The Relative Importance of Asset Allocation and Security Selection

No clear hierarchy of investment choice.

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The common belief that asset allocation is the primary investment activity originated with Brinson, Hood, and Beebower (BHB) [1986]. Both BHB and Brinson, Singer, and Beebower (BSB) [1991] conclude that strategic asset allocation accounted for over 90% of the variation in the performance of 91 pension plans over a ten-year period. Ibbotson and Kaplan [2000] have noted it is important to correctly analyze the right question, however; they warn of misinterpretation of the BHB/BSB results.

Kritzman and Page [2003] and Kritzman [2006] note it could be quite hazardous to draw any conclusion on the relative importance of security selection and asset allocation using the methodological approach in BHB/BSB. Kritzman [2006, p. 10] provides a simple numerical example to demonstrate that

> most of the variation that they [BHB/BSB] attributed to asset allocation arose not from the choice of the portfolio's asset mix but, instead, from [only] the decision to invest [in anything].[1]

The debate on the relative importance of asset allocation and security selection took a new turn when Kritzman and Page (KP) adopted a normative approach based on a bootstrap simulation to establish the hierarchy of such investment activities. Their approach is designed to disentangle investor behavior from investment opportunity, as it is based on *potential* rather than *realized* portfolio returns. In fact, normative economics—as opposed to positive studies—explores which investment choice has the greatest potential to influence investment results rather than what investors choose to do.

KP [2003, p. 22] essentially find that "asset allocation is the least important investment activity . . . and security selection is the most important investment choice."[2] This is an important result that challenges conventional wisdom. KP argue that investors, for a variety of reasons, tend to hug certain benchmarks and avoid engaging meaningfully in security selection.

Some critics, notably Staub [2004], claim that KP implicitly hamstring asset allocation. Staub also questions the normative status of KP's work in arbitrarily establishing the asset mix benchmark at 60% stocks, 30% bonds, and 10% cash. KP [2004] provide a response to each of Staub's criticisms, showing that allowing for greater asset allocation bets in their framework does not invalidate the decision hierarchy.

Our study to a large extent follows KP's normative approach and builds on their bootstrapping methodology. We contribute to the debate on the relative importance of asset allocation and security selection in the U.S. market in four ways.

First, we introduce a more representative benchmark portfolio to provide a better understanding of the relative importance of both activities. We believe that in the current investment environment, practitioners consider a broader spectrum of asset classes including non-traditional as well as traditional investments. Indeed, "The 2005-2006 Russell Survey on Alternative Investing" points out that in 2005 North American tax-exempt organizations allocated 21.4% of their portfolios to alternative investments. Allocations could reach 24.0% in 2007. To account for this broader investment opportunity set, we construct a benchmark portfolio that includes non-traditional asset classes such as real estate, private equity, and commodities.[3]

Second, we improve the security selection methodology used by KP. Following Staub [2004] and KP [2004], we strictly apply the same rebalancing rules for both asset allocation and security selection.

Third, we emphasize the time series behavior of the cross-sectional dispersion in active returns rather than only the average cross-sectional dispersion over the entire investment period. This lets us investigate the stability of the hierarchy of investment choices over time.

Finally, we pay particular attention to the equity database (S&P 500 stocks) by avoiding any survivorship bias, and expand the analysis to a 20-year period ending in June 2005.

DATA

Kritzman and Page [2003] generate portfolios with asset mixes varying randomly around 60% stocks, 30% bonds, and 10% cash. This asset allocation is legitimate, but we examine another asset allocation benchmark that is more in line with the broader spectrum of asset classes available to institutional investors, including non-traditional classes such as real estate, private equity, and commodities. We examine the relative importance of asset allocation and security selection using a benchmark portfolio invested 75% in traditional asset classes and 25% in non-traditional classes.

Exhibit 1 shows the asset classes chosen to represent the benchmark portfolio with the weights given to

EXHIBIT 1
Asset Classes in Benchmark Portfolio

			Annualized descriptive statistics							
Weight	Asset class	Source for data	Average geometric return	Standard deviation	Correlations (quarterly)					
					Cash	Bonds	Stocks	Real estate	Private equity	Commodities
5%	**Cash**	Lehman 91 day T-Bills	4.9%	1.0%	1.0					
30%	**Bonds**	Lehman aggregate	8.4%	4.7%	0.3	1.0				
40%	**Stocks**	S&P 500	12.4%	16.6%	0.1	0.0	1.0			
10%	**Real estate**	NCREIF national property index	7.6%	3.1%	0.0	-0.1	0.0	1.0		
10%	**Private equity**	Venture Economics; time-weighted pool average return; all private equity	13.9%	12.0%	0.0	-0.2	0.6	0.1	1.0	
5%	**Commodities**	GSCI total return index	11.5%	20.8%	0.1	-0.2	-0.2	0.1	0.0	1.0

each class. The sources of the data used are listed, along with descriptive statistics for each asset class.[4]

For the security selection analysis, we pay particular attention to construction of the database. Rather than picking only stocks listed in the current S&P 500 index, we carefully construct a database free of any survivorship bias. We retain the exact 500 constituents of the index for each month in the July 1985-June 2005 period.

