Investment
Management
Division

Sustainable Spending Policies for Endowments and Foundations

- Endowments and foundations have two main, and often competing, objectives:
  - To preserve the real value of assets
  - To expand the value of payouts to their beneficiaries
- In this paper, we analyze the impact of various investment and spending policies on the financial health of tax-exempt organizations
- To illustrate the impact, we use a Monte Carlo simulation model that incorporates moderate return and risk assumptions, consistent with long-term real returns and volatilities

November 2001

Investment Management Research

Goldman Sachs Investment Strategy Group

Euphoria and Concern

The extraordinary performance of the U.S. equity market through the 1980s and 1990s has enabled endowments and foundations to achieve two competing objectives:

- To grow the real (inflation-adjusted) value of assets
- To expand the dollar value of payouts to universities, hospitals, museums and other beneficiaries

While officers of foundations and endowments recognized their good fortune during this period, the recent equity market performance has shown that bull markets do not continue indefinitely. In this context, recall that throughout the 1970s, the annual compound *real* return for the S&P 500 was –1.41%. If one had invested $1,000 in the S&P 500 on January 1, 1970, the real value of that initial investment, with all dividends reinvested, would have declined to $868. Due to the rising interest rate environment during this period, fixed-income fared no better than equity. The compound *real* return for 1-year Treasuries was –0.30% while fixed-income securities with longer maturities fared even worse.

Amplifying the impact of poor markets during the period was the minimum-payout legislation passed in 1969. This legislation mandated that private foundations distribute the greater of 6% of total assets or the totality of investment gains on an annual basis. Failure to adhere to this mandate might have resulted in a severe tax penalty, but adhering to this mandate also had its "penalty." If a tax-exempt investor had maintained a portfolio consisting of 70% stocks and 30% bonds and had distributed the required 6% annually throughout the 1970s, the investor would have experienced a 50% decline in the real value of assets by the end of the decade.[1]

On a positive note, after this harrowing experience, Congress reduced the minimum-required annual payout to 5%. Yet even with 5% spending, trustees are likely to experience a perpetual tension between the need to satisfy immediate income needs of beneficiaries and the desire to meet the long-term goal of preserving the real value of the underlying asset pool (the corpus)—the ultimate source of their spending.

Our Research

In this paper, we analyze the impact of various investment and spending policies on the financial health of tax-exempt organizations. We take neither an excessively pessimistic nor an unduly optimistic view of future market performance. Instead, we utilize a simulation model that incorporates moderate return and risk assumptions consistent with long-term real returns and volatilities.

Key Findings

Our findings lead to a cautious summation on spending: it is easier to make incremental grants when the markets are exceptionally strong than it is to decrease funding when the markets are weak. Our simulation of "normal" market conditions shows that even with 5% spending, there is likely to be considerable difficulty in balancing the competing objectives of growing—or at least preserving—the real value of the corpus and maintaining a stable, predictable level of spending. If corpus preservation is a priority, foundations should stay as close to 5% spending as possible, including management costs. For endowments, we suggest educating their constituencies regarding the long-term benefits of controlled spending at rates *well below* 5%.

[1] If the same 70% equity/30% fixed income allocation had been maintained and no withdrawals had been made, the real value of the assets would have declined by about 8.12% over the 1970s.

Please see page 15 for regulatory disclosures.

Our key findings are as follows:

- Over the long-term, for an institution with a fixed payout policy, we believe a portfolio comprised of 70% equity/30% fixed income has more upside potential and is less likely to lead to a decline in the real corpus value than a portfolio with a large fixed income component.[2]
- In the short term, high fixed-income allocations result in less downside risk than high equity allocations.
- With a 5% annual payout policy and a 50% equity/50% fixed income allocation, there is a greater than 34% probability that, over a 10-year investment horizon, the real value of the corpus will decline by more than 10%. Even with 70% equity/30% fixed income, there remains at least a 29% probability of a 10% corpus decline.
- If the payout is 6% of assets annually, the likelihood of a long-term real corpus decline increases dramatically. In contrast, maintaining the annual payout at 3% to 4% gives reasonable assurance that the corpus can be preserved over time.

A Comparison of Endowment and Foundation Spending

In this paper, we focus on foundations and endowments whose goal is to exist in perpetuity. We do not address the distribution and investment strategies appropriate to foundations that make grants at an accelerated rate with the intent of distributing all funds over some pre-determined time period.

Foundations are non-profit organizations, typically created by an initial gift from an individual or family. The purpose is to make grants and operate programs that are consistent with the wishes of the donor. While additional contributions to the core assets are possible, new contributions are rarely made after the initial grant (or planned schedule of grants). Growth in the asset base can typically only be achieved by attaining a real return on investments that exceeds the distribution rate. In general, regardless of a foundation's long-term goals, at least 5% of assets (based on some average level of assets) must be distributed annually in order to avert a potential IRS audit and a substantial tax penalty.

