

Investment Alternatives for the Global Fund Liquidity Portfolio

March 2005

Prepared by: IBRD, as Trustee of the Global Fund

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Executive Summary

This paper has been prepared in response to the recent request made by the Global Fund Board that the International Bank for Reconstruction and Development (IBRD), in its capacity as the Trustee of the Fund, produce a paper outlining the current investment strategy of the Global Fund's Liquidity Portfolio, and explore alternative strategies to enhance the future expected return of the portfolio. The Global Fund Liquidity Portfolio, which amounted to \$ 2.2 billion as of December 31, 2004, is currently being managed by IBRD as a part of the overall \$ 9.3 billion Trust Funds Liquidity Portfolio.

On January 31st, 2005, IBRD implemented a new investment strategy for trust funds (Tranche 2) in which the Global Fund portfolio is invested. IBRD informed both the MEFA and Global Fund Board at the 9th Board Meeting of the move to Tranche 2 and confirmed that this was the appropriate choice for the Global Fund portfolio. Tranche 2 is a conservative high-grade fixed income portfolio, where the principal objectives are to protect the value of the donor contributions ("safety"), and to ensure that funds will be available as needed to meet grant disbursement obligations on a timely basis ("liquidity"). The emphasis has been on preserving the nominal funding capacity for the trust fund through its life, with little tolerance for any loss of initial principal.

This paper describes the two investment strategies currently available for trust funds managed by IBRD (Tranche 1 and Tranche 2) and then presents other investment alternatives and the associated risk return profiles for these alternatives and discusses some of the requirements that need to be met in order to invest in these alternatives (or some variation on them). The four alternatives are:

- Alternative 1: Tranche 1 (comprised of Money market instruments and Treasury notes)
- Alternative 2: Tranche 2 (comprised of Treasury Notes and Mortgage Backed Securities (MBS))
- Alternative 3: Lehman Aggregate Index (comprised of Treasury notes, MBS, Agency securities, ABS and Corporate Bonds)
- Alternative 4: Lehman Aggregate Index and equities

Two other investment strategies that are introduced and briefly explained in the paper involve: 1) hedge funds and 2) active management through trading and position taking.

The table below summarizes the investment alternatives, highlighting their risk-return characteristics, as well as the most critical requirements that each of them may lead to.

Global Fund to Fight AIDS, Tuberculosis and Malaria Summary Investment Alternatives ⁽¹⁾

		Alternative 1: Tranche 1	Alternative 2: Tranche 2	Alternative 3: Lehman Aggregate Index	Alternative 4: Lehman Aggregate Index + Equities	
SAA		44% Money Market 56% Treasuries	70% Treasuries 30% MBS	24% Treasury 37% MBS 11% Agency 4% ABS 24% Corporate and Other Credit	70% Lehman Brothers Aggregate Index 30% US Equities	
Duration / Investment Horizon		1 year/ 1 year	1.9 years / 3 years	4.26 years / 5 years	TBD/> 5 years	
Expected Returns	1 Year	Forwards	2.70%	2.94%	3.33%	4.12%
		Unch. Yield	3.20%	3.68%	4.49%	5.44%
	3 Years	Forwards	3.31%	3.36%	3.64%	4.51%
		Unch. Yields	3.20%	3.62%	4.40%	5.39%
	5 Years	Forwards	3.70%	3.73%	3.94%	4.88%
		Unch. Yields	3.20%	3.53%	4.26%	5.31%
Forward-Looking Risk Measures	1 Year	Prob. Neg.	0.1%	6.3%	20%	30%
		99% C-VaR	+0.4%	-2.6%	-8.0%	-15.0%
	3 Years	Prob. Neg.	0.0%	0.1%	5%	16%
		99% C-VaR	+0.7%	+0.5%	-2.0%	-7.0%
	5 Years	Prob. Neg.	0.0%	0.1%	1.0%	10%
		99% C-VaR	+0.7%	+0.6%	-0.5%	-5.0%
Requirements		- Short-term investment horizon	-Liquidity deemed stable over longer period, i.e. 3 Years - Accuracy of cash flow projections both donor contributions and disbursements. - Mid-term investment horizon	-Liquidity deemed stable over longer period, i.e. at least 5 Years - Accuracy of cash flow projections both donor contributions and disbursements. - Long-term investment horizon	-Liquidity deemed stable over longer period, i.e. > 5 Years - Accuracy of cash flow projections both donor contributions and disbursements. - Long-term investment horizon	

(1) Annualized Figures

MBS: Mortgage Backed Securities, ABS: Asset Back Securities

SAA: Strategic Asset Allocation

Unch. Yields: Interest Rates will remain unchanged at their current levels.

Forwards: Interest rates evolve as per the forward yields implied in the yield curve.

99% C-VaR: Conditional Value-at-Risk quantifies the average size of loss one could expect if extreme outcomes beyond 99% confidence limit were to materialize.

These investment strategies are by no means exhaustive; instead, they are intended to be illustrative of an array of investment alternatives across the risk/return spectrum. Key considerations for the MEFA members are:

- **Objective:** For the Global Fund, we understand that the primary investment objectives are to protect the value of the donor contributions and to have funds available to disburse towards grants on a timely basis. Do these continue to be the primary objectives?
- **Risk Tolerance:** Higher risk investment alternatives offer a higher expected return but also are subject to higher risk. Thus, higher risk alternatives could increase the chance of losses of Global Fund assets. Is the Global Fund authorized to invest resources with a higher risk of

loss of principal (donor contributions) in order to have the possibility of higher returns, by moving to a longer investment horizon and higher risk tolerance than Tranche 2?

- **Reliability of Cash Flows:** The higher risk investment alternatives would require stable liquidity for longer periods since resources would be invested within longer investment horizons and therefore, require accuracy of cash flow projections (both donor contributions and grant disbursements). Liquidating securities prior to the investment horizon could result in significant losses. Are the cash flow projections reliable and accurate, and do they justify a longer investment horizon?
- **Volatility of returns:** Unrealized gain/losses from market movements would mean higher volatility of income in the financial statements. Is higher volatility of income something the Global Fund can accept and explain to donors, recipients and other readers of their financial information?
- **Cost:** There may be an additional increase for a separate and customized portfolio. In addition, some alternatives may be managed in part by external managers, thereby increasing the fee charged to the Global Fund. Is the Global Fund prepared to incur these additional fees?

Based on our current understanding of Global Funds objectives, risk tolerance, cash flow projections, constraints and preferences with regard to the safeguarding of its assets, IBRD has determined that Tranche 2 is the appropriate investment strategy for the Global Fund. IBRD will review the investment strategy with some frequency given the nascent stage of the Global Fund and in light of the upcoming replenishment process, the future level of pledges, the changing currency composition of grants, and renewals, among other considerations. This review is expected to be done annually.

A decision to follow any of the other alternatives presented (or variations on them) would require: 1) specific instructions from the MEFA and Global Fund Board to IBRD that includes a statement on the reasons for the change and that the Global Fund Board is fully informed of the risks of the alternative chosen; 2) a determination by the IBRD that the alternative is an appropriate strategy for the Global Fund and that IBRD is otherwise prepared to provide such investment services; 3) modification of the Trustee agreement and 4) depending on the proposed alternative, approval by the IBRD Executive Directors.

Investment Alternatives for the Global Fund Liquidity Portfolio

1. This paper has been prepared in response to the recent request made by the Global Fund (GF) Board that the International Bank for Reconstruction and Development (IBRD), in its capacity as the Trustee of the Fund, produce a paper outlining the current investment strategy of the Global Fund's Liquidity Portfolio, and explore alternative strategies to enhance the future expected return of the portfolio.

2. The paper is organized as follows: Section I provides background information on the existing investment strategy for the Trust Funds Liquidity Portfolio managed by IBRD (of which the Global Fund portfolio is a part), including the recent changes that took effect on January 31, 2005. Section II provides the near and medium-term outlook for fixed income portfolios in the context of the current US interest rate environment. Section III reviews some of the key considerations that need to be taken into account while formulating an investment strategy. Section IV contains a description of alternative investment strategies. Section V provides a summary of the key considerations for implementation of the alternatives described in the paper.

I. Background on Existing Investment Strategy

3. The Global Fund Liquidity Portfolio, which amounted to \$ 2.2 billion as of December 31, 2004, is currently being managed by IBRD as a part of the overall \$ 9.3 billion Trust Funds Liquidity Portfolio. The funds held in the Trust Fund portfolio are invested in such manner, and such form, as IBRD may decide, consistent with its established practice of managing other trust funds held by it, including pooled investments with other trust funds administered by it.¹ As with all portfolios managed in-house by IBRD, including its own liquidity portfolio, the Trust Funds portfolio is managed as a conservative high-grade fixed income portfolio, where the principal objectives are to protect the value of the donor contributions ("safety"), and to ensure that funds will be available as needed to meet the contractual disbursement obligations on a timely basis ("liquidity"). Historically, the emphasis has been on preserving the nominal funding capacity for each trust fund through its life, with little tolerance for any loss of initial principal. The risk aversion reflects perceived donor sensitivity to potential losses and the reality that individual trust funds have contractual funding commitments and associated disbursement obligations that cannot be breached.

4. Until January 31, 2005, all Trust Fund liquidity portfolios were managed as a single commingled portfolio, based on a one-year investment horizon (Tranche 1). The overriding objective was to maintain a near-negligible likelihood (i.e., a 1% or less probability) of incurring negative returns over the course of a fiscal year. The portfolio was invested in a mix of cash, money-market instruments including bank deposits and short-term bonds issued by the US Government (Treasury Notes).

¹ Agreement by and between the Global Fund to Fight AIDS, Tuberculosis and Malaria and the International Bank for Reconstruction and Development, as Trustee of the Trust Fund, dated May 31, 2002.

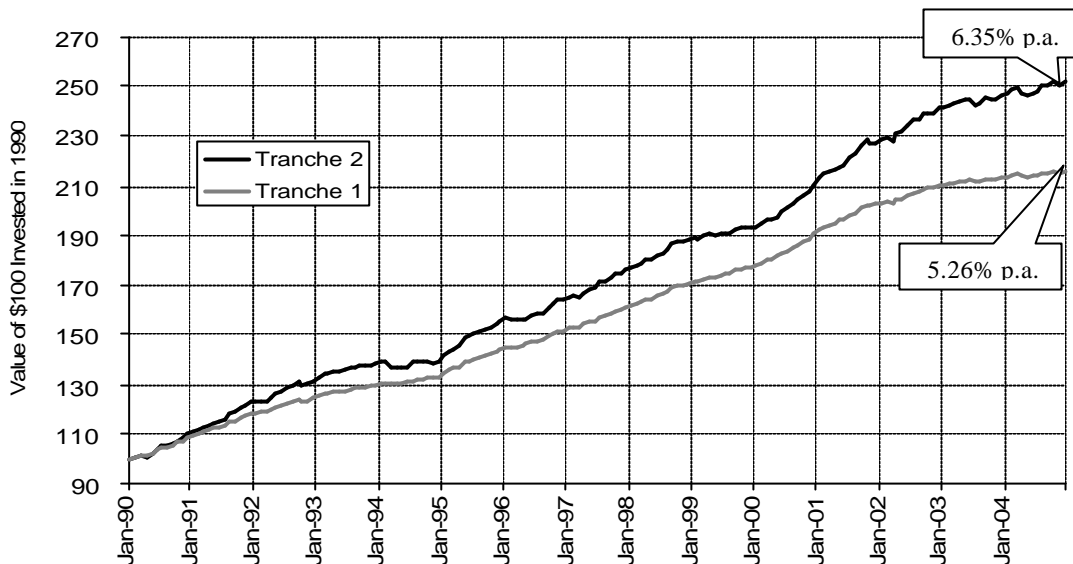
5. A revised investment strategy has been implemented by IBRD for Trust Funds, effective January 31, 2005, whereby there are now two portfolio “tranches” with different asset mix profiles. The first tranche (Tranche 1) comprises all funds with an investment horizon of up to one year, and the second tranche (Tranche 2) comprises all funds with a longer (three-year) investment horizon and a commensurately larger risk tolerance. The objective of the tranching is to differentiate between trust funds with disparate risk appetites so as to be able to optimize investment returns for each tranche consistent with the funds risk tolerance and liquidity requirements.

