

WALLACE GLOBAL FUND
INVESTMENT POLICY STATEMENT

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Approved by WGF Investment Committee

WALLACE GLOBAL FUND INVESTMENT POLICY STATEMENT
Table of Contents

<u>Section</u>	<u>Page</u>	<u>Section</u>	<u>Page</u>
I. PHILOSOPHY	1	IV. GOVERNANCE	8
A. Objectives and Assumptions	1	A. Review of Investment Policy	8
B. Finance Advisory Committee	2	B. Investment Manager Guidelines	8
II. FUND POLICIES	2	C. Performance Monitoring and Review	9
A. Eligible Investments	2	D. Proxy Voting and Other Stakeholder Actions	10
B. Asset Allocation and Weights	3	E. Implementation of Investment Policies and Decisions	10
III. INVESTMENT GUIDELINES	4	F. Amendments to Investment Policy	10
A. Diversification	4	APPENDICES	
B. Volatility	4	I: Asset Class Definitions and Specifications	11
C. Liquidity	5	II: Glossary	13
D. Derivatives and Leverage	6		
E. Fixed Income Credit Quality and Maturity	7		
F. Equities	7		
G. Alternative Investments	7		

WALLACE GLOBAL FUND - INVESTMENT POLICY STATEMENT (IPS)

The Wallace Global Fund (the "Fund") is a private, charitable organization the mission of which is to promote an informed and engaged citizenry, to fight injustice, and to protect the diversity of nature and the natural systems upon which all life depends. Using the Fund's mission as its base, this investment policy statement (IPS) articulates a broad investment philosophy, which guides the management of the assets of the Fund by coordinating the actions of the Fund's Board of Trustees ("the Board"), its Executive Director, staff, appointed committees if any, and financial and investment advisors to achieve the Fund's investment objectives.

I. PHILOSOPHY

The principal goal of the Fund's investment program is to maximize resources for the Fund's philanthropic work while maintaining the real value of the Fund's assets.

A. Objectives and Assumptions

1. The Wallace Global Fund's investment objective ("Investment Objective") is to construct and maintain an investment portfolio that will, over a market cycle, provide a total return sufficient to replace assets spent for program, administrative, and investment expenses, and to restore any decline in asset value due to inflation. Given the Fund's distribution goal, described below, the Investment Objective is to generate a 6% long-run average, real return net of inflation and net of investment expenses ("Real Return Target").
2. It is expected that the Investment Objective could be achieved on average over a long-run time horizon coinciding approximately with a full market cycle. However, it is thus also expected that in any given short-term period of one or a few years (or still shorter periods), the Fund may fail to achieve its Investment Objective. It is the intention of the Board to maintain the Fund's investment positions consistently with this Investment Policy Statement - and the flexibility it permits - despite the potential for episodes of poor returns.
3. The portfolio shall be comprised of diversified investments in multiple asset categories in order to safeguard the portfolio's capital and to lower overall portfolio risk (or volatility) to a level commensurate with achieving the Investment Objective.
4. It is the Fund's goal to exceed the IRS mandated annual distribution requirement for private foundations. The IRS mandate currently is a distribution of 5% of average assets per year, with average assets measured as the average monthly fair market value of investment assets and assessed value of certain other assets.

Wallace Global Fund Investment Policy Statement

5. In keeping with the Fund's mission as defined in the preamble above, the Fund may but is not required to include as factors in its investment decisions and directives the consideration of environmental and social effects of its investments, e.g. in its decision to invest with Generation Investment Management ("Generation"). In addition, when it has the latitude to do so, the Fund may direct its investment managers or retain for itself the right to vote proxies in a manner consistent with the Fund's mission.

6. The Funds Available for Investment, and subject to this investment policy, will be all Fund monies, except payroll accounts, retirement accounts, and certain restricted Fund assets designated by the Board of Trustees or by its delegated representative(s).

B. Finance Advisory Committee

1. Investment Responsibilities. It is the responsibility of the Finance Advisory Committee to advise the Board of Trustees on the policies and decisions affecting the investment portfolio and the selection and performance of investment managers. The advice under this function includes, but is not limited to, the review of proposed changes to the IPS. The Committee shall share all of its recommendations with the Board, and any such recommendation shall be subject to approval of the Board before it may be implemented.

2. Organization of Committee The Finance Advisory Committee shall have at least two (2) members who serve as Trustees of the Fund, and no more than three (3) non Trustee members. Should the membership of the Finance Advisory Committee fall below this specified minimum, the Board shall elect as many new committee members as are needed to form a complete committee within 150 days. However, the Committee may continue to function until and beyond this time limit despite this vacancy. Non-Trustee members of the Finance Advisory Committee offer the benefit of expertise or experience in financial, legal, administrative or other aspects of investment management. The Executive Director, Fund staff and financial and investment advisors to the Fund shall work closely with the Finance Advisory Committee in implementing committee recommendations that the Board adopts.

3. The Board shall elect Trustee and non-Trustee members of the Finance Advisory Committee with the assistance of the Executive Director within six (6) months of adoption of this Investment Policy Statement.

II. FUND POLICIES

A. Eligible Investments

Asset classes eligible for investment by the Fund are U.S. Equities (including Large-Cap, Mid-Cap and Small-Cap Equities and Value and Growth Equities), International Equities,

Wallace Global Fund Investment Policy Statement

Emerging Market Equities, U.S. Fixed Income Obligations, Hedge Funds and other Alternative Investments, Non-U.S. Fixed Income Obligations, Mission Based Investments (MBIs), Cash and Cash Equivalent Investments, and Commingled Vehicles. Appendix I (pages 11-12) to this IPS provides definitions of the asset classes and enumerates specific vehicles and instruments that reside in each asset class.

