

INTERNATIONAL MONETARY FUND

**Establishment and Operation of the Investment Account**

Prepared by the Finance Department  
(In consultation with other departments)

Approved by Michael G. Kuhn

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## EXECUTIVE SUMMARY

**Directors expressed strong support for exploring in more detail the possibility of establishing the Investment Account (IA) during the March 2005 seminar on the Review of the Fund's Finances and Financial Structure.** The Second Amendment of the Fund's Articles of Agreement which became effective in 1978 authorized the Fund to establish an IA in the General Department. That authority has yet to be exercised.

**Incremental income could be generated by investing the Fund's reserves.** The opportunity cost of the resources that could be invested is equal to the SDR interest rate, since these balances are currently used to lower the Fund's remunerated positions. The impetus for seeking to establish the IA at this time stems in part from the accumulation of sizeable Special and General Reserves—totaling SDR 5.7 billion—whose investment could generate additional income for the Fund.

**The investment objective of the IA would be to exceed the return on the SDR interest rate over time while minimizing the frequency and extent of negative returns and underperformance over a 12-month investment horizon.** The assets of the IA would be invested in a portfolio that would include the domestic government bonds of the euro area, Japan, the United Kingdom, and the United States, as well as the bonds and other marketable obligations of eligible national and international financial organizations, and deposits with the Bank for International Settlements (BIS).

**The IA portfolio would be managed against a 1–5 year bond benchmark weighted to reflect the currency weights of the SDR basket.** Our analysis of the historical returns of bond portfolios of various maturities suggests that a 1–5 year bond benchmark has risk and return characteristics in line with the IA's investment objectives. This benchmark has generated a higher return than the SDR interest rate under most market conditions, while offering higher risk-adjusted returns than the alternative benchmarks considered. The investment policy planned for the IA is similar to that pursued by a number of central banks and other reserve managers.

**The proposed investment strategy for the IA is also similar to that already in place for the investment of SDA, PRGF, and PRGF-HIPC resources.** Prior to April 2000, the assets of the SDA and the PRGF and PRGF-HIPC Trusts had been invested in six-month SDR-denominated deposits with the BIS. Since the adoption of a new investment strategy in April 2000 through end-June 2005, the return on the SDA, PRGF and PRGF-HIPC assets has added an annual average of about 81 basis points, net of fees, over and above what would have been achieved if the assets had remained invested in six-month SDR-denominated deposits with the BIS. It is hoped that the IA would be able to earn a similar level of excess returns over time.

**The IA will build on the existing organizational structure for the SDA, PRGF, and PRGF-HIPC resources, thus limiting the budgetary impact of its activation.** It is

anticipated that 1½ additional staff positions in FIN would be required to handle the increased investment volume and the associated reporting requirements.

Based on the views expressed by Executive Directors on the general modalities for the IA and their risk-return preference, staff will prepare a paper covering implementation issues, including proposed decisions. Issues for consideration are presented in Section VII.

## I. INTRODUCTION

1. **During the March 2005 seminar on the Review of the Fund's Finances and Financial Structure, Directors discussed a range of issues relevant to the Fund's finances.** Specifically, with the aim of broadening the Fund's income base, Directors expressed strong support for exploring in more detail the possibility of establishing an investment account, into which currencies held in the GRA could be transferred for immediate investment. Many Directors also noted the need to adopt a prudent investment approach based on carefully developed risk guidelines.

2. **Consideration of the establishment of the IA is taking place in the broader context of the Review of the Fund's Finances.** The financial benefits of starting the IA's operations stand on their own, although the IA has interlinkages with a number of other financial policy issues, such as financial risk assessments, the overall structure of charges and the financing of Fund operations. This paper discusses issues regarding the operation of the IA, but no decisions for its activation are proposed. Following discussion of this paper, a paper containing operational decisions could be presented to the Executive Board. The Executive Board will have an opportunity to discuss the adequacy of precautionary balances, in connection with an assessment of the financial risk, shortly after the Annual Meetings. On charges and maturities, in follow-up to the Board discussion in June, staff will build on existing work by exploring further the options for aligning surcharges on a level- and/or time-based system and will return to the Board with a staff paper in due course.

3. **This paper is structured as follows.** The paper reviews the IA's precursors and the rationale for its authorization at the time of the Second Amendment of the Fund's Articles of Agreement (Section II), identifies the key decisions and actions needed to establish and fund the IA (Section III), specifies the investment authority and the range of eligible securities and investment strategies of the IA (Section IV), explains the rationale for the investment strategy and guidelines planned for the IA (Section V), and considers how the assets and earnings of the IA may be applied (Section VI). The next steps in activating the IA and issues for consideration by Executive Directors are set out in Section VII. How the operation of the IA would affect the Fund's income and financial statements is considered in Annex I. An analysis of the risk and return characteristics of alternative investment strategies is provided in Annex II.

## II. THE INVESTMENT ACCOUNT'S PRECURSORS AND RATIONALE

4. **The Fund has undertaken investments to broaden its sources of income in the past.** These investments were made before the authorization to establish an IA was included in the Articles of Agreement. In 1956, the Fund initiated an investment program under which gold was sold to the United States for the purpose of investing the proceeds in U.S. treasury bills (Box 1). These investments were made to offset the deficit that had accumulated as income regularly fell short of expenditure in the early years of the Fund's operations. The investments were continued after the deficit had been cleared and were accumulated in a Special Reserve. Further administrative deficits were to be written off first against this

Special Reserve. The investment program in U.S. treasury securities of various maturities was continued through 1972, but terminated in 1972 on concern that a change in the par value system that pegged the price of gold in dollars would expose the Fund's investments to exchange risk.

5. **The Second Amendment of the Fund's Articles of Agreement authorized the Fund to establish an IA to broaden the sources of Fund income and protect its capital.**<sup>1</sup> The experience of previous administrative deficits helped motivate the amendment to authorize the establishment of an IA. This experience highlighted the desirability of accumulating reserves to strengthen the Fund's ability to absorb net income shortfalls and other contingencies, and of diversifying the Fund's sources of income.

### III. ESTABLISHMENT AND ACTIVATION OF THE INVESTMENT ACCOUNT

6. **The reasons for authorizing the establishment of the IA at the time of the Second Amendment—the desirability of increasing the Fund's resilience and expanding its sources of income—remain salient.**<sup>2</sup> A number of steps are required to establish and make the IA operational (Table 1).

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<sup>1</sup> Article XII, Section 6(f). See also "Proposed Second Amendment to the Articles of Agreement of the International Monetary Fund, *A Report by the Executive Directors to the Board of Governors*," pp. 56–59.

<sup>2</sup> The Executive Board last considered the establishment of an Investment Account in the context of the 1994 review of Fund finances. At that time, reserves were relatively small (SDR 1.7 billion) and the potential benefit of investing those reserves was deemed to be limited.

### **Box 1. Precursors to the Investment Account**

In the early years of the Fund, its expenditures frequently exceeded income, leading to a mounting administrative deficit. The accumulated net deficit was deducted from member quotas, and thus represented an impairment of the Fund's capital.

The possibility of mobilizing part of the Fund's gold holdings for investments as a means of addressing recurrent administrative deficits was considered as early as 1946. Although the Fund was judged to have an implicit authority to undertake such investments under appropriate safeguards as a means of covering administrative deficits, the investment program was not initiated until 1956.

In January 1956, the Fund initiated an investment program to broaden the sources of its income and close the accumulated administrative deficit that had by then reached about US\$14 million. To that end, the Fund sold gold with a value of US\$200 million to the United States for dollars and for the purpose of investing the proceeds in U.S. treasury bills with a maturity not to exceed 93 days.