6. Based on the cash flow projections and the nature of the fund, the Global Fund portfolio has been categorized as a part of Tranche 2. The investment objective for Tranche 2 has been formulated as one of enhancing investment income, subject to maintaining adequate liquidity and keeping down the probability of cumulative negative total return over a three-year horizon to 1% or less. This is predicated on the assumption that the trust funds in this tranche, including the Global Fund, have the wherewithal for tolerating increased variability in year-to-year returns, including potential negative returns of approximately 3% or so in any given year. The expectation is that a negative return in any given year will likely be offset by favorable return outcomes during subsequent years so as is likely to ensure that the nominal value of donor contributions will be protected over a three-year time frame. The higher degree of risk tolerance for this tranche compared to that for Tranche 1 not only makes it possible for the portfolio duration to be longer but also for the portfolio to be invested in an expanded array of instruments within the fixed income asset class – notably, mortgage-backed securities, that offer the prospect for higher returns in exchange for greater uncertainty and volatility. Currently, the benchmark composition for Tranche 2 is a mix of 70% in short and medium-term Treasury securities with an average duration of 1.5 years, and a 30% allocation to mortgages.² The investment strategy also provides some room for active (i.e., tactical) risk-taking around this benchmark asset composition, within the overall risk envelope. The strategic asset allocation and benchmark asset composition for the Tranche 2 portfolio will be adjusted as needed, based on changing market conditions to adhere to the stipulated risk tolerance.

7. By way of illustration, Figure 1 shows the simulated historical performance of the two tranches over the last 15 years. Were market conditions and interest rates to evolve as they did over this period, Tranche 2 would have an average annual return of 6.35% per annum compared to 5.26% for Tranche 1, representing an excess annual relative return of 1.09%. *It should be emphasized, however, that historical returns are not a predictor of future returns, and that there can be no assurances regarding future investment performance as this is inevitably subject to the vagaries of financial markets. Indeed, the current low level of interest rates and the widely prevalent outlook for future interest rate increases suggest lower fixed income returns over the coming years, as described in some detail in Section 3.*

² A small portion of the trust fund balances belonging to Tranche 2 will be set aside as working capital and invested in overnight cash to cater to ongoing liquidity needs.

Figure 1 - Simulated Historical Performance of Current Trust Funds Portfolio Benchmarks



II. Current Market Environment and Implications for Fixed Income Portfolios

8. When interpreting historical information, it is important to note that the last 20 years were characterized by a declining trend in inflation rates in developed countries, which drove interest rates to their lowest levels in history. However, when viewed against the backdrop of current yield levels and the widely prevalent expectations for interest rate increases in the coming years, the historical results shown above would seem to convey an overly optimistic risk-return picture, as explained below.

9. US interest rates are near historical lows, as can be seen in Figure 2 which shows the 30-year history of the interest rate (or yield) on 2-year US treasury notes. This has important implications for future returns:

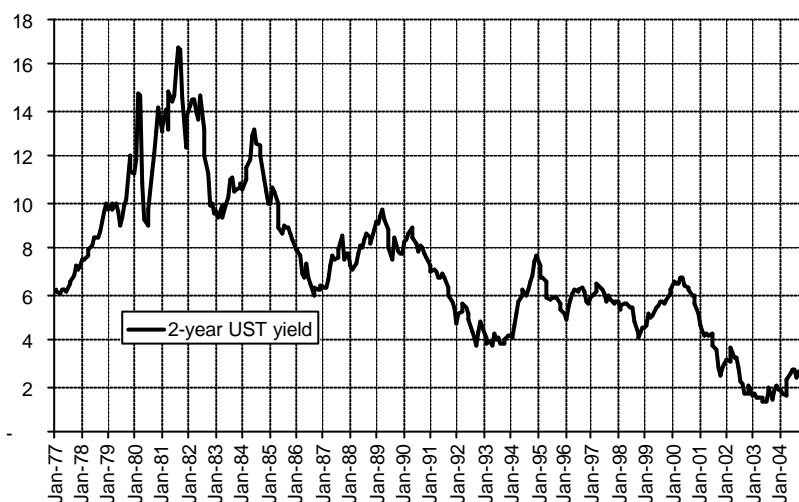
- i) the low yield level implies lower coupon income in the immediate future (see Annex 1 for characteristics of fixed income portfolios);
- ii) other things being equal, yields are more likely to increase than decrease.

10. Even if yields were to decrease, the potential for interest rate declines is limited, since nominal interest rates cannot fall below zero. Consequently, there is a greater probability that fixed-income portfolios will incur price losses than gains over the foreseeable future. Taken together, these imply lower projected overall returns than the historical averages shown earlier.³

³ Sustained increases in interest rates will eventually prove beneficial for fixed income portfolio returns because of higher coupon income and potential for subsequent interest rate declines, but the short-term impact of increasing rates is unquestionably negative.

In the same vein, historical analysis would also seem to significantly understate the potential for negative annual returns on longer duration portfolios, going forward. The implication is that investment policy and strategy should be driven not by backward-looking historical analysis, but by forward-looking measures of projected future returns and risks, that expressly take into account the current low interest rate environment.

Figure 2 - History of 2-year US Treasury Yields

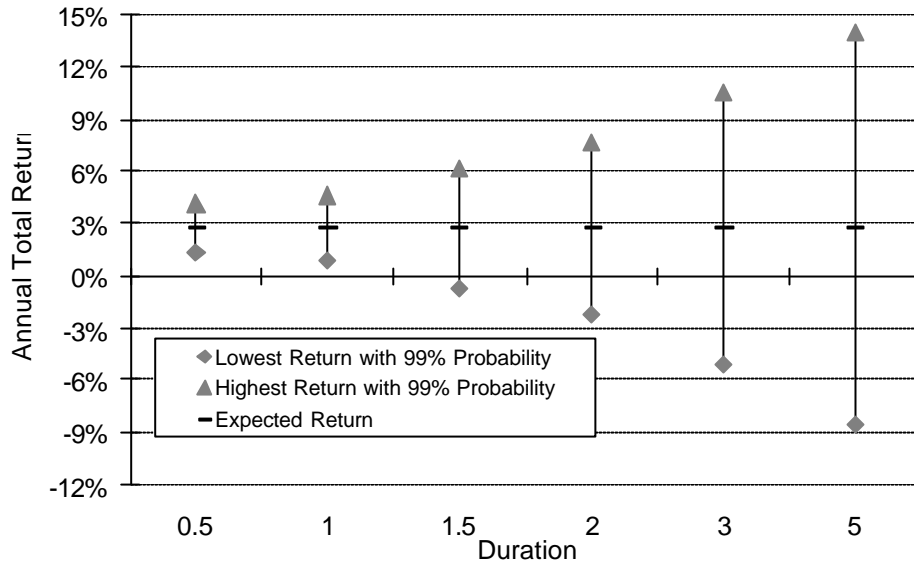


11. Figure 3 below shows the range of returns that could materialize for different duration portfolios based on a simulation of alternate interest rate paths over the next 1-year horizon expected return is estimated based on the assumption that yields follow the path as predicted by the forward yields based on the prevailing yield curve. We can interpret this yield scenario as the one closest to market expectations⁴; the projected return ranges are bounded by the highest and lowest possible returns with 99% probabilities.⁵

⁴ This interpretation of forward rates is known as the “pure expectation hypothesis”. More sophisticated approaches separate the market expectation from the risk premium embedded in the forward rates.

⁵ Different yield curve shifts would create other scenarios with different return results.

Figure 3 - Forward-Looking Analysis



12. As the graph shows, the return projections – even on the upside – fall short of the historical average returns. Also, since the current yields are so low, negative return scenarios are more likely than in the past.

III. Considerations Influencing Investment Strategy

13. **Investment Strategy, Objectives and Risk Tolerance:** Investments are held for a wide range of different objectives, such as providing liquidity to meet obligations on an on-going basis, or to generate return to grow capital or to support future spending objectives. Ideally, an investment portfolio should be structured taking into account the specific investment objectives that is consistent with liquidity and funding management and the risk tolerance of the investor. The first and the most important step in the structuring of a portfolio is the formulation of the investment strategy, which consists of deciding on an appropriate strategic asset allocation (SAA) or mix of assets for the portfolio to be invested in and the choice of a related benchmark portfolio.⁶ The SAA and the choice of a benchmark portfolio are influenced by a number of factors. The most important of these are:

⁶ There are two distinct components to portfolio return and risk: the first is the return and risk characteristics associated with the SAA or the benchmark portfolio; and the second is the return and risk characteristics associated with active portfolio management or tactical trading around the benchmark portfolio within prescribed risk limits. The specification of the institutional risk tolerance, the approval of an appropriate SAA and associated benchmark portfolio consistent with this risk tolerance is typically the responsibility of the Board, as also the specification of the allowable risk limits for active management around the benchmark portfolio. The responsibility for generating excess returns over and above that of the benchmark portfolio within the specified allowable risk limits generally rests with the portfolio management team. Frequently, 80% to 90% of the overall portfolio return and risk emanate from the SAA decision and the benchmark portfolio. The remaining return and risk – typically, no more than 10% to 20% of the total portfolio aggregates – are attributable to active management or tactical trading.

- (a) the investment horizon, which can be viewed as the minimum length of time or periodicity over which portfolio returns have meaningful significance for the institution and its board;
- (b) the institutional risk tolerance, which is the ability to accept risk or potential losses or less than optimal returns in exchange for the prospect of generating higher expected returns; and
- (c) the risk-return characteristics of the various available asset classes and instruments in the eligible investment universe.

14. In particular, there are three important and often conflicting aspects of investments that need to be considered in determining the appropriate investment objectives:

- **Safety:** The performance of the investment portfolio may fall short of expectations. The return on investments can be lower than expected and could even be negative. This means that the value of the portfolio in the future may be less than it is today. Can the donors and recipients tolerate significantly lower returns than expected? What is the magnitude of potential losses that the donors and recipients can tolerate?
- **Liquidity:** We consider an investment to be liquid if it can be quickly converted to cash with very little cost. Securities, such as treasury bills, that are frequently traded in large volume in public markets are typical examples of liquid assets. Private equities, on the other hand, are not easy to liquidate immediately.
- **Expected returns:** How much income and capital growth can the investor expect on the funds?

