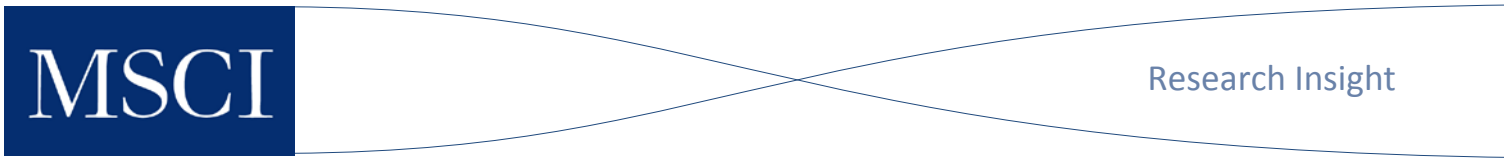

Research Insight

Incorporating Risk Premia Mandates in a Strategic Allocation

A Client Case Study: Wyoming Retirement System

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May 2012

The Challenge

Wyoming Retirement System (WRS), a public pension plan sponsor with a 50% target policy allocation to global equities, wished to explore options for diversifying its global equity portfolio. The investment staff had three main objectives: to lower volatility, improve risk-adjusted returns and decrease fees. To achieve these goals, WRS examined extensive academic and industry research and ultimately decided to include risk premia mandates in its strategic allocation.

The WRS Approach

The policy benchmark for the WRS equity allocation is MSCI ACWI, a broad global benchmark that includes the large and mid capitalization segments of the global equity universe. Panel A of Exhibit 1, illustrates the WRS policy benchmark in comparison to the pension plan's final strategic allocation—with about 70% of the total equity allocation assigned to passive managers, and the other 30% mandated to active managers. The WRS investment staff decided to allocate 70% of the total passive allocation to a portfolio that tracked MSCI ACWI IMI, a broad global benchmark that encompasses the large, mid *and small* capitalization segments of the global equity universe. This allocation provided a strategic overweight of approximately 10% to global small caps (size risk premium) in addition to capturing the core global equity risk premium. They also elected to make two strategic allocations—each of 15%—to portfolios that passively tracked the MSCI ACWI Value Weighted and MSCI ACWI Risk Weighted Indices. The two portfolios aimed to capture the value and low volatility risk premia, respectively. By design, these two portfolios were tilted towards lower capitalization stocks, which led to approximately equal allocations to the size, value and low volatility risk premia in the overall strategic equity allocation.

Panel B of Exhibit 1, presents the risk and return characteristics of the plan's strategic allocation to passive managers versus its policy benchmark which is assumed to be 100% invested in MSCI ACWI. All return estimates in Exhibit 1 ignore both transaction costs and management fees. It can be seen that a strategic allocation to risk premia along with a core allocation to the market portfolio provided better risk adjusted performance over the policy benchmark during the analysis period.

Exhibit 1: Strategic Allocation to Risk Premia

	Policy Benchmark Portfolio For Equities (MSCI ACWI Index)	Strategic Allocation to Risk Premia (market+size+value+volatility)
Panel A: Portfolio Allocations		
Market Beta	100%	70% MSCI ACWI IMI Index
Size		
Value		15% MSCI ACWI Value Weighted Index
Low Volatility		15% MSCI ACWI Risk Weighted Index
Panel B: Annualized Risk and Return Characteristics (November 1995 to March 2012)		
Return (%)	6.2	6.9
Risk (%)	16.6	16.5
Return/Risk	0.37	0.42
Tracking Error (%)	0.00	1.82
Beta	1.00	0.98

Source: MSCI. Portfolio weights are rebalanced quarterly to the target weights.

Before coming to the above mentioned final passive equity allocation, the WRS investment staff conducted what it described as an extremely thorough due diligence. In the following section we review the decision points (or due diligence questions) that the WRS investment staff reports that it considered over the course of their risk premia allocation process. These measures supplemented the existing policies and procedures regarding equity allocation as approved under WRS investment policy.

Certain Due Diligence Considerations for Risk Premia Allocations

Cyclicality of Risk Premia into the Future

Numerous studies have demonstrated the existence of risk premia in the past. However, the active returns of risk premia strategies are cyclical. As more (fewer) investors are willing to bear a particular kind of risk, the ex ante compensation for that risk decreases (increases). The first decision point for the pension plan concerned the future behaviors of risk premia. To what extent did WRS investment staff think that the past risk-adjusted outperformance of risk premia could be expected to persist in the future?

The interplay of investor flows and factor premia is complex, particularly when examined over varying time periods. It is expected that relative risk premia returns will wax and wane in the future, as in the past. (Exhibit 2, for example, displays the cyclicality found in historical risk premia returns from May 1994 – February 2012.) The magnitude and duration of these cyclical patterns largely depends upon the sources of each risk premium. For example, the value premium can be explained by both a rational phenomenon, priced in equilibrium as compensation for systematic risk, or by the irrational or behavioral view that reflects the tendency of certain investors to overreact to good and bad news.