B. Asset Allocation and Weights

1. With the aim of meeting the Fund's Investment Objective and Real Return Target, the IPS stipulates an asset allocation for the Fund's investments and the benchmark and weight for each asset class included in this asset allocation ("Policy Asset Allocation" or "PAA"), as enumerated in the table below.

<u>Policy Asset Allocation (PAA)</u>		
<u>Asset Class</u>	<u>Benchmark</u>	<u>Weight (%)</u>
U.S. Large-Cap Equities	S&P 500 Equity Total Return Index or Russell 1000 (growth and value) Indices	30
U.S. Small-Cap Equities.	Russell 2000 (growth and value) Indices	15
International Equities	Morgan Stanley Capital International Europe, Australasia, Far East Index (MSCI EAFE) Net of Tax Withholding or MS World Index	15
Emerging Market Equities	Morgan Stanley Emerging Market Equities in U.S. Dollars (gross of taxes)	5
Fixed Income	Barclays Capital Aggregate Bond Index or Barclays Capital Govt Credit Intermediate Bond Index	20
<u>Alternatives (Hedge Funds & Private Equity)</u>	<u>S&P 500 or Absolute Return Target</u>	<u>15</u>
TOTAL		100
<i>Mission Related Investments/Impact Investments</i>	<i>Absolute Return Target</i>	<i>5**</i>

**Mission Related Investments/Impact Investments initial target is 5% and will be taken from other asset classes as the specific investments are funded.

2. In addition to those asset classes that have assigned weights in the PAA, other asset classes or subclasses that are eligible for investment ("Other Asset Classes") are limited to the following: U.S. Mid-Cap Stocks; International Equities - Currency Hedged; Private Equities; Venture Capital; Real Estate Equities (including equity in real estate operating companies or "REOCs" and real estate investment trusts or "REITs"); High Yield (or non-

Wallace Global Fund Investment Policy Statement

investment grade) Bonds; Non-U.S. Fixed Income Obligations - currency hedged or unhedged; Treasury Inflation Protected Securities (TIPS); and Cash and Cash Equivalents. (See Appendix I, pages 11-12 for more detailed description of Other Asset Classes.)

Wallace Global Fund Investment Policy Statement

3. Just as each asset class has a market index or benchmark that quantifies the performance of that asset class, the performance of the P AA is quantifiable. The performance benchmark ("Benchmark") for the P AA, and hence for the Fund's actual investment portfolio, is the weighted average performance of the benchmarks of the PAA using the weights of all the asset classes in the P AA. Should data for any asset class benchmark designated above cease to be readily available, and upon consultation with others, the Finance Advisory Committee may and shall substitute a comparable benchmark for the retired benchmark and report on such changes to the Board.

III. INVESTMENT GUIDELINES

A. Diversification

Investment diversification is consistent with the intent to contain the risk of large losses to the Fund. Consequently, the total portfolio shall be constructed to attain prudent diversification in all asset classes.

B. Volatility

1. Consistent with the desire for diversification and containing risk, the IPS stipulates that expected volatility of returns for the Fund's aggregate portfolio should be similar to the volatility of returns of the Benchmark. In focusing on volatility and risk, it is important to note that a real or nominal return target is exactly that - a target - and is not meant to suggest that such a target return could be expected in any given year, but rather that such a return might be expected on average over many years. Indeed, the usual behavior of investments requires that any target return be associated with some level of risk. An efficient investment program should be designed to have the lowest expected risk that can feasibly be associated with a particular return target. The asset allocation analysis underlying this IPS (see Appendix II, pages 13-21) implies that the 6% expected real-return target is associated with an expected 14% volatility as measured by the annual standard deviation of returns.¹

¹ Returns are random from period to period. The assumption in the asset allocation analysis is that the distribution of returns is "normal" (in the formal sense used in statistics). Thus, the probability of observing a particular return in any period decreases the greater it differs from - and symmetrically above or below - the expected return. Under the normal-distribution assumption, the 6% return and 14% volatility mean that one should expect approximately two-thirds of the time to observe annual returns between a loss of minus 8% and a gain of plus 20% (the expected return plus or minus the volatility). Approximately 95% of the time, one should expect to observe annual returns between a loss of minus 22% and a gain of plus 34% (the expected return plus or minus double the volatility). In either case, by construction one should expect the return to be 6% only on average over many years.

Wallace Global Fund Investment Policy Statement

2. To manage volatility of returns of the Fund's investments within acceptable limits and to meet the Fund's liquidity needs, allocations of investments at time of purchase shall remain within designated ranges for all eligible asset classes and asset class groups defined below. For each asset class in the PAA, the weight of the asset class in the Fund's actual investment portfolio may be up to 15 percentage points greater or less than the designated weight for that asset class in the PAA, but never less than zero. Subject to complying with the above designated range on each asset class in the PAA and ranges on asset class groups (to be defined below), the Fund also may invest up to 10% of its investments in each of the Other Asset Classes, except for cash and cash equivalents, which may comprise up to 20% of the Fund's assets.

3. Asset class groups and their permissible allocation ranges are as follows:

- a. Global Equities, including domestic and foreign publicly traded stocks, venture capital and private equity: 40% to 90%.
- b. Global Fixed Income Obligations: up to 40%.
- c. Hedge Funds and Commodities: up to 20%.
- d. Foreign Currency Exposure, including holdings of foreign stocks, non-U.S. fixed income obligations and directly held currency forwards: up to 40%.

