Thoughts on Managing Endowment Goals, Spending, and Investment Policy

By Ronald N. Kahn, Ph.D.

Consultants face many standard investment problems, including structuring corporate pension plans, investing for an individual client’s retirement, and advising endowment funds.

Pension plans and individual retirement savings fund specific future liabilities over finite times: the lifetimes of the beneficiaries. The investment challenge is to fund these liabilities and appropriately trade off cost against risk.

Endowment funds are different. They are set up to exist forever. The goal is to use those assets to best benefit the recipient for the indefinite future.1

This essay focuses on endowments and will address the following three topics in particular: 1) the financial goals of the endowment, 2) the annual spending rule given a target (long-term) spending rate, and 3) the determination of that sustainable long-term spending rate based on the endowment’s investment policy.

The goal is to provide insights for consultants or new endowment trustees into these key elements of managing an endowment, though not to provide a comprehensive treatise. The final section, on determining the sustainable long-term spending rate, will analyze the expected U.S. inflation rate as well as expected rates of return for U.S. equities and bonds. While this section does provide specific forecasts, the goals are a) to illustrate more generally the critical role these forecasts play in endowment management, and b) to present a framework for analyzing expected returns and inflation. But the specific forecasts included do not cover all asset classes of interest and reflect conditions in existence during the first half of 2007.

In this essay, I’ve relied on three key sources, though any errors here are my fault. David Swensen (2000) describes his experience running the Yale Endowment Fund, and in particular that fund’s financial goals and spending rules. This article will address those aspects of how Swensen and his team have managed the Yale endowment that apply to all endowment funds. Many particular characteristics of the Yale endowment are unique to that institution and will not apply to endowments broadly. Richard Grinold and Kenneth Kroner (2002) provide the bottom-up framework underlying the analysis of sustainable spending rates. James Garland (2004) analyzes the same issue, but from a somewhat different perspective and with some historical analysis.

Financial Goals

We should run an endowment so that it provides stable and sustainable support for the organization. Stable support means a fairly predictable—and not very volatile—cash contribution each year. Stable support facilitates annual budgeting and organizational planning. Sustainable support means that over the long run, the annual spending, combined with the investment policy, will retain the purchasing power of the original capital. Very limited spending may even facilitate growth in the purchasing power of the endowment, but we expect most if not all such growth to require new contributions. Too much spending will erode purchasing power unless the endowment receives additional donations. However, additional donations should grow the purchasing power of the endowment, not address losses in purchasing power of the existing endowment caused by spending more than the current endowment can sustainably support.

Beyond these two financial goals, we would ideally like to provide countercyclical support, or at least to provide support with less cyclicity than that of the endowment assets. Organizations that provide charitable or educational services often face countercyclical needs. Demands for support and services rise in economic downturns, just as asset levels and contributions drop.

Finally, we would like a spending rule that is easy to implement.

The Spending Rule

Here is the spending rule developed at Yale by economists James Tobin, William Brainard, Richard Cooper, and William Nordhaus (Swenson 2000, p. 30). Let:

\[ s(t) = \text{dollars of endowment spent in year } t \]
\[ i(t) = \text{rate of inflation in year } t \]
\[ V(t) = \text{endowment value in year } t \]
\[ x = \text{target (long-term) spending rate} \]
\[ w = \text{weight on the current (year } t \text{) endowment value} \]

Then in year \( t \), we should spend:

\[ s(t) = w \cdot \left[ x \cdot V(t) \right] + (1 - w) \cdot \left[ (1 + i) \cdot s(t - 1) \right]. \] (1)

So our spending this year is a weighted average of two numbers: the target spending based on the current endowment value, and last year’s spending adjusted for inflation.
Implementations of this rule typically place most of the weight on last year’s spending. Tobin, Brainard, Cooper, and Nordhaus recommended that the Yale endowment set $w = 30$ percent, which Yale did until recently, when they reduced $w$ to 20 percent. As we shall see below, lowering $w$ lowers the volatility of the annual spending.

