by Commonfund

redefining the risk waterfall

An asset/liability approach to endowment risk management

Mission-based organizations may get a more complete grasp on risk and its implications by approaching risk from the perspective of asset/liability management and by structuring their risk management activities around specific time frames.

Risk can be defined as the "possibility of loss or injury."[1] The financial profession —borrowing from Modern Portfolio Theory—uses the standard deviation of a portfolio's returns to quantify potential loss. But a definition that focuses solely on the assets in a portfolio and equates risk with volatility of those assets ignores liabilities that need to be funded and suffers from being too narrow to be truly useful for mission-based investors. For those investors and their organizations, risk is better defined as the possibility of failing to fund liabilities incurred in fulfilling their long-term mission.

Focusing on the volatility of assets is insufficient for two primary reasons. First, volatility is a price concept that focuses on market risk[2] while ignoring the many other types of risks organizations face. While many investors default to thinking of market risk as the most likely cause of such a failure, many other sources of risk —such as liquidity risk, operational risk in the processing of investment transactions, custody risk in the safekeeping of securities, legal and regulatory risk, and outright fraud—also have the potential to impair an organization's mission.

Second, the asset focus ignores the obligations or liabilities that mission-based organizations have taken on and are trying to meet to further their mission. For a nonprofit mission-driven organization, risk may be best defined in a more strategic sense as the possibility of a failure to meet the organization's implicit or explicit commitments to its beneficiaries arising from its inability to deliver sufficient cash flow to meet dynamic near-term liabilities while earning a long-term return in excess of inflation. Asset/liability management, widely used in the pension and banking industries, is an effective form of risk management that endeavors to mitigate or hedge the risk of failing to meet institutional obligations. It warrants greater consideration as a way to manage the risks of mission-based organizations.

Hitting a moving target: asset/liability hedging

From the perspective of an asset/liability management problem, the endowment exists not for absolute return maximization but to fund future liabilities. In the traditional endowment model, the spending rule dictates the funding obligation of the endowment based on historical endowment asset values and, therefore, returns. The institution is expected to adjust its strategy and spending as a function of the endowment's return. The reality is, however, that an institution's dependency on the endowment for funding may increase in negative economic environments just when endowment returns may be declining. To address this reality, perhaps the endowment's risk-taking should be constrained to ensure it can provide essential funding to the institution rather than force the institution to change strategy in a downturn.

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1 Merriam-Webster's Collegiate Dictionary, 11th Edition, 2003
2 Volatility is also overly dependent upon statistical models that, while useful, make assumptions that the future will be much like the past. Historical volatility measures alone fail to explain or anticipate abnormal markets—the very situations in which the risk of principal loss may be greatest.

institution's overall strategy. It is an oversimplification to state that the endowment is unconstrained in its investment options because the institution's spending rule effectively passes the risk of volatility and drawdowns to the institution's budget and operations. If dramatic and painful reductions in contributions from the endowment to the budget can be avoided without significantly impacting long-term returns, shouldn't decision-makers avoid them?

An examination of the financial and strategic dependency of the institution on the endowment can identify additional constraints that should be considered in setting investment policy. Financial dependencies may be revealed from an examination of the behavior of donations, capital spending, government funding, tuition income, endowment returns and debt issuance costs in scenarios characterized by high growth, low growth, high inflation and low inflation. Strategic constraints can be identified by looking at the assumptions in expected endowment returns and expected endowment income in the strategic plan of the institution. Furthermore, looking at the achievability of the strategic plan in adverse economic scenarios can identify not only the institution's expected needs but its worst case needs for income from the endowment. An example of an adverse economic scenario would be low economic growth, which can highlight the benefit of lower equity factor weights in the endowment portfolio. Such a portfolio, for example, would likely not have as large a drawdown and be better able to meet an increased need to fund the institution when it is most necessary.

Understanding the potential correlation of the assets in the endowment to the known and potential liabilities of the institution is important in determining an asset allocation that is most likely to support the institution or mission in a downturn. As an institution's needs change over time, refreshing this understanding and adjusting the asset allocation accordingly should be embedded in the periodic risk management activities of the institution.

Risk management activities by time frame

Prioritizing the risk management activities of an institution according to time frames can be efficient. To better visualize these risks and time frames, it is helpful to look at the "risk waterfall" shown in the diagram that accompanies this article (see page 12). The time horizon ranges from a decade—for evaluating asset/liability relationships, making decisions on asset allocation, spending and gifts policy—to monthly—for monitoring the current portfolio's alignment to policy.