15. There are clear trade-offs across these characteristics. Although there are different ways to increase the expected return on a portfolio, the higher returns can usually be obtained only at the expense of higher risk and potentially lower liquidity. For the Global Fund, we interpret “safety” as the requirement to protect the value of the donor contributions and fulfill disbursements on commitments on grants signed, and “liquidity” as the requirement to keep them available to disburse towards grants on a timely basis. Our objective is to optimize the expected return subject to these safety and liquidity requirements. It is important to note that taking higher risk *does not* guarantee a higher realized return. While investing in riskier assets carries the prospect for higher expected returns, the actual *ex post* return on riskier assets may well be below that on the safer asset classes – this is in fact, by definition, why we consider them to be riskier.

16. The definition of the investment objective should include a consideration of:

- Return objectives and liquidity needs: In the case of the Global Fund, the return objective is to optimize the expected return, subject to protecting the value of the donors’ contributions and having funds available for timely grant disbursements.
- Investment time horizon: The choice of investment horizon should ideally be a function of the nature and type of the portfolio, the projected liquidity needs and likely funding and drawdown profiles that determine the relative permanence (or otherwise) of the invested funds,

and the institutional capacity to bear risk in exchange for expected additional returns. Based on the short and mid-term outlook for donor contributions, the reliability upon which these cash flows can be estimated, and the stability of liquidity for the Global Fund, the investment horizon has been set to three years.

- Risk tolerance and risk bearing capacity: the risk tolerance for conservative portfolios is specified as the maximum *probability of negative return* that an institution is willing to accept over a specified investment horizon. In the case of the Global Fund the probability of negative return in a 3-year cycle has been set to no more than approximately 1%. The probability of negative return measure has the virtue of being a relatively simple risk yardstick, but does not provide any information as to the potential size of the losses that could be incurred. For this reason, we believe it is prudent to supplement the negative-return probability measure with measures of worst-case loss. *Value-at-Risk* (VaR) is one such measure, which quantifies the worst-case loss that a portfolio could suffer over a given investment horizon at a specified confidence level, say 95% or 99%. *Conditional Value-at-Risk* (CVaR) is another such measure, which quantifies the average size of loss one could expect if extreme outcomes beyond the 95% or 99% confidence limit were to materialize. We believe a practical significance of the CVaR measure is that it is a good indicator of the amount of risk capital that should be set aside to absorb the portfolio risk.

17. It is commonly assumed that investors with longer time horizons have higher tolerance to short-term fluctuations in the portfolio value. The intuition behind this assumption is that the impact of short term fluctuations will potentially be eliminated and the losses will be recovered over time (time diversification), but this does not mean that we should automatically neglect the impact of the short-term losses that could at times be significant. For example: since short term losses would be reported in the Global Funds financial statements this may require explanations that are sometimes difficult for certain audiences to understand and may be politically unacceptable to donors and others even though over the long term these losses will potentially be eliminated and recovered. Generating capital growth as a return objective is usually associated with a longer time horizon. At the same time, we have to note that time horizon and risk tolerance are not equivalent concepts; a longer time horizon does not mechanically imply higher risk tolerance in and of itself.

IV. Investment Alternatives for the Global Fund Portfolio

18. As described in the previous section, we believe the choice of an appropriate investment strategy for the Global Fund is critically dependent on its investment horizon and the degree of risk that the Global Fund is willing to assume over this horizon. Therefore, it is useful to begin the discussion on investment strategy by considering the fund's projected cash flows (donor contributions are largely the cash inflows and disbursements and operating expenses are the cash outflows) for the future and how its liquidity is expected to evolve under alternate donor contribution scenarios. The current size of the Global Fund Liquidity portfolio is about \$2.2 billion. Table 1 shows the expected quarterly cash flow forecasts for the next three-and-a-half years. As is the common practice, the base case is based on a fairly neutral position of reflect the

current level of activities of the Global Fund i.e. 2004 contributions of \$1.6 billion. This level of contributions, however, provides funding to currently approved projects and project renewals for the next two years.⁷

Table 1 - GFATM Cash Flow Forecast

	Q1-Q2 05	Q3-Q4 05	Q1-Q2 06	Q3-Q4 06	Q1-Q2 07	Q3-Q4 07	Q1-Q2 08	Q3-Q4 08
Inflows*	771	771	833	802	760	760	760	760
Disbursement	-537	-662	-721	-730	-821	-851	-789	-723
Oper. Expens.	-32	-32	-28	-28	-22	-22	-20	-21
Net Flows*	202	76	83	44	-83	-113	-49	16
Balance*	2,302	2,377	2,461	2,505	2,422	2,309	2,260	2,276

*excluding investment returns

19. Under the base case, projected cash outflows are expected to be more or less covered by cash inflows each quarter, and liquidity is expected to remain fairly stable between \$2.3 billion and \$2.6 billion. *In short, the base case projections and business cycle of the Global Fund serve to support a three-year investment horizon assumption for the Global Fund Liquidity Portfolio.* If, however, there is a significant short-fall in the amount of donor pledges down to say \$1 billion per year and the projected disbursements remain at the base case level, the fund's liquidity level will get drawn down over time, and could potentially dissipate within the next three years. *Such a low-case scenario would argue for a shorter average investment horizon, not much longer than a year or so.* If, on the other hand, donor contributions can be sustained beyond three to four years at a \$1.6 billion or higher annual pace and the disbursement pattern allows liquidity's stability or even growth beyond its current \$2 billion, such a high-case scenario may argue in favor of a potentially longer investment horizon beyond three years. For the Global Fund, this would not necessarily be the case since factors such as the business cycle (replenishment and disbursement patterns) and the accuracy and reliability of the underlying projections, among other things, need to be considered before such a determination could be made.

20. Clearly, there is no one single investment strategy that would be equally appropriate under each of these scenarios. Rather, the optimal strategy will very much depend on an informed judgment as to the objective, risk tolerance, reliability of cash flows and investment horizon, against the backdrop of all that is known and all that cannot be known about the future. Against this background, the following paragraphs outline a range of different alternative investment strategies the Global Fund may want to consider ranging progressively from the most conservative alternatives to the more aggressive alternatives. A summary of the projected risk and returns for each of the alternatives is presented in tables 3, 4 and 5 towards the end of the section. In addition, for further reference, Annex 4 describes the investment approach of endowment funds as well as a strategy often referred to as cash flow immunization.

⁷ Source: IBRD estimate

21. Contingency Reserve: If and when the Global Fund finds itself in a position where it can contemplate a more aggressive strategy, it would be prudent for the fund to set aside a contingency reserve or provision equal to the potential worst-case investment loss it could incur under the applicable alternative and reduce the commitment authority by an equivalent amount. A contingency reserve is not deemed necessary for Tranche 1 or Tranche 2 at this time.

Investment Alternative under the Low Case Scenario

22. Alternative 1: A low-case scenario would indicate that the applicable investment horizon for the Global Fund is on the order of one year or so. If preservation of donor contributions and availability of funds to meet projected disbursements over this horizon is the principal investment objective, the most appropriate investment strategy would correspond to that adopted for Tranche 1 of the Trust Funds Liquidity Portfolio. It will be recalled that Tranche 1 is being managed so as to preserve capital (i.e., donor contributions) over a one-year time frame. The benchmark asset composition for this Tranche currently includes 44% in money-market instruments managed against a 3-month deposit benchmark, and 56% in short and medium-term Treasury Notes managed against a 1-3 year maturity Treasury index. The average duration of this portfolio is around one year, which is about the longest portfolio duration that would satisfy the capital preservation constraint to maintain probability of loss below 1% over a one-year time horizon under the prevailing interest rate environment. If yields evolve as predicted by the forward yield curve, the projected return on Tranche 1 will be 2.70% over the next year. The probability of negative return is estimated to be 0.1% over a 1-year horizon.⁸

Investment Alternative under the Base Case Scenario

23. Alternative 2: As described above in paragraph 22, the base case cash flows, the liquidity projections and the business cycle among other things suggest a three-year investment horizon for the Global Fund. If preservation of donor contributions over this horizon is the paramount investment objective, the investment policy that has been specified for Tranche 2 – predicated on a near-negligible probability of negative cumulative returns over a three-year time frame – would be quite appropriate for the portfolio. Based on the information known at this time, it is the IBRD's assessment as trustee that Tranche 2 is the appropriate investment strategy for the Global Fund.

24. The higher risk tolerance for Tranche 2 makes it possible for this tranche to have a somewhat more aggressive asset allocation than Tranche 1. The most straightforward approach to enhancing expected returns would be to extend the duration of the portfolio (i.e., exposure to outright interest rates), although this would not be the most optimal approach, especially under current market conditions. The longest duration portfolio that would satisfy the capital preservation constraint over a three-year time horizon would be around 2 years under the current interest rate environment. A more efficient way of taking advantage of the higher risk tolerance and seeking enhanced returns would be to expand and diversify the range of investable

⁸ Risk and return projections are based on the yield curve and other market data as of December 31, 2004.

instruments within the fixed income asset class. Accordingly, the investment strategy for Tranche 2 seeks to do a combination of two things: the first, to partially lengthen the duration of the portfolio beyond that for Tranche 1, and the second, to obtain exposure to the MBS sector alluded to earlier in paragraph 10. The addition of the MBS sector offers at least two potential benefits: (1) higher expected return compensating for additional risk (prepayment risk, volatility, etc.) and (2) risk diversification⁹. The existing investment strategy for Tranche 2 accordingly envisages a benchmark portfolio composition of 70% in Treasuries (with a 1.5 year duration) and 30% in MBS.

25. As shown in Tables 3 and 4, the projected return for Tranche 2 is 2.94% over the next year. Thus, Tranche 2 is expected to add 24 basis points of additional return over Tranche 1, assuming the forward yields scenario. The probability of negative return is 0.1% on a 3-year horizon, but there is a 6.3% chance of negative return over the first year.

26. The appropriateness of the three-year investment horizon should be reviewed and reaffirmed periodically, at least at the beginning of each fiscal year to assess changes in cash flow projections and liquidity needs. The corollary being any significant shifts in the investment horizon (whether it is to make it shorter or longer) could prompt a rethink of the investment strategy.