Like foundations, endowments are tax-exempt entities that make regular distributions to beneficiaries. Endowments typically are established as permanent funds for the support of institutions such as private high schools, colleges, universities, museums and other cultural institutions. Funds for endowments are generally raised through appeals to alumni and other interested individuals and corporations. Consequently, endowments may have continuing access to financial support through regular fundraising programs. Endowments typically distribute between 4% and 6% of assets annually for institutional operational costs and capital expenditures. There are no tax penalties for a failure to make a minimum distribution, but structural constraints make it difficult for endowments to reduce payouts. Poor market conditions only compound institutional pressures. For example, in a weak market environment, educational costs and the demand for funds are likely to increase, and the immediate need to increase distributions from the endowment may override long-term considerations. A likely consequence of high distributions in weak markets is that the real

[2] Fixed income assets, including TIPS (Treasury Inflation Protected Securities) are unlikely to provide the 5% real return that would be required to sustain 5% spending and preserve the real value of the corpus.

value of endowment assets will decline unless contributions increase. But weak markets are likely to affect contributors directly and immediately, with the consequence that their ability and willingness to make new contributions may wane at precisely the time that the need for new funds accelerates.

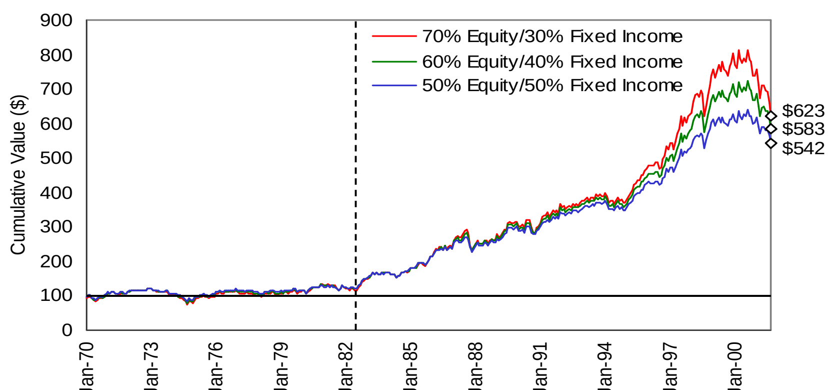
Historical Analysis

To better understand the impact of spending on portfolio growth, we begin with the historical record. We compare three mixes of equity and fixed income (70% equity/30% fixed income, 60% equity/40% fixed income and 50% equity/50% fixed income), which are assumed to be rebalanced monthly. We investigate the impact of 5% spending on the growth of each of the aforementioned allocations. As a yardstick for performance, we use the S&P 500 for U.S. equity and the Lehman Aggregate for U.S. fixed income. For all three allocations, the starting value as of 1/1/1970 is assumed to be $100. At the beginning of each year, the spending budget for the year ahead is assumed to be 5% of current assets. The resulting budgeted amount is divided into twelve equal portions, which will be paid out at the beginning of each month. For example, the spending budget for the year 1970 would have been 5% of $100 or $5, paid out in twelve equal distributions of $0.42.

Growth of Assets with 5% Annual Spending

Figure 1 illustrates the growth of assets under this spending policy. The graph shows that the time span from 1970 to 2001 can be separated into two sub-periods. Over the first twelve years (1970 to 1982) there was little growth. After 1982, strong markets led to substantial asset appreciation. Comparison of the performance of the three allocations shows that the proportion of equity did not significantly affect portfolio growth before about 1986. In the weak markets of the 1970s, equities barely outpaced fixed income. In the early 1980s, falling interest rates (interest rates dropped approximately 900 basis points over the span of a few years) led to equity-like returns for bond portfolios. After rates stabilized in the mid-eighties, equities finally realized their expected outperformance relative to fixed income.

Figure 1. Cumulative Nominal Growth of Equity/Fixed Income Portfolios with 5% Annual Spending (January 1970 to September 2001)



Data Source: Ibbotson Associates

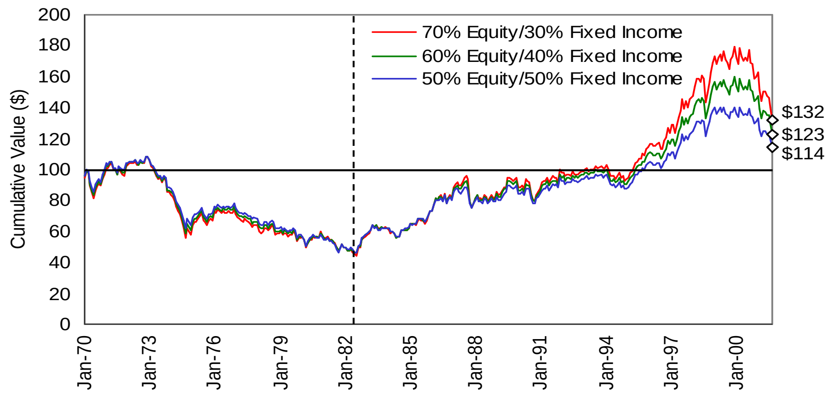
Please see page 15 for regulatory disclosures.

Adjusting Asset Values for Inflation

Figure 1 would seem to support the argument that annual spending of 5% is prudent. In the bear market of the 1970s, it provided stable assets, while in the ensuing bull market it led to massive corpus growth. However, when comparing asset values over long periods of time, we must take loss of purchasing power into account.

