



*Enhancing the investment returns
of non-profit organizations*

MESSAGE IN A BOTTLE

A Review of Investment Premises and Policies

This monograph was originally published in two parts. Part I appeared in TIFF's Commentary dated March 31, 1999, and Part II appeared in the June 30, 1999, Commentary.

Fortuitous Find

Magnum-Sized. Believe it or not, some faithful readers of TIFF's voluminous reports voiced complaints about our last batch of quarterly commentaries, which were larded with an abnormally large number of baseball anecdotes. Did readers complain that we injected too much humor into what should have been utterly serious reports? Not at all: they complained that we had failed yet again to diversify our anecdotal reservoir with tales gleaned from other sports. We're doing our best to diversify our holdings to a greater extent (e.g., golf too has a rich tradition of anecdotal humor, although there is not much interest in the game within TIFF and some members of the staff are stridently anti-golf). But readers may not enjoy the fruits of our diversification efforts for some time, and until such fruits ripen, we will do our best to avoid invoking baseball anecdotes to bring home certain points. Indeed, there are surprisingly few baseball allusions in this document, and one of them is oblique at best: the star of the movie from which we've borrowed the title to the very long piece that follows was also the star of a memorable flick about baseball (Kevin Costner, a/k/a Crash Davis in *Bull Durham*). The piece in question represents Part I of a two-part message that one peripatetic member of the TIFF staff found in a beached bottle. Like Mr. Costner's female pursuer in the recent hit film *Message in a Bottle* (Theresa Osborne, played by Robin Wright Penn), the TIFF staffer in question knows not this document's true origins — at least, not yet. But we are publishing it nonetheless because it is a comprehensive review of the premises underlying the investment program pursued by what would appear to be a large philanthropy. Indeed, "comprehensive" is a vast understatement because the "message" that follows comprises a very lengthy critique of an immensely popular approach to long-term asset allocation known as mean-variance analysis ("MVA"), a/k/a efficient frontier analysis. Evidently, this particular organization has been relying heavily on MVA for some time, and the following document was crafted primarily to induce certain trustees to rely less heavily on MVA and more heavily on alternate approaches to maintaining and enhancing endowment purchasing power.

Looking Ahead

Two-Part Message. As previously noted, the "message in a bottle" that we are publishing comprises two parts, with the following table of contents.

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First Principles

Food for Thought. Not all of TIFFF’s directors and officers agree fully with the “message in a bottle” reproduced below. But even if certain directors and officers disagree with certain aspects of this document, they agree that it provides considerable food for thought, and they encourage readers to consider the extent to which any endowed institutions with which they are associated have formulated similarly comprehensive statements of the premises underlying their investment programs. Experience suggests that it is by no means easy to fashion such a statement, and the difficulty of the task increases geometrically as the number of trustees engaged in the discussion increases. But the value of clear “first principles” tends to be directly proportionate to the effort expended in formulating them, and as part of its mission of helping all philanthropies (members or otherwise) to make more productive use of their endowments, TIFFF implores all trustee groups to develop their own statement of “first principles.” These statements need not be as long as the one that follows, of course, but they should be **at least** as clear as what follows — and perhaps even freer of apparent logical defects.

Odd-Shaped Cookie. At the risk of insulting readers who know intuitively why we are labeling the policy review that follows mere “food for thought,” we feel compelled to emphasize that it is geared to a foundation whose idiosyncratic attributes may differ in material respects from those of other endowed institutions with which readers are affiliated. Differently put, readers tempted to apply what follows in “cookie cutter” fashion to the investment challenges facing their own organizations should be aware that it is designed to produce an odd-shaped cookie: the foundation in question has a relatively large asset base, does not necessarily seek perpetual life status, and displays other idiosyncracies that differentiate it from the typical foundation (if there is such a thing).

Ringling Endorsement

Part-Timers Not Wanted. To your editor’s way of thinking, arguably the most important paragraph of the document that follows is the first one (entitled *Purposes*). Why? Because many years of experience advising institutional funds suggest that the chief obstacle to investment success for many eleemosynary

funds is excessive diffusion of responsibility at the governing board level. To be sure, a shortage of time or expertise at the governing board level can also be sufficient conditions for failure, but having too many chefs in the kitchen is almost always a recipe for disaster, especially if some of the chefs appear in the kitchen on a part-time basis only. In today’s wired world, trustees need not always be in the same room to hold meaningful discussions, and the ease with which meetings can be conducted via teleconference and videoconference is making it increasingly easy for individuals living in different cities (if not countries) to engage in joint decisionmaking. Interestingly, the single most successful investment committee of all time meets telephonically far more often than it meets face-to-face, a practice that admittedly is facilitated by the committee’s very small size. (Mr. Buffett lives in Nebraska, and his sole fellow committee member Mr. Munger lives in California.) Indeed, it may be that improving communications technologies are compounding rather than reducing the problem of having too many chefs in the kitchen: trustees whose interest in an institution’s investment process tends to be episodic rather than constant may find it easier to inject themselves into the conversation if they can do so from the comfort of their own homes or offices.

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Preface

Purposes. The purpose of this document is two-fold: (1) to codify the Foundation’s investment policies and (2) to codify the premises on which these policies rest. To make the policies more intelligible to first-time readers, the premises (§I below) precede the policies themselves (§II). As noted below (see “Strengths”), the Foundation believes that investment committees function best when they are kept small in size and when participation in committee deliberations is confined to board members who are closely familiar with the Foundation’s investment policies and practices. To the extent that members of the Foundation’s board who do not serve on its Investment Committee (“IC”) attend IC meetings, it is expected that they will have read this document, recently and in its entirety, before playing an active role in IC discussions.

Ongoing Review. To remain effective, the Foundation’s investment program must be responsive to both the Foundation’s evolving needs and to changing external market conditions. Accordingly, it is imperative that the Foundation’s Investment Committee review this document on an ongoing basis and make changes as needed. Material changes shall be communicated to the Foundation’s Board of Trustees (“Board”).

Format. Within each section, boldface and italics are used to lend order to the paragraphs, as follows: the paragraph header for each topic appears in **Boldface**; the header for each subsidiary topic therein appears in **Italicized Boldface**; the header for each topic therein (“sub-sub-topic”) appears in *Italics*; and the headers for any subsidiary paragraphs appear in Regular Typeface.

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Part I. Premises

The major premises underlying the Foundation’s investment program can be usefully sub-divided into four categories: premises respecting the Foundation’s idiosyncratic goals and competencies (§I.A); premises respecting the markets in which the Foundation’s assets are invested (§I.B); premises respecting methods that the Investment Committee should employ when deploying the endowment across and within asset classes (§I.C); and premises respecting the attributes to be sought in external managers (§I.D).

A. Foundation Goals and Competencies

Targeted Life. In contrast to many grantmaking institutions of comparable size, the Foundation does not seek perpetual life status. The Foundation ascribes more importance to funding high-quality programs consistent with its grantmaking priorities than it does to the pursuit of perpetual life status for its own sake. The investment policies outlined below assume that grantmaking could cause the Foundation’s endowment to become depleted fully by the late 21st century. The actual depletion rate will depend on the magnitude and quality of grantmaking opportunities that arise and external market conditions.

Liquidity Needs. The Foundation is compelled by law to distribute an average of 5% of its assets per annum. By design, only a limited portion of the Foundation’s annual distributions are contractually committed, and the Foundation stands prepared to reduce spending in constant dollars in order to prevent the forced sale of holdings at depressed prices. It also stands prepared to distribute a substantial fraction of its assets in a given year if compelling grantmaking opportunities arise. Accordingly, the Foundation has a finite tolerance for illiquid investments (defined as investments not readily reducible to cash within 20 business days).

Current Spending Policies and Commitments. For calendar year 1999, annual distributions plus expenses are expected to approximate 6% of gross assets at year-end 1998. The face value of unpaid future commitments to grantees approximates 10% of gross assets, or about 8% of gross assets when discounted to present value using a nominal discount rate equal to the yield-to-maturity of 91-day US Treasury bills.

PI-Related Cash Flows. The Foundation is obliged to meet capital calls from certain private investment (“PI”) managers that prefer to call down client funds on an as-needed basis only. In accordance with written agreements between such managers and the Foundation, the Foundation’s PI-related capital commitments are defined over a multi-year time period. In practice, such commitments can sometimes be substantially if not fully met by redeploying funds generated by earlier PI commitments (cash distributions or sales of in-kind distributions). However, the policies set forth in §II assume that under worst-case conditions the Foundation’s external PI managers will suspend such liquidations, obligating the Foundation to satisfy with

non-PI resources aggregate calls ranging as high as 15% of total assets over a rolling five-year period.

Investment Time Horizon. Consistent with its targeted life as defined above, the Foundation's theoretical investment time horizon is long term. Its actual investment time horizon is shorter than theory suggests, however, for two reasons: first, the Foundation's liquidity needs preclude the implementation of a long-term buy-and-hold policy respecting all of its assets; second, the Foundation's trustees and staff think it unwise to assume that their investment decisionmaking will be entirely free of behavioral tendencies that cause most institutions' actual time horizons to be shorter than theory suggests (see **Behavioral Pitfalls** below).

Investment Objectives. The Foundation's investment objectives must be consistent with the boundary conditions set forth in this §I. These objectives are stated summarily below and discussed in greater detail in §II.

Primary Return Objective. The Foundation's primary return objective is to preserve the purchasing power of the unitized value of its endowment assets, net of administration and investment management costs, over rolling five-year periods. This goal is synonymous with the pursuit of a time-weighted return on endowment assets that is at least equal to an inflation rate appropriate to the Foundation (the CPI or an agreed-upon alternative) measured over rolling five-year periods.

Secondary Return Objective. The Foundation's secondary return objective is to enhance the purchasing power of the unitized value of its endowment assets over rolling five-year periods. This goal is synonymous with the pursuit of a time-weighted annualized return on endowment assets that exceeds an inflation rate appropriate to the Foundation plus five percent net of all costs, measured over rolling five-year periods.

