Diversification – still the only free lunch?

Alternative building blocks for risk parity portfolios

J.P.Morgan
Asset Management

TABLE OF CONTENTS

“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)

INTRODUCTION

Risk parity has recently garnered significant attention, particularly owing to its strong performance to more traditional approaches of asset allocation in the last decade. This paper seeks to shed some light on this framework and outline the main advantages, while highlighting some of the concerns currently at the forefront of the minds of risk parity investors – namely leveraged positions in fixed income assets at this point in the interest rate cycle as well as the increasing correlation among asset classes.

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

Much has been made recently of the increasing correlation among asset classes and the increasing 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 over asset class diversification. The difference is subtle because when one refers to asset classes one is also referring to compensated risk premia. These themselves are therefore factors. One can think of equities 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 [15]. Indeed, when one focuses on the risk premia, there are a much broader and more orthogonal set of factors of which one can take advantage. In addition to those mentioned, for example, we can also include the equity value premium, the size premium, the forward rate bias and the merger arbitrage premium among others as further risk premia. The literature is clear that factor diversification is generally more appealing to asset class diversification. Ilmanen and Kizer [8] go further and point out that factor diversification has been more effective, particularly during periods of crisis.

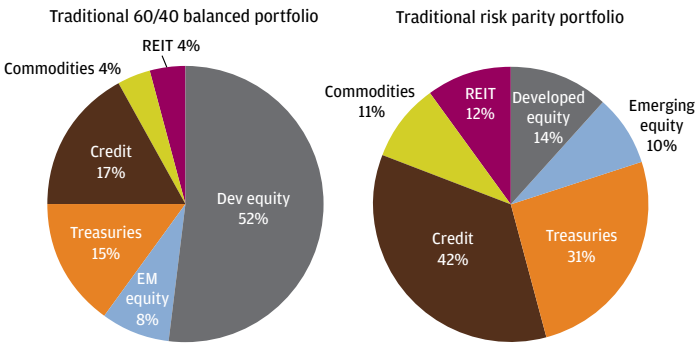
In this paper, extending risk parity in this direction can be seen to address the core concerns around traditional risk parity and can offer a very attractive approach to strategic asset allocation. In order to demonstrate this, data is included from several periods going back to 1927 and shows that 'factor premium' risk parity consistently outperforms and is stronger to '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 between 80-90% of the volatility of the portfolio. Risk parity was therefore introduced as a way to address this imbalance by emphasising 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 favour 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 stylised 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 **Exhibit 1**.

EXHIBIT 1: TRADITIONAL 60/40 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 (1991 – DEC 2011)

	Traditional 60/40 balanced	Traditional risk parity
Annualised return	7.70%	9.87%
Annualised volatility	10.55%	7.97%
Sharpe ratio	0.41	0.82
Worst drawdown	-40%	-27%
Average long	100%	120%
Average short	0%	0%

Source: J.P. Morgan Asset Management. For illustrative purposes only. Past performance is not a guide to the future.

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

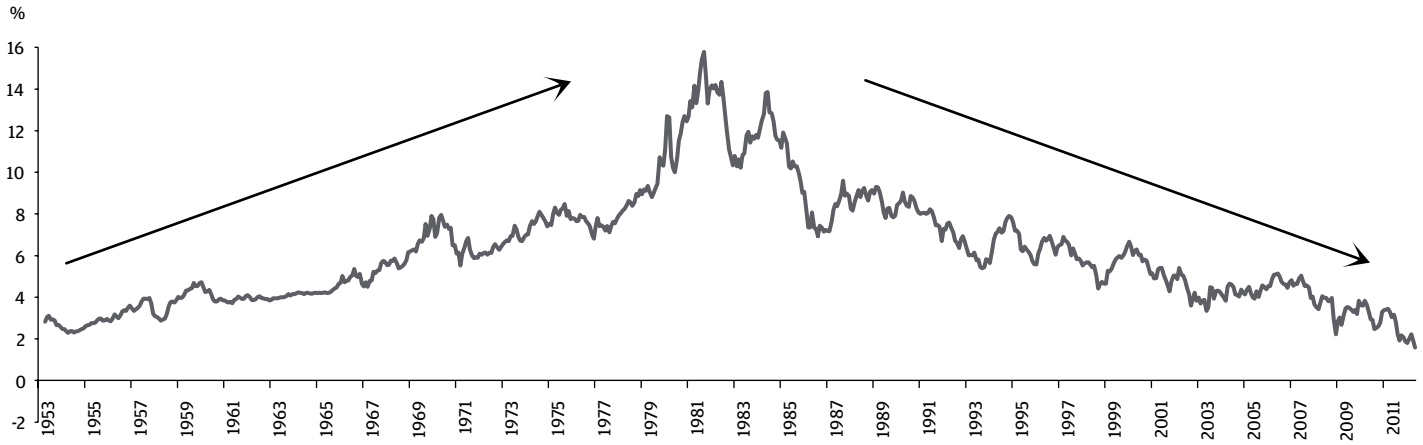
Concern 1: Leveraging risk premia with poor return expectations

