CAMBRIDGE ASSOCIATES LLC

LIQUIDITY CONSIDERATIONS IN TODAY'S ENVIRONMENT

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C O N T E N T S

EXECUTIVE SUMMARY

The severity of the recent market decline has dramatically decreased liquidity for many types of investments. The events create challenges for investors, particularly those with large alternative assets portfolios and inflexible spending needs. Such investors may be in danger of a liquidity shortfall; that is, they may find they lack sufficient cash resources to sustain spending and meet capital calls, forcing them to sell assets at distressed prices. For such investors in particular, but for most investors generally in today's environment, a detailed study of their sources and needs for cash should be a top priority.

We regard a prolonged slump in equity prices as highly plausible, so we recommend that all investors ask: "What is the likelihood my portfolio will not be able to support its near-term cash needs? How should I think about liquidity, and how much should I have?" Some investors may find they have ample liquidity, but others may need to create a liquidity reserve by raising their allocation to cash to ensure that the durations of their assets and liabilities are properly aligned during a period of heightened volatility.

This paper provides a framework for assessing a portfolio's liquidity needs in the context of its spending rate, its allocations to marketable and non-marketable alternative assets (NMAA), and its approach to rebalancing. Taking a holistic view of the investor's sources and uses of cash, we first look at the liquidity of a portfolio's holdings and then offer some recommendations on implementation. As a practical illustration, we also provide a case study of a fictional institution addressing these issues.

Unfunded capital calls, inflexible spending needs, and the use of endowment to collateralize loans are the most likely sources of liquidity stress in the current environment.

Investors with large allocations to NMAA—broadly defined to include private real estate, private energy, timber, private equity, and venture capital—are likely to experience liquidity pressure for a number of reasons. First, this year's distributions are on pace to be among the lowest on record (and show no signs of picking up over the near term), while capital calls, which have also slowed this year, may well revert to normal levels, or potentially pick up pace before long. Already, many investors—even those with mature programs—are finding that their allocations to non-marketable assets are no longer self-funding (i.e., capital calls exceed distributions) and seem likely to become increasingly cash flow negative. Second, significant unfunded commitments can place strains on portfolios with limited liquidity, particularly as existing unfunded commitments remain fixed, even as portfolio market values fall. When considering current portfolio market values, investors should also estimate third quarter declines in NMAA market values, as these values are typically lagged by one quarter on investors' performance reports.

Since spending will likely be the single largest determinant of most investors' liquidity needs over the next few years, any liquidity analysis should focus on a review of projected spending. Investors should consider how a difficult environment might affect spending, whether it can be curtailed, or conversely, whether it might actually increase because under adverse conditions other sources of revenue might be expected to decline, forcing increased reliance on portfolio assets.

Finally, investors should consider the degree to which they have demands on the portfolio that could escalate should the portfolio decline. For example, where portfolio assets have been pledged as collateral for loans, with debt covenants that require the maintenance of a specific ratio of portfolio market value to debt outstanding, investors may be close to violating these ratios, putting them at risk of having to pledge more endowment as collateral (or repay the debt) at a time when resources are tight and reliance on portfolio assets more important.

At the same time, portfolio liquidity is obviously more constrained. As noted above, NMAA portfolios have experienced a decline in net contributions. Further, among hedge funds, the risk is that substantial redemptions in the coming months may temporarily diminish the ability of investors to liquidate their holdings, particularly if managers exercise their "gating" provisions. Although most funds are taking ample steps to address redemptions, this impact could persist for several quarters. We recommend investors review all their hedge fund holdings with a view to minimizing lock-ups where possible (even if this results in higher fees), in order to ensure that these investments can serve as a potential source of some liquidity in the next few years, if necessary.

Even the cash markets have not been immune to liquidity shocks, with several money market funds suspending redemptions and one "ultra-safe" Rule 2(a)7 money market fund "breaking the buck." Furthermore, troubles with cash vehicles used as collateral in securities lending programs have even reduced the liquidity of a number of broad-based index funds, some of which have temporarily suspended full redemption rights.[1]

As long as the market environment remains highly volatile, investors should consider rebalancing more frequently. Until credit markets stabilize and the earnings cycle bottoms out, it is likely that rallies in risk assets will prove ephemeral, making more aggressive rebalancing an important strategy for both raising cash and locking in gains. Investors that are facing liquidity pressures should rebalance to fund a cash liquidity reserve from which to fund future spending. Those without acute liquidity pressures would be well served to hold a higher than usual level of frictional cash, particularly if they do not have access to a secure line of credit, until liquidity conditions improve and market volatility subsides. Such investors should also think carefully about existing and future alternative equity exposures. For example, should the hedge fund program—despite its potential to hold up better than traditional equities—be seen as a source of liquidity? Should the growing allocation to non-marketable assets be trimmed through secondary sales or through a reduction in subsequent commitments going forward? Or should the current liquid reserve simply be depleted, in the hope that it will prove sufficient before it runs out?

Finally, we have also advised for some time that investors might consider holding more cash than usual simply to have some "dry powder" for subsequent investment in the various opportunities we expect to emerge from the ashes of the bear market over the next couple of years. For example, investors that had dry powder available in recent weeks were able to move equity allocations up toward targets at reasonable, and in some cases, compelling, valuations. While we cannot know how long this bear market will continue, we are clearly closer to the end than we were a year or so ago and valuations have improved markedly.

[1] For detailed discussion of these issues, please see our October 6, 2008, memo to clients posted to our client website.

Why Liquidity Matters

Liquidity is a measure of the ability to convert an asset into cash. Most of our clients rely on their portfolios, in whole or in part, to fund current cash needs. Whether those needs are faculty payroll, grant commitments, or personal consumption, they all require cash in hand. The less flexibility there is in the timing or amount of those cash needs, the greater the need for assets that can be readily converted into cash.

Other things being equal, investors should therefore favor liquid assets over less liquid assets (cash now being preferable to cash later). This preference results in a "liquidity premium" that is, the extra value buyers are willing to pay for more liquid rather than less liquid assets. In other words, the less liquid an instrument, the higher the rate of return the market will demand.

Liquidity *risk* is thus defined as the likelihood that an investor will fail to have enough cash on hand to meet its cash-based obligations, despite having sufficient total assets to do so.

Investors such as endowments or foundations with extremely long (near infinite) time horizons theoretically have a higher ability to take liquidity risk than most other investors. This is a product of both the long-dated duration of their liabilities, as well as the substantial time they have to make up for near-term losses. The ability to take liquidity risk is a substantial strategic advantage that, if managed well, should provide the opportunity to earn higher returns. (Effectively these investors can be sellers of liquidity premia to the market.)

For these reasons, Cambridge Associates has long been an advocate of including alternative investments in a well-diversified portfolio, but with the realization that their inclusion does change the liquidity profile of that portfolio. Exhibit 1 shows the allocation to illiquid assets for ten large endowments (median size $12 billion) and how those allocations have changed over time. Since 1994, their median allocation to hedge funds increased from roughly 1% to about 20%, while their median allocation to broadly defined non-marketable alternative assets (NMAA) increased from about 20% to 37%. While most of our clients have more modest allocations to alternatives, many have had substantial increases in recent years, often driven by newer commitments to illiquid real estate and natural resource managers.

Investors face a classic investment trade-off between the desire for the higher returns offered by non-liquid assets and the need for liquidity to meet cash obligations. To arrive at an optimum balance, they need to understand both the liquidity profile of their investments and the sources and uses of their cash.

Assessing Portfolio Holdings

In analyzing their liquidity profile, investors should categorize their holdings in terms of how long it would take to convert each investment into cash. This timing could range from immediate to years, with the distinctions coming from differences in legal structure, investment strategy, and market conditions at the time of exit.

However, we can provide general rules of thumb for each asset type:

Source	Normal Timing
Cash	T + 0 days
Listed Securities	T + 1–3 days
Commingled Vehicles	T + 0–30 days
HF Limited Partnerships	T + 90–365–730 days*
Non-Marketable Investments	T + 5–10 years

* Many hedge funds now have multi-year lock-ups.

Exhibit 2 provides a graphical representation of the layers of liquidity in the portfolio of a hypothetical $1 billion endowment.

The specific considerations for liquidating each asset type, from least liquid to most liquid, are detailed below.

Non-Marketable Alternative Assets

NMAA include private real estate, private energy, timber, private equity, and venture capital. Investors should assume these are highly illiquid assets, with the realization date and amount of their underlying holdings only modestly predictable and largely out of investors' control. Fund managers typically structure these investments as a limited partnership with a contractually fixed life, with legal commitments for capital contributions by an investor, and with discretion on liquidation in the hands of the fund manager. (Cash flow considerations for NMAA are discussed in the "Aggregating Sources of and Uses of Cash" section below.)

Interests in NMAA funds can be sold in the secondary market, but transaction costs are high and lead times long. For truly constrained investors, this option should be fully considered. Appendix A discusses the market for and mechanics of secondary NMAA transactions.

Current Environment. In this time of stress, it is important to remember the longer-term nature of these assets and their role in a portfolio. While there will undoubtedly be markdowns in NMAA portfolios in the coming months, the ability of fund managers to call and prudently deploy capital into attractive investments in rough markets is a potential source of substantial future returns. We believe that sharp dislocations can often lay the groundwork for strong vintage years in NMAA, and remind investors of the importance of a steady hand in managing commitments for vintage year diversification. In the meantime, investors must take into account their (frequently substantial) unfunded commitments in NMAA programs, and monitor the impact of these unfunded commitments on overall liquidity. However, in light of declining total portfolio values and particularly for investors facing a liquidity crunch, consideration will need to be given to reducing the pace of future commitments, at least on a temporary basis.

Additionally, the advent of mark-to-market accounting[2] and the implementation of FAS 157 by institutional investors will cause greater swings in the value of NMAA assets and consequently their allocations within a portfolio.[3]

Hedge Funds

Although hedge funds' underlying investments are most often liquid, publicly traded securities, these funds are also typically structured as limited partnerships or other types of vehicles with restrictions on entry and exit. The legal terms of the partnership and the underlying investment strategy will largely determine the ability of a hedge fund's investors to turn their investment into cash, as the timing and conditions of entries and exits are set forth in the fund documents. Unlike the fixed life of an NMAA limited partnership, hedge funds typically have evergreen structures (i.e., no preset term) and include provisions for investors to enter and exit the funds periodically at will.

While entry typically happens at the start of a quarter or month, exiting a hedge fund requires the investor to submit a redemption notice a set number of days in advance of a quarter or year end. Multi-year "lock-ups," where a fund manager will restrict redemptions of any kind for an initial investment period, have become more common in recent years. After the initial lock-up period, some of these lock-ups revert to quarterly or annual liquidity, while others roll over to another lock-up period of a similar length, often in connection with a fee reduction. Investors employing such lock-up funds should ensure that their funds have overlapping periods that do not all expire in the same year. Creating a liquidity profile, shown in Appendix B, is one way to review and manage redemption provisions in the portfolio.

A hedge fund's underlying investment strategy will also affect the manager's ability to meet redemption requests. For example, strategies relying on highly liquid futures trading can easily liquidate positions, even under periods of market stress, while those trading in micro-cap stocks or exotic derivative securities would be far less liquid. Investors should also keep track of the manager's right to make investments in private securities or create side pockets, as the fund documents will often protect the manager from having to liquidate these investments, except at its own discretion. Thus, even if an investor fully liquidates a hedge fund, any capital invested in side pockets remains invested and illiquid until the manager sells the position.

The fund documents will also provide for the manager to limit redemptions based on either redemptions exceeding a set proportion of fund assets, or based on the manager's discretion that such redemptions would adversely affect the remaining investors. These so-called "gate" provisions protect managers from being forced to sell assets under adverse market conditions to meet redemption requests. From investors' perspective, however, such gating provisions detract from their portfolio liquidity,

[2] In mark-to-market accounting, or "fair value accounting," assets are recorded on the balance sheet at exit prices, or prices at which they could be sold. As such, changes to fair value are reflected on the income statement and cumulative changes are recorded on the balance sheet.
[3] For detailed discussion of these issues, please see our October 2008 report, *"Mark to Market" Accounting: An Endowment's Guide to the New Valuation (FAS 157).*

particularly if they have characterized such hedge funds as potential sources of cash in their liquidity analysis. Consequently, we recommend that hedge fund investors monitor the proportion of total fund assets their investment represents, and the profile of the fund's other investors, both at the time of investment and on an ongoing basis. If one's investment constitutes a large percentage of a fund's assets, and/or one is invested alongside "fast money" co-investors (such as a retail investor-oriented fund-of-funds), the chances of getting trapped by the fund's gating provisions are commensurately higher.

Current Environment. In the past several months we have seen a number of funds activate their gates to limit redemptions, particularly funds with recent poor performance and a high proportion of hedge-fund-of-funds investors. In these cases, investors have found that it could take as long as several years to fully redeem their holdings. In their most recent data, Hedge Fund Research Inc. reported that hedge-fund-of-funds made up 43% of total hedge fund assets as of March 31, 2008 (and we have heard from the prime brokerage community a belief that the total may, in fact, be substantially greater than 50%). Because these funds-of-funds will likely face some redemption pressure from their investors, many underlying hedge funds are deleveraging their balance sheets in anticipation of such demands (and also, it should be added, in response to the heightened uncertainty in the capital markets).

Because this unwinding injects greater uncertainty into the expected liquidity of a hedge fund program we have been closely monitoring the potential for disruptive capital flows out of hedge funds we track.

However, despite the current turmoil and the existence of gating provisions, hedge fund programs can still be regarded as a source of some liquidity for investors with a medium- to long-term time horizon. With adequate advance planning, investors should still be able to withdraw a portion of their hedge fund assets to support spending or to reinvest in other, more liquid asset classes as part of their rebalancing and liquidity management program.