Investment Alternative(s) under the High Case Scenario

27. At present, IBRD has determined that Tranche 2 is the appropriate investment strategy for the Global Fund in light of the uncertainties regarding the replenishment process, the future level of pledges, the currency composition of grants, and renewals, among other considerations, however given the Global Fund Board's request to explore alternative strategies that exceed the risk/return profile of Tranche 2, the following alternatives are presented for the Global Fund's consideration. A scenario for the Global Fund is sustained donor contributions at a \$1.6 billion or higher annual level over the long term; it is assumed that under this scenario a case could be made for a longer investment horizon than three years.¹⁰ This means that the likelihood that the funds will be needed earlier for disbursement is low, this is very important because to liquidate the investments earlier could result in losses to the Global Fund. Under this scenario, this could allow consideration of progressively more aggressive investment alternatives than those considered earlier, provided these future cash flows can be estimated with some reliability and the liquidity level is stable over a longer period among other factors that would need to be considered. In the following paragraphs, we explore a few such investment options that can potentially help enhance portfolio returns in the future, albeit at the expense of significantly increased portfolio risks compared to that being currently assumed for Tranche 2. Additional risks could mean any or all of the following: increased probability of incurring losses or negative

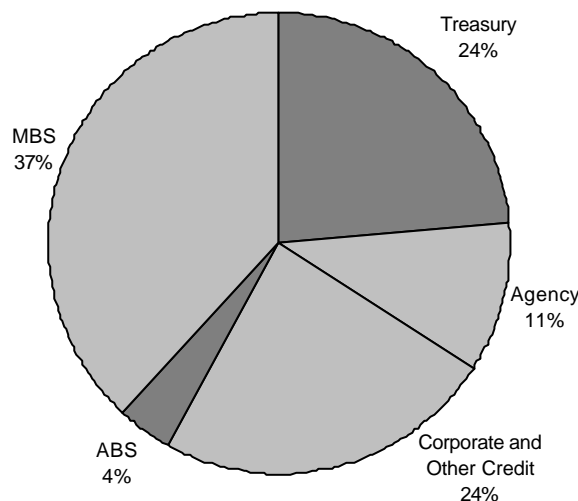
⁹ Diversification means that the portfolio risk is less than the simple arithmetic sum of the risks associated with the individual sub-components of the portfolio.

¹⁰ The Global Fund Board would need to demonstrate and make a definitive case for a longer investment horizon, based on the longer-term outlook for donor contributions, the reliability upon which these cash flows can be estimated and the stability of liquidity over a longer period among other factors that would need to be considered.

returns in any given year; increased probability of sustained losses over a longer time horizon; and potentially, larger magnitude of losses. It bears reiterating that taking higher risk *does not* necessarily guarantee higher returns. While riskier investment options often imply higher expected returns on average over the long haul (why else would a rational investor seek out a riskier investment strategy?), it is very possible for the actual realized returns under any of the ‘riskier’ investment options presented here to fall below that of conservatively managed portfolios in any given year or even over a longer time horizon. Table 6 and Figure 8 provide a comparison of the historical investment performance for each of the alternatives.

28. Alternative 3: One alternative would be to extend the scope of the credit risk beyond the MBS to include investment-grade corporate bonds.¹¹ This would allow the portfolio to benefit from an additional source of potential returns – namely exposure to the corporate sector. Inclusion of investment-grade corporate bonds will enable the portfolio to be invested in each of the large sub-sectors of the fixed-income universe (Treasuries, agencies, MBS and ABS). Typically, investors seeking an exposure to the overall investment-grade fixed income markets often have their portfolios managed against a so-called broad index, such as the Lehman Brothers U.S. Aggregate index that bundles together in one composite index each of the sub-sectors referred to above. Figure 4 shows the structure of the Lehman Brothers U.S. Aggregate index.¹² Equally, it is possible to create custom indices so as to optimize the weighting of each sub-sector based on an investor’s specific return objectives and risk constraints.

Figure 4 - Structure of the Lehman Aggregate Index



Source: Lehman Brothers

¹¹ It should be noted that the existing IBRD’s Investment Authorizations permit investments in AAA-rated corporate bonds only. As described in the next section, consideration of this alternative will require an explicit authorization from the Global Fund Board.

¹² For investors desirous of investing in bonds inside and outside the U.S., global bond indices are available as well.

29. Based on the past 15 years of history, AAA bonds produced 40-50 basis points excess return over treasuries on a duration adjusted basis. Similarly, the BBB-rated sector had an average excess return of 50-60 basis points over treasuries. Current credit spreads are shown in Table 2.

Table 2 - Corporate Credit Spreads
December 2004

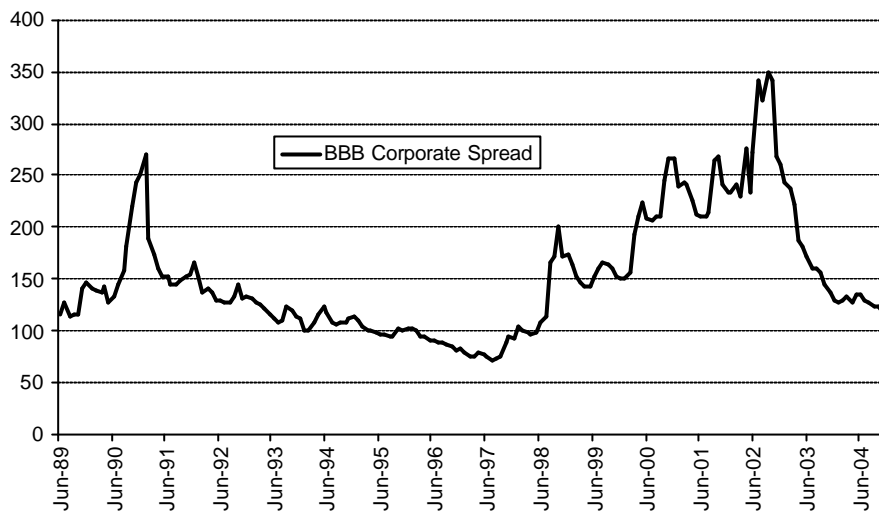
Rating	Spread
AAA	40-50 bps
AA	50-55 bps
A	65-70 bps
BBB	90-110 bps

Source: Lehman Brothers, Merrill Lynch

30. The downside of corporate bonds is that they could have adverse relative price movements if their credit spread were to widen in relation to Treasuries. As Figure 5 shows, there have been several instances of significant spread widening over the past decade. Depending on the duration of the corporate bonds in a portfolio, a 100-150 basis points increase in credit spreads could easily result in a 400-700 basis points 12-month cumulative underperformance of the sector versus treasuries in adverse market periods. It should be noted that the ABS sector exhibited more moderate downside risk: the ABS index suffered its worst performance versus treasuries in 1998, on the order of -230 basis points¹³. The milder downside risk of ABS is attributable, among other things, to the underlying collateral and the higher credit quality, as well as the lower average duration at the overall sector level.

Figure 5 - History of BBB Corporate Credit Spread

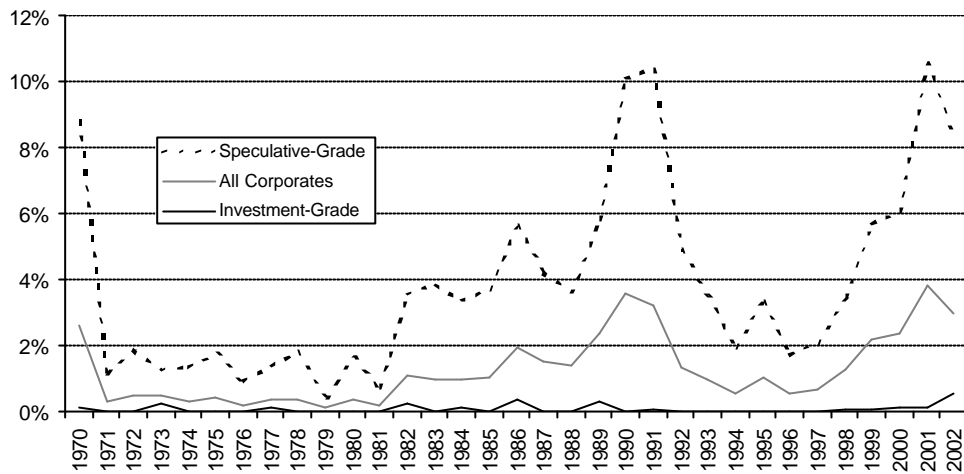
¹³ We have to make the comment that treasury yields and credit spreads are negatively correlated in certain periods. In turbulent market conditions we can observe “flight to quality” syndrome, when investors liquidate risky assets (resulting in spread widening) and buy treasuries (resulting in decreasing treasury yields.)



Source: Lehman Brothers

31. Beyond the repricing risk due to increasing credit spreads, investors could face serious losses if the bond issuer were to default. Figure 6 shows the historical default rate of investment grade (AAA to BBB) bonds as well as speculative grade bonds. Although the default rate of investment grade bond remained below the frequency of 0.50%, we have to emphasize that this is measured at the overall investment grade corporate bond universe level. Based on the pure history, there would be a chance of an issuer default on the order of 0.07% in the investment grade universe (0.00% for AAA, 0.02% for AA and A rated issuers, and 0.18% for BBB issuers) only if we hold a fully diversified corporate bond portfolio, containing securities from all of the issuers. Since such a complete replication of the market is hardly feasible, portfolios usually contain selected securities only, thus the concentration risk may significantly increase the potential portfolio losses higher than the previous statistics would hint at first sight.

Figure 6 - Annual Global Corporate Issuer-Weighted Default Rates



Source: Moody's

32. Based on the forward yield curve and other information we would project the Lehman Aggregate Index to earn 3.33% over the following 12-month horizon, generating an excess return of 39 basis points over Tranche 2. As Table 4 shows, the probabilities of negative return on a 3-year and 5-year horizon are 5% and 1% respectively. In fact, the Aggregate index would not satisfy the current risk tolerance assigned to Tranche 2.

33. Alternative 4: Another higher-risk alternative would be to consider making a foray beyond the fixed income asset class into the public equity markets. Equities carry significantly higher risk and should only be considered if the Global Fund determines that it has the wherewithal to withstand potentially significant losses of the invested principal, i.e., donor contributions. Historically, equities have produced average annual excess returns of around 5.4% percentage points compared to fixed-income investments over the last 80 years. However, this summary statistic masks significantly different relative performances over different time periods. For example, over the last 10 years, equities did not perform nearly as well. Over the past 10 years, the S&P 500 index outperformed treasuries only by 2.03% on an annualized basis. This relatively low excess return can be attributed to the bubble burst in the equity market over 2000-2002. If we focus on the past four years only, equities underperformed Treasuries by 12.8% on an annual basis.

34. The projected future returns on equity investments in relation to fixed-income returns would depend on the assumed equity risk premium and the assumed volatility of returns. While history can provide a reasonable clue as to the volatility of annual equity returns (say, on the order of 15%), there is much less consensus on what the level of the equity risk premium is on a forward-looking basis. Estimates from academics and practitioners span a wide range from 0% to

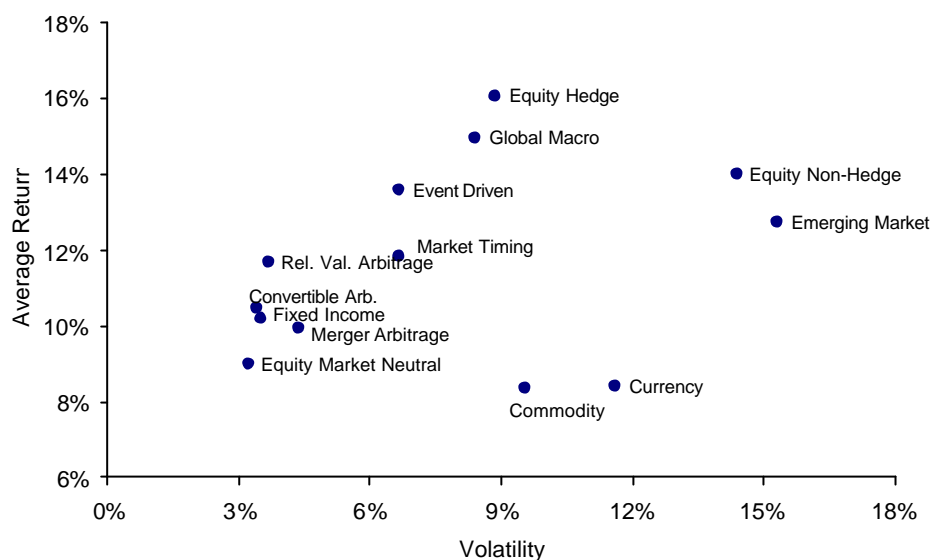
5% or so. Assuming an equity risk premium of 3%¹⁴, a portfolio composed of a 70% allocation to broad-grade fixed-income investments as typified by the Lehman Brothers Aggregate US Index and a 30% allocation to US equities as typified by say, the Russell 3000 index could be expected to have an expected additional return of 1.2%-1.4% percentage points compared to pure government bond portfolios.

