

Performance Of The Large University Endowments: Can It Be Replicated?

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HighVista Strategies

HighVista Strategies was founded in 2004 by an experienced team with diverse backgrounds in endowment management, hedge fund and principal investing, wealth management and academia.

We focus singularly on achieving attractive risk-adjusted portfolio returns through investing across public and private markets. We utilize the time-tested principles of endowment investing and a forward-thinking application of risk management to manage globally diversified investment strategies and solutions tailored for our clients' varying needs. The priority placed on capital preservation and avoiding major drawdowns fosters the patient and rigorous pursuit of excess returns, and is itself a critical driver of long-term performance.

Executive Summary

Large endowments have significantly and consistently outperformed smaller institutions, though the sources of this performance are not well understood. Using reported asset allocation and performance data, we evaluate the relative contributions of differences in portfolio risk levels, active strategies such as alternative investments, and asset allocation.

We find that outperformance of larger endowments is attributable primarily to better performance from alternative investments and other active strategies, though even these have underperformed in recent years. Large institutions hold portfolios with higher volatility and greater exposure to equity risk than their smaller counterparts, but have not added value through asset allocation.

Meanwhile, small to mid- sized institutions continue to tilt their portfolios toward the approach of their larger brethren, but have not benefitted from active strategies. In small institutions, active management has actually detracted from performance, in spite of the increased risks, illiquidity, and costs associated with alternative investments. As these institutions continue to seek to emulate the large endowments, they are likely to exacerbate their under- performance and to do so at a cost of owning higher- risk, lower Sharpe Ratio portfolios than they otherwise would have held. Those without strong edges in manager selection should focus instead on portfolios with appropriate risk, liquidity, and asset diversification for the objectives of their institutions.

Performance Of The Large University Endowments: Can It Be Replicated?

The performance of the large university endowments is rightly regarded as one of the most impressive stories in modern institutional investing.

Harvard and Yale, in particular, have each achieved long- term track records that are the envy of the institutional investment world, with returns over the last two decades of 12.9% and 14.2% per annum, respectively, compared with just 8.5% for the median endowment (Wilshire ATP)¹ and 8.2% for a 60-40 portfolio. By our estimates, Harvard and Yale are wealthier today by \$22 billion and \$16 billion, respectively, by virtue of having outperformed the median endowment between 1991 and 2011.²

While the track records of the large university endowments are well known, less understood are the sources of their outperformance. In its simplest expression, the large endowment model of investing consists of a “policy portfolio” of broad asset class exposures with allocations to managers who seek to add additional value after fees. How much of the outperformance of large endowments is attributable to having a better/riskier policy portfolio? How much is attributable to outperformance through active management? How much should we expect these sources to contribute to future performance? Can this track record be replicated by other institutions?

These are critical questions for the many smaller institutions now seeking to emulate their larger brethren, and certainly for the prospects for future performance of larger institutions. Focusing on data covering 2003 to 2011, this paper investigates the persistence of this outperformance, its likely sources and attribution, and implications for institutional investors going forward.³

Institutional Performance and Size

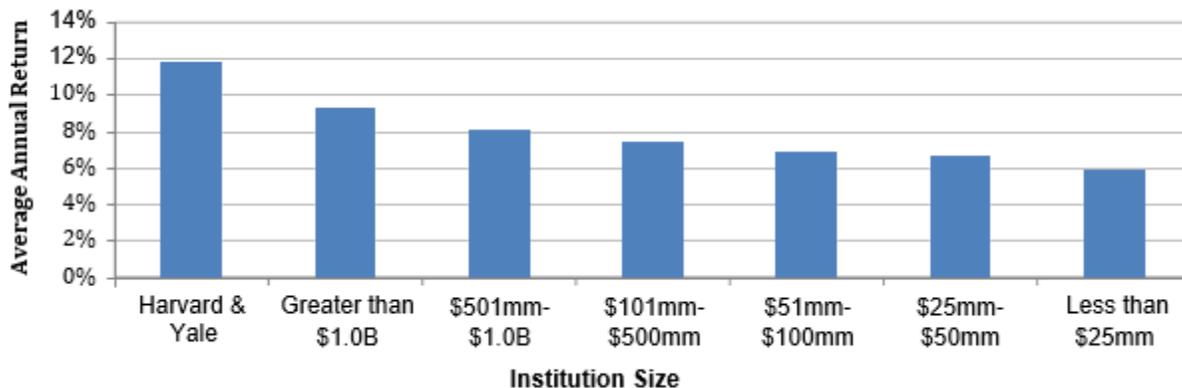
The performance of Harvard and Yale is part of a much broader relationship between institutional size and performance. As shown in **Figure 1**, Harvard and Yale achieved an annual return nearly double that of the smallest institutions over this period, and more generally, the larger the institution the better the performance. These differences in performance over a long period of time obviously have significant implications for the operating and financial aid budgets of these institutions—a \$1 billion institution in 2002 with Harvard/Yale’s performance over this period would have had more than \$1 billion of additional spendable wealth by 2011 relative to the same institution whose performance matched that of the smallest endowments.¹

Figure 1: Average Annual Return by Size of Institution, 2003- 2011

¹ Wilshire ATP reflects the invested universe of the over 900 US fund sponsors and the over \$3 trillion in assets (US) they represent in the Wilshire TUCS database.