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 that has resulted in exceptionally low levels of yield. The complication for traditional 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 given 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 (as shown in **Exhibit 3**) to see what happened the last time yields were this low. What is most striking about the period from 1950-1980 is that despite the yield curve being generally positively sloped, bond investors ended up performing worse than cash. The period from 1980 onwards, which represents the period most backtests study when looking at risk parity, has been a particularly attractive period for leveraged duration investments as it has been characterised 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: US TEN-YEAR TREASURY YIELDS



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

EXHIBIT 4.1: RAISING RATE PERIOD (JAN 1951 – DEC 1980)

	Return	Volatility
US equity	10.8%	13.8%
US Treasury	3.9%	4.8%
US cash	4.3%	0.7%

EXHIBIT 4.2: FALLING RATE PERIOD (JAN 1981 – MAY 2012)

	Return	Volatility
US equity	10.5%	15.5%
US Treasury	8.7%	8.2%
US 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 US 10 year Index, US 3m T-bills and Headline CPI over the past 60 years ending 31 May 2012.

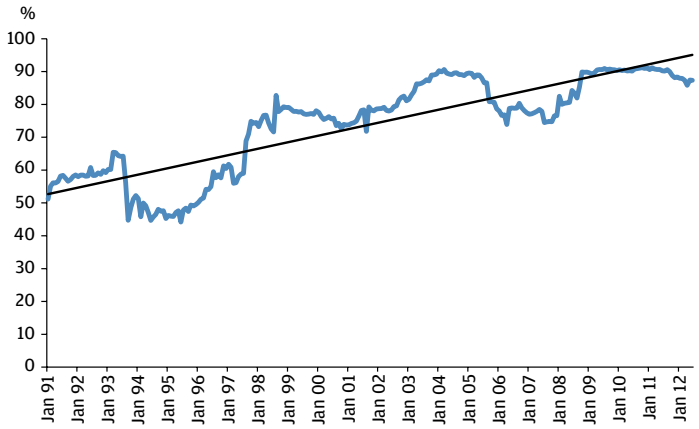
Concern 2: Correlation and hybrid asset classes

As a portfolio construction method, risk parity also removes sensitivity to low precision forecasts of returns and correlation[1]. 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. This all increases 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 5** below, which shows the average rolling three-year correlation among four regional markets: Europe, the US, Japan and emerging markets. These broad regional definitions should keep the correlation estimate low, yet the impact of increased globalisation is clear, with average correlations increasing from 0.4 in 1980 to nearer 0.8 today.

EXHIBIT 5: AVERAGE CORRELATION AMONG EQUITY REGIONS



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

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. Historically, commodities have been largely in backwardation and thus simply being long would have captured both premia. However, to what extent 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 backend 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 so 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.

