic asset allocation. Our analysis looks at multiple time periods and different market environments, with data going back to 1927, and shows that 'factor premium' risk parity consistently outperforms and is stronger than 'asset class' risk parity.

The concerns with traditional risk parity methods

Traditional balanced portfolios with a 60/40 mix between equities and bonds may sound diversified but, in fact, over any period of time, stocks will have accounted for 80% to 90% of the volatility of the portfolio. Risk parity was therefore introduced as a way to address this imbalance by emphasizing balanced risk contributions from each asset class. While the solution to this disproportionate influence of the stock portfolio can be simply achieved by decreasing the equity exposure in favor of the bond weight, the problem with this approach is that the expected return would also decline. Therefore, in order to maintain a similar level of return going forward, the resultant portfolio is then typically levered. In effect, the risk parity solution would advocate reducing the equity positions only slightly, while leveraging the fixed income positions significantly. In risk terms, the resultant portfolio is certainly better diversified.

Of course, this is a stylized example. In reality, a risk parity portfolio provider would go beyond the simple stock and bond asset classes mentioned above and would include as many asset classes as possible given the focus on diversification. An example is illustrated in **Exhibits 1** and **2**, next page.

There are two major concerns, however, with traditional risk parity methods of portfolio diversification.

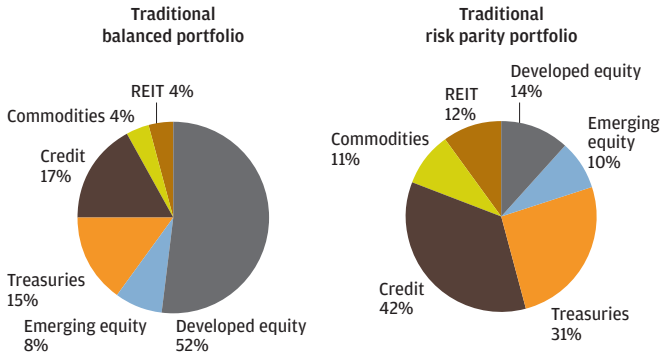
Concern one: Leveraging risk premia with poor return expectations

Government bonds today are an example of an asset class whose risk premium is likely to prove less attractive going forward. This follows a 20-year bull market (since 1991) that has resulted in exceptionally low levels of yield. The complication for traditional

[1] Romahi, Y., and Santiago, K. (2012, January). *The Democratization of Hedge Funds: Alternative beta–Accessing Hedge Fund returns in a liquid, low-cost and transparent manner*. J.P. Morgan Asset Management white paper.

[2] Ilmanen, A., and Kizer, J. (2012). "The Death of Diversification Has Been Greatly Exaggerated." *Journal of Portfolio Management,* 38(3), 15–27.

EXHIBIT 1: TRADITIONAL BALANCED PORTFOLIO VS. "ASSET CLASS" RISK PARITY PORTFOLIO



Source: J.P. Morgan Asset Management. The above charts are shown for illustrative purposes only.

EXHIBIT 2: TRADITIONAL RISK PARITY PORTFOLIO BETTER BALANCES RISK

	Traditional balanced	Traditional risk parity
Annualized return (%)	5.6	8.2
Annualized volatility (%)	11.3	8.8
Sharpe ratio	0.26	0.63
Worst drawdown (%)	-39	-29
Average long exposure (%)	100	130
Average short exposure (%)	0	0

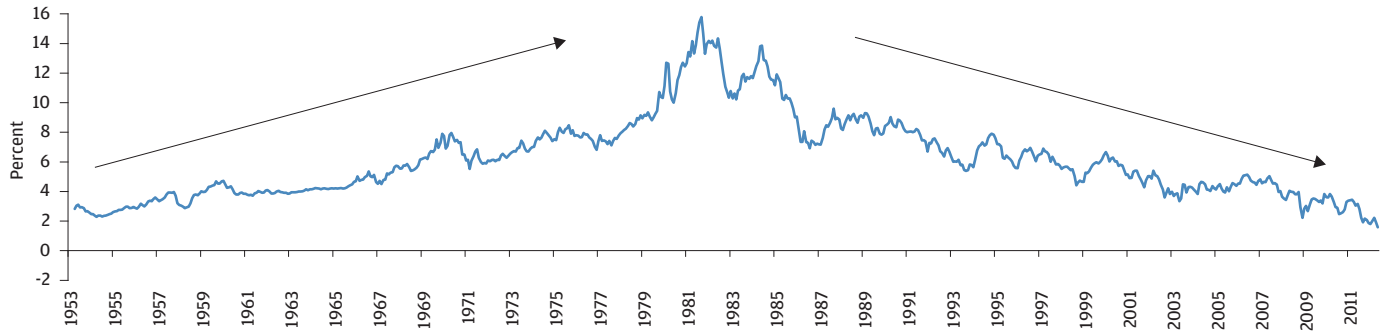
Source: J.P. Morgan Asset Management. Analysis period January 1998–December 2011. For illustrative purposes only. Past performance is not a guide to the future.

risk parity portfolios is that this is precisely the asset class that needs to be levered to achieve a lower portfolio volatility.

