



To: TIFF Multi-Asset Fund (MAF) Members
Date: June 5, 2009
Re: Pending Changes in MAF's Constructed Index

I. Executive Summary

Have a Look. This document summarizes much work done by this staff of late aimed at identifying appropriate changes in the market bogey [a/k/a Constructed Index (CI)] that we promulgate as a means of telegraphing to endowed charities investing in MAF a general sense of the asset class and segment risks to which their capital might be subject over **long term** holding periods. As documented in quarterly reports mailed routinely to MAF members and posted at www.tiff.org, MAF's CI has changed seven times since the Fund's inception in 1995. As of July 1, 2009, it will change in the manner described in the following tables, which examine the CI through the three prisms most commonly employed by MAF members. For what it's worth, we prefer the "Dugout View" when pondering the CI's constituent parts. Please see Appendix B for a description of the market indices referred to in this memorandum.

MAF Constructed Index — Upper Deck View			
Asset Class	Current	Effective July 1st	Change
Equities Broadly Defined	66%	70%	+4%
Fixed Income	30%	25%	-5%
Commodities	4%	5%	+1%

MAF Constructed Index — Box Seat View					
Asset Class	Current *		Effective July 1st		
	Weight	Bogey	Weight	Change	Bogey
Equities Broadly Defined	66%		70%	+4%	
Global Equities	53%	All Country World	58%	+5%	ACW with 1.5x weight to emerging **
Resource Related Stocks	7%	Custom	0%	-7%	Not needed
High Yield Bonds	3%	ML High Yield	7%	+4%	Barclays HY 2% Issuer Capped
Real Estate Investment Trusts	3%	MSCI REIT	5%	+2%	Same
Fixed Income	30%		25%	-5%	
Cash Equivalents (f/k/a AR)	15%	T-bills +4%	5%	-10%	ML US 6-mo T-bill Index
Inflation-Linked Bonds	10%	10-year TIPS	20%	+10%	Barclays TIPS Index
Conventional US Bonds	5%	10-year Treasuries	0%	-5%	Not needed
Commodities	4%		5%	+1%	Same ***

MAF Constructed Index — Dugout View					
Segment / Subsegment	Current *		Effective July 1st		
	Weight	Bogey	Weight	Change	Bogey
Total Return Assets	56%		65%	+9%	
Global Equities	53%	All Country World	58%	+5%	ACW with 1.5x weight to emerging **
High Yield Bonds	3%	ML High Yield	7%	+4%	Barclays HY 2% Issuer Capped
Inflation Hedges	14%		10%	-4%	
Commodities	4%	DJ Commodities	5%	+1%	Same ***
Real Estate Investment Trusts	3%	MSCI REIT	5%	+2%	Same
Resource Related Stocks	7%	Custom	0%	-7%	Not needed
Deflation Hedges	5%		0%	-5%	
Conventional US Bonds	5%	10-year Treasuries	0%	-5%	Not needed
All Purpose Hedges	25%		25%	0%	
Inflation-Linked Bonds	10%	10-year TIPS	20%	+10%	Barclays TIPS Index
Cash Equivalents (f/k/a AR)	15%	T-bills +4%	5%	-10%	ML US 6-mo T-bill Index

* The current CI includes a 15% allocation to "Absolute Return (AR)," benchmarked against 3-month Treasury bills plus 4% annualized. As noted in §II below, this 4% increment on a 15% allocation equates to 0.6% on total fund assets, a return premium that the revised CI seeks to not only recapture but eclipse through its heavier allocation to total return assets. Will the latter assets outperform their "funding" sources (essentially conventional bonds and cash equivalents formerly lumped into MAF's AR segment) by a margin sufficient to make the revised CI a "faster rabbit," all else equal? No one can know for sure. But we think so, as noted in response to Question 3 below. Importantly, in future reports, performance of the CI generated after June 30, 2009, will be reduced by 0.20% (20 basis points) per annum, prorated monthly. Why? Because we want to keep reminding all interested parties that there are real-world costs (approximating 0.20% per annum at present, according to staff's ballpark estimates) to investing passively in the CI itself.

