Global Value Investing Delivers Diversification: *A Multi-Strategy Perspective*

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In 1938, John Burr Williams posited the first comprehensive approach to value investing in his classic, *The Theory of Investment Value*, when he analytically modeled the present worth and the risk premium associated with uncertainty in order to value a financial asset. Over the subsequent 70 years, value investing has become a universal centerpiece of modern portfolio management. The dominance of this general approach has survived the ages, due in part to the evidence that value strategies tend to work over time.

For example, value investing is a cornerstone in bottom-up stock selection using measurements, such as book-to-price ratio, dividend yield, cash flow yield, and later extensions of Williams' now ubiquitous dividend discount model. The counterpart for bottom-up bond investors has evolved to various measures of yield, such as option-adjusted spread or spread to fair value.

Value strategies can also be deployed top-down, such as in country allocation for overall equity markets, bond markets, currencies, and commodities.[1] These strategies make relative value comparisons with top-down asset class criteria, such as country-level book-to-price, yield curve slope, interest rate differentials, and so on.

Depending on market conditions, stand-alone value strategies, such as buying value stocks, are capable of generating excess returns.[2] Our focus in this article is on the diversification benefits of combinations of value strategies. Can we generate superior performance with multiple value strategies in one portfolio? Can we mix top-down with bottom-up strategies? If single value strategies have some efficacy, should not a multi-strategy process do even better?

In this article, we examine our findings about the importance of diversification in a multi-strategy framework for which all the individual strategies are value-centric. One of our key findings was that correlations among different value strategies are relatively low. Additionally, we found that they depend on exogenous market conditions, such as overall financial asset returns and volatility. This has interesting implications when considering market neutral multi-strategies. We considered top-down country allocation in developed and emerging market equities, bonds, and currencies, as well as bottom-up stock selection in large-cap and small-cap stocks in the U.S., Japan, and Germany.

METHODOLOGY: INVESTMENT STRATEGY PERFORMANCE

Due to the general nature of our study, we used a simple dollar-neutral portfolio methodology. The methodology generates a value-add each month (alpha) for each strategy. We estimated correlation characteristics across

strategies and their linkages to broad market factors. The methodology incorporates traditional information coefficients (IC) and cross-sectional dispersions of factors and returns, which capture a factor's alpha-generating ability despite abstracting from some typical risk and transaction cost specifications.[3]

We denote factor by f and subsequent return by r. Assuming N assets, the value-added (alpha) of a dollar-neutral portfolio, whose weights are proportional to the factor for time period t, is

$$\alpha_t = \kappa \sum_{i=1}^{N} f_{i,t} r_{i,t}$$

The parameter κ is used to scale alpha to a fixed tracking error. The factors have mean zero, which ensures dollar neutrality. The value-added alpha can be rewritten as

$$\alpha_t = \kappa (N-1) \text{corr}(\mathbf{f}_t, \mathbf{r}_t) \text{dis}(\mathbf{f}_t) \text{dis}(\mathbf{r}_t)$$

where corr($\mathbf{f}_t$,$\mathbf{r}_t$) is the cross-sectional correlation coefficient, or information coefficient (IC), and dis($\mathbf{f}_t$), dis($\mathbf{r}_t$) are cross-sectional dispersions of factors and returns, respectively. Hence, value-added is proportional to IC, and to the dispersion of factors (opportunity in return forecasts) and the dispersion of returns (actual return outcomes). With this methodology, the value-added alpha depends, in part, on the dispersion of factors. If the factor dispersion declines over time, the value-added would also decline, ceteris paribus.[4]

STAND-ALONE VALUE STRATEGIES

A variety of choices exists as a value metric for simple strategies. For example, yield is an obvious choice for fixed-income strategies, and measures, such as book-to-price (B2P) and dividend yield, are good candidates for equity strategies. Our approach was to adopt the most generic (and least controversial) measures to describe the relative value of an asset class or a security.

Global Bond

We forecast hedged sovereign bond returns, using yield curve slope (SLOPE): 10-year bond yield less short-term rate. The slope factor is a proxy for the income component of the hedged return. The short-term rate can also be thought of as a financing cost when the strategy is implemented through 10-year government bond futures. With this strategy, we overweight countries with steeper yield curves and underweight countries with flatter yield curves.

