Alternative Thinking

Strategic Risk Allocation

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This quarter we will explain how we think about combining them, and how investors might go about similar decisions in their own portfolios.

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Executive Summary

- Two liquid "building blocks" for portfolio construction are long-only investments (market risk premia) and long-short strategies (alternative beta premia)
- Although long-short strategies have offered more attractive risk-adjusted returns and correlations to traditional portfolios, they tend to play a relatively small role for many investors
- We describe four major reasons – the "4 Cs" – that institutional practice tends to diverge from what is theoretically optimal
- Investors who are comfortable with the "4 Cs" may be more naturally suited to take advantage of diversification

Strategic Risk Allocation

In previous issues of Alternative Thinking, we discussed three major building blocks of liquid asset portfolios — market risk premia (MRP), alternative beta premia (ABP) and opportunistic hedges. This quarter we will explain how we think about combining them, and how investors might go about similar decisions in their own portfolios.[1] When answering these questions, we will try to reconcile the gap between institutional practice and simple optimization results.

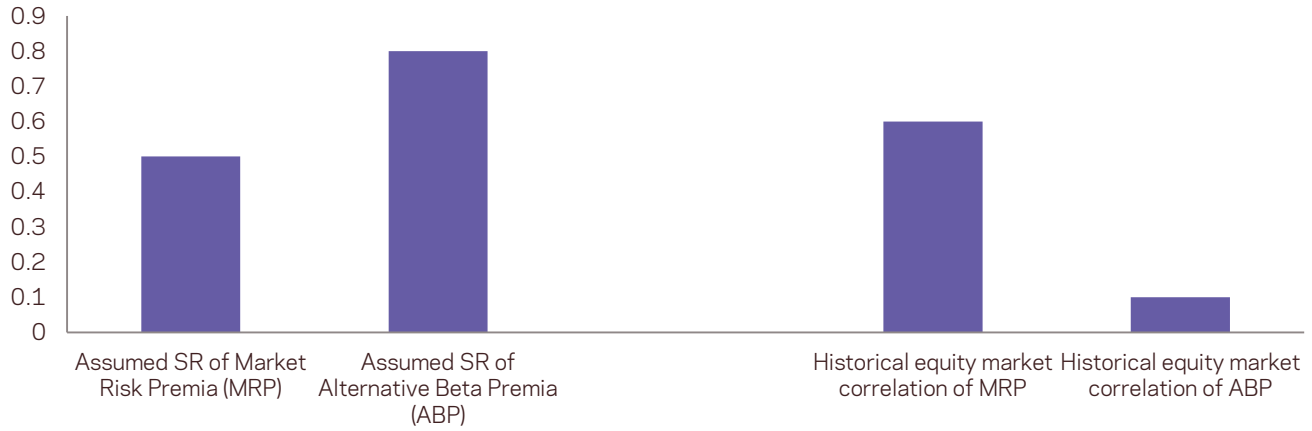
While we think that tactical views based on the conditional attractiveness of different premia have a meaningful role to play, we will focus on the more important topic of strategic allocations.

Risk Balance Works Within Categories, Not Across Them

When allocating *within* each of our building blocks, risk balance can be a great strategic base, often more robust than mean-variance (M-V) optimization. (Please see box at end for more on this topic.)

However, risk balancing is less useful when weighing across these three categories (or, say, when allocating between liquid and illiquid assets). The reasons include the "4 Cs": Conviction, Constraints,

Exhibit 1 | *Comparing Market Risk Premia and Alternative Beta Premia*



Source: AQR. For illustrative purposes only. There is no guarantee, express or implied, that long-term return assumptions will be achieved. Realized returns may come in higher or lower than expected

[1] We stress broad concepts of long-only MRP (such as equity premium or duration premium) and long-short ABP (such as rewards for convertible arbitrage or trend-following strategies) rather than specific fund vehicles. For example, a risk parity strategy could involve exposure to three or four market risk premia and include or exclude volatility targeting and tactical tilts. Similarly an alternative beta premia strategy could be classified by hedge fund risk premia or style premia (see Alternative Thinking, Second Quarter 2012).