From a normative perspective, our reconstitution represents an improvement over the approach in other studies. Indeed, only 198 of the current 500 constituents were in the 1985 S&P 500 index. The spread between the true index and the index reconstructed from the 198 constituents ranges from 567 basis points in 1991 to −315 basis points in 1993.[5]

ASSET ALLOCATION METHODOLOGY

We use a bootstrapping methodology similar to that in Kritzman and Page [2003]. That is, we randomly choose an asset mix at the beginning of each of the 20 annual periods, starting in July 1985, and compute the corresponding return over the next four quarters. We obtain a time series of 80 quarterly portfolio returns. We then repeat this experiment 10,000 times; each repetition represents one sample portfolio.

In choosing a random asset mix, we proceed as in KP [2003]. We make 100 draws with replacement, each draw representing 1% of the portfolio, from a pool of six asset classes, in the proportions shown in Exhibit 1: 5% cash, 30% bonds, 40% stocks, 10% real estate, 10% private equity, and 5% commodities.

Exhibit 2 graphs the distribution of sample portfolio weights of two asset classes—stocks and real estate—along with their respective benchmark portfolio weights. The upper graph demonstrates that the asset allocation drawing method assigns to stocks a random weight of around 40%, ranging from 18% to 61%. In 95% of cases, the stock weight ranges from 30% to 50%, representing a ±10 percentage point bet. For real estate in the lower graph, the random weight varies around 10%, between 1% and 22%. In 95% of all cases, real estate weights vary between 4% and 16%, representing a ±6 percentage point bet.

While we retain a wider investment opportunity set with alternative asset classes, Exhibit 2 confirms that the KP asset allocation method does not tightly anchor sample

EXHIBIT 2

Sample Distributions of Weights Generated by Bootstrap Simulation

portfolios as much as some critics have implied. We believe asset allocators can extend their bets throughout these reasonable ranges and, contrary to Staub [2004], we are confident of the normative aspect of such rebalancing rules.

To determine the importance of the asset allocation activity through time, we measure the dispersion in the performance of the 10,000 sample portfolios resulting from the different asset mixes randomly derived from the distributions. The more disperse the performance of the sample portfolios, the more asset allocation should be seen as important.

KP [2003, p. 16] note that dispersion is important to both skillful and unskillful investors—to the former because "it enables them to increase wealth beyond what they could expect to achieve from average performance," and to the latter because "it exposes them to losses that might arise."

MODIFIED SECURITY SELECTION METHODOLOGY

Kritzman and Page [2004] in their response to Staub [2004] emphasize that uniform rebalancing rules are essential in order to establish a comparison between two investment choices. Thus, we design a modified security selection methodology that ensures strict uniformity with the asset allocation methodology.

Using the asset mix established in Exhibit 1, we first generate 10,000 sample portfolios annually, and record their returns over the four subsequent quarters. For each portfolio, we randomly select 100 stocks with replacement, assigning each constituent of the S&P 500 a probability equal to its weight in the index (same method as for asset allocation). KP instead use a sequential rule; they randomly select 100 stocks with replacement, assigning each constituent an equal probability, and then rescale returns according to their relative market capitalizations.

These methods differ with respect to the probability of selecting a stock and in the weight assigned to each selected stock in the sample portfolios. Consequently, there are significant weight differences among large stocks within portfolios, whether by our methodology or by the KP methodology.

To illustrate the differences between the security selection methodologies, consider an example stock ABC, with a 10% weight, in a 500-constituent stock index, and assume that the 499 other stocks in the index are equally weighted (90%/499 each). The probability of randomly picking ABC x times out of $n = 100$ draws with replacement under the binomial distribution is given by:

$$f(x; n, p) = \frac{n!}{x!(n-x)!} p^x (1-p)^{n-x}$$

Both security selection methods differ in terms of the probability, p, of picking ABC at each draw. Under our security selection method, the probability p is equal to the actual ABC weight in the index; that is, 10%. Under the KP security selection method, the probability p is equal for each stock; that is, 1/500—since the stock index has 500 constituents.