** Emerging Market (EM) stocks comprise roughly 10% of the MSCI All Country World Index at present. Whatever this fraction is as of June 30, 2009, TIFF Advisory Services, Inc. (TAS), MAF's advisor, will expand it 50% (and contract Developed Markets' weight to the corollary degree) for purposes of computing EM's weight in the global equity segment's bogey for 3Q09, and will employ a similar process to rebalance this bogey at each quarter-end. TAS will calculate the performance of the global equity segment's bogey using the following formula: $(1-EM) \times (\text{MSCI World Index total return}) + (EM) \times (\text{MSCI Emerging Markets Index total return})$, with EM rebalanced at each quarter-end to 1.5 times the weight of emerging markets in the MSCI All Country World Index.

*** The current CI includes a commodities segment whose bogey is the Dow Jones-UBS Commodity Index Total Return (formerly the Dow Jones AIG Commodity Total Return Index) less a debit of 1% per annum to reflect the minimum assumed real-world costs of gaining passive exposure to said Index. This debit will be eliminated respecting the revised CI in light of the overall CI debit of 0.20% described in the note at the top of this page.

II. Detailed Discussion. The reasons why the CI will morph in the above manner and the process we employ when pondering or making changes to it are discussed in detail below. To make this discussion as user-friendly as possible, we've cast it in Q&A form. Here are the major questions addressed below and the pages on which discussion of them commences:

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We hope readers find this entire document enlightening if not also stimulating and encourage readers to contact us if they have questions or comments about it.

Question #1 — Why maintain a market bogey or Constructed Index in the first place?

Why Indeed. We highlighted **long term** in the Executive Summary because MAF's prospectus gives its stewards the discretion to deploy its capital in a manner that differs from the CI. Why do the Fund's stewards — by which we mean primarily external managers but also staff in its dual role as manager-of-managers and shepherd of an internally managed portfolio comprising a non-trivial portion of MAF's assets — enjoy such discretion? Because history and experience teach that no static asset mix can reasonably be expected to perform satisfactorily regardless of market conditions, where "satisfactorily" is defined in the manner outlined in Step 5 under Question 5 below, i.e., a tolerably high probability of

generating mid-single digit or higher real returns coupled with a tolerably low probability of producing painfully large peak-to-trough declines or drawdowns. Of course, given the flexibility MAF's stewards enjoy to deploy the Fund's assets in a manner different from the Fund's evolving Constructed Index, why maintain the CI at all?

Two Reasons. There are at least two reasons for doing so. First, because as noted previously such an Index or market bogey can be useful in highlighting for MAF's member-charities general asset class and segment risks to which their capital might be subject over long term holding periods. Second, because experience teaches that well-intentioned trustees find it useful to compare the returns produced by actively managed portfolios or mutual funds they employ to the returns produced by passive portfolios whose inherent risks approximate those of the active portfolios being assessed. To be sure, since the essence of active investing is to hold securities that differ in character or proportions from passive alternatives, one must take care to avoid excessively short-term assessments of active managers' or funds' results relative to relevant passive benchmarks or bogeys. That said, we don't object hugely to having MAF's evolving results compared to those generated by its evolving Constructed Index over, say, rolling three year time periods or longer. Differently put, in this staff's opinion the CI represents the least-worst means of assessing MAF's performance over time horizons shorter than the multi-decade holding periods needed to assess the Fund's performance relative to its primary return goal of 5% or higher annualized real returns (i.e., the Consumer Price Index's annual change plus 5% per annum).

Question #2 — How has MAF's Constructed Index evolved since the Fund's inception?

Slothful or Savvy? As noted above, on seven occasions since the Fund's inception the analytical process described herein or earlier incarnations of it have caused us to tweak MAF's CI. On countless other occasions it's caused us to reaffirm the CI we were using at the time. Far from being embarrassed by this latter fact — i.e., by our seeming sloth at declining to change the CI even after devoting lots of staff if not also board time to a periodic review of its constituent parts — we're proud of it. We're proud of it because change for its own sake can be as dangerous in money management as it manifestly is in other forms of human endeavor prone to excessive emotionalism, e.g., democratic governments' attempts to produce targeted levels of employment or GDP growth.