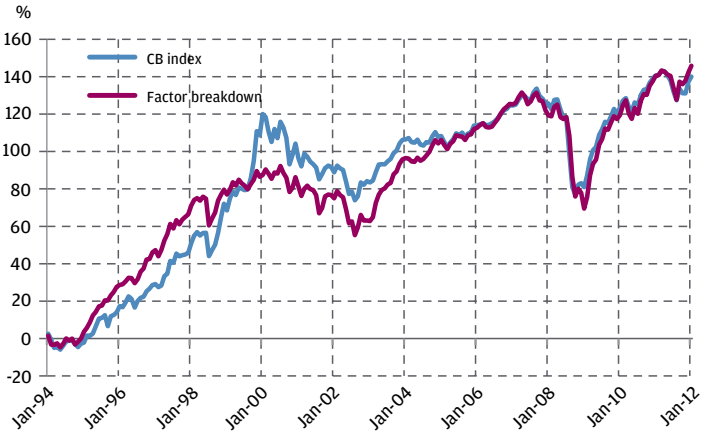
[1] Incorporating return and correlation forecast with a given level of confidence is discussed in more detail in a separate paper by Peter Rappoport from J.P. Morgan's Strategy Group.

Example 3: Convertible bonds – A hybrid asset class

Convertible bonds (CBs) have a high level of correlation to traditional asset classes. This is unsurprising 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 as they have more limited access to more traditional forms of financing. When analysing the bond component, the premium is a combination of credit and duration. **Exhibit 6** highlights that a portfolio made up of equity premium, small cap premium, credit and duration generates a significant portion of the return from CBs over the period.

Nevertheless, there is a component of CBs that is unique to the asset class that 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 6: 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 based on the weights illustrated above with monthly rebalancing and gross of fees. CB Index: UBS US Convertible Index. Past performance is not a guide to the future.

ALTERNATIVE BETA AND FACTOR RISK PREMIA

Understanding sources of return beyond the equity return 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 come from these risk premia exposures rather than pure skill [11]. Essentially, these factors are systematic exposures that are rewarded with a return above the risk free rate uncorrelated to traditional equity returns.

To illustrate the concept, we will focus on the equity factor exposures as it is most likely the reader is already familiar with the concept here.

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 these returns were driven by the stock market in aggregate and more importantly, that a return simply by being long the market. This notion of there being 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 towards 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 cap from 1927 to the present day. Others have documented the same effect internationally. Carhart [5] added momentum to these factors arguing that positive momentum stocks outperform negative momentum stocks and that this is no different from tilting towards value or size.

These size, momentum and value premia are now widely regarded as separate risk premia 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 that there is an element of capturing market inefficiencies. Either way, there is overwhelming evidence for 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 as 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 7** highlights.

EXHIBIT 7: ROLLING CORRELATION AMONGST FACTORS

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

EXHIBIT 8: TAXONOMY OF RISK FACTORS

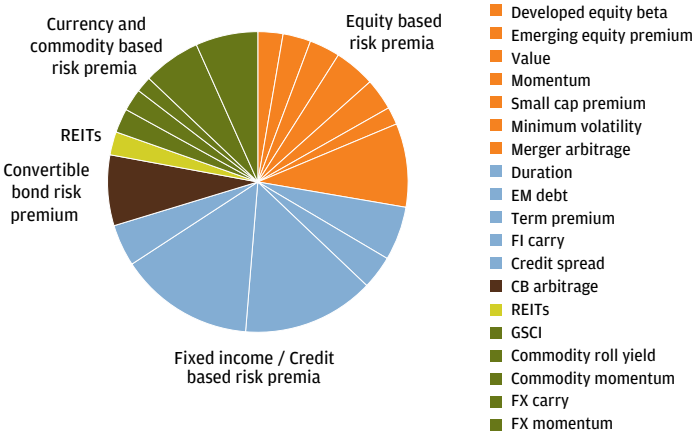
Traditional beta	Alternative beta
Equity premium	Small cap premium
Commodity (GSCI)	Value premium
Credit premium	Equity momentum
Emerging debt	Minimum volatility
Term premium	Commodities momentum
Emerging equity	FX momentum
REIT	Relative bond carry
	Relative bond yield curve
	Convertible arbitrage
	Merger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

Source: J.P. Morgan Asset Management.

Taxonomy of risk factors

Several recent studies have made a case that factor diversification is more appealing to asset class diversification [3,10,14]. 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 8** shows the wide range of factor risks that have been identified in the literature [4,7,8]. To the left of the dotted line would typically be the only components of a traditional risk parity strategy, but by incorporating all of the alternative risk premia on the right, the concentration in any single factor becomes less significant.