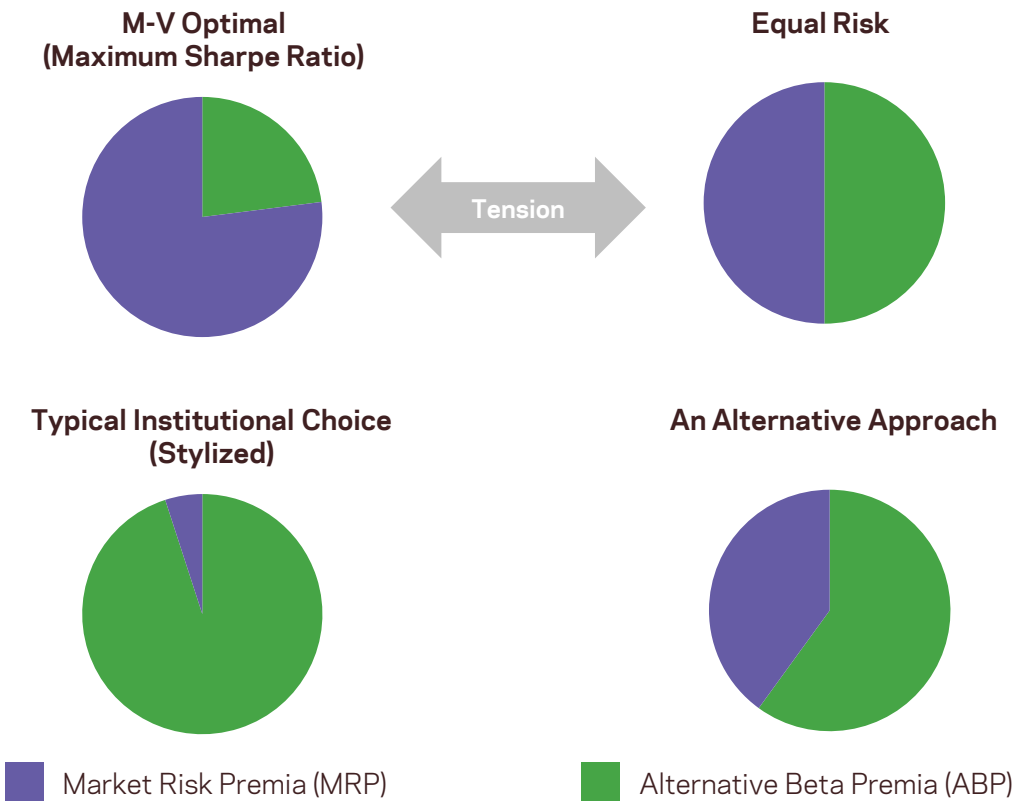
Conventionality and Capacity. We'll focus on market-risk and alternative-beta weighting here, then broaden briefly into other top-down decisions. While quantitative tools are necessary in portfolio construction, they are not sufficient, and other considerations need to be taken into account.

Puzzle: Why Have More Exposure to Market Risk Premia than to Alternative Beta Premia?

Exhibit 1 contrasts MRP and ABP's Sharpe ratios[2] (first two bars) and diversification to equities (second two bars). Note that historical simulated Sharpe ratios since 1990 are two to three times higher, even after trading costs, but we discount historical Sharpe ratios heavily to account for (i) selection biases (possible overfitting) and for (ii) "the-world-has-changed" concerns (these factors are better known and more easily accessible today; the low-return environment for traditional assets reduces the prospective reward for *any* investment).

Another key input is correlations. We assume modestly higher correlations than seen in historical backtests (both MRP vs. ABP, and each one vs. equity markets). For an equity-oriented portfolio, we believe long-short alternative beta premia are clearly better diversifiers than long-only market risk premia (the former have only 0.1 correlation with global equities,

Exhibit 2 | *Different Risk Weights Between Market Risk Premia and Alternative Beta Premia*



Source: AQR. For illustrative purposes only.

[2] We assume forward-looking Sharpe ratios of 0.5 for tactical global risk parity strategies and 0.8 for hedge fund risk premia strategies. About 0.1 of these Sharpe ratios are from tactical decisions. Well-chosen premia and cost-effective harvesting are essential, but effective diversification, thanks to a better risk balance, and stable volatility over time are the distinctive characteristics that give our favored approached an edge over traditional portfolios.

the latter 0.6), besides having higher Sharpe ratios.