We also note that with potential outflows come opportunities for clients to access managers previously closed to new investors. Already, we have seen talented managers that have been hard closed for several years open to new investors, particularly for investors viewed as desirable long-term investors (e.g., colleges and universities, nonprofits, well-established family offices). Such investors therefore have an opportunity to upgrade the quality of their hedge fund programs.

Commingled Funds

Commingled funds are typically long-only vehicles that include formally regulated mutual funds and other pooled investment vehicles (e.g., common trust funds) that managers have created for a group of investors. These funds have preset guidelines dictating investment strategy and portfolio construction. Depending on the terms in the fund's documents, redemptions can be made with a specified day's notice during the month or at the end of a month. Nevertheless, commingled funds can give managers discretion to suspend or delay full redemptions due to market conditions, only allowing immediate exit through providing an equitable share of securities in-kind.

Again, investors should be clear what the redemption provisions are, assess the liquidity of the investment strategy and the underlying securities, and know the profile of their co-investors.

Current Environment. The liquidity of some commingled vehicles has been strained due to problems with securities lending programs. Even investors in what should have been highly liquid assets—including indexed bond or stock funds—have seen redemptions limited as problems arise with cash collateral accounts related to securities lending. Securities lending has been a common practice in these funds, and investors will need to monitor the risks embedded in such programs or identify funds that do not lend their securities.[4] However, at present, commingled funds generally remain highly liquid. Cash funds are discussed separately below.

Separately Managed Accounts

With separately managed accounts, investors have real-time transparency into their managers' holdings, which allows for easy monitoring of the liquidity profile of the underlying investments. Investors also have the ability to exert immediate and complete control to direct the sale of securities should they need or want to. Nevertheless, investors should still monitor the manager's assets under management in other accounts or funds with the same particular strategy, and the profile of those other investors, as with hedge funds or commingled funds. A rush to exit positions held in several separately managed accounts could create the possibility of a bottleneck in liquidations similar to those affecting a commingled fund or hedge fund.

Current Environment. As with commingled funds, securities lending could be a concern in separately managed accounts. Investors with separate accounts, however, have full discretion to terminate such a program, although doing so may result in taking a loss should the cash pool collateralizing the loaned securities be impaired, have mark-to-market losses, or experience declines from selling positions to terminate the program.

As many of the same factors impact the range of public security investment vehicles, we provide the table on the next page as a summary of the key considerations.

[4] For more detailed discussion, please see our July 2008 report *Surviving the Bear Market: An Investor's Guide.* For more general background on securities lending, see our report *Securities Lending: An Introduction.*

CHECKLIST OF MARKETABLE MANAGER CONSIDERATIONS

		Long-Only	
	Hedge Funds	Commingled Funds	Separate Accounts
1. Evaluate the inherent liquidity of the fund's investment strategy	X	X	X
2. Assess and monitor the mix of other investors in all vehicles managed in the same strategy	X	X	X
3. Know the redemption notice requirements and exit dates	X	X	X
4. Know the gate provisions	X	X	
5. Monitor the allocations to side pockets/ illiquid investments	X		
6. Know whether redemption requests can be met by giving investors securities rather than cash	X	X	
7. Monitor your proportion of a manager's assets in particular strategies across all vehicle types	X	X	
8. Monitor amount of assets in parallel accounts or funds	X	X	X
9. Monitor the profile of a fund's holdings in days' trading volume	X	X	X
10. Track the use of securities lending programs		X	X

Listed Securities

The liquidity of a listed security is a direct function of the depth and breadth of the market for that particular issue. For public stocks, the most common measure of liquidity is the number of days' trading volume a holding represents. Large positions and/or thinly traded stocks obviously take longer to liquidate and/or can only be liquidated quickly at a discount to the current price; consequently, such sales should be planned as far in advance as possible.

The liquidity of bonds can vary substantially, from continuous buy/sell action of on-the-run U.S. Treasuries to unusual agency or corporate issues that trade only "by appointment." In times of market stress, this illiquidity can become even more pronounced, with a flight to quality significantly decreasing the marketability of all but Treasuries and the highest-quality short-term corporate bonds.

Current Environment. In the stresses of recent weeks, public equity markets have been extremely volatile, but still liquid (although often at very unattractive prices). The fixed income markets, though, have widely seized up, as reflected in the sharp expansion of spreads in corporate, asset-backed, and municipal bonds, as well as the aggressive actions by governments and central banks across the globe aimed at relieving this pressure. The one notable market that has not experienced diminished liquidity has been that for U.S. Treasuries, which have benefited from rising risk aversion.

Cash

By definition, cash is the ultimate liquid asset. Investors, though, rarely have much physical cash on hand or sitting in a demand deposit account. Rather, those monies typically make their way into a range of money market options that seek to generate some return, while remaining highly liquid. Thus, "enhanced cash" funds have proliferated in recent years as managers seek incremental yield through greater exposures to duration, illiquidity, or credit risk.

Current Environment. Money market and "enhanced cash" funds are now spooked due to fear of credit losses, sparked in part by the failure of Lehman Brothers and the near-failure of AIG that generated realized losses in a few high-profile money market funds. The specter of taking losses in what were considered very safe investments (e.g., "breaking the buck" in a cash fund, where the net asset value [NAV] of the fund falls below $1 per share) has created an extreme risk aversion, substantial redemption requests, and a run for the safety of Treasury securities. To meet these liquidations, managers have found themselves trying to sell what were once highly liquid assets into a market that no longer wants them. The redemption pace has slowed since the U.S. Treasury announced a temporary guarantee of Rule 2(a)7 money market funds. Still demand for the safety of Treasury bills has been steady.

This extreme risk aversion is evident in the distress in the commercial paper markets. (Commercial paper refers to very short-term corporate bonds, which are a key part of the money markets and corporate finance.) The relationship between commercial paper rates and rates on comparable maturity U.S. T-bills historically has been very stable, but in the last few weeks has spiked to new highs as commercial paper

issuance has dried up (Exhibit 3), inducing the U.S. government to step in as an issuer and/or guarantor of such short-term paper.

Managers of money market funds invested in such instruments could face the prospect of turning mark-to-market losses into realized losses in the event of a "run on the bank" of investor redemptions. Some funds, facing such a run, have limited redemptions, and left investors unable to fully access assets they had previously believed to be highly liquid.

We continue to monitor cash managers closely, and work with our clients to identify where there are real or perceived liquidity or credit challenges to their cash investments. As always, investors need to evaluate the appropriateness of the investment guidelines that govern their money market investments and regularly assure themselves that the manager is adhering to those guidelines.

Aggregating Sources of and Uses of Cash

In addition to assessing the liquidity profile of assets in a portfolio, investors need to have a full picture of both sources of cash and impending cash demands. Understanding how these might change in times of economic distress is a critical component in assessing how liquid the overall portfolio needs to be.

Sources of Cash

In addition to asset sales, dividend and interest payments are obvious additional sources of cash flow. Further, bond portfolios can provide an additional source of liquidity as individual bonds mature.

NMAA Distributions. The expected pace of distributions from a NMAA program can be modeled based on historical averages, but may be fairly lumpy in practice. For example, Exhibit 4 shows how venture capital distributions for several large institutions with mature NMAA programs have varied over the last 20 years. Of course, investors with less mature programs should expect their programs to be cash flow negative rather than a source of cash.

In recent months, NMAA distributions have dwindled to a trickle, as the challenges in the capital markets have greatly diminished initial public offering, merger & acquisition, and recapitalization activity. Meanwhile, as soon as credit markets stabilize, weak equity markets should encourage buyout firms to draw down capital commitments, resulting in negative cash flows for investors. Consequently, we recommend that those with large NMAA programs and substantial uncalled commitments examine their liquidity needs closely and make conservative provisions against the possibility of this situation persisting for an extended period.

Donations, Gifts and Government Grants. Portfolios may also benefit from less predictable inflows. For many institutions, annual donations and capital campaigns can represent very meaningful contributions to liquidity. Given the losses potential donors may have suffered in the capital markets,

institutions should assume declines in the amount and/or timing of donations, and should include this in their cash budgeting process.

Earnings/Revenue. Earnings and revenue from tuition, merchandizing, and other activities can also be a meaningful source of liquidity. However, investors should be realistic about the stability of these sources in a recessionary environment. The pace of growth should be expected to moderate or even turn negative in difficult economic environments.

Line of Credit. One final source of cash to consider is the use of a line of credit, which is often most competitively priced from an investor's custodian bank. One way to think of a line of credit is as a liquidity insurance policy, with the annual commitment fee as the premium for that insurance.

Using a line of credit may cause tax-exempt institutions to incur Unrelated Business Taxable Income (UBTI) and such investors should seek appropriate tax advice. Nevertheless, if faced with the prospect of a true liquidity crunch, the total costs of temporarily using a line of credit could be substantially less than a forced liquidation. Importantly, investors should recognize that substantial lines of credit may be difficult to secure in the current market environment and should recognize that these lines are not necessarily guaranteed to be available when needed, whether due to covenant issues, lender distress, etc.

Uses of Cash

As with sources of cash, investors will want to take a holistic view of cash needs. For most investors, these can be split between the needs of the owners of the assets and the needs of the portfolio itself (e.g., the university versus the university's endowment, the family versus the family's long-term investment portfolio). For most investors, spending needs will be the largest determinant of a portfolio's liquidity needs, but today, meeting unfunded commitments will be a more pressing determinant for those investors with significant unfunded commitments.

Within the Portfolio: Derivatives. Some investors use swaps or futures to create exposures in their portfolios, and these derivative transactions can require the posting of additional cash as margin. The more volatile the exposure created, the more carefully the investor should gauge how much cash will be needed (even in extreme situations) to support such positions.

Within the Portfolio: NMAA Capital Calls. It is always difficult to predict how much cash will be needed to fund an NMAA program since investors do not control the timing of capital calls. Immature programs will be significantly cash flow negative and require ongoing funding, while more mature programs may be cash flow positive over longer periods of time, but punctuated by periods, like today, when capital calls outstrip distributions. Exhibit 5 shows how even long-tenured programs can frequently have sustained periods where distributions fall far short of covering all capital calls.

The pace of capital calls will also be impacted by the mix of NMAA strategies (e.g., distressed versus real estate) and how those strategies are impacted by macroeconomic conditions.

Given the enormous range of variables that impact the pace of capital calls, it is impossible to generate a simple rule of thumb, particularly in this period of substantial economic uncertainty. Nevertheless, we recommend today that investors reviewing their unfunded commitments assume capital calls will be at or above their long-term average, since managers may call capital not only for new deals but also to provide additional support to existing portfolio companies whose access to credit has become constrained in a period of limited exit opportunities.

Outside the Portfolio. A key component of any liquidity review should be an assessment of current and future spending needs (including operating expenses, taxes, capital expenditures, legal commitments, and contingent liabilities). Questions to ask include: what portion of spending is fixed (in amount or proportion) and what is variable (over the next for several years)? How much flexibility do we have in our spending? Are other sources of revenue (e.g., tuition, government contracts, earnings) likely to shrink under conditions of market stress and economic contraction? Are portfolio assets pledged as collateral for debt with covenants tied to the ratio of portfolio asset market values to debt outstanding? How might this affect the ability to meet cash needs should more of the portfolio need to be pledged as collateral if market values were to decline? Are there direct investments outside of the investment portfolio that might require additional capital? On the other side of the coin, are there costs (e.g., financial aid) that might increase?

Both the *amount* and the *rate* of spending should be revisited. If the dollar amount of spending is maintained even as asset values suffer sharp declines, the rate of spending can rise quickly. Investors should fully consider "what if" scenarios and their relative ability to curtail spending, as these significantly influence the liquidity needs of the portfolio. (Appendix C shows how spending rates have varied over time for colleges and universities.) We also note that during the prolonged downturn of the 1970s, most endowments maintained nominal spending levels, even if this meant abandoning their long-term spending rules. As a result, most suffered a decline in real value from which they did not recover until the mid-1990s (if at all).

Rebalancing Policy

A final determinant of a portfolio's liquidity needs is its approach to rebalancing. While public equity and bond exposures can be adjusted relatively quickly, allocations to less liquid asset classes are far more difficult to rebalance (e.g., hedge funds or NMAA investments).

Rebalancing policies are typically based on fixed time intervals, on a certain variance from asset allocation targets, or on relative valuation metrics. Most investors also use their need for cash withdrawals to rebalance overweight asset classes back toward targets. As market volatility has increased to historical highs, those following strict valuation- or allocation-based rebalancing strategies need highly liquid pools of public equities and bonds to execute their policy. More frequent rebalancing results in many small transactions, while less frequent rebalancing requires less management but results in larger shifts.

In the current highly volatile environment, we believe more frequent rebalancing may be prudent until conditions supportive of a sustained recovery prevail. Until credit markets stabilize and the earnings

cycle bottoms out, rallies in risk assets may prove ephemeral, making more frequent rebalancing an important strategy for both raising cash and locking in gains. However, investors should also consider the cost of such rebalancing, including the potential impact on taxes.

Investors should also consider underlying exposures as they rebalance their allocations. For example, the "denominator effect" may push private equity allocations well over target, and investors should consider offsetting this increase with a commensurate decrease in public equity exposure, thus maintaining total equity exposure at the desired level. By taking this more expansive view of rebalancing, investors can avoid feeling the need to sell illiquid assets just to get back to a narrowly defined asset allocation target.

Liquidity Management Options

A given level of portfolio liquidity can be attained in any number of ways, as outlined on the next page. (We would note that even the categories denoted as having "predictable liquidity" on the next page have been challenged in recent weeks.)

