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Risk Parity, Risk Management and the Real World

At the heart of risk parity, there is risk management. Risk parity's core benefit — improved portfolio diversification — ultimately is a product of how well risk is assessed and managed. For investment managers, the practical considerations are important.

In this article we consider two essential aspects of risk management for risk parity portfolios: maintaining balanced risk exposures through time and managing portfolios through periods of significant market stress. We conclude that risk parity portfolios require dynamic management; their holdings need to be regularly adjusted to reflect the dynamics of underlying market risk. Further, we conclude that risk parity portfolios should incorporate a planned capital preservation strategy to try to avoid significant disruptions in a crisis.

Common Goals, Divergent Choices

Risk parity strategies share two common elements: (1) balanced risk exposures, which usually mean less capital exposure to stocks than traditional portfolios (and more exposure to everything else); and (2) the use of leverage to scale the portfolio risk to about the level of traditional portfolios.

The goal of risk parity strategies is for everything in the portfolio to matter, but for nothing to matter too much. Implicit is the assumption that risk parity managers can make reasonable assessments of risk, and make those assessments in a constantly changing market environment. Generally, there are two approaches:

- *The static approach.* On initial portfolio construction, the manager determines the exposures needed to deliver comparable risk across asset classes, generally based on long-term historical behavior. These exposures are held steady through time. Managers may adjust exposures, but these changes are based on subjective views about risk and return.
- *The dynamic approach.* The manager frequently re-estimates asset and portfolio risks and adjusts the portfolio's holdings to try to maintain a constant allocation of risk among the asset classes and a steady level of total portfolio risk. The dynamic manager requires a systematic method to estimate changes in risk levels, and may also have a systematic approach for preserving capital in periods of extreme stress.

A Balancing Act

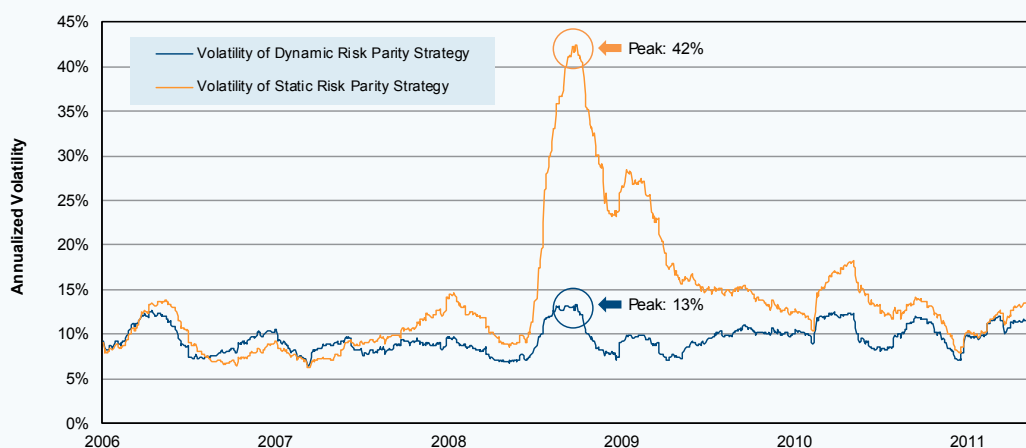
Though the goal is to balance risk exposures, managers hold capital exposures, and make transactions only in capital terms. Managers must therefore have a method for translating risk exposures into position sizes.

Static risk management, based on long-term asset-class characteristics, does not account for how risks evolve through time, so position sizes are relatively fixed. Static risk parity portfolios constructed in periods of relative calm become violently risky during periods of extreme market stress. For example, during the 2008 financial crisis, a static risk parity portfolio would have become dominated by the assets whose risks had experienced the greatest relative increases, such as equities and inflation-linked bonds. Just when diversification of risk would have been most valuable, these portfolios became concentrated in risk, behaving much like traditional portfolios — undiversified and highly volatile.

Dynamic risk management seeks to target a portfolio's risk exposures both across assets and through time, and so must regularly reassess risk and adjust exposures. The goal is not to time markets based on forecasting expected returns but instead to assess and manage the current risk environment, which can be done far more accurately. This process allows a dynamically managed portfolio to remain much closer to its risk targets.