Tertiary Return Objective. The Foundation's tertiary return objective is to avoid peak-to-trough declines in unitized endowment purchasing power exceeding 30%.

Underpinnings. The adoption of objectives expressed in unitized terms reflects an assumption that the endowment's total market value could potentially shrink in accordance with the Foundation's overall financial goal of potentially liquidating its assets. The

adoption of rolling five-year periods for assessment of results reflects a balancing of the financial goal with its Board's perceived tolerance for unexpectedly poor results. The five-year period for assessing results is intended as a floor but not a ceiling; its adoption indicates that the Board ascribes little importance to declines in unitized endowment purchasing power that have persisted for less than five years, unless they entail peak-to-trough declines exceeding 30%. The 30% limit serves as a proxy for the Foundation's tolerance for changes in its financial condition that, however fleeting, would likely trigger fundamental changes in the scope and character of its grantmaking endeavors.

Other Attributes. The Foundation's investment policies must necessarily be sensitive to its distinctive attributes, including the following:

Strengths. The Foundation derives a theoretical "edge" when investing (relative to most US-based institutional investors) from at least four important attributes:

Large Asset Base. At present, the Foundation's endowment is large enough to permit it to surmount the minimums imposed by external managers and to retain highly qualified outside consultants without incurring fees that are disproportionate in relation to the Foundation's total assets. This advantage could erode over time if the absolute size of the endowment declines due to a material acceleration in the Foundation's grantmaking activities.

Small Committee Size. To avoid "lowest common denominator" decisionmaking (i.e., decisions dictated by the least expert person involved) as well as excessive diffusion of responsibility for portfolio results, the Foundation's Investment Committee ("IC") is small in comparison to peer group norms. At present, the Committee comprises four voting members: the Foundation's president, its chief investment officer, and two non-executive investment professionals. The Foundation is committed to keeping the IC's membership at five individuals or fewer under all circumstances, including any staff members serving as voting members of the Committee.

Low Concern for Reputational Risk. A fear of underperforming other investors (especially peer institutions) plays a central role in the stewardship of most eleemosynary organizations' assets (especially

institutions engaged in ongoing fundraising) but is of less relevance to the Foundation's Board and Investment Committee.¹

PI Manager Relationships. The Foundation enjoys a strong relationship with several private equity firms in which its Investment Committee and staff have considerable confidence. PI-related holdings and commitments represent a material fraction of the Foundation's total assets, reflecting the Committee's conscious decision to bear the idiosyncratic risks that such investments entail in exchange for the incremental returns that they are expected to generate relative to more readily marketable equity investments. As previously noted, the Foundation has entered into a series of agreements with external PI managers that oblige the Foundation to meet capital calls from them within defined limits. The Foundation can attempt to influence through discussions with such managers the rate at which they liquidate investments made on behalf of the Foundation and their other clients, but the Foundation has no direct control over the timing of such liquidations.

¹ The Foundation is subject to prudent investor standards articulated by the legislature of the state in which it is domiciled. While the "modern" prudent man rule represents a vast improvement over the "old" version, it still provides no meaningful guidance to well-intentioned trustees seeking to choose among an almost infinite variety of plausible investment options. The "modern rule" is flawed because it essentially states that institutional investors are free to invest in anything that strikes their fancy as long as doing so will enhance their overall portfolios' risk-adjusted returns. When applying this test to a prospective investment, trustees typically do that which a judge or jury will assumedly do if the investment goes sour and it is subsequently challenged in court: they analyze how the addition of the asset in question would have affected the utility of the pre-existing policy portfolio on a historical basis. With this decision rule, of course, the better an asset has performed historically, the more merit there is in adding it to an institution's asset mix today. In other words, the "modern" prudent man rule creates a not-so-subtle incentive to "buy high," as in small cap stocks *circa* 1983, real estate *circa* 1986, Japanese stocks *circa* 1989, emerging market stocks *circa* 1993, and so on. Ironically, all of the asset classes just mentioned are now objectively "cheap" in relation to historical valuation standards. They have become "cheap" for fundamental reasons, of course, but also because backward-looking assessments of asset class characteristics have caused different types of "alternative investments" to supplant these first-generation "alternatives" as the logical repositories of "smart money," the most conspicuous examples being "private equity" broadly defined and so-called "absolute return" strategies. One expert on fiduciary standards has stated that a careful review of every published legal opinion in his field since 1800 reveals not a single instance in which a trustee of an eleemosynary organization has been found liable for flawed investment decisions — excepting cases of self-dealing. In other words, the countless trees and the many hours of legislators' and attorneys' time expended in promulgating the "prudent man" rule in its various guises could have been saved with a simple three-word injunction: "no self-dealing."

Weaknesses. The Foundation's investment program is potentially handicapped (relative to most US-based institutions) by virtue of two attributes:

Private Foundation Status. The Foundation's tax status renders it potentially vulnerable to at least two forms of taxation to which many US-based tax-exempt institutions (e.g., ERISA funds and educational endowments) are not subject: (1) unrelated business income taxes ("UBIT") on debt-financed realty investments and (2) excise taxes arising from a failure to fulfill Congressionally-mandated payout requirements. The Foundation is subject to other taxes also (e.g., withholding on dividends derived from countries with which the US lacks fully exemptive tax treaties). In practice, the Foundation's tax status compels those stewarding its assets to assess carefully the tax implications of all prospective investments. It also compels those administering the Foundation's investment program to design and implement tax-sensitive contractual arrangements with external managers, including UBIT-related reporting requirements that some prospective managers are likely to find offputting.

Interplay between Tax Status and Large Asset Base. The tax-driven contractual and reporting requirements just described boost the "fixed costs" of certain types of investments. These costs include one-time expenses incurred during the selection and negotiation phases of each investment, plus ongoing administrative and reporting costs. In light of these fixed costs, the Foundation must be careful to avoid making commitments that are too small to have a meaningful impact on its overall results. At present, the informal minimum commitment size is \$30 million (approximately 3% of total assets), a requirement that can prove problematic when applied to managers with relatively small asset bases: although the Investment Committee has not adopted formal limits on the percentage of a manager's assets that the Foundation's capital may represent, it recognizes the dangers inherent in commitments that are abnormally large in relation to a manager's total assets and seeks to avoid commitments representing more than 25% of such assets.

Behavioral Pitfalls. Those charged with stewardship of the Foundation's assets recognize that they are not immune to the behavioral pitfalls that befall investors. A catalog of the pitfalls to which investors are vulnerable appears immediately below. The purpose

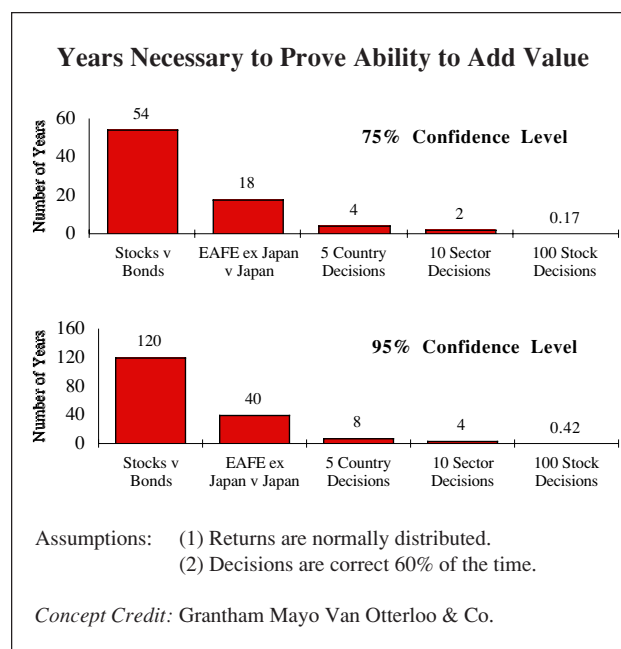
of this catalog is to remind members of the Foundation’s Board, Investment Committee, and staff of the ever-present danger of such traps:

Overreaching. The Foundation’s investment program is geared consciously toward the avoidance of a pitfall to which institutions with large asset bases are especially vulnerable: attempting to play many games adequately rather than a few games well. “Games” is not used here in a pejorative sense but rather as shorthand for the myriad tasks that institutional investing necessarily comprises. In an ideal world, the Foundation could add human resources as needed (at the trustee or staff level or both) to exploit any and all return-optimization opportunities that arise. But there are concrete limits to how large the Investment Committee can expand without producing both lowest common denominator thinking and an excessive diffusion of trustee responsibility. Moreover, there are real limits to how large the staff can expand without displaying bureaucratic tendencies, and it is unreasonable to suppose that the Foundation can attract and retain first-rate investment professionals if these individuals are saddled with excessive administrative burdens. Consequently, the Foundation must routinely decline investment opportunities that comport with its investment objectives when viewed in isolation, mindful that the returns expected from any new investment must be adjusted downward to reflect exogenous costs, i.e., costs arising from the allocation of scarce resources to one “game” as against all other “games” that might conceivably be “played.” In determining which “games” to play, the Foundation must assess both the magnitude of the opportunity being evaluated and the probability that the opportunity can be exploited profitably. Differently put, it must take care to allocate scarce human resources (at both the staff and trustee level) based on probability-weighted assessments of likely outcomes, avoiding “games” that are relatively difficult to win unless their potential payoffs are sufficiently large.

Implications for Asset Allocation. As noted in §I.C below, the Foundation’s preferred approach to asset allocation assumes that neither the Investment Committee nor staff can accurately and consistently forecast the near-term direction of capital markets. The approach also assumes that macroeconomic conditions that either have already unfolded or are reasonably certain to unfold over the near term are already reflected in securities prices. Accordingly, the

Investment Committee and staff devote only as much time to discussing such conditions as is needed to exercise intelligently the discretion they possess to engage in asset substitution, as that term is defined in §II.C below.

