

## RISK PARITY: COMMON FALLACIES

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Risk parity strategies have gained a tremendous amount of traction in recent years, particularly since the onset of the global financial crisis as “traditional” approaches to asset allocation did not seem to do an effective job through those turbulent times. The concentration in certain types of risk, such as equity risk, coupled with drawdowns that were on par with the equity markets as a whole, turned the spotlight onto alternative approaches to asset allocation such as risk parity. To simply define such approaches, risk parity strategies seek to build more diversified and more efficient portfolios by allocating capital to assets based on an asset’s expected contribution to the total risk of the portfolio, rather than on forecasts of the asset’s returns.

Using this approach, the expectation is that the risk/return profile of a risk parity portfolio would be more attractive over the long term and less subject to drawdowns and other risk concentrations than other asset allocation approaches where risk is not an explicit consideration. Given the attractiveness of this notion, it is not surprising that investments in these strategies have mushroomed in recent years. But with this influx of investor interest has come an increasing amount of criticism of certain aspects of these strategies. While numerous criticisms exist, one of the most common is that risk parity strategies have only performed well due to a bull market for bonds and that the leverage employed subjects investors to increased risks. We believe these criticisms warrant a deeper look, as they often reflect a lack of understanding of the underpinnings, process, and management of risk parity strategies. In this paper, we seek to address several of the most common misconceptions.

### **FALLACY: THE USE OF VOLATILITY AS A MEASURE OF RISK IS FLAWED**

Some critics of risk parity make the claim that using volatility to determine how to allocate assets is not an appropriate measure of risk. A common theme in these arguments is that not only do rare events with large magnitude asset returns happen more often than what a normal distribution would have predicted, but the distribution of realized returns also appears to be skewed to the negative side. Statistically speaking, relative to a normal distribution, the historical distribution is said to exhibit “excessive kurtosis with fat tails and negative skewness.” These observations are nothing new, however, as Mandelbrot drew attention to them as early as the 1960s, so we certainly agree with the critics on the empirical observations as they have been well-known and well-documented for over half a century. However, we believe a more productive exercise is to think about the potential reasons behind such apparent deviations from normal distributions, and what alternative risk measures have been explored.

Suppose all assets indeed follow normal distributions at any point in time. Remember that when we apply a normal distribution to model asset returns, the distribution can be characterized by two parameters: 1) the mean, and 2) the standard deviation, or what is commonly known as volatility. Focusing on the latter, it is easy to argue that the volatility of an asset changes over time by considering any number of examples, such as how the

business cycle drives asset behavior or how the behavior of a U.S. large cap stock index may be a function of how the weight of the railroad industry in that index has evolved, or how the behavior of the S&P 500 Index differs during normal times versus recessions. It is therefore, we believe, not a stretch to imagine the parameters of the normal distribution governing the behavior of assets also changing over time.

Let's focus on the example of the S&P 500 Index during recessions. It is well documented that sizable losses have occurred in the index during recessions, but recessions still remain relatively rare in occurrence when compared to normal times. Therefore, it is entirely possible that the same asset—the S&P 500 Index in this example—follows different normal distributions at different points in time, with different means and volatilities as determined by the prevailing conditions. Now imagine that someone is charged with collecting historical monthly returns of the S&P 500 throughout time, including returns from both types of periods (“normal” periods and recessions). Do the critics really expect the resulting frequency distribution to be a satisfyingly symmetrical normal distribution? Restating the question, isn't it entirely plausible to expect that combining returns from different measurement periods and different conditions would exhibit some rare events, some asymmetry, some thickness of tails, and generally speaking, some deviations from a normal distribution? To be clear, by no means are we arguing in this S&P 500 example that a normal distribution is a perfect description of the world. Instead, we point out the possibility that when we are “surprised” by rare events, this does not necessarily represent the abject failure of volatility (i.e., normal distribution) from being an effective measure of risk as some critics suggest. Rather, it may very well be the result of an “underestimation” of volatility—which in such instances may have jumped as conditions have changed.