Triggers. As a general rule on which we elaborate in response to Question 6 below, we change the CI only when the environment in which we're putting MAF's capital to work changes materially enough and in a manner that we deem perdurable enough to justify such changes. Perdurable as just used doesn't mean truly permanent: as the saying goes, the only things that are truly permanent are death and taxes.¹ That said, on occasion the world changes in a manner that commends if not necessitates changes in the CI. The best example germane to MAF's evolving CI is the introduction into this Index of inflation-linked bonds. Such bonds weren't issued by Uncle Sam prior to 1997. Mindful that the US Treasury planned to issue such bonds eventually, we studied their probable features for many months, prepared an extensive report about them for MAF's outside directors and others in late 1996 and added them to MAF's CI when this nascent asset class arguably became large and liquid enough to become truly investable for institutions with sizeable sums to deploy. (TIPS entered the CI on 9/30/1999) Similarly, although it was difficult for MAF to invest cost effectively in commodities when the Fund commenced operations in 1995, by 2004 the environment had morphed in a manner that in this staff's opinion made it sensible to add commodities to the CI and we did so effective year-end 2004.

Eyes on the Prize. Before highlighting recent changes in MAF's external environment that induce us to change its CI in the manner outlined above effective July 1, we'll answer preemptively a question that MAF members must surely be pondering as they review this memo: why the heck didn't TIFF change the CI in **anticipation** of the recent market meltdown? For example, taking due account of the unsustainability of the credit "bubble," why didn't we boost materially the CI's implicit allocation to the one major asset class that produced material gains during the recent meltdown — US Treasury bonds — and reduce materially its implicit allocations to stocks and high yield bonds? Our answer runs as follows. First and

¹ When going about that part of our work involving investment policy-making, this staff is mindful of the great historian Edward Gibbon's pithy characterization of his own professional labors. The work of the historian, Gibbon lamented, tends to be "precarious and short."

foremost, as noted in Appendix A, MAF's stewards did indeed take steps to "furl the sails" in anticipation of the major storm that's blown through global capital markets of late by reducing its exposure to several of the asset classes comprising the current CI. Importantly, for reasons outlined in a bulletin issued to MAF members on March 10, 2009, that was posted at www.tiff.org that day, the Fund's stewards unfurled MAF's sails to an extent they deemed prudent as 1Q 2009 unfolded, by which we mean that they shifted capital on the margin into securities that had fallen sharply in price as the aforementioned storm raged. Such shifts are an important reason that MAF has performed in a manner pleasing to this staff since global stock indexes turned sharply higher in mid-March. **We note of course that past performance does not guarantee future results.** Turning back to the question of why TIFF didn't change the CI in a manner that anticipated the recent market meltdown, we have days when we wish we'd done so — and days when we wonder whether we'd have been cocky enough to shift more aggressively into cash and other assets that held their value as financial markets unraveled even if the CI itself had been weighted more heavily toward such "defensive" assets. We reference cockiness here because it requires something akin to cockiness for persons entrusted with the deployment of perpetual charities' capital to shift at any given time large fractions of such wealth into asset classes or subclasses that history and intuition suggest are likely to produce suboptimal real returns over time horizons appropriate to such charities. And we put "defensive" in quotes because the asset class that in hindsight would have been most profitable to overweight throughout the recent market meltdown — namely, long-term US Treasury bonds — could prove anything but conservative of investors' capital in coming years. We highlighted this concern in our March 10 memo and would be pleased to elaborate on it upon request. Clearly, it represents an important underpinning of the decision discussed here to eliminate conventional bonds from the revised CI while in essence hedging our implicit bet that deflationary conditions won't persist for long by boosting the CI's allocation to TIPS. We label TIPS "all purpose hedges" because they can help hedge overall portfolio values during deflationary as well as inflationary conditions provided that they're purchased at or below par. This is because Uncle Sam promises to pay holders of TIPS at least par when such securities mature.

