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## The Hidden Risks of Risk Parity Portfolios

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Much has been made in the last few years about a new variety of investment strategies broadly known as risk parity portfolios. These portfolios appear to offer the beguiling combination of lower risk and higher return when compared to a traditional 60/40 stock/bond benchmark, and are more in keeping with modern financial theory. While the theory is very appealing to some, it is probably due to the fact that equities have been such a disappointing asset over the last decade that alternatives to the 60/40 portfolio like risk parity portfolios have come to the fore. A decade ago, investors were seduced into thinking that they could have 100% (or close to 100%) equity portfolios by looking at historical equity returns when equities had just been on their best run in history, and consequently were the most overvalued in history. By shifting to risk parity portfolios now, investors run the risk of loading up on fixed income duration after the best run for bonds in history, a run that has left government bonds, in our opinion, looking extremely dangerously overpriced.

But apart from the tactical question of whether to move to risk parity now, we believe more generally that the benefits that risk parity portfolios offer are largely an illusion, while they harbor a number of hidden risks that may have investors regretting their decisions a few years down the road. Broadly, we believe that there are three basic weaknesses in risk parity portfolios. First, these portfolios suffer from the same basic flaw as value-at-risk and other modern portfolio theory tools – they confuse volatility with risk, assuming that if the standard deviation of the portfolio over some particular time period is  $x\%$ , this is really all the investor needs to know. Second, some of the asset classes generally included in these portfolios have risk premiums that we believe may well be zero or negative for the foreseeable future. And third, several of the asset classes involved in these portfolios have significant

negative skew, which makes the backtests behind them suspect and, in conjunction with leverage, may prove extremely painful to investors.

While there is nothing inherently wonderful about a 60/40 stock/bond portfolio, we believe that it has a couple of virtues. For one, the risk premium that dominates it – the equity risk premium – is the one that we think is extremely likely to be positive in the long run. And, because it does not include any leverage, the risk of turning a temporary setback into a permanent loss of capital is manageable.

In a perfect world, we believe that investors should give their managers a long-term return target and risk guidelines, letting the manager take advantage of the changing opportunities available in the financial markets. For institutions that are unwilling to go that far, starting with the traditional 60/40 benchmark and allowing the manager significant discretion to deviate from it as asset class valuations dictate seems more likely to offer a decent risk/reward trade-off in the long run.

### What Is Risk Parity?

The basic idea behind risk parity is that a traditional 60/40 equity/bond benchmark may look roughly balanced from a capital allocation standpoint, but from a risk perspective, stocks contribute far more to the volatility. In fact, since 1973, stocks would have accounted for over 90% of the volatility of a 60/40 benchmark.<sup>1</sup> The solution to this disproportionate risk allocation to stocks, according to risk parity, is to reduce the weight of stocks and increase the weight of bonds in order for stocks and bonds to have similar volatility impacts on the portfolio.

<sup>1</sup>Benchmark is 60% S&P 500/40% Barclays U.S. Government/Credit Index. Source is Standard & Poor's and Datastream

In a simple world where we have only equities and bonds, following such an approach would have resulted in a 28/72 equity/bond allocation. Of course, this would have had a significant impact upon returns. Instead of the +9.4% return achieved on a 60/40 portfolio, the risk parity portfolio returned +8.8% from 1973 to 2009.

This is a fairly small loss of return for a very considerable drop in risk. While the 60/40 portfolio had a volatility of 9.3%, the 28/72 portfolio had a volatility of only 5.7%. If you are happy with the volatility of a 60/40 portfolio, say the proponents of risk parity, then simply leverage up the risk parity portfolio. In this example, ensuring that the risk parity portfolio and the 60/40 portfolio had the same volatility would have resulted in a +10.6% return on the risk parity portfolio. And so, we would have acquired a 1.2% higher return for the same risk as 60/40, with a lower drawdown than that portfolio over the period to boot (27% loss versus 33% for 60/40).

In fact, several risk parity portfolio providers say that they can do even better than this. By adding asset classes such as commodities, credit, TIPS, and emerging equity and debt, they say they can improve the Sharpe Ratio of the portfolio still more.