35. Given the assumptions detailed earlier, we project 4.12% total return for Alternative 4 for the next 1-year time horizon. Compared to the other alternatives, we could expect 79 basis points of additional return over Alternative 3, and 118 basis points over Tranche 2. At the same time, there could be a more significant downside risk as well; the worst case loss over the first year could be as much as 15%, and the probability of negative returns is close to 10% even on a 5-year horizon.

36. Hedge Funds: It is possible to consider additional variations on the theme involving investments that go beyond the broad fixed-income asset class encompassed in the Lehman Brothers Aggregate Index – whether it is investments in speculative grade bond investments or international equities or in hedge funds. Hedge funds don't represent a unique asset class as such, but rather an agglomeration of disparate investment strategies focused on exploiting market opportunities across a broad spectrum of asset classes with a view to generate 'absolute' returns. They are typically not bound by a specific benchmark allocation, and have considerable flexibility to employ leverage or take short positions in individual securities unlike traditional asset managers. Hedge fund strategies run across the entire return-risk spectrum, with strategies focused on directional market positions or 'macro' bets capable of producing high but volatile returns and market-neutral or so-called 'long-short' strategies offering lower but less volatile returns. Under the high case scenario, such market-neutral or long-short hedge funds operating at the lower end of the risk spectrum may provide an interesting investment opportunity for a portion of the portfolio. Figure 7 illustrates the risk and return characteristics of some selected hedge fund strategies, based on the last 14 years history of hedge fund return indices provided by the Hedge Fund Research Inc. As the graph shows, there is a significant dispersion across the strategies in terms of both risk and return.

¹⁴ Market estimates for equity risk premiums can range between 1% -5%; many participants use 3% for their asset allocation model.

Figure 7 - Select Hedge Fund Profiles



37. Active Management: It will be recalled from the earlier discussion in Section III (refer Footnote 6) that there are two distinct components to portfolio return and risk: the first is the return and risk characteristics associated with the SAA or the benchmark portfolio; and the second is the return and risk characteristics associated with active portfolio management or tactical trading around the benchmark portfolio within prescribed risk limits. The alternatives that have been described so far entail taking on progressively greater systematic risk at the level of the SAA to an expanding range of market factors. Active management of a portfolio can also be a source of potential extra returns.¹⁵ In this section we present an approach that involves the use of active risk to generate additional returns through opportunistic or tactical trading and position-taking in currencies.¹⁶

38. Active risk-taking seeks to exploit market opportunities based on market timing, sector rotation, security selection and other such strategies. It is to be noted that the value that can be added through active management is conditional on skills. The chosen portfolio managers need to have skills for market timing, security selection etc., while the fund sponsor or the investor needs the skills to select good and ideally, consistent managers.

¹⁵ As mentioned earlier, IBRD treasury portfolio managers have the leeway to use active risk within the eligible range of authorized fixed-income instruments on Tranche 2, subject to a stop-loss limit (i.e., a worst-case loss limit) of 75 basis points of the portfolio size.

¹⁶ Currencies are not a particularly interesting asset class for inclusion in the SAA, since they do not appear to offer the potential for systematic additional returns through time and given the violent fluctuations they can be subject to. They can, however, be an interesting asset class from the view point of active risk-taking.

39. Active currency risk can be assumed using what are referred to as currency overlay strategies. The idea is to superimpose a dedicated risk-controlled currency trading strategy on top of the base portfolio. Frequently, such strategies are outsourced to specialized external asset managers, as is currently being done in the case of IBRD's pension portfolio. For a given skill level, the amount of expected additional returns that can be generated through currency mandates, varies directly with the amount of risk that the fund sponsor or the ultimate investor is willing to assume. By way of illustration, based on the experience of IBRD's pension portfolio, a risk-limit equivalent to a stop-loss of 75 basis points can be expected to result in average additional returns of around 20 basis points or so in any given year. As with all investments, however, there can unfortunately be no guarantee of future performance, and there can be years when performance can be significantly worse than expected.

40. Summary of Alternatives: Tables 3 and 4 summarize forward-looking expected return and risk estimations for alternatives 1 through 4 over the three different time horizons of 1, 3 and 5-year horizons. Table 3 shows the projected expected returns under two assumptions – the first, based on implied market expectations that interest rates will evolve as per the forward yields implied in the current yield curve, and the second based on a simplistic but somewhat arbitrary assumption that interest rates will remain unchanged at their current levels. Furthermore, we have assumed a risk premium of 3% for equities over long-term government bonds.

Table 3 - Estimates of Expected Returns
as of December 31, 2004

Investment Alternatives	Expected Return: 1-year		Expected return: 3 years*		Expected return: 5 years*	
	Forwards Scenario	Unch. Yield Scenario	Forwards Scenario	Unch. Yields Scenario	Forwards Scenario	Unch. Yields Scenario
Alt. 1: Tranche 1	2.70%	3.20%	3.31%	3.20%	3.70%	3.20%
Alt. 2: Tranche 2	2.94%	3.68%	3.36%	3.62%	3.73%	3.53%
Alt. 3: Lehman Aggregate	3.33%	4.49%	3.64%	4.40%	3.94%	4.26%
Alt. 4: 70% Leh. Agg + 30% Equities	4.12%	5.44%	4.51%	5.39%	4.88%	5.31%

* Annualized figures

41. Table 4 shows the potential downside risks of the previously described investment alternatives over different time horizons. In addition to the probability of negative return, the table also shows the C-VaR numbers which reflect unlikely, but still possible losses in extremely adverse market environments¹⁷. These figures can be interpreted as the potential worst-case losses on the investment portfolio. If the Global Fund is concerned about the unlikely but possible temporary investment losses, it may wish to consider setting aside reserves or provisions from the commitment authority for potential investment losses based on these numbers. If the

¹⁷ We can define 99% VaR (value at risk) as the worst possible return with 99% probability, i.e. there is only 1% chance for a return (loss) lower than the VaR figure. However, a loss exceeding the projected 99% VaR is still possible. The 99% C-VaR (conditional value at risk) measures the expected magnitude of loss, given that we portfolio loss exceeds the predicted 99% VaR. An additional comment can be made here: the 1% probability of negative return, in fact, corresponds to a 99% VaR number of 0%: there is only 1% chance that the portfolio will suffer a return lower than 0%.

forecasted investment losses do not materialize, the excess reserves (the amount that is held back from commitment, and exceeds the required reserve size) can be released for disbursement in the future. The possible extreme losses of Alternative 2 are relatively moderated on a 1-year horizon (between -2% and -3%), and in fact, there is very little chance to accumulate a negative performance on a longer time horizon. Alternative 4, on the other hand, could possibly accumulate cumulative losses even on a 5-year time horizon. The possible loss for Alternative 4 over the first year could be as much as 15%. To be on the conservative side, the required size of reserve for a 1-year horizon could be on a similar order.

Table 4 - Forward-Looking Risk Measures
as of December 31, 2004

Alternative	1-year		3 years*		5 years*	
	Prob. Neg.	99% C-VaR	Prob. Neg.	99% C-VaR	Prob. Neg.	99% C-VaR
Alt. 1: Tranche 1	0.1%	+0.4%	0.0%	+0.7%	0.0%	+0.7%
Alt. 2: Tranche 2	6.3%	-2.6%	0.1%	+0.5%	0.1%	+0.6%
Alt. 3: Lehman Aggregate	20%	-8%	5%	-2%	1%	-0.5%
Alt. 4: 70% Leh. Agg + 30% Equities	30%	-15%	16%	-7%	10%	-5%

* Annualized figures

42. Table 5 summarizes the investment alternatives, highlighting their risk-return characteristics, as well as the most critical requirements that each of them may lead to. Furthermore, for illustration purposes, we show the historical performances of Tranche 1, Tranche 2 as well as Alternatives 3 and 4 in Figure 8 and Table 6. Whereas Alternative 4 generated the highest historical return over the last 10-15 years, we note that both Tranche 2 and Alternative 3 outperformed Alternative 4 over the last 5 years. Again, it is important to note that historical returns are not a predictor of future returns. There can be no assurances regarding future investment performance as this is inevitably subject to the vagaries of financial markets.

**Table 5 - Global Fund to Fight AIDS, Tuberculosis and Malaria
Summary Investment Alternatives ⁽¹⁾**

		Alternative 1: Tranche 1	Alternative 2: Tranche 2	Alternative 3: Lehman Aggregate Index	Alternative 4: Lehman Aggregate Index + Equities	
SAA		44% MoneyMarket 56% Treasuries	70% Treasuries 30% MBS	24% Treasury 37% MBS 11% Agency 4% ABS 24% Corporate and Other Credit	70% Lehman Brothers Aggregate Index 30% US Equities	
Duration / Investment Horizon		1 year/ 1 year	1.9 years / 3 years	4.26 years / 5 years	TBD/> 5 years	
Expected Returns	1 Year	Forwards	2.70%	2.94%	3.33%	4.12%
		Unch. Yield	3.20%	3.68%	4.49%	5.44%
	3 Years	Forwards	3.31%	3.36%	3.64%	4.51%
		Unch. Yields	3.20%	3.62%	4.40%	5.39%
	5 Years	Forwards	3.70%	3.73%	3.94%	4.88%
		Unch. Yields	3.20%	3.53%	4.26%	5.31%
Forward-Looking Risk Measures	1 Year	Prob. Neg.	0.1%	6.3%	20%	30%
		99% C-VaR	+0.4%	-2.6%	-8.0%	-15.0%
	3 Years	Prob. Neg.	0.0%	0.1%	5%	16%
		99% C-VaR	+0.7%	+0.5%	-2.0%	-7.0%
	5 Years	Prob. Neg.	0.0%	0.1%	1.0%	10%
		99% C-VaR	+0.7%	+0.6%	-0.5%	-5.0%
Managed by		WB	WB	WB / External Managers	WB / External Managers	
Pros		- Good alternative when there is high degree of uncertainty regarding cash flow projections - 0.1% probability of negative return over the first year	- Higher expected return and risk diversification with respect to Alt.1	- Higher expected return and risk diversification with respect to Alt.3 since the portfolio would be invested in each large sub-sectors of fixed-income universe.	- Higher expected return and risk diversification with respect to Alt.4.	
Cons		- Lowest expected return	- 6.3% chance of negative return over the first year - 2.6% worst-case loss first year	- Exposure to Credit Risk - 20% chance of negative return over the first year - 8% worst-case loss first year	- Exposure to high volatility of Equity Market - 30% chance of negative return over the first year - 15% worst-case loss first year	
Requirements		- Short-term investment horizon	-Liquidity deemed stable over longer period, i.e. 3 Years - Accuracy of cash flow projections both donor contributions and disbursements. - Mid-term investment horizon	-Liquidity deemed stable over longer period, i.e. at least 5 Years - Accuracy of cash flow projections both donor contributions and disbursements. - Long-term investment horizon	-Liquidity deemed stable over longer period, i.e. > 5 Years - Accuracy of cash flow projections both donor contributions and disbursements. - Long-term investment horizon	

(1) Annualized Figures

MBS: Mortgage Backed Securities, ABS: Asset Back Securities

SAA: Strategic Asset Allocation

Unch. Yields: Interest Rates will remain unchanged at their current levels.