The Fund retained the right to reverse the transaction with the United States and repurchase the gold at the same official gold price at which it had been sold, thus eliminating any exchange risk. In order to avoid having the transaction affect the Fund's holdings of U.S. currency, the dollar proceeds of the sale of gold before investment in U.S. treasury bills, the U.S. treasury bills purchased, and the proceeds from the sale or maturity of the U.S. treasury bills before the repurchase of gold by the Fund were all treated as representing gold, not holdings of U.S. currency. The income of the investment was not treated as representing gold, however. This income was used to close the accumulated administrative deficit.

The investment program succeeded in clearing the accumulated administrative deficit by November 1957. It was then decided that it would be prudent to continue the investment program in order to build a special reserve to address future administrative deficits. The investment program was increased by US\$300 million in 1959, and by another US\$300 million in 1960.<sup>1</sup> The maturity of eligible securities was also extended from three months to up to one year to increase yields. The increased level of investment was considered prudent given the potential for wide swings in the Fund's income which made it desirable to build up a special reserve to address future administrative deficits. It was decided that the special reserve should be increased by US\$10–15 million each year to reach an eventual target of some US\$100–200 million. In this way the general reserve, which was being accumulated to address unexpected contingencies, would not have to be used to cover administrative deficits.

Concern that the official price of gold might increase began to mount in 1968. The growing risk that such an increase would expose the Fund to an exchange loss on its investments led to a phasing out of the investment program. The amount of investment was halved in September 1970 to US\$400 million, and the investment program was terminated in February 1972. By end-April 1972, the special reserve totaled some US\$411 million generated by the investment program.

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<sup>1</sup> Administrative expenditures in FY 1959 and FY 1960 were US\$6.7 million and US\$7.3 million, respectively.

Table 1. Steps to Activate the Investment Account

Decisions	Required Majority/Action
1. Establish the Investment Account (IA)	Majority of votes cast
2. Fund IA from: <ul style="list-style-type: none"> <li>• profits from gold sales</li> <li>• transfer of currencies in the GRA</li> </ul>	85 percent majority of total voting power 70 percent majority of total voting power
3. Transfer currencies from GRA	Provision for transfer to be included in Financial Transactions Plan
4. Use of member's currency to make investments	Consultation with member
5. Adoption of IA rules and regulations	70 percent majority of total voting power

### Key decisions to establish and activate the Investment Account

7. **The decision to establish the IA may be taken by a majority of the votes cast.** The funding of the IA may be derived from two main sources: the transfer of currencies from the GRA, or transfer of profits from the sale of gold held by the Fund on the date of the Second Amendment. The maximum amount that may be transferred from these sources to the IA is limited to the level of General and Special Reserves held in the GRA. The IA would initially be funded through transfers of currencies from the GRA. Such transfers would require a decision adopted by a 70 percent majority of the total voting power. Funding through the transfer of profits from gold sales would require a decision taken by an 85 percent majority of the total voting power. The IA may retain income generated from its investment activities without limit. This income as well as the proceeds of securities sold and of maturing securities may be reinvested by the IA.

### Funding the Investment Account

8. **The IA would be funded through the transfer of currencies from the GRA.** As discussed in greater detail in Section V, the funding of the IA would be phased over time to avoid concentrating its initial investments at a particular level of yields. The transfer of currencies from the GRA would not change the Fund's total assets and liabilities or the level and composition of its reserves. However, the transfer would change the composition of the Fund's currency holdings in the GRA. On the asset side, the Fund's holdings of some members' currencies in the GRA would be reduced while currencies held in the IA would be increased. On the resource side, reserve tranche positions of some members would increase and the Fund's usable currency resources would decline by the amount transferred to the IA (Annex I).



9. **The transfer of currencies from the GRA would be undertaken through the Financial Transactions Plan (FTP) in accordance with existing procedures and principles.** The funding of the IA would increase the reserve tranche positions of creditor members, who would acquire a liquid claim on the Fund in exchange for the investment of the Fund's holdings of their usable currencies. These reserve tranche positions would be remunerated at the SDR interest rate.

10. **It would be necessary to secure the concurrence of members whose currencies are used to make investments.** In order to minimize currency risk, such transfers would be in the currencies included in the SDR basket (see Section V below). Thus, the concurrence of the countries in the euro area, Japan, the United Kingdom, and the United States would be needed.

#### IV. INVESTMENT AUTHORITY AND RANGE OF ELIGIBLE INVESTMENTS

11. **The investment authority of the IA is specified in Article XII, Section 6(f)(iii) of the Fund's Articles of Agreement:**

*The Fund may invest a member's currency held in the Investment Account in marketable obligations of that member or in marketable obligations of international financial organizations. No investment shall be made without the concurrence of the member whose currency is used to make the investment. The Fund shall invest only in obligations denominated in special drawing rights or in the currency used for investment.*

12. **The investment authority is quite restrictive and identical to the provisions of the Articles that address the investment authority for SDA resources.** Decisions and interpretations that have been taken with respect to the investment of SDA resources are thus relevant in the IA context. As noted in the Commentary to the Second Amendment, eligible IA investments include income-producing and marketable obligations of the members whose currencies are used for the investment (including the obligations of their central banks and official agencies) denominated in its currency or SDRs. Eligible IA investments also include income-producing and marketable obligations of international financial organizations such as the World Bank, the European Investment Bank, regional development banks, and the Bank for International Settlements denominated in the currency used for investment or in SDRs.

13. **The investment authority poses practical problems and limits the scope to add value.** The range of ineligible securities encompasses many that are commonly included in the investment portfolios of central banks and other reserve asset managers. For example, derivative securities and most credit spread products such as most U.S. agency securities, corporate bonds, and swaps would not be eligible investments for the IA, as the issuers of such instruments do not qualify. As discussed in greater detail below, credit instruments that are obligations of eligible issuers, such as the medium-term instruments of the BIS, represent one of the few ways in which the IA would be able to try to add value by taking credit exposure.

14. **The legal authority does not impose any limit on the currencies in which eligible securities may be denominated** (other than being denominated in the currency used for investment or in SDRs). However, in order to minimize exchange rate risk, the benchmark planned for the IA portfolio would be based on the SDR. The IA would be invested in securities denominated in SDRs or in the constituent currencies of the SDR with the latter weighted to reflect the share of each currency in the SDR basket.

15. **There is some merit, however, in considering whether in future currencies other than those included in the SDR basket could be included in the IA's portfolio.** Doing so would broaden the range of eligible investments and, in particular, create the possibility to capture the higher credit spread that may be available on such securities. However, such investments would need to be strictly limited as they would entail an unhedged currency exposure. In addition, in order to avoid any potential conflict of interest or appearance of impropriety, decisions on such investments would need to be delegated to external investment managers operating within agreed guidelines clearly removing Fund staff from decisions to buy and sell particular securities denominated in currencies not included in the SDR basket.

16. **Despite the restrictive investment authority, the Fund's experience of investing SDA, PRGF and PRGF-HIPC resources and past bond market performance suggest that a judicious extension of duration from the SDR interest rate has the potential to add value, albeit at the cost of a higher level of return volatility.**

## V. INVESTMENT STRATEGIES AND IMPLEMENTATION

17. **There are a number of parallels between the IA and the assets of the SDA and the PRGF and PRGF-HIPC Trusts, which currently total SDR 9.6 billion.**

- The IA and the SDA have identical investment authorities.
- Both sets of portfolios would have similar investment objectives. While the investment strategy for SDA and PRGF and PRGF-HIPC assets aims at exceeding the six-month SDR interest rate in most market conditions,<sup>3</sup> the strategy envisaged for the IA would aim at exceeding the (three-month) SDR interest rate.
- Given the similar investment authorities and objectives, the range of securities included in the IA portfolio would be similar to those in which the assets of the SDA, the PRGF, and PRGF-HIPC assets have been invested.