As an example, let’s say the Benevolent Society of Freedonia (BSF) has an endowment, and it targets a contribution of 4 percent of that endowment to the budget each calendar year. The BSF completes its annual budget planning in late fall each year. In late 2006, it observed the following (see table 1):

Applying the target spending of 4 percent to the current endowment value would lead to a contribution of $428,000 to the 2007 budget. Simply increasing last year’s contribution by the inflation rate would lead to a contribution of $387,750.

Using equation 1, with $w = 30$ percent, we weight these two numbers to calculate the actual contribution of $399,825. While the endowment grew by 7 percent over those 12 months, the contribution will growth by only 6.6 percent.

What is the intuition behind the spending rule? For simplicity, consider the case where inflation is zero. Figure 1 shows how the spending rule effectively exponentially weights prior values of the endowment, using the specific example of $w = 30$ percent.²

Figure 1 shows that the weight on the current endowment value is 30 percent, as we specified. Note that the weight on the endowment value from two years ago has dropped by about half (actually it’s 49 percent of the original 30 percent). So the half-life of the spending rule is slightly less than two years. Figure 1 also shows that this spending rule places about half its total weight (actually 51 percent) on the current endowment value, plus the value one year ago. So it places about half its total weight on values over the past year.

We can further analyze this approach to determine how our choice of weight, $w$, influences the half-life of the spending rule and the volatility of the annual spending.

The half-life for the spending rule is the time at which the weight has dropped to half the weight on the current endowment value. For $w = 30$ percent, the half-life is 1.94 years. We used figure 1 to estimate a half-life of approximately two years. The more exact result is:

$$j_{\text{half}} = \frac{-0.69}{\ln \left\{1 - w\right\}}.$$

So this more-precise result is consistent with the earlier analysis.

While this analysis of half-lives is perhaps interesting, it’s also rather abstract. A more directly relevant question is: How does the weight $w$ impact spending volatility? Developing an analytic result here is more complicated, and it also requires us to make the additional assumptions that total endowment annual returns have stable volatility, are serially uncorrelated, and considerably less than 100 percent.

Here we simply state the result:

$$\sigma \cdot \sqrt{\frac{w}{2 - w}}.$$

We can immediately see that equation 2 works when we put all the weight

<p>| TABLE 1 |
|-----------------|-----------------|</p>
<table>
<thead>
<tr>
<th>Quantity</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endowment value on 9/30/05</td>
<td>$10,000,000</td>
</tr>
<tr>
<td>Endowment value on 9/30/06</td>
<td>$10,700,000</td>
</tr>
<tr>
<td>Endowment contribution to 2006 budget</td>
<td>$375,000</td>
</tr>
<tr>
<td>Inflation rate from 9/30/05 to 9/30/06</td>
<td>3.40%</td>
</tr>
</tbody>
</table>

FIGURE 1: WEIGHTING PAST ENDOWMENT VALUES

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Investments

contributions, this spending rule has
beyond reducing the volatility of third of the entire budget.

spending now represents about one endowment spending, have
important to Yale because the endowment contribution.

Lowering this volatility is increasingly important to Yale because the endowment, and endowment spending, have
grown very significantly. Endowment spending now represents about one third of the entire budget.

Beyond reducing the volatility of contributions, this spending rule has
the useful property of slowing growth in contributions as markets rise and slowing the shrinkage in contributions as markets fall. This is another desirable financial goal.

The rule also is easy to implement.

As to the sustainability of spending under this rule, that depends on the target spending rate and the investment policy of the endowment.

Investment Policy and Sustainable Long-term Spending

The spending rule will achieve sustainability if the target (long-term) spending rate ($x$ in equation 1) is less than the difference between the expected long-term rate of return of the endowment and the rate of inflation.