Using these inputs, the unconstrained (mean-variance) optimal risk weights between MRP/ABP are 23/77. (See **Exhibit 2**. The bottom line would be broadly similar whether we use discounted or pre-discounted returns and whether correlations are built into risk contributions or not.) Risk parity across the two categories would be, by definition, 50/50. Yet, we typically start closer to 60/40 MRP/ABP when combining these sources of returns, and institutions typically use risk weights in the ballpark of 95/5. Why?

This is a puzzle.[3] How can anyone invest less in the category (ABP) that looks better on both Sharpe ratio and diversification? An unconstrained M-V investor would not, yet most everyone does. Investors must either not trust the optimization inputs or they must not be well characterized by M-V preferences.

The Answer Resides Beyond Mean-Variance Optimization

In the real world, several complementary reasons explain investor behavior. We call them the "4 Cs." Conviction is about doubting inputs to the mean-variance optimization and requiring more intrusive adjustments than those we have made. The other Cs are mainly about constraints to the M-V optimization, recognizing that people care about more than means and variances. We highlight below the relatively easily-quantified "LSD" constraints — limits on leverage, shorting and derivatives — and harder-to-quantify peer and capacity concerns.[4]

Conviction. Investors may lack conviction in the sustainability of historical performance figures, even after they have been discounted.[5] One source of uncertainty is concern that "the opportunity was never really there." Any past success may simply reflect data mining. Or wider arbitrage bounds in the past made the strategy infeasible in practice (higher transaction-costs, less ability to short, etc.). Another source of doubt is concern that "the opportunity is no longer there." The world has changed. Too many players know about it. It has been arbitraged away, especially if it relies on a behavioral story.

Such sustainability doubts plague all investment themes after bad years. Faith in the equity premium is understandably strongest, given the best theories and longest empirical evidence, allowing more patience when investors rely on the equity premium. Other strategies are often harder to stick with, and more often lead to ill-timed asset allocation decisions.

Constraints against Complexity. Many investors are averse to the three "dirty words" in finance – leverage, shorting and derivatives (LSD) – because they add complexity to portfolios. Alternative beta premia involve shorting and typically require more leverage than market risk premia for a given volatility target. Leverage, shorting and derivatives do involve serious risks, but these risks can be managed. Relaxing LSD constraints can result in major portfolio improvements through more effective diversification. Without these tools, investors are constrained to retain risk-concentrated portfolios and ride the equity market rollercoaster.[6]

[3] There is a similar puzzle in risk parity vs. the traditional 60/40 stocks/bonds portfolio -- the prevailing institutional practice is inconsistent with simple unconstrained optimization results. When weighting market risk premia vs alternative beta premia, the puzzle is deeper.

[4] Not highlighted here, but constraints could also be about liquidity (but we only deal with liquid investments here), asset-liability mismatch, drawdowns or tail exposures (higher moments), counterparty risk, acceptable assets (e.g. deviations from ESG investing principles), acceptable risk sources (e.g. no currency risk), or against any excessive risk concentration. All these constraints try to deal with a mis-specified optimization problem where things beyond portfolio mean and variance matter to investors. (The problem specification could be even more complex and incorporate multi-period world, time-varying risks and rewards, trading costs and signal decay, etc.)

[5] The main reason for discounting MRP evidence is removing windfall gains in past returns for all assets (due to falling bond and stock yields) as well as adjusting for today's lower starting yields; past 20-30 years really were exceptional and returns over this period warrant significant discounting. The main reasons for discounting ABP evidence are concerns about selection biases and about more widespread knowledge/access; these concerns are harder to quantify.

[6] LSD aversion may be about strict constraints — e.g. each asset's weight

Conventionality. Investors may underweight ABP simply because peer portfolios are dominated by MRP. Deviating from peers can subject investors to discomfort and career risks. Keynes famously argued that it may be safer to fail conventionally than to resort to unconventional strategies with a long-run edge.

Capacity. Alternative beta premia strategies tend to have lower capacity and higher costs and fees than market risk premia strategies. This is a particular concern for very large plan sponsors, as a feasible optimal portfolio will be different for a $100 billion fund than for a $10 billion fund or a $1 billion fund. Capacity considerations influence not only the weighting between MRP and ABP but also the most reasonable ways to capture either of these two (e.g., giant funds are more anchored to market-cap weights than are smaller funds).