LIQUIDITY MANAGEMENT OPTIONS

Option	Positives	Negatives
Hold Large Cash Balances	➢ Predictable liquidity ➢ Minimal risk of investment losses	➢ Opportunity cost of cash vs other assets ➢ Inability of investor to meet long-term spending needs due to a declining corpus
Invest in Highly Liquid Securities	➢ Predictable liquidity	➢ Limits available number of asset classes ➢ Relatively limited opportunity for alpha generation ➢ No opportunity to earn "liquidity premium" ➢ Variable market values
Secondary Sales of NMAA Assets	➢ Ability to adjust exposures (both mix and total amount) ➢ Generate cash from an otherwise illiquid asset ➢ Lower capital call cash needs	➢ Large bid/ask spreads ➢ Difficulty of reversing the decision (that is, will take many years to rebuild allocations if desired) ➢ Long lead times to complete
Line of Credit	➢ Immediate extra cash ➢ Precludes need to sell assets at undesirable times	➢ Use of leverage increases risk profile ➢ Financing costs ➢ UBTI considerations
Futures/Swaps	➢ Enables significant changes in portfolio exposures with minimal cash outlays ➢ Can create economic exposure while retaining very high level of liquidity	➢ Can create economic leverage and/or actual leverage ➢ Requires higher level of active management ➢ Posting initial margin and ongoing monitoring of cash margin account ➢ Swaps: counterparty risk

Active Management of Liquidity

How much cash should an investor hold? How liquid should a portfolio be? There are no universal answers to these questions; the right solution will vary with the particular needs of each investor. However, a solid understanding of the layers of liquidity, the sources and uses of cash in a portfolio, and a fully articulated rebalancing policy can help investors begin to answer these questions. With this information in hand, an investor can create a holistic process for managing liquidity and cash balances.

We give an example of such a process in Appendix D, which looks at all the elements that affect the liquidity of a fictional $1 billion university endowment. The appendix outlines a three-year scenario that takes into account current asset allocations, spending, and unfunded capital commitments, and stresses that scenario in a down market. While the analysis contains many simplifying assumptions, it is helpful in describing how much cushion the investor has in terms of liquid assets relative to cash needs, and how that cushion can be affected by a range of market outcomes.

Considering a Liquidity Reserve

One key objective of liquidity management is to minimize cash needs by closely monitoring the portfolio and planning ahead. However, in stressed market environments, having some cash on hand may be desirable for two primary reasons: (1) keeping some dry powder on hand for opportunities in a fast-moving market and (2) prefunding spending needs in advance to better control when funds are raised to reduce the risk of having to sell into distressed markets.

Having cash on hand provides the fastest way to take advantage of investment opportunities that may rapidly disappear in a volatile market. For example, we have been advocating for some time that investors keep some dry powder to invest in deep value assets of all sorts once they become attractively valued.[5] This advice was specific to an environment in which the vast majority of investments were overvalued. Our recommendation was not to sell assets down below policy targets to fund this dry powder, but rather to rebalance assets that had appreciated beyond targets into cash in anticipation of funding investments that would become fairly valued or undervalued.

We continue to believe some dry powder would be valuable, even as valuations have improved markedly, particularly to fund distressed opportunities, as we expect opportunities in this area will continue to emerge gradually. However, assuming an investor has adequate cash to support liquidity needs, we advocate rebalancing to equities, as valuations have improved significantly. Of course, in the uncertainty of the current environment, with the significant headwinds of declining earnings, an economic recession, and a major credit crisis, prices should be expected to remain under pressure, but much of the price risk previously in the market has now been eliminated. While we cannot know when this bear market will end, we are obviously far closer to the end today than we were a year ago.

[5] Please see our September and April 2008 reports *Market Update: Expanded Quarterly Edition* and *The Eye of the Storm*.

The second reason for holding cash today is to build a cash liquidity reserve to prefund near-term obligations, rather than risk being forced to sell assets at potentially depressed prices when cash is needed. Prefunding such obligations in cash provides investors with a secure source of funding to meet liquidity needs. This is particularly helpful to investors for whom existing liquid assets could potentially be quickly absorbed by relatively inflexible capital call commitments and spending needs. Leaving these assets in investments with relatively high volatility increases the risk that such investors will find they have inadequate liquid resources to fund near-term cash needs. After cash, bonds, particularly high-quality issues, are the next most stable source for funding future cash needs. Hedge funds also provide stability relative to equities, but are generally less liquid and require advance planning to access.

A cash liquidity reserve should only be considered for investors that have sizable existing unfunded commitments to NMAA programs, inflexible spending obligations, a small allocation to liquid assets, and limited resources to support cash needs outside of the portfolio (e.g., revenues, gifts, government grants). For such investors, the size of such a cash reserve depends on both the degree to which investors are constrained by high cash needs relative to cash sources, as well as investor risk tolerances. The creation and sizing of this reserve is very much a judgment call for investors and fiduciaries. For most investors that should consider a cash liquidity reserve, we would expect sizing to equate to two to four quarters of total cash needs for spending and capital calls. Below are two examples of investors at each end of the spectrum. The first has ample liquidity from its existing portfolio, while the second is more constrained and would be expected to benefit from a liquidity reserve.

Example 1. An investor with a $500 million portfolio has experienced the recent declines in the market, and now has a 10% allocation to non-marketable alternatives (broadly defined to include all illiquid, private investments, including hard assets), a 20% allocation to marketable alternatives, and a 70% allocation to a variety of highly liquid assets. Given the high proportion of liquid assets, this investor should not need a liquidity reserve. To be certain, the portfolio can be stress tested under the following severe market assumptions:

1. The decline in market values has pushed the portfolio's $50 million of uncalled capital commitments to 100% of the non-marketable program's NAV, and those commitments are expected to be drawn down rapidly over the course of two years. It is worth noting that uncalled capital commitments are really higher than suggested by current market values, as the NMAA portfolio's NAV is based on June 30 market values, which are likely materially higher than current NAVs that have not yet been reported. Further, we assume that the program produces few, if any, distributions. (This is more severe than we have seen historically, but the current environment is different than any for which we have data, so stress testing the portfolio in this way is reasonable.)
2. Nominal spending is fixed over the next two years, such that the investor needs to spend $30 million a year, or 6% of the portfolio (compared to a 5% long-term target).
3. There are no other sources of cash outside of the portfolio.

In this simplified scenario, the investor would need to raise $55 million in cash in each of the next two years ($30 million spending plus half of the $50 million in uncalled capital commitments). Given liquid

assets total $350 million, the portfolio could absorb further losses and still support these very conservative cash need estimates for at least the next two years. This investor does not need to raise a cash liquidity reserve today, but should monitor liquidity needs on an ongoing basis, particularly if portfolio market values decline substantially from current levels or if the investor's cash needs change materially.

Example 2. At the other extreme, a more constrained investor may decide to hold more cash and/or be confronted with difficult decisions about alternative equity exposures. For example, should the hedge fund program—despite its potential to hold up better than traditional equities—be seen as a source of liquidity? Should the growing allocation to non-marketable assets be trimmed through secondary sales or through a reduction in subsequent commitments going forward? Or should the current liquid reserve simply be depleted, in the hope that it will prove sufficient before it runs out?

Consider an endowment of $1 billion that has 25% of its assets in non-marketable alternatives, 30% in marketable alternatives, and 45% in a diversified portfolio of liquid assets. The investor makes the following assumptions as a stress test:

1. Uncalled capital commitments now amount to 20% of the total portfolio value ($200 million). Again, we recognize that the total portfolio value is actually lower, given that NMAA NAVs are reflected on a lagged basis. Further we make the severe assumption that the non-marketable program produces no distributions, and unfunded commitments are fully called down in two years.
2. The portfolio needs to sustain a 5% spending rate ($50 million).
3. There are no other sources of cash outside of the portfolio.

This endowment must now raise $150 million per year ($50 million in spending and $100 million for capital calls) on a liquid pool of $450 million. Even assuming flat market performance, two-thirds of the portfolio would be drawn down by the end of a two-year period. In such cases, investors should weigh the opportunity cost of holding more cash against the risk that adequate cash will not be available to fund commitments and that liquid assets may be largely depleted, causing significant challenges for years to come.

The cost of raising cash will vary depending on the asset class from which the cash is drawn. Exhibit 6 shows the opportunity cost relative to the downside protection provided by moving to a 5% and a 10% allocation to cash funded solely from global equities, solely from marketable alternatives, and half from each source. The 5% allocation to cash would equate to roughly one-third of this very conservative estimate of annual spending, while the 10% allocation would equate to two-thirds of annual spending. In general, because the long-term expected return for risky assets exceeds the risk-free rate earned by holding cash, the opportunity cost of holding cash exceeds the downside protection. As shown in Exhibit 6, for each of these scenarios, holding cash provides benefits should performance fall to roughly the 75th percentile or below. We note that the hurdle is a bit higher when funding fully from a marketable alternatives program, as the risk/return tradeoff is expected to be higher for such investments, and so they are assumed to provide relatively strong downside protection.

Of course, the assumptions we make about annual net unfunded capital commitments are very severe, so we also show how the portfolio might be depleted over a two-year period assuming that cash needs are $50 million, $100 million, and $150 million as a sensitivity test (Exhibit 7). As would be expected, the higher the cash needs relative to the size of the liquid portfolio, the faster that portfolio gets depleted. A higher allocation to cash does not change the expected ending market value of the liquid portfolio materially, but it does reduce the downside risk (for the cost of giving up the upside return potential).

Additional Considerations

These examples ignore the fact that investors can, and should, increase the liquid pool by bringing marketable alternative allocations, which have generally held up better than equities, back down to target allocations. However, this should be expected to take some time and advance planning, particularly in the current environment, as discussed earlier. Further, to the extent that portfolios include high-quality bonds, particularly U.S. Treasuries, they will provide a reasonably stable source of funding for future spending needs. However, investors that are liquidity constrained should rebalance bonds as well, holding the proceeds in cash to support future spending. At the other extreme, investors with concentrated stock positions or minimal bond allocations may find their liquid portfolios are particularly volatile, raising the risk that asset values could decline sharply at a time when cash is needed to fund cash obligations.

At present, beyond rebalancing overweight allocations to hedge funds and bonds, there are no ideal areas from which to fund a cash liquidity reserve today, as such funding should be based on relative valuations, preferably when assets appreciate beyond target exposures. Investors holding Treasuries as a hedge to support spending in a deflationary or a flight-to-quality environment may reasonably decide to source cash flow needs from bonds. In such cases, investors should extend the duration of the remaining bond portfolio if possible, to maintain the insurance with a lower allocation. Should equities experience further sharp rallies, aggressive rebalancing into market strength may provide the next-best source of funding for a liquidity reserve. We hesitate to sell equities that are fairly valued or even undervalued, as doing so locks in losses already experienced at valuations that have discounted much (although likely not all) bad news. Nevertheless, this may be the cost required to gain added stability to make sure that cash needs can be met in the near term.

While for some investors raising a cash liquidity reserve should be a central component of a liquidity management plan, in general, there is no particular reason to hold cash liquidity reserves to fund impending non-marketable capital calls. In fact, should the non-marketable program increase in size relative to the whole portfolio because commitments get drawn down rapidly in an environment in which all risk assets have come down in value, the only means investors have to adjust their equity exposure is through either cutting back the marketable equities exposure or selling non-marketable positions in the secondary market. In many cases, the former will be the most cost effective and timely means for making such adjustments. Funding non-marketable equities from marketable equities may seem problematic, particularly if you have to sell off marketable equities at depressed prices. However, this could be seen as a transfer from one equity investment with depressed prices to another, albeit with a degree of basis risk, both in terms of when the sale of marketable equities is made and when the non-marketable manager invests the called down capital, as well

as in terms of the specific nature of the equity investment (e.g., small-cap value is somewhat different from buyouts). Nonetheless, for investors that have limited sources of liquidity, raising a cash liquidity reserve through selling assets that are relatively expensive is an important, although challenging, component of liquidity management.

Conclusion

The focus of this paper has been on liquidity generally, and not on cash balances. Strategically, we believe long-term investors' policy portfolios should have minimal cash allocations since the long-term opportunity cost is substantial and we find no evidence that any investor is likely to prove consistently successful at market timing. For most investors, this remains our advice today.

Nevertheless, we regard the current and prospective environment as unusually challenging in terms of meeting liquidity needs. Consequently, we recommend that all investors review their need for cash over the next two to three years. However, we expect that as a result of such a review only those investors that are concerned about the combined strain of meeting both capital calls and relatively inflexible spending needs will conclude that they should increase their cash holdings as a liquidity reserve. These investors are likely to be most concerned that they will be short of necessary cash at a particularly inopportune time for raising additional cash from asset sales. Many investors may desire to hold some additional frictional cash in the current environment, which is reasonable, particularly for investors without secure access to a line of credit, as it may take longer to liquidate needed portfolio assets today than is normally the case and with such volatile markets, it is helpful to avoid selling during market downturns.