Historically, long-term government bonds have generally offered a term premium over cash. Because the yield from bonds is generally higher than that from cash, investors are essentially paid a premium to lock up their money and lend to those requiring long-term credit to finance their investment needs.

However, today's low yields are not unprecedented. We are able to look back to the 1950s (**Exhibit 3**) to see what happened the last time yields were this low. What is most striking about the period from 1950 to 1980 is that despite the yield curve being generally positively sloped, bond investors ended up performing worse than cash. The period from 1980 onwards—the period most back tests study when looking at risk parity—has been a particularly attractive period for leveraged duration investments as it has been characterized by consistent disinflation and falling yields. Indeed, levering a bond portfolio to have the same volatility as the equity markets (as proxied by the S&P 500) in 1982 would have resulted in returns of about 28% per annum against 12% for equities. Over this period, however, Treasury yields have fallen from a high of 15.7% in September 1981 to a low of 1.58% in May 2012, so a significant portion of this return was capital gain rather than interest rate carry. A repeat of this yield contraction from today's levels is, of course, impossible.

EXHIBIT 3: U.S. 10-YEAR TREASURY YIELDS



RISING YIELD ENVIRONMENT, JANUARY 1951–DECEMBER 1980

	Return (%)	Volatility (%)
U.S. equity	10.8	13.8
U.S. Treasury	3.9	4.8
U.S. cash	4.3	0.7

DECLINING YIELD ENVIRONMENT, JANUARY 1981–MAY 2012

	Return (%)	Volatility (%)
U.S. equity	10.5	15.5
U.S. Treasury	8.7	8.2
U.S. cash	4.9	0.9

Source: J.P. Morgan Asset Management, Bloomberg. For illustrative purposes only. Past performance is not a guide to the future. The illustrated returns are based on historical index returns of the S&P 500 Index, Citigroup U.S. 10-year Index, U.S. 3m T-bills and Headline CPI over the past 60 years ending May 31, 2012.

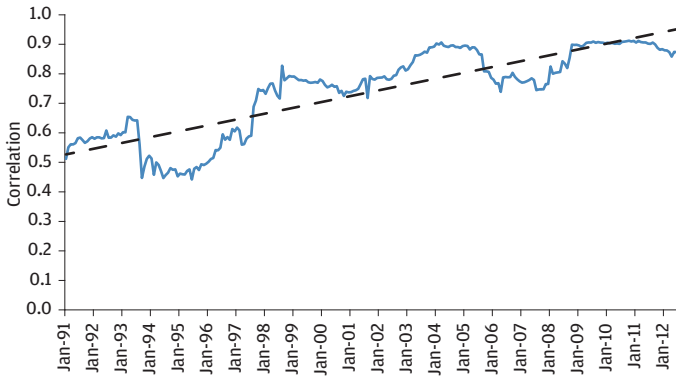
Concern 2: Correlation and hybrid asset classes

As a portfolio construction method, risk parity also removes sensitivity to low precision forecasts of returns and correlations.[3] However, this raises one of the key weaknesses of traditional risk parity—the fundamental assumption that the building blocks are uncorrelated in the first place. Indeed, in attempts to diversify the asset mix, some proponents of risk parity have included regional equities to diversify the equity exposure and have started to include what are essentially hybrid asset classes, such as convertible bonds. These additions increase the correlation among the building blocks being used.

Example 1: Regional equity correlation

Opportunities for global diversification within asset classes have declined due to increasing global correlation. This is highlighted in **Exhibit 4**, which shows the average rolling three-year correlation among four regional markets: Europe, the U.S., Japan and emerging markets. These broad regional definitions should keep the correlation estimate low, yet the impact of increased globalization is clear, with average correlations increasing from 0.4 in 1980 to nearer 0.8 today.

EXHIBIT 4: AVERAGE CORRELATION AMONG EQUITY REGIONS



Source: J.P. Morgan Asset Management. The above chart is shown for illustrative purposes only.

[3] Incorporating return and correlation forecasts with a given level of confidence is discussed in more detail in a separate paper from J.P. Morgan's Strategy Group: *Improving on Risk Parity-The forecast hedge,* Peter Rappoport, September 2012.