4. The asset allocation ranges of this IPS represent a long-term perspective. However, rapid, unanticipated market shifts may cause actual investments to fall outside the ranges specified above. The Finance Advisory Committee shall review the Fund's investments at least quarterly for compliance with this guideline's limits on asset classes and asset class groups. Any divergence should be repaired within a practical time period not greater than 150 days. To accomplish this repair, the Executive Director, after consultation with the Finance Advisory Committee and investment managers, shall effect transactions, or instruct investment managers to effect transactions, to rebalance the asset allocation to within the required ranges.

C. Liquidity

1. The Executive Director or a delegated staff member, officer or agent of the Fund ("Delegate") shall monitor Fund activities and cash flow needs for operations, capital expenditures, regulatory changes and other factors and maintain cash flow budgets and projections. The Executive Director or Delegate shall communicate the Fund's

Wallace Global Fund Investment Policy Statement

cash flow needs and prospects for account withdrawals to investment managers on a timely basis so as to avoid disruption of the investment process. The expectation is that income earned will be the first source of liquidity and that otherwise cash balances will be kept at the minimum necessary to fund expenditures because other asset classes offer higher expected returns over time.

2. However, the Board or a delegated representative may instruct external investment managers as necessary to retain short-term assets in the accounts under their supervision and to be prepared for potentially frequent withdrawals by the Fund. This directive is designed to mitigate the need to sell securities with longer investment time horizons, especially at disadvantageous points in the investment cycle.

3. Operating capital in most circumstances shall be withdrawn from investment manager accounts only when needed. Upon withdrawal, such operating capital shall be held in short-term fixed income and money market investments pending operating outlays. This segment of the portfolio shall be limited to U.S. dollar investments, be available overnight and be of a high credit quality. Investment managers typically should not hold larger cash balances intended for operations, but may hold cash as part of their investment strategies within the confines of their respective investment mandates.

D. Derivatives and Leverage

1. Upon the Finance Advisory Committee's express approval, investment in eligible derivatives is permissible but shall be limited to hedging existing cash-market positions and to establishing investment positions in lieu of purchasing cash-market instruments. For example, at some time it may be necessary to reduce exposure to a particular asset class promptly. Buying index put options or selling index futures may be the quickest and least costly method for reducing market exposure. Establishing currency hedges while retaining exposures to specific countries' stock markets can also be beneficial to the Fund. Currency hedges may be most economically established through use of forward contracts. (See *currency hedge, forward contract, index put options, sell index futures* in glossary.)

2. Leverage of the portfolio through use of derivatives is specifically prohibited.

3. Margin debt or other forms of debt is specifically prohibited and except as may result from short sales when permitted, e.g. through purchases of interests in hedge funds as described immediately below.

4. Upon the Board's express approval the Fund may invest in hedge funds, which thereby become exempt from the above limits on derivatives and leverage so long as the hedge funds are limited liability entities that limit losses for non-general partners to invested capital and returns thereon. The Fund is prohibited from investing in any entity as a general partner or that has unlimited liability.

Wallace Global Fund Investment Policy Statement

5. The Fund under its investment management agreements shall require each manager to agree in writing to abide by the above limitations on derivatives and leverage and to consult with the Executive Director or Delegate should any question arise with regard to these restrictions.

E. Fixed Income Credit Quality and Maturity

Fixed income investments should help diversify the Fund's investments, mitigate volatility and ensure the Fund of predictable liquidity in times of market distress. Fixed income instruments may be of any maturity or credit quality. Non-investment grade securities should be limited to 20% of the portfolio.

F. Equities

Domestic and foreign equities should enable the Fund to enjoy returns commensurate with its spending and investment policies. The Fund may invest in any type of company domiciled in any country. However, the PAA's permissible ranges on each asset class (section IILB, "Volatility") limit the allocations to equities as a whole and between foreign and domestic markets in particular. For purposes of geographic requirements, ADRs (American Depository Receipts) on foreign stocks shall be included in foreign investments. Moreover, in their investment agreements and within the portfolios under their supervision, investment managers shall be required to maintain reasonable diversification of equity securities with respect to issuers, countries and industries.

G. Alternative Investments

Hedge funds and other alternative investments may diversify the portfolio with strategies that have low correlation to the performance of equities and fixed income, and may reduce portfolio volatility. The Finance Advisory Committee shall review proposed alternative investments for compliance and consistency with this IPS. The Finance Advisory committee's approval of any alternative investment is required prior to investment of funds in such investment. Alternative strategies in which the Fund may invest include, but are not limited to, hedge funds, commodities, syndicated loans, real estate, distressed credits, venture capital and private equity and, subject to the restrictions of paragraph IILD ("Derivatives and Leverage"), direct investment in derivatives for purposes of hedging risk.

IV. GOVERNANCE

A. Review of Investment Policy

Wallace Global Fund Investment Policy Statement

The Finance Advisory Committee shall review the IPS at least annually. This review shall consider the investment philosophy, financial objectives, performance requirements, asset allocation ranges, and any other portion of this IPS deemed appropriate by the Finance Advisory Committee. The result of this review and any recommendations shall be shared with the Board of Trustees and any appropriate participants in the investment process with the intention of continually improving the investment process. However, the expectation is that the IPS will change infrequently. In particular, the IPS generally should not require adjustments because of short-term or cyclical changes in financial markets.