Implications for Active Manager Selection. To the extent that institutional funds engage in “overreaching,” they tend to do so most frequently with respect to active manager selection. Selecting superior active managers is in important respects more difficult than selecting winning stocks, for two reasons: (1) the people making the decisions (i.e., Investment Committee members or staff working under their supervision) have far less information about managers than investors have about publicly traded companies and (2) these people must balance the conflicting propaganda of managers (many of whom are quite glib) against the only facts available to them, i.e., managers’ past performance. Accordingly, fiduciaries or their agents invariably base manager selections on available facts rather than unproven and unprovable marketing claims, causing them to favor recent winners over recent laggards. Managers’ marketing claims are generally unprovable because it takes a long time to prove (statistically) that favorable results reflect skill rather than luck (see exhibit below). Given these highly unfavorable boundary conditions, most manager changes are a mistake. Firings are generally a mistake because clients usually bail out just before a manager’s



style turns, and hirings are generally a mistake because clients are chasing recent successes. The underpinnings of such behavior are identified in the next two paragraphs.

Herdling. This is the natural human instinct to move with the crowd. In an institutional setting, it manifests itself in an aversion to “reputational risk,” which in layman’s terms means simply the risk of being wrong and alone. Given most investors’ extreme discomfort with being wrong and alone, investments entailing a high degree of reputational risk tend to provide disproportionately high expected returns.²

Representativeness. This pitfall manifests itself when investors assign too much weight to recent events. For example, polls taken over the last several years show that an alarmingly high percentage of individual investors think that the broad US stock market will generate 15% or higher returns over the long term. The broad US stock market has indeed produced such lofty returns in recent years, but in order to continue doing so from today’s lofty price levels, either profitability levels or valuation measures (e.g., price/earnings ratios) would have to soar to levels that strain credulity. Representativeness manifests itself repeatedly with respect to so-called alternative investments, creating big problems for institutional investors who mistakenly believe that strategies which have produced very strong returns in recent years can continue doing so even if they become infused with shockingly large amounts of fresh capital. Recent examples would include the returns expected from emerging market stocks acquired at the zenith of their popularity in 1993 or from distressed securities entering 1998.

Risk Aversion. Risk aversion entails a distaste for uncertainty *per se*, including unexpectedly favorable outcomes. Thus, when confronted with a choice between a certain gain (e.g., a 5% return) and an uncertain outcome whose expected value exceeds the certain gain (a 50% chance of a 30% gain coupled with a 50% chance of a zero gain), most investors opt for the

certain gain. Risk averse decisionmaking is not always in the best interest of an institutional fund with a very long-term investment time horizon.

Loss Aversion. Although much of the academic literature on investing assumes that investors are risk averse, the typical investor is more properly described as loss averse. Loss aversion entails a distaste for certain failure. Thus, when confronted with a choice between a certain loss (e.g., closing out a position entailing a 10% loss) and an uncertain outcome whose expected value is even more detrimental (a 50% chance of a 15% loss coupled with a 50% chance of a zero loss), most investors opt for the uncertain outcome. Loss averse decisionmaking and a related phenomenon known as “pride of ownership” tend to inhibit decisionmakers from redeploying capital from suboptimal investments to potentially more productive ones.

Anchoring With Reference Points. The most natural reference point for most investors is their cost basis. As noted previously (see **Loss Aversion**), this reference point can produce highly suboptimal decisions. So too can the anchoring that occurs with respect to prospective investments, i.e., assets not already held in the portfolio. In the latter context, investor views tend to be anchored in historical data. For example, because US stocks had traditionally performed poorly for multi-year periods following their initial display of dividend yields below 3%, many solidly anchored investors reduced their exposure to US stocks when the dividend yield on the S&P 500 dipped below 3% in the mid-1980s (and again in the mid-1990s). This particular anchor has proven extremely costly.

Framing. This is the tendency to try to make a complex world simple by attaching overly broad and convenient labels to data or ideas that merit more heterogeneous treatment. A topical example: treating the strategies and tactics employed by commingled investment vehicles operated pursuant to specified contractual arrangements (i.e., hedge funds) as a distinct “asset class.”

B. Markets

No Free Lunch. Given the relatively free flow of capital within and among nations in the modern global economy, the Foundation’s operative assumption is

² A vivid recent example would be Korean stocks at the end of 1997 — assets that had performed so poorly for so long that most fiduciaries (and their agents) would not think of holding them, let alone putting fresh money into them. As the Korean economy moved into a more stable state in 1998, investors realized that Korean stocks were excessively depressed in price, and the injection of modest amounts of fresh capital into the market made Korea the best-performing market in the MSCI database in 1998.

that all investments produce roughly equivalent risk-adjusted returns. Differently put, the Foundation attributes differences in the returns produced by different types of investments to differences in the types and degrees of risk that they entail. Consistent with this mindset, the Foundation devotes substantial resources to determining the types and degrees of risk that each investment entails and to determining whether the Foundation is well-suited to serve as the marginal buyer (or seller, in the case of prospective short sales) of the asset in question.

Market “Efficiency.” The statement that “all investments produce roughly equivalent risk-adjusted returns” is not intended as an endorsement of the view that capital markets are perfectly or even approximately “efficient” as that term has traditionally been defined. Indeed, to the extent that “efficiency” has traditionally been defined as returns that are proportionate to each asset’s **price volatility** (typically measured over relatively brief holding periods such as 12 months), the assumption about markets advanced in the preceding paragraph is actually intended as a refutation of the prevailing view. As noted below, short-term price volatility is one valid measure of investment hazard, but it is by no means the only form of risk that the Foundation expects to be rewarded for bearing. In short, the Foundation’s investment program assumes that diligent research will enable the Foundation to identify investments that generate superior returns after being adjusted for short-term price volatility.

Almost-Free Lunch. The most plausible exception to the “no free lunch” rule is the Foundation’s potential exploitation of opportunities arising from its status as a very high grade borrower whose investment returns are essentially tax-exempt. However, as the Foundation and other tax-exempt investors have discovered, exploiting such opportunities through the conscious use of leverage entails costs that go beyond interest expenses, including the inherently unquantifiable opportunity costs associated with investment choices that would have been better researched or better executed had those responsible for such choices been less preoccupied with debt service concerns. Accordingly, the investment guidelines set forth below permit the Investment Committee to employ leverage within specified bounds. The guidelines also encourage but do not require the Committee to include financing costs in the determination of whether a specific substitute asset (i.e., any asset or strategy other than

one reflected in the Policy Portfolio) merits inclusion in the actual portfolio, and also to earmark borrowings to the extent needed to facilitate the Committee’s selection of an appropriate gearing ratio.

Rigorous Standard. Earmarking borrowings entails a heavier burden of proof against debt-financed investments than non-earmarking because expected returns receive no boost from “the portfolio effect,” i.e., the tendency of combinations of non-correlated assets to produce long-term returns that exceed the weighted average of their individual returns. As discussed below, to the extent that portfolios comprise illiquid assets whose weights cannot be rebalanced readily, or assets whose correlations tend to soar under worst-case conditions, “the portfolio effect” has been vastly oversold. It has been oversold because the incremental returns that “the portfolio effect” produces in computer simulations evaporate if real-world constraints (be they legal or behavioral) preclude disciplined rebalancing.

Risks. There are just a few types of risk that are truly germane to the Foundation and that it demands to be rewarded when bearing.

Inflation Risk. The most worrisome form of investment hazard that the Foundation confronts is inflation risk, i.e., the risk that an asset or portfolio of assets will not hold their value in real or inflation-adjusted terms. As used here, “long term” means the multi-decade time horizon defined above (see **Investment Time Horizon** in §I.A).

Caveats. For perpetual life institutions, equities broadly defined are the least risky asset because they are the most reliable way of maintaining endowment purchasing power. For investors with potentially finite time horizons, assets whose prices fluctuate (including equities) can be very risky because such investors may need (or elect) to sell them at depressed prices. While mindful that equities broadly defined have outperformed bonds over the very long term, the Foundation is also mindful that equities broadly defined have been known to produce negative real returns for extended time periods. Importantly, the inflationary conditions to which such periods of disastrous returns can be attributed (e.g., the –17.7% inflation-adjusted cumulative return produced by the S&P 500 during the 10 years ending in 1982) also tend to wreak havoc on the right-hand side of the Foundation’s balance sheet:

to maintain their effectiveness during an extended inflation, grant payments must be ratcheted upward in nominal terms, as must staff salaries and other administrative expenses. In short, very high rates of unanticipated inflation place endowed institutions in a position not unlike an object tossed into a compactor: falling stock prices place ferocious pressure on the left-hand side of their balance sheets (i.e., assets) while soaring costs create countervailing pressures in the opposite direction. To hedge against the forced sale of equities at depressed prices under highly inflationary conditions, a defined portion of the Foundation's portfolio is invested in inflation-indexed bonds (or alternate inflation hedges) at all times.

Deflation Risk. A second and very different form of catastrophic risk that can befall the Foundation is deflation. Unfortunately, the assets that most reliably hedge long-term inflation risk (i.e., equities broadly defined) are distinctly unhelpful under deflationary conditions. Indeed, equities tend to perform disastrously under such conditions. That said, deflation arguably is less worrisome than hyperinflation to endowed institutions because liabilities tend to fall in nominal terms when deflation strikes, mitigating the damage sustained on the asset side of such institutions' balance sheets. However, deflation can cause equity values to plummet more rapidly than the cost of goods and services that the Foundation seeks to purchase (directly or via grants). To hedge against the forced sale of equities at depressed prices under deflationary conditions, a defined portion of the Foundation's portfolio is invested in high quality, non-callable, long-term bonds at all times.

Short-Term Price Volatility. This is germane for two reasons. First, the Foundation has liquidity needs that are potentially difficult to satisfy through current income. The more short-term volatility an asset or asset class displays, the more vulnerable the Foundation is to forced sales at depressed prices to meet cash flow requirements. Second, quite apart from liquidity needs, short-term price volatility can produce "whipsaw" — the reflexive sale of holdings at depressed prices not to meet cash flow needs but to satisfy the risk tolerances of the persons charged with stewarding the Foundation's endowment. Whipsaw is especially worrisome when fiduciary risk tolerances are themselves unstable, a phenomenon that cannot be ruled out even in the absence of trustee turnover.