² These estimates assume the same dollar amounts spent each year (net of gifts), differing only in investment returns.

³ The focus on the recent period is driven primarily by availability of data. While the long- term performance of Harvard and Yale is publicly available, adequate data for smaller institutions is available only over the more recent decade. In addition, inference drawn from the more recent period is likely more useful for the environment going forward. Data on performance and asset allocation by institutional size is taken from the NACUBO endowment study series, while data for the larger institutions is collected from public reports issued by these institutions. Unless otherwise noted the data are from annual June fiscal years ending from 2003 through 2011, and institutions are equal- weighted within institutional size categories from 2002- 2008, then dollar- weighted within categories from 2009- 2011 (reflecting a change in methodology in the available NACUBO data). The National Association of College and University Business Officers (NACUBO) publishes the NACUBO- Commonfund Study of Endowments each year. In 2011 these data were collected from 823 U.S. college and university endowments and affiliated foundations, representing over \$408B in endowment assets. Historical asset allocation and performance data are publicly available on their website at www.nacubo.org. Detailed information required to compute some calculations in this paper require a subscription.

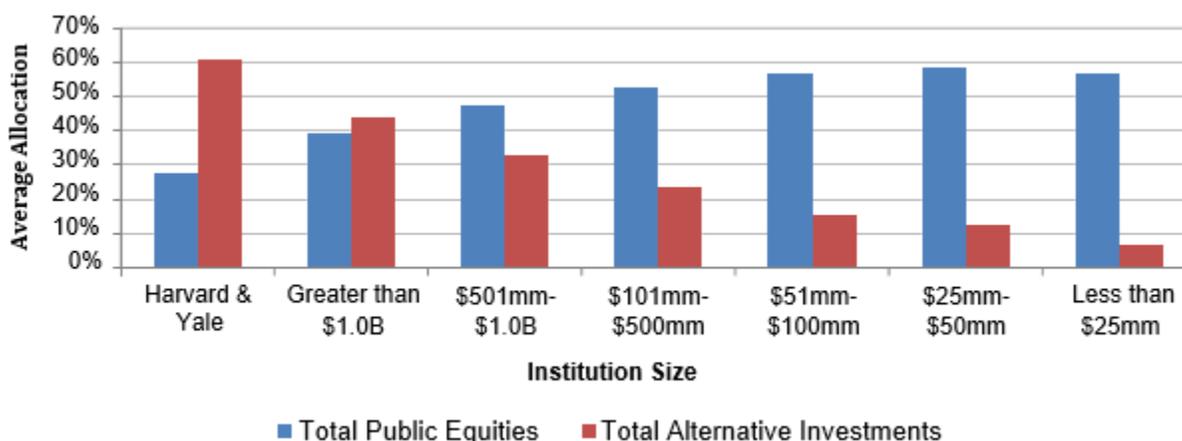


Given the critical importance of investment returns for institutions, it is somewhat surprising that the relationship between size and performance is not better understood. In brief, it is known that large institutions differ from smaller institutions in their asset allocations (e.g. significant allocations to real estate and natural resources) and in their access/allocation to alternative managers. But whether the excess returns of the large endowments ultimately were the result of greater risk taking, better asset allocation, or greater outperformance from managers has not been well answered.

Importance of Alternative Investments

Given their greater resources and sophistication, it is intuitive that larger institutions would be more diversified and make greater investments in hedge funds, private equity, and other alternative assets. This is supported by the data over this period (Figure 2) which illustrates the disproportionate commitment by larger endowments to alternative investments relative to their mid- and smaller- size counterparts.⁴

Figure 2: Average Allocation to Public Equities and to Alternatives by Size of Institution, 2003-2011