B. Investment Manager Guidelines:

The duties and responsibilities of each investment manager appointed to manage Fund assets are as enumerated below.

1. Agreements with investment managers shall include terms that require the managers to comply with and abide by reporting requirements, trading restrictions, performance objectives, benchmarks appropriate to the mandates of the managers, and fee schedules.
2. The Fund expects that each investment manager will, over a full market cycle and net of management fees, produce for the portfolio under its supervision investment performance in excess of the performance of the benchmark representing returns of the capital market(s) in which the portfolio is invested. This manager benchmark shall be *consistent* with the IPS, but need not necessarily be an explicitly specified component of the Benchmark or of the benchmarks of the Policy Asset Allocation. Over the long term, performance of each manager is expected to be in the top quartile of a universe of comparable managers of like-sized portfolios. The universe may be from readily available data sources and shall be consistently applied.²
3. The Fund will delegate discretion over investment decisions to investment managers subject to the IPS and the terms of management agreements that are consistent with this policy. If managers believe modifications to the IPS or their contractual mandates would be in the best interest of the Fund, the managers must submit recommendations or requests in writing to the Fund and obtain explicit approval for the modifications. The IPS may not be waived or violated without a written waiver or amendment obtained in advance.
4. Money managers' communications with the Fund shall include, but are not limited to, monthly statements, quarterly performance reports, summaries of significant actions

² Manager universes may derive from, among other sources, NACUBO (National Association of College and University Business Officers), TUCS (Northern Trust's Trust Universe Comparator Service), Morningstar or Lipper mutual fund data, institutional manager data bases such as Thomson Nelson Information, Plan Sponsor Network (PSN) or Morningstar Institutional Investor Exchange (formerly InvestorForce) and hedge fund databases such as those of Hedge Fund Research, Inc. (HFRI) or Hedgefund. net (HFN).

Wallace Global Fund Investment Policy Statement

taken in portfolios during each period, the current financial outlook, current investment strategy and expected changes in their portfolios. Agreements with investment managers shall stipulate that such managers meet with the Executive Director, Delegate, members of the Finance Advisory Committee or Board "as needed".

5. Agreements with investment managers shall stipulate that each manager is responsible for notifying the Fund of any events that might materially affect investment of the Fund's assets or investment performance. Significant events include but are not limited to changes in the manager's ownership, affiliations, organizational structure, financial condition, professional personnel, investment process or other pertinent business matters, and major changes in investment strategy, portfolio structure, asset values or market conditions.

6. The Fund reserves the right to terminate an investment manager for any reason at any time with reasonable notice, where feasible in 30 days or less, where necessarily more than 30 days, then according to the terms of the investment vehicle or management agreement. Grounds for investment manager termination may include, but are not limited to: failure to comply with guidelines agreed upon for the management of the Fund's portfolio, including holding ineligible investments; failure to achieve performance objectives specified in the manager's guidelines; loss of key personnel; evidence of illegal or unethical behavior by the investment management firm or its personnel; a change in the Fund's IPS or in market conditions that necessitate shifts to different investment styles or asset classes.

C. Performance Monitoring and Review

1. The Executive Director or Delegate shall review results of all managers at least quarterly and submit reports on the Fund's investments and investment performance to the Finance Advisory Committee at least quarterly.
2. The Finance Advisory Committee shall meet at least semi-annually to review the performance of the Fund's investments and investment managers. In cases of managers producing poor performance or experiencing material changes in personnel or other business conditions, more frequent reviews and meetings may be warranted.
3. Consistent with the philosophy of pursuing the Investment Objective for the long run, the focus of performance evaluations of specific managers and for the Fund's investments as a whole should be longer-term, typically three to five year periods, and possibly full market cycles not to exceed 10 years.

D. Proxy Voting and Other Stakeholder Actions

Wallace Global Fund Investment Policy Statement

1. The Board of Trustees shall retain the right to vote all proxies and to act on other stakeholder matters such as bankruptcy proceedings and class actions connected with the Fund's investment assets (collectively referred to hereafter as "to vote proxies" or "proxy voting"). The Board may delegate authority to vote proxies to any party at any time and may rescind such delegations of authority at will
2. The Board shall retain the right to determine proxy-voting guidelines and, when delegating responsibility for voting proxies, shall communicate these guidelines to such delegate.
3. The guideline under this IPS is to vote proxies in a manner that is consistent with the Fund's mission. The detailed implementation of this guideline shall be the responsibility of the Finance Advisory Committee.

E. Implementation of Investment Policies and Decisions

Responsibility for deciding on retention of managers, custodians and other providers of services to the Fund's investment program, as well as for all investment decisions and implementation thereof, resides with the Board. The Board may assign these responsibilities in whole or in part to other parties of its choosing and may rescind such assignment at will. For example, the Board may delegate as it wishes to the Executive Director the day-to-day responsibility for implementing investment decisions or for conveying instructions to external investment advisors or investment managers in order to implement such decisions. The Board may delegate to the Finance Advisory Committee the responsibility for screening or approving new eligible securities or new investment managers while retaining for itself the responsibility for final approval of such selections.

F. Amendments to Investment Policy Statement

This Investment Policy Statement may be revised at any time by approval of the Board.

Investment Policy Statement approved and adopted by the Board of Trustees
[Need to insert updated date when approved.]