A somewhat stylized version of a risk parity portfolio might consist of the following:

<b>U.S. Equities</b>	<b>5%</b>
<b>EAFE Equities</b>	<b>5%</b>
<b>Emerging Equities</b>	<b>3%</b>
<b>High Yield Debt</b>	<b>8%</b>
<b>Investment Grade Credit</b>	<b>24%</b>
<b>Emerging Debt</b>	<b>5%</b>
<b>TIPS</b>	<b>15%</b>
<b>Commodities</b>	<b>5%</b>
<b>U.S. Government Bonds</b>	<b>15%</b>
<b>Non-U.S. Government Bonds</b>	<b>15%</b>

But because the resulting portfolio appears to imply much lower risk than a 60/40 stock/bond portfolio, the actual weights at 10% expected volatility would be as follows:

<b>U.S. Equities</b>	<b>11%</b>
<b>EAFE Equities</b>	<b>11%</b>
<b>Emerging Equities</b>	<b>7%</b>
<b>High Yield Debt</b>	<b>18%</b>
<b>Investment Grade Credit</b>	<b>54%</b>
<b>TIPS</b>	<b>34%</b>
<b>Commodities</b>	<b>11%</b>
<b>Emerging Debt</b>	<b>11%</b>
<b>U.S. Government Bonds</b>	<b>34%</b>
<b>Non-U.S. Government Bonds</b>	<b>34%</b>
<b>Cash</b>	<b>-125%</b>

The negative position in cash is the balancer for the fact that the weights in the other asset classes now sum to significantly greater than 100%. The standard deviation of this portfolio<sup>2</sup> for the period 1997-2009 (the longest period that all of these asset classes were available and investable) has been 10.2%, equivalent to a 60/40 MSCI All Country World/Barclays Aggregate Bond benchmark, and the maximum drawdown has been -32%, versus -33% for the 60/40 portfolio.

### **Problem 1: Volatility and Risk Are Not the Same**

So what's not to like? First, if we had done this analysis through 2006, we would have thought that the risk parity portfolio had a volatility of 7.7% versus 8.8% for the 60/40 portfolio and consequently may have been tempted to lever it up not 125%, but 154%. From 2008-09, this would have given us a drawdown of -36%, ignoring any problems that might have arisen from trouble with the collateral behind this portfolio, which consisted largely of synthetic exposures. The 2008-09 period was an outlier for the 60/40 portfolio as well as for the risk parity portfolio. But because the risk parity portfolio uses short-term leverage – it is marked to market daily and forces investors to cut their exposures when asset prices are falling – the combination of high correlations and high volatility that all investors experienced in the financial crisis was significantly further outside the realm of what investors may have been led to expect.

So risk parity looked even better in 2006 than it does in 2010. What's the big deal? To our minds, the big deal is that risk parity portfolios are sufficiently complicated that they are difficult to analyze without resorting to backtests and/or covariance matrices, and such analysis ignores whatever doesn't occur frequently enough and, in particular, recently enough, to make it in. If risk is about experiencing a long-term or permanent loss of capital, we believe the best defense against it is an understanding of the valuation and the underlying fundamentals of the assets in which you invest.

Leverage is a dangerous tool for investors. While it allows investors to magnify returns, it adds an element of path-dependency to them. An unlevered investor can

<sup>2</sup> Portfolio consists of S&P 500, MSCI EAFE, MSCI Emerging, Citigroup High Yield, Barclays US Aggregate, Barclays US Treasury Inflation Notes, GSCI Reduced Energy Index, J.P. Morgan EMBI, J.P. Morgan US Government Bond, J.P. Morgan Non-US Government Bond, and 3 month LIBOR.

generally afford to wait for prices to converge toward economic reality, but a levered investor may not have that luxury. A number of proponents of risk parity portfolios point out that stocks are an inherently levered investment because the average company has a debt/equity ratio of approximately 1:1. What makes that sort of leverage acceptable while the other is not? To our minds, one very large difference between the two is that the leverage that companies acquire is long term and not marked to market. With a few exceptions, lenders cannot call in their loans to a company simply because its share price has gone down. So if the market were to unreasonably mark down its estimate of the future cash flows of a company, the company is not immediately forced to liquidate its assets in order to pay down the debt, which now looks excessive relative to its equity market value. For a hedge fund or other levered investor in debt securities, which appeared to have equity-like volatility by virtue of the leverage on a lower-volatility asset, there was no such forbearance. These investors were forced to liquidate their holdings in the fall of 2008 on the basis of a panicky market's sudden near total aversion to anything with credit risk. While the subsequent fundamental performance of many of these assets has been good – for example, many asset-backed bonds that could not find a bid in the fall of 2008 have continued to pay their interest and principal payments on time and look set to continue to do so – this is of little comfort to the levered investor who was forced to liquidate in the meantime.