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<sup>3</sup> Under the initial investment approach, these assets were invested in six-month SDR-denominated deposits with the BIS. Thus, to add value over the initial investment approach, the return on SDA, PRGF and PRGF-HIPC assets must exceed the six-month SDR interest rate. The six-month SDR interest rate is also the rate paid to providers of loan resources for the PRGF.

- The approach to controlling currency risk would also be similar in each case.
- Finally, the same administrative arrangements adopted for the investment of SDA, PRGF, and PRGF-HIPC assets would be followed in the case of the IA.

18. **The assets of the SDA and the PRGF and PRGF-HIPC Trusts had been invested in six-month SDR-denominated deposits with the BIS prior to April 2000.** In April 2000, these assets were shifted to a portfolio that consisted mainly of government bonds with an average maturity of about two years denominated in the constituent currencies of the SDR with each currency in the bond portfolio weighted to reflect the currency weights of the SDR basket. This average maturity was maintained through January 2002 when maturities were shortened in response to the increased risk of loss on the bond portfolio resulting from the low interest rate environment. The risk of loss has since declined, and the timing of an eventual extension of maturities is being considered, and would coincide with the investment of IA assets. Since its inception in April 2000 through end-June 2005, the investment strategy for the SDA, PRGF and PRGF-HIPC assets has added an annual average of about 81 basis points net of fees over and above what would have been achieved if the assets had remained invested in six-month SDR-denominated deposits with the BIS.

#### **Investment objective and benchmark**

19. **The investment objective of the IA would be to exceed the return on the SDR interest rate over time while minimizing the frequency and extent of negative returns and underperformance over a 12-month investment horizon.**

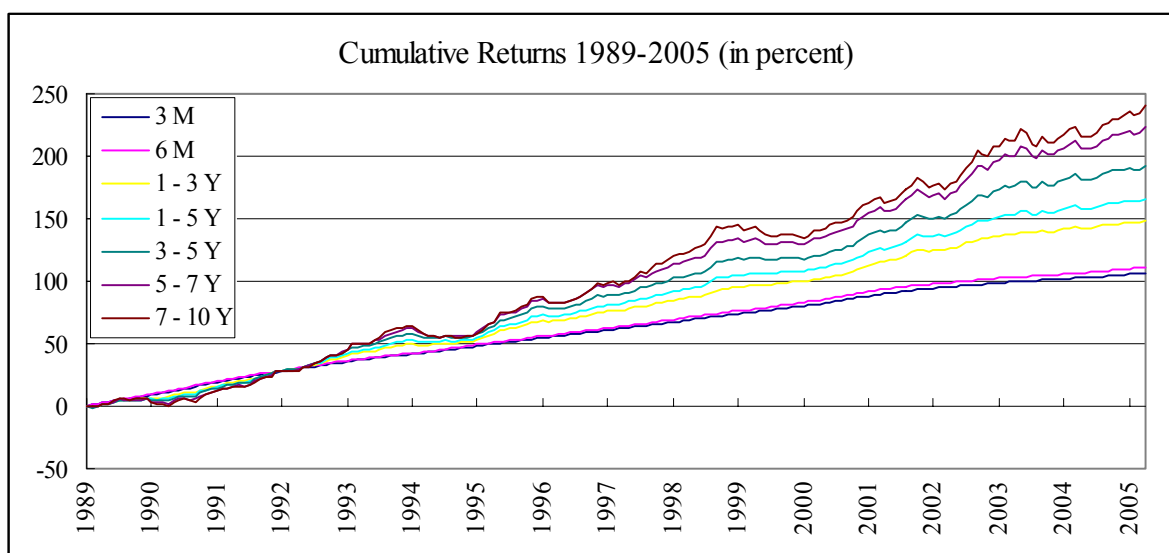
20. **There is no guarantee that this objective would always be met.** However, the investment strategy would seek to increase the likelihood of consistently generating incremental returns while minimizing the frequency and extent of performance shortfalls. The investment strategy planned for the IA is similar to that pursued by a number of central banks and other reserve managers. A similar strategy was also adopted for the management of the assets of the SDA, and the PRGF and PRGF-HIPC Trusts.

21. **The staff analyzed the historical returns of bond portfolios of various maturities to identify a benchmark with risk and return characteristics in line with the IA's investment objectives.** The details of this analysis are provided in Annex II. The analysis illustrates the range of past outcomes generated by different bond portfolios under a variety of market conditions. It also gives an indication of the likely prospective risk and return characteristics of bond portfolios of different maturities. Over time, bond portfolios with longer maturities have generated higher returns than those with shorter maturities, albeit at the cost of increasing return volatility (Figure 1).

22. **Of the benchmarks considered, the 1–5 year benchmark bond appears promising.** This benchmark bond index has in the past exhibited a risk and return profile

consistent with the IA's investment objective.<sup>4</sup> The interest rate sensitivity of the 1–5 year is somewhat higher than the 1–3 year benchmark index adopted for PRGF-HIPC assets at the time of the adoption of a new investment strategy for those assets in 2000.

Figure 1. Cumulative Bond Portfolio Returns and Probability of Monthly Returns, 1989–2005



23. **In the past, the 1–5 year index has generated a higher return than the SDR interest rate under most market conditions, while offering higher risk-adjusted returns than the alternative indices considered.** During the past period for which data are available, the 1–5 year index did not experience a negative return in any rolling 12-month period, although it has experienced negative returns in past quarterly and semiannual periods.

24. **Over a two-year investment horizon, the 1–5 year index has consistently performed better than the SDR interest rate.** However, its return did fall short of the SDR interest rate in about one fifth of the rolling 12-month periods over the last 16 years. Thus, while the index has a track record of adding value over time and in most 12-month horizons, some return variability should be anticipated. The variability of investment returns would increase that of the Fund's income and may require compensating action. It is expected,

<sup>4</sup> The 1–5 year benchmark index was constructed using the Merrill Lynch government bond indices for the euro, the yen, sterling, and the U.S. dollar weighted to reflect the weights of each currency in the SDR basket. The performance of this index during 1989–April 2005, the longest period for which data are available, was compared with the returns on similarly constructed indices with maturities of 1–3 years, 3–5 years, 5–7 years, and 7–10 years.

however, that such short-term fluctuations would be compensated by higher returns over time.

25. **The timing of the investment in line with the 1–5 year index would influence initial returns.** In order to avoid undue concentration of exposure to market interest rates prevailing at a particular point in time, it would be desirable to phase the initial investment over time. The current low absolute level of interest rates and the low spread between the three-month SDR interest rate and the yield on longer maturities suggests the need for caution in determining the timing of an extension of maturities, further reinforcing the merits of undertaking a phased approach. As already indicated, similar considerations would apply to the extension of the maturity of SDA and PRGF and PRGF-HIPC investments.

26. **The 1–5 year government bond benchmark index would be complemented by investments in medium-term instruments (MTIs) in a similar maturity range.** MTIs are based on the AA-rated swap yield curve and are issued and custodied by the BIS. They typically provide a higher initial yield than investments in comparable government bonds, but are subject to risk arising from a widening of the credit spreads. The share of MTIs in the total portfolio would be adjusted in response to changing market conditions. Given the restrictive investment authority for the IA, MTIs are one of the few means available to attempt to add value by capturing credit spreads. Investments in MTIs were made successfully in the case of the Fund's PRGF and PRGF-HIPC assets. Including MTIs in the IA's portfolio has the potential to increase its risk-adjusted returns and to provide a limited diversification benefit. The IA's portfolio would also include SDR-denominated deposits of various maturities with the BIS, although such deposits would in most cases be limited.