Forwards: Interest rates evolve as per the forward yields implied in the yield curve.

99% C-VaR: Conditional Value-at-Risk quantifies the average size of loss one could expect if extreme outcomes beyond 99% confidence limit were to materialize.

Figure 8 - Historical Cumulative Performance of Investment Alternatives

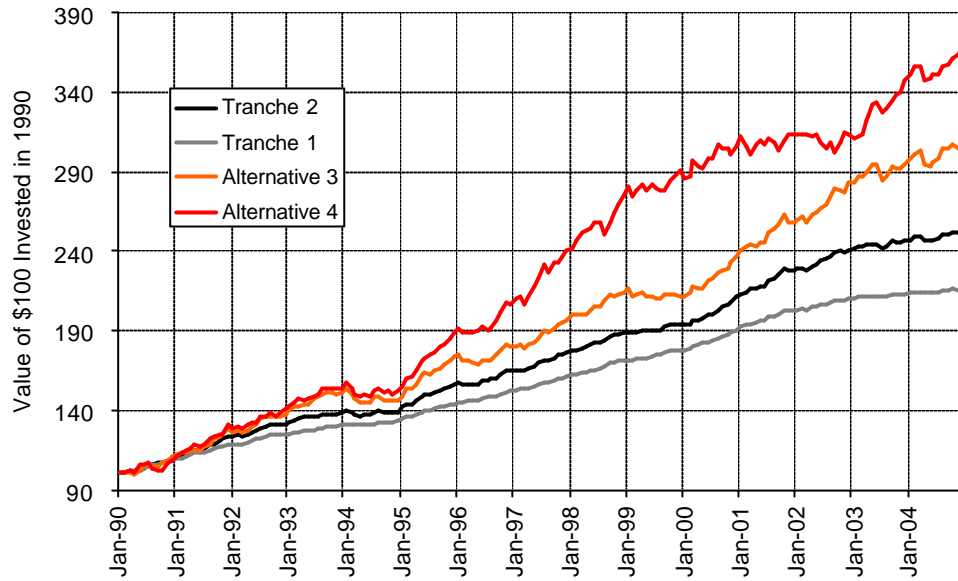


Table 6 - Historical Performance of Investment Alternatives

Historical Return	Tranche 1	Tranche 2	Alternative 3	Alternative 4
15 years, p.a.	5.26%	6.35%	7.79%	9.11%
10 years, p.a.	4.95%	6.11%	7.72%	9.31%
5 years, p.a.	3.96%	5.40%	7.71%	4.96%
3 years, p.a.	2.10%	3.48%	6.20%	5.72%

43. Costs: In CY04, the IBRD charged the Global Fund \$ 2 million (equivalent to 11 bps of the Global Fund liquidity balance) for Trustee services of which the asset management services are a small component. In the event that a more aggressive investment strategy is deemed appropriate, the fees associated with the management of the investment portfolio will increase. The following indicative fees are presented to give the Global Fund a reference for the size of the fees that would be required for alternative asset class strategies. These fees include: 1) asset management fees for external managers; 2) custodian fees since the engagement of external managers would require the hiring of a global custodian who would perform transaction settlement, custody services and would provide some portfolio reporting; and 3) fees for the provision of risk management services, if required. In addition to these fees, IBRD's fee for hiring, managing and overseeing the investment managers would need to be reviewed as well as any fee for a separate investment strategy for the Global Fund and potential system changes, if necessary.

Indicative Annual Fees

1. **External asset managers** – the fee charged by asset managers generally are comprised of a fixed and a performance linked component. The performance linked component is typically a percentage of the excess return over the benchmark. The fixed component may vary widely depending upon the asset class in question. Taking both the fixed and the performance linked components into account, following are indicative fee ranges for the average market value of the assets under management:
 - a. US fixed income managers (Lehman Aggregate index): 15-25 bps;
 - b. US equity managers (S&P 500 or Russell 3000): 30-50 bps;
 - c. Hedge fund managers: 200-300 bps; and
 - d. Currency managers: 100-150 basis points.
2. **Custody** – if external asset managers were required, a global custodian would need to be hired. Custody fees would be in the neighborhood of 3-6 bps, depending on the volume of the assets managed externally.
3. **Risk management services** – should additional risk management services be required to monitor the market and credit risk on the Global Fund portfolio, an additional fee of approximately 3-6 bps would be required, depending on the complexity of the portfolio and the sophistication of the risk reports.

V. Summary

44. This paper was prepared in response to the request made by the Global Fund Board that the IBRD produce a paper outlining the current investment policy of the Global Fund's Liquidity Portfolio and explore investment alternatives to enhance the future expected return of the portfolio. The investment alternatives presented in this paper are by no means exhaustive but are intended to be illustrative across the risk/return spectrum. A decision to pursue an investment strategy different from that currently

embodied in Tranche 2 would require consideration of a range of issues. Some of these issues are highlighted here and have been discussed in detail in the paper.

- **Objective:** For the Global Fund, we understand that the primary investment objectives are to protect the value of the donor contributions and to have funds available to disburse towards grants on a timely basis. Do these continue to be the primary objectives?
- **Risk Tolerance:** Higher risk investment alternatives offer a higher expected return but also are subject to higher risk. Thus, higher risk alternatives could increase the chance of losses of Global Fund assets. Is the Global Fund authorized to invest resources with a higher risk of loss of principal (donor contributions) in order to have the possibility of higher returns, by moving to a longer investment horizon and higher risk tolerance than Tranche 2?
- **Reliability of Cash Flows:** The higher risk investment alternatives would require stable liquidity for longer periods since resources would be invested with longer investment horizons and, therefore require accuracy of cash flow projections (both donor contributions and grant disbursements). Liquidating securities prior to the investment horizon could result in significant losses. Are the cash flow projections reliable and accurate, and do they justify a longer investment horizon?
- **Volatility of returns:** Unrealized gain/losses from market movements would mean higher volatility of income in the financial statements. Is higher volatility of income something the Global Fund can accept and explain to donors, recipients and other readers of their financial information?
- **Cost:** There may be an additional increase for a separate and customized portfolio. In addition, some alternatives may be managed in part by external managers, thereby increasing the fee charged to the Global Fund. Is the Global Fund prepared to incur these additional fees?

45. At present, the IBRD has determined that Tranche 2 is the appropriate investment strategy for the Global Fund in light of the uncertainties regarding the replenishment process, the future level of contributions, the currency composition of grants, and renewals, among other considerations. The IBRD intends to review the investment strategy with some frequency given the nascent stage of the Global Fund. This is expected to be annually.

46. A decision to invest in any of the other alternatives presented in the paper (or variations on them) would require 1) specific instructions from the MEFA and Global Fund Board to IBRD that includes a statement on the reasons for the change and that the Global Fund Board is fully informed of the risks of the alternative chosen, 2) a determination by the IBRD that the alternative is an appropriate strategy for the Global Fund, 3) modification of the Trustee agreement and 4) implementation of the Global Funds investment instructions may also require review and approval by IBRD Board.

Characteristics of Fixed Income Portfolios

1. Investment returns on high-grade bond portfolios consisting of government securities are made up of two components: (1) periodic coupon income at the contractual interest rate, and (2) appreciation or depreciation in the value of the bond portfolio (change in value of principal) on account of changes in interest rates. All other things being equal, an increase in market interest rates results in a depreciation in the value of the original investment, and a decrease in market interest rates results in an appreciation in the value of the original investment.

2. Total return includes both of the above components. If the second component is negative, and its magnitude exceeds the periodic coupon income, the total return can turn negative, thus resulting in a decrease in the overall value of the investment. While longer maturity bonds typically carry a higher interest rate and thus generate higher coupon income compared to shorter maturity bonds, they are also more susceptible to price changes as a result of a change in interest rates.¹⁸ Thus, the choice of the optimal portfolio duration involves a trade-off between the higher interest income that can generally be expected on longer duration portfolios on the one hand and their increased propensity to suffer price changes on the other. Other things being equal, conservative portfolios with limited tolerance for negative returns need to have shorter durations; and the lower the level of interest rates, the shorter will the portfolio duration have to be in order to preclude losses. Also, given the increased susceptibility of long duration portfolios to price losses in the event of interest rate increases, investment managers prefer to avoid longer durations when the outlook is for interest rates to increase.

3. While lengthening portfolio duration is one means (often the most straightforward means) of seeking higher returns on a fixed income portfolio, it is also possible to enhance the expected returns in exchange for potential added volatility by considering investments in a broader array of instruments such as mortgage-backed securities (MBS), asset-backed securities (ABS) or corporate bonds. Indeed, this latter approach of expanding the range of investments is often preferable to merely lengthening portfolio duration, as a diversification strategy. Investments in MBS, ABS and corporate bonds enable the investor to be compensated at a higher interest rate than comparable maturity Treasury securities (the excess is referred to as the 'spread' over Treasuries), although they carry greater attendant risks. MBS investments entail 'pre-payment' risks, which is the risk that a security can be pre-paid in part or full in advance of its stated maturity, and ABS securities and corporate bonds carry the possibility of loss of some or all of the

¹⁸ As mentioned in Footnote 1, the sensitivity of the price of a bond or a bond portfolio to changes in interest rates is measured by its 'duration'. Other things being equal, duration is roughly proportional to the average maturity of a bond or a bond portfolio.

principal were the credit standing of the bond issuer to deteriorate. Annex 1 contains a brief description of the market for MBS and ABS securities.

Annex 1
Page 2 of 2

4. Simply stated, investments in non-government securities entail a third component of return over and above those related to coupon income and price changes induced by changes in interest rates. Price changes in non-government securities can also be induced by a change in their spread levels to comparable maturity Treasuries. Such spread changes can result from changes in market perception about the credit quality of the underlying issuer or on account of idiosyncratic factors specific to the particular sector such as changes in pre-payment characteristics in the case of MBS. Conservative portfolios typically confine their investments in non-government securities to the higher end of the credit spectrum, i.e., to bonds that are rated to be investment-grade and do not consider investments in lesser rated speculative-grade securities such as high yield, junk or emerging-market bonds.¹⁹ Annex 2 provides an overview of the historical performance of fixed income portfolios. The following table summarizes the key determinants of fixed income portfolios:

Determinants of Fixed Income Portfolio Performance

1. Level of interest rates;
 - Higher interest rates generally translate to higher returns, and vice versa.
1. Change in interest rates;
 - Increase in rates leads to loss in the value of principal, and vice versa.
2. Longer maturity bonds often carry higher interest rates, but are also more vulnerable to changes in rates;
 - Choice of optimal maturity or duration involves trade-off.
3. Credit quality;
 - Decline in credit quality of issuer or credit losses can impact portfolio performance adversely.