While an exhaustive review of the literature on this particular topic—jumps in volatility—is beyond the scope of this paper, it is worth mentioning a few of the works as well as the fact that the research dates back nearly four decades. In the 1970s, for example, during the initial phase of the development of options pricing theory, Merton (1976) explored pricing options when underlying stock returns are discontinuous with rare jumps. Subsequently, in the 1980s, based on market experience and the intuition behind non-negative interest rates, Cox, Ingersoll and Ross (1985) abandoned the constant volatility assumption and modeled interest rate volatility as a function of the square root of the interest rate. While these are just two examples within an extensive body of literature, suffice it to say that there is an abundance of research work and models that incorporate the possibility that asset returns do have jumps, or that volatility can change over time, or both—in fact, an Internet search of “jump diffusion” and “stochastic volatility” returns 41,500 results alone. If indeed volatility as a measure of risk is as flawed as some critics contend, then why does it continue to be one of the default parameters included in rigorous financial modeling work, more than half a century after Mandelbrot's observations?

While volatility as the *only* measure of risk may have limitations, we still view it as a good starting point, and certainly far better than nothing. Without a better, quantifiable alternative measure, we consider that using such a measure, even if it comes with known limitations, is still a more constructive approach to investing. In the context of risk parity investing, we believe the key words here as it pertains to using volatility as a measure of risk is that it is a good starting point, and that a risk parity investment approach that builds on this while also incorporating features to address some of the limitations—such as volatility regimes, jumps and others—is prudent.

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We strive to understand how assets behave relative to each other both in normal times and in stress periods, and to that end we take into account regimes of both high and low correlations that are dependent on market conditions.

#### **FALLACY: RISK PARITY STRATEGIES ARE BUILT ON HISTORICAL VOLATILITY**

While there may be index providers and others who use historical volatility as a quick and transparent way to quantify the risk of an asset, seasoned risk parity managers generally utilize more sophisticated and robust methodologies to try and capture multiple dimensions of risk. As a risk parity strategy provider ourselves, we use econometric models that are built on well-documented characteristics of returns, such as regime changes in volatilities and tail risks, that cannot be modeled with simple historical volatility. On top of this, we strive to understand how assets behave relative to each other both in normal times and in stress periods, and to that end we take into account regimes of both high and low correlations that are dependent on market conditions. Finally, we create hundreds of thousands of future return scenarios in which both tail events and extreme unexpected co-movements of assets are experienced, and use these scenarios to then optimize and stress test risk balanced portfolios. In a nutshell, what these sophisticated models try to do is to look for less expensive protection (portfolio insurance) by diversifying among all asset combinations, rather than obtaining such insurance through options, which are often most expensive just when the protection is most needed, such as during stress periods.

The preceding explanation represents a very high level overview of some aspects of our approach to creating risk parity portfolios, and while the specific details are beyond the scope of this piece, the key takeaway is that we—as well as many of our industry counterparts—do not simply look at historical volatility. Rather we use our years of research and experience to develop and apply risk models that we believe more accurately represent the world in which we live. Additionally, aside from the quantitative mechanics of portfolio construction, qualitative assessments may also be necessary when risks are less quantifiable, such as for new asset classes with short histories, or in the case of assessing how government regulations or potential interventions may impact certain assets. At the risk of overgeneralizing, the resulting risk parity portfolio derived from these concepts would typically be characterized by assets that have low beta, low volatility, low tail risk and low correlations with other assets, such as government bonds, gold, or livestock. These are just some examples, of course, and it should be expected that such a list would change with market conditions. In contrast, a risk parity portfolio based solely on historical volatility may not be adaptable to these conditions and other sources of risk, and therefore may fail to identify suitable diversifiers in a timely manner or to achieve the desired risk balance.

In addition to the incorrect blanket statement that risk parity managers just use historical volatility as their risk measure to build portfolios, another false assumption often made is on the frequency with which risk is measured (a common assumption is that historical volatility using monthly returns is the measure used). In fact, there would be vast differences in one's assessment of how risky an asset is depending on whether returns are measured every millisecond, day, month, year, decade or century. For example, stock prices have been shown to mean revert over longer horizons which means that equity risk in the long run is lower than what it would appear to be when measured over a shorter horizon. On the other hand, some assets, such as bonds, tend to have persistent, trending behavior over time, and it is difficult to predict where the price of these assets will be in the long run unless one has the uncanny ability to predict the underlying trends. Therefore, looking at these assets relative to one another, the riskiness of stocks relative to bonds tends to decrease as the time horizon lengthens, before ultimately stabilizing. In practice, this means that the resulting capital allocations in a risk parity portfolio can look quite

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different depending on which investment horizon is used (i.e., the measurement period for returns and risk, such as months versus years).