Example 2: Commodities—Inflation premium and the roll return

Commodities are another asset class where understanding the driver of the underlying premium is important. When people look at the returns from commodities historically, they focus on the total return. However, this can be disaggregated into two separate and distinct premia: the return due to the underlying commodity price itself and also the return to the *roll yield*.[4] Historically, commodities have been largely in *backwardation* and thus, simply being long would have captured both premia. However, the extent to which a commodity curve is in backwardation or in *contango* is an indicator of supply/demand imbalances and therefore reflects a distinct premium associated with liquidity provision in the commodities markets. When the futures term structure is in backwardation, this reflects excess demand for long hedges since the commodity producers need to hedge their positions with shorts at the back end of the curve. The investor therefore takes the opposite position by buying backwardated long-dated commodity futures. Similarly, the opposite is true for commodities in contango. In effect, the arbitrageur earns the roll yield in exchange for taking on the price uncertainty and offering the hedger price certainty. This risk premium is essentially an insurance risk premium. However, the growth of the notion of commodities as an asset class in the investment community has distorted the curve due to the supply/demand imbalances concentrating on the demand side. This has pushed curves into contango such that capturing the premium going forward is no longer focused on just being long commodities. Long commodities exposure will certainly expose the investor to the inflation premium, but a more nuanced long/short approach would be necessary in order to capture the roll premium going forward.

Example 3: Convertible bonds—A hybrid asset class

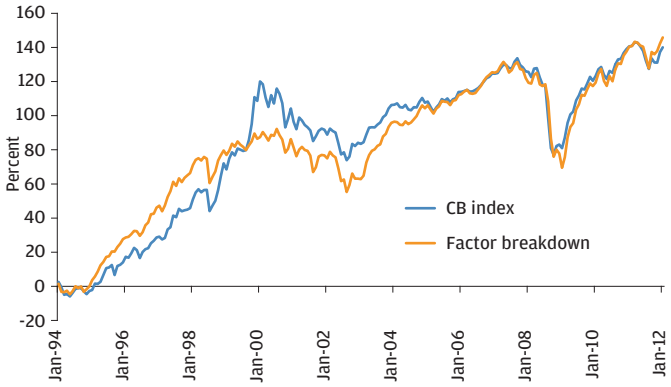
Convertible bonds (CBs) have a high level of correlation to traditional asset classes. This is not surprising given that CBs are themselves hybrid bond/equity instruments. The equity component is made up of a small cap premium as well as an equity premium. The reason for this is that typically it is smaller companies that issue CBs, since they have more limited access

[4] The *roll yield* is the return earned by establishing a position in the commodity future or forward market that takes on price uncertainty while providing hedgers with price certainty. When the market is in *backwardation,* the futures price is below the spot price; in *contango,* the futures price is above the spot. A roll yield is earned, for example, when the market is in backwardation and the investor is long a futures contract, which converges toward the higher spot price as the contract approaches expiration.

to more traditional forms of financing. When analyzing the bond component, the premium is a combination of credit and duration. **Exhibit 5** highlights that a portfolio made up of equity premium, small cap premium, credit and duration can generate a significant portion of the return from CBs.

Nevertheless, there is a component of CBs that is unique to the asset class and is considered a separate risk premium. This is the illiquidity premium associated with the embedded optionality of the convertible bond itself. However, when investing in CBs in order to capture this unique risk premium, it is important to take into account the other premia in the asset class, such as the small cap, equity and credit premia, that will typically already be present elsewhere in the portfolio.

EXHIBIT 5: BREAKING DOWN THE RETURN TO THE CONVERTIBLE BOND INDEX



Source: J.P. Morgan Asset Management. Analysis period January 1994 to December 2011. Portfolio performance is calculated using a static allocation (factor breakdown: 60% Credit Suisse High Yield Index, 10% Russell 2000 Index and 50% S&P 500 Index) with monthly rebalancing and gross of fees. CB Index is UBS U.S. Convertible Index. Past performance is not a guide to the future.

Alternative beta and factor risk premia

Understanding sources of return beyond traditional asset class returns has been a key focus of academic research. Indeed, this has spawned the work on alternative beta by helping to understand that a significant portion of hedge fund returns often comes from these risk premia exposures rather than pure skill.[5] Essentially, these factors are systematic exposures that are rewarded with a return above the risk-free rate uncorrelated to traditional asset class returns.

To illustrate the concept, we will focus on the equity factor exposures, where readers may already be familiar with the concept.

Equity risk premia—value, size and momentum

Going back to the early years of the fund management industry, prior to the development of indexation, investors attributed all of their return to the manager's skill, or alpha. Over time, it became clear that a significant portion of this return was driven by the stock market in aggregate. The notion of a compensated return for simply owning the equity market led to the development of indexation.