Global Currency

The return of a deliverable currency forward consists of a spot return and a forward premium, which is the short-term interest differential through covered interest parity. Therefore, the short-term interest differential (INTDIFF) can be considered an "income" component of the forward return. The traditional carry trade buys currencies with higher short-term rates and sells currencies with lower short-term rates, earning a positive interest differential, or carry. From this perspective, the carry trade is a value-based strategy.

Global Equity

We used country-level book-to-price (B2P) aggregated from stock-by-stock data to forecast relative country returns. The strategy overweights countries with higher B2P (cheap) and underweights countries with lower B2P (expensive). The strategy was tested in both developed countries in the MSCI World Index and emerging markets in the MSCI Emerging Market Index.

Global Stock Selection

Stock selection strategies with the B2P factor were applied within several developed countries, including the U.S., Japan, and Germany. In the U.S., we separately tested both large-cap stocks in the Russell 1000 Index and small-cap stocks in the Russell 2000 Index. Because market beta and size are important determinants of stock return, we neutralized B2P against the two factors to eliminate the potential beta and size biases embedded in the B2P factors (for more detail, see Qian and Hua [2004]).[5]

RISK-ADJUSTED PERFORMANCE AND CORRELATION

Exhibit 1 presents the performance statistics of the value strategies based on monthly excess returns. Average

EXHIBIT 1
Risk-Adjusted Performance of Value Strategies

	TOP-DOWN				BOTTOM-UP			
	INTDIFF	SLOPE	B2P (DM)	B2P (EM)	B2P (R1000)	B2P (R2000)	B2P (JAPAN)	B2P (GERMANY)
Avg. Excess Ret.	0.68%	0.54%	0.82%	0.57%	0.59%	0.72%	1.37%	0.37%
Std. Dev.	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
IR	0.68	0.54	0.82	0.57	0.59	0.72	1.37	0.37
Skewness	–0.49	–0.17	1.05	1.83	0.25	0.24	2.47	0.17
Kurtosis	3.75	10.58	3.97	12.68	2.44	5.18	18.12	2.99
Sample	02/75–09/07	01/85–09/07	02/75–09/07	02/92–09/07	01/91–09/07	01/91–09/07	01/91–09/07	01/91–09/07

excess return, standard deviation, and IR are annualized, with standard deviation scaled to 1% for all by adjusting parameter κ. The scaling is arbitrary and does not affect the correlation analysis. Also listed in Exhibit 1 are skewness, kurtosis (in excess of three), and the sample period for each strategy.

The IRs of the value strategies are all positive, ranging from 0.37 for B2P in Germany to 1.37 for B2P in Japan. Several observations are worth noting. First, the top-down strategies are, on average, equally as effective as the bottom-up strategies in terms of IR. This contrasts with the conventional wisdom that bottom-up stock selection strategies are more effective because they have more investment opportunities, or breadth. Conventional wisdom may be misleading, however, because the true number of independent investment opportunities is far less than the number of assets. The efficacy of the strategy should be analyzed on a factor basis, in terms of the strategy's average alpha and standard deviation of alpha.[6] Second, the monthly returns all have some degree of excess kurtosis, or a fat tail; this is particularly evident for the slope factor in global fixed income, B2P in emerging markets, and B2P in Japan. Interestingly, the excess kurtosis is almost nonexistent in annual returns, which illustrates the importance of the evaluation horizon in analyzing return distributions.[7]

Exhibit 2 shows the correlation of excess returns, which is surprisingly low. First, the currency strategy with the interest rate differential factor (INTDIFF) and the bond strategy with the slope factor (SLOPE) are uncorrelated with other strategies. This reflects the fact that despite their common value tilts, the market's reaction to value in the currency and bond markets seems separated from the relative equity market, indicating great diversification potential for global macro and multi-strategy funds. Across value strategies in equity markets, the correlations are all positive, but modest. The highest correlation, 0.53, is between B2P in the Russell 1000 and B2P in the Russell 2000. The correlations between top-down B2P and bottom-up B2P are generally low, however, the correlations increase somewhat when annual returns are used instead of monthly returns.