Exhibit 3 compares the probability of picking ABC x times out of 100 draws under

EXHIBIT 3

Probability of Selecting ABC x Times Out of 100 Draws and Weight of ABC in Random Portfolio

	KP's methodology		Modified methodology	
x	$f(x;100,1/500)$	w_{KP} [a]	$f(x;100,10\%)$	w_{MSS} [b]
0	81.857%	0.0%	0.003%	0.0%
1	16.404%	35.9%	0.030%	1.0%
2	1.627%	53.1%	0.162%	2.0%
3	0.107%	63.2%	0.589%	3.0%
4	0.005%	69.8%	1.587%	4.0%
5	0.000%	74.5%	3.387%	5.0%
6	0.000%	78.0%	5.958%	6.0%
7	0.000%	80.7%	8.890%	7.0%
8	0.000%	82.8%	11.482%	8.0%
9	0.000%	84.6%	13.042%	9.0%
10	0.000%	86.0%	13.187%	10.0%
11	0.000%	87.3%	11.988%	11.0%
12	0.000%	88.3%	9.879%	12.0%
13	0.000%	89.2%	7.430%	13.0%
14	0.000%	90.0%	5.130%	14.0%
15	0.000%	90.7%	3.268%	15.0%
16	0.000%	91.4%	1.929%	16.0%
17	0.000%	91.9%	1.059%	17.0%
18	0.000%	92.4%	0.543%	18.0%
19	0.000%	92.9%	0.260%	19.0%
20	0.000%	93.3%	0.117%	20.0%
21	0.000%	93.6%	0.050%	21.0%
22	0.000%	94.0%	0.020%	22.0%
23	0.000%	94.3%	0.007%	23.0%
24	0.000%	94.6%	0.003%	24.0%
25	0.000%	94.9%	0.001%	25.0%
...	...	...	...	...
Sum	100%		100%	
Standard deviation		**14.7%**		**3.0%** [c]

[a] $w_{KP} = (x \cdot 10\%)/[(x \cdot 10\%) + ([100 - x] \cdot 90\%/499)]$.
[b] $w_{MSS} = x/100$.
[c] $[p.q/n]^{1/2} = 3.0\%$.

both methodologies. As an example, the probability of randomly picking ABC twice [$f(2; 100, 10\%)$] is 0.162% with our methodology, while with KP's [$f(2; 100, 1/500)$], it is 1.627%.

The security selection methods also differ with respect to calculation of the weight of ABC in the sample portfolios. Under our security selection method, the weight of ABC is given by the number of occurrences, x, divided by the number of draws, n. Under the KP security selection method, the weight of ABC in a random portfolio is a function of the respective index weights of ABC (10%) and of the other randomly selected stocks (90%/499)

Exhibit 3 provides the weight of ABC in the sample portfolio, given that it has been picked x times out of 100 draws under both methodologies. As an illustration, the weight of ABC in the portfolio, given that ABC has been selected twice out of 100 draws, is equal to 2% in our case compared to 53.1% for KP.

In our methodology, the weight associated with ABC varies around 10%, from 2% to 20%. For KP, the weight associated with ABC is either 0% for 81.9% of the sample portfolios, or 35.9% or higher for 18.1% of the sample portfolios. The KP dispersion is much greater than ours, with a standard deviation of 14.7% compared to 3% for ours.

Exhibit 4 shows according to actual S&P 500 data as of June 30, 2005, the distribution of weights assigned to General Electric (GE), the largest S&P 500 constituent, under the two frameworks. Our security selection methodology assigns GE, which accounted for 3.31% of the S&P 500 index at the end of June 2005, a random weight ranging from 0% to 12%. KP's original method assigns GE a weight ranging from 0% to 46%, a much wider range.

What is troubling in this regard is first, that a sample portfolio can be heavily loaded with just a single stock weighted at as much as 46%, and second, that 82% of the time the largest S&P 500 stock is not included in the sample portfolio. In 18% of cases when it would be included, its weight ranges from 11% to 46%. KP's original method looks like a binary scheme for larger stocks—either zero or at a very heavy weight.

Exhibit 5 reports the probabilities of giving a zero weight in a sample portfolio to the group of the i largest constituents of the S&P 500 as of June 30, 2005. The results show that sample portfolios could be zero-weighted for each of the three largest companies (General Electric, Exxon Mobil, and Microsoft, representing 9% of the index) nearly 55% of the time according to the KP security selection

EXHIBIT 4

Distribution of Weights of GE in Sample Portfolios (6/30/05)

