FEATURE

The Yale Endowment Model of Investing Is Not Dead

By Timothy J. Keating

The Ivy League is known for its traditions, its gothic buildings, and, until recently, the mystique of its mammoth-sized endowments that consistently generated incredibly high returns in bull and bear markets alike. Ivy League and other large endowments, weighing in at billions of dollars, were able to achieve extraordinary results by following what often is called the “Yale Model” for endowments developed by Yale University Chief Investment Officer David Swensen, under whom the school invested heavily in alternatives such as private equity and hedge funds. Until very recently, the Yale Model appeared invincible.

This financial invincibility ground to a halt, however, in the past year, when the largest university endowments—those of Harvard and Yale—announced losses of 27 percent and 25 percent, respectively, for the fiscal year ended June 30, 2009. This stunning news led many to declare that the “Yale Model” was dead. Upon closer inspection, however, it becomes clear that the problem is with neither modern portfolio theory nor asset allocation. The problem lies with the endowments’ policies of holding shockingly small amounts of cash relative to the amounts needed to fund day-to-day operations.

In this article, I argue that the meltdown at certain endowments had nothing to do with purported flaws in modern portfolio theory but was caused instead by a failure to model for truly extreme events. Given the enormous obligations of many Ivy League endowments to fund general university operations, their portfolios were positioned on the wrong point of the efficient frontier. In other words, given their liabilities, they simply invested far too little in cash and liquid assets—not too much in alternatives such as private equity.

Modern Portfolio Theory and Asset Allocation

Modern portfolio theory relies on the assumption that each asset class has a measurable historical return (“mean”), volatility (“variance”), and historical correlation with respect to each other asset class (“covariance”). This mean-variance framework is used to construct optimal portfolios based on risk and return assumptions. The idea is that diversifying a portfolio to include asset classes that have different correlations reduces risk. For example, if the stock market declines, those assets that are strongly correlated to the stock market also will decline, but at the same time those that are negatively correlated to the market will rise, thus reducing any loss or even producing gains (Bary 2009).

The Yale Model

Relying heavily on modern portfolio theory, Swensen and Yale endowment managers developed the following five principles, which have become the basis of the Yale Model (Swensen 2009):

- Invest in equities, because it is better to be an owner rather than a lender.
- Hold a diversified portfolio, avoid market timing, and fine-tune allocations at extreme valuations.
- Invest in private markets that have incomplete information and illiquidity to increase long-term incremental returns.
- Use outside managers except for all but the most routine or indexed investments.
- Allocate capital to investment firms owned and managed by the people actually doing the investing to reduce conflicts of interest.

Guided by these principles, the Yale endowment is diversified in alternatives and historically has invested almost exclusively in equities. Although universities with smaller endowments are limited in their ability to invest in alternatives because they rely on greater percentages of their endowments for cash, large endowments typically have had long-term investment horizons and could afford to trade short-term illiquidity for long-term returns (Bary 2009).

The Success of Ivy League Endowments

The Yale endowment achieved enormous success under Swensen’s 24-year leadership, enticing many other large...
Despite all of the successes of the Yale Model, smaller endowments have significant endowment liquidity is critical for the Ivies (Karmin 2009a). In fact, Harvard’s endowment distributed $1.7 billion to the university in fiscal 2009—more than one-third of the operating budget (Salsberg 2009). These distributions are in addition to unfunded investment commitments to private equity and real estate. As of June 30, 2008, these investment commitments were $11 billion at Harvard, $8.7 billion at Yale, and $6.1 billion at Princeton. Normally, endowments finance these commitments with current income and distributions from existing funds. When distributions dried up, however, endowments became desperate for cash. As a result, they were forced into the bond market. In 2009, Harvard took on debt of $1.5 billion, Princeton took on $1 billion, and Yale took on $800 million (Bary 2009).

One cornerstone of modern portfolio theory is that an optimal portfolio should lie on the efficient frontier, yielding the highest expected return possible for the given amount of risk (see figure 1). Many large university endowments were positioned in the high-risk/high-return portion of the curve. Absent any need for short-term liquidity, this would seem like a logical risk-return profile for a patient, long-term investor. These endowments, however, have significant day-to-day operations, with Harvard, Princeton, and Yale topping the range at 55 percent, 48 percent, and 37 percent, respectively. Compare this figure to the all-colleges average of 5 percent; indeed, endowment liquidity is critical for the Ivies (Karmin 2009a). In fact, Harvard’s endowment distributed $1.7 billion to the university in fiscal 2009—more than one-third of the operating budget (Salsberg 2009). These distributions are in addition to unfunded investment commitments to private equity and real estate. As of June 30, 2008, these investment commitments were $11 billion at Harvard, $8.7 billion at Yale, and $6.1 billion at Princeton. Normally, endowments finance these commitments with current income and distributions from existing funds. When distributions dried up, however, endowments became desperate for cash. As a result, they were forced into the bond market. In 2009, Harvard took on debt of $1.5 billion, Princeton took on $1 billion, and Yale took on $800 million (Bary 2009).