Illiquidity. Although liquidity risk is largely subsumed by price risk — i.e., "there is a market-clearing price for **everything**" — the Foundation deems it useful to distinguish between publicly traded assets whose realizable value is subject to short-term swings in market sentiment and privately traded assets whose immediately realizable value is constrained by the relatively high transaction costs that are necessarily incurred when their ownership changes hands.³ This sensitivity to potentially penal transaction costs is reflected in the policy guidelines set forth in §II.

Informational Risk. The Foundation does not expect to be rewarded for bearing uncertainty attributable solely to its own failure to collect and assess intelligently legally obtainable information. But it does expect to be rewarded for bearing uncertainty that cannot be eliminated through disciplined research and analysis. The corollary is crucially important: given the intense competition among investors for abnormally profitable investments, the Foundation assumes that information which is readily available to investors is already reflected in asset prices. This is especially true with respect to (a) information respecting forecastable events that have not yet occurred and (b) historical returns on asset classes. Putting both points differently: (a) it is the true surprises that move markets on the margin and (b) by the time investors accumulate sufficient evidence suggesting that an asset class (or investment approach) produces superior returns, any abnormal profits associated with such opportunities have already been made.

Hedging Costs. Disaster hedges such as those contemplated by the policies set forth in §II are sometimes so mispriced that the "insurance" they provide has a "negative cost," i.e., investors get paid to become insured. An example: in 1981, long-term

³ There is an important nexus between liquidity risk and "whipsaw risk" (as that term is defined in the preceding paragraph of the main text). By their very nature investments that entail a high degree of liquidity risk entail a low degree of whipsaw risk. In other words, if an institution cannot bail out when things go unexpectedly poorly over a given period of time, it is much less vulnerable to getting whipsawed. That does not mean the Foundation should invest exclusively in illiquid investments. And it does not mean that an enterprising external manager can make an otherwise liquid investment more attractive to the Foundation by subjecting it to a lock-up. It simply highlights the fact that the Foundation's chief task is to make informed judgments about appropriate tradeoffs between risk and return. If extreme liquidity constitutes a drawback under certain narrow conditions, then illiquidity constitutes a virtue under the same conditions.

Treasury bonds (the classic deflation hedge) yielded more than 14%, an unprecedentedly high nominal yield that provided the potential for rich capital gains if the Federal Reserve succeeded in bringing inflation under control (as it subsequently did) and significant protection (via reinvestment of coupon income) if it did not. There is an important corollary to the principle that investors can occasionally get paid to become insured: such hedges can also become so overpriced that investors who acquire them at peak prices can wind up worse off than investors who lack such “insurance” — even if the event being insured against occurs. An example of the latter phenomenon: investors who acquired energy-related properties for inflation-hedging purposes at the peak of energy prices in 1980 were going to do very poorly even if inflation had continued spiraling upward. Of course, it did not.

Equity Real Estate as an Inflation Hedge. The absence of a permanent allocation to real estate in the accompanying guidelines reflects two assumptions about this asset class: (1) that the Foundation’s tax status reduces materially expected after-tax returns from debt-financed equity real estate and (2) that certain forms of equity real estate may not provide meaningful diversification versus other equity-oriented assets during inflation-induced bear markets in stocks. Accordingly, the Investment Committee’s operative assumptions respecting equity real estate are (1) that any new commitments to equity real estate will be preceded by a careful assessment of after-tax returns and (2) that they will be subject to the stringent application of the Asset Substitution criteria set forth in §II.C.

Commodities as an Inflation Hedge. The accompanying guidelines exclude a permanent commitment to commodities for reasons similar to those underlying the exclusion of a permanent allocation to equity real estate. Accordingly, the purchase (or retention) of commodity-related holdings also shall be subject to the stringent application of the Asset Substitution criteria set forth in §II.C, with special attention being paid to supply and demand forces within commodity markets that could cause such holdings to under- or outperform the market benchmark for the Foundation’s inflation hedging subsegment. As a general rule, the Foundation will eschew investments in raw commodities but stands willing to acquire commodity-related assets to which value-enhancing strategies and tactics can be applied

(e.g., energy reserves held by deftly managed operators).

C. Asset Allocation Approaches

Overview. This subsection has a twofold purpose: (1) to describe summarily the approach that the Investment Committee employs when formulating asset allocation guidelines and (2) to codify the reasons why it does not rely more heavily on alternate approaches favored by many large institutional funds. To make the Committee’s favored approach more intelligible, the critique of alternate methods appears first.

Mimicry Decried. The ultimate measure of the appropriateness of a given asset mix for a given foundation is whether it will produce the maximum return for whatever level of risk the Foundation’s trustees are willing to bear. But few if any trustee groups can gauge accurately their tolerance for poor results until those results actually roll in. The idea of an “ideal” asset mix for foundations with different governing boards is thus an impossibility. When added to the Foundation’s relative indifference to peer group comparisons (see §I.A above), this fact obviates the need for the Foundation to mimic intentionally peer institutions’ policies and practices.

“Efficient” Portfolios Decried. The most popular method used by institutional investors when formulating asset allocation guidelines is mean-variance analysis (“MVA”), the aim of which is to identify “efficient” asset mixes. The aim is choiceworthy — the Foundation does indeed seek to earn the highest possible returns for any combination of risks that it elects to bear— but the means typically employed in pursuit of this aim are defective in multiple respects. These defects are catalogued here to remind readers why the Foundation does not rely more heavily on MVA or related approaches when making asset allocation decisions.

Partial Critique Only. What follows is by no means a comprehensive catalog of MVA’s perceived defects. Rather, it is a partial critique that discusses only those defects of MVA that are displayed by the computer-based model that the Foundation’s external investment consultant has made available for the Foundation’s use. In contrast to conventional mean-variance optimizers, this model has the important advantage of

focusing not on a single undifferentiated holding period but rather on multiple time periods and of facilitating the assessment of alternate portfolios' riskiness using client-specified definitions of risk. For modeling purposes, the Foundation has traditionally defined risk in two ways: first and foremost, as potential shortfalls in terminal wealth below a given threshold; and secondarily, as differences between the Foundation's returns and the returns realized by institutions pursuing what are assumed to be more conventional policies. In its most recent application, the model was told to weight the first definition 10 times more heavily than the second, in keeping with the Foundation's relative indifference to peer group comparisons as described above. The model in question is quite elegant, especially in its capacity to analyze risk through prisms more robust than mean-variance, but an elegant dwelling built on an inherently shaky foundation provides no more shelter when earthquakes strike than a cruder abode built on the same shaky foundation. The foundation on which the model rests is defective in the following respects:

Clairvoyants Not Available. The chief defect of the model is that it presupposes more forecasting acumen than the Foundation or any advisors available to it are likely to possess. To elicit output from the model, its user must specify the expected returns, standard deviations ("variances"), and correlations ("covariances") of the asset classes being analyzed. Importantly, empirical studies by leading statisticians working in the investment arena indicate that the return forecasts are roughly 10 times as important (in terms of indicated asset mixes) than forecasted variances, with the latter in turn being roughly two times as important as forecasted correlations. Differently put, institutions that turn to MVA models in an effort to sublimate if not eliminate forecasting in the policy formulation process are doing nothing of the sort.

Speciousness of Historical Return Data. It is unwise to rely solely on unadjusted historical returns as inputs, because such data ignore the dynamism of capital markets. Simply stated, the current price of an asset is always more important than historical averages. Moreover, studies extolling the virtues of particular investments tend to appear at or close to secular peaks in the returns on such investments. Examples abound: small stocks in the US (horribly expensive by 1983, when the first big wave of studies was published

extolling their long-term virtues); real estate in the mid-1980s (same story as small stocks); developed market foreign stocks in the late 1980s (ditto); and emerging market stocks *circa* 1992-93 (same phenomenon).

Dangerous Vacuum. The return expectations on which investment policies formulated using optimization models rest tend to be formed in a vacuum without regard to the fact that countless other institutions are engaged in precisely the same exercise of forecasting expected asset class returns. (Logisticians refer to this as the "fallacy of composition.") Consensus expectations are not always wrong, but they are seldom right with respect to asset allocation opportunities whose aggregate size is a fraction of the institutional capital pursuing such opportunities in the mistaken belief that they can absorb vast sums of fresh capital (e.g., US venture capital *circa* 1983-84, emerging market stocks *circa* 1992-93, fixed income arbitrage *circa* 1997-98). When using the optimization model supplied by its external investment consultant, the Foundation makes the assumption that all types of marketable stocks held by the Foundation will produce the same return. This mitigates the problem of assuming that relatively small pockets of opportunity (e.g., emerging market stocks) can accommodate large sums of fresh capital without undermining their assumed return advantage, but it introduces a different form of arbitrariness into the modeling process that is also unsettling.

Dismal Track Record. The forecasting errors alluded to above cannot be attributed solely to the paucity of data respecting non-traditional assets with which forecasters were confronted when these novel ingredients were initially tossed into the optimization stew. After all, the forecasted returns of the more "traditional" assets analyzed in such studies also proved wildly inaccurate, albeit mostly on the low side. Indeed, foreign stocks (developed as well as emerging) are the only major asset classes that have produced returns in the 1990s **below** those forecasted by MVA users when the decade began. (Commodities represent a third exception.) But the forecasts of other asset classes' behavior have proven equally inaccurate, a fact obscured by the generally benign character of the forecasting errors in question. Trustees find it hard to get upset when the major markets in which they've invested perform much better than expected (e.g., US stocks and bonds over the last 16 years). But they are

far less tolerant of materially **smaller** forecasting errors when results are much worse than expected, especially when the assets purchased for return enhancement reasons produce negative returns (e.g., emerging market stocks 1993-present).