For the unlevered investor who could hold on, the risk that mattered for those bonds was the underlying credit risk, and for quite a number of securities shunned by the markets in the fall of 2008, this risk was manageable. As we think of it, the “fundamentals risk” of the bonds didn't change very much, but the volatility rose massively. This is not an unbearable problem for an unlevered investor, but potentially fatal for a levered one.

### **Problem 2: Leveraging Non-existent Risk Premiums**

Another problem for risk parity portfolios is that the risks that investors are leveraging may not actually have a positive return associated with them. As a simple example, selling short stocks is every bit as risky as buying them (actually, more risky given the particular nature of shorting), but an investor systematically selling short equities cannot expect to earn a risk premium simply because he is taking on volatility. We believe that several asset classes usually

included in risk parity portfolios may well have negative risk premiums associated with them, either because of the pricing prevailing in the asset class today, or the general features of the asset class.

The simplest case to look at is an “asset class” that doesn't actually exist in the normal sense: commodities. Stocks and bonds exist because companies and governments use the capital raised to make investments. The investing world is inherently “long” stocks and bonds because they are the means by which issuers acquire the capital they need to function. In return for the investors' capital, the issuers promise either a contractual stream of payments (bonds) or residual cash flows left over after those contractual payments and other investments have been made (equities). Commodity futures are different. For every commodity futures contract that exists, there was a buyer and a seller, and the contract will cease to exist at the expiration date. If there is going to be any systematic return to owning commodity futures, there needs to be some reason why those who sell the commodity futures are prepared to accept a systematically negative return for the privilege. Because the gains and losses are symmetrical to the buyer and seller of the contract, it is not enough to say that the buyer, by taking on volatility, should be entitled to a return, since the seller by that reasoning would also be entitled to a return, and one of them must lose money for the other to gain it.

Looking at the history of commodity returns, it appears that buyers of commodity futures did once enjoy a systematic positive return, the “roll return” of the futures. While commodity prices generally might be expected to simply move with inflation over time, the return to being long commodity futures was higher than this. The forward prices of many commodities, particularly in the energy space, systematically undershot the actual prices at which those commodities wound up trading, leaving the long commodity futures investor well ahead of the game.

An explanation was created for this effect, which sounded plausible enough. In the early days of commodity futures trading, there were two basic groups of players: hedgers and speculators. The hedgers were generally short sellers because the production of most commodities is a capital intensive business and it is worthwhile for the producers to try to hedge the big unknown in their business – the price they will receive for their output – even if there is some inherent cost to doing so. The speculators, on the other hand, have no inherent need to participate in the