Our focus here is on long-term expectations, i.e., what equities, bonds, and inflation will deliver over a 10–20 year horizon. That said, we should revisit this analysis every two to three years and whenever market conditions change significantly.

For some initial perspective here, Swensen (2000) reports that $x$ ranges from 1.25 percent to 10 percent among institutions of higher education, with 90 percent choosing $x$ between 4 percent and 6 percent, and nearly half choosing 5 percent. He also states that “the distribution rates for educational institutions generally exceed the return-producing capacity of endowment assets.” To put that comment in context, he also states that the inflation rate appropriate to higher education grows about 1-percent faster than the consumer price index.

The endowment’s expected rate of return will depend on its investment policy: how much it invests in different asset classes, and the returns of those asset classes. For this essay, we will explicitly analyze generic endowments invested in equity and bond index funds only. But even endowments invested in active management and alternatives will need to build upon expected returns to equities and bonds. Extrapolation to active management then will require expected active returns. Extrapolation to additional asset classes will then require expected returns for those asset classes.

So we need to analyze expected returns for equities and bonds and expected inflation. Let’s start with the relatively easy parts. We will assume bond returns of 4.8 percent, roughly the current Treasury bond yields to maturity. These represent the market’s current assessment of bond returns over a long horizon. And though these change daily, they seem like a reasonable long-term view.

We will also assume inflation of 2.5 percent, also a reasonable long-term view. One important caveat here is our focus on the Consumer Price Index. If the institution faces inflation challenges somewhat distinct from this broad measure—as do institutions of higher learning, social services, and the performing arts—we must adjust for that. We will return to this point later.

So if the endowment were entirely bonds, we could target a spending rate of 2.3 percent while maintaining the purchasing power of the capital.

But what is the expected return to equities? We will analyze this two ways. First, we will use the analysis of Grinold and Kroner (2002), a bottom-up, economically driven analysis. Second, we will use the historical analysis of Garland (2004).

Grinold and Kroner (2002) break
down the expected return to equities into several components:

- income return (dividend yield plus "repurchase yield")
- inflation
- real earnings growth
- repricing (i.e., change in the P/E multiple)

Let’s assume there will be no repricing over the long-run, i.e., that equities currently are fairly priced. Given our long-term view, this assumption makes sense. We could argue about it, and it is the hardest component to pin down. But for the purpose of this essay, we will assume no repricing.

So we need to estimate two components: income return and real earnings growth. The dividend yield is currently about 1.7 percent for U.S. equities. As to the repurchase yield, Liang and Sharpe (1999) estimate this to be about 2 percent for large S&P 500 firms. So we expect the income return to be slightly more than 3.5 percent.

As to real earnings growth, Grinold and Kroner (2002) (and also Warren Buffett) argue that in the long-run, real earnings growth must closely relate to economic growth. They specifically argue that S&P 500 earnings should grow about 0.5-percent faster than the economy as a whole, because the sectoral composition of the S&P 500 is growthier than that of the overall economy (which includes the government sector and the farming sector). They project that the economy can achieve real growth of about 3 percent, and hence earnings can grow at about 3.5 percent.

This analysis argues that an endowment entirely invested in equities could target spending 7 percent. That is aggressive, compared with Garland’s historical analysis. He started with the argument that you shouldn’t be able to spend more than the earnings yield and maintain purchasing power, however you should be able to spend more than the dividend yield. He simulated various spending amounts tied to the dividend yield for the S&P 500 from 1950 to 2003. He showed that spending 130 percent of the dividend yield was the maximum sustainable spending rate over this period.

If we simply combine dividend yield and repurchase yield, the Garland rule estimates that we can sustainably spend 130 percent of 3.5 percent, or roughly 4.5 percent of an endowment entirely invested in equities. (Garland argues that a percent of repurchase yield isn’t equivalent to a percent of dividend yield, but he believes that this is an open issue.)