Other Top-Down Decisions

We stress here the decision about how to allocate liquid assets between long-only market risk premia and long-short alternative beta premia. Another question concerns how to weight opportunistic hedging strategies. Investors should first assess their overall risk tolerance; if their current portfolio seems unacceptably risky, and the alternative is buying ongoing tail insurance through options, investors might instead consider reducing their overall level of risk. Indeed, we'd counsel against passively long put strategies, however good the tail insurance they offer, in favor of simply reducing the portfolio's risk level. However, if it is possible to construct a well-diversified combination of empirical tail hedges, such as trend-following strategies, with flat to positive long-run expected returns, a positive weighting may be warranted.

How can investors apply these ideas when considering their total portfolio? Other important top-down decisions besides the MRP vs. ABP weighting include:

- Liquids vs. illiquids;
- Strategic vs. tactical positions; and
- Systematic "beta" returns vs. star managers' purported "alpha."

We believe that in each case the former is a better core for delivering consistent long-run returns. Others may disagree. These decisions depend on investor priors (beliefs: where investors have most faith in value added) as well as their specific circumstances (natural edges, constraints). Again, optimization and other quantitative tools offer limited help, especially when illiquid investments offer biased risk and rewarded statistics; when selection biases overstate the track records of simulated tactical trading rules or "star" managers' actual performance (whether the concern is about overfitting, selection/incubation biases or luck vs. skill, the appropriate amount of discounting is subjective); and when constraints are not strict but are really about fuzzy non-binding aversions.

In sum, what can investors do in strategic asset allocation? Within categories, we believe they should broadly diversify and risk balance as a starting point, but perhaps mildly deviate toward overweighting assets with high Sharpe ratios or good diversification benefits if they can identify these. In contrast, when deciding on broad categories (building blocks for top-down decisions) and weighing across them, investors cannot rely on risk parity or Sharpe ratio estimates. Instead, they should identify the most important "real-world" considerations and incorporate them as best they can. Introspection ("know thyself") and heuristic short-cuts (such as the "4 Cs") can help them go beyond quant tools.

must be between 0-100% is an unambiguous constraint against leverage (weight above 100%) and shorting (weight below 0) — or about fuzzy less-than-binding dislike/discomfort. Prudent use of LSD can be well-rewarded. Embedded leverage is convenient (LSD is often acceptable when embedded or delegated) and therefore often overpriced. Delegation is often a better choice than no access to LSD even through external managers, but costs and risks must be monitored.

About Mean-Variance Optimization vs. Risk Parity

The mean-variance (M-V) approach to investing seeks to solve a particular optimization problem: select weights that maximize a portfolio's expected return for a given volatility target and any pre-specified constraints. Intuitively, an unconstrained solution amounts to overweighting investments that have high Sharpe ratios and/or good diversification ability. The key problems with unconstrained optimization are that given inputs are trusted "as God's word" and all considerations beyond means and variances (e.g., aversion to illiquidity or leverage) are ignored. Practical solutions often modify inputs (e.g., shrinking historical in-sample mean or covariance estimates toward more reasonable priors) or overlay various constraints.

M-V optimization results are notoriously sensitive to inputs, especially those of future returns, which are the most difficult input to forecast. Volatilities and correlations also vary over time but they are clearly more persistent and predictable than returns. Risk parity focuses on these less uncertain components and thus usually gives more robust out-of-sample performance. M-V optimization simplifies to risk parity under various conditions, such as equal Sharpe ratios and equal correlations across constituents, or a constant ratio of Sharpes divided by the diversification ability across them.

Constraints are another way to deal with unreasonable results in mean-variance optimization: M-V optimal solutions are often derived subject to various constraints (e.g., no shorting or leverage) that can dominate real-world optimization results. Relaxing these constraints enables better diversification as unconstrained optimal portfolios tend to use leverage, short-selling, and derivatives. For example, if portfolio constituents (say, asset classes) have broadly comparable Sharpe ratios, the unconstrained solution surely will not be dominated by a single source of risk. Leverage allows low-volatility assets to matter as much as high-volatility assets, while shorting can prevent a common market-directional risk from dominating the portfolio. (Finally, derivatives may offer better liquidity, lower transaction costs and more effective shorting.)