Why Now? To the important question of why we're changing the CI **now**, we offer a two-part answer. First and most generally — if not also obviously — it's because we think the revised CI entails a more attractive balancing of risks and expected returns than the current CI. We explore this assumption — which we're careful to label as such — in considerable detail below. Second, although we're by no means certain that the market meltdown that has kept all responsible stewards of capital including us working overtime for many months has run its course, we're confident enough in our opinion about this meltdown's reshaping of future return distributions to tweak the CI now, mindful that neither law nor custom prevent us from tweaking it further in coming years (if not sooner). More specifically, we've persuaded ourselves that while continued deflation of the sort that the US and many other nations have experienced of late could continue, the path of least resistance for nations pursuing democratic capitalism is inflationary. Accordingly, within the context of an investment program which assumes that ownership broadly defined will trump creditorship broadly defined over time horizons appropriate to perpetual life charities, we think it makes sense to (a) weight equities as heavily as possible consistent with participating investors' perceived risk tolerances and (b) tilt non-equity holdings toward assets likely to perform better under inflationary than deflationary conditions. Moreover, respecting whatever portion of an endowment management program one benchmarks against equity-oriented bogeys, we think it makes sense to skew or tilt such bogeys toward economies characterized by relatively strong (a) demographics (i.e., relatively young populations); (b) balance sheets (i.e., relatively low external debt needs); (c) work ethics; and (d) educational aspirations. Obviously, a given country can score highly on all such metrics and still be an unattractive place to invest equity capital, as was true of India when its stock market reached its most recent zenith in January 2008. Just as obviously, a given country can score poorly on such metrics and be an attractive place to invest equity capital, as would be true in this staff's potentially flawed judgment if — all else equal — broad indices of "Old Europe" stocks or indeed of US stocks were to fall materially from current levels. Our aim in overweighting emerging market stocks in the revised CI is not to tilt MAF's actual holdings materially and permanently toward such stocks but rather to facilitate over time the Fund's potential exploitation of tailwinds spawned by emerging economies' seemingly superior fundamental attributes. Importantly, at this writing, emerging market stocks as a group are not compellingly cheap in the eyes of MAF's stewards and **it is possible if not probable that the Fund will display an underweight to EM stocks** when the revised CI becomes effective on July 1st. What's even more probable, we'd argue, is that come July 1st certain developed economies with relatively old populations that borrowed from the future to finance consumption binges in recent decades are going to have long-term outlooks not

discernibly improved from today's. What are such outlooks today? Uninspiring, to say the least, in our opinion, for reasons we'd be pleased to discuss upon request.

Question #3 — Why have MAF's Resource Related Stock (RR) and Absolute Return (AR) segments been eliminated?

Looks Can Be Deceiving. Our elimination of MAF's RR segment doesn't necessarily signal a fundamentally changed view of the long-term merits of holding resource-related stocks on behalf of endowed charities. Rather, it's rooted primarily in our decision to skew the global equity segment's bogey toward emerging markets — a skew that causes this bogey to display an implicit tilt toward RR stocks due to the dominance of RR issues in emerging market subindexes. The RR segment's elimination is also tied to our decision to boost the CI's allocation to commodities and TIPS, which we view as more reliable means than RR stocks of hedging overall portfolio values against unanticipated spikes in general price inflation over short-term measurement periods. Differently put, the RR segment's elimination might be viewed not as a signal that we think such inflation is less probable in coming years than it was when the segment was first created but rather that it's equally if not more probable.

Labels Can Be Confusing. We're eliminating MAF's AR segment for two reasons. First and foremost, in this staff's judgment the term "Absolute Return" has hampered more than helped our efforts to keep MAF members apprised of how we're deploying their capital. It's hampered such efforts because we employ a "look through" approach when assessing the risks to which each and every external manager funded by MAF is subjecting the Fund's members. We're referring primarily to systemic risks here — a/k/a asset class "betas" — and we're doing so to highlight the fact that "Absolute Return" is not an asset class as such, i.e., it's not investable on a passive or indexed basis. Rather, it's a mode of investing or more precisely a label applied to many varied forms of investing that, like the labels liberal or conservative in the political realm, has essentially lost its meaning through overuse. That said, and as the tables furnished above make plain, MAF's revised CI as of July 1 will in fact comprise a reduced allocation to the inherently investable asset class that has underlain the AR segment's bogey since MAF's inception, namely US Treasury bills. Why are we essentially lowering the weight to a fund segment whose bogey has provided relatively attractive risk-adjusted returns throughout much of MAF's history? We're doing so for precisely that reason: because our assumptions respecting the distribution of returns that each of MAF's segments might be expected to deliver over the decade-long horizon governing our investment policy work on MAF's behalf suggest that short-term US Treasury bills are more likely than not to be inferior investments over this interval. "Perhaps," some readers might respond, "but what about T-bills coupled with the 4% annualized alpha or excess return built into the AR segment's bogey at present?" As described in a note accompanying the tables above, a targeted return premium of 4% on a segment comprising 15% of the CI at present is nothing more nor less than a targeted premium of 0.6% on overall fund assets. Our opinion, reinforced by the modeling work described below, is that the passively investable components of the revised CI have a higher expected return than the passively investable components of the CI it'll replace, and, as elaborated upon below, the elimination of "AR" doesn't hamper our ability to seek alpha through active management. We'll strive to do as good a job as any team of investment pros laboring on behalf of endowed charities in pursuing this elusive goal. We're even more confident in our opinion that the revised CI will outperform the CI it'll replace. The by-product of the latter mindset is the elimination of MAF's AR segment as such.