Some active managers, however, continued to outperform the index by simply tilting toward low price-to-earnings (P/E) and small cap stocks. The Fama-French model[6] introduced the idea of other priced risk factors beyond that of the market. More specifically, the model identified the persistent outperformance of value stocks and small cap stocks over large caps from 1927 to the present day. Others have documented the same effect internationally. Carhart[7] added momentum to these factors arguing that positive momentum stocks outperform negative momentum stocks and that this is no different from tilting toward value or size.

These size, momentum and value premia are now widely regarded as separate from the equity market premium. However, there is still some debate as to the economic source of these premia, with some arguing that each is a reward for bearing systematic risk while others argue there is an element of capturing market inefficiencies. Either way, there is overwhelming evidence of their persistence.

Most importantly, however, there is one clear departure from the traditional equity premium: to capture these other risk premia, there is a benefit from shorting. The value premium, for example, would be best captured by buying stocks with low P/E multiples while shorting those with high P/Es. Similarly, the size premium would be best captured by being long small cap stocks while shorting large cap stocks.

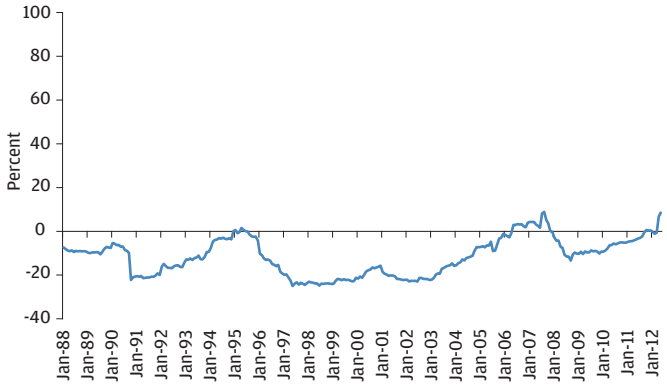
One of the most important consequences of looking at the equity market along these lines is the ability to create factors that are genuinely uncorrelated to each other, as the graph of rolling correlation in **Exhibit 6** (on the next page) highlights.

[5] Jaeger, L. (2008). *Alternative Beta Strategies and Hedge Fund Replication.* Wiley Finance.

[6] Fama, E., and French, K. (1993, February). "Common Risk Factors in the Returns on Stocks and Bonds," *Journal of Financial Economics,* 33(1), 3-56.

[7] Carhart, M. M. (1997, March). "On Persistence in Mutual Fund Performance," *Journal of Finance,* 52(1), 57-82.

EXHIBIT 6: ROLLING CORRELATION AMONG EQUITY RISK FACTORS



Source: J.P. Morgan Asset Management. The above chart is shown for illustrative purposes only.

Taxonomy of risk factors

Several recent studies have made a case that factor diversification is more appealing than asset class diversification.[8] By creating a risk parity strategy from factor risk building blocks rather than a traditional asset class perspective, we are able to address the key weaknesses of a traditional risk parity strategy, giving greater diversification as well as avoiding the concentration in duration or any single asset class.

Exhibit 7 shows the wide range of factor risks that have been identified in the literature.[9] Factors in the left column would typically be the only components of a traditional risk parity strategy. However, by incorporating all of the alternative risk premia on the right, the concentration in any single factor becomes less significant.

Exhibit 8 illustrates what a diversified factor risk parity portfolio might look like.

Most importantly, the correlation matrix in **Exhibit 9** (next page) highlights the fact that these alternative risk factors are much more orthogonal to each other than are the traditional asset class factors.

EXHIBIT 7: TAXONOMY OF RISK FACTORS

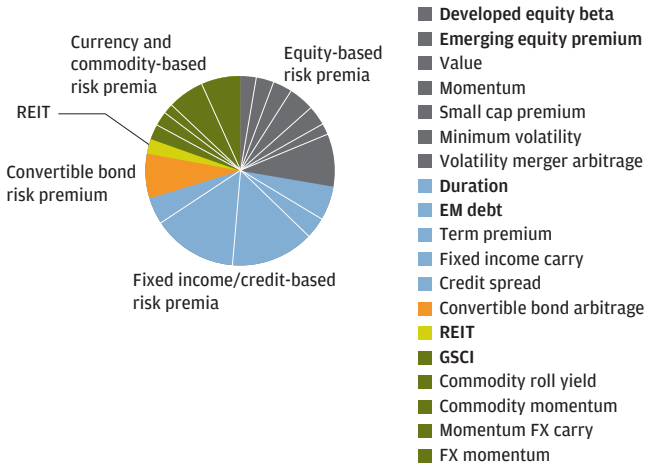
Traditional beta	Alternative beta
• Equity premium	• Small cap premium
• Credit premium	• Value premium
• Term premium	• Equity momentum
• Commodity (GSCI)	• Minimum volatility
• Emerging debt	• Commodities momentum
• Emerging equity	• FX momentum
• REIT	• Relative bond carry
	• Relative bond yield curve
	• Convertible arbitrage
	• Merger arbitrage
	• Commodities roll yield
	• Forward rate bias

Source: J.P. Morgan Asset Management.