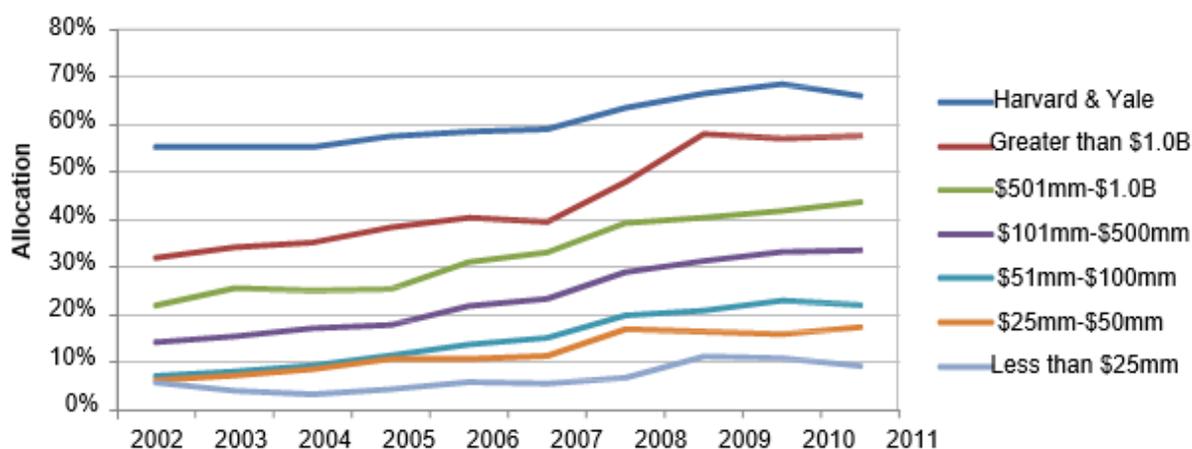


⁴ In constructing the figure, we for simplicity use endowments' allocation to public equities as a proxy for lack of "diversification"—meaning that a higher allocation to public equities implies a smaller allocation to other diversifying assets.

As seen in **Figure 2**, the allocations to alternative investments by larger institutions dwarf those of the smaller endowments: for example, institutions in the \$100- \$500 million group had only about half as much invested in alternatives as institutions greater than \$1 billion, but nearly four times as much allocated to alternatives as the smallest group. And not unrelatedly, the larger endowments have maintained much lower allocations to public equities.

It is also clear that smaller institutions have significantly increased their allocations to alternative investments over time. See **Figure 3** which plots the allocation to alternatives over time and by size of institution.

Figure 3: Allocation to Alternatives by Year and Size of Institution, 2003- 2011



Investing in alternatives is no panacea for performance. It is well documented that, just as with active management more generally, median alternative investment returns are subpar, which means that alternatives investing is a game that at best a minority can be expected to win. We now show how the large endowments have benefited significantly from success in active management, while the smaller endowments would likely have been better off avoiding active strategies altogether.

Policy Portfolios and Alpha

To understand how the performance gains or losses from active management vary by size of endowment, we combine data on asset allocation and performance, beginning with the reported asset allocation for each institutional group. Making simple assumptions for each alternative “asset class,” we map the reported allocations into a beta allocation among marketable asset classes. This allows an evaluation of the marketable policy portfolio, which can be thought of as the portfolio of index investments that most closely approximates the broad market exposures and risks of the actual portfolio of each institutional group. Details on the mapping from reported asset classes to beta exposures are given in the **Appendix**.

Alpha, which we define here as the difference in actual performance and the performance of these estimated policy portfolios, is attributable to active management—manager outperformance, intra-period market timing, and security selection. Unfortunately, available data do not allow us to differentiate between these sources, though our experience indicates the latter two comprise only a very small part of the activities of most institutional investors. Manager alpha is the overwhelming contributor. Calculating these differences in each year by institutional group can therefore provide an indication of the relationship between institutional size and contribution from manager outperformance.