In Figure 2, the allocations and spending are the same as in Figure 1, but the dollar values are shown in *real* terms (that is, adjusted for inflation based on the Consumer Price Index). The difference between the two figures is striking. Figure 1 suggests that assets were stable in the 1970s, but Figure 2 shows a loss of purchasing power in excess of 50%. Even worse, it took about twenty years to recover the initial level of assets. Higher equity allocations led to quicker recovery because these allocations realized more of the benefits of the strong equity market of the 1990s.[3]

Figure 2. Cumulative Real Growth of Equity/Fixed Income Portfolios with 5% Annual Spending (January 1970 to September 2001)



Data Source: Ibbotson Associates

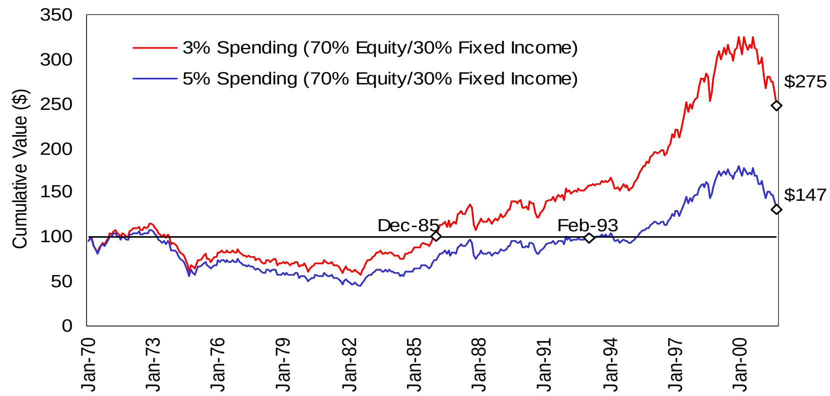
The Influence of Spending Reductions

We now turn our attention to the influence that a 3% spending rate would have had on corpus decline and recovery, assuming a 70% equity/30% fixed income allocation. In a given year, small changes in spending are likely to be dwarfed by the level of asset returns, but these small differences accumulate over time. Figure 3 shows that a 2% reduction in spending (from 5% to 3%) would have resulted in almost twice the (real) ending assets ($275 vs. $147).

[3] Some investors observe similarities between today's markets and the markets of the mid-to-late-sixties. If we had used January 1966 as the starting date in Figures 1 and 2, the performance of a 70% equity/30% fixed income portfolio with 5% spending would have been even worse than already illustrated. If spending had been 6%, the corpus still would not have returned to its original real value (as of September 2001).

Please see page 15 for regulatory disclosures.

Figure 3. Cumulative Real Asset Growth Under Two Spending Rates (3% and 5%) (January 1970 to September 2001)



Data Source: Ibbotson Associates

Spending Rates and Time to Recovery

Under 3% spending, we observe that recovery (when assets return to the initial real value) improved by more than seven years, in comparison to the recovery time under 5% spending (Figure 4). In contrast, 6% spending (vs. 5%) would have resulted in a further four-year delay in recovery.

Figure 4 sounds a note of caution—spending in excess of 5% annually may result in significant long-term harm to the real value of the corpus.[4] In this case, while the impact of reduced spending is dramatic, we recognize that "real-world" constraints are likely to limit spending adjustments. The IRS mandates 5% spending for foundations, and endowments may face overwhelming constituent pressure to maintain high spending levels.

Figure 4. Recovery Dates Under Varying Spending Rates for Portfolios with 70% Equity/30% Fixed Income

Annual Spending Rate	Month When Real Corpus Value Returned to January 1970 Level
3%	December 1985
4%	August 1986
5%	February 1993
6%	May 1997

Data Source: Ibbotson Associates

Simulation Analysis

To fully understand the influence of spending on endowments and foundations, we construct a simulation model around a set of "moderate" forward-looking assumptions, and we focus on a five- to twenty-year investment horizon.

4 While the observations above convey a powerful message, we recognize that the analysis suffers the shortcoming of representing only one country and one time period. For example, if we had undertaken the same analysis from a Japanese perspective, we would have found that the collapse of the equity market at the end of 1989, the lack of a subsequent recovery, and a deflationary environment tended to strongly favor fixed income over equity.

Long-Term Assumptions

The characteristics for U.S. equity and U.S. fixed income are reflective of the long-term assumptions that we are currently using for strategic asset allocation at Goldman Sachs. To arrive at these assumptions, we estimate volatilities and correlations from historical index data going back to 1973 for asset classes with sufficient history. For shorter data series, we use an approach described by Stambaugh to "back-fill" missing data.[5] We base the hypothetical mean asset returns on the Black-Litterman market equilibrium model.[6] For inflation, the hypothetical mean of 2.50% coincides with consensus forecasts.

The assumptions summarized in Figure 5 are driving forces in the subsequent analysis. If we assume lower mean returns and higher volatility, there will be a greater likelihood of corpus erosion. Likewise, higher return and lower volatility estimates will result in a more stable corpus.