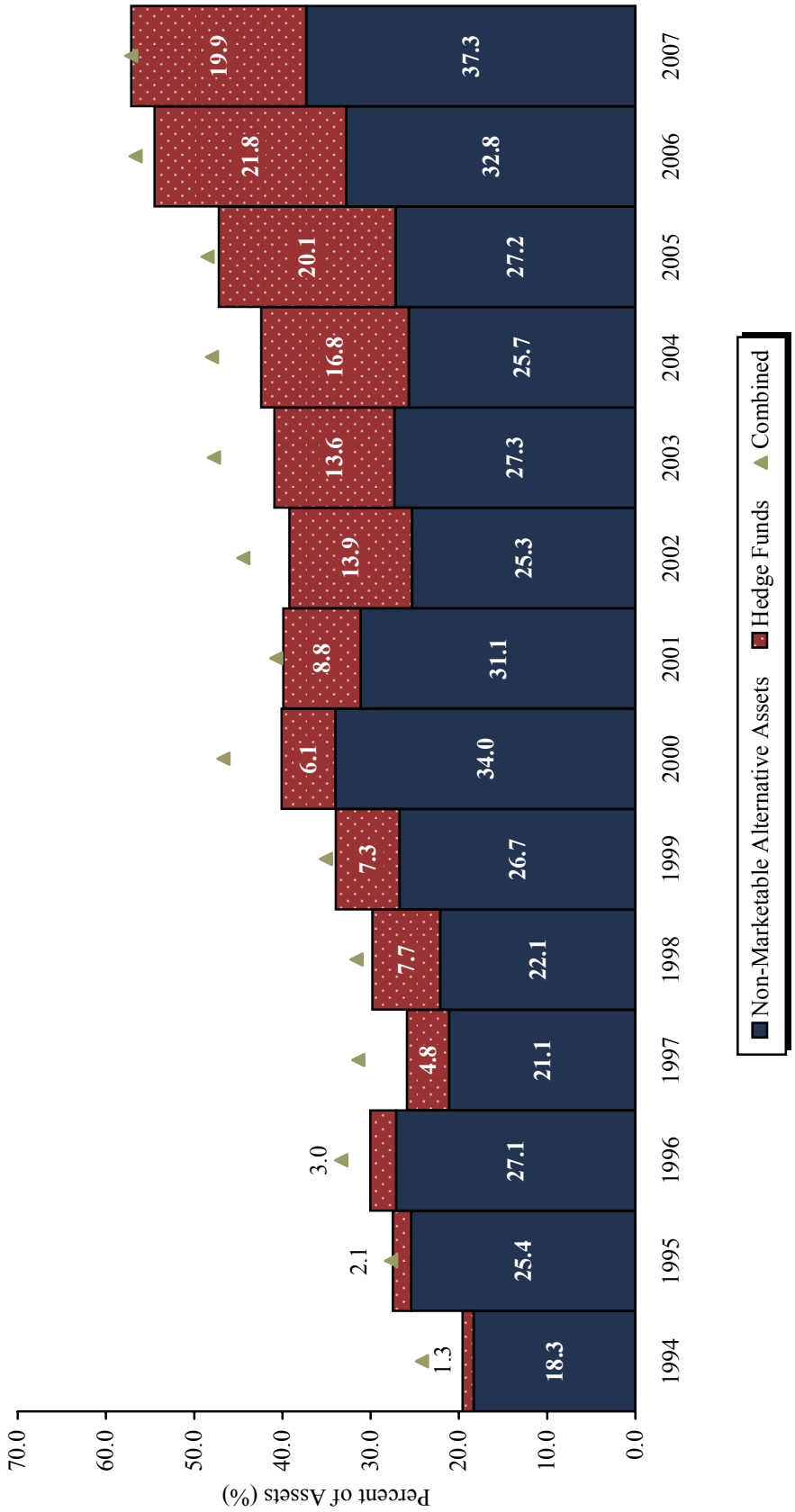
The size of any such reserve depends greatly on each investor's specific needs as regards anticipated capital calls, spending, relevant debt covenants, projected asset allocation, and risk tolerances. All investors with sizable cash needs relative to liquid assets should undertake a similar evaluation of the conditions under which liquidity today may not be adequate to support cash flow needs tomorrow in order to decide whether they need to enhance liquidity by increasing the size of the liquid pool and/or consider raising a cash liquidity reserve. Once such decisions are made, the liquid cash reserve should be maintained until circumstances have materially changed. Such a policy should be revisited relatively frequently (e.g., at minimum twice a year, and perhaps as often as quarterly) to determine if the relationship between cash sources and uses and portfolio liquidity have changed enough relative to expectations to modify the liquidity management plan. This is also the case for investors that determine a cash liquidity reserve is not necessary today. Should market conditions deteriorate, some investors may find that they need to change their liquidity management plan.

Much like good risk management, good liquidity management is more about a good process than a formulaic asset allocation or metric. Know your exposures, plan for your cash needs, monitor changes closely, and consider a short-term liquidity reserve. In this context, investment committees should receive regular reports on the organization's liquidity profile and a game plan for addressing possible challenges.

EXHIBITS

Exhibit 1

MEDIAN ALLOCATIONS OF TEN LEADING ENDOWMENTS



Source: Cambridge Associates LLC.

Exhibit 2

CONVERTING ENDOWMENT ASSETS TO CASH

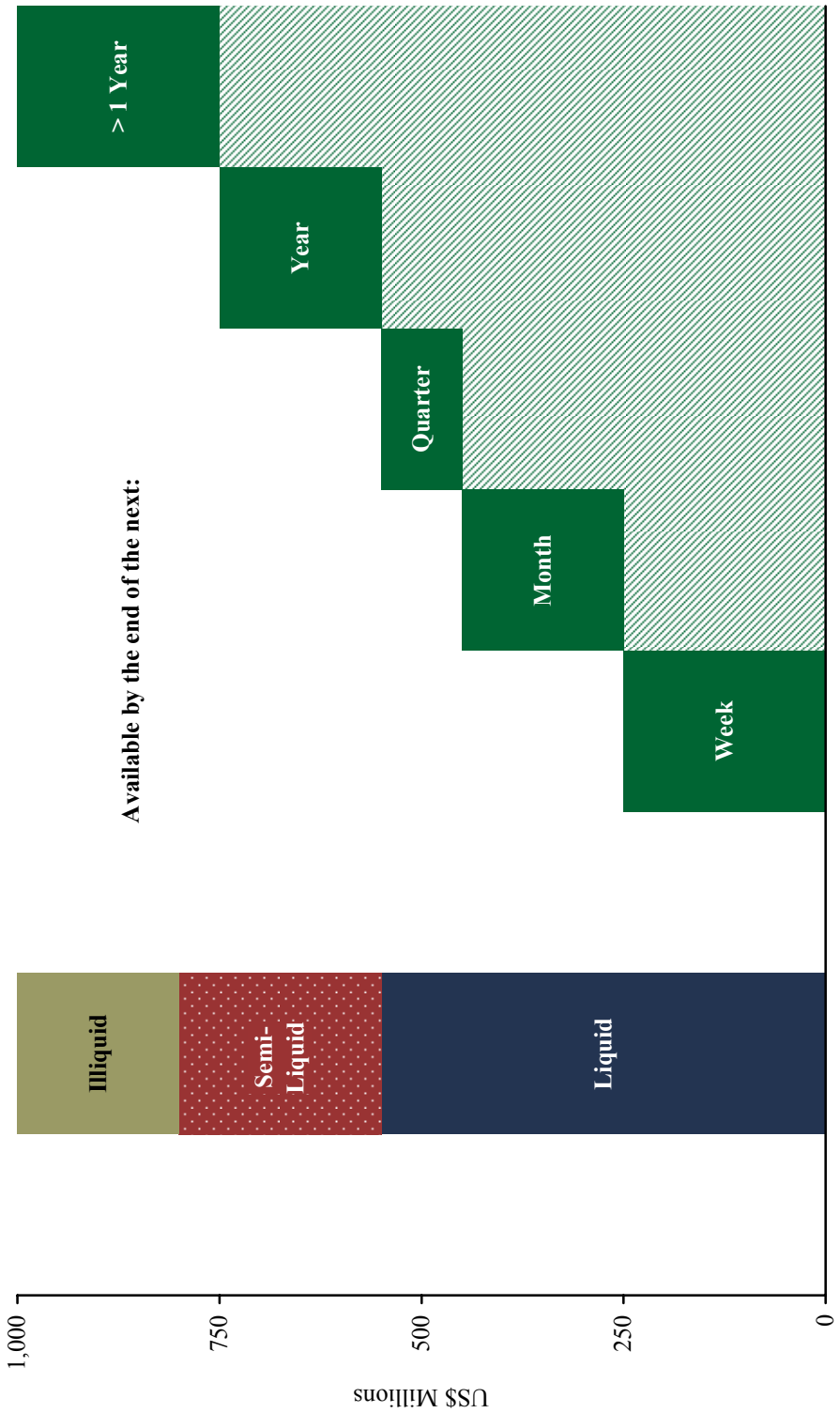
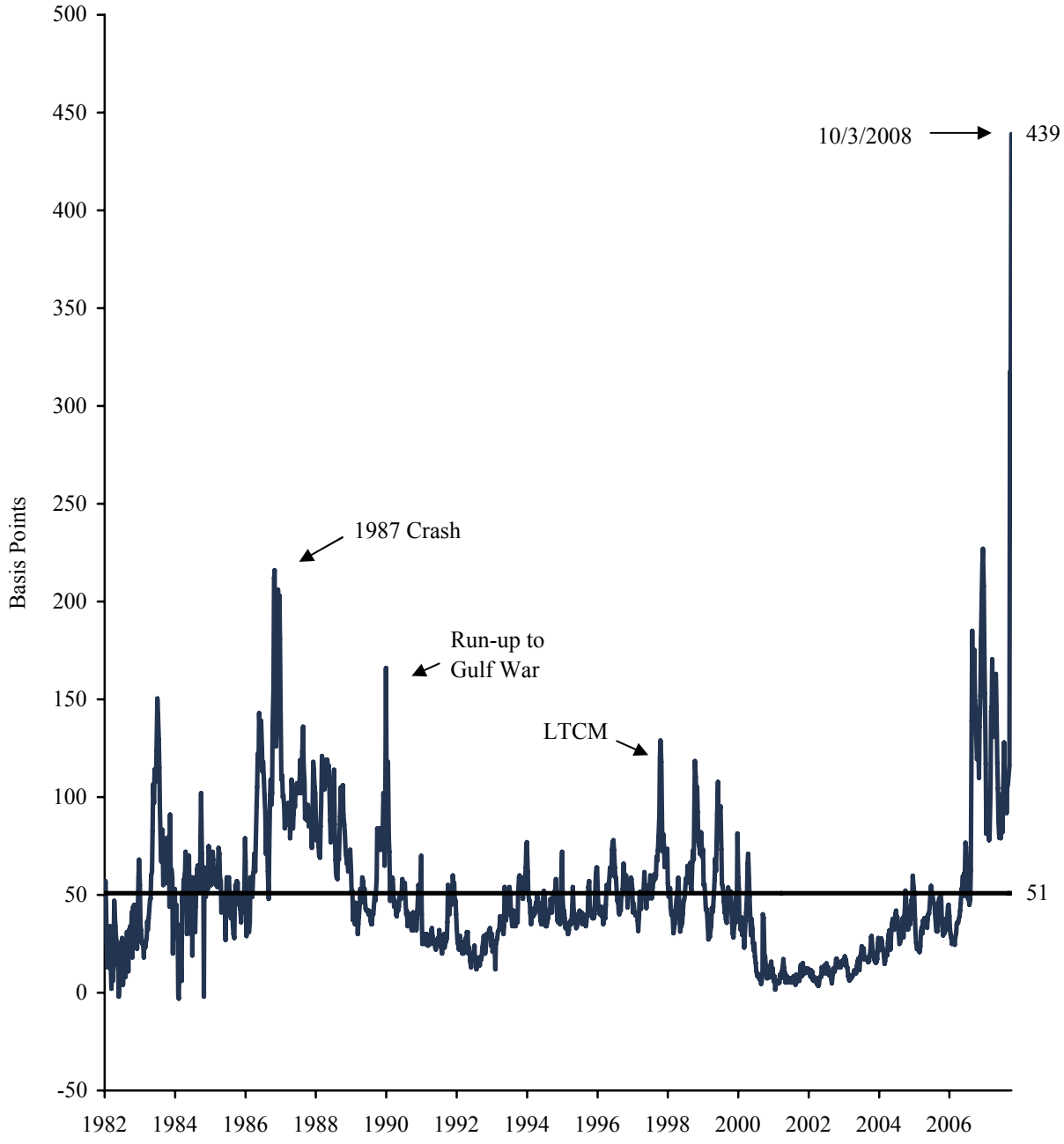


Exhibit 3

COMMERCIAL PAPER SPREAD RELATIVE TO THREE-MONTH TREASURY BILL

December 31, 1982 – October 3, 2008



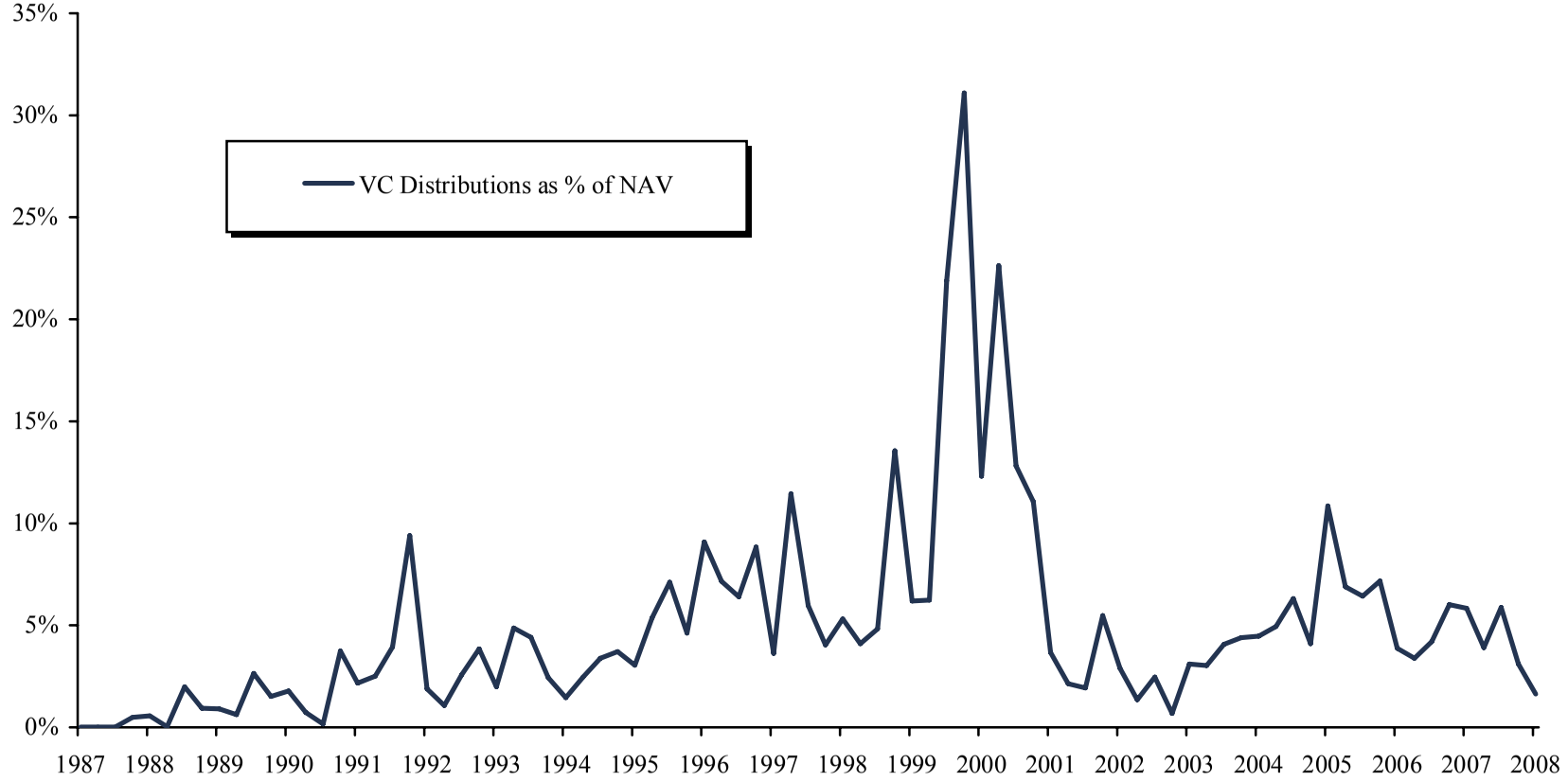
Source: Ned Davis Research, Inc.