What does this imply overall about the maximum sustainable target spending rate? It should be somewhere in a range defined by the two approaches described above. Let:

\[ w_e = \text{weight in equities}, \]
\[ w_b = \text{weight in bonds}, \]

and ignore issues about international versus domestic equities, or large-caps versus small-caps. Then the maximum sustainable target (long-term) spending rate is:

\[ 2.3\% (w_e) + 4.5\% (w_e) \leq x \leq 2.3\% (w_b) + 7\% (w_b) \]

An investment policy allocating 65 percent to equities and 35 percent to bonds leads to a maximum spending rate of somewhere between 3.7 percent and 5.4 percent. Note that this is the maximum spending rate, not necessarily the optimal spending rate for a particular endowment.

As mentioned above, we must reduce this target spending rate if the institution faces inflation pressures above those of the broader economy. In fact, an important economic argument is at work here. There are limits to productivity gains in higher education, social services, the performing arts, and any industry dependent upon the services of skilled individuals. The number of actors required for a production of Hamlet has remained constant over the past 400 years. Class sizes cannot grow without limit without impairing educational benefits.

Providing home care for the elderly and infirm requires an individual to visit homes. But pay for workers in these industries must still keep pace with general costs of living. Costs in these industries rise without any associated productivity gains. Baumol and Bowen (1966) first discussed this, proposing that costs in such “inflexible technology” industries will grow at inflation plus productivity growth. Kane (1999) showed that higher education costs per student in fact grew at this proposed rate between 1950 and 1970.

Given the economic arguments of Baumol and Bowen (1966), which impact many organizations that have endowments, and given the example of Swensen (2000) at Yale, most institutional endowments should consider targeting, e.g., inflation plus 1 percent, i.e., lowering the previously estimated maximum spending rate by 1 percent.

Conclusions

Endowment funds provide consultants with some unique investment challenges, especially how to manage a pool of assets to provide stable and sustainable support to the institution. Achieving those goals requires the following:

- An investment policy designed to achieve returns over the long run in excess of the inflation rate faced by the institution
- A spending policy to contribute smoothed payments targeting less than (or equal to) that spread of returns over inflation

Endowments must align investment policy with spending to best meet their financial and organizational goals.

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ranging from 1.5 percent to 2.7 percent led to a three-year post-hiring return. Consultant-supported hiring decisions may be much better job. But they should make confident (based on past returns or other analysis” Goyal said. “They may be haven’t been doing enough cost-benefit analysis” Goyal said. “They may be overreliance that for both retail and institutional investors, “It is clear that overreliance on performance isn’t a good thing. “It’s my feeling they will move from being returns chasers to will become cost-benefit chasers. Perhaps someday, both institutional and retail investors—and their advisors—returns chasing by plan sponsors lies at the core of the problem. And it is driven by the belief that if a manager can produce a slightly higher return rate than the cost of the transaction, these costs could reach as high as 30% of fees. Such a misalignment is a recipe for overconfidence and underperformance. “Share Repurchases and Employee Stock Options,” unpublished manuscript, Board of Governors of the Federal Reserve System, 2007. “The Equity Risk Premium.” BGI Investment Insights 5, no. 3 (July).

References


Goyal’s suggestion for institutional 

Endnotes

1 Some of this discussion of endowments also applies to foundations set up and managed to operate in perpetuity. But many foundations now are established with limited lives. For example, the Bill and Melinda Gates Foundation will spend all its assets within 50 years of the death of the last of its three current trustees, and then cease operations.

2 A technical appendix (available upon request from the author) provides the mathematical analysis behind this and several other results quoted in the paper.

3 Grinold and Kroner (2002) provides a framework and specific estimates valid at that time. Here, I embrace their general and insightful framework, though I’ve updated the numbers to reflect conditions in early 2007. Barclays Global Investors (BGI) reviews and updates these estimates annually, so the estimates included in this article may not match current BGI views.

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