In sum, a thoughtful risk parity strategy will go far beyond the simple objective of evening out the historical volatilities of assets. An experienced manager would recognize that risk has many dimensions—regimes, jumps, time horizons and non-quantifiable components among others—and it is therefore both an art and a science to bring all the pieces together in an effective risk parity strategy.

#### **FALLACY: RISK PARITY EXCESSIVELY LOADS UP ON FIXED INCOME**

In order to address this statement, we make the assumption that critics and readers are aware of the well-accepted investment theory that a risk parity portfolio is an efficient portfolio when the Sharpe ratios and correlations among all assets are the same. The discussion that follows will not be meaningful without taking this as a given and thus we direct interested readers to our research—which supports this conclusion—or any other number of other sources for the supporting theory and proofs, which again are beyond the scope of this piece.

With this assumption as a backdrop, however, when the critics contend that the allocation to fixed income, or to any asset in a risk parity portfolio, is “excessive,” it must be the case that either they disagree with the risk model behind the portfolio (since it is largely the risk model that will determine the resulting capital allocations), or they do not believe that Sharpe ratios and correlations are identical in the long run. Both points are well taken.

First, there is no standard way to model risk and we respect the fact that investors will derive their own assessments of the risks of assets. For instance, if the critics have a view that fixed income risk is actually higher than the view represented by a particular risk parity portfolio, then they would understandably believe in turn that the allocation to fixed income appears to be “excessive.”

More often than not, however, we believe that this particular fallacy has arisen due to the critics’ belief that Sharpe ratios and correlations of assets are not identical. This belief may not actually be explicitly stated by the critics using the words *Sharpe ratio* and *correlation*, but it is ultimately what lies beneath their frequent comments that “the bull market in bonds is over and risk parity will suffer.” We will address this in more detail shortly, but no matter what terms in which the view is expressed, the critics are implicitly saying that going forward bonds will have a significantly lower Sharpe ratio than other assets and therefore they disagree with the allocations of a risk parity portfolio—in particular the allocation to fixed income. They are correct. Sharpe ratios and correlations have never been identical—nor will they ever be going forward, in our view. As a result, according to investment theory, it is entirely likely that there were in the past—and could be in the future—other portfolios that are more efficient than the risk parity portfolio. Pointing this fact out in hindsight is the easy part. The challenge, however, is to find a portfolio, *ex ante* and with high conviction, that is more efficient than a risk parity portfolio.

We remind readers that the long-term Sharpe ratios of some representative asset classes are remarkably close. In addition, our research has shown that even in an environment when Sharpe ratios and correlations are different, it would still require an extensive (long) historical data series to have precise enough forecasts to find a portfolio that is more likely to be more efficient than the risk parity portfolio. We agree that the set of underlying investment views of a risk parity portfolio may not be the best set of forecasts of the future,

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but both research and observed history have suggested that to be able to outperform a risk parity portfolio requires highly skillful tactical insights.

In summary, we believe it is entirely legitimate for anyone to disagree with the allocations in any portfolio, but we point out that such disagreement should be more correctly labeled as having a different *tactical* view rather than believing there is a fundamental flaw in the theory behind a particular strategy's construction. After all, one of the main reasons investors trade is because of the different tactical views they may hold—views which may of course turn out to be right or wrong.

Shifting now to address some of the more common discourse we hear around this critique, many investors seem to share the view that government bond yields will be on an uptrend now that the Federal Reserve has embarked on its exit strategy from quantitative easing. Critics of risk parity, especially those who believe that the strategy's allocation to government bonds is "excessive," often cite the four decades from the 1940s to the early 1980s as an extended period that leveraging bonds would have been a bad trade.

Putting aside the government-controlled, war/postwar economy which makes the early part of this period incomparable to future periods, the losses in bonds during this period occurred mainly as a result of hyperinflation. Note that inflation risk is precisely the reason a risk parity manager invests in inflation-sensitive assets such as inflation-linked bonds and commodities. In the above mentioned four-decade period, commodities performed well and mitigated the losses in bonds and partially in stocks, while also playing a role as a buffer against uncertainty through the start of the Volcker era which resolved many of these macro management issues. Again, risk parity managers do not lever up bonds in isolation from other assets or market conditions, but rather adjust bond exposures as needed—which includes periods of leveraging as well as deleveraging—in an effort to deliver a return stream that conforms to a predetermined expected risk profile.