Figure 1 illustrates the limitations of static risk management by comparing the volatility of two sample risk parity portfolios during the financial crisis. Both portfolios target 10% volatility, and at the

Figure 1: Dynamic Risk Management Realizes More Consistent Portfolios
Volatility of Two Approaches to Risk Parity Portfolio Management



Sample Risk Parity Portfolios created using Equities (S&P 500 Index), Bonds (Barclays Capital Aggregate Bond Index) and Commodities (S&P GSCI). Notional exposures for static portfolio are set at inception. Notional exposures for dynamic portfolio are adjusted based on a volatility forecasting model. Source: AQR. For illustrative purposes only.

height of the crisis both exceed that target. But the portfolio with static risk management experiences a dramatic four-fold increase in volatility, while the volatility of the portfolio with dynamic risk management increases far more modestly.

The risk level realized by the static portfolio is far too high and presents risks that are likely unacceptable to most investors. In contrast, the short-term and modest increase in risk of the dynamically managed portfolio will likely fall within acceptable tolerances.

Of course, a manager employing a static approach may make any subjective decision, including a good one, leading to somewhat better performance. However, the success of dynamic risk management — its more reliable ability to remain on risk target — argues against a subjective approach. Errors in human judgment over just one or two periods can have a lasting impact on portfolio results. AQR’s research suggests that dynamic risk management can offer risk parity investors more consistent volatility across a range of asset classes and time periods.

Managing Risk in the Face of Investment Losses

Risk management becomes perhaps even more challenging during times of crisis. Managers without a pre-determined strategy for weathering a crisis are challenged to shield investors from tail events, which can dominate long-term returns. One reason a manager might maintain static exposures during a crisis is fear of getting whipsawed during a rebound. Investors fear ‘selling at the bottom’ and so become

inclined to hold on, hoping for the storm to pass.

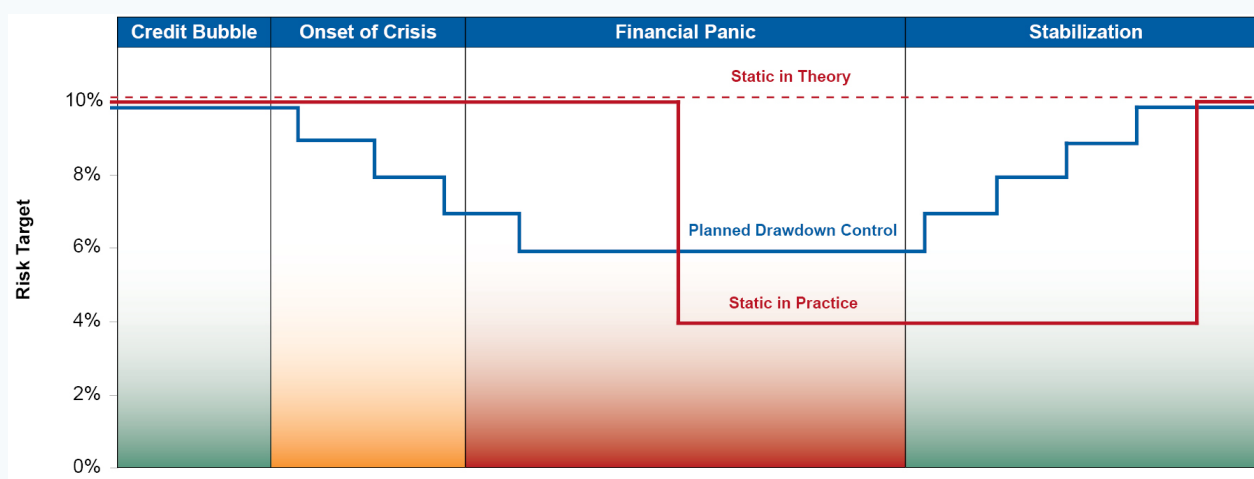
In practice, however, there is no such thing as static portfolio management during a crisis. Risk parity managers manage leveraged portfolios and do not realistically have the option to stand fast, particularly with a strategy that employs leverage. The actual choice is whether risk management decisions are planned by the manager or forced upon him.

A manager without a crisis management strategy is more likely to hold on to deteriorating positions for too long, only to be forced to sell anyway as market conditions deteriorate. Then, having cut positions, the manager may be reluctant to rebuild risk positions until it’s clear that the worst is over. Alas, markets seldom provide an ‘all-clear’ signal, and this approach often means missing out on all or part of a rebound.