Speciousness of Other Inputs. The illogic of relying solely on historical return data is rivaled by the illogic of relying on historical volatilities and correlations. The latter variables are no less dynamic than returns and hence no less difficult to forecast, even over multi-year time horizons. Again, examples abound, the most topical being the wild inaccuracy of the expected behavior of emerging market stocks when these were added to institutional asset mixes in the early- to mid-1990s. Commodities represent a second example, not primarily because commodity returns have been dreadful of late but because commodities performed so poorly during the two biggest downdrafts in world stock markets since commodities became an institutionally accepted holding about a decade ago (i.e., the 1990-91 bear market and the briefer 1998 stock market swoon). More specifically, the correlation between commodities and marketable stocks was assumed to be negative, but commodities fell in price during both of the market downdrafts just mentioned, and dramatically so during the summer of 1998. Of course, if inflation fears rather than recession fears trigger the next big downdraft in global stock prices, commodities might indeed display a negative correlation with stocks. As for equity real estate — another asset class traditionally viewed as an “inflation hedge” — this too performed horribly during the bear market in stocks in 1990-91, providing virtually no diversification vis-à-vis publicly traded equities when such diversification was needed the most. As Chow, Jacquier, and Kritzman have demonstrated convincingly,⁴ asset class correlations have a nasty but proven tendency to soar when financial markets are confronted with a major “shock” (e.g., Iraq’s invasion of Kuwait in 1990, Russia’s default in August 1998, etc.). If the chief purpose of optimization models is to identify portfolios that will generate satisfactory returns **within acceptable volatility constraints**, then institutions relying on such models should use correlations that reflect worst-case

conditions, as distinct from “normal” conditions. Alas, highly diverse portfolios that appear “efficient” (i.e., embody an acceptable balance between return and risk) under “normal” conditions invariably embody intolerable levels of downside risk when analyzed under worst case conditions (deflation or hyperinflation).⁵

Inherent Contradiction. As a means of selecting rational asset allocation guidelines in an uncertain world, MVA and related optimization methods do not withstand logical scrutiny. Excepting whatever value investors might derive from combining assets that are unarguably non-correlated under worst case conditions (e.g., long-term Treasuries vs. unseasoned stocks under deflationary conditions), investors seeking meaningful guidance from their MV-based models cannot escape one ugly fact: if they truly believe their own return forecasts, they should load up on the asset(s) with the highest assumed returns, subject only to liquidity constraints. (Investors who are truly clairvoyant arguably can skip the back-end liquidity check, mindful that lending institutions will furnish as much liquidity as they need to finance their demonstrably winning ways.) Of course, most investors lack such confidence in their own return forecasts, else their portfolios would be more concentrated, and they would pay little if no heed to MVA. Lacking complete confidence in their return forecasts, the investors we’re discussing take a step that is as natural (in light of their insecurities) as it is perverse: they hedge their return forecasts by constructing diversified portfolios that seem “efficient” based on a different set of equally suspect assumptions. These assumptions include the forecasted volatilities and correlations of the asset classes deemed eligible for purchase, their own risk tolerances (“utility functions”), and — critically — their own ability and **willingness** to rebalance portfolios in as disciplined a manner as their computer-based models presuppose.

Unrealistic Rebalancing Assumptions. A key premise underlying MVA and related optimization methods

⁴“Optimal Portfolios in Good Times and Bad,” *Financial Economist*, No. 272-1, December 1998. This paper was summarized nicely in the December 15, 1998, edition of “Economics and Portfolio Strategy,” published by Peter L. Bernstein, Inc.

⁵ Even the most ardent proponents of optimization models concede that such models work imperfectly at best when equity real estate is included as an eligible asset. This is true under even so-called normal market conditions because real estate is traded on a discontinuous basis, rendering price series insufficiently robust. Indeed, some leading consultants refuse to include real estate in optimization studies, preferring instead to relegate it to “alternative investment” status. In theory, this means that real estate has no **permanent** place in the indicated policy portfolio even if it does have a more or less permanent place in the actual portfolio.

(including penalized shortfall models such as the one currently employed by the Foundation) is that asset mixes can and will be rebalanced periodically. Indeed, much of the “efficiency” inherent in portfolios that lie on the “efficient frontier” derives from the inherently contrarian recycling of funds from asset classes that have outperformed to those that have lagged. But several of the asset classes that make “efficient” portfolios choiceworthy on paper are inherently illiquid, private equity being the prime example. To surmount this obstacle, many computer-based asset allocation models permit users to specify rebalancing costs for each asset class being analyzed. This mitigates the problem but hardly eliminates it: an institution that seeks to reduce private equity exposure through means other than the normal maturation of such holdings (e.g., through sales of partnership interests on the secondary market) will quickly discover that its access to attractive private equity opportunities has been materially reduced due to general partners’ concerns about its staying power. Quite apart from whether an institution is **able** to rebalance its assets in as disciplined a manner as most MV-based models presuppose, experience suggests that all but the most intrepid institutions are **unwilling** to do so. They are unwilling because rigorous rebalancing sometimes requires selling assets that have been moving sharply higher while simultaneously buying assets that have been plummeting in price (e.g., topping off emerging market stocks in late 1998 via sales of US equities). The Foundation could potentially constitute an exception to the latter rule, but before adopting policies that presuppose such intrepidity the Foundation should make triply sure that all parties who enjoy a *de facto* or *de jure* veto over investment decisions have internalized contrarian principles.

Potentially Costly Distraction. Mindful of the above problems with computer-based asset allocation models, many institutions and their consultants nonetheless devote much time to their use. They do so in the belief that scrutiny of multiple model runs, each reflecting different inputs and perhaps also time horizons, can shed important light on the tradeoffs inherent in choosing one asset mix over competing alternatives. Perhaps it can, although in practice most institutions spend far more time tweaking forecasted returns than they do tweaking forecasted volatilities or correlations — a potentially dangerous practice given the importance that most asset allocation models ascribe to asset pairings displaying low or negative correlations.

But the greater danger inherent in such scenario testing is that it becomes preoccupying, consuming research and discussion time that is disproportionately large in two respects: first, in relation to the low accuracy of the assumptions underlying computer-based optimizers when viewed in hindsight; second, in relation to the much greater potential value-added from applying the same scarce resources to manager selection and other policy or strategic issues that the fiduciaries involved (especially Investment Committee members) routinely confront.

False Axiom. The typical investment committee devotes most of its time to asset allocation in the axiomatic belief that this aspect of the investment planning process has the greatest influence on a fund’s long-term performance relative to its peers. It can, potentially, but only if the asset mix ultimately adopted is materially different from the average mix employed by peer institutions. Alas, to wind up with a highly unconventional policy portfolio, a trustee group that is headed down this path typically spends an inordinate amount of time agonizing over model inputs and constraints, which necessarily differ from those used by other investors. Having stuck their necks out in this manner, and perhaps exhausted most of the time available for research and discussion, our hypothetical group of maverick trustees often finds it difficult to deliver the goods, i.e., to deploy the endowment in a manner that will render their return forecasts reasonable in hindsight. This is especially true with respect to so-called alternative assets (a slippery term that used here means anything other than publicly traded US stocks and bonds). For better or worse, one cannot buy many alternative assets on an indexed basis, private equity and absolute return-oriented investments providing two concrete examples. To actually realize the lofty return goals for these two asset classes that are reflected in most “state of the art” asset allocation studies, trustee groups (or hired guns working under their supervision) must devote substantial amounts of time to manager selection and evaluation within these two asset classes. This is easier said than done, because the process of adopting an unconventional policy portfolio often leaves scant time available for the latter tasks.

Lamentable Fact. The lamentable fact is that computer-based approaches to asset allocation do not eliminate the need for fiduciaries (or their advisors) to make subjective judgments about the future returns, volatilities, and correlations of the asset classes and

subclasses being considered for purchase. Indeed, they actually amplify this need, and they put fiduciaries in the untenable position of attempting to forecast the inherently unforecastable. No sensible trustee would claim an ability to forecast asset class returns over a one-day or even one-year holding period because realized returns over such short-term periods can be affected materially by numerous imponderable variables. Conversely, no sensible trustee would rely heavily on MVA or related methods when formulating investment policy for an endowment whose investment time horizon is indeed perpetual and whose spending rate lies wholly within its board's discretion: such reliance would be misplaced under these conditions because model inputs geared toward the medium-term time horizons that actually dominate most trustees' thinking (i.e., 2–3 years in most cases, 5–7 years if trustees are abnormally patient) become nonsensical when the scenarios being analyzed are truly long term (e.g., 30–50 years or more). They become nonsensical because correlations among what are today regarded as distinct “asset classes” (e.g., foreign vs. US stocks or US stocks vs. US real estate) rise as the measurement period lengthens, and returns migrate in a manner that casts doubt on modern analysts' well-intentioned efforts to parse financial markets into a half-dozen or more “asset classes.” In short, the financial landscape is both simpler and more complex than most computer-based approaches to asset allocation imply: simpler because what appear to be a myriad of distinct asset classes can be prudently reduced to just three segments for long-term planning purposes (as illustrated in §II) and more complex because the returns that any institution can legitimately hope to realize from each of these segments depend heavily on the specific strategies and managers employed within them.

Distributions vs. Point Estimates. Although the concerns raised in the preceding paragraph are especially apt with respect to asset allocation approaches based on point estimates of expected returns, they are highly germane to the more common practice of forecasting return **distributions** (i.e., attaching probabilities to a vast if not infinite spectrum of potential outcomes). In academic parlance, point estimates are referred to as “means” — shorthand for mean returns. These means are accompanied by forecasted variances or standard deviations to produce expected return distributions. Unfortunately, the actual distribution of returns for most asset classes and

subclasses tends to be disturbingly unstable — “non-stationary” in academic parlance.

Proposed Use of Computer-Based Optimization Models. The Foundation will continue to use computer-based optimization techniques (via its external consultant's model), but for descriptive rather than prescriptive purposes. In other words, it will use MVA to analyze the potential implications of asset allocation and manager selection choices arrived at by more intuitively appealing means. Put yet another way, with the exception of passive investments that will track closely the segment and subsegment benchmarks identified in §II, no strategy or manager will be employed unless it has the potential to satisfy the criteria for Substitute Assets set forth in §II — regardless of the asset or manager's perceived utility when viewed through the prism of MVA and related optimization techniques. The Foundation consciously relegates such techniques to this subordinate rather than supreme role in the investment planning process because its Investment Committee and staff do not have sufficient confidence in the assumptions on which computer-based optimization rests. To keep the resources devoted to such optimization reasonable in relation to its limited utility, the Foundation will confine its use to the scrutiny of probable downside volatility under worst-case conditions, defined as economic scenarios entailing either deflation or very high rates of unanticipated inflation. The chief if not sole purpose of such “stress testing” will be to ensure compliance with the tertiary return objective specified herein (avoiding 30% or greater peak-to-trough declines in the endowment's unitized value).