The second problem with the above analysis is that it assumes a risk parity manager is going to sit back and watch these episodes like a deer caught in the headlights of an oncoming truck before meeting its final destiny. As we discussed above, risk parity strategies are both responsive and adaptive. If there is a pick-up in the volatilities of certain assets—even those that were initially thought of as low risk assets such as bonds—risk parity managers are not afraid to switch their perception of these assets to viewing them as high beta, high risk assets until the underlying risky regime ends. In contrast to the critics' objections, a good risk parity manager would not excessively lever up bonds, as he or she cannot do so by the strategy's very definition, due to the increased risks of bonds in this period. Rather, the manager will dynamically shift weights to those assets that exhibit relatively low risk reaction in traumatic periods, and decide whether to lever or delever the portfolio based on the overall average increases in volatilities. Therefore, leverage and relative capital allocation in a risk parity strategy is not static, but instead very much depends on the underlying risk regime at a particular point in time.

#### **FALLACY: RISK PARITY PORTFOLIOS ARE NOT ACTUALLY AT RISK PARITY**

There have been published research articles that have reported that the historical returns and/or portfolio snapshots of some risk parity managers suggest that they are not taking equal risk across assets. Such assessments have also been made in relation to the previous discussion point around risk parity portfolios excessively loading up on fixed income. While we cannot speak on behalf of those managers, the obvious flaw in such a blanket assessment is that using one unified risk model to review other managers' portfolios will

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not necessarily result in a fair analysis, for the simple reason that different managers use different risk models and there is no single, universally accepted “correct” risk model. For instance, we work with clients with different investment horizons and varying aversions to tail risks, and the resulting customized risk parity portfolios we manage for them are built upon similarly customized risk models, which can be meaningfully different from one client to another. We do not believe in one size fits all, and we suggest that the critics recognize that their risk models are not necessarily applicable to others’ portfolios and their respective investment objectives.

**FALLACY: RISK PARITY STRATEGIES DO NOT REFLECT THE FUNDAMENTAL VALUE OF ASSETS**

Proponents of this view claim that risk parity does not reflect the fundamental value of assets because it does not take into account price multiples, yields or other measures that are believed to reflect asset values. While this is true when considering risk parity portfolio construction mechanics, this is also the case for other portfolios such as 60/40 or a typical cap-weighted stock index, among others that are widely followed, studied and rationalized in financial economics. None of these other “accepted” portfolios take into account in their construction such valuation measures, but yet they are still widely believed to be potentially the right portfolios for the right investors and have not faced the same criticism as risk parity. Moreover, we believe that all portfolios ultimately reflect fundamental values in different ways and forms. What we suspect that the critics really disagree with is the underlying investment views embedded in a risk parity portfolio. Namely, it comes back to the issue discussed above—critics disagree, either directly or indirectly, with the assumption that all assets have the same Sharpe ratios and same correlations with other assets.

On top of this, recent research has indicated that the assets a risk parity portfolio prefers may carry a certain risk premium, called the low beta premium. Historically, in many investment domains, both within asset classes and between asset classes, low risk assets have tended to perform better in terms of reward-to-risk ratios. Today, there are a number of hypotheses that explain why these low risk assets carry additional risk premium. For example, one hypothesis is that low beta assets tend to be those that are out of favor due to the leverage aversion of investors: because these assets carry less upside potential (when they are not levered) compared to high beta assets, it is actually the high beta assets that are sought after by investors, thereby resulting in compressed returns on high beta assets as compared to low beta assets. Another hypothesis maintains that it is the volatility drag of high beta assets that makes them losers in the long run; for example, an asset that drops 50% in value needs to increase 100% to return to its previous high. Low beta assets that do a better job in avoiding these large losses tend to experience less drag due to their volatility and can compound more productively over time. These are just a few of the hypotheses, with the full list being one that is continually growing due to the volume of ongoing academic research on the topic.