One financial imperative for an endowed nonprofit organization is to maintain intergenerational equity or purchasing power, as measured by achieving a long-term return, after spending, that at least equals inflation and investment management expenses. More concretely, the portfolio must earn sufficient long-term investment returns to support the institution's long-term mission. A second and increasingly important financial imperative is for the endowment portfolio to be able to meet its funding obligations to the institution as described in the strategic plan on an annual basis (rather than have the strategic plan adapt to a lower level of spending from the endowment). And, third, the ability of the endowment to increase its funding for the institution in times of economic hardship,

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when it is needed most, is critical. It is the role of the trustees of an institution to determine the portfolio's asset allocation, distribution policy and method, and endowment gift policy in order to at least maintain the purchasing power of the pool and, at most, increase its funding to the institution in times of hardship. By doing so, the trustees mitigate the greatest risk that the institution fails to achieve its mission.

It has been observed that the largest and highest-returning nonprofit investment portfolios are, in fact, those that are also the least liquid—or, to put it another way, whose spending rules require relatively low levels of liquid assets be maintained in order to meet the spending requirements of the institution, thereby freeing assets for investment in longer-term, less liquid strategies that offer the possibility of higher total return.[3] Despite this apparent fact, many nonprofits implicitly or explicitly prioritize the second and/or third financial imperatives and maintain more than enough liquid assets to meet the needs of the institution in normal times and potentially in negative or stressed economic environments. In short, they fail to take full advantage of their ability as perpetual pools to earn greater long-term returns in favor of short- to medium-term liquidity.

Foundations may have different primary objectives. For example, a foundation may seek to make an accelerated level of grants and be willing to spend principal in order to address an urgent social need. Similarly, a foundation may be willing to accept a lower expected return if it can make investments that not only earn a positive return but simultaneously address an important social issue. Whether an educational endowment or foundation, identifying the timing of required cash flows that need to be funded from returns or principal is necessary to determine the appropriate illiquidity risk appetite.

It is best to explicitly define the institution's priorities with respect to the mission and the role that the endowment is expected to play in it. It may be that mission goals enable the operating budget to rely relatively little on the endowment, thus making maximizing long-term return and taking liquidity and volatility risk appropriate. It may be, however, that the mission requires a high dependency of the operating budget on the endowment, meaning that stability and liquidity are more important than maximizing long-term returns. One way to approach these risk management decisions is to shift them from strategic policy decisions to tactical monitoring activities. Each category of issues is tied to specific time frames proportional to how

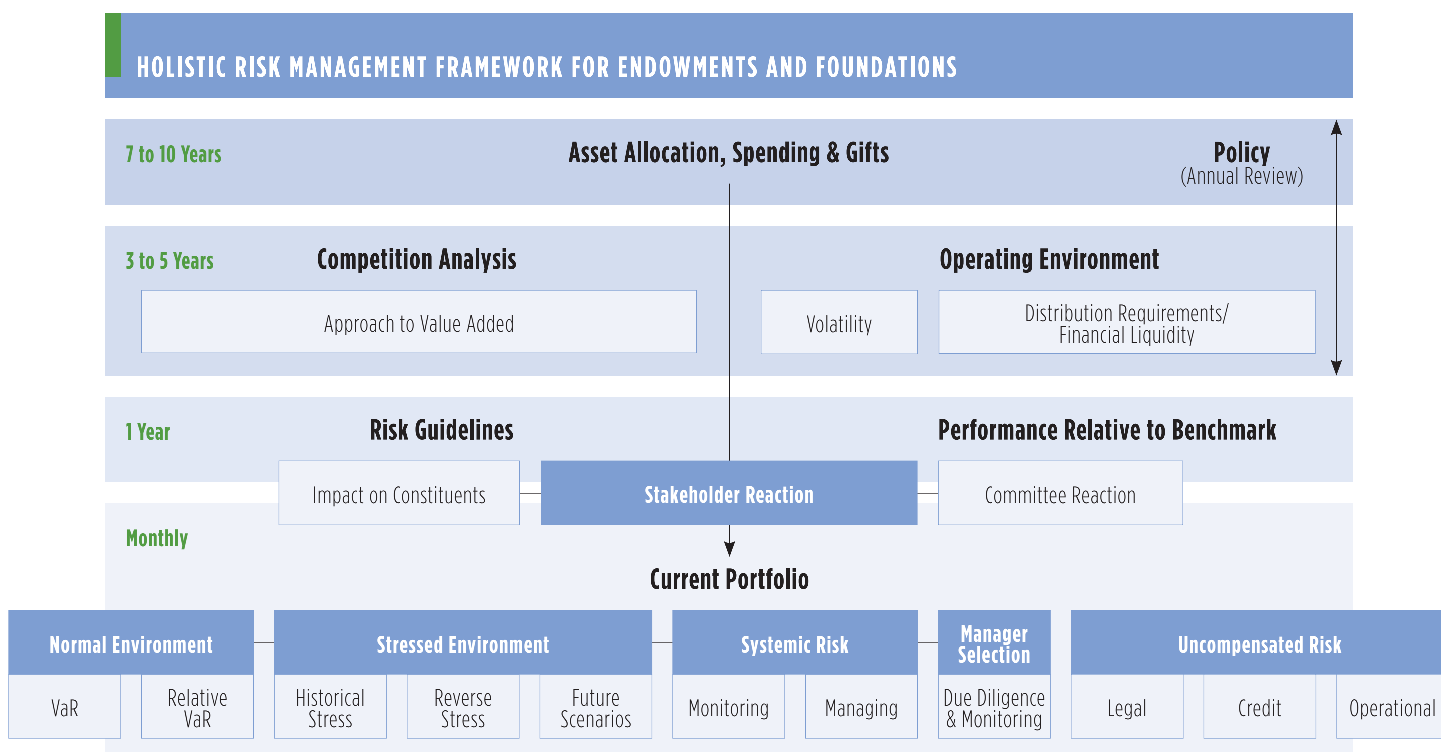
3 See Verne O. Sedlacek, "Looking at Liquidity in a New Light," *Mission Matters*, Fall 2006/Winter 2007, pp. 2–7.