Important Corollary. An important corollary to the statement above that staff employs a "look through" approach when assessing the risks to which each external manager employed by MAF subjects the Fund is this: **our jettisoning of the term Absolute Return won't necessarily compel us to change MAF's external manager roster or indeed external managers' percentage allocations once the new CI becomes effective.** We highlight this fact because we know from conversations with multiple MAF members and prospective members over the years that one of the Fund's chief virtues in their eyes is its employment of a diverse array of managers and strategies, including especially managers making their services available to MAF via vehicles commonly referred to as hedge funds. We ourselves try to eschew the label "hedge funds" because it tends to foster misunderstanding about the risks to which managers we employ are subjecting their clients: as a quick scan of so-called hedge fund returns as reported in *The Wall Street Journal* or *Barron's* will attest, the vehicles labeled as such by the media and other observers employ collectively strategies that are vastly more numerous and diverse than the impressive array of pitches

thrown by Red Sox star Daisuke Matsuzaka. To be sure, we **may** change MAF's external manager roster in due course, but this won't be because the Fund's lexicon if you will has changed nor even because the CI's segment weights have changed. We highlight this fact for two reasons: first, to underscore that as previously noted the Fund's actual exposures to the systemic risks or betas embodied in each of its segments may and likely will differ from the CI's implicit exposures to such risks at any given point in time; and second, to assure MAF members who are attracted to the Fund due in part to its engaging of carefully chosen hedge fund managers that it will almost certainly continue to access this type of talent via external partnerships (a/k/a Commingled Investment Vehicles or CIVs) moving forward.

Question #4 — Why doesn't the revised CI comprise any wholly new "asset classes"?

KISS. This is an interesting and indeed fun question. We've tipped our hand respecting our answer to it by surrounding asset classes with quotes — to underscore our skepticism that certain relatively novel forms of deploying capital that have begun working their way into institutional asset mixes indeed merit treatment as asset classes *per se*. This isn't to say that some such instruments and techniques — infrastructure investments, carbon credits, "clean" energy, water rights: the list goes on and on — won't find their way into MAF's actual holdings over time. Rather, it's to say that when fashioning MAF's CI as a means of telegraphing to the Fund's members a general sense of the asset class and segment risks to which their capital might be subject, we seek to construct the simplest and most straightforward bogey that'll achieve this elusive aim.

Tail Risk. Consistent with the principle just articulated, we have not included in the revised CI a distinct allocation to instruments that we've employed episodically on MAF's behalf, and expect to continue using episodically, to mitigate what investment pros refer to as "tail risk." By this we mean the risk that one or more asset classes will generate in a given reporting period returns wildly different from whatever long-term returns investors holding such assets expect them to produce. (*Cf.* calendar year 2008 returns for most major asset classes for graphic demonstrations of "tail risk.") More specifically, we have employed episodically on behalf of MAF as well as other comprehensive endowment management programs we administer a variety of derivatives in general and options in particular — and expect to continue doing so. Indeed, one reason why we didn't eliminate entirely from the CI a segment whose underlying bogey is cash equivalents is to facilitate mentally if not physically our occasional use of a carefully delimited fraction of MAF's capital to buy options — options which, if all goes well respecting MAF's other holdings, will expire worthless. Why would we "waste" MAF's capital in this manner? For the same reason that property owners "waste" money buying homeowners' insurance that they too hope will prove unnecessary in hindsight. Of course, as we've noted repeatedly in prior reports, every now and then investors can make moves that essentially enable them to pocket return premia while also obtaining protection against certain investment hazards. We believe this was true in hindsight respecting the purchase of commodities as inflation hedges when we introduced them into the CI at year-end 2004. Are any such opportunities, which some might characterize as akin to "free insurance policies," available today? We think not, but we're constantly on the lookout for same and stand poised to obtain them on MAF's behalf when we espy such perceived opportunities.

Question #5 — What specific steps does staff employ when revising the CI?