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short-term liabilities and thus need short-term liquidity.

Endowments boomed in the bull market, leading to investment policies that assumed perpetually free-flowing cash. How else to explain enormous allocations to illiquid investments and minuscule or no allocations to cash, coupled with obligations to fund meaningful portions of operating budgets? As table 2 shows, investment commitments accounted for a large portion of endowment funds to begin with, and, as endowments shrank, investment commitments consumed a larger proportion of endowment funds. Furthermore, operating budgets were at all-time highs and had grown to rely on endowment contributions for enormous percentages of those budgets.

Of course, university endowments enjoy regular cash inflows from alumni donations. However, as people experience declines in wealth, propensity to donate also declines (this is known as “the negative wealth effect”). In the recent financial crisis, Ivy League endowments have suffered doubly because of shrinking asset values as well as shrinking donations, a result of potential donors’ own decimated portfolios.

To remedy these problems, university endowments are redefining their asset allocations. Harvard reduced risk exposure by raising cash, removing $3 billion in future commitments to investment funds and reducing real-asset allocation to 23 percent from 26 percent. The Harvard endowment now aims to hold 2 percent of assets in cash, rather than the previous –5 percent position, which reflected cash borrowed to invest in other asset classes (Hechinger 2009).

A Different Experience at Penn and Columbia

A few endowments using significantly different investment strategies avoided large losses. The University of Pennsylvania’s endowment, for example, sustained a loss but did better than many of its Ivy League peers by shifting a significant portion of its portfolio into Treasurys. The large Treasury position provided enough liquidity for Penn’s endowment to meet investment commitments to private equity funds that caused other Ivy League endowments so much trouble (Karmin 2009b).

TABLE 2: STRESS ON IVY LEAGUE INVESTMENT COMMITMENTS AND ANNUAL BUDGETS FROM SHRINKING ENDOWMENTS

<table>
<thead>
<tr>
<th>Endowment Feature</th>
<th>Harvard</th>
<th>Yale</th>
<th>Princeton</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endowment Size (billion)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On June 30, 2008</td>
<td>$36.9</td>
<td>$22.9</td>
<td>$16.3</td>
</tr>
<tr>
<td>On June 30, 2009</td>
<td>$26.0</td>
<td>$16.3</td>
<td>$12.6</td>
</tr>
<tr>
<td>Year-to-Year Decline</td>
<td>–27%</td>
<td>–25%</td>
<td>–23%</td>
</tr>
<tr>
<td>Investment Commitments (billion)*</td>
<td>$11.0</td>
<td>$8.7</td>
<td>$6.1</td>
</tr>
<tr>
<td>Annual Budget (billion)**</td>
<td>$1,100</td>
<td>$2,280</td>
<td>$1,360</td>
</tr>
<tr>
<td>Contribution from Endowment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dollars (million)</td>
<td>$600</td>
<td>$850</td>
<td>$653</td>
</tr>
<tr>
<td>Percentage</td>
<td>55%</td>
<td>37%</td>
<td>48%</td>
</tr>
</tbody>
</table>

*Commitments as of June 30, 2009. **Faculty of Arts and Sciences

Sources: Bary (2009); Demos (2009); Associated Press (2009)
Columbia, on the other hand, allocated more to stocks relative to alternatives. As a result, the Penn endowment experienced a relatively modest decline of 16 percent for the fiscal year ended June 30, 2009, and Columbia showed losses of 14 percent (Demos 2009).

Many have squarely blamed modern portfolio theory for the huge losses at endowments that followed the Yale Model. They claim that asset allocation no longer works because many asset classes have become so highly correlated. I disagree.

Modern Portfolio Theory Is Not Dead

All models are only as good as their underlying assumptions. The mean-variance framework of modern portfolio theory relies heavily on historical returns to predict future outcomes. When markets collapse, asset classes become very highly correlated.

Converging Correlations during Extreme Events

During extreme events, a shock often starts in one asset class and quickly spreads to other risky asset classes, causing flights to quality and liquidity (i.e., Treasuries). When this happens, the return on an asset becomes inversely proportional to its riskiness, precisely the opposite of what happens during normal times. In the past 22 years alone, many crises have fit this description: Black Monday (1987), the Gulf War (1990), the Mexican Crisis (1994), the Asian Crisis (1997), the Tech Bubble (2000), 9/11 (2001), and the Credit Crisis (2008) (Briand and Owyong 2009, 15). During these periods of extreme stress, diversification has provided little benefit because correlations converged to one and all asset classes declined in tandem.1

The Misleading Nature of Asset Classifications

Traditional asset classes such as equities, fixed income, and alternatives refer more to the structure of the asset rather than the role the asset plays in a well-diversified portfolio. In short, an asset in the equities category may be highly correlated to another asset in the alternatives category, making diversification among equities and alternatives less appropriate than otherwise assumed. For example, the alternatives category includes hedge funds, private equity, and private real estate. Several studies, however, have shown that hedge fund strategies have high traditional beta, private equity returns are highly correlated to public equity returns, and privately held and managed real estate assets follow the ups and downs of public returns are normally distributed, which underestimates the chance of extreme events (the so-called "black swan," also known as tail risk). In reality, return distributions usually have "fat tails," meaning that extreme events are more likely. The solution is to use extreme value theory to produce a generalized extreme value distribution that can more accurately predict the pattern of returns as well as the chance of extreme events (Briand and Owyong 2009, 12).