EXHIBIT 9: DIVERSIFICATION ACHIEVED WITH FACTOR RISK PARITY



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

Most importantly, the correlation matrix in **Exhibit 10** highlights the fact that these factors are much more orthogonal to each other than the traditional factors are to each other.

EXHIBIT 10: CORRELATION MATRIX – DIVERSIFICATION ACHIEVED WITH FACTOR RISK PARITY

	MSCI World	Value	Mom.	Size	Min. volatility	Merger arb.	WGBI	EMBI	Term prem.	Real yield	High yield	Convert. arb.	REITs	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.

FACTOR RISK PARITY

It is interesting to compare a traditional 60/40 balanced portfolio to traditional asset class risk parity to factor risk parity. For some investors, a full leap from asset class diversification to factor diversification may be too difficult due to limitations on leverage, or because of 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.

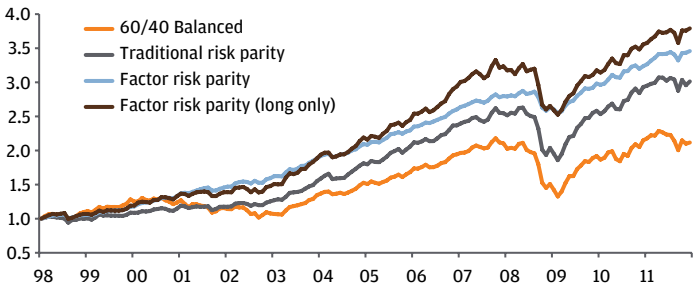
A variant of factor risk parity, shown as 'long only' factor risk parity, involves asset allocation on a factor basis but constrained to be long only. Clearly, the level of traditional beta carried by this solution will be markedly higher, but the most important result is that despite the constraints,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

Several periods are examined going back to 1927. 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 but not for those going back further.

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 is quite favourable to traditional risk parity due to a large bond position. Risk Parity would have actually outperformed a traditional 60/40 balanced portfolio over this time period without requiring any use of leverage. However, it is striking that the improved diversification of factor risk parity is of significant benefit even over this period where the pure factor risk parity portfolio has a similar historical return with much lower levels of drawdown and risk – purely achieved through increased diversification (the information ratio improves from 0.64 to 1.79). In order to achieve these results, there is a requirement for leverage and for shorting as the pure factor risk parity approach has an average long holding of 133% and an average short of -67% compared to no shorting requirement in standard risk parity.

EXHIBIT 11: PERFORMANCE OF TRADITIONAL BALANCED VS RISK PARITY VS FACTOR RISK PARITY SINCE 1998



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.

Sources: 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.

A long only portfolio can also be created on a factor basis and is shown to have a significantly higher information ratio (0.91 vs 0.64). However, at the same level of risk, the long only version, while achieving a higher return and lower drawdown, does still require more leverage than traditional risk parity to achieve a typical 8% volatility level.

As seen in **Exhibit 12.2**, 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 slightly higher equity beta with much less duration) while the long/short factor risk parity is similar to the HFRI Fund of Hedge Fund index.

EXHIBIT 12.1: 1998 – DEC 2011

	Traditional 60/40 balanced	Traditional risk parity	Factor risk parity (long only)	Factor risk parity (long/short)
Return	5.6%	8.2%	10.0%	9.3%
Risk	11.3%	8.9%	8.1%	5.0%
Sharpe ratio	0.26	0.63	0.91	1.32
Worst drawdown	-39%	-29%	-24%	-11%
Long exposure	100%	130%	149%	133%
Short exposure	0%	0%	-13%	-67%

EXHIBIT 12.2: BETA TO TRADITIONAL RISK PREMIA

	MSCI World	WGBI	High yield	GSCI
Factor parity risk (long/short)	0.24	0.10	0.39	0.08
Factor parity risk (long only)	0.41	0.16	0.64	0.14
Traditional risk parity	0.33	0.33	0.57	0.14
60/40 Balanced	0.65	0.35	0.90	0.20
HFRI FoF	**0.25**	**0.01**	**0.40**	**0.12**

Source: 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.

Sources: J.P. Morgan Asset Management, Bloomberg. Analysis period January 1998 to December 2011.

Past performance is not a guide to the future. The above tables are shown for illustrative purposes only.