A pre-determined drawdown control strategy addresses these shortcomings. The goal is to cut risk incrementally before a full-blown crisis, without relying on perfect foresight to time the bottom. A planned drawdown control approach seeks to make gradual rather than sudden reductions in portfolio exposure when returns are very poor; it doesn’t require foresight that the environment is getting worse. An additional benefit is that in contrast to an unplanned portfolio deleveraging, it can be designed to preserve the risk balance of the portfolio during a market crisis.

Figure 2 is a stylized illustration of the way two approaches to risk management react to a market crisis and recovery. Markets may present us with the need to rapidly reduce risky positions. A manager who waits until he is confronted with that decision must

Figure 2: A Systematic Drawdown Control Process May Limit Losses
Illustration of Two Types of Risk Management in a Crisis



Note that a drawdown control policy may not always be successful at controlling a fund’s risk or limiting portfolio losses. Source: AQR. For illustrative purposes only.

choose among very poor alternatives. The option to remain static in the face of any crisis is an illusion. The real value of a planned drawdown policy is in steering portfolio managers clear of this Hobson's choice.

Can It Really Be Done?

Investors may ask whether dynamic risk management is possible. Whereas it is notoriously difficult to consistently predict market returns, consistently predicting risk is much easier.

Risk, unlike return, is persistent. This week's stock market return tells us little about next week's return, but the risk characteristics of the market this week give us significant, useful information about next week's risk. Markets rarely shift from volatile to placid over a day or a week. On occasion, they do shift from placid to volatile quite quickly, though our research suggests that large changes in risk in either direction are much more likely to happen with some market warning. In most periods of unusually high equity risk, volatility builds slowly, gathering steam as markets veer toward a crisis. Even a relatively sudden event like the crash of 1987 was preceded by several days of significant market turbulence, potentially enough warning for a dynamically risk targeted portfolio to make some valuable adjustments.

Figure 3 highlights the ability of dynamic risk management to create relatively steady risk exposures. The orange line represents a

static (constant value) exposure to equities. The blue line represents a dynamically managed portfolio that seeks to maintain constant volatility over time by adjusting capital exposures. The volatility of both portfolios varies, but the volatility of the dynamically managed portfolio varies much less, particularly during market crashes, minimizing exposure to tail events.

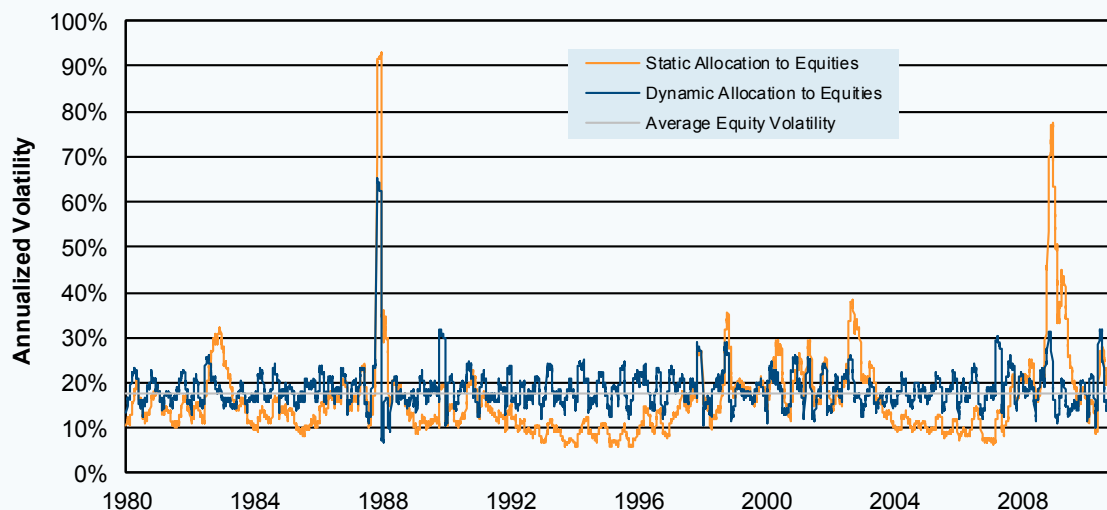
The Proof Is in the Pudding

The past three years have proved once again that risk management is critical for investment success. Investors were hurt in 2008 if their risk management methods were inadequate, and again in 2009 if drastic risk management steps taken during the crisis prevented them from re-entering the market during the rebound.