Factor risk parity—comparative analysis

It is interesting to compare a traditional balanced portfolio to traditional asset class risk parity and factor risk parity solutions. For some investors, a full leap from asset class diversification to factor diversification may be too difficult due to limitations on leverage or an inability to exploit the short side, given that key elements of factor-based asset allocation require more active rebalancing, the use of derivatives and short positions.

EXHIBIT 8: A FACTOR RISK PARITY PORTFOLIO IS A COMBINATION OF TRADITIONAL AND ALTERNATIVE BETAS



Source: J.P. Morgan Asset Management. The above chart is shown for illustrative purposes only.

[8] Bender, J., Briand, R., Nielsen, F., and Stefek, D. (2010). "Portfolio of Risk Premia: A New Approach to Diversification," *Journal of Portfolio Management,* 36(2), 17-25; Jones, B. (2011). "Re-Thinking Asset Allocation: The Role of Risk-Factor Diversification." Deutsche Bank Global Markets Research; Page, S., and Taborsky, M. (2011). "The Myth of Diversification: Risk Factors versus Asset Classes," *Journal of Portfolio Management,* 37(4).

[9] Blitz, D. (2011). "Strategic Allocation to Premiums in the Equity Market." Working Paper, Robeco Asset Management; Hjalmarsson, J. (2011). "Diversification across Characteristics," *Journal of Investing,* 20(4), 84-88; Ilmanen, A., and Kizer, J. (2012). "The Death of Diversification Has Been Greatly Exaggerated," *Journal of Portfolio Management,* 38(3) 15-27.

EXHIBIT 9: LOWER CORRELATIONS ACROSS TRADITIONAL ASSET CLASSES VERSUS ALTERNATIVE RISK FACTORS

	MSCI World	Value	Momentum	Size	Minimum volatility	Merger arbitrage	WGBI	EMBI	G7 Term premium	G7 Real world	High yield (spread)	Convertible bond arb.	REITs (beta hedged)	GSCI
MSCI World	1.0													
Value	0.3	1.0												
Momentum	0.3	0.2	1.0											
Size	0.3	0.3	0.1	1.0										
Minimum volatility	-0.4	-0.2	0.4	-0.1	1.0									
Merger arbitrage	0.4	-0.3	-0.1	0.0	-0.3	1.0								
WGBI	-0.2	0.0	0.0	-0.1	-0.2	-0.2	1.0							
EMBI	0.8	0.3	0.1	0.3	-0.4	0.5	0.2	1.0						
G7 Term premium	-0.1	-0.1	-0.3	0.0	-0.2	0.2	-0.3	-0.1	1.0					
G7 Real world	-0.2	0.1	-0.2	0.1	0.0	-0.3	0.0	-0.1	-0.3	1.0				
High yield (spread)	0.8	0.4	0.1	0.4	-0.3	0.4	-0.1	0.9	0.0	-0.1	1.0			
Convertible bond arb.	-0.1	-0.2	-0.2	0.1	-0.3	0.1	0.1	-0.1	0.0	0.1	-0.1	1.0		
REITs (beta hedged)	0.3	0.3	0.3	0.6	0.0	-0.1	0.0	0.3	-0.2	0.3	0.4	0.2	1.0	
GSCI	0.6	0.1	0.1	-0.1	-0.2	0.5	-0.2	0.5	0.0	-0.2	0.5	-0.1	-0.1	1.0

Source: J.P. Morgan Asset Management, Bloomberg. Analysis period December 2006 to December 2009. WGBI: World Government Bond Index. EMBI: Emerging Markets Bond Index. GSCI: Goldman Sachs Commodity Index. The above chart is shown for illustrative purposes only.