Figure 4: Harvard & Yale Endowment Alpha by Year

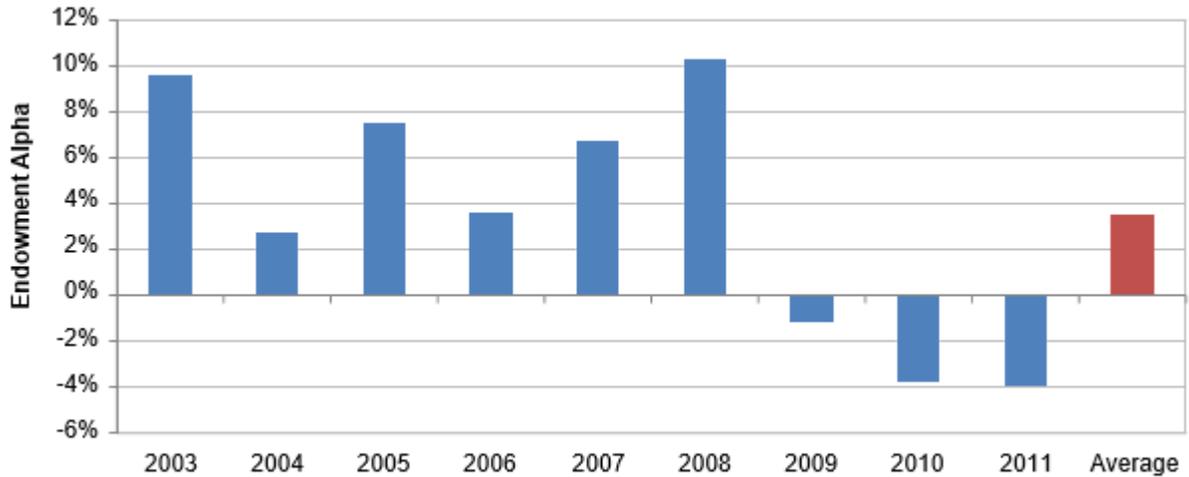
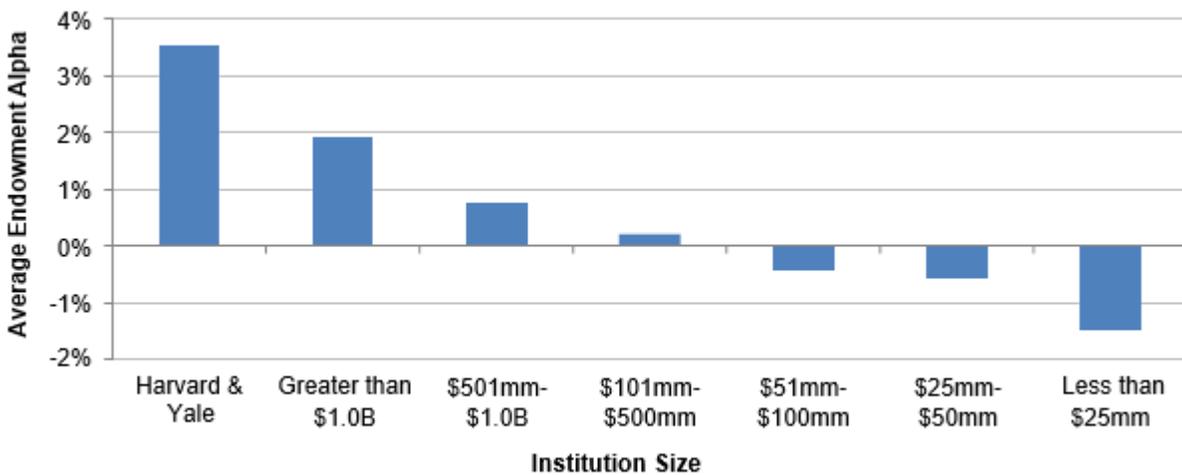


Figure 4 plots annual performance for Harvard & Yale relative to their policy portfolio. Harvard and Yale have outperformed their policy portfolios by about 3.5% per year over this period, representing significant excess returns, primarily by their alternative investments. Note, however, that recent performance has been less impressive, with alpha turning negative in the last three fiscal years. In other words, over the last three fiscal years, these institutions would have been better off invested in equivalent- risk index investments than in alternative investments and other active strategies. A critical question obviously is whether this recent performance is an exception to an otherwise impressive record or the beginning of a more challenging period for active management.

The record of smaller institutions is more worrying. Comparing the performance of each institutional size group to its own policy portfolio highlights the advantages possessed by larger institutions in allocating to managers who can outperform, as shown in **Figure 5** below.

Figure 5: Average Endowment Alpha by Size of Institution, 2003- 2011



The data shows that outperformance is strongly and positively related to institutional size, and average alpha is negative for small institutions. Note again the magnitude and consistency of this result—even among those greater than \$1 billion the very largest (Harvard & Yale) generated nearly double the alpha of the other large institutions. Even moderately sized institutions (\$100- \$500 million) would have performed only slightly worse had they avoided active management altogether and simply owned their equivalent indexed marketable policy portfolio.

The Performance of Policy Allocations

The other area of differentiation between large and small institutions is in their approach to asset allocation. As noted earlier, larger institutions tend to be more diversified in that they own fewer public equities and more non- equity assets such as real estate and natural resources. Has this contributed to their outperformance relative to smaller institutions?

Whether based on reported annual performance or the estimated performance of policy portfolios, the conclusion is similar—larger institutions have higher equity beta and higher overall volatility than smaller institutions. Note that actual performance is subject to smoothing effects from potential lags in marks for illiquid investments such as private equity and real estate, while policy portfolio returns are based on marketable index performance and, thus, may be a more reliable gauge of true portfolio risk characteristics. **Figures 6 and 7** illustrate these statistics using both policy portfolio returns and actual reported returns across institution size.