Note: Data are weekly through October 3, 2008.

Exhibit 4

QUARTERLY VENTURE CAPITAL DISTRIBUTIONS

1987–2008



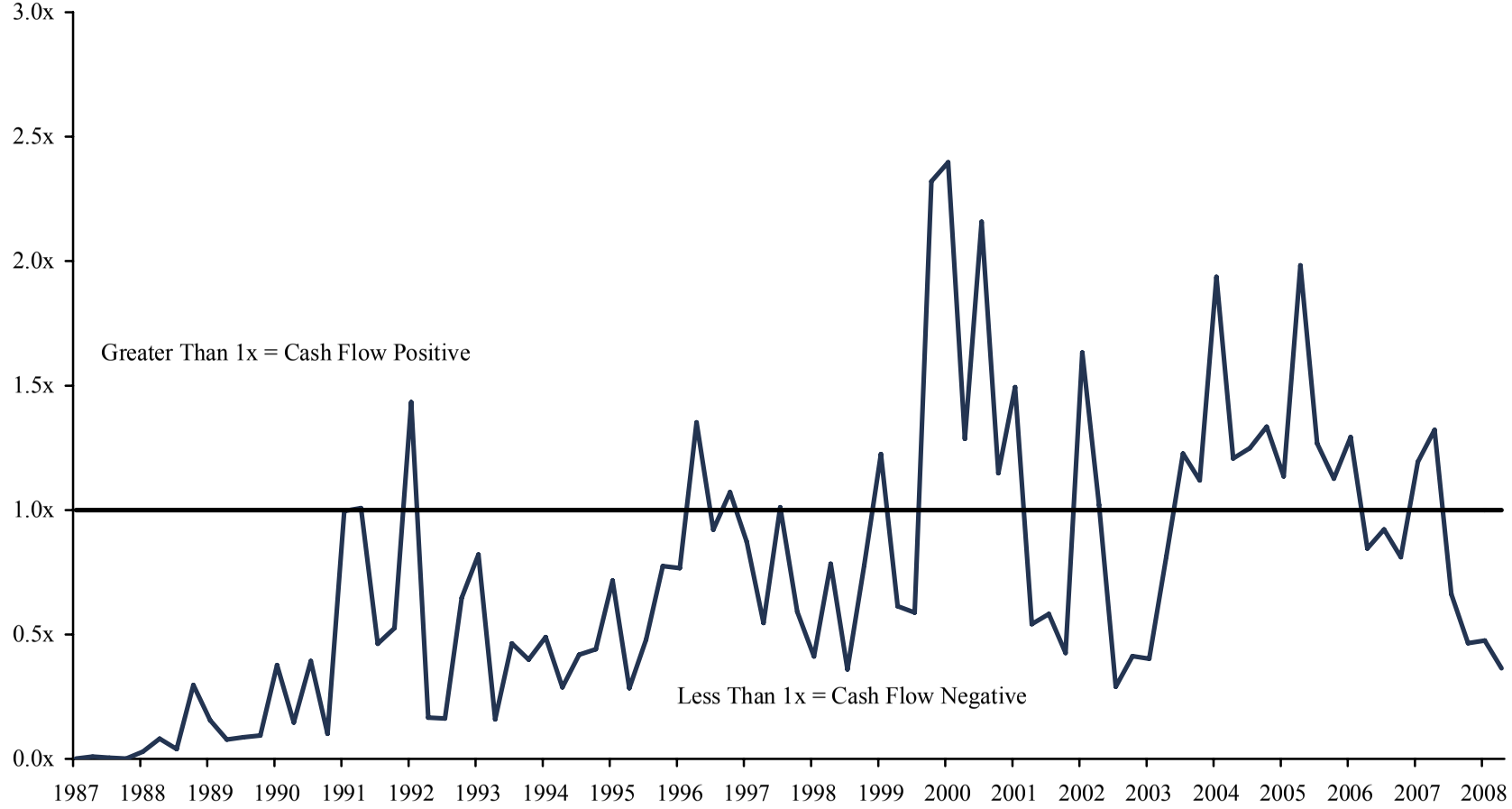
Source: Cambridge Associates LLC.

Note: Data drawn from several clients that have non-marketable alternative assets programs that begin in the 1980s, and represent aggregated distributions for all private equity and venture capital partnerships.

Exhibit 5

QUARTERLY RATIO OF DISTRIBUTIONS TO CAPITAL CALLS

1987–2008

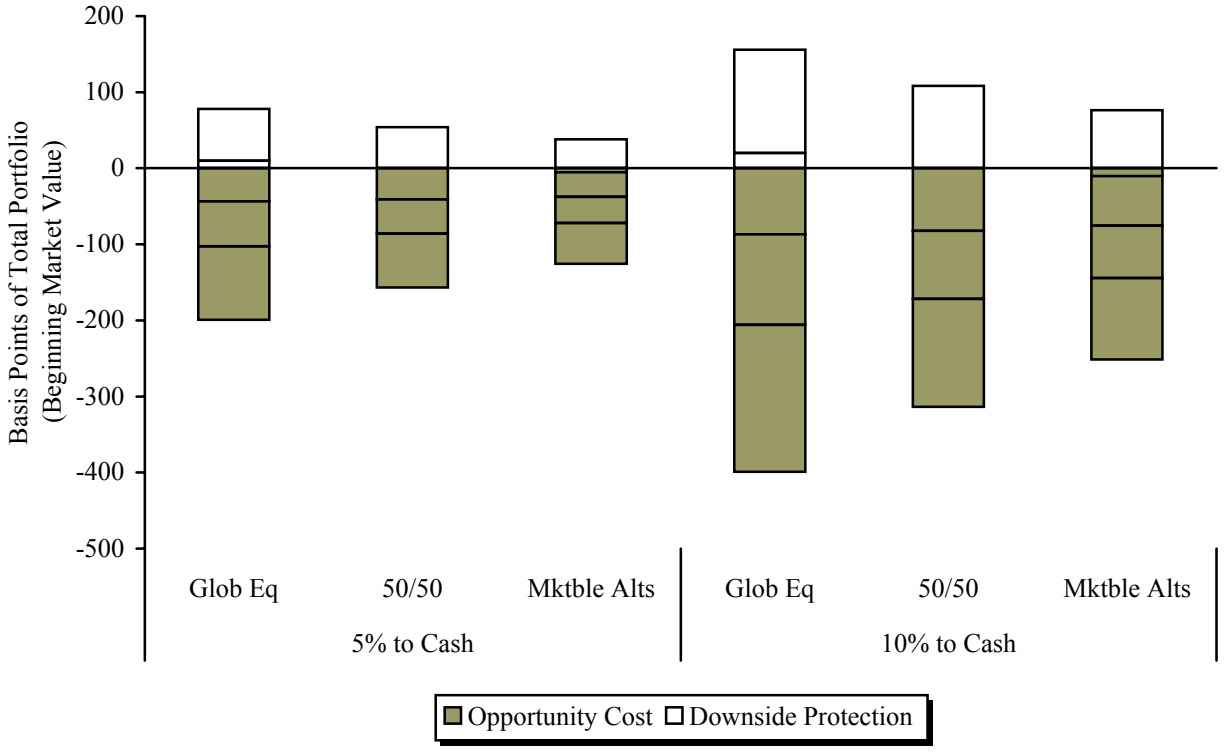


Source: Cambridge Associates LLC.

Note: Data drawn from several clients that have non-marketable alternative assets programs that begin in the 1980s, and represent aggregated distributions/aggregated capital calls for all private equity and venture capital partnerships.

Exhibit 6

ANNUAL OPPORTUNITY COST OF CASH RESERVE



Annual Opportunity Cost of Cash Reserve in Basis Points Relative to Total Portfolio Beginning Market Value

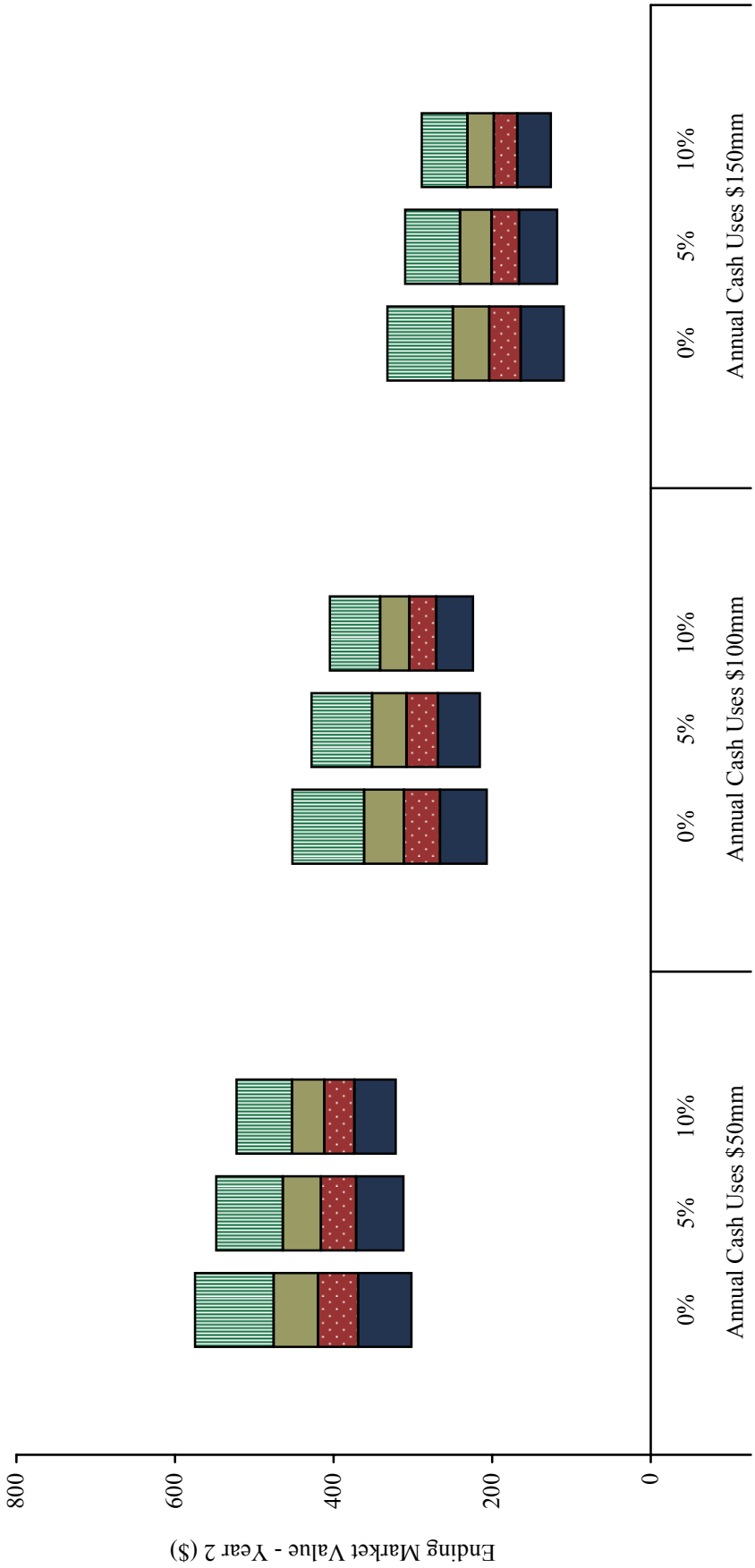
	5% to Cash			10% to Cash		
	Glob Eq	50/50	Mktble Alts	Glob Eq	50/50	Mktble Alts
5th	-200	-157	-126	-400	-314	-252
25th	-103	-86	-72	-206	-172	-145
50th	-44	-41	-38	-87	-82	-75
75th	10	0	-5	20	0	-10
95th	78	54	38	156	108	76

Note: The 50/50 portfolio is 50% in global equities and 50% in marketable alternatives.

Exhibit 7

DISTRIBUTION OF LIQUID POOL ENDING MARKET VALUE

5th–95th Percentile



Note: Assumes beginning market value of $450 million.