Java Anyone? We've postponed this question until this point because our answer to it is necessarily long and we didn't want to risk losing readers by addressing it earlier in this missive. Accordingly, we encourage readers whose energies might be flagging after digesting the prose above to grab a fresh cup of Peet's coffee before plowing ahead. Lord knows this memo's author imbibed many such cups (from the Peet's outlet just footsteps away from TIFF's Cambridge, Massachusetts offices) while crafting this memo.

Multi-Step Process. The multi-step process that staff employs when it reviews periodically and changes as needed MAF's evolving market bogey or CI can be usefully summarized as follows:

Step 1. Use mean-variance analysis to formulate "perpetual" market bogey N'. This asset mix arguably is attractive from a mean-variance perspective if one accepts as valid the expected real returns, standard deviations and correlations used to construct it. These inputs presuppose a very long investment time horizon — what for lack of a better term we label "normal" market conditions (N') — and hence are

relatively insensitive to current market conditions. Importantly, N' is **not** our recommended policy portfolio. Just as importantly, we're **not** disclosing publicly the inputs used in the modeling efforts described herein. There are several reasons why, including our keen desire to avoid spending undue time explaining how and why we derived certain outputs based on the inputs we've chosen to employ. We're willing to furnish such explanations to persons serving on the boards of the TIFF Investment Program or the advisor thereto (TAS) but we're not in the investment consulting business and we don't stake our reputations on our perceived skill in applying quantitative methods to the inherently squishy task of investment policy formulation. Rather, we stake our reputations and indeed livelihoods on our skill in stewarding effectively the capital entrusted to us, with computer-based modeling of the sort being discussed here comprising but a minor aspect of such prowess.

Step 2. Formulate alternate portfolios expected to perform very well under specific economic scenarios. Using assumptions about the probable behavior of the asset segments employed in Step 1 under "extreme" as distinct from "normal" conditions, we seek to generate a set of alternate portfolios which, if held in combination with N', would assumedly mitigate N's inherent risk of producing performance shortfalls (absolute or relative) under "extreme" conditions. These alternate portfolios and the conditions under which each is distinctly attractive to hold are as follows:

I'. This portfolio seeks to limit market value declines during periods of high unanticipated general price inflation.

D'. This portfolio seeks to limit market value declines during periods of unanticipated general price deflation.

E'. This portfolio seeks to generate material gains during periods of rapid stock price appreciation (a/k/a "exuberance", thus explaining our use of E as this portfolio's descriptor).

Step 3. Combine N', I', D' and E' in a manner reflecting staff's judgments respecting the probabilities of each of the "extreme" scenarios identified above unfolding over multiple market cycles. The resulting asset mix becomes our preliminary policy portfolio, dubbed P'. Formally, $P' = W_N N' + W_I I' + W_D D' + W_E E'$, where the weights (Ws) reflect in essence the assumed probabilities that each of the four scenarios identified above will unfold during the very long investment time horizon appropriate to perpetual life charities. Less formally, P' represents the asset mix we'd adopt if our policy work were conducted without reference to current market conditions.

Step 4. Recast P' to reflect current market conditions. We do this by tweaking the segment weights inherent in I', D' and E' to reflect staff's judgments respecting tweaks needed to render these three portfolios "optimal" in light of current market conditions. When assessing such conditions, we focus primarily on the current price tag that investors as a group have assigned to each eligible asset class as well as the probabilities that each of the three scenarios will unfold over the next 10 years. Why 10 years? Because this interval seems long enough for any truly anomalous conditions (a/k/a material mispricings) currently observable to get arbitrated away yet short enough to render such price-sensitive considerations germane to policy portfolio formation. The resulting "tweaked" alternate portfolios are dubbed I, D and E and the resulting overall asset mix becomes our tentative policy portfolio, dubbed P. Formally, $P = W_N N' + W_I I + W_D D + W_E E$, where the weights (Ws) reflect in essence the assumed probabilities that each of the four scenarios identified above will unfold over the next 10 years.