fast these risks evolve (see the diagram below). Policy issues are strategic and can be addressed relatively infrequently, e.g., once every seven to 10 years. Other activities, such as ensuring that deviations from strategy remain within tolerance and exposure to sudden extreme events remains acceptable, must occur more frequently.

7-10 years: asset allocation, spending and gifts

This is the widest, longest vision—a macro view of how the endowment seeks to add value to the portfolio over time. It's the fundamental investment philosophy and is linked closely to the institution's mission statement. A foundational principle is intergenerational equity or maintaining purchasing power, as it impacts virtually every decision from asset allocation to the spending rate to fund-raising and gifts. That said, the endowment may be expected to enhance the mission, for instance, by engaging in impact investing, following socially responsible investing principles or divesting fossil fuels. Alternatively, it may need to take less risk on the asset side so that if demands (i.e., liabilities) from the mission grow in adverse economic times it will still be able to support the mission fully.

In the context of the longer time frame, the investment committee may want to periodically examine—and then monitor—overarching themes with the potential to create long-term investment opportunities. Examples include demographic trends (e.g., rise of the middle class in India and high birth rates in sub-Saharan Africa), paradigm shifts in technology (robotics and artificial intelligence), and geopolitical change and stores of value (the U.S. dollar versus gold versus the yuan). How much it invests in the selected themes should be proportional to the committee's conviction. It should do the research and evaluate the likelihood of these themes generating returns—and define its expected case, the worst case and the best case. The thematic investing opportunities should be rank-ordered based on the confidence level around each theme, and investable capital allocated proportionally.



Another point to be aware of: the portfolio may be diversified in terms of asset allocations but returns may not be as diversified as expected. Dollar allocations may be diversified by asset class and strategy, but the correlation of returns to selected macro factors—like GDP growth rates, interest rates or the inflation rate—may be higher than expected. So, while an endowment may appear to be diversifying its exposures and earning a liquidity risk premium by having a large allocation to private equity within its 60/40 portfolio of equities and fixed income, it may actually be holding an exposure to global growth insofar as returns to both liquid equity and private equity are highly correlated to long-term global growth. Similarly, an endowment may be seeking to diversify by investing in commodities and real estate, but both are vulnerable to deflation.

The challenge of diversification is that, over the long term, the factor that matters most in determining returns is often how fast the global economy is growing. Growth drives the returns to the equity factor and returns across multiple asset types in the long run. Long-run interest rates are linked to GDP and inflation expectations. Because of the dominance of this growth factor across asset classes there is a very high likelihood that when, for example, a university most needs the endowment to subsidize the institution's income in a difficult economic growth environment, that factor exposure may create a problem.

3 to 5 years: understanding the competition and the environment

Over a shorter time frame of three to five years, it is important for an organization to understand the forces influencing its position in the marketplace, like the returns earned and the risks borne by its competitors and how those returns can be evaluated relative to its own portfolio returns. While not all nonprofit organizations think of themselves as competing with each other, many sectors, such as education and healthcare, are far from being immune to competitive pressures. Human nature, governance issues and behavioral biases, such as framing, confirmation and hindsight biases, enter here. Colleges and universities do compete; an institution's alumni may be disappointed if the endowment performs poorly. And colleges get ranked in terms of their attractiveness and selectiveness by *US News & World Report* and others.