Appendix A

SECONDARY SALES OF NON-MARKETABLE ALTERNATIVE ASSETS INTERESTS

Appendix A

SECONDARY SALES OF NON-MARKETABLE ALTERNATIVE ASSETS INTERESTS

Key Characteristics of a Secondary Sale of a Limited Partnership

1. A limited partner (LP) will sell its existing interest in a fund and also transfer the obligation for any and all future capital calls as well as the right to any future distributions.
2. The secondary market has become increasingly viewed as an alternative liquidity and portfolio management option, and is no longer primarily the province of stressed sellers.
3. Secondary transactions are complex and necessarily lawyer-intensive as multiple parties and issues requiring detailed due diligence are involved. At a minimum, participants include the existing LP/seller, the new LP/buyer, and the general partner or partners (GPs).
4. In many cases, restrictions exist beyond the requirement for GP approval, which can add time and expense to the process (for example, any rights of first refusal held by the existing LPs).
5. Liquidity may not be immediate. Deal completion generally takes at least two to three months as the buyer completes its valuation of the existing LP interest and the terms and documents of the transfer are negotiated.
6. Investors selling interests in funds from access-constrained managers should realize that they are highly unlikely to get access to the manager's future funds.

If You Must Sell

1. Delay, if possible. Investors may wish to prepare to initiate a secondary sale once the market stabilizes if they anticipate a longer-term need to exit certain assets/obligations and may thereby act quickly if the flow of supply subsides.
2. Work with the GPs. Their consent is key to a smooth process and they may be able to discreetly identify interested buyers (particularly for access-constrained funds).
3. Consider thoughtfully approaching other existing LPs (with appropriate confidentiality protections in place) in the hope of securing a transaction on friendlier terms. An existing investor is more likely to be familiar with the portfolio and may have long-term objectives with the fund/manager.
4. Recognize that any sale will necessarily be a compromise between what an investor desires to sell and what can be sold effectively in the current market. Also, the secondary market is illiquid and can require substantial effort to identify buyers. Selling agents can provide valuable help to investors negotiating this process (for a price).
5. If speed is of the essence, a "swap" transaction may be possible where the buyer pays cash and effectively has economic rights to the assets, but the seller remains the LP and acts as a conduit for capital calls and distributions. This transaction type is atypical and involves counterparty risk in addition to legal and relationship issues.
6. Sellers that are not in immediate need of cash may also be able to bridge bid-ask spreads via structured payments with performance hurdles.
7. We strongly advise clients to speak with an experienced sell-side advisor before pursuing any of these options.

Summary Observations

The record levels of primary fund raising in recent years combined with the current market environment has led to tremendous current supply on the secondary market. In the past month more distressed sellers have emerged from the already sizable group of motivated sellers that have characterized the market in recent months. With valuations on the decline and as initial public offering and merger & acquisition markets remain frozen, investors anticipate longer holding periods and lower returns. As a result bids for secondary assets have come down as buyers price for the current environment and expect valuations to drop further when the books are closed on September 30 and at year-end. Market participants recently stated that average bids are generally at discounts to net asset value (NAV), where interests were still trading at a premium to NAV this time last year.

Appendix B

SAMPLE HEDGE FUND LIQUIDITY TRACKER

Appendix B

SAMPLE LIQUIDITY TRACKER FOR HEDGE FUNDS

Liquidity by Exit Date as of October 10, 2008

			Hard Lock-up		Soft Lock-up		Exit Without Fees				
					Follows Hard Lock-up						
Fund	**Share Class**	**Funding Date**	**Total**	**Remaining**	**Total**	**Remaining**	**Exit Frequency**	**Next Available Redemption**	**Notice (Days)**	**Notified By:**	**Days Until Exit as of 10/10/08**
Liquidity Within 0–6 Months											
AAA Partners Offshore Fund, Ltd.	D	7/1/2007	N/A	N/A	N/A	N/A	Monthly	11/28/2008	30	10/29/2008	49
BBB Institutional Partners, L.P.	LP	1/1/2004	N/A	N/A	N/A	N/A	Calendar Quarter	12/31/2008	65	10/27/2008	82
CCC Investors, Inc.	E	4/1/2004	N/A	N/A	N/A	N/A	Calendar Quarter	12/31/2008	45	11/16/2008	82
DDD Opportunities Fund, Ltd.	D	10/1/2007	N/A	N/A	N/A	N/A	Calendar Quarter	12/31/2008	45	11/16/2008	82
EEE Credit Fund, Ltd.	D	12/1/2007	N/A	N/A	N/A	N/A	Calendar Quarter	12/31/2008	45	11/16/2008	82
FFF International, Inc.	A	1/1/2004	N/A	N/A	12 Months	Expired	Calendar Quarter	12/31/2008	30	12/1/2008	82
GGG Fund, Ltd.	A	5/1/2004	12 Months	Expired	N/A	N/A	Calendar Quarter	12/31/2008	30	12/1/2008	82
HHH Japan Fund, Ltd.	A	4/1/2004	12 Months	Expired	N/A	N/A	Calendar Quarter	12/31/2008	30	12/1/2008	82
III Fund, L.P.	LP	1/1/2004	N/A	N/A	39 Months	Expired	Calendar Quarter	3/31/2009	90	12/31/2008	172
Liquidity Within 7–12 Months											
JJJ International, Ltd.[1]	B, Series 1	1/1/2004	6 Months	Expired	Ongoing	Ongoing	Annually June	6/30/2009	90	4/1/2009	263
KKK Capital Fund, Ltd.[2]	A	7/1/2005	12 Months	Expired	Ongoing	Ongoing	Annually June	6/30/2009	45	5/16/2009	263
Liquidity Within 13–18 Months											
LLL Capital, Ltd.[3]	F Series	11/1/2005	24 Months	Expired	N/A	N/A	Anniversary of Purchase	10/30/2009	45	9/15/2009	385
LLL Capital, Ltd.[3]	F Series	2/1/2007	24 Months	Expired	N/A	N/A	Anniversary of Purchase	10/30/2009	45	9/15/2009	385

Appendix B (continued)

SAMPLE LIQUIDITY TRACKER FOR HEDGE FUNDS

Liquidity by Exit Date as of October 10, 2008

			Hard Lock-up		Soft Lock-up		Exit Without Fees				
					Follows Hard Lock-up						
Fund	**Share Class**	**Funding Date**	**Total**	**Remaining**	**Total**	**Remaining**	**Exit Frequency**	**Next Available Redemption**	**Notice (Days)**	**Notified By:**	**Days Until Exit as of 10/10/08**
Liquidity within 13–18 Months (continued)											
MMM Overseas Fund, Ltd.[4]	B	1/1/2004	Rolling	Rolling	N/A	N/A	Every 36 Months	12/31/2009	90	10/2/2009	447
NNN Offshore Partners, Ltd.	A - July 1-Dec 1	10/1/2007	25 Months	13 Months	N/A	N/A	Annually December	12/31/2009	90	10/2/2009	447
Liquidity Within 25–36 Months											
NNN Offshore Partners, Ltd.	A - July 1-Dec 1	2/1/2008	25 Months	17 Months	N/A	N/A	Annually December	12/31/2010	90	10/2/2010	812
OOO Fund, Ltd.	BB	1/1/2008	N/A	N/A	Rolling	Rolling	Every 36 Months	12/31/2010	60	11/1/2010	812
OOO Fund, Ltd.	BB	2/1/2008	N/A	N/A	Rolling	Rolling	Every 36 Months	3/31/2011	60	1/30/2011	902
Illiquid Side Pockets											
PPP Partners, L.P.	B	2/1/2007									
MMM International, Ltd.	S	1/1/2006									
NNN Offshore Partners, Ltd.	Special Situation Shares	10/1/2007									

Notes: Early Liquidity Option: Dates and fees are only shown if early liquidity is available and next available early liquidity date is prior to redemption date without fees. Market values are estimated for funds with more than one tranche.

[1] Ongoing soft lock-up: Redemptions allowed on quarter-ends that are not June 30 are subject to a 1.5% redemption fee.

[2] Redemptions made on the first anniversary of the initial purchase and on each June 30 are not subject to a redemption fee. Redemptions made on September 30 are subject to a 3% fee. Redemptions made on December 31 are subject to a 2% fee. Redemptions made on March 31 are subject to a 1% fee.

[3] Lock-up time is based on initial purchase only. The exit frequency of subsequent purchases is the anniversary purchase date of the initial purchase, taking the lock-up into account.

[4] As of each fiscal year-end upon 45 days' written notice, a limited partner may withdraw up to full amount of "Adjusted Excess Profits." See offering memorandum for details.

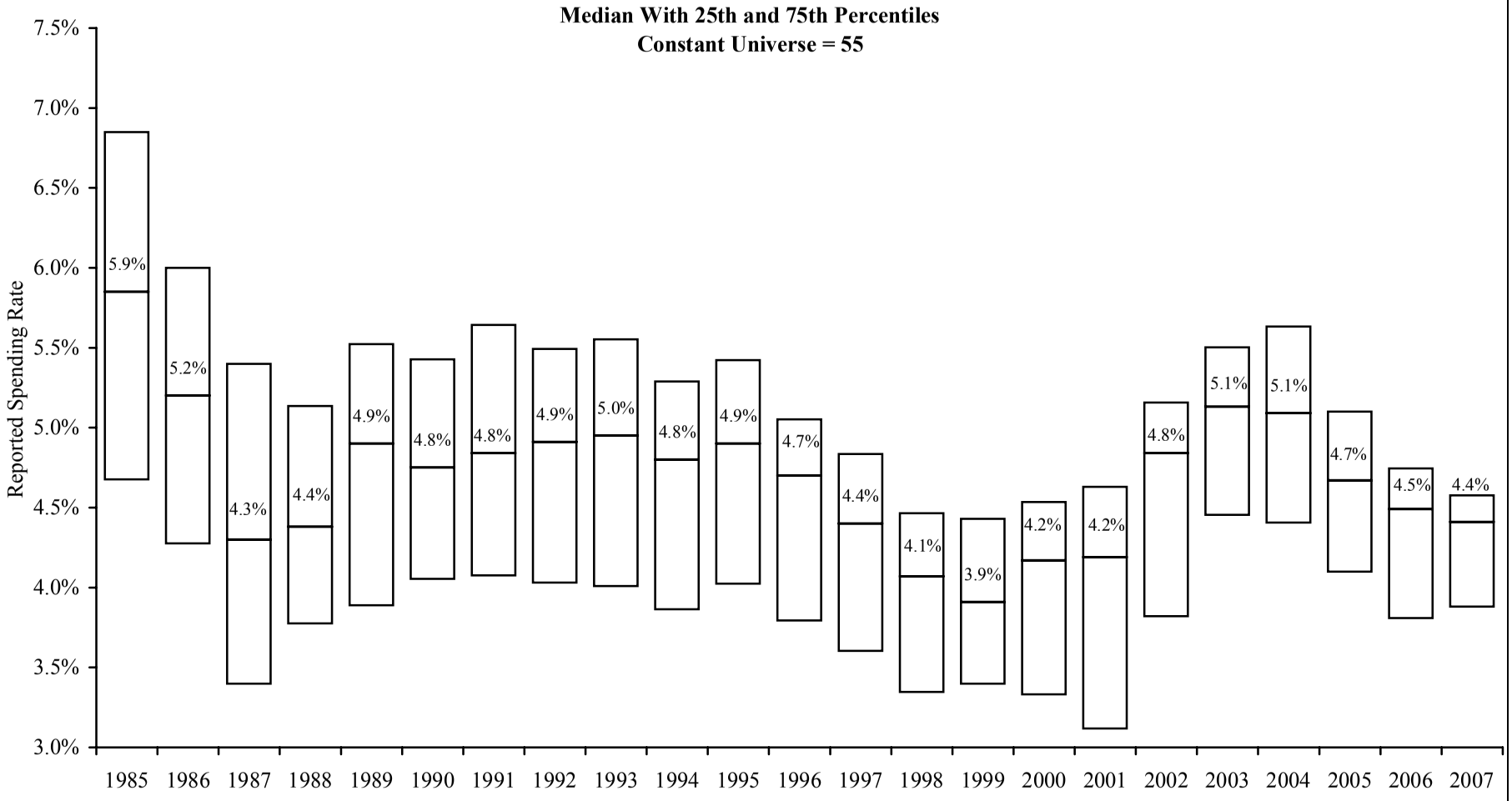
Appendix C

SPENDING RATES OVER TIME

Appendix C

COLLEGE AND UNIVERSITY SPENDING RATES

College and university spending rates range widely in any given year, but the medians show how effective spending rates fell during the bull market of the late 1990s and rose in the bear market of the early 2000s. This pattern is to be expected, given the wide use of smoothing rules. Foundation spending moves in a narrower band, and has a natural floor near the IRS-mandated 5% minimum spending rate.



Source: Cambridge Associates LLC.

Appendix D

FICTIONAL CASE STUDY: *GREAT RIVER UNIVERSITY*

Appendix D

FICTIONAL CASE STUDY: *GREAT RIVER UNIVERSITY*

In the interest of providing an example of the analysis investors should pursue in evaluating portfolio liquidity and developing a comprehensive liquidity management plan, we present the case of Great River University. First we assess how illiquid the endowment could become, then we look at alternatives for increasing liquidity.

Great River University has the benefit of a $1 billion endowment that provides substantial support (e.g., 40%) to its operating budget. The University has been investing in alternative investments for quite some time, and now has substantial allocations to hedge funds (25%) and non-marketable alternative assets (NMAA) (25%) with an additional $175 million of unfunded capital commitments. The CIO, Leslie N. Dowment, is concerned that his unfunded capital commitments have reached 17.5% of his portfolio market value. (In particular, he is worried that this percentage is really higher as the values for his NMAA holdings are quite stale given the normal lag in reporting, and that their true current fair values are now lower than they were several months ago at their last official mark to market. This would further reduce the value of the total endowment, and consequently push the percent of uncalled NMAA commitments even higher.)