Figure 6: Equity Beta by Size of Institution, 2003- 201

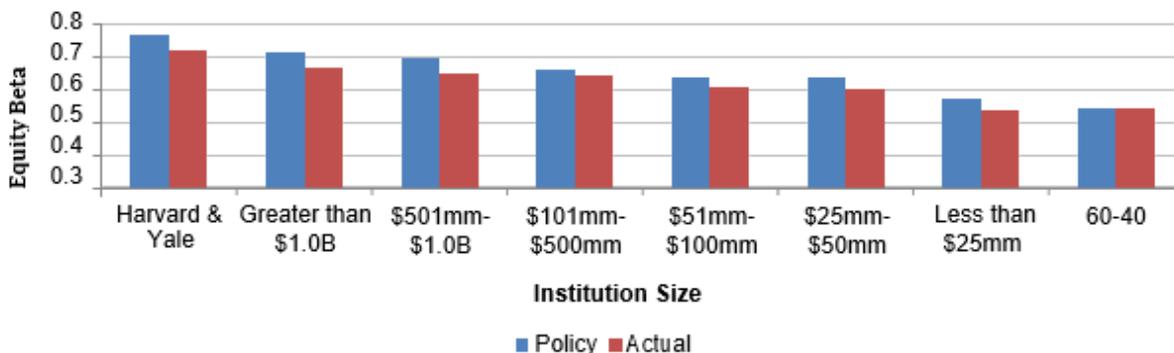
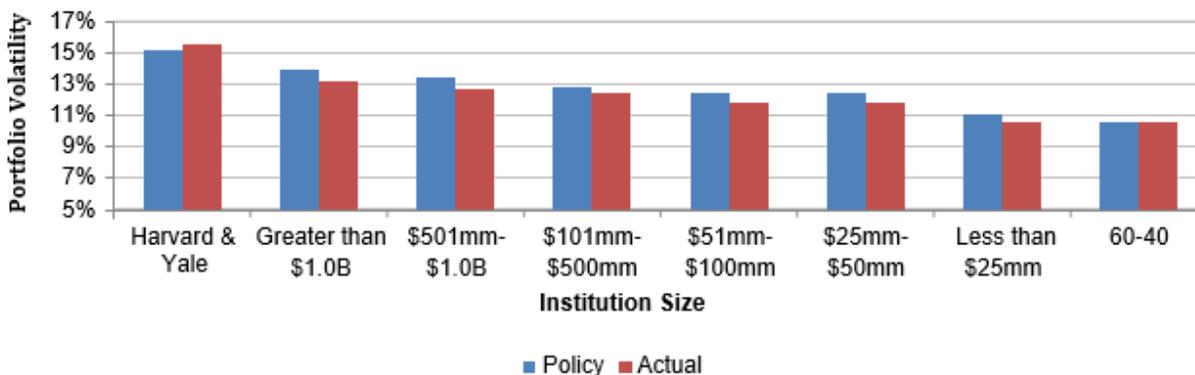


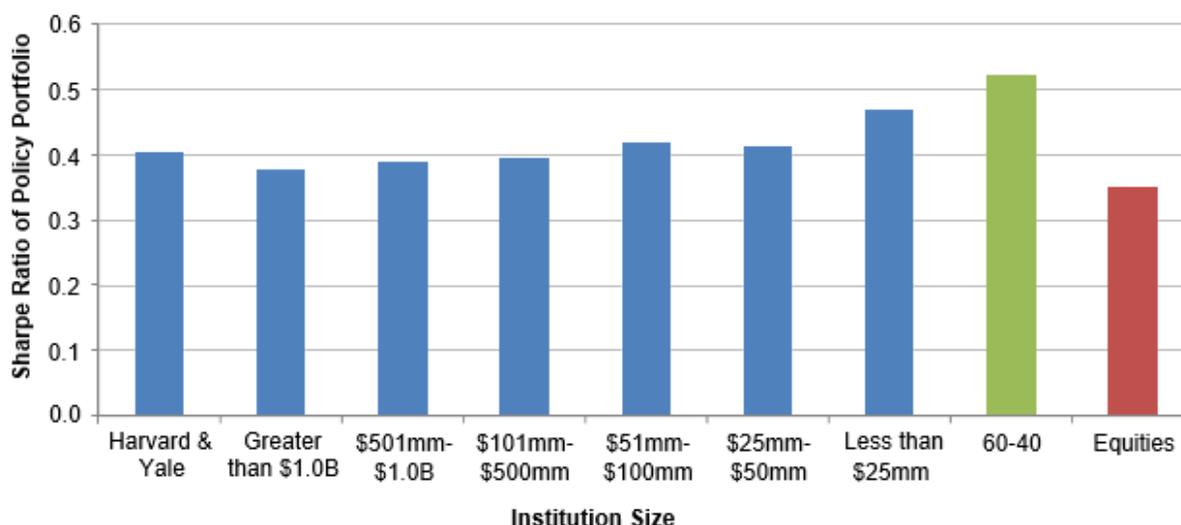
Figure 7: Portfolio Volatility by Size of Institution, 2003- 2011