1927 to the present day

We also have results over the other time periods studied all the way back to 1927. The following factors are included: equity value, equity momentum, equity size premium, equity premium and term premium.

EXHIBIT 13: 1927 – DEC 2011

	Traditional 60/40 balanced	Traditional risk parity	Factor risk parity (long only)	Factor risk parity (long/short)
Annualised return	8.44%	7.73%	9.40%	9.32%
Annualised 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	100%	140%	100%	140%
Average short	0%	0%	0%	-73%

Source: 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.

Sources: J.P. Morgan Asset Management. Analysis period January 1927 to December 2011.

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 US 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, and confirm that the incremental benefits observed in the period since 1927 is maintained.

Exhibits 15 and 16 break this data into two 30-year periods based on the trend in rate we identified earlier (**Exhibit 3**).

During the 30 years of rising yields, a traditional risk parity portfolio that relies on leveraging bonds to achieve a similar volatility level underperforms a traditional 60/40 balanced portfolio. What is even more striking is that the traditional risk parity portfolio only just outperforms cash over this period, returning an annualised rate of 5.23% relative to 4.33% returned by holding cash. Alternatively, a traditional risk parity portfolio has been able to significantly improve the Sharpe ratio of a traditional balanced portfolio over the subsequent 30 years, which has been the environment in which they were originally constructed and gained recognition.

The benefits of creating a more diversified portfolio that allocates risk across risk factors instead of asset classes without relying solely on fixed income become clear as the factor risk parity (and even the long only constrained portfolio) outperform and improve efficiency over both periods, even when a more limited subset of risk premia are examined.

EXHIBIT 14: 1951 – DEC 2011

	Traditional 60/40 balanced	Traditional risk parity	Factor risk parity (long only)	Factor risk parity (long/ short)
Annualised return	8.93%	9.00%	10.51%	11.56%
Annualised 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	100%	140%	100%	155%
Average short	0%	0%	0%	-44%
Cash	4.73%			

Sources: J.P. Morgan Asset Management. Analysis period January 1951 to December 2011.

EXHIBIT 15: 1951 – 1980

	Traditional 60/40 balanced	Traditional risk parity	Factor risk parity (long only)	Factor risk parity (long/ short)
Annualised return	7.79%	5.23%	8.30%	9.69%
Annualised 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	100%	140%	100%	155%
Average short	0%	0%	0%	-42%
Cash	4.34%			

Sources: J.P. Morgan Asset Management. Analysis period January 1951 to January 1980.

EXHIBIT 16: 1981 – DEC 2011

	Traditional 60/40 balanced	Traditional risk parity	Factor risk parity (long only)	Factor risk parity (long/ short)
Annualised return	10.05%	12.78%	12.69%	13.40%
Annualised 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	100%	140%	100%	155%
Average short	0%	0%	0%	-45%
Cash	5.11%			

Sources: J.P. Morgan Asset Management. Analysis period January 1981 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 tables are shown for illustrative purposes only.

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, one sees similar results. Traditional risk parity is an improvement on traditional balanced portfolio whilst factor risk parity is a significant improvement on both. A constrained factor risk parity which is long only is still more appealing to both balanced as well as traditional risk parity.

EXHIBIT 17: 1975 – DEC 2011

	Traditional 60/40 balanced	Traditional risk parity	Factor risk parity (long only)	Factor risk parity (long/ short)
Annualised return	9.44%	9.67%	15.16%	13.71%
Annualised 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	100%	130%	120%	170%
Average short	0%	0%	0%	-99%

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.

Sources: J.P. Morgan Asset Management. Analysis period January 1975 to December 2011.

Past performance is not a guide to the future. The above table is shown for illustrative purposes only.

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 and once again, the same conclusion is clear. However, the correlation benefits do reduce the portfolio's volatility, requiring some use of leverage to achieve higher risk targets.

EXHIBIT 18: 1991 – DEC 2011

	Traditional 60/40 balanced	Traditional risk parity	Factor risk parity (long only)	Factor risk parity (long/ short)
Annualised return	7.70%	9.87%	11.43%	11.76%
Annualised 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	100%	120%	130%	170%
Average short	0%	0%	0%	-124%

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.

Sources: 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.