With these factors in mind, he wants to evaluate the impact on the liquidity profile of the portfolio if endowment market values were to deteriorate further. His preliminary instinct is that he may need to raise some cash as a liquidity reserve, to ensure access to cash in these fast-moving markets. Given his near-term cash needs, his initial thought is that such a reserve might need to be 10% of assets.

The University's current asset allocation is:

Current Asset Allocation

	Percent (%)	US$ Millions
Global Equities	40	400
Bonds	10	100
Cash	0	0
Semi-Liquid[1]	25	250
NMAA[2]	25	250
Total Assets	100	1,000

[1] Primarily hedge funds.

[2] Diversified exposure to buyouts, venture capital, real estate, and oil & gas.

Based on their current asset allocation and assumptions about long-term asset class expected performance, the CIO knows his portfolio has a long-term nominal expected return of roughly 9%. Knowing these are unusual times, he would like to stress test his portfolio to see how well the University's cash needs could be met during extreme market conditions. He tests the portfolio under a -2 standard deviation event and a -3 standard deviation event (a low probability, but devastating, tail event).

Capital calls and distributions are difficult to predict, but Les makes the assumption that calls over the next three years will be in line with current expectations. Distributions are likely to be low if the capital markets continue to struggle, so he takes them down to 25% of their normally expected levels. Some committee members have expressed concern that distributions could drop to a trickle while capital calls could accelerate, so he also evaluates a second scenario in which capital calls double, while distributions evaporate entirely.

Great River's operating budget is highly dependent on its endowment, and it is expected that nominal spending is essentially fixed for the next three years. (Spending may even go up should the University have shortfalls in other sources of revenues such as grants and alumni donations.) For the purposing of the modeling below, Les assumes that nominal spending is fixed. He also assumes that capital calls will need to be met by the endowment, with no outside revenue sources available to help meet cash needs.

Base Case:

Anticipated Cash Flows

	FY09	FY10	FY11
Planned Spending	**$45**	**$50**	**$50**
Capital Calls	$40	$40	$40
Distributions	$50	$50	$50
Total Cash Flow Needs	$35	$40	$40

Cash Flow Scenario 1:

Anticipated Cash Flows

	FY09	FY10	FY11
Planned Spending	**$50**	**$50**	**$50**
Capital Calls	$40	$40	$40
Distributions	$13	$13	$13
Total Cash Flow Needs	$77	$77	$77

Cash Flow Scenario 2:

Anticipated Cash Flows

	FY09	FY10	FY11
Planned Spending	**$50**	**$50**	**$50**
Capital Calls*	$80	$80	$80
Distributions	$0	$0	$0
Total Cash Flow Needs	$130	$130	$130

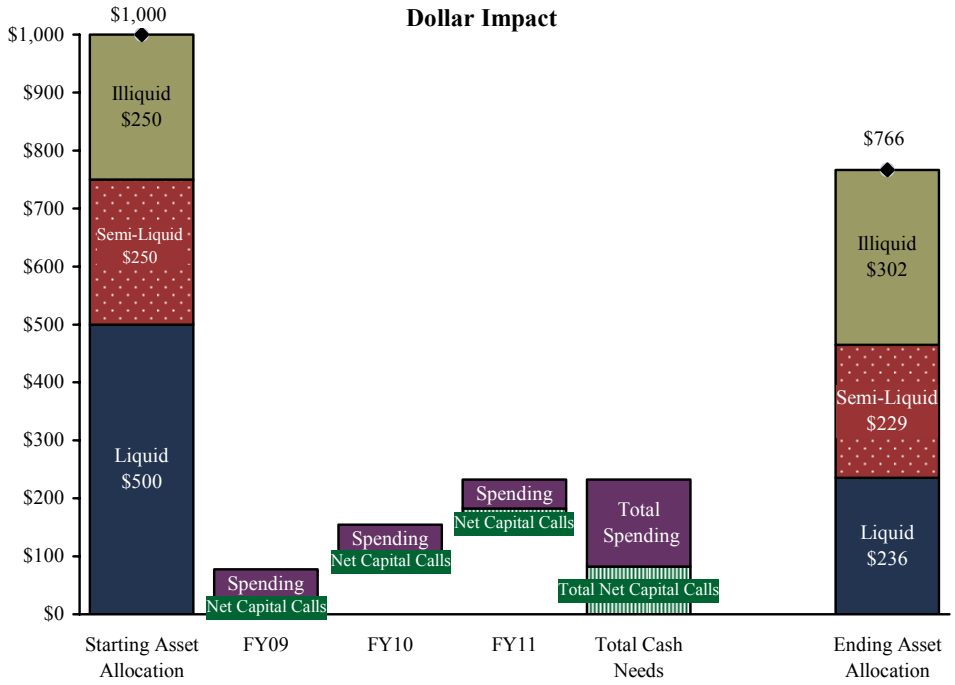
* Assumes institution continues to makes new commitments beyond its current $175 million of uncalled capital commitments.

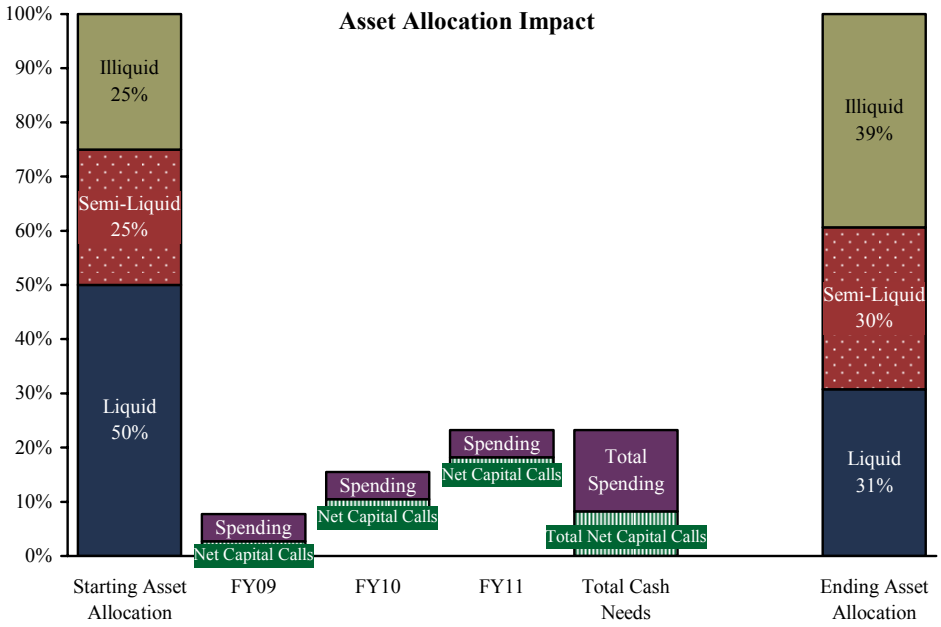
Using these assumptions, Les models how the liquidity profile of the endowment might be expected to change both in percentage and dollar terms under both severe underperformance scenarios. For simplicity, the models are run assuming no rebalancing, which is roughly in line with a "where could I end up if I do nothing now?" scenario. This provides a starting point for assessing what, if anything, he should do to increase the likelihood that the endowment will have adequate liquidity to meet capital calls and spending requirements. The results of his modeling are shown on the next four pages.

Cash Flow Scenario 1: Spend $50 million/year, capital calls remain stable, distributions drop to 25% of historical value. Annual cash needs of $77 million.

-2 Standard Deviation Outcome, Three-Year Annualized Return of -2.2%

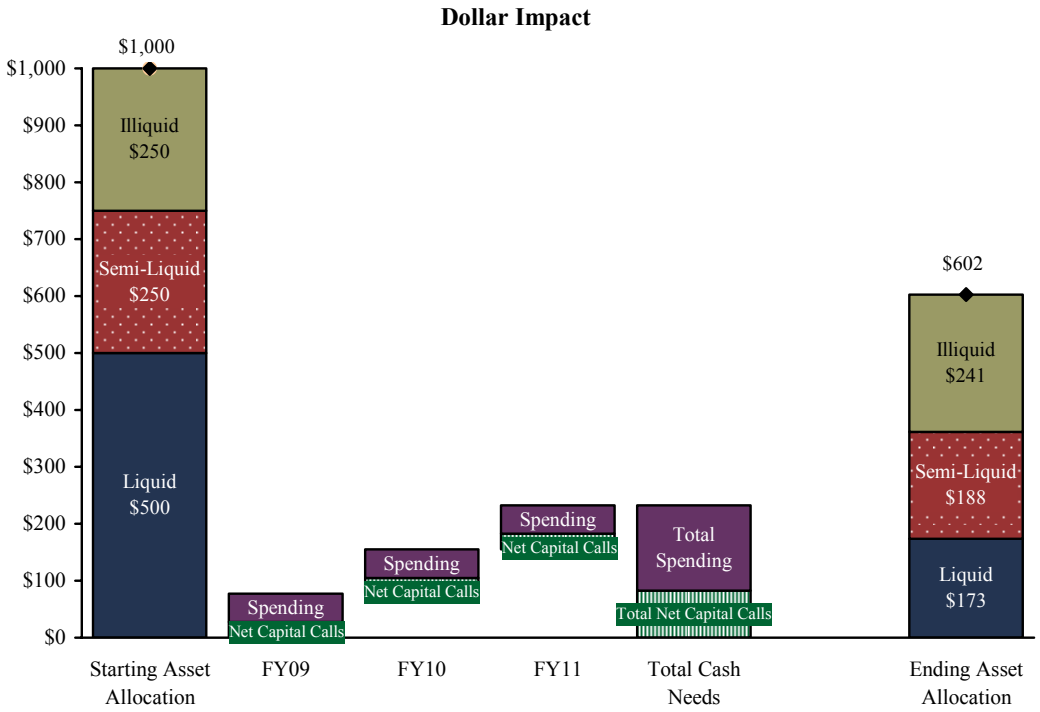
Under this scenario, the endowment would lose an estimated 6.3% on its investments and liquidate roughly 15% of its assets over the three years, which takes total assets down by roughly 23% to $766 million. Additionally, capital calls would send illiquid assets up to 39% of the portfolio. Even more worrisome, liquid assets (cash, stocks, and bonds) now represent just over three years of cash needs, assuming the same level of cash flows is sustained in year four.

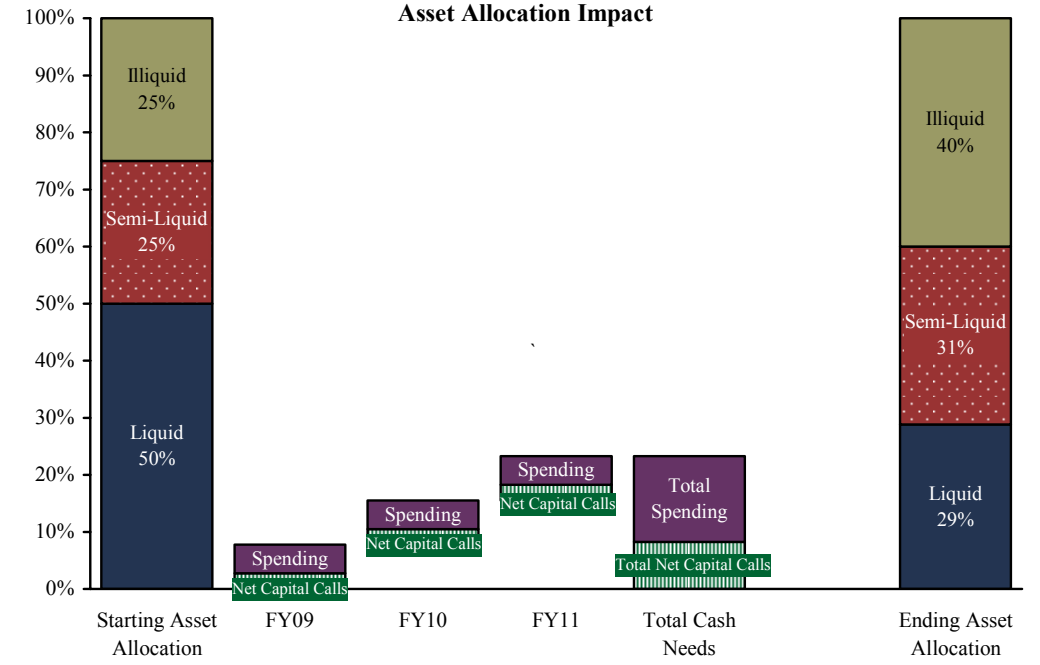




-3 Standard Deviation Outcome, Three-Year Annualized Return -7.9%

Under this scenario, the endowment would lose more than 21% on its investments and spend roughly 15% of its assets, taking total assets down by nearly 40% to $602 million. Additionally, as the NMAA managers continue to call capital, illiquid assets would have grown to 40%. Liquid assets (cash, stocks, and bonds) now represent two-and-one-quarter years of cash needs.