Once the probability of extreme events is properly determined, managers can use a portfolio business continuity plan to manage tail risk.

Another useful protocol is to perform stress tests for the portfolio to see how well the portfolio holds up against the biggest current threats.

Managing for Extreme Events: The Black Swan

So what can or should the large endowments do to prepare portfolios to better withstand crises? One solution is to better model and manage risk for extreme events using the concepts of Value at Risk (VaR) and extreme value theory.

VaR is a statistic used to measure downside risk. It’s defined as the maximum loss that a portfolio is expected to incur over a specified period of time, within a specified probability. For example, if the one-year 99-percent VaR is 30 percent, then there is a 1-percent chance that the portfolio will decline more than 30 percent in one year. A common problem with VaR measures is that managers tend to assume that

This involves first defining what they consider to be an extreme event, which includes precise values of returns, volatility, VaR, or some combination of these factors. Another useful protocol is to perform stress tests for the portfolio to see how well the portfolio holds up against the biggest current threats. Finally, actions involving portfolio trades to mitigate tail risk should be planned for as and when the black swan occurs.

Where the large endowments really broke down was in their failure to maintain the liquidity needed to withstand the shock of an extreme event. The endowments succumbed to the fallacy that as long-term investors they had no need for short-term liquidity. They mistakenly assumed that cash from alumni donations and investment distributions would be perpetually free-flowing to meet any short-term liquidity needs. These are the same endowments that are obliged to fund 25 percent to 45
percent of their respective universities’ operating budgets and had outstanding investment commitments totaling in the billions.

Conclusion
Given their immense and ongoing cash needs, it is shocking how little cash these university endowments had in their portfolios. The fault, however, is not that the endowments invested too much in alternatives such as private equity, but that they invested far too little in cash and liquid assets.

Modern portfolio theory and asset allocation are not dead, and alternatives can and do play an important role in a well-constructed and well-diversified portfolio. The recent difficulties of the large endowments don’t reflect a breakdown of the principles of asset allocation; they reflect failure of endowment managers to properly diversify and plan for extreme events. Endowments must model and prepare for extreme events, evaluate whether the classification of their assets genuinely reflects true diversification, and perhaps most importantly, appropriate a much larger portion of their portfolios to cash and other liquid assets.

Timothy J. Keating is founder and president of Keating Investments, LLC, a Denver-based SEC-registered investment advisor. He earned an AB cum laude in economics from Harvard College. Contact him at tkeating@keatinginvestments.com.

Endnote
1 Modern portfolio theory relies on covariance matrices to calculate correlations among different sets of securities. Sharpe’s “one-factor model,” which assumes that securities are correlated with each other only because they are all correlated with the market, provides a convenient framework for examining correlation and diversification. Sharpe maintains that the return (\(R\)) on a security is equal to a constant, the security’s beta (\(\beta\)), times the underlying market return (\(R_m\)), plus an independent, random idiosyncratic term interpreted as unsystematic risk (\(\rho\)). In other words, \(R = \alpha + \beta(R_m) + \rho\). In this model, \(\alpha\) represents the security’s additional return unrelated to the market and \(\beta\) represents the security’s coefficient of volatility relative to the market, which is determined from historical data. Beta is also known as “systematic risk.” Thus, the variability in any security’s return can be explained by moves in the market and idiosyncratic risk. For example, assuming the market goes up by 10 percent and \(\rho = -5\) percent, a security with \(\alpha\) of 5 percent and \(\beta\) of 1.5 would have a 15-percent return.

To calculate the return of an entire portfolio, we use the weighted average (\(\bar{R}\)) of the individual securities’ returns, which would be expressed as \(\bar{R} = \alpha + \beta \bar{R}_m + \rho\). Both \(\alpha\) and \(\beta\) are constants, but \(\rho\) is random (i.e., some securities in a well-diversified portfolio will have a negative \(\rho\) and others will have a positive \(\rho\)). This means that the variance of the idiosyncratic term for the portfolio is much smaller than that for each of the individual securities, so diversification reduces the risk represented by \(\rho\). However, systematic risk (i.e., the market return) cannot be diversified. Risk can be lowered by decreasing \(\beta\), but that also lowers the potential for return. When the market moves dramatically downward as it did in 2008, the systematic risk will swamp the idiosyncratic risk, negating the benefits of diversification.

References
Associated Press. 2009. Princeton endowment down, but not as bad as feared.

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