IMPLICATIONS AND CONCLUSIONS

The main benefit of approaching asset allocation from a factor perspective is the diversification benefits achievable over constructing portfolios using more traditional asset class definitions. We have highlighted 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 a lot 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 many. 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.

The requirement for shorting and leverage 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 where they are out of favour. 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.

BIBLIOGRAPHY

[1] Ang, A, W Goetzmann and S Schaefer, 'Evaluation of Active Management of the Norwegian Government Pension Fund-Global, 2009.' Available at http://www.reegjeringen.no

[2] Asness, C, A Frazzini and L Pederden, 'Leverage Aversion and Risk Parity,' Financial Analysts Journal, Vol. 68 (1) , 2012, pp. 47-59.

[3] Bender J, R Briand, F Nielsen and D Stefek, 'Portfolio of Risk Premia: A New Approach to Diversification', Journal of Portfolio Management, Vol 36 (2), 2010, pp. 17-25

[4] Blitz, D, 'Strategic Allocation to Premiums in the Equity Market', Working Paper, Robeco Asset Management, 2011.

[5] Carhart, M M, 1997, 'On persistence in mutual fund performance', Journal of Finance.

[6] Fama and French, 'Common Risk Factors in the Returns on Stocks and Bonds', Journal of Financial Economics, 1993.

[7] Hjalmarsson, E, 'Diversification across Characteristics', Journal of Investing, Vol 20 (4), 2011, pp. 84-88.

[8] Ilmanen, A, J Kizer, 'The Death of Diversification Has Been Greatly Exaggerated', Journal of Portfolio Management, Vol. 38 (3), 2012, pp. 15-27.

[9] Jegadeesh, Narasimham, and Titman, Sheridan, 1993. 'Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency.' Journal of Finance 48, 93-130.

[10] Jones, B, 'Re-Thinking Asset Allocation: The Role of Risk-Factor Diversification', Deutsche Bank Global Markets Research, 2011.

[11] Lars Jaeger, 'Alternative Beta Strategies and Hedge Fund Replication', Wiley Finance, 2008.

[12] Lee, W, 'Risk Based Asset Allocation: A New Answer to an Old Question', Journal of Portfolio Management, Vol 37 (4), 2011, pp 11-28.

[13] Maillard S, T Roncalli and J Teiletche, 'The Properties of Equally Weighted Risk Contribution Portfolios', Journal of Portfolio Management, Vol 36 (4), 2010, pp. 60-70.

[14] Page S, and M Taborsky, 'The Myth of Diversification: Risk Factors versus Asset Classes', Journal of Portfolio Management, Vol 37 (4), 2011.

[15] Romahi, Y, and Santiago, K, '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, January 2012.

AUTHORS

Yazann Romahi, *managing director*, is Head of Quantitative Portfolio Strategies and a portfolio manager on the alternative beta suite of products in the Global Multi-Asset Group (GMAG), based in London. An employee since 2003, Yazann joined the firm from the Centre for Financial Research at the University of Cambridge where he worked as a research analyst and did consulting work for a number of financial institutions including Pioneer Asset Management, Pricewaterhouse Coopers and HSBC. Yazann also previously taught undergraduate courses in statistics and operations research at the University of Cambridge. He holds a PhD in Applied Mathematics from the University of Cambridge and is a CFA charterholder.

Katherine S Santiago, *vice president*, is a portfolio manager for the alternative beta suite of products in the Quantitative Portfolio Strategies team within the Global Multi-Asset Group, based in London. An employee since 2005, currently focuses on hedge fund beta, tactical asset allocation and strategic portfolio construction across multi-asset class accounts. She holds a BA in Mathematics from Bowdoin College, an MS in Mathematics in Finance from New York University and is a CFA charterholder.

FOR FURTHER INFORMATION

For further insight on addressing the shortcomings of the traditional risk parity approach, please see: 'Improving on risk parity – The forecast hedge' by Peter Rappoport, head of our Global Strategy team, and Nicholas Nottebohm.

Please contact your J.P. Morgan Asset Management client advisor for additional information.

J. P. MORGAN ASSET MANAGEMENT
Finsbury Dials | 20 Finsbury Street | London, EC2Y 9AQ | United Kingdom

LV–JPM5211 07/12

J.P.Morgan
Asset Management