Focal Point. Consistent with the assumption that **time** (at the staff and Investment Committee level) is likely to be the most important determinant of the Foundation's realized returns within each segment, the policies outlined below assume that the Foundation will seek index-like returns from its two hedging segments (deflation-hedging bonds and inflation-hedging hard assets) in order to devote the maximum available manpower to determining which assets should be held within its Total Return segment (equities broadly defined). The Committee stands prepared to make judicious use of so-called Substitute Assets within the Hedging subsegments as well as the Total Return segment, but its chief task (aided by staff) is to identify and exploit opportunities to deploy the Total Return segment's assets in a manner that will enable

this segment to outperform by a prudent but not heroic margin the securities comprising the segment's benchmark. In pursuing this goal, the Committee and staff will focus their energies on identifying outstanding external managers that can produce truly superior returns on a portion of the Total Return segment. Given the size of the Foundation's aggregate endowment, the operative premise is that the percentage of the Total Return segment capable of producing truly superior returns will be small indeed, with most if not all of the return advantage gained through means **other** than strategic or tactical asset allocation.

D. Manager Selection

Manager Selection Criteria. In general, the more important and desirable an attribute is (e.g., a well-defined and preferably innovative investment philosophy), the more difficult and time consuming it is to confirm its presence in a given money manager. Conversely, undesirable attributes (e.g., portfolio managers who are encumbered with excessive administrative or client servicing responsibilities) are relatively easy to detect. This suggests that screening criteria should generally be applied in reverse order — negative screens first, positive screens later, after the selection universe has been reduced to a more manageable number, as follows:

- Step 1 Eliminate Managers Displaying Disqualifying Attributes
- investment decisionmakers engaged primarily in brokerage or financial planning (as distinct from portfolio management)
 - an inability to meet performance reporting deadlines
 - criminal convictions or sanctions by the SEC or other federal or state regulatory agencies

- Step 2 Eliminate Managers Displaying Too Many Undesirable Attributes
- a high degree of personnel turnover
 - insufficiently trained administrative personnel
 - insufficiently robust investment accounting systems
 - investment decisionmakers that are unduly burdened with administrative tasks
 - an unwillingness to specify asset size limits for products or services that require such limits
 - glaring mismatch between the liquidity offered clients and the inherent liquidity of the strategies being pursued

- Step 3 Eliminate Managers Displaying Too Few Desirable Attributes

- money management is the firm's sole (preferably) or primary line of business
- the firm's decisionmakers are seasoned professionals or the firm's philosophy is unusually innovative (preferably both)
- the firm is willing to employ performance-based fees (with meaningful hurdles rates that inhibit undue enrichment) as an expression of confidence in its own abilities
- the firm complies fully with the performance standards promulgated by AIMR

- Step 4 Eliminate Managers Displaying Too Few Important Attributes

- a well-defined investment philosophy that gives the manager a discernible competitive advantage in the gathering or processing of investment data
- a verifiable record that the firm has faithfully executed this philosophy over time
- a proven capacity to deliver uniform results to all clients to whose assets the philosophy is applied
- a reasonable amount of assets under management to which this philosophy is applied
- satisfactory returns versus relevant benchmark indices
- a proven capacity to adapt to changes in financial markets
- a proven willingness to invest adequately in its own business (including technological resources) in light of such changes
- investment professionals who have strong personal incentives (both financial and psychological) to produce satisfactory results for their clients
- strong if not proprietary deal flow *

* Asterisk denotes criterion that is germane primarily to managers investing in non-marketable assets.

Liquidity Mismatch. In recent years, many money managers have sought to feather their own nests by forming hedge funds whose redemption windows pop open at intervals much shorter than a prudent investment time horizon for the strategies such managers employ. The Foundation is acutely sensitive to the potential problems that this mismatch creates and seeks to avoid managers that have veered down this dangerous path.⁶

⁶ The path is dangerous because the constituencies that most hedge funds serve bear little resemblance to the constituency served by the archetypical pool operators, i.e., life insurance companies. Life insurers can tolerate a mismatch between their investment time horizon and the periodicity of forced sales of investments because the catalysts for such sales (i.e., deaths) tend to be independent events, and the sales tend to be partial. The opposite approximates the truth for many hedge funds: the conditions that induce some clients to yank their money typically induce most clients to withdraw, transforming a trickle of outflows into a torrent of redemptions.

Exceptions That Prove the Rule. The policy bias advanced in the preceding paragraph should not be construed as a prohibition against longer-term lock-ups for vehicles investing primarily in marketable securities. The Foundation is fully prepared to incur long-term lock-ups with respect to marketable securities managers, as long as the handcuffs being adorned are associated with demonstrably superior rules of engagement in other respects, e.g., with respect to fees, clawback provisions, permissible strategies, and the like. There are many hedge funds investing exclusively in marketable securities that would have great difficulty implementing their favored strategies and tactics if their capital bases were subject to annual or even bi-annual withdrawals.

Expected Alphas. The asset allocation guidelines set forth in §II are accompanied by real return expectations for each segment that are themselves the sum of two independent variables: (a) an expected real return for the assets comprising the segment's benchmark if held on a passive or indexed basis over multi-decade time periods and (b) an assumed premium from active management (net of fees and trading costs). These premia or "alphas" are necessarily "best guesses," and are necessarily expressed in the form of point estimates rather than ranges. In practice, the higher the expected return on an asset class or subclass, the larger the range of expected alphas, i.e., the greater the dispersion between the long-term returns produced by the best-performing managers and those produced by the worst-performing managers.

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Part II. Investment Policies

A. Return Objectives

Primary Return Objective. The Foundation's primary return objective is to preserve the purchasing power of the unitized value of its endowment assets, net of administration and investment management costs, over rolling five-year periods. This goal is synonymous with the pursuit of a time-weighted return on endowment assets that is at least equal to an inflation rate appropriate to the Foundation (the CPI or an agreed-upon alternative) measured over rolling five-year periods.

Secondary Return Objective. The Foundation's secondary return objective is to enhance the purchasing

power of the unitized value of its endowment assets over rolling five-year periods. This goal is synonymous with the pursuit of a time-weighted return on endowment assets that exceeds an inflation rate appropriate to the Foundation plus 5% net of all costs, measured over rolling five-year periods.

Tertiary Return Objective. The Foundation's tertiary return objective is to avoid peak-to-trough declines in unitized endowment purchasing power exceeding 30%.

Underpinnings. The adoption of objectives expressed in unitized terms reflects an assumption that the endowment's total market value is likely to shrink in accordance with the Foundation's overall financial goal of potentially liquidating its assets. The adoption of rolling five-year periods for assessment of results reflects a balancing of the Foundation's targeted life with its board's perceived tolerance for unexpectedly poor results. The five-year period for assessing results is intended as a floor but not a ceiling: its adoption indicates that the board ascribes little importance to declines in unitized endowment purchasing power that have persisted for less than five years, unless they entail peak-to-trough declines exceeding 30%. The 30% limit serves as a proxy for the Foundation's tolerance for changes in its financial condition that, however fleeting, would likely trigger fundamental changes in the scope and character of its grantmaking endeavors.

B. Liquidity

Spending Policy. As a publicly supported organization, the Foundation is not legally obliged to distribute a stated percentage of its assets in any given year, nor is it encumbered by grant commitments that are excessive in relation to its total assets. At present, such commitments approximate 12% of the Foundation's total assets in present value terms. In recent years, distributions have approximated 6% of the endowment's market value. The board stands prepared to distribute more than the constant dollar equivalent of this sum in any given year if compelling grantmaking opportunities arise and less if depressed financial markets or a paucity of attractive grantmaking opportunities dictates a lower spending rate.

Cash Flow Requirements. The Investment Committee seeks to ensure that the endowment comprises deflation

and inflation hedges (as defined below) whose respective market values each are at least equal to 18-month projections of worst-case (i.e., maximum) cash flow requirements.

Cash Flow Requirements Defined. When quantifying cash flow requirements as that term is used immediately above, the Committee shall add to projected grantmaking needs (as defined by the board) the maximum aggregate capital calls the Foundation might receive from external managers to which it has agreed to furnish fresh capital. In general, because the Foundation has access to other sources of liquidity such as bank lines of credit, there is no need for the endowment to maintain substantial balances of very short-term instruments (so-called cash equivalents).

Rationale for 18-Month Projections. The requirement that the endowment's hedging segments (deflation and inflation, as defined below) be sized in accordance with 18-month cash flow requirements is founded on the assumption that economic shocks of either type (deflationary or inflationary) could cause the price of most assets held by the Foundation to decline materially. For example, in a major deflation, it is assumed that the price of all assets except those held specifically for deflation hedging purposes would decline materially. There is no assurance that the losses in question will be reversed within 18 months; indeed, history teaches that major shocks of the sort being hedged against almost always depress asset prices for more prolonged periods. The size of each hedging segment is pegged to 18-month cash flow needs, not because the disasters being "insured" against tend to be so short-lived, but because 18 months is deemed an adequate time period for the Foundation's board and staff to adjust grantmaking and perhaps other cash flows (e.g., those associated with private investment activities) to suit changing external circumstances. In an ideal world, the Foundation would take out insurance against the forced sale of assets at depressed prices under deflationary or inflationary conditions lasting longer than 18 months, but the assumed opportunity costs of maintaining hedges larger than those specified in the accompanying exhibit (12.5% for each hedge or 25% in total) are deemed excessive. Moreover, under truly extreme conditions (massive deflation or inflation), it is reasonable to assume that assets held to hedge against such a condition would actually appreciate in value, thereby obviating for periods longer than 18 months the forced sale of other assets trading at very depressed prices.