¹⁹ Bonds are assigned credit ratings by rating agencies such as Standard & Poor's (S&P). Under S&P's methodology, bond credit ratings range from AAA at the higher end of the scale down to C at the lower end – AAA-rated bonds represent the best credit while C-rated bonds represent obligations that are close to bankruptcy. In industry parlance, bonds with AAA, AA, A or BBB ratings are referred to as investment-grade bonds, while those rated below BBB are referred to as speculative grade (or high yield, or junk) bonds.

Mortgage-Backed Securities (MBS) and Asset-Backed Securities (ABS)

1. MBS are bonds or notes backed by mortgages of a home or other real estate. The majority of MBS are issues and/or guaranteed by an agency of US government (Government National Mortgage Association) or by government sponsored enterprises, or GSE (Federal National Mortgage Association and Federal Home Loan Mortgage Corporation). Issuers of MBS are very selective in choosing the mortgages that make up their pools. US government guaranteed MBS are backed in full faith and credit of the US government, while GSEs have a line of credit with the US government. MBS offer higher yield than comparable US Treasuries due to the prepayment risk. All of US agencies MBS are AAA. More than \$1 trillion of MBS securities were issued in 2003. The daily trading volumes of MBS exceed that of the US Treasuries, so the asset classes provide comparable liquidity.

2. ABS are bonds or notes backed by financial assets such as receivables from credit cards, mortgage, auto and home-equity loans, etc. Since ABS are secured by collateral and undergo credit enhancement, the majority of ABS securities are AAA rated. Among AAA assets, ABS offer higher yields than comparable US Treasuries. Even though ABS are similar to corporate bonds, collateralization offers significant protection against downgrades, mergers, takeovers, restructuring, etc. Assets that back ABS represent many sectors of business activity, thus ABS as an asset class offer diversity of investment opportunities. ABS market is a mature market. The issuance of ABS has been growing continually since 1985 and reached \$580 billion in 2003.

Historical Performance of Fixed Income Portfolios

1. Figure A1a below shows the average, maximum and minimum total return of US Treasury bond portfolios with different durations over a 1-year horizon, based on observed history over the last 25 years. Figure A1b shows the average, maximum and minimum cumulative returns measured over a 3-year horizon for the same portfolios. The figures bear out the fact that duration is a key determinant of fixed-income portfolio returns, with longer duration portfolios netting higher returns compared to shorter duration portfolios over the long haul. The figures also confirm that portfolios with longer durations carry progressively larger risk, as measured by the observed volatility in returns as well as the minimum recorded returns. In particular, it can be seen that portfolios with duration longer than two years did not satisfy the capital preservation constraint over a one-year time frame.

Figures A1a and A1b -

Historical Return Distribution of Bond Portfolios with Different Durations (1977-2004)

Figure A1a: 1-year horizon

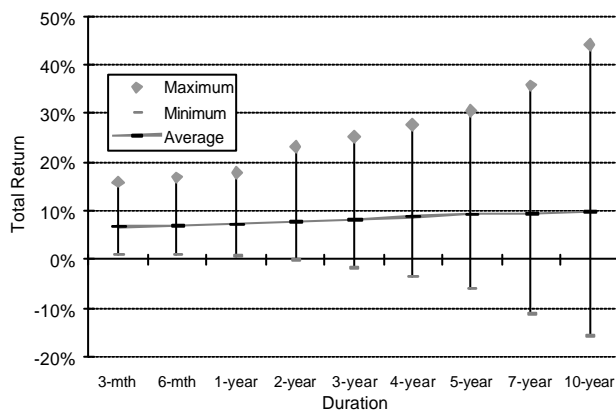
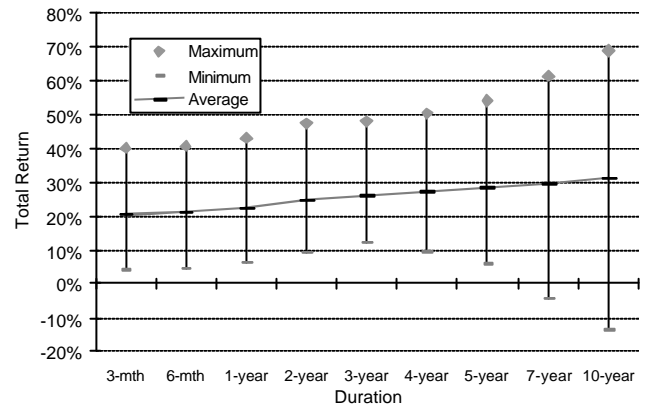


Figure A1b: 3-year horizon



Source: Merrill Lynch Treasury indices

Beyond the Scope of Capital Preservation

A. Global Fund, an Endowment?

1. Endowment funds are typically established to provide ongoing financial support to non-profit organizations such as universities, colleges, hospitals and charitable foundations towards the accomplishment of designated institutional objectives over an extended, often indefinite, time period. The core or the corpus of an endowment is typically funded by private donations, and represents permanently held capital that is generally managed with the following twin investment objectives in mind: *to maintain inviolate the (real or inflation-adjusted) value of the corpus through time, while at the same time generating sufficient year-to-year investment income to provide a pre-specified level of ongoing support.* Simply stated, the core itself cannot be expended away – its real value has to be preserved or grown over time; the periodic investment returns can be expended according to pre-specified spending rules. Typical spending rules provide for between 3% to 5% of the fund's market value (or average market value over the previous three to five years) to be withdrawn and spent in any given year. Thus, the size of the corpus is generally large in relation to the annual withdrawals or disbursements, and can range anywhere between 20 to 40 times this figure.

2. The long investment horizon, the limited need for immediate liquidity and the requirement to generate average annual investment returns of 5% or more over inflation, often translates to an aggressive strategic asset allocation. It is common for endowment funds to have substantial allocations to the riskier asset classes – going beyond fixed-income and public equities to so-called absolute return oriented products such as hedge funds, commodities etc., and less liquid asset classes such as private equity, venture capital and real estate.

3. It appears that the Global Fund is not an endowment by design, its absolute size and perceptions to the contrary notwithstanding. The Global Fund has not been set up with a large pre-funded corpus with the express objective of funding ongoing programs over a long or indefinite horizon. Rather, the annual donor pledges are fully committed and expected to be drawn down over an ensuing two to three year period. It is possible that if the donor contributions were able to be sustained at a significantly higher pace than that required to meet on-going program needs, or if the time lags between receipt of donor contributions and disbursements were to progressively expand, the liquidity balances could continue to grow and the fund may begin to acquire the look and feel of a make-believe endowment. If so, it is possible that at some time in the future, the fund may be able to re-evaluate its investment horizon, objectives and the desirability of looking beyond the mainstream or public asset classes.

4. In other words, even though the Global Fund cannot be regarded as a classic endowment type of fund, setting a long term real capital preservation or capital growth objective could be reasonable at some point in the future, if the following conditions hold:

- The portfolio is assumed to remain stable or increasing during the extended future. In other words, disbursements are not likely to erode the balance of the portfolio;
- The future cash flows (both inflows and outflows) are assumed to be relatively stable over an extended time horizon;
- The future cash flows are predictable with a high degree of certainty.

B. Cash Flow Immunization (Asset-Liability Management)

5. Capital preservation as a risk constraint reflects the investor's concern with respect to the value of assets. This does not take the liability stream (grant commitments) into account. The idea of the capital preservation principle is to preserve the value of the contributions, no matter what cash-flows can be expected for the future. If we have sufficient information about the structure of the liabilities (e.g. cash flow streams), the assets don't need to be decoupled from the liabilities, but instead, the investment portfolio can be managed in a close relation with the liabilities. There are different simple ways of implementing an asset-liability management (ALM) framework:

- Cash flow matching sets the investment portfolio such that the cash flow stream of assets will match the cash flow stream of the liabilities. This can be achieved, for example, by a laddered bond structure.
- Duration matching is a simpler and operationally more feasible way of matching assets to liabilities. The present value of the assets and the liabilities will react equally to the yield changes if the duration (or key rate durations) of the investment portfolio is mimicking the interest rate sensitivity of the liabilities.

6. The objective of the ALM is to prevent the value of the assets from a possible shortfall compared to the value of the liabilities. If the asset portfolio structure has no relation with the liabilities, the market value of investments can diverge from the liabilities, potentially resulting in a shortfall. In fact, the capital preservation concepts satisfy a similar objective: preserving the value of assets on a pre-specified time horizon, and in fact, independently from any characteristics of the liabilities. The advantage of the ALM is that the time horizon of the capital preservation is naturally defined by the structure of the liabilities. Instead of tailoring the portfolio to preserve its nominal value on an arbitrarily selected time horizon (e.g. 1 year), the portfolio can take advantage of a potentially longer, naturally defined investment horizon.

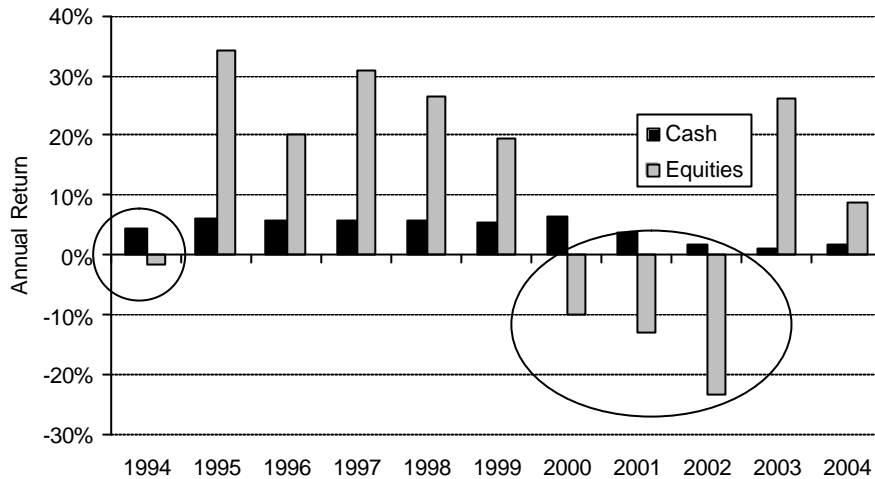
7. For example, the case of the Global Fund, the target duration of the asset portfolio would match the duration of the liability streams funded by the portfolio, potentially increasing the duration of the assets.

Structuring Portfolios with Risk Constraints Based on Capital Preservation

1. This Annex focuses on considerations that influence the choice of SAA and benchmark portfolio composition under a capital preservation constraint, which is a conservative way of expressing risk tolerance. The capital preservation constraint is usually expressed in the form of a shortfall probability: the investor tolerates only a very little chance, say, 1% probability of capital loss (i.e., negative total return) over the pre-specified investment horizon. Where does a negative total return – or capital loss – come from? Investment returns are made up of two components: (1) periodic income such as interest on bank deposits, dividends on stocks, etc., and (2) appreciation or depreciation of the investment value such as change in the price of a bond or stock. Total return includes both of the above. If the second component is negative, and its magnitude exceeds the periodic income, total return itself can turn into negative, thus resulting in a decrease of the overall value of the investment. Capital preservation as a risk constraint is conservative – it practically does not tolerate any loss of the initial principal on a pre-specified time horizon. (Later we will clarify that this measure is meaningful and conservative on a relatively shorter, say 1 or 3 years time horizon.)