Wallace Global Fund
Technical Appendix to the Investment Policy Statement:
Developing Optimal Asset Allocations
April 18, 2007

This appendix details the development of an array of optimal long-run asset allocations and the selection of one of these optimal mixes as the policy asset allocation for the Global Wallace Fund's Investment Policy Statement. Determining the asset classes and portfolio weights for these optimal asset mixes relies on widely accepted mathematical optimization techniques. The optimization process identifies the set of asset class weights that maximize the expected return for each given trial value of portfolio standard deviation (a measure of volatility or risk). The expected returns and volatilities of the optimal portfolios that come out of the process are weighted functions of the returns and standard deviations of all the individual asset classes considered and the correlations of returns among all the asset classes.

Two difficult steps in optimizing asset mixes are more practical than mathematical: first, determining the return, standard deviation and correlation parameters for all relevant asset classes; and, second, imposing reasonable constraints on the optimization to avoid nonsensical results. Simplistic optimization methods tend to favor investments that have high expected returns and low correlations with other classes of investments. This outcome in itself would be desirable. What would be nonsensical would be the extreme weights that would result from the process for asset classes that clearly are inappropriate as core holdings for a large portfolio that is somewhat averse to risk. Without constraints, the optimization process would load portfolios with private equity and venture capital (both highly volatile and illiquid), small-cap and emerging market stocks (also volatile and illiquid, but less so than venture capital or private equity) and hedge funds (somewhat illiquid). The appendix will detail the constraints on these more exotic asset classes later, but turns next to parameter assumptions for the behavior of different asset classes.

Parameter Settings. Volatility of returns, the measure of risk for each asset class, is assumed to be the actual historical volatility of annual returns data for the longest history available for each asset class. For some asset classes, the history dates back nearly 80 years and longer (U.S. equities, domestic bonds, cash). For others the history is more recent, dating back only to the late 1960s, the 1970s or the early 1980s. For Treasury inflation protected securities (TIPS), the measure of volatility in this analysis reflects actual returns from 1997 to the present and constructed returns prior to the first issuance of U.S. TIPS in 1997. The constructed returns derive from a basic bond valuation formula using nominal interest rate and inflation data going back to 1950.

While history might be an acceptable guide for the volatility (and correlation) of asset class returns, history is less informative about the prospects for the level of returns. A history of high returns for a risky asset class combined with the fact of its high risk might suggest the asset class should continue to produce high returns. However, past high returns may have been the result of specific factors that would be unlikely to be repeated.

For example, high historical returns on high yield bonds would be unlikely to continue unabated because they have in recent years been dependent on the improving credit quality of bond issuers, moderately paced economic growth (on average) and, for a much longer period, secularly declining inflation since the late 1970s. But this sanguine combination of events is highly unlikely to recur in the long run.

In general, portfolio optimization using only historical returns is likely to point toward investments that enjoyed high returns in the past but which therefore are relatively more likely to suffer below normal returns going forward. And conversely, the optimization would be likely to avoid asset classes that suffered poor returns in the past but which could rebound in future. Japanese stocks might, emphasis on might, be such an example. The Nikkei 225 Index of Japanese stocks, after peaking at nearly 39,000 in 1989 and declining to less than 16,000 in 1992, has not since approached a value even as high as 23,000. The Nikkei ended 2006 at 17,225, representing a cumulative 56% loss or an average loss of principal of 4.7% *per year* for 17 years. (This loss omits dividends, which presumably have added a minor percentage to annual total returns.) It is hardly likely that Japanese stocks would lose another 56% of their principal value over the next 17 years, although it would be remotely possible. A simplistic approach to portfolio construction based only on historical returns likely would omit Japanese stocks entirely and inappropriately.

A more reliable approach to forming long-term expectations for investment returns is to consider the returns that fundamental economic and financial relationships imply. A simple case is TIPS. The current yield to maturity on long-term TIPS is approximately 2 1/2%. Regardless of the historical returns to TIPS, this yield is the best available current estimate of long-term TIPS returns. By definition, the TIPS yield is net of inflation and, if one were to buy a TIPS with a 2 1/2% yield and hold that security to maturity, one would earn that yield with virtual certainty. As it turns out quite coincidentally, the current TIPS yield is very near the long-term average real (net of inflation) yield and the current real yield on long-term, plain-vanilla U.S. Treasury bonds. Thus, both nominal and inflation-protected Treasury obligations have the same expected return: 2 1/2% per year. They do however have different expected volatilities and correlate imperfectly because they respond differently to inflation surprises. Assigning returns expectations to other fixed income instruments - real estate investment trusts (REITs), high yield bonds and cash - using current and normal yields is also appropriate, albeit with some adjustments.

Prospects for long-run stock returns are more difficult to evaluate. Normal returns and premiums implied by financial relationships among earnings, dividends, prices, interest rates and inflation are helpful starting points. Discounting the expected premium by the amortization over a long period of estimated market over- (or under-) valuations helps to correct for the historical bias of focusing on successful asset classes and ignoring unsuccessful ones. Various estimates lead to expected real returns for larg^{\sim} U.S. stocks that lie in a narrow range centered at a bit less than 6%, noticeably below the historical average real return of approximately 7% per year.

Given returns expectations for U.S. large-cap stocks and various forms of fixed income, assigning expected returns to other asset classes can rely on comparisons to these baseline asset classes. For each other asset class, it is appropriate to add to the appropriate baseline expected return a premium that parallels that asset class's long-run average premium compared to the baseline asset class's long-run average return.