Large institutions have taken more risk than smaller institutions, and much of that additional risk is equity risk. While some of this is attributable to higher exposures to private equity and venture capital (which are generally high- risk forms of equity) much of it is also likely attributable to these endowments' "non- equity" allocations to real estate and natural resources. These asset classes in previous decades were only mildly positively correlated to equities, but have been highly correlated more recently. For example, in the decade prior to the period of our study, the correlation between equities and real estate was approximately 0.3, compared with 0.7 during the more recent period. Similarly, the correlation between equities and commodities rose from 0.1 previously to 0.5. These elevated correlations increased equity beta and portfolio volatility in the portfolios of larger institutions. Smaller institutions seeking to emulate the large institutions ought to carefully consider whether increasing their risk and equity beta exposures is in alignment with the goals and risk tolerance of their institutions.

Of course, having higher equity beta and volatility does not imply that larger endowment portfolios are less efficient than smaller institutions' portfolios. Asset allocation should serve two objectives: to take an appropriate amount of risk and to maximize return given that level of risk. It may be that larger institutions are maximizing return given their level of risk, but simply have higher risk tolerances than smaller institutions. In other words they may have an asset allocation that maximizes their Sharpe Ratio while taking a relatively high level of risk, consistent with their objectives. Policy portfolio Sharpe Ratios are shown in **Figure 8** along with the Sharpe Ratios of a 60- 40 portfolio and a 100% equity portfolio.

Figure 8: Sharpe Ratio of Policy Portfolio by Size of Institution, 2003- 2011



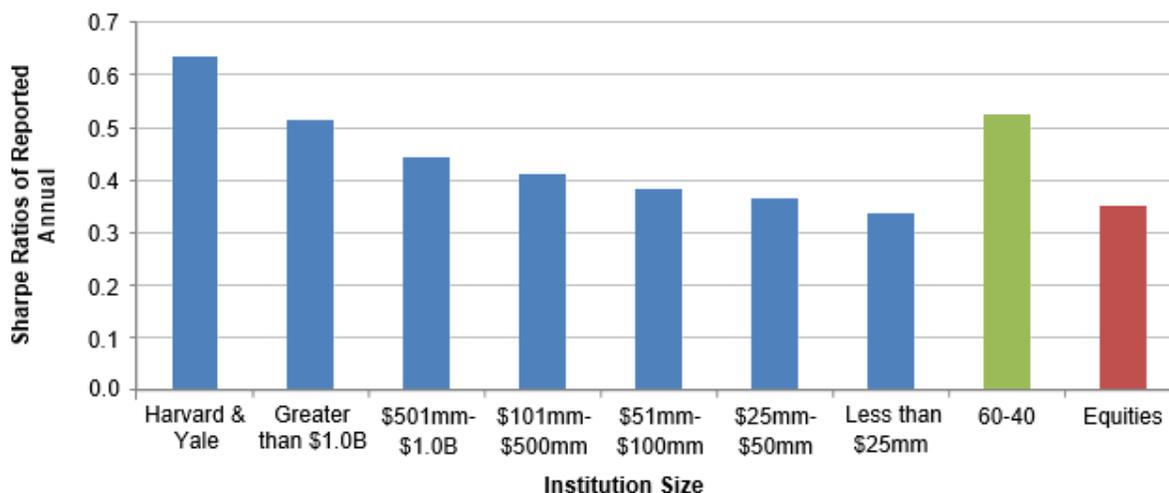
As the data indicate, the policy portfolios of larger institutions do not have higher Sharpe Ratios than those of smaller institutions. Given their higher volatility and equity betas, they can therefore be thought of as levered versions of smaller institutional portfolios. Note also that all size groups have lower Sharpe Ratios than 60- 40 over this period, and only marginally better Sharpe Ratios than 100% equities. In other words, the policy portfolios accrued only slightly more benefit from asset allocation and diversification than if they had invested 100% in equities!

For large institutions the performance record over this period is now a bit clearer: they allocated to talented managers who took equity- like risk but generated enough alpha to overcome their less efficient asset allocations. Being invested with top managers may in fact be worth the cost in asset allocation and risk management, depending on one's expectations for their outperformance.

For smaller institutions the picture is less sanguine. Over time they have increasingly held portfolios with greater equity exposure and larger allocations to alternative managers, but have been unable to realize any real benefit from their manager selections. Over this period their allocations to active investments often actually hurt their performance. They seem intent on making the same trade-off as the larger institutions, but without accruing the benefits of outperformance to make up for holding higher-risk, less-efficient portfolios.