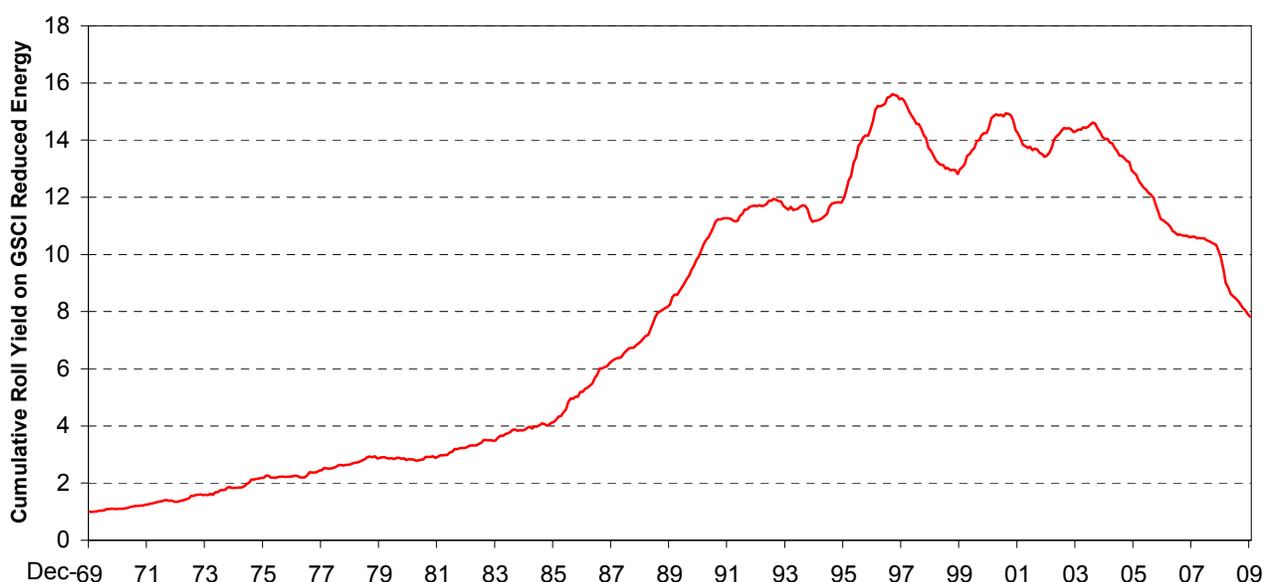
commodity markets, and will only do so when they believe they will profit from their investments. If the hedgers are net short, the speculators must be net long, and therefore to “bribe” the speculators to take the other side of their position, the hedgers needed to offer up return in the form of an artificially low forward price for the commodity. Investors were not entirely blind to this and as a result a new investment strategy, the long commodity index, was born. But a funny thing happened. As money moved into commodities, there was now a new group of investors who were systematically going long the commodity futures regardless of price. As this group became larger and larger in comparison to the hedging community, the roll yield dissipated and then turned decisively negative. Today, it looks as if the imbalance in the commodities market is that there is an excess of buyers relative to sellers, the opposite of the old condition, which means that the systematic return is likely to be on the side of the sellers of commodities rather than the buyers. It seems to us that until this circumstance changes – that is, until those who bought into long commodities as a good long-term investment give up on the idea – investors would be safer assuming that the future risk premium to commodity futures will be negative. We can see the shift in the roll yield on the GSCI Reduced Energy Index below.

Despite the long return history of the index, the commodity component didn’t actually come into existence until 1992,

and didn’t catch on as an investment until the first part of the 21st century. From 1969 to 1992 (the backtest period), the roll return, which is the difference between the total return of the index and the spot price, averaged +11% per year, whereas since 2001 it has averaged -6.6%. Noting this shift, a number of companies have come up with new commodity indices to try to avoid this problem. Some of them may succeed in this, at least until they too become popular enough to destroy the effect they are trying to exploit. In the absence of a compelling reason for the participants to accept the negative returns associated with taking the other side of a particular commodity strategy, none of these strategies can be considered a source of long-term returns.

Government bonds today provide another example of an asset class whose risk premium may prove negative for an inconveniently long time. Historically, long-term government bonds have generally given a term premium over cash. Because the yield on bonds has been higher than that on cash, investors have been paid to “ride the yield curve” by borrowing short and lending long. This is, in fact, one of the traditional ways banks make money. Throughout most of history, the number of investors looking to tie up their money for long periods of time was smaller than the number of investors looking to acquire long-term credit to finance their investments, and a positively sloped yield curve was the natural result. But there are reasons

### Roll Return on GSCI Reduced Energy Index



Source: Datastream As of 12/31/09

to believe that that may be changing. Pension funds are increasingly looking to buy long-duration fixed income securities to match the maturity structure of their liabilities to their pensioners. For these investors, the appeal of long-dated fixed income securities does not come from a risk premium. In some cases like the gilts (particularly the index-linked gilts) issued by the UK government, the long-dated bonds have been trading at lower yields than the shorter dated ones for a number of years. This makes no sense in terms of a term premium, but that has not stopped UK pension funds from snapping the long bonds up in an effort to match their liabilities.