Privately Traded Assets. The Foundation may invest without limitation in privately traded assets, except that new agreements to purchase such assets shall not be executed if the aggregate market value of all such privately traded assets exceeds 60% of the aggregate market value of the Foundation's total assets.

C. Policy Portfolio

Purposes. The cornerstone for the management of the Foundation's assets is its Policy Portfolio, which is set forth on page 23. The Policy Portfolio represents the lowest-cost asset mix that, in the Investment Committee's opinion, is likely to satisfy the objectives specified in §II.A and the constraints specified above in §II.B.

Use and Abuse of Policy Portfolio. The Policy Portfolio is not intended to serve as a benchmark against which the short-term performance of the Foundation's actual investments shall be measured. More specifically, the board ascribes little importance to outperforming the Policy Portfolio over rolling time periods shorter than five years. It recognizes that the Foundation's actual returns could lag the Policy Portfolio's returns over any interim measurement period for two reasons. First, the Investment Committee has discretion to shift funds across segment boundaries (within prescribed limits) to enhance returns or reduce risks. When exercising such discretion, the Committee recognizes the extreme difficulty of making timely shifts across segment boundaries. Indeed, as a general rule, the Committee (and its delegates) refrain from making material or frequent shifts other than for rebalancing purposes. Second, as noted below, the Committee has discretion to deploy the capital allocated to each segment into holdings other than those comprising each segment's benchmark. When exercising such discretion, the Committee's decisions shall employ the criteria for asset substitution set forth below. Absent investment opportunities appropriate to a fund segment that satisfy these criteria, the funds allocated to the segment shall be deployed in a manner that will cause the segment's performance to resemble as closely as possible the performance of its benchmark.

Origins. The Policy Portfolio was established after research and discussion involving board members, Investment Committee members, staff, and outside experts. Close attention was paid to the Foundation's liquidity needs and perceived risk tolerance, as well as

the projected behavior of the asset classes, subclasses, and strategies deemed worthy of consideration for the Foundation's potential use.

Periodic Reviews. The Policy Portfolio is reviewed regularly by the Investment Committee and modified as needed in light of experience and changing circumstances.

Conscious Offsets. The Policy Portfolio comprises hedging segments that, when constructed properly, could provide potentially offsetting total returns under extreme market scenarios. For example, if funds allocated to the deflation-hedging segment are essentially "indexed" to the segment's benchmark, then it is reasonable to suppose that in environments of unexpectedly high inflation losses on such deflation hedges will essentially offset gains on the portfolio's inflation hedges. The converse could occur in deflationary environments. Why does the Policy Portfolio comprise these potentially offsetting hedges, in the normal proportions reflected in the accompanying exhibit? The answer is rooted in three related factors alluded to in §I of this document: (1) neither the Foundation nor any advisors available to it can forecast general economic conditions **more accurately and consistently** than "the market"; (2) although history provides some insight into the probable behavior of various asset classes and subclasses under extreme economic conditions, the "fallacy of composition" makes it imprudent to assume that future outcomes will necessarily be bounded by past extremes;⁷ and (3) the Foundation's liquidity needs (i.e., grant-related outflows) will not evaporate and could actually increase under extreme economic conditions. Taking all of these factors into account, the Investment Committee has concluded that the Foundation should be adequately insured against **both** disaster scenarios (prolonged deflation or very high rates of unanticipated inflation), mindful that the opportunity costs of holding both forms of insurance could exceed materially the opportunity costs of being less adequately insured.

Segment Return Objectives and Benchmarks. The return objectives for each segment are based on an analysis of capital market history, adjusted for valuations and economic conditions at the time this

statement of policies was last revised. The benchmarks for each segment reflect the Investment Committee's best judgment respecting the asset class or subclass that is reasonably certain to achieve each segment's return objective (net of fees) when bought and held on an indexed basis.

Total Return Segment Benchmark. This segment's benchmark is founded on the simplifying assumption that the segment's allocation to private equity is a "given" for policy planning purposes. Accordingly, the segment's benchmark is the weighted average of (1) actual private equity returns and (2) returns on a diversified global stock index with each return weighted in accordance with each subsegment's proportionate weight. The operative premise underlying this weighting scheme is that a material portion of the non-private equity assets held in the Total Return segment will comprise marketable securities, thus permitting the Committee to rebalance the segment's weight within the overall endowment without disturbing private equity holding. The choice of the MSCI All Country World Free Index as an appropriate benchmark for the non-private equity Total Return subsegment creates a rebuttable presumption that the Foundation will maintain at least some exposure at all times to each of this Index's three generic parts: publicly traded US stocks (49% of the Index at year-end 1998), publicly traded developed market foreign stocks (47% at year-end 1998), and publicly traded emerging market foreign stocks (4% at year-end 1998). The presumption is rebuttable because the actual allocation to each of these types of investments could approach zero if sufficient opportunities arise to engage in Asset Substitution (as defined immediately below).

Capitalization-Weighted Benchmarks. The Investment Committee recognizes fully the dangers inherent in basing actual portfolio choices on observed capitalization weights (i.e., market weights) to the exclusion of other considerations. For example, it is evident in hindsight that institutions that have maintained MSCI-like allocations to Japanese stocks over the last decade have paid a very heavy price for their aversion to benchmark risk (defined as deviations from MSCI's ubiquitous capitalization-weighted stock indexes). The Committee is mindful that some institutions have adopted policy portfolios comprising non-capitalization-weighted indices (e.g., GDP-based approaches), and it remains open-minded about the possibility of adopting such approaches in due course.

⁷ In this context, the fallacy of composition warns trustees that if most investors array their affairs in a manner which assumes that future outcomes will be bounded by historical extremes, then such extremes are virtually certain to be eclipsed.

However, before adopting such approaches or even agreeing to consider doing so, the Committee must assess soberly whether the expected benefits of such unconventional approaches are likely to exceed the expected costs. These costs include the material amounts of Committee and staff time that would assumedly accompany an effort to jettison capitalization-weighted benchmarks in favor of alternate approaches; the upfront and ongoing hassles associated with selecting and monitoring external managers willing to be measured against highly unconventional benchmarks; and the stresses and strains associated with staff compensation schemes that link quantitatively based bonuses (to the extent these are rewarded to key investment professionals) to outperformance of benchmarks comprising unfamiliar or esoteric sub-benchmarks.

Asset Substitution. The Policy Portfolio is founded on the assumption that the Foundation’s Investment Committee will exercise judiciously its discretion to allocate assets within segments in a manner that will cause each segment’s actual returns to diverge favorably from the returns of its specified benchmark.

Criteria. Committee decisions to employ assets⁸ other than those comprising each segment’s benchmark shall be based on a careful assessment of the following variables: expected returns, net of fees, expenses and, with respect to leveraged investments, financing costs; a substitute investment’s capacity to reduce overall fund volatility; and the ease with which such assets can be accounted for and traded. The weight accorded each of these variables shall differ depending on the segment in which an asset would be held.

Total Return Substitutes. Substitute assets held within the Total Return segment must have the potential to outperform the securities comprising the segment’s benchmark over a rolling five-year time period (or longer periods in the case of investments entailing longer-term lock-ups). As a general rule, substitute assets held within the Total Return segment are not expected to contribute to the reduction of overall fund volatility: under worst case conditions for the securities comprising the Total Return segment’s benchmark,

assets held within it are expected to decline materially in price rendering their immediate sale an unattractive means of meeting external cash flow requirements.

Hedging Substitutes. Substitute assets held primarily for hedging purposes (deflation or inflation) must have the potential to outperform the securities comprising the relevant “naive hedge” over a rolling five-year time period (or longer periods in the case of investments entailing longer-term lock-ups). “Naive hedge” as used here means either 10-year US Treasury notes held on a constant maturity basis (in the case of deflation hedges) or 10-year US Treasury Inflation-Protected Securities (in the case of inflation hedges). As a general rule, substitute assets held for hedging purposes are not expected to produce long-term returns commensurate with those produced by the securities comprising the Total Return segment’s benchmark. Assets that have the potential to produce such high returns and to simultaneously reduce total fund volatility during either of the disaster scenarios being hedged against (deflation or unexpectedly high inflation) should be assigned to the Total Return segment.

Leverage. Under normal circumstances the Foundation will not engage in borrowing for purposes of enhancing returns. However, the Investment Committee has discretion to purchase assets using borrowed money, provided that such debt financing does not exceed 5% of the total endowment’s market value when any such purchases are consummated nor 10% of total endowment assets at any subsequent valuation date.

Alpha Estimates. When adding substitute assets to each segment, staff shall propose and the Investment Committee shall approve or modify estimates of each prospective investment’s expected real return over its expected holding period defined three ways: (1) worst case, (2) best case, and (3) best point estimate (i.e., most likely outcome). The purpose of specifying expected returns in this manner is to ensure that substitute assets embody an acceptable trade-off between risk and expected return. In the case of actively managed holdings and excepting those cases where active excess returns (“alphas”) are indistinguishable from indexed or passive returns (e.g., private equity), staff shall specify each of these two sources of total return under scenario (3) [i.e., best point estimate], as well as the expected volatility of such “alphas.” The purpose of specifying the expected volatility of holding-specific “alphas” is to ensure that

⁸ As used throughout this document, “asset” is defined in the broadest possible sense and includes securities or properties held directly, through managed accounts, or through commingled vehicles (including fund-of-funds).

the information ratio of each actively managed investment (i.e., expected excess return divided by the standard deviation of that return) falls within reasonable bounds.

Alpha Correlations. The Committee recognizes the extreme difficulty of forecasting correlations among active managers' excess returns, especially under the worst-case ("macro shock") conditions that make scenario testing a useful exercise in theory. Accordingly, the Committee encourages staff to redirect time that would otherwise be spent forecasting such correlations to ferreting out managers whose expected alphas are abnormally skewed to the upside.