Exhibit 2: Risk Premia Performance over Time

Source: MSCI. Note: **Small minus Large** represents the performance difference of the MSCI World Small Cap Index relative to the MSCI World Large Cap Index. **Value minus Growth** represents the performance difference of the MSCI World Value Index relative to the MSCI World Growth Index. **Low Vol minus High Vol** represents the performance difference of simulated volatility equity index consists of the bottom one-third (Low Vol) and top one-third (High Vol) of the MSCI World Index market capitalization ranked by security variance. The security variance is calculated using weekly returns over 52 weeks prior to the semi-annual rebalancing date.

The WRS investment staff concluded that by diversifying across multiple uncorrelated risk premia the pension could improve the risk-adjusted returns of its equity allocation. For example, by allocating to lower volatility risk premia and assuming a similar expected return as the market portfolio, the pension decided it could improve the overall risk adjusted return of its equity allocation. Exhibit 3 displays the correlations between different risk premia and the global market beta as represented by the MSCI World Index. Most of the correlations among the risk premia shown in Exhibit 3, are low or negative and confirm that these individual risk premia did capture unique return characteristics and offered diversification over a nearly 18-year period.

Exhibit 3: Correlations among Risk Premia (Correlations over May 1994 – February 2012)

	MSCI World Index	Small minus Large	Value minus Growth	Low Vol minus High Vol
MSCI World Index	1.00			
Small minus Large	0.04	1.00		
Value minus Growth	-0.23	-0.02	1.00	
Low Vol minus High Vol	-0.73	-0.21	0.53	1.00

Source: MSCI. Note: **Small minus Large** represents the performance difference of the MSCI World Small Cap Index relative to the MSCI World Large Cap Index. **Value minus Growth** represents the performance difference of the MSCI World Value Index relative to the MSCI World Growth Index. **Low Vol minus High Vol** represents the performance difference of simulated volatility equity index consists of the bottom one-third (Low Vol) and top one-third (High Vol) of the MSCI World Index market capitalization ranked by security variance. The security variance is calculated using weekly returns over 52 weeks prior to the semi-annual rebalancing date.

Strategic versus Tactical

A second decision point for the pension plan was to determine whether an allocation to risk premia should form a part of its strategic equity mix or whether it should be a purely tactical one.

Often pension plans seek to obtain risk premia tilts in their strategic allocations by assigning mandates to managers who implicitly or explicitly aim to capitalize on these premia and add alpha. Several studies have shown that for a majority of managers, their performance results are attributable to having captured a risk premium with no persistent alpha over and above the premium itself (Grinblatt et al., 1995, Carhart, 1997). This raises the question as to whether investors should strategically allocate to risk premia rather than obtaining these exposures through a manager selection process. One key benefit to making strategic allocations to risk premia is that the plan can better control portfolio risk. Each risk premia allocation has a distinct risk return profile relative to the policy benchmark, which is typically a market capitalization weighted global index. By recognizing the implications of adding risk premia exposures at the strategic asset allocation level, the WRS investment staff believed that they could better control the intended deviation (or active exposure relative to the policy benchmark) from the WRS equity policy benchmark, the MSCI ACWI Index.

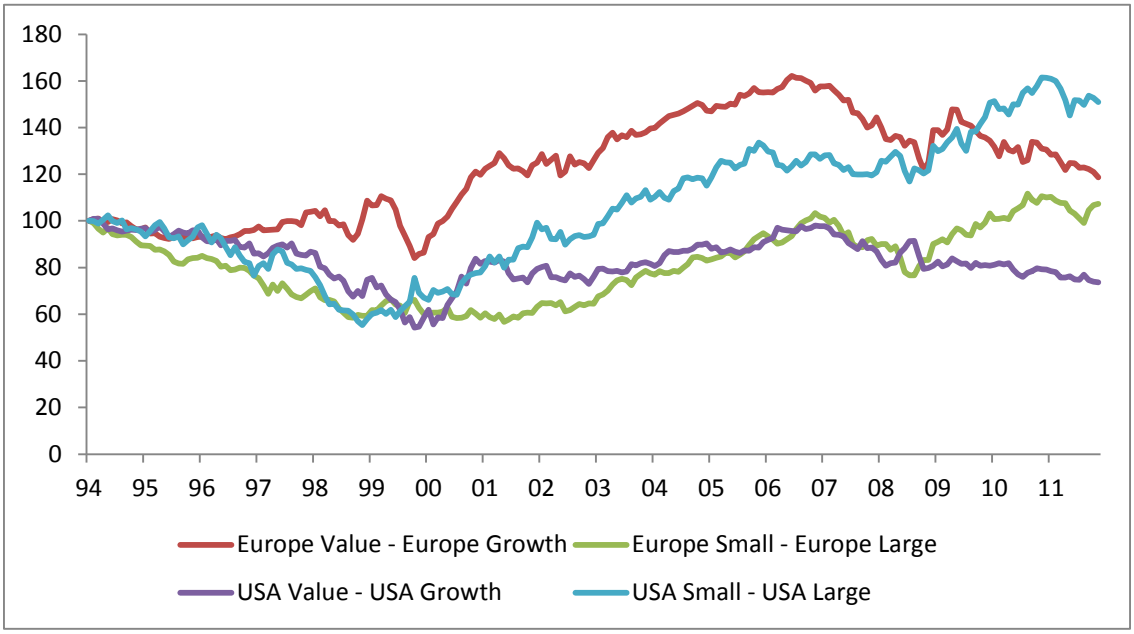
Which Risk Premia to Capture?