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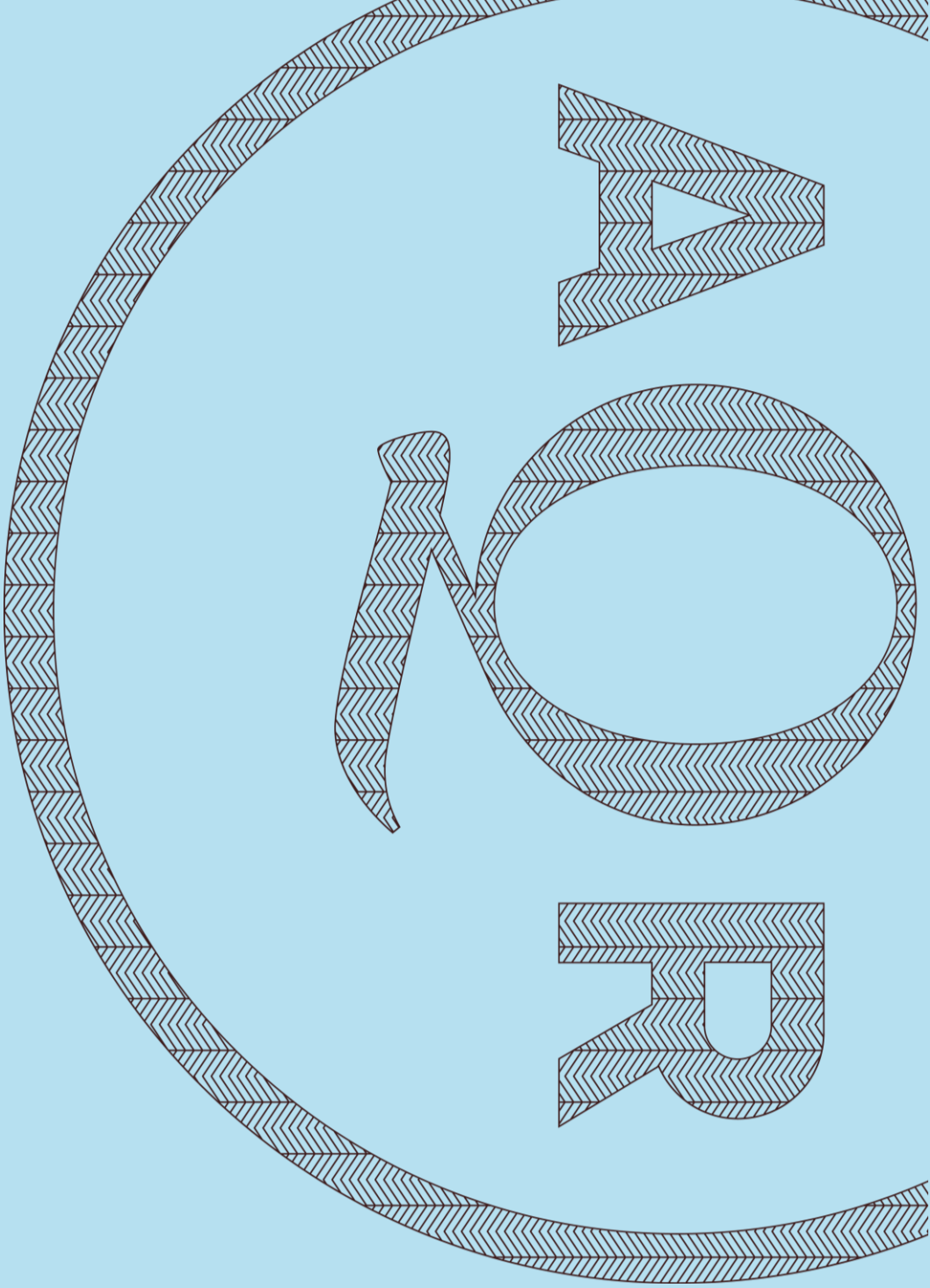
The white papers discussed herein can be provided upon request.



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