Figure 5. Hypothetical Long-Term Market Assumptions[7]

	Hypothetical Mean Real Return	Hypothetical Mean Nominal Return	Nominal Volatility
U.S. Inflation	n/a	2.50%	1.00%
U.S. Fixed Income	3.10%	5.68%	4.90%
U.S. Equity	7.80%	10.50%	14.89%

For illustrative purposes only.

A Comparison Between Simulated and Historical Data

We utilize the assumptions of Figure 5 in a Monte Carlo simulation model in order to analyze the multi-year impact of asset allocation and various payout rules on the core assets of a tax-exempt institution.[8] Part of our motivation for using simulation is that, with historical data, we are limited to only one time path of asset returns. Thus, to assess possible risks, we must focus on specific sub-periods of poor performance (such as the 1970s in the example discussed earlier) and attempt to draw our conclusions from those periods. This historical focus raises the concern that the periods under consideration may have been rather unique and that there are likely to be hidden risks not reflected in history. Under the simulation approach, we consider 5,000 time paths and study an array of possible outcomes. The Monte Carlo approach also helps us to see how portfolio values evolve over time and how much variation occurs during the course of that evolution.

5 Stambaugh, R. F., "Analyzing Investments Whose Histories Differ in Length," Journal of Financial Economics, 1997, pp. 45, 285-331.

6 Black, Fischer and Litterman, Robert, "Global Portfolio Optimization," Financial Analysts Journal, September-October 1992, pp. 28-43.

7 The correlation between U.S. inflation and U.S. fixed income is assumed to be –0.12, between U.S. inflation and U.S. equity –0.15, and between U.S. fixed income and U.S. equity 0.33. There can be no assurance that the hypothetical long term market assumptions set forth above will be achieved. Such assumptions are typically subject to high levels of uncertainty regarding future economic and market factors that may affect future performance. Accordingly, these assumptions should be viewed as representing a broad range of possible returns. Such assumptions should not be construed as providing any assurance or guarantee as to returns that may be realized in the future from investments in any asset or asset class described herein. Please note that these hypothetical long term market assumptions are estimates only and are subject to significant revision.

8 In our model, interest rates and returns are driven by four factors: inflation, real rates, residual nominal rates, and independent equity effects. Annual returns are assumed to evolve conditionally lognormal, while interest rates and inflation are subject to mean reversion

Simulation Results

Figure 6 summarizes the simulated performance, over a five-year period, of a 70% equity/30% fixed income portfolio, with 5% annual spending.[9] Terminal portfolio values are expressed in constant (inflation-adjusted) dollars, as a percent of the initial value. For each of the 5,000 simulated return paths, we obtain a terminal wealth value. The resulting set of values is grouped into twelve "buckets," with each bucket incorporating a span of 25 percentage points. For example, 1,712 of the simulated terminal values fall between 75% and 100% of the initial asset level.

Final portfolio values greater than 100 reflect growth in the real value of the corpus. Terminal values below 100 represent an erosion of the corpus. The total number of outcomes falling below 100 is 2,143 (11+420+1,712). Therefore, the probability of falling below the starting value over a five-year period is 42.9% (=2,143/5,000).

Figure 6. Distribution of Real Terminal Asset Values after Five Years (70% Equity/30% Fixed Income; 5% Annual Payout; 5,000 Iterations)

% of Initial Inflation-Adjusted Wealth after 5 Years		# of Observations
Corpus Erosion	0-25%	0
	25-50	11
	50-75	420
	75-100	1,712
Corpus Growth	100-125	1,791
	125-150	771
	150-175	221
	175-200	59
	200-225	12
	225-250	3
	250-275	0
	275-300	0
		Total 5,000

Simulated performance results do not reflect actual trading and have certain inherent limitations. Please see Regulatory Disclosures for additional information.

Distribution of Wealth Over Various Time Horizons

Figure 7 displays the information in Figure 6 as a frequency distribution. The "buckets" (intervals) used in this graph are narrower than in the table above (5 units vs. 25 units) in order to provide a more detailed illustration. The height of each bar represents the number of observations falling into the respective bucket. Outcomes that fall to the right of the solid vertical line represent corpus growth; outcomes to the left reflect corpus erosion.