The Sharpe Ratios based on reported performance over this period bear this out. **Figure 9** compares the Sharpe Ratios for institutional groups based on actual reported returns, again with 60-40 and 100% equities for comparison.

Figure 9: Sharpe Ratios of Reported Annual Returns by Size of Institution, 2003- 2011



We conclude that Sharpe Ratios are positively related to institutional size mainly because of the ability to generate outperformance through investment in alternative managers and other active strategies. For the largest institutions this outperformance increased their Sharpe Ratio above that of 60-40. For moderate to large institutions, manager outperformance increased their Sharpe Ratio but not enough to overcome their asset allocation underperformance relative to 60-40 during this time period. For small to moderate institutions, active strategies actually detracted from performance, pushing their Sharpe Ratios close to that of 100% equities.

In short, all but the largest institutions would have been better off in a simple 60-40 stocks-bonds portfolio over the last 9 years. This is in part due to the very positive performance of bonds over this period, but note that many barely outpaced the Sharpe Ratio of a 100% equities portfolio.

Summary and Conclusions

Larger university endowments were early and enthusiastic entrants into the alternative investment space, and have been well rewarded with significant manager outperformance. Nevertheless, they hold portfolios with higher volatility and greater equity risk than smaller institutions, and have not added value through their broad market allocations over time. For the very largest institutions, manager outperformance has generally been worth the cost of less efficient (lower Sharpe Ratio) asset allocations, yielding a reasonable overall performance relative to a simple 60-40 portfolio, though their manager performance has deteriorated in recent years. For other large institutions (greater than \$1 billion, for example), this trade-off has resulted in a Sharpe Ratio roughly equal to that of 60-40.

Small to mid- sized institutions continue to seek to emulate the “endowment model,” tilting their portfolios toward the higher volatility and equity- related risk of alternatives. As with the larger endowments, they have borne the cost of lower Sharpe Ratios for their policy portfolios; but instead of reaping a benefit, they suffered further deterioration from underperforming active investments. These institutions may therefore actually be doing harm as they seek to pursue the strategies of the large endowments.

As is well known, past performance is just that, and it need not be indicative of future results. The high equity- correlations of real estate and commodities and strong performance of fixed income certainly distinguish this recent period from others, and one might well believe these unrepresentative of the future. Even in this context, the results from the recent period are striking: using reported annual returns, and on a Sharpe Ratio basis, a 60- 40 portfolio outperformed all institutional groups but the very largest (including Harvard & Yale) over this period. Small and moderate- sized institutions achieved Sharpe Ratios no greater than that of a 100% equity portfolio.

The implications for institutional investors are obvious and significant. All institutions should evaluate whether they possess the edges necessary to generate true outperformance from alternative investments and other forms of active management and have a network to access these managers. They should moreover carefully evaluate whether it is worth bearing the greater equity- related risk and likely deterioration in Sharpe Ratio associated with greater concentrations of alternative investments. Those without strong edges in manager selection, or for whom these tradeoffs are unlikely worthwhile, should focus instead on portfolios with appropriate risk, liquidity, and asset diversification for the objectives of their institutions.

Appendix – Estimating Marketable Policy Portfolios

Consider the asset allocation of the largest institutional size category (greater than \$1 billion) in 2002, as reported by NACUBO:

Asset Class	Weight
Equity	45.1%
Fixed Income	20.5%
Real Estate	4.3%
Cash	1.9%
Hedge Funds	17.8%
Private Equity	4.3%
Venture Capital	3.9%
Natural Resources	1.7%
Other	0.5%
Total	100%

For an institution with this asset allocation, how would one evaluate the contribution to performance from manager alpha? To measure outperformance requires a benchmark to which performance can be compared; to be fair the benchmark ought to reflect the risk taken in the actual investment. For marketable asset classes such as “Equity” or “Fixed Income,” we can simply use marketable indices such as a world equity index or a U.S. Treasury index.