EXHIBIT 2
Correlations of Value Strategies

	INTDIFF	SLOPE	B2P (DM)	B2P (EM)	B2P (R1000)	B2P (R2000)	B2P (JAPAN)	B2P (GERMANY)
INTDIFF	1.00							
SLOPE	0.02	1.00						
B2P (DM)	–0.05	–0.20	1.00					
B2P (EM)	–0.02	0.00	0.20	1.00				
B2P (R1000)	–0.04	–0.04	0.19	0.14	1.00			
B2P (R2000)	0.02	–0.01	0.14	0.14	0.53	1.00		
B2P (JAPAN)	0.07	0.00	0.05	0.32	0.15	0.20	1.00	
B2P (GERMANY)	0.11	0.17	0.07	0.04	0.21	0.07	0.09	1.00

FACTOR EXPOSURE OF VALUE-BASED STRATEGIES

The value-based strategies are for dollar-neutral long/short portfolios. We controlled the stock selection strategies for equity beta and size, but these constraints do not guarantee market neutrality per se. In this section, we discuss our investigation of the exposure of the value-based strategies to exogenous market factors. Our results provide insights regarding how individual strategies perform under different market environments, as well as insights regarding the underlying sources of the strategies' correlations.

Market neutrality and/or market exposure have multiple dimensions. We selected six factors from three categories that are typically relevant for the value-based strategies. The first two factors are return factors—the MSCI World Index return and the Citi WGBI return. The next two factors are the value premium and the size premium from the style category. We used the monthly return difference between the Russell 1000 Value and Russell 1000 Growth indices and between the Russell 1000 and Russell 2000 indices. The final two risk factors are the change in VIX and the change in the Moody's BAA spread, to measure equity risk and credit risk, respectively.

Exhibit 3 shows the correlations among these six factors and their standard deviations, based on monthly data from January 1985 to September 2007. The correlations are generally low with a few exceptions. The value premium (R1V–R1G) has a correlation of –0.31 with the MSCI World return, implying value typically outperforms growth when the equity market is declining (Sorensen and Fabozzi [2008]). The correlation between the MSCI World return and the change in VIX is negative (i.e., the well-documented leverage effect), and the correlation between the WGBI return and the change in the BAA spread is positive. The two risk factors also have a positive correlation (0.28), indicating interconnectedness between the equity and credit markets.

The monthly standard deviation of the MSCI World return is 4.13% and the bond return standard deviation is roughly half of that level. The value and size premiums have standard deviations close to 3%. The standard deviation of the VIX change is about 4.5% and the standard deviation of the change in BAA spread is 17 basis points (bps).

We estimated a regression on the value-added of individual strategies against the six factors and a constant, and the results—the regression coefficients and *t*-statistics—are reported in Exhibit 4. The α is the constant, measuring monthly excess return when all factors are at their respective means. The excess returns are statistically significant with the exception of SLOPE and B2P (Germany). Exhibit 5 shows the impact on the strategies' monthly returns of one standard deviation of factor increase.

We can analyze the exposure matrix in Exhibit 4 along both factor and strategy dimensions. Along the factor dimension, the equity return factor (MSCI World return) is not significant in any strategy, but a higher equity return is marginally beneficial to the carry trade (INTDIFF), Russell 2000 stock selection, Japan stock selection, and Germany stock selection, and is marginally detrimental to global bond (SLOPE), country selection in developed and emerging markets, and Russell 1000 stock selection. The bond return factor (WGBI return) is significant in the carry trade and the global fixed-income strategies. Increasing bond return helps SLOPE, but hinders INTDIFF. The value premium (R1V–R1G), not surprisingly, is significant in almost all equity strategies, while the size premium (R1–R2) is only significant in

EXHIBIT 3
Correlation and Standard Deviation of Select Factors

	MSCI World	WGBI	R1V−R1G	R1−R2	CHG VIX	CHG BAA SPD
MSCI World	1.00					
WGBI	0.24	1.00				
R1V−R1G	–0.31	0.00	1.00			
R1−R2	–0.05	0.14	0.11	1.00		
CHG VIX	–0.51	0.17	0.19	0.20	1.00	
CHG BAA SPD	–0.14	0.44	0.09	0.30	0.28	1.00
Standard Deviation	4.13%	2.01%	2.98%	3.13%	4.49%	0.17%