27. **In sum, the assets of the IA would be invested in a portfolio that includes the domestic government bonds of the euro area, Japan, the United Kingdom, and the United States, as well as the bonds of eligible national and international financial organizations, MTIs, and deposits with the BIS.** In addition, uninvested residual cash balances held by the bond managers would be swept by the custodian bank into short-term instruments that are consistent with the general investment authority to which the IA is subject. Under most conditions, these assets would be combined to provide a risk and return profile for the total portfolio similar to that of the 1–5 year benchmark index.

28. **Investment managers will be encouraged to attempt to outperform the 1–5 year benchmark index.** An investment benchmark provides an independent rate of return against which the performance of investment managers is measured. A benchmark defines the neutral position around which asset managers are expected to structure their portfolios. It thus embodies the investment objectives, constraints, and risk tolerance of the investor. The managers of IA assets would be given the latitude to deviate from this neutral position within predefined limits when they perceive opportunities to add value. These active management decisions would mainly include adjustments to the benchmark duration. Managers will be encouraged to adjust the duration of the portfolio around the benchmark index in response to changing market conditions.

29. **Deviations from the benchmark duration could also be initiated in response to market conditions.** In particular, such deviations would include the tactical shortening of the benchmark duration to preserve capital. Decisions on such tactical deviations from the investment benchmark would be based on an assessment of the probability of loss to the portfolio over a 12-month horizon, absolute yield levels and spreads, and yield volatility. As outlined above, such tactical changes have been applied to the assets of the SDA, and PRGF and PRGF-HIPC Trusts.

#### **Investment benchmarks of comparable institutions**

30. **The tripling of official reserve assets over the past fifteen years has contributed to a number of changes in reserve asset management practices.** With the rapid growth in reserves, there has been a tendency for reserve asset managers to increase the duration and broaden the range of assets included in their portfolios. Credit spread products represent an area of particular growth. Interest in credit spread products has been motivated as a source of diversification, and, in a low interest rate environment, a means to boost yields. There is also a view among asset managers that investments seeking to benefit from credit spreads are a more reliable source of adding value than those based on duration decisions.

31. **The IA's investment benchmark would fall well within the range of benchmarks adopted by central bank reserve managers (Box 2).** As in the case of the IA, most reserve managers favor the shorter end of the yield curve, although some reserve asset managers have adopted benchmarks with longer average durations. The range of assets included in central bank reserve portfolios is typically broader—encompassing credit spread products such as U.S. agency securities, asset-backed securities, corporate bonds, and in some cases equities—all of which are precluded by the IA's more restrictive investment authority. Many reserve asset managers use derivative securities to take or hedge positions.

## Box 2. Evolving Reserve Asset Management Practices

The investment strategies of reserve asset managers are influenced by a number of factors. Assets held in reserve for intervention are typically managed to ensure their liquidity and stability, while minimizing the cost of accumulating reserves.<sup>1</sup> However, beyond a certain threshold—which varies by the exchange rate regime, the openness of the capital account, the structure of a country’s foreign liabilities, and the variability of current and capital account flows—liquidity and stability become less paramount and risk-adjusted return predominates. As reserves increase beyond this threshold, the share of reserves that need to be held in a highly liquid form declines and the impact of the return on reserve assets on central bank profitability increases.<sup>2</sup>

In response to the rapid increase in reserves and the low interest rate environment, reserve asset managers have in recent years increased their exposure to duration, currency, and credit risk, broadened the range of securities eligible for investment, and expanded their use of external asset managers.

- Reserve asset managers continue to focus on the short end of the yield curve. Nevertheless, there has been a tendency to lengthen duration. Benchmark durations of 18–36 months are typical, although benchmarks continue to span a broad range from LIBOR-based to 1–10 year bond indices.
- Reserve asset managers have increased allocations to higher yielding currencies, even if these currencies do not form part of their benchmark. Part of this shift reflects a search for yield in a low interest rate environment, as well as the observation that some higher-yielding currencies have also appreciated in value in certain market conditions.
- Managers have expanded the range of eligible securities. A particular focus has been the increased use of credit spread products, including U.S. agency securities, mortgage-backed securities and other asset-backed securities, the spread products offered by the BIS, sovereign euro bonds, and the bonds of supranationals. A few central banks have recently included corporate bonds and equities in their asset mix. In addition, central banks have increased the use of derivative securities—forwards, futures, and swaps—to take and hedge investment positions.
- The use of external bond managers has also increased. External managers have been engaged primarily as central banks have expanded into new asset classes in which they lack investment experience. In some cases, outsourcing has been used to transfer technical capacity or to compete against internal managers.

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<sup>1</sup> Some reserve managers with these objectives and access to relatively low financing costs match their assets and liabilities and attempt to minimize the cost of holding reserves by capturing the credit spread between their cost of funds and investments.

<sup>2</sup> For an overview of sound practices in reserve management see International Monetary Fund, 2004, “*Guidelines for Foreign Exchange Reserve Management*.” (<http://www.imf.org/external/pubs/ft/ferm/guidelines/2004/index.htm>). A recent survey of reserve management practices is contained in Rigaudy, Jean-François, 2005, “Ten Years of Reserve Management,” *BIS Banking Papers*, Issue 14, (March). The regular surveys of central bank reserve management practices undertaken by the Union Bank of Switzerland represent another useful resource.

**32. The IA's investment benchmark also appears broadly consistent with the investment policies pursued by other international organizations.**

- **The BIS** has adopted a longer duration benchmark for its reserves (also denominated in SDRs) to capture the term premium of yield curves that are typically upward sloping. This benchmark, while likely to earn higher returns over time, is also subject to a greater risk of loss in the short- and medium-term than the benchmark selected for the IA. This risk of loss has prompted the BIS to consider tactical shortening of the benchmark in certain market conditions. The BIS manages portfolios for each of the constituent currencies of the SDR and rebalances these portfolios quarterly to limit currency exposure. Credit exposure encompasses investments in U.S. agencies, asset-backed securities, supranational bonds, and pfandbrief-type instruments (European mortgage-backed securities). Assets are subject to a minimum rating of AA, but EMU countries rated below this threshold are also eligible, within strict limits.
- **The World Bank** manages a number of bond portfolios for its own account and for others, including the Fund. While the duration of the benchmarks for these comparable portfolios is broadly in line with that selected for the IA, the Bank's portfolios include a much broader range of credit spread products, reflecting the less restrictive investment authority for the Bank's portfolios.

### **Implementation**

**33. The administrative arrangements for the investment activities of the IA would mirror those adopted for the investment of SDA, PRGF, and PRGF-HIPC resources.** External asset managers—including the BIS, the World Bank, and private managers—would be entrusted with buying and selling individual securities in accordance with the IA's investment guidelines and benchmark. The BIS would act as the custodian for the MTIs and deposits it provides. A private custodian bank would be charged with holding all other assets in safekeeping and providing consolidated reporting on the IA's assets.

**34. The external bond managers would be given the following mandate:**

- Assets are to be actively managed and invested in income-producing and marketable obligations of the members whose currencies are used for the investment, including their central banks and official agencies, or of international financial organizations. Assets are thus to be actively managed and invested in the domestic government bonds of the euro zone, Japan, the United Kingdom, and the United States, as well as bonds issued by eligible international financial organizations in SDRs or a currency included in the SDR basket. Active management is expected to outperform the benchmark index, while limiting downside risk.
- The portfolio benchmark is a customized index comprising the Merrill Lynch 1–5 year government bond indices for the euro area, Japan, the United Kingdom, and



the United States with each market weighted to reflect the currency composition of the SDR basket. Managers may invest in eligible securities across the maturity spectrum, so long as the sensitivity of the portfolio to interest rate changes remains in line with the benchmark index.