Over the three- to five-year time frame, broader risk analysis should examine how dependent the organization's operations are on the long-term asset pool. This risk relates to the volatility of the endowment's distributions as they impact the institutional mission. "Operating environment" in the chart refers to the operating budget of the university or institution. Demands on the operating budget are changing all the time—perhaps salary, healthcare costs, employee benefit costs are going up or a university strategically wants to make its mark in computer sciences with a new state-of-the-art facility. That's the changing nature of liabilities. How much the operating budget depends on the endowment is a moving target that needs to be periodically re-assessed. Thus, it is important to understand how the possible outcomes of the asset allocation and distribution policy impact operations ("volatility" in the chart). Directly impacting that issue is the degree of liquidity required by the endowment to meet the prescribed distribution. Gifts and donations should be taken into account as well, as they have a significant impact on endowment growth and vary with the macro environment.

The analysis of risk should not omit the strategy for adding value to the policy portfolio, as it influences the investment risks that the portfolio takes. The institution may seek to add value by reducing fees and indexing most of the portfolio, or it may see active investing as attractive at the current time and allocate to

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active managers in pursuit of higher returns (net of fees) or shift between the two based on periodic reassessments. As discussed previously, some institutions may seek to add value to the asset portfolio by taking on greater allocations to illiquid alternative assets classes, or thematic investing, while others seek to add value to the overall mission by assuring sufficient liquidity to fund the mission in stressed environments or even impact investing. This is the time frame within which to evaluate the results of the value added strategy and whether it has been successful. An institution may have tried a strategy that isn't working and may consider changing, persevering or abandoning it.

1 to 3 years: risk management in the context of portfolio investing

Over the short and intermediate term, investors have a number of analytical tools available to them. One is scenario analysis—the process of analyzing future outcomes by considering various events. The process of trying to imagine what the world is going to look like three years hence and what impact that environment would have on current holdings can be very helpful for investors. In place of VaR, which is not a very strong estimator of long-term returns, scenario analysis is an informed estimate of how much a portfolio could miss its expected or target return based on different future states of the world. If markets experience an extreme stress event, a diversification strategy that previously worked well in normal economic cycles may be undermined and the portfolio may experience a major drop in value.

Factor analysis enters here because correlations change through time and should be monitored. As correlations across assets become stronger, one would probably see that the factors driving your portfolio are becoming fewer and fewer, eroding diversification and potentially increasing volatility. The goal is to keep the portfolio earning risk premia from diversified, uncorrelated sources of return, and you can measure that by looking at factor concentrations across asset classes. The focus is not on concentrations by dollars in certain assets, but on how much of the return of the portfolio as a whole is correlated to the return of various factors and the movement of these factors. Over the longer term, economic factors predominate—things like inflation, interest rates and growth. Over the shorter term, more tactical asset allocation decisions are based on equity and fixed income factors.

Under 1 year: managing the current portfolio

With this long-term strategic framework as background, we can turn to the shorter-term monthly risk activities identified in the chart. Generally, these relate to ensuring that risks in the current portfolio do not stray significantly beyond those intended in the policy portfolio. Risk management activities at this stage include measuring VaR and relative VaR (used to look at potential losses in normal markets over a shorter-term, more forecastable time period); conducting stress tests to evaluate market risks in abnormal environments; evaluating normal and stressed portfolio liquidity; conducting the manager due diligence necessary to implement and monitor an asset allocation; and monitoring the legal, credit and operational risks that are the by-products of the investment process.

Tail risks: a word of caution

Most analytical tools assume the future will be like the past and make simplifying assumptions which are not always present in the real world. They are, therefore, limited in evaluating the potential effects of new extreme events upon a portfolio:

- Efficient or liquid markets do not always remain that way.
- Not all asset return profiles are linear, nor are they all normally distributed.
- Not all information that is relevant to an investment decision is reflected in the price of the security.

Examples of abnormal conditions include periods of high market stress, when securities whose price movements had previously been uncorrelated display an unexpectedly high degree of correlation, thereby negating the effects of diversification and giving rise to "tail risk" situations, where the expected loss significantly underestimates the actual loss incurred in an investment strategy. This may be due to inadequate consideration and pricing of all risks by the market, some of which do not lend themselves to being quantified. To help manage tail risks, standard short-term analytics must be supplemented with longer-term stress and scenario testing. Adequate management of tail risk at this stage requires an intimate consideration of the intended compensated risks being taken, an understanding of the shortcomings of the quantitative tools available, ability to integrate qualitative approaches, and an attention to the uncompensated risks, such as legal, counterparty credit and operational activities, taken in executing the strategy.

Conclusion

Asset/liability management, widely used in the banking and pension industries, warrants greater consideration as a way to manage risks for endowed institutions. It is an effective form of risk management that endeavors to mitigate or hedge the risk of failing to meet mission-driven obligations (liabilities). An examination of the financial and strategic dependency of the institution on the endowment can identify additional constraints that should be considered in setting investment policy and risk-managing the institution.

Segmenting risks by time frame provides a holistic risk management framework for educational institutions and foundations. Asset/liability management can be integrated into the overall risk management process and used by endowed institutions to mitigate the primary risk of failing to fulfill their mission. IN

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