Going back to global risk parity portfolios, the rationale is simple. Managers believe that certain risk premiums exist for long-term investors. For example, stocks carry the equity (growth) risk premium, bonds carry the interest rate risk premium, and TIPs and commodities carry the inflation risk premium; other premiums specific to additional asset classes also exist. Without precise estimates about the potential size of these premiums and with relatively more precise estimates of their risks on hand, we think the logical way to allocate across these dimensions is to seek risk parity.

It is worth noting as a final thought on this topic that as with most portfolio managers, risk parity managers do their homework before investing in any asset, asset class, factor or strategy. That is why one does not find a risk parity manager who bets on sporting events just because it carries risk. What risk parity managers are looking for is a long-term risk premium, the existence of which justifies including it in a well-diversified asset allocation (risk parity) portfolio.

#### **FALLACY: RISK PARITY IS TREND FOLLOWING—IT SELLS THE LOSERS AND BUYS THE WINNERS**

Some critics argue that risk parity portfolios sell the losers and buy the winners because asset risk levels tend to go up when returns are negative, and vice versa. As a result, they contend that the strategy is trend following in that those assets with elevated risk levels are consequently sold by risk parity managers. Critics view this as a negative and as counterintuitive since, in their view, the assets are now cheaper and may be undervalued as a result of the price declines.

We believe that this fallacy results from oversimplifying the mechanics behind the dynamic rebalancing of a risk parity portfolio towards the pre-determined risk profile, as well as from tying the fair value estimation of an asset entirely to the market price. First, asset weights in a risk parity portfolio are determined by the *relative* volatilities of assets, as well as their correlations, rather than just the *absolute* volatility of the asset—regardless of whether the asset is doing well or not. It is entirely possible to experience a scenario in which both the volatility of an asset goes up and the risk parity manager actually loads up more on that asset, as a result of how relative volatilities and correlations with other assets have also moved during this period.

Second, even if the risk parity portfolio indeed wants to cut the weight of the asset with elevated (relative) risk, it would not be unusual that the asset's price decline had already reduced the asset's weight in the portfolio below the new target weights sought by the risk parity model as a result of the revised risks of all portfolio assets. In this case, again, the risk parity portfolio will buy, rather than sell, the losing asset.

Without going through countless additional possible scenarios, we hope it is clear that this fallacy is a gross overgeneralization of what actually happens in a risk parity portfolio when asset prices move in a particular direction. More constructive, in our view, is spending time to understand the different scenarios underlying both price changes and shifts in relative and absolute asset risks, and in turn analyzing how a particular risk parity strategy may react in practice.

#### **FALLACY: LEVERAGE IS BAD**

Because risk parity managers prefer low risk assets which tend to carry relatively low returns compared to higher risk assets, leverage may indeed be necessary to bring the expected return of the portfolio in line with an investor's required return objective. It is important to clarify that risk parity managers do not borrow money to lever up individual assets on margin as if they were opening speculative trades. To the contrary, risk parity managers first create a portfolio that is balanced in its components' risk contributions. Next, the manager levers this diversified portfolio (that is, increases all exposures across the board) to the point where the portfolio volatility is at a constant level. This is what we call a managed volatility framework. As a result, while the leverage of the portfolio will fluctuate over time due to changes in risk regimes, the overall volatility of the portfolio

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is expected to remain relatively stable. When used like this, we believe leverage is not a weapon of mass destruction, but rather a means of potentially extracting more value within certain risk limitations.

#### **FALLACY: RISK PARITY IS ILLIQUID**

Proponents of this view suggest that risk parity may suffer from potential liquidity events, given the different exposures (assets) in a risk parity portfolio as compared to a market cap based portfolio. While this risk is present for all investments that deviate from market capitalization weights, risk parity portfolios may be better prepared for potential liquidity events because the selection process for their investment universe considers both liquidity and diversity.

Most risk parity portfolios invest in futures contracts on indices on stocks and bonds, as well as on individual commodities. These futures contracts are very liquid. As a measure of comparison, even a relatively illiquid futures contract typically omitted from such portfolios, such as lumber, still has an average bid/ask spread of 20 basis points. Compared to small cap stocks, which typically exhibit bid/ask spreads of around 10 basis points, this “worst case scenario” futures contract does not look that bad. More importantly, bid-ask spreads for the most heavily used futures in risk parity portfolios, such as U.S. 10-Year Treasury and U.S. stock index futures are around 2–3 basis points.