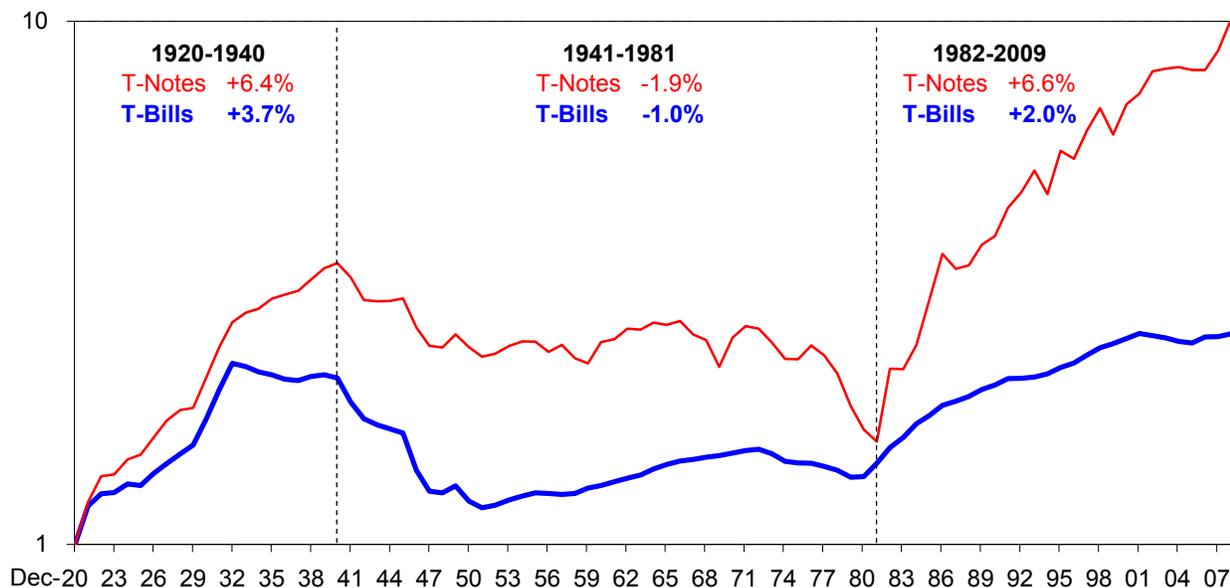
Most of the rest of the world is seeing a more traditional positively sloped yield curve at present, but this may not suffice to ensure a positive term premium for bond investors from here on. The last time U.S. bond yields were as low as they have been recently was the 1940s, which does not sound anywhere near as impressive as saying that bond yields have never been this low. But because today's yields are not unprecedented, we can check to see what the precedent tells us. What it says is that the 1940s ushered in an era of negative real bond returns lasting over 40 years where, despite a generally positively sloped yield curve, bond investors took such large capital losses that they wound up losing to cash. In fact, the 1980-2009 period that many risk parity managers tend to use for their backtests was almost tailor-made for a levered bond

investor, given that inflation and yields fell more or less continually over the period, making for the biggest term premium of any comparable period in history. The very least we can say today is that the tailwind of disinflation and falling bond yields is almost certainly gone.

From 1940 to 1981, neither T-Bills nor T-Notes did investors any good in real terms, but T-Notes were a particular disaster, and would have been excruciatingly painful to have bought on leverage. While it is not a foregone conclusion that the 41 years from 2008 will be as bad, we are not talking about a couple of bad years, we are talking about a period of time as long as a normal professional career where investors would have been well-served to avoid T-Notes entirely. Since the rest of the developed world government bond yields are no better, there's no good place to hide for risk parity players.

Timing may not be everything in investing, but it's pretty close. The choice to lever up a bond portfolio in 1982 would have been a stunningly good one. A 10-year treasury bond levered to the same volatility as the S&P 500 would have given a return of over 15% per year from 1982 to 2008, against 10% for the S&P 500. But the reason for this is that the yield of a treasury note went from 13.7% to 2.4% over the period. To say that a repeat of this performance is unlikely is a profound understatement. From today's yields, it would be impossible.

### Cumulative Real Returns on T-Bills and T-Notes



Note: Treasury Notes are 10-year U.S. Treasury Bonds or closest equivalent, T-Bills are 3-month Treasury Bills.

Source: Global Financial Data, Datastream, Federal Reserve, GMO As of 12/31/09

At the end of the day, the nice thing about the equity risk premium is that it is so hard to see how it could disappear forever, and it is so easy to check to see if it looks to have done so temporarily. The cash flow of the corporate sector is strongly correlated to the economic cycle and, therefore, income from employment. It is not so much the volatility to equities that leads to an equity risk premium, but that volatility is almost guaranteed to hurt at the wrong time from an investor's perspective. This means that just about any rational investor would demand an equity risk premium on an expectational basis. While an ex-post risk premium will only come when the valuation of equities allows it, the nice thing is that it is pretty easy to see when valuations are supportive of decent returns. If prices relative to 10-year real earnings are near historical levels (16 or 17 times), returns should be likewise similar to history in the medium to long term. If they are massively above, such as the insane 45 times that the S&P 500 traded at during the height of the internet bubble, it shouldn't take too much prescience to decide to avoid them.