Finally, the return parameter for each asset class is based on expectations for that asset class's *market*. It would be more accurate to add a differential premium to many of the asset classes to reflect the probability of adding value to market returns from carefully selected *active management* methods. These value-added increments derive from a combination of expectations from professional experience (e.g., that good cash managers can add a modest increment to benchmark returns) and empirical estimates. The empirical estimates rely on actual value added by median managers from a fairly representative universe (the Morningstar database on mutual funds) over 5-, 10- and in some cases 15- year periods, adjusted for the difference between typical institutional money management fees and the expenses of the median mutual fund.³

Table A-2 on the next page summarizes the expected returns and standard deviations of returns for various asset classes and brief descriptions of the core assumptions leading to the assumed return expectations. Note some important patterns among the asset classes. Primarily but not uniformly, those asset classes with higher risk (volatilities or standard deviations of returns) have higher expected returns. In theory, this pattern should be uniform. In practice, some asset classes are severely out of equilibrium, such as real estate currently. Other asset classes may provide lower returns than their standard deviations alone might suggest because these asset classes provide good diversification from the risks of others, and thus they serve more to reduce risk than to add to returns. Commodities and TIPS could fit this description since they perform well during times of high inflation when other financial asset classes tend to perform poorly.

Partly as a matter of conservative assumption and partly for theoretically reasons, expectations for certain groups of asset classes are similar. For example, international equities and U.S. large-cap equities have the same *expected* return because in the long run all developed markets have similar potential for economic growth and comparable risk, although not necessarily at the same time. Similarly, to avoid biasing the analysis in favor of core, growth or value stocks within the U.S. large-cap stock segment, and separately within the small-cap segment, each sub-sector has the same expected return. In fact, growth stocks historically have had lower returns than core stocks, which in turn have had lower returns than value stocks. This neutral assumption biases the analysis in favor of growth stocks. Nonetheless, and despite allowing the optimization to select any or all growth, value or core segments, the process favors core and value stocks and avoids growth stocks probably because of the latter's higher volatility.

³ These value-added increments turn out to be quite comparable to those assumed by SIG in their investment mandate analysis.

Table A-2:
 Long Run Expected Returns and Standard Deviations of Various Asset Classes
 Net of Inflation (% per Year)

Asset Class	Expected Market Return	Active Value Added	Total Expected Return	Standard Deviation	Comment
Private Equity	8.1	0.0	8.1	50.0	Historical premium to large-cap stocks.
Venture Capital	7.1	0.0	7.1	53.1	Historical premium to large-cap stocks.
U.S. Large Equities	5.8	0.5	6.3	18.1	Market implied return less amortized overvaluation.
U.S. Large Growth	5.8	0.5	6.3	19.7	Same as for large-cap core equities.
U.S. Large Value	5.8	0.5	6.3	21.4	Same as for large-cap core equities.
U.S. Small-Cap Eq.	6.6	1.3	7.9	31.2	Historical premium to large-cap stocks.
U.S. Small Growth	6.6	1.3	7.9	28.0	Same as for small-cap core equities.
U.S. Small Value	6.6	1.3	7.9	25.9	Same as for small-cap core equities.
International Equity	5.8	0.5	6.3	22.0	Assumed equal to U.S. large-cap return.
Int'l Equity Hedged	5.6	0.5	6.1	19.5	Unhedged international equities return less hedging cost of 20 basis points per year.
Emerging Markets	7.1	0.9	8.0	44.2	Historical premium to large-cap stocks.
Real Estate / REITs	1.1	1.0	2.1	16.5	Current real yield; zero real price appreciation.
High Yield Bonds	2.6	1.0	3.6	11.3	Current real yield less projected default losses.
Foreign Bonds	2.5	0.4	2.9	11.3	Same as U.S. government bonds.
Foreign Bonds Hedged	2.3	0.4	2.7	6.5	Foreign bond return less hedging cost of 20 basis points per year.
U.S. Investment Grade Bonds	3.0	0.4	3.4	8.0	Real yield on government bonds plus 50 basis point spread for non-government bonds.
Commodities	0.1	1.3	1.4	11.1	Zero yield. Price appreciation slightly above inflation. Maximum value added.
Hedge Funds	3.1	1.3	4.4	9.6	Return consistent with volatility vs. other comparably volatile assets; maximum value added.
TIPS	2.5	0.4	2.9	10.3	Current real yield.
Cash & Equivalents	0.8	0.2	1.0	2.5	Current real yield.

*Private Equity and venture capital returns based on performance of live portfolios. Hence, value added above market is zero.

Table A-3 on page 6 summarizes the correlations among asset classes. These parameters rely on the historical correlations between pairs of asset classes using the longest possible history for each pair. The asset classes of greatest interest are those with low and negative correlations, because those asset classes serve best to diversify risk. The standout here is the hedge fund sector, which by design has low correlation with standard asset classes. Other notable asset classes are commodities and TIPS, which do well in times of inflation when most financial assets perform poorly, and real estate and emerging markets, which also have some ties to inflation. Cash also has low correlation with most asset classes, but also unattractive returns.

Optimization. After selecting reasonable parameters for expected returns, standard deviations of returns and correlations among returns for all asset classes, the process of optimization can begin. Optimization selects weights for all asset classes in order to identify for any given target return the portfolio mix that can achieve that return with the lowest overall risk. The mathematics of and computer algorithms for portfolio optimization are fairly standard; a fuller discussion of that process appears in several finance textbooks. The difficult aspect of optimization is devising reasonable outputs. As mentioned earlier, blindly applying optimization techniques without constraints would lead to skewed weightings in favor of high-expected-return and/or low-correlation assets. But these skewed weightings may ignore liquidity constraints or other prudential limits.