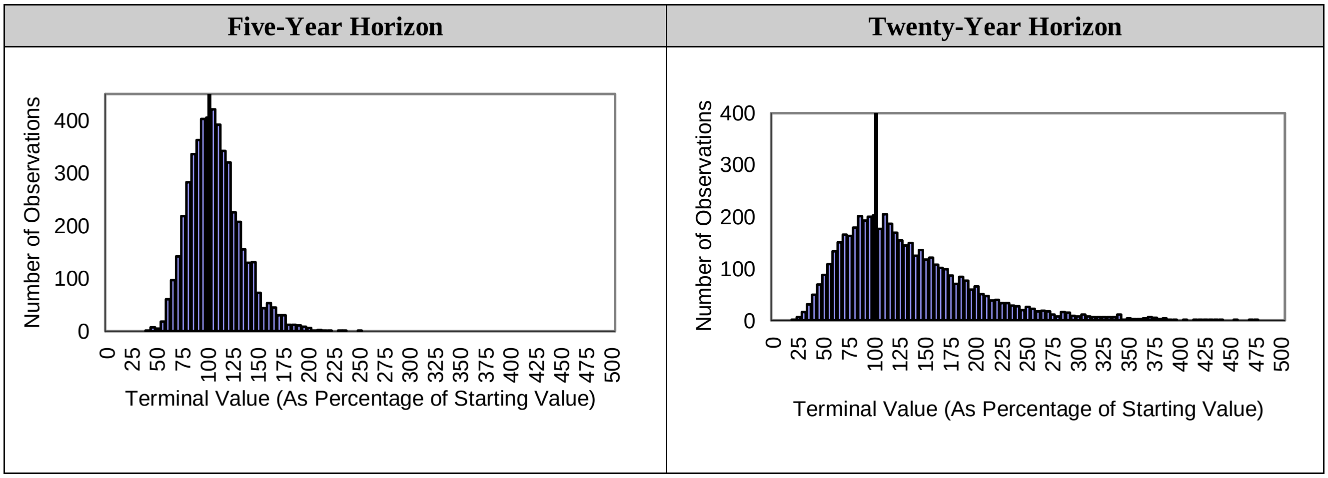
(15% per year). Also, we note that there are alternative approaches to simulation. For example, we could have employed "bootstrapping," where returns are sampled from the actual historical return distribution. While such an approach is potentially superior in capturing outliers in the data, it fails to incorporate autocorrelation effects.

Please see page 15 for regulatory disclosures and disclosure concerning hypothetical mean return.

9 We use 70% equity/30% fixed income as an example of the allocation policy of more aggressive institutions. For simplicity, we base our spending on the year-end asset value. We have also performed the simulation analysis in the case where spending is based on the average value of assets over a multi-year period. The results vary only modestly from those displayed in Figure 6.

Please see page 15 for regulatory disclosures.

Figure 7. Distribution of Real Terminal Asset Values after Five and Twenty Years (70% Equity/30% Fixed Income; 5% Annual Payout; 5,000 Iterations)



Simulated performance results do not reflect actual trading and have certain inherent limitations. Please see Regulatory Disclosures for additional information.

The Likelihood of Real Corpus Declines

Over time (comparing the five-year and twenty-year distributions), the range of values above 100 increases, illustrating the possibility of truly extraordinary performance. However, many of the simulation outcomes show terminal values well below 100, reflecting a 25% to 50% asset erosion. In fact, the likelihood of a decline in the corpus over all periods is similar (Figure 8). Over five years, 43% of the simulated terminal values fall below 100; over 20 years, 37% of the terminal values are below 100.

Figure 8. Probability of a Loss in Real Asset Value over Different Time Horizons (70% Equity/30% Fixed Income; 5% Annual Payout; 5,000 Iterations)

Time Horizon	**5 Years**	**10 Years**	**20 Years**
Probability of Real Asset Decline	43%	41%	37%

The Tension Between Risk and Return

The results of the likelihood of a real asset decline presented in Figures 6, 7, and 8 are sobering. To put these results in perspective, we realize that to spend 5% of assets and preserve the corpus, you must achieve a real return in excess of 5%. Because the real return for bonds (including TIPS) is likely to be well below the required 5%, investors who wish to preserve the real corpus will have to maintain a substantial allocation to equity. Thus, each incremental "reach for return" will trigger an increase in risk, and we must question how much volatility is acceptable. Figure 9 reflects terminal portfolio values over a 5-year, 10-year and 20-year investment horizon for three different asset allocation policies: 70% equity/30% fixed income, 50% equity/50% fixed income and 30% equity/70% fixed income.

Please see page 15 for regulatory disclosures.

Figure 9. Multi-Year Simulation Results (Selected Equity/Fixed Income Allocations; 5% Annual Spending)

Table values represent terminal portfolio values as % of initial assets (inflation-adjusted)

	5-Year Horizon			10-Year Horizon			20-Year Horizon		
	70% EQ/ 30% FI	50% EQ/ 50% FI	30% EQ/ 70% FI	70% EQ/ 30% FI	50% EQ/ 50% FI	30% EQ/ 70% FI	70% EQ/ 30% FI	50% EQ/ 50% FI	30% EQ/ 70% FI
Hypothetical Mean	106.9	102.1	97.5	114.4	104.4	95.2	130.8	109.3	91.2
Hypothetical Median	104.2	100.7	96.9	108.4	101.0	93.6	116.7	101.3	87.4
Volatility	25.9	19.5	14.3	39.7	28.7	20.4	65.6	43.9	29.8

EQ: Equity, FI: Fixed Income

Simulated performance results do not reflect actual trading and have certain inherent limitations. Please see Regulatory Disclosures for additional information.