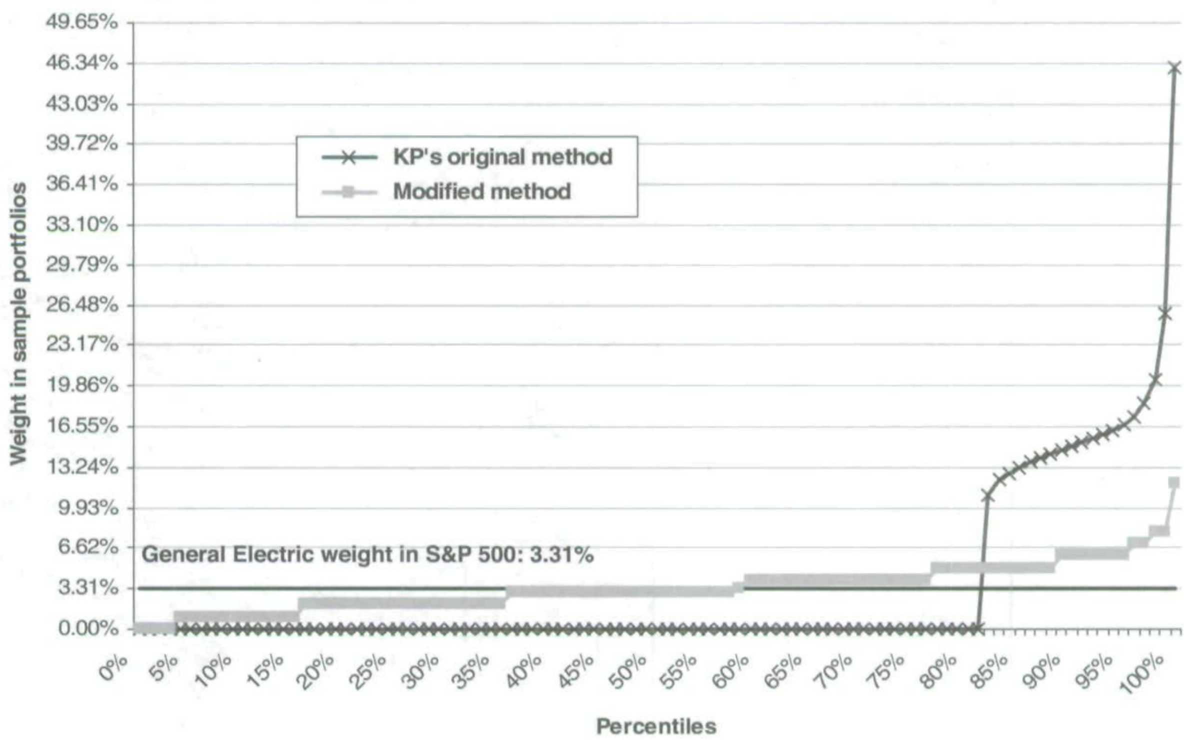


EXHIBIT 5

Probability of Assigning 0% Weight to the *i* Largest Stocks (6/30/05)

Company	Market Value (M$)	Weight in S&P500	Cumulative Weight in S&P 500 (Wi)	Probability of 0% weight: Modified methodoloy[a]	Probability of 0% weight: KP's methodoloy[b]
1 General Electric Co	367,495	3.3%	3.3%	3.4%	81.9%
2 Exxon Mobil Corp	365,797	3.3%	6.6%	0.1%	67.0%
3 Microsoft Corp	268,371	2.4%	9.0%	0.0%	54.8%
4 Citigroup Inc	240,497	2.2%	11.2%	0.0%	44.8%
5 Pfizer Inc	205,067	1.8%	13.0%	0.0%	36.6%
6 Wal-Mart Stores	201,573	1.8%	14.9%	0.0%	29.9%
7 Johnson & Johnson	193,205	1.7%	16.6%	0.0%	24.4%
8 Bank of America Corp	184,051	1.7%	18.3%	0.0%	19.9%
9 Intel Corp	160,621	1.4%	19.7%	0.0%	16.3%
10 American International Group	150,764	1.4%	21.1%	0.0%	13.3%
Ten largest	**2,337,441**	**21.1%**			
S&P 500	**11,096,711**	**100.0%**			

[a] $p(w = 0\%) = [1 - w_i]^{100}$.
[b] $p(w = 0\%) = [1 - (i/500)]^{100}$.

approach. Furthermore, 13.3% of the time a sample KP portfolio could possibly include none of the ten largest companies in the index, which would represent more than 21% of the index.

Under our methodology, which ensures that the security selection method is exactly similar to the asset allocation method, there is a negligible probability of not including any of the ten largest stocks in a sample portfolio.[6]

ASSET ALLOCATION

Exhibit 6 shows the results of the asset allocation bootstrap analysis. Every quarter, we present the cross-sectional dispersion in the performance of randomly selected portfolios relative to the benchmark portfolio arising from different asset mixes. We report the 5th, 25th, 50th, 75th and 95th percentiles relative to the median.

In other words, Exhibit 6 displays the extent to which a talented investor (5th percentile) would improve upon median performance by engaging in asset allocation. It also shows how far below the median performance an unskilled or unlucky investor (95th percentile) would perform by choosing this investment activity. Called out on the graph are the three quarters in which the asset allocation decision generated the greatest dispersion.