EXHIBIT 4

Regression Coefficients and *t*-statistics for Value-Added vs. Market Factors

	INTDIFF	SLOPE	B2P (DM)	B2P (EM)	B2P (R1000)	B2P (R2000)	B2P (Japan)	B2P (Germany)
α	0.07% (3.40)	0.03% (1.82)	0.03% (2.03)	0.05% (2.20)	0.04% (2.22)	0.04% (2.26)	0.10% (4.54)	0.03% (1.30)
MSCI World	0.005 (0.90)	–0.008 (–1.40)	–0.002 (–0.58)	–0.008 (–0.98)	–0.005 (–0.80)	0.003 (0.54)	0.008 (1.01)	0.011 (1.38)
WGBI	–0.026 (–2.44)	0.025 (2.31)	0.007 (0.99)	0.001 (0.09)	0.004 (0.36)	0.011 (1.10)	0.010 (0.77)	–0.014 (–1.11)
R1V–R1G	0.004 (0.68)	–0.001 (–0.20)	0.010 (2.51)	0.020 (3.05)	0.044 (7.56)	0.055 (10.41)	0.019 (2.83)	0.013 (1.93)
R1–R2	–0.001 (–0.24)	0.010 (1.65)	–0.010 (–2.64)	–0.005 (–0.79)	0.004 (0.71)	0.001 (0.14)	0.007 (1.14)	0.009 (1.36)
CHG VIX	–0.013 (–2.65)	–0.008 (–1.68)	–0.001 (–0.28)	–0.026 (–3.60)	–0.009 (–1.38)	0.004 (0.73)	0.002 (0.23)	0.005 (0.74)
CHG BAA SPD	0.004 (0.03)	0.098 (0.78)	–0.073 (–0.87)	0.036 (0.22)	–0.497 (–3.51)	–0.127 (–0.98)	–0.008 (–0.05)	–0.003 (–0.02)

the B2P (DM) strategy. The risk factor (change in VIX) is more significant in top-down strategies, all of which suffer in the case of increasing volatility, with the carry trade and B2P in emerging markets being the most significant. The second risk factor (change in BAA spread) seems to only affect U.S. stock selection strategies.

Along the strategy dimension, the carry trade (INTDIFF) has significant exposure to the WGBI return and the change in VIX. If, for instance, both factors are at a one-standard-deviation level relative to their means, they would cause the strategy to lose a total of 11 bps when the average alpha is only 7 bps. The strategy with SLOPE is only significantly exposed to WGBI return. The one-standard-deviation impact of the factor on the return is 5 bps. The two top-down equity strategies (B2P (DM) and B2P (EM)) have significant exposures to the value premium, while B2P (DM) also has significant exposure to the size premium and B2P (EM) has significant exposure to the change in VIX. All bottom-up stock selection strategies have significant exposures to the value premium (e.g., the Germany *t*-stat is almost two). In addition, B2P (R1000) also has significant negative exposure to the change in BAA spread. Note that the performance of B2P in the Russell 1000 and Russell 2000 is highly sensitive to the value premium, with a one-standard-deviation impact at 13 and 16 bps, respectively, much higher than the average alpha. B2P (Japan) and B2P (Germany) are not strongly influenced by other factors, which are mostly U.S. based. It is possible that they are exposed to local factors, which would also explain the low correlations between these non-U.S. strategies and U.S. stock selection strategies.

MULTI-STRATEGY PERSPECTIVE

We considered two multi-strategy combinations based on the eight strategies. The first is a global macro strategy with INTDIFF, SLOPE, and B2P (DM), which combines country allocation in currencies, bonds, and equities, and can often be implemented with futures and forwards as an overlay strategy. The second is an all-encompassing multi-alpha strategy that invests in all eight strategies.

The allocation to individual strategies is crucial in the construction of multi-strategy products. We used a risk-budgeting methodology that incorporates the risks and correlations of the underlying strategies. Risk budgeting, in comparison to an optimization method, is less dependent on return assumptions of underlying strategies. In addition, risk budgets are clearly interpreted as loss budgeting in terms of overall portfolio performance (Qian [2006]). Specifically, we applied an equal risk contribution to the underlying strategies in both multi-strategy combinations using risk inputs from Exhibit 1 (standard deviation) and Exhibit 2 (correlation). Because we scaled all annual standard deviations to 1%, the correlations play a dominant role in terms of strategy allocation.