### **Problem 3: Negative Skew**

Most risky investments seem to exhibit negative skew – that is, the negative returns tend to be larger in magnitude than the positive returns. This is particularly true of credit as an asset class. In the end, a borrower will either pay back the loan or default. If they do pay, a bond with credit risk offers a yield somewhat higher than that of a government bond (assuming investors believe the government is credit-worthy). The return pattern to the bond is bimodal – either the borrower pays and the return is moderately positive, or the borrower defaults and the return is massively negative. This is not inherently a problem, but in combination with leverage, negative skew can kill. One problem is that for any given finite look-back period, it is impossible to know what the true downside risk is. For a security with a normal distribution, downside risk is reasonably easy to analyze. But for one with negative skew, the risk in a given period may be a wholly inadequate representation of the true risk of the security. This was the case with sub-prime mortgages up until 2007. Sub-prime loans had not been in existence for all that long, and had generally coincided with rising home prices. The risk of the loans seemed under control, but the default rates skyrocketed when house prices stopped rising and the mortgages, which had seemed low risk when bundled together, performed disastrously worse than investors had modeled. Leveraged credit is therefore a particularly tricky investment, but just

about everything that a risk parity portfolio levers up has some of this feature to it, including the equities.

An unlevered investment with negative skew has a risk that is hard to fully quantify. This is inconvenient, but not necessarily a debilitating problem. Combining that with leverage – with its inherent assumption that the riskiness of the investment is known – will give a result that probably looks well-behaved until the moment when it suddenly doesn't.

### **Risk Parity – Just Another Flawed Benchmark**

Given the changing nature of asset class pricing and, therefore, expected returns, it is difficult for us to recommend a particular fixed-weight benchmark for institutional investors to follow. But if you insist on giving your manager a benchmark, we would make two basic suggestions. First, be as sure as possible that everything you have put in your benchmark is there for a good reason – either you are quite confident it will provide a decent risk premium in the long term (like equities), or it has risk characteristics that make sense given your liabilities and risk tolerance (like long-term bonds for closed pension plans or real assets for investors concerned with long-term real returns). And second, give your manager both the opportunity and incentive to move away from the benchmark weights when market prices warrant it.

Risk parity portfolios seem to fail both of these tests. First, a number of the assets in them do not have an obvious risk premium to be leveraging, either on a theoretical basis or given current pricing. And second, they are designed as “set it and forget it” portfolios, where you are absolved of the need to pay attention to the investment circumstances of a given point in time. Such passivity makes little sense in a world where asset class valuations, and therefore the risk and opportunity sets available to investors, change so much from year to year.

### **Solving the Strategic Benchmark Conundrum**

At the end of the day, investors are interested in earning a decent return for the level of risk that they are taking. Why not make risk and return the parameters for the manager to worry about, rather than a particular arbitrary benchmark? At any given point in time, there are some risks for which investors are being adequately or generously compensated and others where the compensation is inadequate or even negative. Rather than forcing managers to take those risks irrespective of the returns on offer, give them incentive

to take risks if and when the returns look to be fair compensation.

The difficulty with this approach is that it requires a longer time horizon and more trust of one's managers, since without a normal benchmark to look at, is very difficult to tell whether the manager has done a decent job from year to year. We do not think this approach, or any other, is a guarantee of success. But one of the biggest problems in modern investing comes from the career risk of managers, who make investments they don't like because they are afraid to deviate from their benchmark. If you take away the benchmark, you can at least be confident that the manager is making investments that they believe in.

The only portfolio that every investor could logically hold is the overall market portfolio. Anything else is a kind of

active management, and coming up with a set of fixed asset class weights and calling it a strategic benchmark is no less active than something more dynamic. While investors need to take advantage of risk premiums if they are going to have any hope of meeting the targets they have set for themselves, those risk premiums can neither be assumed into existence nor counted on to continue because they were there in some historical backtest. Concentrating on those assets offering valuations consistent with a decent return provides the best hope of success, and the point of a benchmark should be to encourage managers to do just that. No particular fixed weight benchmark is a good solution for all time or all environments. Risk parity portfolios are no exception.

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