Exhibit 6 covers three quite different periods. In the 1985-1992 period, cross-sectional dispersion in sample portfolios was significant, and asset allocation could have been considered an important activity. During this period, two major events occurred: the October 1987 stock market crash and the September 1990 Iraqi invasion of Kuwait, with an associated spike in oil prices.

In the 1993-1996 period, there was much less cross-sectional dispersion in the sample portfolios. During this period, asset allocation did not really have any impact on the overall performance of portfolios. The period can be characterized as relatively calm, with no really significant crises.

Finally, in the 1997-2005 period, asset allocation clearly regained importance. Here also, the rising high tech bubble of the late 1990s and the associated crash during the first years of the new millennium underscore the importance of choosing the right asset class at the right time.

Over the entire period, the third quarter of 1990 (first Iraqi invasion crisis); the fourth quarter of 1987 (October 1987 stock market crash); and the fourth quarter of 1998 (high tech bubble) happened to be the three most important quarters for asset allocation activity. The difference between the fifth-best sample portfolio out of 100 and the fifth-worst is more than 4.78% for the last three months of 1987; 5.02% for the third quarter of 1990; and 4.12% for the fourth quarter of 1998. On an annualized basis, over the whole 20-year period, of our study, the difference between the 5th and the 95th percentile sample portfolios for asset allocation was 0.8%, which is in line with the KP [2003] results over the 1987-2001 period.

SECURITY SELECTION

Exhibit 7 reports the cross-sectional dispersion in quarterly performance of randomly drawn portfolios.

EXHIBIT 6

Asset Allocation Analysis: 5th, 25th, 75th, and 95th Percentile Quarterly Performance Relative to Median

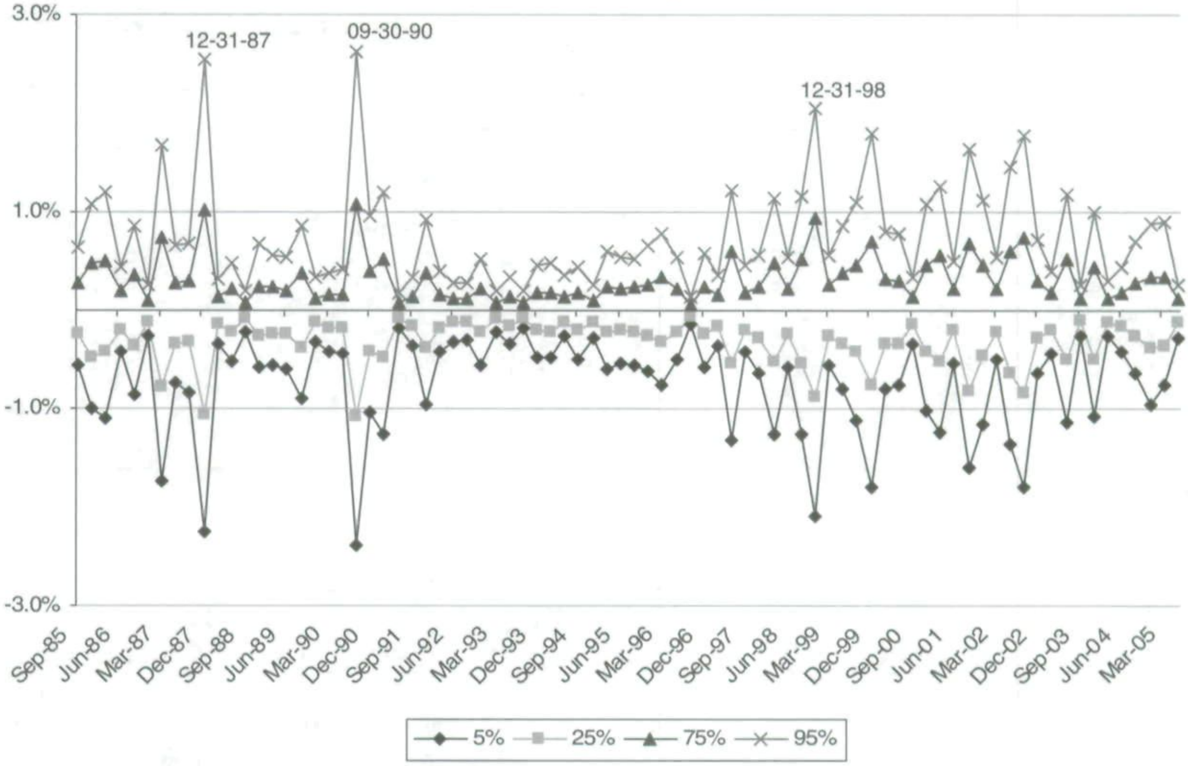
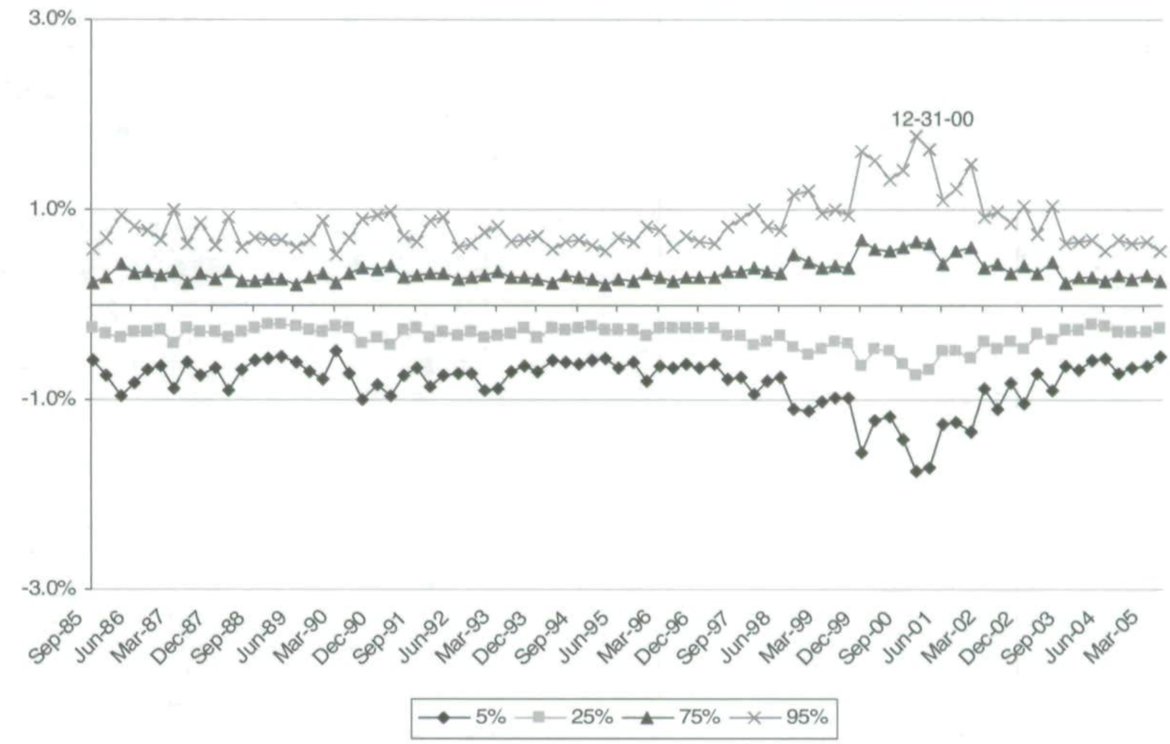