Thus, the optimization procedure for present purposes constrains certain asset classes for the reasons appearing below.

- Private equity and venture capital: Each of these two asset classes limited to a potential allocation of 5% or less of the value of total portfolios, to contain illiquid investments.
- Small-cap stocks are limited to a potential 25% share within the U.S. equity segment (large- and small-cap combined). This limit is double the 12 1/2% share of the total U.S. stock market comprised of small-cap stocks.
- Hedge funds and commodities are limited to a combined 15% share of the value of portfolios in recognition of liquidity constraints (usually initial one year lockup with quarterly withdrawal rights thereafter).

Without constraints, and depending on the selected investment target, the above asset classes would dominate most optimized portfolios despite their volatility and illiquidity.

Characterizing Efficient Portfolios. Table A-4 on page 7 presents a sample of optimized portfolios covering the range of available target returns given the above constraints. The table presents the most conservative and the most aggressive optimized portfolios and several intermediate portfolios with a greater or lesser degree of balance among various investment classes. While the Fund's operating mission determines the appropriate real return target or investment objective, it is illuminating to examine some of the patterns in this range of optimized portfolios in order to place the Fund's policy asset allocation in context.

Table A-3: Correlations among Selected Asset Classes

The table below is based on the longest history of annual returns available between each pair of asset classes through 2006.

	Private Equity	Venture Capital	US Large Equities	US Large Growth	US Large Value	US Small Cap	US Small Growth	US Small Value	International Equities	Int'l Equities Hedged	Emerging Markets	Real Estate / REITs	High Yield Bonds	Foreign Bonds	Foreign Bonds Hedged	US Investment	Commodities	Hedge Funds	TIPS
Private Equity	1																		
Venture Capital	0.53	1																	
US Large Equities	0.67	0.31	1																
US Large Growth	0.58	0.37	0.96	1															
US Large Value	0.71	0.21	0.91	0.81	1														
US Small-Cap Eq.	0.42	0.18	0.78	0.71	0.85	1													
US Small Growth	0.61	0.41	0.81	0.77	0.84	0.94	1												
US Small Value	0.40	-0.03	0.83	0.73	0.90	0.96	0.90	1											
International Equity	0.63	0.19	0.60	0.57	0.54	0.41	0.50	0.39	1										
Intemat'l Eq. Hedged	0.76	0.34	0.68	0.62	0.66	0.49	0.59	0.52	0.86	1									
Emerging Markets	0.38	0.30	0.21	0.17	0.24	0.39	0.48	0.17	0.51	0.48	1								
Real Estate /REITs	0.31	-0.17	0.50	0.30	0.62	0.70	0.63	0.83	0.33	0.42	0.16	1							
High Yield Bonds	0.35	-0.10	0.55	0.43	0.59	0.64	0.52	0.73	0.36	0.40	0.16	0.57	1						
Foreign Bonds	-0.23	-0.22	0.22	0.25	0.17	0.06	0.05	0.05	0.55	0.20	0.09	0.08	0.17	1					
Foreign Bds Hedged	0.06	-0.04	0.45	0.37	0.46	0.19	0.15	0.34	0.28	0.34	-0.20	0.45	0.58	0.44	1				
US Inv. Grade Bonds	-0.21	-0.27	0.23	0.20	0.10	0.06	0.07	0.12	0.18	0.21	-0.22	0.38	0.66	0.30	0.68	1			
Commodities	0.07	0.13	-0.12	-0.14	-0.06	-0.12	-0.12	-0.10	0.02	-0.04	0.26	-0.04	-0.15	0.12	0.03	-0.23	1		
Hedge Funds	0.44	0.41	0.36	0.30	0.37	0.34	0.55	0.32	0.25	0.26	0.40	0.17	0.00	0.05	-0.11	-0.12	0.19	1	
TIPS	-0.27	-0.11	-0.14	-0.15	-0.06	-0.17	-0.24	-0.13	-0.15	-0.31	0.23	-0.19	0.24	0.17	0.12	0.33	0.26	0.25	1
Cash & Equivalents	-0.12	-0.04	0.11	0.13	-0.03	-0.08	-0.01	-0.04	0.14	0.28	-0.42	0.17	0.38	0.09	0.59	0.68	-0.46	-0.19	0.03

Table A-4:
Performance Characteristics of Major Asset Classes and Optimal Portfolios (percent)

			Asset Allocations and Portfolio Characteristics									
Asset Class	Expected Real Return (%/Year)	Standard Deviation (%/Year)	Portfolio Shares by Asset Class (%)									
			1.5%	2%	3%	4%	4.5%	5%	5.5%	6%	6.5%	6.9%
Private Equity	8.1	50.0	--	--	--	--	--	--	--	--	--	5
Venture Capital	7.1	53.1	--	--	--	5	5	5	5	5	3	5
US Large Equities	6.3	18.1	5	--	--	--	--	10	20	30	45	40
US Small Value	7.9	25.9	--	5	5	10	15	15	15	15	15	15
Internat'l Equities	6.3	22.0	--	--	--	--	--	5	10	10	15	20
Emerging Mkt Eqs.	8.0	44.2	--	--	5	--	5	5	5	10	10	15
Non-US Govt Bonds	2.9	11.3	--	--	5	10	5	--	--	--	--	--
High Grade Bonds	3.4	8.0	--	10	30	55	55	45	35	20	2	--
Commodities/Gold	1.4	11.1	10	10	5	5	--	--	--	--	--	--
TIPS	2.9	10.3	--	--	5	5	5	5	--	--	--	--
Hedge Funds	4.4	9.6	5	10	10	10	10	10	10	10	10	--
Cash	1.0	2.5	80	65	35	--	--	--	--	--	--	--
Total	--	--	100	100	100	100	100	100	100	100	100	100
			Portfolio Characteristics (%/Year)									
Expected Return	--	--	1.5	2.0	3.0	4.0	4.5	5.0	5.5	6.0	6.5	6.9
Standard Dev.	--	--	2.1	2.7	4.4	6.1	7.4	9.2	11.3	13.9	16.6	19.8
Return:Risk Ratio	--	--	0.71	0.74	0.68	0.66	0.61	0.54	0.49	0.43	0.39	0.35