Skewed Distributions

The mean terminal value is obtained by averaging the 5,000 end-of-period asset values. The range of possible outcomes above the starting value of 100 is theoretically unlimited, but the minimum asset value is zero (assuming unleveraged assets). This asymmetry accounts for the skewed appearance of the frequency plot (Figure 7). In the calculation of the mean, "high" outliers (which for a 20-year horizon might exceed 500% of the initial value) carry more weight in the calculation of the mean than "low" outliers. The possibility of unlimited upside leads to an "upward bias" for the mean.

In the presence of such "skewness," the likelihood of falling below the mean is greater than 50%. To better understand the distribution of outcomes, we therefore also consider the median, which represents the mid-point of the distribution: 50% of the outcomes fall below the median, 50% above.

A Comparison of Conservative and Aggressive Allocations

For a 70% equity/30% fixed income portfolio and a 20-year time horizon, the difference between the mean and median terminal values (as a percentage of the initial value) may be quite sizeable (131% vs. 117%). From an asset allocation perspective, both the mean and the median tell a similar story. Unless the allocation to equity is substantial (in excess of 50%), there is likely to be a decline in real asset value. While the benefits of higher equity allocations are higher mean/median asset values, the cost is greater corpus risk (volatility). With a conservative (low equity) allocation, a loss in corpus value is likely, and there is limited asset growth potential. In contrast, for a more aggressive allocation, asset growth is likely, but the resulting higher volatility leads to a much wider range of (positive and negative) outcomes. In the next section, we offer a more detailed look at the probability of loss that is associated with the various investment alternatives.

Returns on "Safe" Assets

A fundamental difficulty in establishing an appropriate asset allocation for endowments and foundations results from the absence of "safe" assets that can support required spending. When there is no spending, an extremely risk-averse investor could allocate most of the assets to fixed income instruments and thus, obtain a fairly safe portfolio in terms of volatility—albeit at the price of lower returns.

Treasury Inflation Protected Securities

Under 5% spending, a "safe" asset would have to provide a riskless 5% real return. In 1999, the U.S. Treasury created a new asset class that provides real returns, TIPS ("Treasury Inflation Protected Securities"). Their current real yield is about 3% (as of 11/01/01). While this suggests that endowments with spending targets below 3% might be insured against loss by investing in TIPS, under 5% spending, a 100% TIPS portfolio would almost certainly lead to an erosion of assets.

Effects of Higher Equity Allocations

If there is no asset that reliably provides real returns exceeding the spending rate, returns must be enhanced through allocations to more risky investments (equity). Paradoxically, that implies that, in order to be "safe" in terms of corpus erosion, one has to accept more volatility. Figure 9 suggests that under our long-term assumptions, allocations containing about 70% equity lead to a better than 50% probability that the real corpus value will grow. Increasing the allocation to equities beyond 70% could further enhance corpus growth (at the median level), but each incremental increase in equity leads to the possibility of more extreme downside events.

Maintaining the Real Corpus Value

Our previous results on the corpus risk inherent in 5% spending indicate that a higher 6% spending policy may be fraught with danger. While more restrained 4% spending might be more prudent, we recognize that such reductions are impractical for foundations because of the tax penalty. In any case, if the goal is to maintain the real corpus value over time, we believe that spending in excess of 5% is ill-advised.[10]

Typically, endowments will have more latitude in making spending adjustments than foundations. Endowments with long-standing distribution policies closer to 5% will be constrained in spending by practical rather than legal limitations.

Downside Risk

To illustrate the interplay between asset allocation, spending and corpus risk, we focus on the probability of falling below a given "pain" threshold. We assume that any corpus loss exceeding 10% of initial assets (in real terms) would probably give rise to major concern, and we set this value as our yardstick for downside risk.

[10] Conflicting views exist regarding the importance and desirability of maintaining the corpus. Our commentary and observations should be viewed from the perspective that corpus preservation is an important goal. A range of arguments for corpus preservation are presented in "There's a place for a permanent foundation," by John E. Craig, Jr., in Foundation News and Commentary, May/June 1999.

In Figure 10, we view the impact various investment and spending policies may have on the probability that terminal assets fall below 90% of initial assets.[11]

Figure 10. Probability of a 10% Decline in Real Assets (Selected Equity/Fixed Income Allocations; Selected Withdrawal Rates)

	5-Year Horizon			10-Year Horizon			20-Year Horizon		
	70% EQ/ 30% Fl	50% EQ/ 50% Fl	30% EQ/ 70% Fl	70% EQ/ 30% Fl	50% EQ/ 50% Fl	30% EQ/ 70% FI	70% EQ/ 30% Fl	50% EQ/ 50% Fl	30% EQ/ 70% Fl
3%Spending	15.2%	13.1%	12.3%	12.6%	12.0%	12.7%	9.3%	9.9%	13.0%
4% Spending	20.6	20.1	20.2	19.6	20.8	25.4	17.5	20.3	29.1
5% Spending	27.2	27.6	30.5	29.2	33.9	43.7	29.2	37.2	54.5
6% Spending	34.1	37.1	43.4	40.6	48.2	62.1	45.0	57.8	77.0

EQ: Equity, FI: Fixed Income

Simulated performance results do not reflect actual trading and have certain inherent limitations. Please see Regulatory Disclosures for additional information.