EXHIBIT 7

Security Selection Analysis: 5th, 25th, 75th, and 95th Percentile Quarterly Performance Relative to Median



The dispersion in this case arises from different security portfolios with the same asset mix rather than from different asset mixes with the same security portfolio. We call out the quarter when security selection generated the highest amount of cross-sectional dispersion.

The 1985-1998 period shows a relatively low and quite stable dispersion in sample portfolio performance. During this period, the average difference between the fifth-best sample portfolio out of 100 and the fifth-worst is about 1.5% per quarter. Neither the October 1987 stock market crash, the first Iraqi crisis of 1990, nor the Russian default in August 1998 seems to have affected the way security selection impacts the overall performance of portfolios.

The high tech bubble (in 1999-2002), however, clearly produces a wider dispersion in portfolio performance, indicating more of an opportunity for security selection activity. The quarter with the greatest dispersion indeed corresponds to the peak of the bubble (the last three months of 2000). The difference between the 5th and the 95th percentiles during this quarter is 3.58%.[7]

On an annualized basis, over the entire 20-year period of our study, the difference between the 5th and the 95th percentile sample portfolios for security selection is 0.8%, which is 68% lower than the average of about 2.5% obtained by KP over the 1987-2001 period (estimated from their Exhibit 4).

Like KP, we do not allow security selection in any asset class except for stocks. Security selection may indeed be more significant than reported, both in our research and in KP, because of the cross-sectional dispersion of performance within other asset classes, especially the greater dispersion within alternative asset classes such as real estate or private equity. The dispersion of relative returns associated with security selection in each of the six asset classes and their correlation structure are important elements in determining whether we are significantly underestimating the relative importance of security selection.