- Managers may operate with some latitude in a duration range of  $\pm 6$  months around the benchmark. Provided that the total portfolio's duration range and the prohibition on short positions (see below) are observed, there are no limits on the duration of the portfolio's currency components.
- Investments may be made only in cash securities; positions in derivative securities are not permitted. There may be no short selling or any form of leverage.
- Foreign exchange risk is to be controlled through regular portfolio rebalancing aimed at keeping the weight of the euro, yen, sterling, and the U.S. dollar in the portfolio in line with their respective weights in the SDR basket. No currency hedging using derivatives is permitted.

35. In addition to the government bond portfolios managed by the World Bank and private investment managers, the IA's assets would include MTIs and bank deposits with the BIS. Investments in these instruments would be made on behalf of the Fund by the BIS.

36. **The custody arrangements currently in place for PRGF and PRGF-HIPC assets would be used for IA assets.** Investments in MTIs and BIS bank deposits would be held in custody by the BIS. In the case of the IA's other investments—the portfolio of government bonds and the bonds of eligible national and international organizations—the current custodian for PRGF-HIPC assets would be retained. The custodian's chief responsibilities would include safekeeping assets, settling trades, capturing income, valuing assets, maintaining records, measuring performance, and monitoring compliance with established investment guidelines. It is also standard practice for the custodian bank to sweep idle cash balances into a short-term, income-generating fund whose investments are consistent with the investment authority to which the IA is subject. A small amount of residual cash balances would be so invested from time to time, a practice that has been followed in the case of PRGF and PRGF-HIPC investments.

### **Risk controls**

37. **The incremental return of the IA would be derived largely from extending maturities.** Interest rate risk will thus be the main risk to which the portfolio would be exposed. In addition, the portfolio would take limited credit risk exposure mainly through investments in MTIs.

38. **Interest rate risk—the risk of fluctuations in the portfolio's market value due to changes in market interest rates—would be controlled by the 1–5 year benchmark index.** As detailed in Annex II, this level of interest rate exposure has in the past provided an

efficient tradeoff between risk and return, and resulted in returns that exceeded that of the SDR interest rate in most market conditions.

39. **Limited currency risk would arise since the portfolio would include securities denominated in the constituent currencies of the SDR basket, rather than being limited to securities denominated in SDRs.** To control currency risk, the weight of each currency in the portfolio would be adjusted to reflect its weight in the SDR basket. However, since such instruments will change in value over time and generate cash flows, the weight of each currency in the portfolio will differ slightly from the weights in the SDR basket, generating some residual currency risk and necessitating regular rebalancing of the portfolio. The experience of investing PRGF-HIPC assets has shown that this residual currency risk can be kept low and that the amount of rebalancing needed to contain currency risk is manageable.

40. **Liquidity risk is judged to be small** given the low likelihood of an unanticipated call on the IA's assets and the inherently liquid nature of the planned investments, which would consist primarily of marketable short- and medium-term government securities.

41. **Credit risk is similarly limited** in a portfolio strategy that features BIS deposits, MTIs, the securities of highly rated international financial organizations, and the domestic government bonds of countries whose currencies are included in the SDR basket.

42. **Operational risk**, arising from errors or compliance failures, would be controlled by carefully structured due diligence reviews of external managers and custodians, the checks and balances provided by the reconciliation of portfolio valuation by managers and the custodian, and stringent performance measurement and reporting requirements.

#### **Incremental budgetary costs**

43. **The IA would utilize the existing investment structure already in place for the SDA, PRGF and PRGF-HIPC resources.** The Finance Department (FIN) would be responsible for the day-to-day administration of the IA's investment activities, including: maintaining the official records of the IA; ensuring that the IA's investment and other activities conform with the adopted rules and regulations; monitoring the structure and evaluating the performance of the total portfolio; hiring and firing external investment managers and assessing their performance; supervising custodial arrangements; evaluating the continued appropriateness of the investment policy and objectives and the portfolio benchmark; adjusting the allocation of the portfolio in response to market conditions and the Fund's financing needs; undertaking short-term deviations from the investment benchmark in light of changing market conditions; preparing quarterly reports to Management and semiannual reports to the Executive Board on investment performance, compliance, and on changes in institutional arrangements. The IA would be subject to audits by the Office of Internal Audit and by the Fund's external auditors.

44. **The incremental budgetary costs to the Fund would be small.** The required additional staff resources in FIN are estimated at about 1½ staff years, equivalent to about US\$300,000 at current standard costs for A9–A15 staff positions. The incremental costs

arising from external investment management and custodial fees would likely be no higher than the 7–9 basis point range incurred in the case of the assets of the SDA and PRGF and PRGF-HIPC Trusts. On investments of SDR 5.7 billion (US\$8.3 billion), these fees would amount to about SDR 5 million (US\$7.2 million) annually, and would be charged against investment income.

## VI. USE OF THE INVESTMENT ACCOUNT'S EARNINGS

45. **The transfer of currencies from the GRA for investment by the IA has no impact on the overall balance sheet of the General Department** (which includes the GRA, the SDA and IA, see Annex I). The Fund's total assets, liabilities, and resources of the combined General Department are unchanged. The transfer of currencies to the IA also has no impact on the level or composition of the Fund's reserves: the General and Special Reserves remain intact. However, rather than using the resources provided by the reserves to lower the balances that finance credit (reserve tranche positions), these balances would be invested.

46. **The transfer of currencies from the GRA to fund the IA would thus increase members' reserve tranche positions and the Fund's remuneration expense.** This increased cost would be offset to the extent that the IA's earnings net of asset management and custodian fees exceed the SDR interest rate.

47. In order to avoid reopening the decisions taken in April 2005 concerning burden-sharing and the rate of charge, any additional remuneration cost arising during FY 2006 from the funding of the IA could be offset by IA earnings. The activation of the IA once established would thus not affect either the net income target or the margin for the rate of charge in the current (FY 2006) fiscal year.

48. **The earnings generated by the Investment Account can be retained in the Account or used to meet the expenses of conducting the business of the Fund.** The issue of how and when to use the earnings and assets of the IA in subsequent years would need to be considered in the context of the ongoing broader review of the Fund's finances.

## VII. ISSUES FOR CONSIDERATION

49. The Executive Board's views are sought on the following issues:

- Do Executive Directors agree that the IA's investment objective should be to exceed the return on the SDR interest rate over time while minimizing the frequency and extent of negative returns and underperformance over a 12-month investment horizon?
- Do Executive Directors consider that the 1–5 year benchmark index appears to strike a balance between risk and return that is consistent with the IA's investment objectives, and would be an appropriate benchmark for the IA's assets?

- Do Executive Directors agree that the administrative arrangements currently in place for the investment of SDA, PRGF, and PRGF-HIPC resources should be used in the case of the IA?

50. In light of the Directors' views, the staff would develop a final set of investment guidelines, draw up rules and regulations for the IA, and establish an action plan for activating the IA. These proposals and the requisite decisions for activating and funding the IA would be presented to the Executive Board for adoption.

## **I. IMPACT OF INVESTMENT ACCOUNT FLOWS ON THE FUND'S INCOME AND FINANCIAL STATEMENTS**

### **Background**

**The Fund's General Department comprises three separate accounts: the General Resources Account (GRA), the Special Disbursement Account (SDA), and the Investment Account (IA).** All of the Fund's regular financial operations and transactions are conducted through the GRA. The SDA was established to hold net proceeds from sales of gold held by the Fund on the date of the Second Amendment, and currently holds the net proceeds from the 1999–2000 off-market gold transactions. The IA, which has not been activated, was designed with the potential to receive and hold Fund holdings of members' currencies, and to invest those holdings to help generate income.