Balancing Spending Policy, Investment Horizon, and Equity Allocation

Figure 10 suggests that under 3% spending and a 5-year horizon, the proportion of equity may have little impact on the probability of loss. With low spending and short time horizons, the increased return potential of equity appears to just counterbalance the increased volatility. Longer time horizons, however, favor higher equity allocations. The simulation shows that, over 20 years of 3% spending, the probability of a 10% corpus loss with 70% equity is about 3.7% less than that for 30% equity (9.3% versus 13%). A portfolio containing higher allocations to fixed income may be less volatile, but over time the sponsor will be weighed down by the need to spend more than the real fixed income return.

At higher spending rates, the downside risk becomes increasingly pronounced. For a 20-year investment horizon and 6% spending, the probability of at least a 10% asset decline is 45% with 70% equity, versus 77% with 30% equity. Although 45% probability is better than 70% probability, either probability is likely to be unacceptable. To better understand the factors that lead to these extreme probabilities, we calculate the hypothetical mean real returns for the two portfolios under the assumptions of Figure 5. The real return for the 70% equity/30% fixed income allocation is 6.39%, barely surpassing the spending threshold of 6.00%. In contrast, the more conservative 30% equity/70% fixed-income allocation has a mean real return of 4.51%. Given "mean" performance, the corpus would, on average, be losing about 1.49% per year, making it almost certain that assets will be depleted over time.

[11] We recognize that downside probability is an incomplete measure of risk because it fails to provide any indication of how bad the shortfall will be when it occurs. Downside probability should be viewed as a diagnostic tool and should not be used as the sole criterion of portfolio selection. Like mean returns, downside probabilities are highly impacted by changes in market conditions and, over time, tend to fluctuate widely. Therefore, despite their intuitive appeal, downside probabilities are difficult to estimate directly from historical data. For a more fully developed theory on shortfall analysis, see "Asset Pricing in a Generalized Mean-Lower Partial Moment Framework: Theory and Evidence," W.V. Harlow and R. Rao, in Journal of Financial and Quantitative Analysis, September 1989; and "Capital Market Equilibrium in Mean, Lower Partial Moment Framework," V. Bawa and E.B. Lindenberg, Journal of Financial Economics, November 1977.

Please see page 15 for regulatory disclosures.

The Advantages of Substantial Equity Exposure

We now turn to the 5% spending rate. In this case, a 70% equity/30% fixed income allocation bears a 29% probability of a 10% asset decline over 20 years. The risk of asset decline grows as the bond allocation increases, underscoring the importance of maintaining substantial equity exposure. As a consequence, foundations are compelled to reach for higher returning assets. Because such assets typically bear more risk, a never-ending cycle of tension exists between achieving the desired return and bearing the concomitant risk.

Controlled Spending and Corpus Preservation

If a foundation places great importance on corpus preservation, spending control is critical. Because management costs can be included in the 5% spending rate, foundations can effectively lower spending by insuring that they take advantage of this inclusion. To the extent possible, endowments should attempt to educate their beneficiaries to the long-term benefits of controlled spending. Ideally, spending between 3% and 4% annually will help to preserve their ability to support their sponsoring institutions in both good and bad times.

The Challenge of Achieving Real Returns in Excess of Withdrawal Rate

The above results implicitly indicate that, to maintain the stability of the corpus while continuing to distribute a fixed percentage of assets, investors should develop a policy asset-allocation for which the hypothetical real mean return substantially exceeds the withdrawal rate. This extra cushion is needed to offset portfolio volatility. (In the absence of volatility, it would suffice for real portfolio returns to match the withdrawal rate.) As a potential "rule of thumb," we suggest targeting a real return that is at least 150 to 200 basis points higher than the withdrawal rates. At a 5% withdrawal rate, this implies a mean return in excess of 6.5%. Such long-term real returns are difficult to obtain and require substantial allocations to equity-like investments. Consequently, many institutions look to alternative investments such as hedge funds and private equity in order to achieve those higher returns. Because such investments also may bear substantial risk, investors should create well-diversified investment portfolios to help mitigate the risk. In any case, creating an investment policy that can sustain 5% spending represents an extraordinary challenge to officers and trustees of tax-exempt institutions.

Alternative Payout Strategies for Endowments

The results of the previous sections underscore the difficulty in maintaining a 5% payout policy under market assumptions that are consistent with our hypothetical long-term real returns and volatilities. To gain additional perspective on this difficulty, we view the endowment as having three constituencies—current recipients, future recipients and donors. For current recipients, stability of support is generally extremely important. In practice, institutions use variants of constant percentage spending (where a given year's payout is determined as, say, 5% of last year's ending assets) to provide more stable distributions.[12]

[12] A description of these policies can be found in the "NACUBO Endowment Study," an annual publication by the National Association of College and University Business Officers.

Please see page 15 for regulatory disclosures.

For example, the level of each year's payout may be based on 5% of average assets over the prior three years, rather than solely on last year's. This averaging process leads to a smoother spending pattern — in up-markets spending is lower than it would be under the simple constant policy, and in down-markets it is higher. But, even with "averaging," extended bear markets can drag down the underlying assets so far that a marked drop in the dollar distribution results. Consequently, some institutions explicitly set limits on the extent of year-to-year declines in dollar spending. Other institutions may simply require either constant nominal spending or constant real spending.