For many investors (not just those managing risk parity portfolios), a static approach to managing market risk contributed to significant losses. Too many investors held on too long only to reduce their market exposures after suffering very substantial losses, then waited too long to return to the markets. In contrast, a dynamic approach could have worked, cutting risk incrementally well before the worst of the crisis, and systematically increasing it to capture the rebound.

Risk management is important in more normal markets, too. AQR has managed a live risk parity strategy since 2006, and our dynamic process for setting exposures to the full spectrum of asset classes in our portfolio has enhanced our investors' returns. **Figure 4** shows a

Figure 3: Risk Forecasting Is Worth the Effort
Realized Volatility of Static and Dynamic Equity Portfolios

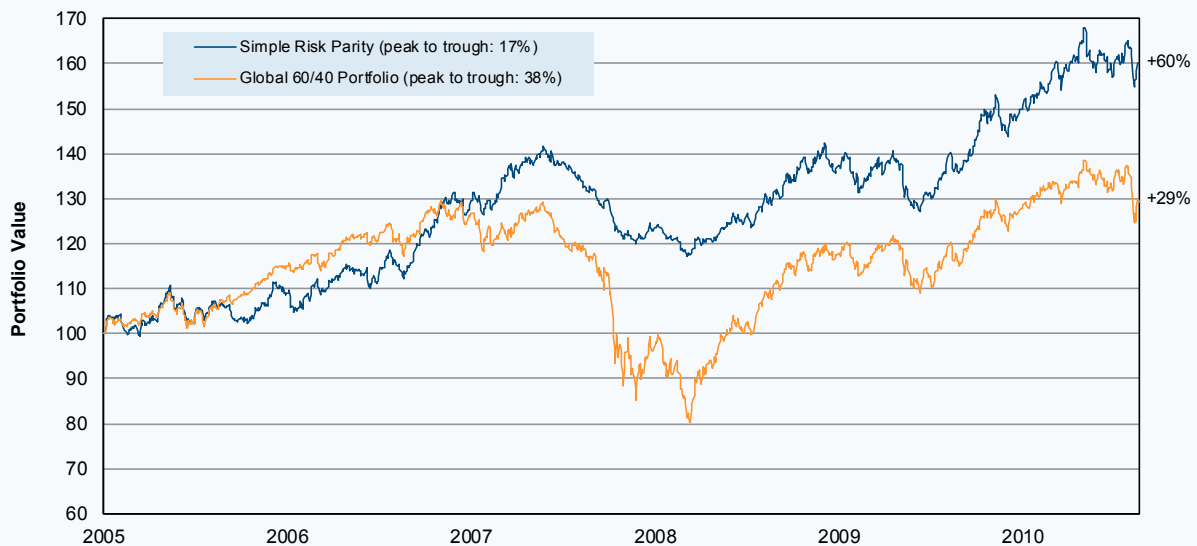


Equity Portfolios created using S&P 500 Index. Static Allocation portfolio holds constant notional exposure to equities. Dynamic Allocation portfolio adjusts holdings based on a volatility forecasting model. Source: AQR. For illustrative purposes only.

simplified version of our approach, plotting the returns of a dynamic risk parity strategy, which incorporates drawdown control.

We at AQR are enthusiastic proponents of risk parity, and the risk-diversified portfolios it creates. We also recognize that risk parity strategies demand effective risk management. We think it is inconsistent to be a proponent of risk parity, and to use a very slow or static approach to risk management. At its core, risk parity is an argument about the importance of diversification – across time and across asset classes. In the long term, we think the best risk parity portfolios will be those that both adopt a dynamic approach to risk management and have a planned capital preservation strategy to avoid significant disruptions in a crisis.

Figure 4: With the Right Risk Management, Risk Parity Can Outperform
5-Year Performance of a Model Risk Parity Portfolio vs. a Traditional 60/40 Blend



Sample Risk Parity Portfolios created using Equities (MSCI World Index), Bonds (Barclays Capital U.S. Government Bond Index) and Commodities (Goldman Sachs Commodities Index). Global 60/40 Portfolio created using Equities (MSCI World Index) and Bonds (Citigroup World Government Bond Index). Source: AQR. Past performance is not a guarantee of future performance. For illustrative purposes only.

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