In light of these spreads, while the liquidity of the components of risk parity portfolios vary from small cap stock levels to extremely liquid levels, it is still extremely unfair to assume that risk parity portfolios exhibit liquidity characteristics on par with private equity or hedge fund investments. In fact, the industry standard of simple redemption policies from risk parity funds speaks for itself about the underlying liquidity.

#### **FALLACY: RISK PARITY OMITTS RISKS LIKE GOVERNMENT INTERVENTION**

While this has been covered to some extent in our earlier discussion of how experienced risk parity managers do not use singular measures of risk like historical volatility, we wish to elaborate further here on just how fallacious this statement may be. To give an example, it is well known how common it is for the Japanese government to intervene in its currency markets. Because these events have happened numerous times throughout history, good quantitative models can learn from past episodes like people learn from them, and can look for potential hedges to circumvent this problem as efficiently as possible. If on the other hand we have no history of government intervention, then a quantitative model cannot distinguish this risk—it will endure the first shock as a surprise but learn from it for the future. Turning now to a fundamental manager in this particular scenario, the manager might smell the trouble and react proactively. If an investor believes there are skilled managers, such as this one, who can consistently predict or time these types of events as well as asset behavior in reaction to these events—and the investor has the ability to source and conduct due diligence on the skilled managers—then the investor should probably pursue that path and avoid risk parity investments. The alternative with risk parity, however, is that it at least offers a transparent process for why and how these shocks are absorbed initially and how the information would be utilized in the portfolio in the future.

#### **FALLACY: THE BENCHMARK FOR A RISK PARITY PORTFOLIO SHOULD BE 60/40, OR CASH, OR ...**

We certainly understand that investors prefer to benchmark a portfolio to some reference point for the purpose of performance evaluation and ongoing monitoring. Many market

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participants tend to jump to use the 60/40 portfolio as the benchmark given its wide adoption by institutional investors, a notion which is also understandable. We are going to be provocative here: we actually propose that the risk parity portfolio should theoretically be the benchmark for other portfolios, including the 60/40, instead of the other way around.

We have written that the long-term Sharpe ratios of many assets are historically comparable, although not identical. According to the investment theory, history suggests that a risk parity portfolio of assets is therefore closer to being an efficient portfolio than the 60/40 portfolio, which is known to be concentrated in equity risk. Moreover, zero allocation to assets such as inflation-linked bonds, commodities, and other assets as in the 60/40 portfolio in fact reflects high-conviction investment views on these excluded assets. Pulling these observations together, we argue that the 60/40 portfolio actually has very strong opinions embedded in it and is therefore very “active” compared to risk parity. Thus, we believe one can reasonably justify using risk parity as the benchmark for how successful these 60/40 views might be.

In reality, we understand that there are multiple challenges to implementing our provocative suggestion. For instance, there are no definite answers to the questions of what assets should be included and in what ways they should be grouped together into asset classes in a risk parity portfolio. Nevertheless, we believe that our suggestion makes logical sense and is worth our readers’ further consideration.

#### **ACTUALITY: RISK PARITY IS AN EFFECTIVE AND MORE EFFICIENT ALLOCATION STRATEGY**

We hope this has helped further explain risk parity strategies, but more importantly we hope it diffuses some of the various fallacies surrounding these strategies. Our view is that risk parity is an effective and more efficient way to generate returns from an asset allocation portfolio. We do not contend that risk parity strategies are “magic bullet” strategies, but we do believe they are an effective means by which to manage a diversified asset allocation portfolio from a strategic perspective. While there are risks and considerations to any investment, in our view, those broadcast by the critics of risk parity are all too often mired in misunderstandings of the investment process, incorrect assessments of market dynamics, or simply arise from distilling the strategy down to such a simplistic point of view that it is no longer an accurate representation. This list of fallacies is not exhaustive but covers what we believe to be the major—and in some cases most erroneous—assumptions about the strategy. By clearing away some of the misunderstanding, we hope to have shed light both on the true underpinnings of risk parity strategies as well as their potential benefits.

We do not contend that risk parity strategies are “magic bullet” strategies, but we do believe they are an effective means by which to manage a diversified asset allocation portfolio from a strategic perspective.

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