Empirical studies have documented the existence of risk premia across various asset classes. The better known risk premia within equities include, size (Banz, 1981), value (Fama and French, 1992), momentum (Jegadeesh and Titam, 1993) and low volatility (Haugen and Baker, 1991). The next question the WRS investment staff confronted was to select which of these four equity risk premia they wanted to have strategic exposure to. As WRS sought to capture the risk premia in a passive manner, they were concerned that transaction costs might eat away at any potential risk premia outperformance. The impact of transaction costs on the capture of a broad market or the equity risk premium through a market capitalization index is low because the market portfolio is a buy-and-hold portfolio and is associated with a very low level of turnover. The turnover for size, value and low volatility risk premia indices are also modest and therefore transaction costs are unlikely to erode their respective premia. WRS investment staff carefully evaluated the expected transaction costs and ultimately decided to strategically allocate to the size, value and low-volatility risk premia.

Global versus Local Risk Premia

The next decision point for WRS concerned allocations to domestic versus global risk premia. Like the risk premia observed in the USA equity markets, many academic studies have confirmed similar premia in global equity markets (Chan, Hamao, and Lakonishok (1991), Fama and French (1998), Rouwenhurst (1998), Asness, Moskowitz, and Pedersen (2009)). The WRS policy objective was to capture a global equity risk premium, therefore, the WRS investment staff wished to capture additional risk premia in a global context. Exhibit 4 displays the historical existence of size and value risk premia across equities in the USA and Europe. Interestingly, over the May 1994 – February 2012 analysis period, both markets showed similar performance patterns for these risk premia.

Exhibit 4: Risk Premia across Markets



Optimal Allocation

A fifth decision point for WRS was to determine how much capital to allocate to each of the risk premia in order to obtain a well diversified portfolio. It is possible to apply an optimization process for allocating among a portfolio of risk premia to maximize the portfolio Sharpe ratio; however, this exercise requires accurate estimates of risk and return for each of the risk premia and may be prone to estimation errors. One method for overcoming the challenges of optimization is to use an equal weighted approach. Equal weighting is a special case of mean-variance optimization that assumes all the risk premia have the same correlation coefficients, together with identical means and variances. Equally weighted portfolios are widely used in practice and they have been shown to be efficient out-of-sample (DeMiguel, Garlappi and Uppal [2009]). The WRS investment staff decided to apply an equal weighted approach to diversify across the risk premia.

Funding Risk Premia

The next WRS decision point related to how they would fund their risk premia allocation. Should they decrease the core passive allocation or decrease the allocation to active managers? The WRS investment staff pursued a more passive investing approach overall, allocating 70% of its equity to a passive strategy and allocating 30% of its total passive equity portfolio to the passive capture of risk premia.

Implementing Risk Premia

A further decision point related to how WRS would capture the risk premia. Should they use passive long-only risk premia tilted portfolios or funds that apply proprietary algorithms to create long-short portfolios to capture the risk premia. Although these proprietary funds have the potential benefit of capturing risk premia in a purer form (versus long-only funds), they can be constrained by capacity (especially on the short side of the portfolios) and in general are more expensive to gain access to. The WRS objective was to access to risk premia in a passive and cost effective manner, and therefore they agreed to implement a long only risk premium tilted portfolio.

Other Considerations

Today many active managers create passive fund options that track benchmarks that they create and calculate themselves. These self-created benchmarks introduce a potential conflict of interest and a governance concern that pension boards and trustees often raise—that is, the separation of roles

between index providers and managers whose performance is generally measured against index benchmarks. The WRS investment staff identified this as the final, but the most critical, due diligence issue that it debated before making its final decision as to which risk premia benchmarks they should choose. Ultimately, WRS opted to go with an independent index provider, without the potential conflicts of interest entailed by a money manager or investment consultant. Additionally, the WRS investment staff recommended adopting risk premia benchmarks that were constructed with a rules-based, objective, transparent, investable and replicable methodology and with appropriate index management guidelines to keep the costs of replication reasonably low.

Conclusion

The course of inquiry which led WRS to strategically allocate to granular risk premia may be useful for other pension plans, even those operating under different constraints. This case study demonstrates how allocating to risk premia in the strategic asset allocation process enabled one sponsor to potentially lower volatility, improve risk-adjusted returns and decrease fees.

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[1] *As of June 30, 2011, based on eVestment, Lipper and Bloomberg data.*