Constraints: private equity <5%; venture capital <5%; emerging markets < 15%; small-cap value stocks < 15%, hedge funds < 10%.

The most basic pattern in this array of optimized portfolios is the clear relationship between risk and return. By definition among optimized or efficient portfolios, it is impossible to increase targeted return without accepting additional expected risk, and this table bears out the relationship. But as importantly, the table illustrates the fact that the tradeoff is subject to the basic economic laws of diminishing returns - in this case literally. Thus, as one scans rightward across the table, the ability to increase targeted returns by an increment of one percentage point carries a more than proportionate increase in volatility. For example, in shifting from a 2% expected real return target to a 3% target, the table suggests that one would have to accept an increase of 1.7 percentage points in greater volatility. (Standard deviation of returns increases from 2.7% to 4.4% in next to last line of table). But to increase from, say, a 6% target to a 6.9% target requires accepting 5.9 percentage points in greater volatility. (Given the constraints on these optimized portfolios, it is infeasible to target a long-term expected 7% real return; 6.9% is the maximum return available.)

Another notable feature of this spectrum of optimized portfolios is what they omit as much as what they include. First, real estate and high yield bonds are absent at this point from the optimized portfolios in large part because they have performed so strongly for several years. Their prospective gains thus seem to be modest compared to their normally good diversification benefits.

Second, the process permitted selecting from among six U.S. stock market style sectors - growth, value or core stocks within each of the large- and small-cap sectors. Nonetheless, only large-cap core stocks and small-cap *value* stocks appear in the optimized portfolios, despite favoring growth stocks through setting their expected returns higher than history might suggest. Value stocks historically have outperformed growth stocks within any size-class of stocks but the optimization process assumed equal expected returns for growth and value stocks, thus potentially favoring growth over value. Nonetheless, as a long-term policy matter, growth stocks are absent from optimal portfolios because of their added volatility, although a portfolio might employ them at any point for tactical (i.e., active management) reasons.

Third, currency-hedged "flavors" of the international stock and bond segments are absent from efficient mixes. In the long run, optimal portfolios favor accepting some currency risk, mainly for their diversification benefits, and disfavor hedging such risk, which is a costly endeavor. This conclusion does not imply that currency hedging is never valuable; only that one needs to be selective about when to hedge such risk, focusing on when foreign currencies appear to be unusually strong.

Fourth, private equities, which recently have been booming as an asset class, appear in the asset mix of only the most aggressive portfolio having a return target of 6.9%. By contrast, hedge funds and venture capital are more prevalent in optimal portfolios. Although hedge funds have been very popular in recent years, they appear in every efficient asset mix *except* that for the most aggressive portfolio. Apparently, they serve the purpose for which they are intended to hedge, or diversify risk. They have moderate volatility and moderate to low correlation with other asset classes across the board. Venture capital is potentially more volatile and less remunerative than private equities, but appears more frequently and for more conservative portfolios than for private equities. Venture capital is less correlated than private equities almost across the board and thus provides greater diversification benefits, other aspects of risk and return considered in balance. This result is intuitive since much of private

equity activity is actually leveraged investment in what were publicly traded companies or going-concern divisions of publicly traded companies that merchant bankers or management buy for strategic reasons. One would expect these investments to be more correlated with standard publicly traded equities. Venture firms, on the other hand, are more differentiated from publicly traded companies. They stand at a more nascent stage of development than most publicly traded firms and thus their returns would respond largely to a different set of factors than more mature companies that are subject to the exigencies of the business cycle.

Constraining some of the exotic asset classes to more limited proportions truncates the available target returns. In principle, one could select very aggressive asset mixes to target expected real returns up to 8%. But with constraints on high-return venture capital and private equity, the maximum feasible expected real return target would be 6.9%. Within this truncated selection of optimal portfolios, the Fund's 6% real return target is thus at the more aggressive end of the spectrum of optimal portfolios, a necessity given the strong tax-incentives for spending more than 5% of assets every year.

Finally, note that the investment mix that targets a 6% real return includes a 5% allocation to venture capital, an illiquid asset class. Were a similar portfolio to be limited to holding publicly traded securities and hedge funds (which typically have openings to liquidate "shares" either monthly or at worst quarterly after a first-year waiting period), the resulting portfolio characteristics would be only marginally different. By allocating the 5% of venture capital to U.S. large-cap equities instead, the expected return would be within rounding error of 6.0% and the expected volatility would be only marginally higher at 14% rather than 13.9%. This latter, public-securities-only portfolio mix is in fact the proposed "Policy Asset Allocation" or "P AA" for the Wallace Global Fund.