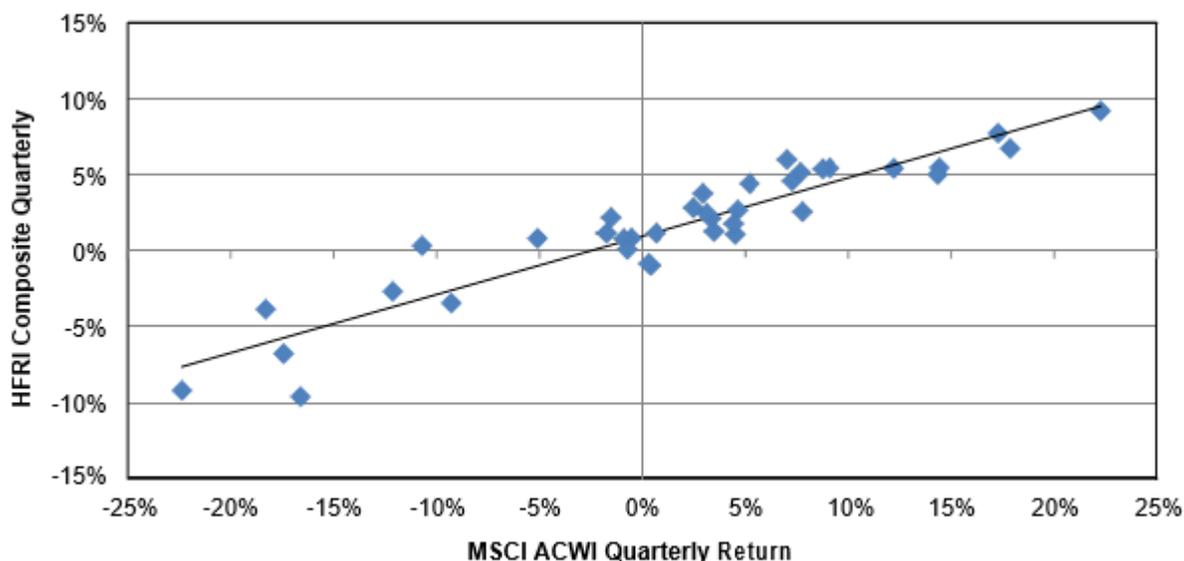
For alternative investments we have to consider benchmarks that have similar exposures—that is, those with similar risk characteristics. To isolate the contribution from manager selection, these benchmarks must be tradable and representative of broad- based rather than security- specific exposure. For example, an allocation to real estate might be benchmarked to an index of public real estate investment trusts. As long as aggregate (institutional group level) real estate holdings are of similar risk character as

the REITs in the index, the difference in performance between actual real estate investments and this benchmark will represent outperformance from manager selection, intra- period timing, or direct security selection. In our experience the latter two sources are not significant activities for most institutions in our sample.

Some alternative asset classes are somewhat more difficult to benchmark. Hedge funds, for example, cannot readily be compared to any single tradable index. One solution is to use an index of hedge funds, such as the HFRI composite, as the benchmark. In addition to the well- known sample biases associated with alternative “indexes,” this ignores the possibility that institutional hedge fund investments add or subtract value in aggregate—it measures manager selection performance relative to some other group of managers, but not the decision to try and select managers in the first place.

Fortunately the risk characteristics of many alternative investment strategies, in aggregate, can be approximated by marketable indices. An index of hedge funds, for example, can be regressed against a global equity index to measure the beta exposure of the average hedge fund to global equities. In the case of the HFRI composite, using quarterly data over the last ten years yields a beta of 0.4, and captures most of the variation in the data, as illustrated in **Figure A1**.

Figure A1: Quarterly Returns of Global Equities vs HFRI Composite Index



In other words the HFRI composite index has broad- market risk that resembles that of a portfolio of 40% world equities and 60% cash. Performance of the index above this equivalent- risk marketable benchmark represents manager “alpha.”

For alternative investment categories with no ready public benchmarks and no easily comparable index (such as private equity and venture capital), we are left with intuition to guide us toward a suitable equivalent- risk benchmark. In both of these categories, the underlying risk is clearly equity risk, though it is unclear exactly how much is undertaken in a typical investment. While a lack of a reliable return series precludes a statistical analysis, we can use data on features such as leverage, market capitalization or bankruptcy rates to compare a dollar invested through a private equity or venture capital fund to a dollar invested in public equities. These analyses generally indicate that each dollar invested in these alternative investments carries more than a dollar of public equity risk.

More ambiguous categories such as natural resources may have exposure to more than one marketable asset class. While many natural resource investments have significant exposure to underlying commodity prices, many also are structured as equity and often behave in similar ways—commanding higher multiples when equity markets rise and so forth. Many with direct exposures to commodities are either partially hedged or tied to long- term prices which are less volatile than spot prices. Ultimately these considerations are balanced to create a benchmark that captures the exposures of the aggregate investments in this category.

It should be noted that while for any one institution the estimates used in this paper will be only noisy approximations to actual policy portfolios, our focus in the paper is on aggregate policy portfolios within institutional size categories, where these estimates are likely more reasonable. Note also that in subsequent years the particular categorizations change and generally become more granular. For consistency we have “rolled up” more detailed classifications into the common categories reported throughout the entire sample.

Additional analysis (omitted for brevity) indicates that the results presented in the paper are not highly sensitive to the particular assumptions described above. The paper’s conclusions are supported across a reasonable range of inputs.

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