Step 5. Subject the tentative policy portfolio P to rigorous statistical analyses. Such analyses take two primary forms — Monte Carlo simulations and so-called bootstrapping simulations — and focus primarily

on gauging the probabilities that our tentative policy portfolio P will perform satisfactorily.² “Satisfactorily” as used here means essentially two things: (a) does P have a tolerably **high** probability — at least an even chance — of producing a 4% or higher annualized real return over the next 10 years?; and (b) does P have a tolerably **low** probability — not more than one in 10 — of producing a peak-to-trough decline of 25% or more in a three year moving average of the portfolio's market value at any time during this 10 year interval? Why do we use a three year moving average in this context? Because that or something substantially similar to it is the denominator if you will used in many endowed charities' endowment spending formulae.³ And why are we willing to “settle” for a 4% real return? We're not, really, inasmuch as one-half of the projected outcomes entail annualized real returns **exceeding** 4%. We use 4% rather than the 5% more commonly cited when endowed charities articulate their long-term real return goals because — very importantly — **we don't intend to hold the CI itself on behalf of MAF**. Rather, we intend to hold a portfolio that can and likely will differ discernibly from the CI over time, with the differences potentially causing MAF to outperform the CI (if all goes well) by an annualized margin of at least 1%. To be sure, we don't promise and indeed don't expect that MAF will outperform the CI in any given quarter or year. Rather, we assume in our modeling work (but obviously can't promise) that MAF will outperform the CI over time horizons appropriate to perpetual life charities. We could assume otherwise, of course: that MAF will return over the long term exactly what the CI returns — or even less. But this assumption would compel us to tilt the CI itself more heavily toward equities broadly defined in an effort to keep at tolerable levels MAF's probability of achieving its primary return objective of 5% or higher annualized real returns. Alas, any such tilting would boost the CI's riskiness (as measured by potential drawdowns or peak-to-trough declines) above levels that MAF members on average assumedly deem tolerable.

Step 6. Tweak P as needed to reflect insights derived from Step 5. Like the favorite spectator sport of many members of this staff (i.e., baseball) the multi-step analytical process outlined here could continue forever — by subjecting P as defined in Step 5 to an endless series of tests aimed at identifying precisely “optimal” normal or policy weights for each asset class and subclass that MAF employs. For better or worse, this staff has no interest in performing endless tests of this sort. We do, however, want and need to get reasonably comfortable with the notion that MAF's evolving market bogey or CI won't hamper our pursuit of investment excellence on behalf of the Fund and its shareholders. Accordingly, after completing preliminarily Step 5, we do what most institutional investors do when engaged in investment policy formulation and conduct an essentially iterative process of comparing alternate asset mixes' risks and expected returns. When we've satisfied ourselves that we've done enough iterations of this sort, and elicited feedback if not also pushback on such work from the outside directors we're privileged to have overseeing our work, we declare victory and promulgate the results as MAF's evolving Constructed Index.

Question #6 — Under what conditions will staff review and potentially revise the CI?

Sound Bite. We could and arguably should answer this question with two words: “as needed.”

As Joe Biden Might Put It. Having encouraged readers to fortify themselves with coffee before plowing through our necessarily lengthy answer to Question 5, we'll expand upon the above answer to Question 6 if for no other reason than to help readers burn through caffeine overloads. In doing so, we'll repeat a point

² Monte Carlo simulations entail the use of algorithms to examine probable outcomes from systems (including but not limited to financial markets) characterized by substantial uncertainty. The term Monte Carlo was coined by physicists working on the Manhattan Project in the 1940s and was inspired by the random character of outcomes generated by roulette wheels that attract gamblers to Monaco and other casino capitals. Bootstrapping simulations also seek to examine probable outcomes from systems characterized by great uncertainty but are conditioned to a greater extent than are Monte Carlo simulations by the empirical or historical distribution of observed data. In plain English, bootstrapping simulations tend to assume to a greater degree than do Monte Carlo simulations that the future will resemble the past. Both techniques can be useful; and both can be dangerous, especially if users don't appreciate fully their inherent limitations. We do.

³ For what it's worth, this risk parameter corresponds very roughly to a not-more-than-one-in-three probability of a peak-to-trough decline of 25% or more in the portfolio's market value (as distinct from a three year moving average thereof) at any time during the assumed 10 year interval.

made in response to Question 2 above, which is that we're proud rather than embarrassed by the fact that we've changed MAF's CI far fewer times since the Fund's inception than we've **considered** changing it. Stated summarily, here are the conditions that compel us to review the CI and revise it as needed:

- A new asset class emerges that satisfies sufficiently our three main tests for an asset class's tentative inclusion in the CI: (a) it's investable by folks with serious money to deploy (meaning: many billions); (b) it's not inherently unappealing to tax-exempt investors (as are municipal bonds and preferred stocks under current tax laws); and (c) it provides meaningful diversification relative to pre-existing CI segments under a broad range of market scenarios. If a new asset class meeting these tests were to emerge (as did TIPS in the late 1990s), we could and likely would revise N' as defined above, which could ultimately lead to changes in the CI.
- The fundamental characteristics of one or more asset classes already comprising the CI, or the relationships among same, morph materially. One could argue that this condition was triggered or fulfilled respecting commodities by the vast infusion of speculative capital into that asset class during the final 12 months or so of commodities' late great bull run *circa* mid-2007 to mid-2008. Why didn't we revise the CI accordingly during this interval? We gave serious thought to doing so, but — frankly — we permitted ourselves to get so preoccupied with strategy and tactics at the time that we did not re-do “from first principles” our policy work on commodities. Fortunately, our preoccupation with shorter-term considerations during the interval in question caused us to underweight resource related stocks and commodities relative to the CI, thus causing MAF's actual exposure to commodities broadly defined as they were plummeting during the second half of 2008 to be discernibly lower than the commodity-based “norms” comprising the CI. Importantly, now that much of the speculative capital alluded to above arguably has exited the commodities arena, we believe that commodities' price behavior during a wide range of economic scenarios will likely resemble their behavior during like scenarios prior to this decade.
- Asset prices morph in a manner that causes us to re-do the composition or weights of our scenario-specific portfolios (I, D, or E in Step 2 above), thus triggering potential changes in the CI in due course, assumedly via changes in its antecedent P (see Step 4).
- Our return expectations for one or more asset classes included in the CI morph in a manner that causes us to doubt the then-current CI's adherence to the risk parameters articulated in response to Question 5 above.

Inefficiency Extolled. Obviously, in determining whether to actually change the CI once a periodic review of it has been conducted, we have applied and will continue applying the proverbial rule of reason and refrain from making changes so minute as to be essentially irrelevant to MAF members' evolving appraisal of the risks to which their capital is being subjected. Less obviously but perhaps more importantly (at least to this staff), revisions to the CI triggered by one or more of the conditions outlined above — or by other catalysts we'd be pleased to discuss — don't necessarily entail our replacement of one “efficient” portfolio with another, where “efficient” is defined in classic quant jock terms as the highest expected mean return for a given level of expected variance or the lowest expected variance for a given level of expected return. Come again? Are we really saying that we'd pick a CI that our models tell us is “inefficient” in mean-variance terms? Yes, we are, for reasons outlined in detail in an essay this staff published almost a decade ago. Entitled *Message in a Bottle*, it's available upon request. More coffee anyone? Perhaps a martini would be more like it. Extra olives for us, please.

III. Glossary

Alpha represents the amount of a stock's return, on average, independent of the market's return, i.e., the difference between a stock's expected return and the expected return for stocks with comparable market risk.

Beta is an asset's sensitivity to market moves. Roughly speaking, if the market gains 10%, an asset with a beta of 1.0 will, on average, gain 10%.

Commingled Investment Vehicles are funds of pooled capital in which multiple investors own an interest, e.g., shares or units or a limited partnership interest. The CIV then buys assets, and investors participate in

the performance of those assets and the costs, fees, and expenses of the CIV, typically proportionally with other investors. Publicly offered CIVs, which are registered for regulatory purposes, may include mutual funds and exchange-traded funds (ETFs). Private CIVs, which typically are not registered, may include pools commonly known as hedge funds. Hedge as just used should not be confused with hedged, as many CIVs referred to as hedge funds by their advisors or others employ strategies entailing high degrees of market as well as other risks.

The **mean-variance** references in this document refer to the common practice of selecting portfolios based on the means and variances of their expected returns. Simply put, for a set of portfolios with the same expected returns, those with lower variances are always preferable to those with higher variances.

Standard deviation in the context of this document is a measure of the dispersion of asset returns. It is calculated by taking the square root of the squared difference between actual returns and mean returns divided by the total number of return observations.

IV. Additional Disclosures and Disclaimers

This document may contain "forward-looking statements." Forward-looking statements are based on assumptions that TAS believes to be reasonable but are not guarantees of results. Actual results may differ materially from TAS's expectations. Readers should not rely unduly on forward-looking statements. TAS expressly disclaims any obligation to update any information herein to reflect actual results or changes in expectations.

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