### **Impact of the Investment Account on the Fund's balance sheet**

**The transfer of currencies from the GRA for investment by the IA has no impact on the overall balance sheet of the General Department** (which includes the GRA, the SDA and IA): the Fund's total assets, liabilities, and resources of the combined General Department are unchanged (Table 1). The transfer of currencies to the IA also has no impact on the level or composition of the Fund's Reserves; the General and Special Reserves remain intact. However, rather than using the resources provided by the Reserves to lower the balances that finance credit (reserve tranche positions), these balances would now be invested.

**The transfer of currencies to the IA changes the composition of the Fund's currency holdings** as follows: (i) on the asset side, in the GRA, member currencies (i.e., currency holdings) are reduced by the amount transferred, while in the IA currencies invested increase; (ii) on the resource side (quotas + reserves), reserve tranche positions increase and usable quota resources decrease by the amount transferred to the IA.

### **Impact of the Investment Account on the Fund's income statement**

**The transfer of currencies to the IA increases the level of reserve tranche positions in the GRA**, on which the Fund pays remuneration at the SDR interest rate. The impact on regular income in the GRA (i.e., the net income target used as the basis for setting the rate of charge) would be for an increase in expenses calculated as the amount transferred to the IA multiplied by the SDR interest rate for the period invested. For example, the hypothetical impact in FY 2006 of a transfer of SDR 5.7 billion in currencies to the IA on May 1, 2005 would increase remuneration expense by SDR 150 million at the current SDR interest rate of around 2.6 percent (Table 2).

**Overall, the income earned on investments held in the IA** would be expected to increase the General Department's income. The increase in income for the General Department is the amount of investment income earned. For example, a hypothetical return of around 3 percent

on the currencies invested in the IA on May 1, 2005 would generate income for the Fund of SDR 170 million.

**The net impact on the income of the General Department is the difference between the amount of investment income earned and the increase in the Fund's remuneration expense** (Table 2). Using the hypothetical scenarios outlined above, the increase in the Fund's net income would amount to SDR 20 million.

**There is also a secondary effect as a result of burden sharing.** Since burden sharing is levied on remunerated position, by a reduction of the rate of remuneration, creditor members could assume that they now will have to pay more, since remunerated reserve tranche positions are higher. This, however, is not the case, since creditor members as a group pay the same amount of burden in absolute amounts (i.e., half of deferred charges and half of the amount of gold mitigation). As a group, therefore, creditors would not pay more burden-sharing, but the adjustment in basis points would be smaller.

#### **Accounting for the disposition of investment income**

**Under the Articles, the Executive Board has discretion over the disposition of income in the IA.** Investment income may be (i) held in the IA, or (ii) used for meeting the expenses of conducting the business of the Fund (Art XII, Sec. 5(f)(iv)). In this regard, income is defined as investment income, but not income net of the cost of funds; i.e., using the hypothetical amounts that illustrated the income impact on the General Department, the income of the IA is SDR 170 million, and not the net incremental income of SDR 20 million. From the perspective of the General Department as a whole, the treatment of the disposition of investment income has no effect on the Fund's total net income. Income retained in the IA would be reflected on the balance sheet as retained earnings of the IA and could not be placed to the Fund's General or Special Reserves.

**Investment income made available to help meet the Fund's administrative expenses could either increase the amount of income available for placement to the Fund's Reserves, or be incorporated in the computation of the rate of charge.** Other things being equal, if all, or part, of the investment income were used to help offset the Fund's administrative expenses, then the amount of income that would otherwise be available for placement to the Fund's General or Special Reserves would increase by the amount of investment income used. For example, if all investment income were to be used to help meet the administrative expenses, then regular net income would increase by the net incremental income (SDR 20 million) arising from the IA. The amount placed to the Special Reserve, therefore, would then be equal to SDR 208 million, or the net income target of SDR 188 million plus the net incremental income of SDR 20 million. Alternatively, the SDR 20 million in incremental income could be incorporated in the computation of the rate of charge by reducing the net income target by an equivalent amount.

Table 1. Impact of Investment Account on the General Department Balance Sheet  
(SDR billions)

Assets	Balances at 4/30/05	Transfer of Currencies to IA	Resources and Liabilities	Balances at 4/30/05	Transfer of Currencies to IA
<b>General Resources Account</b>					
			<b>General Resources and Investment Account</b>		
Credit outstanding	49.9		Reserve tranche positions	49.9	+5.7
Usable currencies	122.4	-5.7	Usable quota payments	122.4	-5.7
Other currencies	41.2		Other quota payments	41.2	
Total currencies	213.5		Total quotas	213.5	
SDR holdings	0.6		Reserves	5.7	
Gold holdings	5.9		Special Contingent Account (SCA-1)	1.6	
Other	1.2		Other	0.4	
Currencies held in the Investment Account		+5.7			
Investments held in the Special Disbursement Account (SDA)	2.6		Accumulated resources of the SDA	2.6	
Total Assets	223.8	--	Total Resources and Liabilities	223.8	--

Table 2. Impact of Investment Account on the General Department Income Statement  
(SDR millions, projected)

	FY 2006 Income Projection (without IA)	Impact of IA <sup>1</sup>
Operational Income		
Interest and charges	1,558	
Interest on SDR holdings	22	
Other charges and income	23	
Total operational income	1,603	
Operational Expenses		
Remuneration	920	+150
Administrative expenses	495	
Total operational expenses	1,415	+150
Regular net income (the “net income target”)	188	-150
Other Income and Expenses		
Surcharges	402	
PRGF administrative expenses	56	
Net surcharge income	346	
Income of the Investment Account		+170
Other – IAS 19 expense	140	
Other net income	206	+170
Net income of the SDA	45	
Total income of the General Department	439	+20

<sup>1</sup>Assumes the transfer of SDR 5.7 billion in currencies to the Investment Account, an average SDR interest rate of 2.6 percent, and average return on investments of 3 percent.



## II. CONSIDERATION OF ALTERNATIVE INVESTMENT STRATEGIES

The investment objective of the Investment Account (IA) is to exceed the return of the SDR interest rate—the effective cost of the assets held in the IA—while minimizing the risk of loss and underperformance over a one-year horizon. Given the restrictive nature of the IA’s investment authority, the main tool to achieve this investment objective is the duration decision, although there is also some scope to invest in credit spread instruments.

This annex analyzes the past risk and return characteristics of SDR-denominated bond portfolios of various maturities to assess which maturity range offers the opportunity to earn more than the SDR interest rate in most market conditions.<sup>5</sup> The analysis includes a value at risk (VaR) assessment as well as stress tests considering past periods in which fixed income investments have performed poorly (Section A). The implications of the current level and volatility of yields for prospective returns are also considered to help gauge the range of outcomes that can be expected from alternative investment strategies (Section B). The diversification and yield benefits afforded by the medium-term instruments (MTIs) offered by the BIS are analyzed to judge the appropriate weight of such instruments in the portfolio (Section C). The main conclusions of the analysis and the investment strategy and performance benchmark selected for the IA are presented in Section D.

The analysis confirms the expectation that investing in bond portfolios with maturities above the (three-month) SDR interest rate has over most past periods generated higher returns. Among the range of portfolio maturities considered, the historical returns of the 1–5 year bond benchmark—with a duration of about 2½ years—appears to offer an attractive trade-off between risk and return. However, care should be taken when using past performance to form expectations for prospective returns. Current bond yields and bond volatility are more than one standard deviation below their respective long-term averages. A return to more normal levels of yields and volatility would detract from bond portfolio performance.