From a normative perspective, and except for stocks, we cannot precisely estimate the cross-sectional dispersion in the five other asset classes considered, with the limited availability of data on their opportunity sets. Given that the drivers of relative returns in the six asset classes, however, are conceptually independent of each other—leading to low correlations between alpha activities (Waring and Siegel [2003])—we believe that much of the relative returns arising from mixing the different asset classes would be diversified. Consequently, the dispersion found when allowing security selection within the six asset classes should not be dramatically greater than the dispersion generated through stocks alone.[8]

ASSET ALLOCATION VERSUS SECURITY SELECTION

Exhibit 8 illustrates the dispersions generated by both asset allocation and security selection in a single graph. We portray the dispersion of the quarterly difference between the 5th and 95th cross-sectional percentile performances generated by the bootstrap simulated portfolios as induced by both asset allocation and security selection activities. The greater the difference, the greater the relative importance of a given activity.

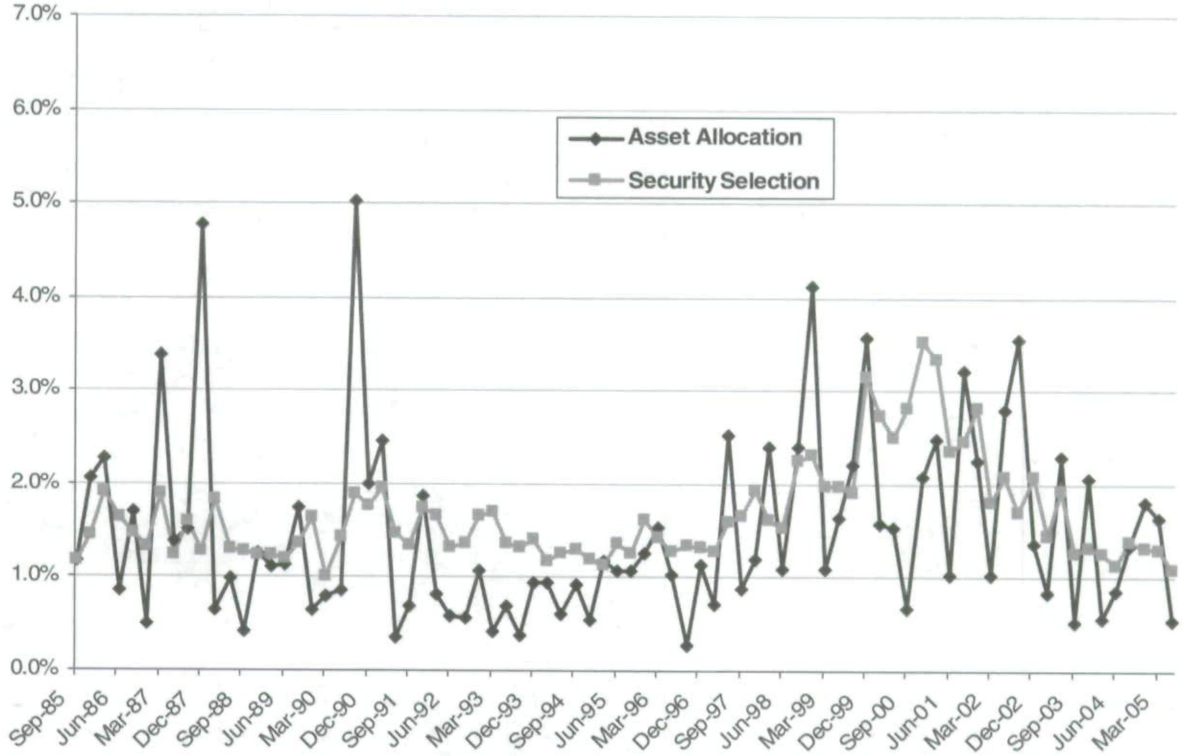
Exhibit 8 reveals three main features: 1) The relative importance of asset allocation and security selection is time-dependent; 2) the asset allocation-driven dispersion is more volatile than the security selection-induced dispersion, and is especially sensitive to crises; and 3) the security selection activity generates as much dispersion in active return as asset allocation, so that it cannot be unequivocally declared that one activity is structurally more or less important than the other.