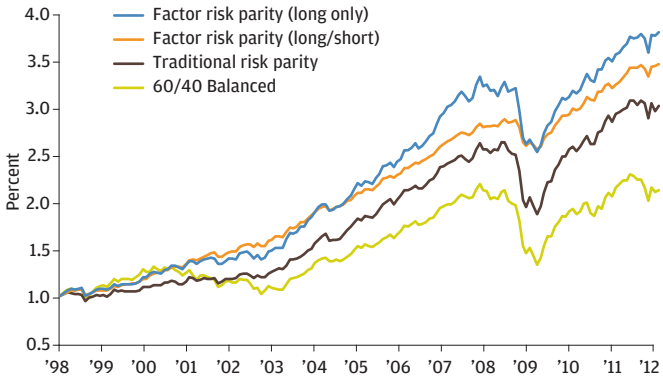
A variant of factor risk parity, referred to here as "long only" factor risk parity, involves asset allocation on a factor basis, using leverage but constrained to being long only. Clearly, the level of traditional beta carried by this solution will be markedly higher, but the most important result is that despite the constraints, over every period examined it is still a more appealing solution than traditional risk parity (although it is not as elegant as the pure [long/short] factor risk parity approach).

Our analysis examines several periods from 1927 to the present. As we go back in time, a smaller subset of factors is available. However, this in itself is interesting as it shows the concept is robust to the choice of factors as well as time period. Transaction costs are factored in for all results from 1991 forward, but not for prior period results.

1998 to the present day

The period from 1998 includes all the factors highlighted previously. Several noteworthy points can be deduced. This is a period that has been quite favorable to traditional risk parity, due to its large bond position. Traditional risk parity would have actually outperformed a traditional balanced portfolio over this time period. However, it is striking that the improved diversification of factor risk parity is of significant benefit, even during this period. As seen in **Exhibits 10** and **11A** (next page), the pure factor risk parity portfolio has a higher historical return, much lower levels of drawdown and risk and an

EXHIBIT 10: PERFORMANCE OF TRADITIONAL BALANCED VS. RISK PARITY VS. FACTOR RISK PARITY SINCE 1998



Source: J.P. Morgan Asset Management. Analysis period January 1998 to December 2011. Past performance is not a guide to the future. The above chart is shown for illustrative purposes only. Portfolio performance is calculated using monthly rebalancing gross of fees. The balanced and traditional risk parity portfolio allocations are shown in Exhibit 1 though the traditional risk parity portfolio allocations change slightly over time based on the most recent 3-year volatility of each asset.

EXHIBIT 11A: A LONG ONLY PORTFOLIO ON A FACTOR BASIS HAS A SIGNIFICANTLY HIGHER SHARPE RATIO THAN TRADITIONAL RISK PARITY, 1998–DECEMBER 2011

	Traditional balanced	Traditional risk parity	Factor risk parity (long only)	Factor risk parity (long/short)
Annualized return (%)	5.6	8.2	10.0	9.3
Annualized volatility (%)	11.3	8.8	8.1	5.0
Sharpe ratio	0.26	0.63	0.91	1.32
Worst drawdown (%)	-39	-29	-24	-11
Average long exposure (%)	100	130	149	133
Average short exposure (%)	0	0	-13*	-67

11B: PURE FACTOR RISK PARITY CARRIES THE LOWEST TRADITIONAL BETA EXPOSURE, 1998–DECEMBER 2011, TRADITIONAL BETAS

	MSCI World	World Government Bond (WGBI)	High yield	Commodities (GSCI)
Factor risk parity (long/short)	0.24	0.10	0.39	0.08
Factor risk parity (long only)	0.41	0.16	0.64	0.14
Traditional risk parity	0.33	0.33	0.57	0.14
Traditional balanced	0.65	0.35	0.90	0.20
HFRI FoF	**0.25**	**0.01**	**0.40**	**0.12**

Source: J.P. Morgan Asset Management, Bloomberg. Analysis period January 1998 to December 2011. Past performance is not a guide to the future. Portfolio performance is calculated using monthly rebalancing gross of fees. The balanced and traditional risk parity portfolio allocations are shown in Exhibit 1 though the traditional risk parity portfolio allocations change slightly over time based on the most recent 3-year volatility of each asset. The above tables are shown for illustrative purposes only.

* The short position in the long only portfolio represents a currency overlay position.

improved Sharpe ratio (1.32 versus 0.63) relative to the traditional risk parity portfolio, purely achieved through increased diversification. Achieving these results, however, requires shorting, in addition to leverage. The pure factor risk parity approach has an average long holding of 133% and an average short exposure of -67%; traditional risk parity requires a similar degree of leverage but no shorting.

Long only factor risk parity is also shown to have a significantly higher Sharpe ratio than the traditional risk parity portfolio (0.91 vs. 0.63). However, at a similar level of risk, the long only version requires more leverage (149% vs. 130%).

As seen in **Exhibit 11B**, the more constrained long only solution forces a portfolio to carry more traditional beta than the long/short solution, due to the shorting constraint that inhibits the ability to hedge appropriately. Despite that, it is interesting to note that long only factor risk parity is similar to traditional risk parity in the level of beta it carries (though it has slightly higher equity beta with much less duration) while long/short factor risk parity is similar to the HFRI Fund of Hedge Fund index.