Portable Alpha. The Policy Portfolio reflects two related and important assumptions with respect to the deliberate overweighting of any of the Portfolio's segments: first, the types of securities normally represented in a segment will be overweighted (relative to the segment's normal weight) only when the Investment Committee concludes that the excess return opportunities presented by such securities are truly compelling; second, the economic impact of funding decisions that would otherwise cause segment weights to fall outside the ranges specified in the accompanying guidelines shall be neutralized through the use of derivative securities. As a general rule, the Investment Committee will resist proposals to capture incremental excess returns through the overweighting of the Total Return segment relative to its rebalancing threshold of 80%. This bias is founded on the assumption that when Total Return allocations approximate 80%, the endowment is likely already to have material exposure to the active strategies that would be funded with fresh capital. In light of the inherent conservatism of the benchmarks adopted for the Hedging segments, no such bias exists with respect to the potential overweighting of these segments for alpha-capture purposes provided that overweights falling outside the accompanying rebalancing thresholds are neutralized via derivative securities or other means.

Asset-Specific Benchmarks. The primary objective of each and every asset held by the Foundation is to produce returns at least equal to the benchmark for the segment in which the asset is held. As previously noted, achievement of this objective shall be measured over the longer of rolling five-year periods or the relevant lock-up period for investments entailing longer-term lock-ups. As a means of assessing the

interim progress of substitute assets (i.e., the Foundation's success in allocating funds to securities or strategies other than those reflected in each segment's benchmark), staff shall propose and the Investment Committee shall approve the specification of a relevant market index for assessing each holding's interim performance. In some cases (e.g., with respect to US Treasuries held in the Deflation Hedge segment), the most relevant market index will be identical to the benchmark for the segment to which the holding has been assigned. In other cases (e.g., a managed account of foreign stocks held within the Total Return segment), the chosen index will differ materially from the benchmark for the segment in question. The more material the difference between the market index deemed most relevant to a specific holding and the benchmark for the segment in which it is held, the more conviction the Committee must have that the asset or strategy in question can achieve the segment's overall return objective taking the passive or indexed exposure that it entails (if any) plus potential returns from active management (if any) into account. The qualifier "if any" is used in the preceding to underscore the fact that some assets that the Foundation might elect to hold entail passive exposure only (e.g., bond or stock index funds) while others are properly regarded as pure alpha generators (e.g., certain forms of either fixed income arbitrage or private equity investing).

D. Implementation

Staff Responsibilities. The Chief Investment Officer (CIO) and his staff are responsible for day-to-day management of the endowment, for promoting the Investment Committee's discussion of asset allocation and manager selection opportunities and perils, for implementing decisions made by the Investment Committee, and for rebalancing the endowment as needed to ensure compliance with the asset allocation ranges set forth above.

Manager Hiring and Firing. The CIO has discretion to hire external managers provided that he/she provides to each member of the Investment Committee a due diligence memo respecting each prospective manager at least 15 business days in advance of the manager's initial funding. This 15-day notice requirement is intended as a floor rather than a ceiling, the assumption being that staff and the Committee will conduct an ongoing discussion of promising managers, with the

Committee approving informally the hiring of designated managers prior to the commencement of highly time-intensive due diligence tasks (e.g., the preparation of formal memos or the performing of detailed tax and legal analyses). The CIO also has discretion to terminate external managers provided that he/she provides to each member of the Investment Committee written notice of the planned termination at least five business days in advance of the termination.

Staff Compensation Plan. The Investment Committee believes that the Foundation's long-term interests would be well-served by adoption of compensation arrangements for the CIO and other senior investment professionals comprising at least three parts: (1) base salary, (2) a qualitatively determined bonus awarded and paid annually, (3) a quantitatively determined bonus awarded annually but paid out in accordance with "clawback" provisions designed to inhibit undue risk-taking (e.g., year-end "gaming"). These arrangements are described in a separate document.

Investment Committee Responsibilities. The Committee shall oversee staff's fulfillment of its responsibilities as specified above and shall also be responsible for reviewing on an ongoing basis the performance of the overall endowment and its constituent parts. Aided by staff, it shall also be responsible for monitoring and exploiting opportunities to enhance returns through asset substitution as that task is defined above.

Committee Composition. As noted in §I, in an effort to avoid "lowest-common-denominator" decision-making as well as excessive diffusion of responsibility for portfolio results, the Foundation's Investment Committee is small in comparison to peer group norms.

Current Size and Composition. At present, the Committee comprises four voting members: the Foundation's president; its chief investment officer; and two non-executive investment professionals, each of whom has broad and extensive experience supervising institutional funds.

Future Additions. The Foundation is committed to keeping the Investment Committee's membership at five individuals or fewer under all circumstances, including any staff members serving as voting members of the Committee.

Decisionmaking Process. Given the Committee's relatively small size and the extensive investment experience of each of its members, the Investment Committee deems it wise to operate on a consensus basis with each member enjoying a *de facto* veto over non-delegable decisions (i.e., policy decisions that the Committee rather than staff is authorized to make).

Rebalancing. Although last among the policy choices that collectively constitute asset allocation, this final step is arguably the most important. Perhaps the best study of rebalancing options (Arnott and Lovell, 1992) concludes that "disciplined rebalancing can boost returns as much as a fairly large shift in the policy mix itself." Interestingly, choosing a rational rebalancing rule is harder with respect to portfolios comprising only marketable securities than it is with respect to portfolios comprising both marketable and privately traded assets. It is harder because the presence of privately traded assets reduce dramatically the number of times per year that a portfolio's constituent parts can be appraised for rebalancing purposes. Unfortunately, the simplicity associated with a smaller universe of plausible rebalancing rules to choose among is more than offset by the complexity of actually rebalancing portfolios comprising privately as well as publicly traded assets.

Generic Rebalancing Rules. Mindful that the Foundation's actual portfolio does indeed comprise illiquid assets, its choice of an appropriate rebalancing rule is essentially a choice between two simple alternatives:

Rebalancing to Norms. As soon as practicable following the valuation of all of the Foundation's assets, segment weights are restored to the targets specified in the accompanying exhibit; or

Rebalancing to Allowed Ranges. As soon as practicable following the valuation of all of the Foundation's assets, segment weights are adjusted, but only to the extent needed to move each weight back within its specified range.

Favored Rules. Which rule will work best in any given investment environment depends on a host of inherently unforecastable variables, including the correlation of returns among the assets susceptible to rebalancing, estimated trading costs, liquidity needs, and qualitative variables such as the Foundation's

MESSAGE IN A BOTTLE *concluded*

image in the eyes of valued external managers. As a general rule, the first approach is potentially the most profitable provided that trading costs are controlled effectively, and this is the approach favored by the Foundation when rebalancing capital across segments. Because rebalancing presupposes updated valuations on all of the Foundation's investments, some of which cannot be repriced more frequently than annually (e.g., selected private equities), actual segment weights are unlikely to be adjusted back to specified targets more than once every 12 months. Intra-segment rebalancing is dictated less by either of the rebalancing rules outlined above than by the asset substitution criteria set forth in §II.C.

Rebalancing in Extreme Market Environments. The rebalancing rules employed by the Foundation under normal market conditions must necessarily be modified in extreme market environments, which are defined as environments in which one of the three segments described in the accompanying exhibit outperforms materially the other segments. In such environments, the Foundation will rely heavily on the sale of appreciating assets to meet grantmaking needs, thereby reducing if not eliminating the need to liquidate other assets at depressed prices. □

Policy Portfolio

Segment / Eligible Assets	Allocation Ranges			Expected Returns Net of Fees			Reason(s) Held	Benchmark
	Target	Minimum	Maximum	Real Return	Excess Return from Asset Substitution*	Real Total Return		
Total Return Assets	75%	60%	80%	6.3%	1.0%	7.3%	Preserve and enhance purchasing power	Subsegment benchmarks weighted by normal %s
Existing Private Investments	per legal agreements	<i>dictated by PI-related cash flows</i>		10.0%	0.0%	10.0%	Enhance purchasing power	Actual PI returns
Other Total Return Assets • Developed Market Equities • Emerging Markets Equities • Private Equity Strategies • Absolute Return Strategies • Other Assets and Strategies	75% less PIs	<i>dictated by asset substitution criteria and liquidity constraints set forth in the accompanying document</i>		5.0%	1.5%	6.5%	Preserve and enhance purchasing power	MSCI All Country World Free Index adjusted for applicable withholding taxes
Hedging Assets	25%	20%	40%	2.6%	0.5%	3.1%	Avoid forced sale of Total Return Assets	Subsegment benchmarks weighted by normal %s
Inflation Hedges • Natural Resource-Related Assets • Real Estate • Inflation-Linked Bonds • Commodities • Other Assets and Strategies	10%	5%	15%	3.5%	0.5%	4.0%	Avoid forced sale of Total Return Assets during periods when unexpectedly high inflation causes such assets to decline in price	10-year US Treasury Inflation-Protected Securities (TIPS) held on a constant maturity basis
Deflation Hedges • US\$ High Grade Bonds • Non-US\$ High Grade Bonds	15%	10%	20%	2.0%	0.5%	2.5%	Avoid forced sale of Total Return Assets during periods when deflation causes such assets to decline in price	10-year US Treasury note held on a constant maturity basis
Cash Equivalents	0%	TBD**	15%	1.0%	0.0%	1.0%	Liquidity buffer; source of leverage to enhance returns in other segments	Merrill Lynch 182-day Treasury Bill Index
Total	100%			5.4%	0.9%	6.3%		Constructed index comprising the asset segment benchmarks specified above weighted by the % allocation in the "Target" column

* Asset substitution means the use of any managers, strategies, or tactics that could cause a segment's or subsegment's returns to deviate from the returns of its benchmark.

** Minimum cash position could be negative, subject to discussions of appropriate leverage ratios.

THE INVESTMENT FUND FOR FOUNDATIONS

590 Peter Jefferson Parkway, Suite 250
Charlottesville, Virginia 22911

Phone: 434-817-8200
Fax: 434-817-8231
Website: <http://www.tiff.org>

Electronic mail inquiries:

Services offered by the cooperative: info@tiff.org
Member-specific account data: memberservices@tiff.org
Manager selection procedures: managers@tiff.org