While the first two features are practically indisputable, the third needs some clarification. We should emphasize that our results do not necessarily contradict those reported by KP; for KP, the security selection activity dominates the asset allocation activity. The difference is essentially attributable to two factors: 1) the difference in security selection methodologies, and 2) the difference in benchmark portfolios. The KP benchmark portfolio includes only traditional asset classes, while ours also includes non-traditional ones, and consequently a lower fraction of stocks. The latter explains about a third of the difference in results, while the former explains the other two-thirds.[9]

In other words, if we were to repeat the simulations with our security selection methodology, but using KP's benchmark portfolio (60/30/10 stocks, bonds, and cash), the difference in annualized performance between the 5th and the 95th percentile sample portfolios induced by security selection activity would be 1.3%, higher than our reported average of 0.8%, but significantly lower than KP's average of 2.5%. Consequently, the relative importance of security selection over asset allocation (1.3% - 0.8% = 0.5%) is reduced by two-thirds when compared to the original findings of KP (2.5% – 0.8% = 1.7%). By deduction, the benchmark portfolio difference is thus responsible for the other third of the difference in results.[10]

EXHIBIT 8

Relative Importance of Asset Allocation and Security Selection



CONCLUSION

To reexamine the relative importance of asset allocation and security selection decisions, we use the normative approach introduced by Kritzman and Page [2003]. We add to the literature in four ways. First, we extend the opportunity set from traditional asset classes only to a mix of traditional and alternative asset classes. Our benchmark portfolio—25/40/30/5 non-traditional asset classes, stocks, bonds and cash—is more representative of the 2006 asset mixes of North American tax-exempt organizations.

Second, while the critics of KP's results often looked at the asset allocation side of the equation, blaming the authors for implicitly hampering this activity, we focus on the security selection side. We design a modified security selection methodology that ensures strict uniformity with asset allocation rebalancing rules.

Third, we use an unbiased investment universe for the stock component of the portfolio, and finally, we consider an up-to-date 20-year period ending in June 2005.

We demonstrate that KP's security selection methodology is not strictly consistent with the asset allocation rebalancing rules, and implicitly produces very large active bets, either by completely ignoring as many as ten of the largest stocks in the S&P 500 universe (representing more than 20% of market capitalization) or by sometimes investing as much as 46% of a portfolio in a single stock. By comparison, our modified security selection methodology, which is consistent with asset allocation rebalancing rules, generates significantly less dispersion in active returns.

Consequently, under the asset allocation opportunity set postulated by Kritzman and Page [2003]—60/30/10 stocks, bonds, and cash—while security selection could still be viewed as the most important activity, its relative importance over asset allocation would be reduced by two-thirds. With our more representative benchmark portfolio, and a modified security selection methodology, our results do not support a clear hierarchy of investment choice. Security selection and asset allocation decisions are, on average, equally important.

Moreover, the relative importance of asset allocation and security selection is largely time-dependent. The October 1987 crash and the first Iraqi invasion crisis in the third quarter of 1990 were especially important for asset allocation, while the high tech bubble of the late 1990s-early 2000s was important for both asset allocation and security selection.

Our results thus indicate that we cannot unequivocally declare that one particular activity is structurally more—or less—important than the other.

ENDNOTES

[1]See also the responses of Brinson [2006] and Hood [2006].

[2]KP examine the relative importance of country and industry choices as well as security selection and sector selection using a broad universe, the MSCI World. They also analyze the issue for five countries: Australia, Germany, Japan, the U.K., and the U.S. The hierarchy of investment choice always remains the same. The most important activity is security selection, and the least important is the asset allocation decision.

[3]Alternative investments include private equity, real estate, and hedge funds. For reasons of limited data availability, we do not include hedge funds, but we do include commodities, also an increasingly popular alternative asset class.

[4]For the sake of simplicity, we exclude foreign stocks from the benchmark. Splitting the equity component of the benchmark portfolio into two separate indexes for foreign stocks and domestic stocks would have very little impact on asset allocation results.

[5]KP [2003] use the MSCI index, not the S&P 500 index, but their data suffer from survivorship bias. To mitigate its effect, they recalculate an index with only the surviving stocks. While survivorship bias has no material impact on stock selection activity, it may affect asset allocation activity, given the wide spreads observed in 1991 and 1993.

[6]There would be markedly different results between the KP and our security selection methodology in equity markets where concentration is a bigger issue (e.g., Finland or Sweden).

[7]de Silva, Sapra, and Thorley [2001] provide evidence that the cross-sectional variation in U.S. realized returns during the bubble led to a correspondingly wide dispersion in realized fund returns. They argue that this increase in dispersion of fund performance is induced by increased security return dispersion and "has little to do with changes in informational efficiency of the market or range of management talent" (p. 29).

[8]The dispersion associated with security selection within bonds and cash is probably significantly lower than for stocks, while the dispersion within real estate and private equity is probably higher; the dispersion associated with commodity security selection is probably somewhere in between.

[9]Other less material sources can explain the difference in results: the study period, 1987-2001 versus 1985-2005, and the dataset for the stock component of the portfolios: MSCI with a survivorship bias in KP's versus S&P 500 without survivorship bias.

[10]When asset allocation decisions are limited to stocks, bonds, and bills, our methodology tempers KP's results significantly, but does not invalidate them because the consistency of security selection dominance remains. For approximately 90% of quarters, security selection dominates asset allocation.

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