EXHIBIT 5

Alpha of Strategies and Return Impact of a One Standard Deviation Increase in Factors on Value-Based Strategies

	INTDIFF	SLOPE	B2P (DM)	B2P (EM)	B2P (R1000)	B2P (R2000)	B2P (Japan)	B2P (Germany)
α	0.07%	0.03%	0.03%	0.05%	0.04%	0.04%	0.10%	0.03%
MSCI World	0.02%	–0.03%	–0.01%	–0.03%	–0.02%	0.01%	0.03%	0.04%
WGBI	–0.05%	0.05%	0.01%	0.00%	0.01%	0.02%	0.02%	–0.03%
R1V–R1G	0.01%	0.00%	0.03%	0.06%	0.13%	0.16%	0.06%	0.04%
R1–R2	0.00%	0.03%	–0.03%	–0.02%	0.01%	0.00%	0.02%	0.03%
CHG in VIX	–0.06%	–0.04%	0.00%	–0.12%	–0.04%	0.02%	0.01%	0.02%
CHG in BAA SPD	0.00%	0.02%	–0.01%	0.01%	–0.08%	–0.02%	0.00%	0.00%

For the global macro strategy, an equal risk budget recommends an allocation of 63%, 69%, and 71% to INTDIFF, SLOPE, and B2P (DM), respectively.[8] The allocations to the latter two strategies are slightly higher because they are negatively correlated. For the multi-alpha strategy, the strategy allocation for an equal risk contribution is 39%, 42%, 36%, 30%, 27%, 27%, 29%, and 30% for the eight strategies. The allocations to stock selection strategies are generally lower due to their positive correlations.

Exhibit 6 shows the performance statistics of the two multi-strategies. Global macro has an IR of 1.12 and multi-alpha has an IR of 1.50. Both have positive skewness and a slightly positive kurtosis.

Exhibit 7 provides the results of the market-factor regression for the two multi-strategies, together with the return impact of a one-standard-deviation increase in the factors. Note that the average alphas are higher and more significant than any single strategy, and have no broad market exposure to either equities or bonds. Both, however, have significant exposures to the value premium. This is to be expected, in particular, for the multi-alpha strategy with stock selection. The only other significant factor exposure that has not been diversified away is the change in VIX. As is typical, most strategies are prone to underperformance when overall market risk rises.

Exhibit 8 displays the annual returns of the two strategies. Global macro had a negative return in 1997 and 1998, while the worst year for multi-alpha was in 1997 with a return close to 0%. Multi-alpha earned the best returns from 2000 to 2002 after the equity bubble burst, but its return has declined in recent years. This is mainly a stock-selection phenomenon.

EXHIBIT 6

Risk-Adjusted Performance of Value-Based Multi-Strategy

	Multi-Strategy	
	Global Macro	Multi-Alpha
Avg. Ret.	1.12%	1.50%
Std. Dev.	1.00%	1.00%
IR	1.12	1.50
Skewness	0.45	0.41
Kurtosis	2.36	1.65
Sample	01/85–09/07	01/91–09/07

SUMMARY

Despite the common thread of value investing, value strategies that are rooted in different market segments and with different drivers across the financial markets exhibit surprisingly low correlations. This provides substantial opportunities for diversification of multi-strategy combinations. Our results indicate that multi-strategy approaches have better risk-adjusted returns and less systematic market exposures to a variety of common factors—the world is not as small as we thought. Nevertheless, volatility shocks shrink everything! Stochastic volatility definitely drags down consistency in performance, because many value strategies are susceptible to underperformance during periods of rising volatility. The same susceptibility to volatility is likely the case for multi-strategy portfolios, although to a lesser degree. Hence, it might be desirable for a pure value strategy or even a multi-value strategy to hedge this exposure with long volatility positioning. With a multi-strategy approach, a combination of value factors