1927 to the present day

In our comparison of these alternative approaches to asset allocation, we conducted an analysis using data extending back to 1927, incorporating the following factors: equity value, equity momentum, equity size premium, equity premium and term premium. Both long only and pure factor risk parity portfolios outperform traditional risk parity in terms of return and Sharpe ratio, while pure risk parity outperforms traditional across all risk and return measures.

EXHIBIT 12: 1927–DECEMBER 2011

	Traditional balanced	Traditional risk parity	Factor risk parity (long only)	Factor risk parity (long/short)
Annualized return (%)	8.44	7.73	9.40	9.32
Annualized volatility (%)	12.12	9.25	9.85	5.93
Sharpe ratio	0.40	0.44	0.58	0.96
Worst drawdown (%)	-62	-24	-40	-14
Average long exposure (%)	100	140	100	140
Average short exposure (%)	0	0	0	-73

Source: J.P. Morgan Asset Management. Analysis period January 1927 to December 2011. Portfolio performance is calculated using monthly rebalancing gross of fees. The balanced and traditional risk parity portfolio allocations are shown in Exhibit 1 though the traditional risk parity portfolio allocations change slightly over time based on the most recent 3-year volatility of each asset. Past performance is not a guide to the future. The above table is shown for illustrative purposes only.

1951 to the present day

Looking specifically at the 30-year rise in U.S. Treasury yields and the subsequent 30 years of falling yields, one can isolate some of the effects the yield environment has on the success of risk parity portfolios.

We first look at the entire period between 1951 and 2011 (**Exhibit 13**) and confirm that the incremental benefits observed in the period since 1927 are maintained.

Exhibits 14 and **15** break this data into two 30-year periods based on rising and falling trends in yields.

During the 30 years of rising yields (**Exhibit 14**), a traditional risk parity portfolio that relies on leveraging bonds to achieve a similar volatility level underperforms a traditional balanced portfolio. What is even more striking is that the traditional risk parity portfolio barely outperforms cash over this period, returning an annualized rate of 5.23% versus 4.33% for cash. In contrast, over the subsequent 30 years of declining yields (**Exhibit 15**)—a yield environment similar to that of the past decade when risk parity portfolios were originally constructed and gained recognition—a traditional risk parity portfolio significantly outperforms a traditional balanced portfolio, in Sharpe ratio terms.

The benefits of creating a more diversified portfolio—allocated across risk factors versus asset classes and far less reliant on fixed income—can be seen clearly by examining this period of strength for traditional risk parity. As illustrated in Exhibits 14 and 15, the long only constrained approach outperforms traditional risk parity in the rising yield environment and is competitive with the traditional approach as yields decline. Pure factor risk parity outperforms and is more efficient over both periods, even when a more limited subset of risk premia is examined.

1975 to the present day

From 1975, one can add relative term premium and carry as well as credit to the factor risks. Once again, the results are similar. Traditional risk parity is an improvement on the traditional balanced approach, while factor risk parity is a significant improvement on both. Even constrained long only factor risk parity is more appealing than both balanced as well as traditional risk parity.

EXHIBIT 13: 1951–DECEMBER 2011

	Traditional balanced	Traditional risk parity	Factor risk parity (long only)	Factor risk parity (long/short)
Annualized return (%)	8.93	9.00	10.51	11.56
Annualized volatility (%)	9.66	9.78	9.53	5.93
Sharpe ratio	0.43	0.44	0.61	1.15
Worst drawdown (%)	-30	-23	-27	-13
Average long exposure (%)	100	140	100	155
Average short exposure (%)	0	0	0	-44
Cash (%)	4.73			

EXHIBIT 14: 1951–1980, RISING YIELD ENVIRONMENT

	Traditional balanced	Traditional risk parity	Factor risk parity (long only)	Factor risk parity (long/short)
Annualized return (%)	7.79	5.23	8.30	9.69
Annualized volatility (%)	9.09	8.45	8.69	5.57
Sharpe ratio	0.38	0.10	0.45	0.96
Worst drawdown (%)	-28	-23	-23	-8
Average long exposure (%)	100	140	100	155
Average short exposure (%)	0	0	0	-42
Cash (%)	4.34			

EXHIBIT 15: 1981–DECEMBER 2011, DECLINING YIELD ENVIRONMENT

	Traditional balanced	Traditional risk parity	Factor risk parity (long only)	Factor risk parity (long/short)
Annualized return (%)	10.05	12.78	12.69	13.40
Annualized volatility (%)	10.19	10.84	10.25	6.23
Sharpe ratio	0.48	0.71	0.74	1.33
Worst drawdown (%)	-30	-16	-27	-13
Average long exposure (%)	100	140	100	155
Average short exposure (%)	0	0	0	-45
Cash (%)	5.11			