There have been periods in the past during which the 1–5 year benchmark has performed less well than SDR hurdle rate, including brief periods of negative returns. This annex highlights the frequency and magnitude of past underperformance. The risk of adverse performance over relatively short horizons is inherent to the attempt to boost returns over time. Carefully considering the extent and duration of these adverse outcomes should facilitate an assessment of the Fund’s risk tolerance, and contribute to reaching a judgment on the acceptable level of the variability of IA returns.

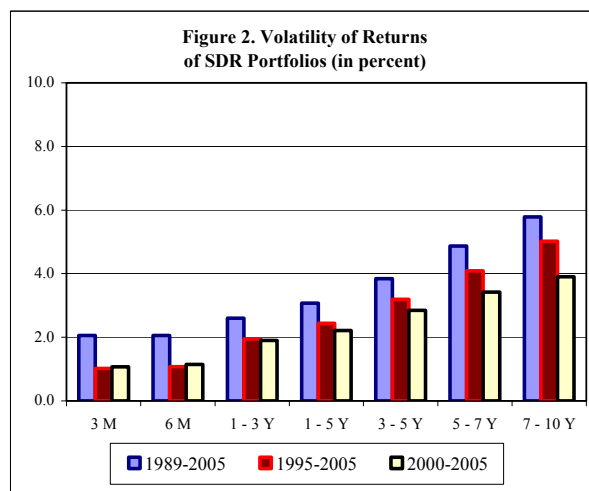
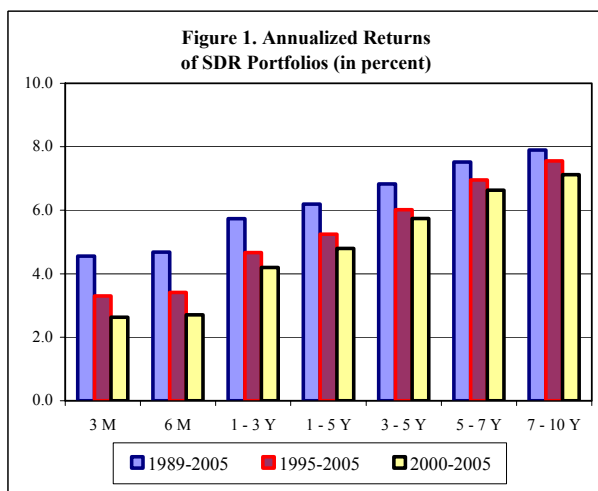
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<sup>5</sup> The total local currency return of Merrill Lynch government bond indices weighted to replicate the currency composition of the SDR basket were used to construct SDR benchmark indices with maturities of 1–3, 1–5, 3–5, 5–7, and 7–10 years.

## A. Historical Risk and Return Characteristics of SDR Bond Portfolios

### Absolute return and volatility

Extending the maturity of a bond portfolio has a tendency to increase its average annual return and broaden the dispersion of those returns. The increase in average return reflects the term premium typically imbedded in government yield curves, while the increased volatility associated with maturity extension reflects the relatively higher sensitivity of the price of longer duration bonds to changes in market interest rates. During the period 1989–2005, portfolios generated an average annualized return from 4.55 percent for the three-month portfolio to 7.90 percent for the 7–10 year portfolio (Figures 1 and 2).<sup>6</sup> Over the same period, the volatility of returns of the longest maturity portfolio was almost three times higher than that of the shortest portfolio (see Figure 2, and Appendix I, Figure 1).



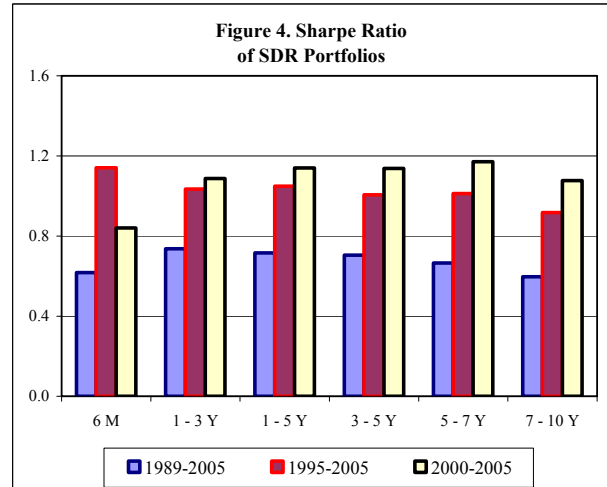
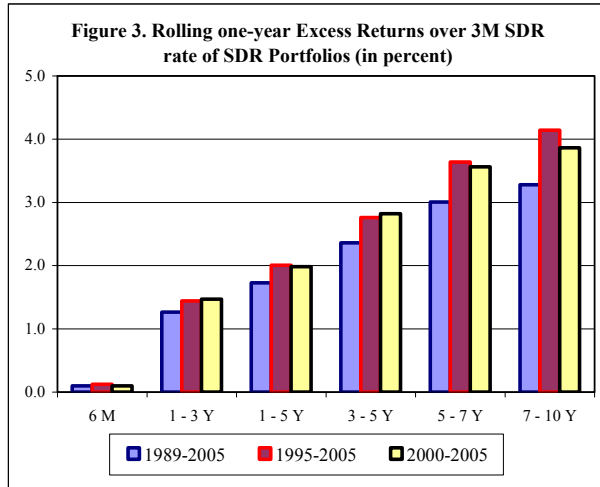
Sources: Merrill Lynch and IMF staff calculations

### Performance relative to the SDR interest rate

Longer maturity portfolios have performed better than the SDR interest rate, although the excess return for the six-month portfolio has been quite small. The average annual excess return increased with maturity, and ranged from 0.11 percent for the six-month portfolio to 3.30 percent for the 7–10 year portfolio during 1989–2005 (Figure 3). Adjusted for risk,

<sup>6</sup> Average rolling returns are used to increase the number of observable periods. The analysis covers 1989–April 2005, the longest period for which data are available. This period was characterized by strong performance of fixed income instruments given the world-wide decline in inflation, and therefore may not be representative of future developments. A one-year investment horizon is generally assumed.

intermediate portfolios of 1–3 and 1–5 years appear superior over the entire period, while the 5–7 year index had the highest Sharpe ratio<sup>7</sup> in recent years (Figure 4).



Sources: Merrill Lynch and IMF staff calculations

### Frequency and extent of negative returns and underperformance

Portfolios with a maturity of 1–5 years or fewer did not experience negative returns in any rolling one year period during 1989–April 2005, as their incremental yield was sufficient to compensate for the relatively small bond price movements they experienced. Longer maturity portfolios, however, experienced periods of negative returns with the frequency and magnitude of losses increasing with duration (Table 1).

The return on the various bond portfolios fell short of the SDR interest rate in about 22 percent of the rolling one year horizons during 1989–April 2005. While the frequency of underperformance was almost identical across portfolio maturities, the magnitude of underperformance increased with maturity. Periods of underperformance occurred when yield curves were inverted (1989–1990), and during episodes of monetary policy tightening (Table 1).

<sup>7</sup> The Sharpe ratio measures the incremental return over the three-month SDR rate as a percent of the standard deviation of returns.