While the various recipient-protection policies appear quite different, they all engender similar long-term corpus risk. In fact, over the long run, our simulations show very little difference in the resulting distribution of real asset values. Thus, "smoothing" has the desirable result of protecting current recipients without penalizing future recipients to any greater extent than the straight 5% policy.

The Effects of Spending Policy on Current and Future Recipients

The cost of all strategies that strive to protect current recipients is higher corpus volatility and greater exposure of the corpus to downside risk. With 5% spending and its variants, extended periods of weak markets and high inflation (such as the 1970s) ultimately are likely to result in a substantial decline in dollars of spending because of corpus erosion. In effect, spending policies that favor current recipients are allowing future recipients to bear the brunt of poor markets. Institutions may also take the optimistic position that corpus erosion ultimately can be remedied by capital campaigns that focus on alumni and other important contributors.

Endowments that seek a different balance between the needs of current and future recipients may be inclined to focus on the need to preserve the corpus. This balance is more likely to be accomplished by somewhat more stringent limitations on current spending.

Summary and Conclusions

The high equity market returns of the 1980s and 1990s have enabled many endowments and foundations to support annual payouts of 5% to 6% and to increase the real value of the asset base. However, as recent equity market performance has shown, bull markets do not continue indefinitely. Going forward, institutions might have to lower their return expectations. In fact, our simulation shows, even annual payouts as low as 4% of assets may entail a substantial risk of depleting the (real) corpus.

The analysis in this paper indicates that tax-exempt institutions, such as endowments and foundations, that adopt forward-looking assumptions similar to ours must be prepared to address the issue of a serious corpus shortfall. As a possible protection against excessive corpus erosion, endowment trustees might consider adopting somewhat more flexible spending policies that adjust payouts to prevailing market conditions. For foundations, our results surely caution against any spending increase beyond the five-percent minimum distribution requirement.

Regulatory Disclosures

The opinions expressed herein are those of the author and not necessarily those of Goldman Sachs Investment Management Division. The investments and returns discussed herein do not represent any Goldman Sachs fund, separate account or product.

Past performance is not indicative of future results, which may vary.

No action is solicited based upon this material. This material is exclusively for the general information of investment management and advisory clients of Goldman Sachs. This material is for your private information. The contents of this paper are not intended to be a formal research report. This paper is not to be construed as an offer to sell or the solicitation of an offer to buy any security. The material contained herein is based upon information that we consider reliable, but we do not represent that it is accurate or complete, and it should not be relied upon as such. Opinions expressed are current opinions as of the date appearing in this material only. While we endeavor to update on a reasonable basis the information discussed in this material, there may be regulatory, compliance or other reasons that prevent us from doing so. No part of this material may be i) copied, photocopied or duplicated in any form, by any means, or ii) redistributed without Goldman Sachs Investment Management Division's prior written consent.

Goldman Sachs does not provide tax advice to its clients. All investors are strongly urged to consult with their tax advisors regarding any potential investment.

Indices are unmanaged, and the figures for the index do not reflect any fees or expenses. We strongly recommend that these factors be taken into consideration before an investment decision is made. Investors cannot invest directly in indices.

The hypothetical mean returns are based on historical data adjusted to reflect judgments of long-term risk premia. These adjustments and the ensuing hypothetical rates of return are arbitrary and future rates of return and distributions of rates of return may vary significantly from those presented herein. These hypothetical returns are used for discussion purposes only and are not intended to represent, and should not be construed to represent, predictions of future rates of return.

In the event any of the assumptions used in this presentation do not prove to be true, results are likely to vary substantially from the examples shown herein. These examples are for illustrative purposes only and do not purport to show actual results.

Simulated performance results have certain inherent limitations. Such results are hypothetical and do not represent actual trading, and thus may not reflect material economic and market factors, such as liquidity constraints, that may have had an impact on the Adviser's actual decision-making. Simulated results are also achieved through the retroactive application of a model designed with the benefit of hindsight. The results shown reflect the reinvestment of dividends and other earnings, but do not reflect advisory fees, transaction costs and other expenses a client would have paid, which would reduce return. No representation is made that a client will achieve results similar to those shown.

The following table provides a simplified example of the effect of management fees on portfolio returns. For example, assume a portfolio has a steady investment return, gross of fees, of 0.5% per month and total management fees of 0.0833% per month (or 1.0% per year) of the market value of the portfolio on the last day of the month. Management fees are deducted from the market value of the portfolio on that day. There are no cash flows during the period. The table shows that, assuming that other factors such as investment return and fees remain constant, the difference increases due to the compounding effect over time. Of course, the magnitude of the difference between gross-of-fee and net-of-fee returns will depend on a variety of factors, and the example is purposely simplified.

Period	Gross Return	Net Return	Differential
1 year	6.17%	5.12%	1.05%
2 years	12.72	10.49	2.22%
10 years	81.94	64.70	17.24%