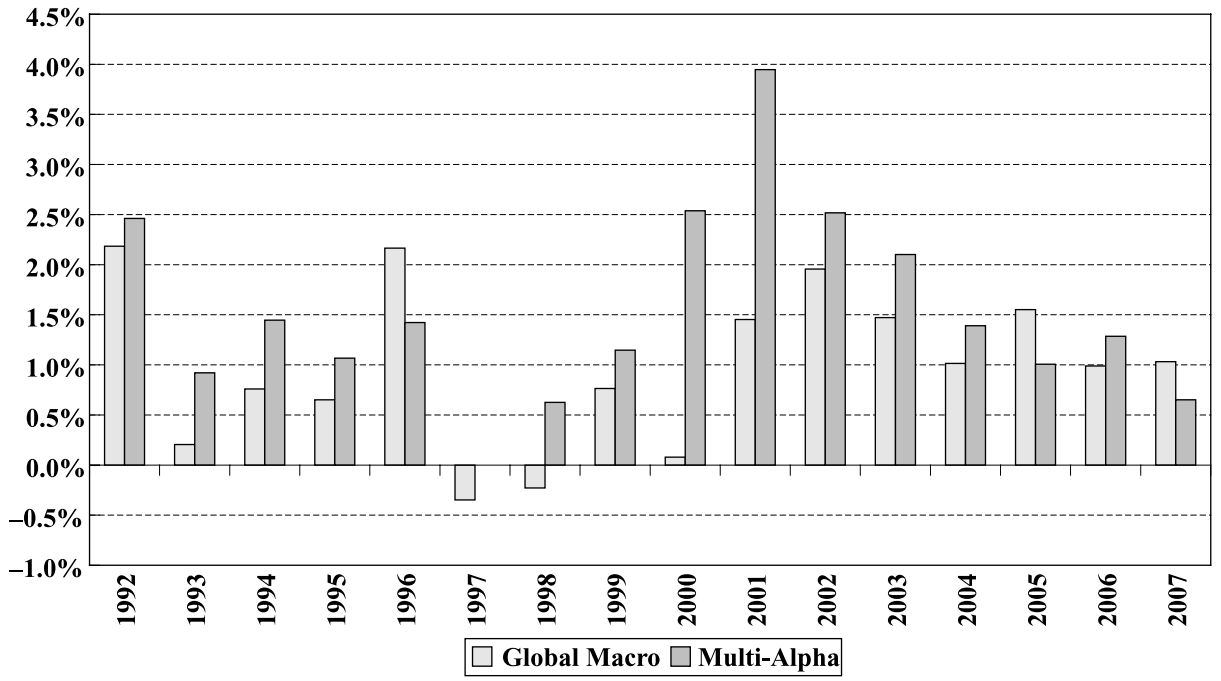
EXHIBIT 7

Regression Coefficients, *t*-statistics, and One-Standard-Deviation Impact for Multi-Strategies

	Global Macro		Multi-Alpha	
α	0.09% (4.81)		0.11% (5.71)	
MSCI World	–0.005 (–0.82)	–0.02%	–0.002 (–0.26)	–0.01%
WGBI	0.008 (0.80)	0.02%	0.013 (1.19)	0.03%
R1V–R1G	0.013 (2.07)	0.04%	0.046 (7.89)	0.14%
R1–R2	–0.005 (–0.88)	–0.02%	0.005 (0.81)	0.01%
CHG in VIX	–0.015 (–3.00)	–0.07%	–0.013 (–2.07)	–0.06%
CHG in BAA SPD	–0.008 (–0.06)	0.00%	–0.219 (–1.54)	–0.04%

EXHIBIT 8

Annual Returns of Two Multi-Strategies



(strategies) with other factors (strategies) can help offset exposure to volatility.

ENDNOTES

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[1]Value investing typically requires a measure of value, such as income or yield, which does not exist naturally for commodities; however, the measure of convenience yield can be a substitute.

[2]The evidence of returns to so-called value stocks versus growth stocks is ubiquitous. For a comprehensive review, see Sorensen and Fabozzi [2008].

[3]More realistic forecasting models incorporate turnover and transaction cost consideration. Qian, Sorensen, and Hua [2007] provided an analytic framework to maximize net IR.

[4]In practice, the choice can be made to standardize the factors so that the dispersion of the factor is constant. The approach is equivalent to taking a constant ex ante risk regardless of forecast changes. Although the investment performance could be different with alternative methods, the implication for correlation analyses is minimal.

[5]Beta and size effect on the country level still exist, but they are not as important.

[6]Qian and Hua [2004] provided a systematic analysis on the performance evaluation of quantitative factors.

[7]The results are available upon request.

[8]We determined the overall level of allocation so that the combined strategy maintains an annual standard deviation of 1%.

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