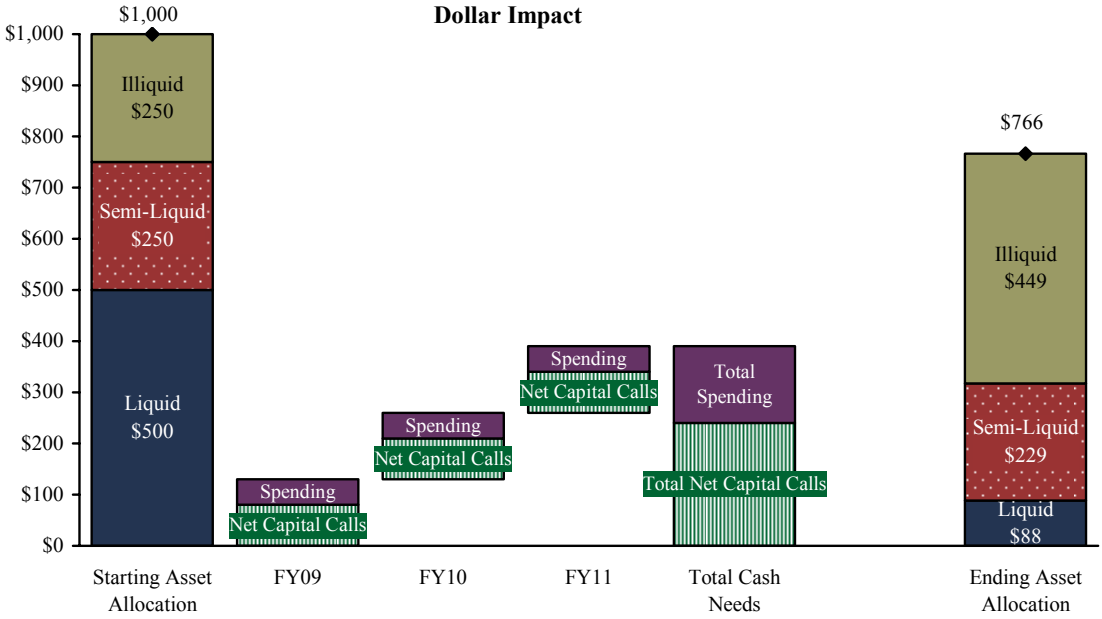


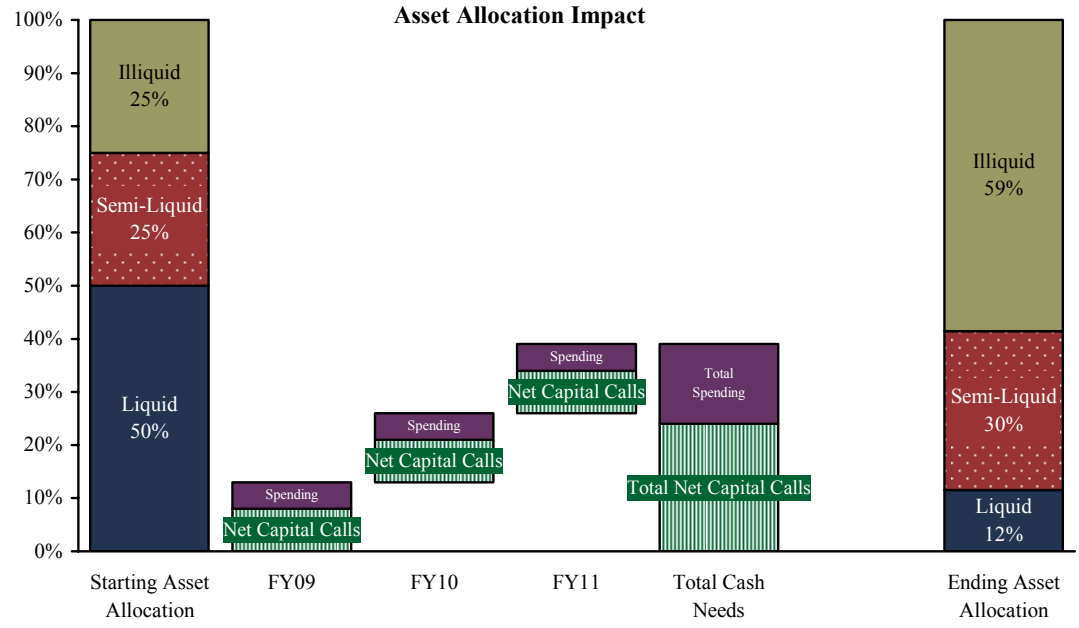


Cash Flow Scenario 2: Spend $50 million/year, capital calls double, and distributions stop. Annual cash needs of $130 million.

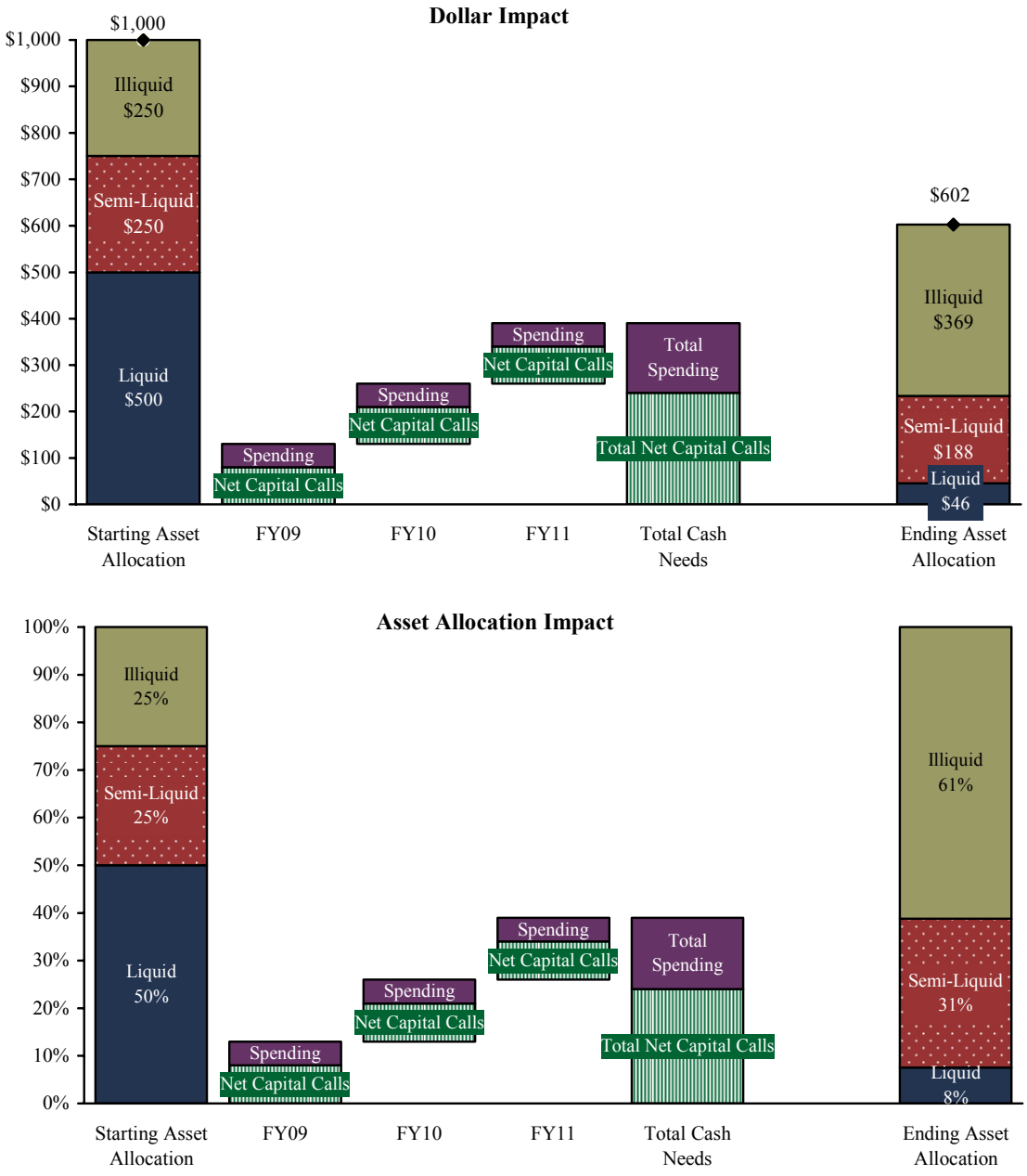
Under this scenario, the market impact would be identical to that of Scenario 1; however, the asset allocation would become far more skewed to NMAA, since distributions stop completely while capital calls double as managers accelerate existing commitments and the University continues to commit new capital. In the -2 standard deviation return environment, illiquid assets grow to 59% of the portfolio, and liquid assets (cash, stocks, and bonds) now represent less than 70% of annual cash needs. The -3 standard deviation environment is obviously more severe.

-2 Standard Deviation Outcome, Three-Year Annualized Return -2.2%





-3 Standard Deviation Outcome, Three-Year Annualized Return -7.9%



Under both sets of assumptions regarding NMAA, accelerated capital calls and spending requirements would have fairly severe implications for liquidity should Les take no action. As such, steps need to be taken to mitigate the impact of such potential outcomes. The CIO, however, has a fixed menu of options, as spending and NMAA cash flows relating to the endowment's existing portfolio of funds are largely out of his hands. He considers the following options:

(a) Raise cash by selling public equities;
(b) Raise cash by redeeming some portion of his hedge fund program;
(c) Fund spending from the high-quality bond portfolio, which is intended to serve as a resource during difficult market environments;
(d) Reduce cash needs over time by stopping or slowing new NMAA commitments;
(e) Raise cash and reduce future cash needs by attempting a secondary sale of NMAA assets; and
(f) Or some mix of options A, B, C, and D.

Reducing NMAA commitment pace is certainly in order in the face of a lower endowment value and asset allocations over target. Still, such a slowing or even outright suspension of new NMAA commitments will have only a limited impact on the portfolio's near-term cash needs. Option D, a secondary sale of NMAA assets, is unattractive given the current market for secondaries, but is a consideration down the road. He can also spend down his bond portfolio, but prefers to maintain this protection rather than sell it down too far below policy targets. Should he need to sell down his bond portfolio, he could increase the duration of the remaining bonds, keeping a similar degree of insurance in place. However, Les determines the bond portfolio may not provide adequate insurance in the current environment, as yields are already very low and Treasuries are very expensive, so he decides to also focus on some combination of options A and B, which would change both the amount of his liquid assets and enable him to raise more cash. Before taking this recommendation to his committee he first wants to evaluate these options further.

While Les and his committee have always agreed to minimize cash balances, he thinks creating a temporary liquidity reserve is now prudent insurance against a liquidity crunch, and would like to calculate the cost of that insurance. Thinking in round numbers, he decides to evaluate the expected impact of a 10% cash liquidity reserve (as 10% is close to his annual spending plus capital calls) if he were to raise that reserve immediately (obviously a simplifying assumption) by selling stocks, hedge funds, or a 50/50 mix of stock and hedge funds. Below is a summary of the results of the potential impact on expected returns under a range of capital markets outcomes. As the boxed data point shows, if Les raised 10% cash by selling a 50/50 mix of stocks and hedge funds and the portfolio experienced a -2 standard deviation event, the annual expected return would be -2.1%.

Expected Returns

		Raise 10% Cash from Selling:		
	Base	Public	Hedge	50/50 Mix
Range of Outcomes	Case	Stocks	Funds	HF and Stocks
2 std devs	21.9%	19.8%	20.5%	20.1%
1 std devs	15.7%	14.3%	14.8%	14.6%
Average	9.5%	8.9%	9.1%	9.0%
-1 std devs	3.3%	3.5%	3.4%	3.4%
-2 std devs	-2.9%	-2.0%	-2.3%	-2.1%
-3 std devs	-9.0%	-7.4%	-8.0%	-7.7%

Put another way, the chart below shows the total expected cost/benefit of holding that 10% cash position. In the case of the -2 standard deviation outcome, Les' decision would have realized a $21 million improvement in the market value of the endowment at the end of the three-year period. (Conversely, the chart shows that if endowment returns were at its long-term average the decision would have cost the endowment $18 million of forgone returns.)

Three-Year Cumulative Cost/Benefit vs Base Case to 10% Liquidity Reserve

		Raise 10% Cash from Selling:		
	Base	Public	Hedge	50/50 Mix
Range of Outcomes	Case	Stocks	Funds	HF and Stocks
2 std devs	N/A	($92)	($60)	($77)
1 std devs	N/A	($54)	($35)	($45)
Average	N/A	($21)	($14)	($18)
-1 std devs	N/A	$5	$2	$4
-2 std devs	N/A	$26	$16	$21
-3 std devs	N/A	$42	$26	$35

To further characterize the opportunity cost of the decision he prepares the chart below to show the impact on expected returns of such a move. The boxed value shows that if the portfolio experienced average expected returns, the endowment would forgo roughly 50 basis points of return to increase the liquidity pool of the endowment.

Annual Cost of Insurance (in terms of forgone returns)

		Raise 10% Cash from Selling:		
	Base	Public	Hedge	50/50 Mix
Range of Outcomes	Case	Stocks	Funds	HF and Stocks
2 std devs	N/A	-2.1%	-1.4%	-1.8%
1 std devs	N/A	-1.4%	-0.9%	-1.1%
Average	N/A	-0.6%	-0.4%	-0.5%
-1 std devs	N/A	0.2%	0.1%	0.1%
-2 std devs	N/A	0.9%	0.6%	0.8%
-3 std devs	N/A	1.7%	1.0%	1.4%

Les in fact is worried the markets will be flat to down over the next few years, and so this liquidity reserve might actually serve to preserve capital, and be additive to the fund's overall expected returns as can be seen in the -1, -2, or -3 standard deviation events.

Given the uncertainty in the markets, Les feels he should recommend implementing a 10% cash reserve by opportunistically rebalancing his public equity and hedge fund investments to the low end of their target allocation ranges as market volatility allows.

In sum, Les' game plan is to:

1. Meet with his CFO and affirm the forecasted spending needs over the next three years.
2. Be prepared to reduce the level of new NMAA commitments as allocation targets are exceeded.
3. Closely monitor capital call activity.
4. Create a liquidity reserve of 10% of assets by opportunistically taking down public equity and hedge fund exposures.
5. Use bonds to meet cash needs as the cash liquidity reserve is built up and extend the duration of the remainder of the bond portfolio should the allocation dip below targets.
6. Continuously top off the liquidity reserve through periodic rebalancing.
7. Re-evaluate the liquidity environment with his committee at least every six months, and review the need for the liquidity reserve.