EXHIBIT 16: 1975–DECEMBER 2011

	Traditional balanced	Traditional risk parity	Factor risk parity (long only)	Factor risk parity (long/short)
Annualized return (%)	9.44	9.67	15.16	13.71
Annualized volatility (%)	10.14	8.01	7.90	5.01
Sharpe ratio	0.38	0.51	1.21	1.62
Worst drawdown (%)	-39	-20	-17	-12
Average long exposure (%)	100	130	120	170
Average short exposure (%)	0	0	0	-99

Source (Exhibits 13-16): J.P. Morgan Asset Management. Past performance is not a guide to the future. The above tables are shown for illustrative purposes only. Portfolio performance is calculated using monthly rebalancing gross of fees. The balanced and traditional risk parity portfolio allocations are shown in Exhibit 1 though the traditional risk parity portfolio allocations change slightly over time based on the most recent 3-year volatility of each asset.

1991 to the present day

This period allows the incorporation of the full set of factors discussed in this paper, except for the commodities roll yield and momentum factors; once again, the factor risk parity portfolios outperform. Note that the correlation benefits significantly reduce the pure risk parity portfolio's volatility, requiring some use of leverage to achieve higher risk targets.

EXHIBIT 17: 1991–DECEMBER 2011

	Traditional balanced	Traditional risk parity	Factor risk parity (long only)	Factor risk parity (long/short)
Annualized return (%)	7.70	9.87	11.43	11.76
Annualized volatility (%)	10.55	7.97	6.92	4.13
Sharpe ratio	0.41	0.82	1.15	2.03
Worst drawdown (%)	-40	-27	-21	-6
Average long exposure (%)	100	120	130	170
Average short exposure (%)	0	0	0	-124

Source: J.P. Morgan Asset Management. Analysis period January 1991 to December 2011. Past performance is not a guide to the future. The above table is shown for illustrative purposes only. Portfolio performance is calculated using monthly rebalancing gross of fees. The balanced and traditional risk parity portfolio allocations are shown in Exhibit 1 though the traditional risk parity portfolio allocations change slightly over time based on the most recent 3-year volatility of each asset.

Implications and conclusions

The main benefit of approaching asset allocation from a factor perspective rather than using more traditional asset class definitions is improved diversification. Our analysis highlights clear risk reduction benefits as well as lower market directionality.

Developments are taking place in the industry to allow investors to access these factors in a liquid and transparent fashion, many of which were simply inaccessible other than through higher cost, more opaque and less liquid vehicles. This development is necessary to enable investors to source factor premia simply and in an appropriate fashion.

It should be noted that many of these factors may already form part of an investor's portfolio through value or small cap investments, or indeed through investments in convertible bonds. Therefore, the investor needs only to consider how to put them together in as orthogonal a way as possible and may be missing only a few additional factors that can be sourced elsewhere.

While an increasing number of investors are already approaching asset allocation in this way, there remains some hesitation among others. Lack of familiarity with new approaches and the desire not to deviate from the peer group create a significant amount of inertia against adopting a different strategy.

Shorting and leverage requirements are two of the more significant hurdles for many investors. While we demonstrated that a long only risk factor approach still does better than traditional balanced or risk parity approaches, a significant portion of the benefit is lost.

The purpose of a better diversified approach to risk parity is that all risk premia go through dislocations or extended periods when they are out of favor. Empirical evidence suggests that risk parity portfolios are the point of least regret and therefore are closer to ex post optimality than other forms of portfolio construction relying on the diversification benefits to feed through.

Isolating the risk premia at the factor level also leads to insight on the level of near-term return potential for the factor as the value associated with the factor is more transparent. This can be used as a way to allocate around the strategic factor risk parity asset allocation benchmark.

By approaching risk parity using factor risk premia building blocks rather than traditional asset class definitions, we are able to take advantage of the benefits of a risk parity approach while addressing the major concerns that more simplistic solutions have raised. A pure approach is of most benefit though long only investors can also benefit from looking at their portfolio in this innovative fashion.

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Diversification—still the only free lunch?

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FOR FURTHER INFORMATION

For further insight on addressing the shortcomings of the traditional risk parity approach, please see: ***Improving on Risk Parity—Hedging forecast uncertainty*** by Peter Rappoport, head of our Global Strategy team, and Nicholas Nottebohm. The paper is available in both full and abbreviated format at jpmorgan.com/institutional or by contacting your J.P. Morgan representative.