2. This concept of capital preservation can be easily demonstrated with a simple example. Assuming that our investment horizon is 1 year, let us compare the yearly total returns of cash (1-month deposit) with equities (S&P 500 index) from the capital preservation point of view. Figure A2 shows the yearly total returns of the two selected assets. Cash returns are always positive, whereas the performance of the equities varies widely from one year to the other. While there are years when equities significantly outperformed the cash deposits (late 90ies and the past two years), there are other years (1994 and the first 3 consecutive years of the current decade) when investors of equities have suffered significant losses from one year to the other. In the case of a trust fund without significantly high excess reserve, such losses of principal could jeopardize, and thus adversely impact developmental programs and goals.

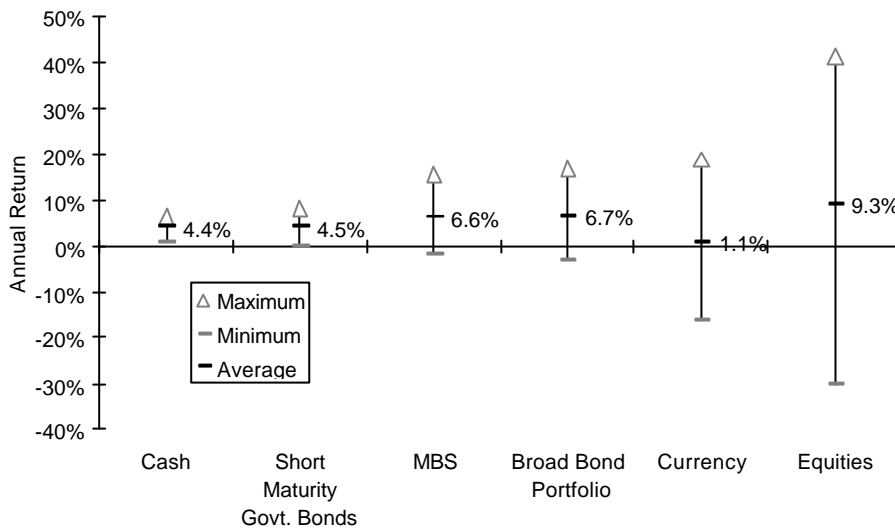
**Figure A2 - Annual Performance of Cash Deposit and Equities
1994-2004**



3. Figure A3 extends this illustration to further asset classes. We show the 10-year historical ranges (average, minimum and maximum) of the annual total return of U.S. dollar cash (1-month deposit), short term U.S. government bonds, U.S. mortgage backed securities (MBS), broad bond portfolio (containing the full range of U.S. investment grade securities: including governments, mortgages, asset backed securities and corporate bonds) as well as currencies and equities. As the graph shows, although there are several alternatives between the lowest volatility cash and the highest volatility equities, it is only the cash deposit and the short term government bond portfolio that truly satisfied the capital preservation criterion on a 1-year horizon. The MBS universe and the broad government index, however, happened to exhibit negative total return on a one year horizon. We note that the negative return of the investment grade bonds typically come from the negative market price changes due to increasing yields and spreads, and not from the credit default of the issuer. For example, while U.S. treasuries are really credit default free securities, long term treasury bonds can easily suffer negative annual total return in an increasing yield environment on a marked to market basis²⁰.

²⁰ Bonds with longer maturities are typically more sensitive to yield changes. The price sensitivity on yield (interest rate) changes is commonly called “duration”.

**Figure A3 - Annual Performance of Different Asset Classes
1994-2004**



4. In the next section we discuss, how the probability of negative return (the risk measure associated with the capital preservation objective) varies along different time horizons, and what are the implications on the optimal asset allocations.

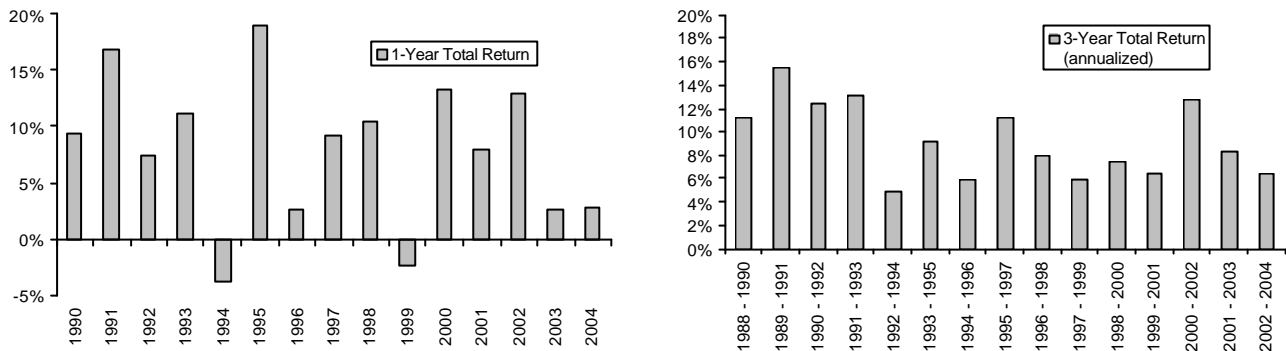
Probability of Negative Return – the Impact of Time Horizon

5. If an investor has a capital preservation objective on a relatively short, say, 1-year time horizon, we have already seen that the range of asset classes, that we can prudently consider is fairly limited. The eligible asset classes that satisfy the capital preservation constraint are typically the cash deposit, short term (low duration) treasuries and agencies. In an asset allocation context, however, we are interested in the risk of the overall portfolio, so even if some of the assets or asset classes may suffer negative return, as long as the overall portfolio return does not go below zero, their involvement in the asset allocation may be still prudent. In certain market environments a small portion of the portfolio may be allocated to MBS and ABS as well.

6. Figure A4 illustrates the annual, and the rolling 3-year performance of the 5-7 years U.S. Treasury bonds. As it is shown, these bonds failed to satisfy the capital preservation constraint on a 1-year horizon twice out of the 14 years. On the other hand, if we measure their total return on a 3-year horizon, we have not observed any capital loss over the past one and half decade. The performance of the 5-7 years treasuries measured on a longer time horizon may appear less risky. The main reason is that increasing yields – that causes the negative price return when the yield is hiking – will

later benefit the portfolio because of the higher reinvestment rate. Performance measured on a longer time horizon will thus not only reflect the shorter term price losses, but also the accumulated impact of the higher reinvestment rates.

Figure A4 - Total Return of 5-7 years US Treasuries on 1-year and 3-year Horizons



The message of this illustration is that a strategic asset allocation that is not acceptable on a short time horizon from the capital preservation aspect can be still acceptable on a longer time horizon. To reiterate the example: a 5-7 years bond index would have failed as a strategic benchmark for a portfolio with capital preservation constraint on a 1-year horizon, but it would have been fully compliant with the same risk constraint on a 3-year horizon.

7. We can conclude that the capital preservation constraint and the time horizon have a joint impact on the range of eligible asset classes. As we discussed before, we could only recommend cash deposit and short term bonds for a portfolio with 1-year time horizon. More aggressive asset allocation can be accepted on a 3-year horizon, including longer term bonds and wider use of credit risk bearing assets, such as MBS or ABS in the strategic benchmark. We said “more aggressive”, because such asset allocations would expectedly exhibit higher volatility compared to the benchmarks assigned to the 1-year horizon, and they would potentially breach the no-negative return constraint on shorter time horizon, such as 1 year. But they would be prudent on the relevant 3-year time horizon. We note that equities would have breached the capital preservation constraint even on a 3-year horizon – remember the consecutively negative performance shown in Figure A2 for years 2000 through 2002.

Probability of Negative Real Return

8. While capital preservation constraint may be an intuitive way of expressing the risk tolerance on a shorter time horizon, it has certain limitations over a longer time horizon. The probability of negative return certainly focuses on the downside risk, but does not tell anything, for example, about the fluctuations of the annual returns. Furthermore, the zero percent absolute return as a threshold for the shortfall probability measure may not be adequate on the long run. More informative thresholds can be set by saying that we want to minimize the probability of not achieving our spending goal. Alternatively, we can keep the concept of capital preservation, but instead of considering the capital in absolute terms, it may be more meaningful to address capital preservation in real terms, i.e. requiring a minimum compensation against inflation. Depending on our risk and return objectives and time horizon, we can select benchmarks that are riskier in the short run, but better serve our objectives and risk tolerance in the long run, compared to some of the apparently safer benchmarks of short time horizon portfolios.

9. To illustrate this comment, let's compare the cash deposit with the Treasury Inflation Indexed Securities (TIPS)²¹. The TIPS index has a relatively long duration and thus higher volatility than cash. On a 1-year horizon, the TIPS sector would not meet the absolute capital preservation criterion – see Figure A5a. On a 3-year horizon, however, if our objective is the capital preservation in *real* terms, cash deposit may fail in certain periods. Although the cash deposit does not have a negative absolute return at any time, it may underperform inflation, thus not preserving the capital in real terms – just like over the past three years, see; Figure A5b.

Figure A5a.

Annual Abs. Return of 1-mth Depo and TIPS

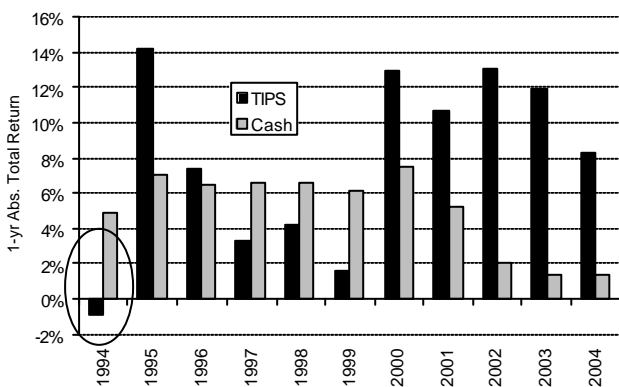
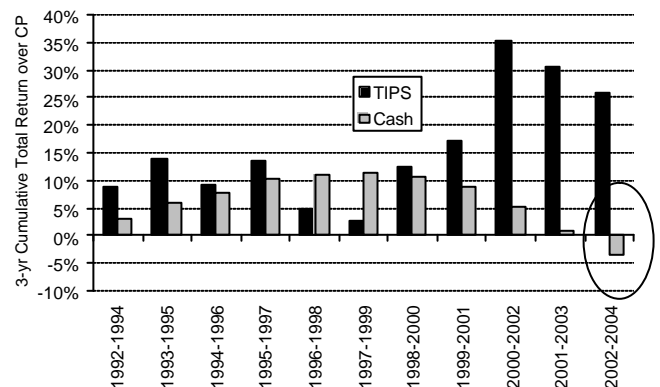


Figure A5b.

3-year Real Return of 1-mth Depo and TIPS



²¹ U.S. Treasury has been issuing inflation linked bond since 1997. We use model based TIPS return for the periods preceding 1997, estimated by Bridgewater.