Table 1. Losses and Underperformance of SDR portfolios

Portfolio	Period	Rolling one-year Absolute Return				Rolling one-year Excess Return				
		Lowest	Periods of	Average	Period	Lowest	Periods of	Average	Underperformance	
		Return	Negative Returns	Negative		Underperformance	Underperformance	Underperformance		
(in units)	(in percent)	Returns	(in units)	(in percent)						
3 M	Jun03-May04	1.58	0	0.0	0.00					
6 M	Apr03-Mar04	1.62	0	0.0	0.00	Aug92-Jul93	-0.19	50	27.0	-0.08
1 - 3 Y	Jul03-Jun04	1.22	0	0.0	0.00	Jan-Dec94	-2.72	42	22.7	-1.21
1 - 5 Y	Jul03-Jun04	0.03	0	0.0	0.00	Jan-Dec94	-4.10	42	22.7	-1.81
3 - 5 Y	Jan-Dec94	-1.67	5	2.7	-0.89	Jan-Dec94	-5.72	40	21.6	-2.68
5 - 7 Y	Jan-Dec94	-3.45	15	8.1	-1.25	Jul89-Aug90	-7.65	37	20.0	-4.22
7 - 10 Y	Jan-Dec94	-5.23	21	11.4	-2.39	Jul89-Aug90	-9.87	40	21.6	-5.18

Sources: Merrill Lynch and IMF staff calculations

### Episodes of monetary policy tightening

Tightening cycles typically detract from absolute and relative bond portfolio performance as the yield increase boosts the return on short-term investments while triggering losses on longer maturity bonds. Nonetheless, portfolios with a maturity of up to 1–5 years have generated positive returns during past monetary tightening episodes as the coupon earned was sufficient to compensate for bond price declines (Table 2). In contrast, portfolios with longer maturities experienced negative returns during tightening cycles, especially during 1994–95 when the pace and extent of the increase in the U.S. Fed funds rate was much higher than expected.

### Value-at-risk and stress test

A value-at-risk (VaR) analysis confirms that portfolios with a maturity of up to 1–5 years are likely to preserve their capital most of the time. This analysis, based on the distribution of returns over the period 1989–2005, was undertaken to estimate the risk and magnitude of loss over a one-year horizon assuming a portfolio value of SDR 1 billion (Table 3). Using this approach, it is estimated that there is a 1 percent chance that in any year the 1–5 year portfolio could lose more than SDR 16 million (1.6 percent of its value).

A stress test based on a period of particularly poor bond performance (1994) was undertaken to represent adverse market conditions. Using this scenario, the 1–5 year portfolio has a 1 percent chance of losing more than SDR 56 million (5.6 percent of its value) over one year (Table 4).

Table 2. Worst Annual Rolling Returns During Tightening Periods (in percent)

January 1989-October 1989												
Tightening 1/					Portfolio							
Buba	BoJ	BoE	Fed	SDR		3 M	6 M	1 - 3 Y	1 - 5 Y	3 - 5 Y	5 - 7 Y	7 - 10 Y
2.0	2.0	2.3	1.0	1.7	Return	8.39	9.01	5.86	4.68	3.37	0.69	-1.71
					Excess return		0.62	-2.53	-3.71	-5.02	-7.70	-10.10

January 1994-February 1995												
Tightening					Portfolio							
Buba	BoJ	BoE	Fed	SDR		3 M	6 M	1 - 3 Y	1 - 5 Y	3 - 5 Y	5 - 7 Y	7 - 10 Y
0.0	0.0	0.0	3.0	1.2	Return	4.11	4.24	1.46	0.03	-1.67	-3.45	-5.23
					Excess return		0.13	-2.64	-4.08	-5.77	-7.56	-9.34

June 1999-October 2000												
Tightening					Portfolio							
ECB	BoJ	BoE	Fed	SDR		3 M	6 M	1 - 3 Y	1 - 5 Y	3 - 5 Y	5 - 7 Y	7 - 10 Y
2.3	0.0	1.0	2.8	1.9	Return	3.46	3.62	2.03	1.02	-0.52	-2.29	-4.45
					Excess return		0.15	-1.44	-2.44	-3.98	-5.75	-7.91

November 2003-April 2005												
Tightening					Portfolio							
Buba	BoJ	BoE	Fed	SDR		3 M	6 M	1 - 3 Y	1 - 5 Y	3 - 5 Y	5 - 7 Y	7 - 10 Y
0.0	0.0	1.3	2.0	1.7	Return	1.58	1.62	1.22	0.84	0.12	-0.55	-2.03
					Excess return		0.04	-0.36	-0.74	-1.46	-2.13	-3.61

1/ Increase in central banks' official policy rates over the period.

Sources: Merrill Lynch and IMF staff calculations

Table 3. Annual VaR by Historical Performance 1989-2005 (Capital SDR 1 bn)

Portfolio	Average Return (in percent)	Standard Deviation	Confidence level	
			95%	99%
			(in millions of SDR)	
6 M	4.64	2.05	6	-7
1 - 3 Y	5.85	2.60	8	-9
1 - 5 Y	6.33	3.07	3	-16
3 - 5 Y	6.99	3.84	-5	-29
5 - 7 Y	7.66	4.87	-19	-49
7 - 10 Y	7.94	5.79	-34	-70

Sources: Merrill Lynch and IMF staff calculations

Table 4. VaR Stress Test (Capital SDR 1 bn)

Portfolio	Return	Standard Deviation (in percent)	Confidence level	
			95%	99%
6 M	1.73	2.05	-23	-36
1 - 3 Y	2.09	2.60	-30	-46
1 - 5 Y	2.35	3.07	-37	-56
3 - 5 Y	2.77	3.84	-48	-72
5 - 7 Y	3.09	4.87	-65	-95
7 - 10 Y	3.15	5.79	-82	-118

Sources: Merrill Lynch and IMF staff calculations

### Impact of changes in the investment horizon

The foregoing analysis is based on a one-year investment horizon. While this horizon is standard, it should be noted that the frequency of negative returns and underperformance declines with the length of the investment horizon because the longer the portfolio is held, the more likely it is that interest income will compensate for capital losses. It is therefore instructive to consider both shorter horizons—to illustrate intra-year return variability that might be reflected in quarterly or semiannual investment reports—and longer horizons—to illustrate the relatively low risk of persistent negative absolute returns and of returns that fall short of the SDR interest rate.

The 1–5 year portfolio has generated negative returns in 7 percent of the rolling 3-month periods during 1989–April 2005. It generated negative returns in only 3 percent of the rolling six month periods (Table 5 and Appendix II, Tables 1 and 2). As already noted above, this portfolio has not experienced a loss over a one-year horizon. No portfolio experienced a loss in any rolling two-year period.

Table 5. Frequency of Negative Returns of SDR portfolios over Various Horizons 1989-2005

Portfolio	Horizon Return	3 M	6 M	1 Y	2 Y	3 Y	5 Y	7 Y	10 Y
3 M	4.54	0%	0%	0%	0%	0%	0%	0%	0%
6 M	4.64	0%	0%	0%	0%	0%	0%	0%	0%
1 - 3 Y	5.85	3%	0%	0%	0%	0%	0%	0%	0%
1 - 5 Y	6.33	7%	3%	0%	0%	0%	0%	0%	0%
3 - 5 Y	6.99	14%	9%	3%	0%	0%	0%	0%	0%
5 - 7 Y	7.66	17%	15%	8%	0%	0%	0%	0%	0%
7 - 10 Y	7.94	22%	18%	11%	0%	0%	0%	0%	0%

Sources: Merrill Lynch and IMF staff calculations

All portfolios, except those with maturities of six months and 7–10 years, generated higher returns than the SDR interest rate over any rolling two-year investment horizon. Over shorter

periods, however, the frequency of underperformance for the bond portfolios increased, with the bond portfolios performing less well than the SDR interest rate in about 30 percent of rolling semiannual periods and about 35 percent of rolling quarterly periods (Table 6).

Table 6. Frequency of Underperformance against the 3-month SDR rate of SDR Portfolios over Various Horizons 1989-2005

Portfolio	Horizon Excess Return	3 M	6 M	1 Y	2 Y	3 Y	5 Y	7 Y	10 Y
6 M	0.10	31%	33%	27%	21%	16%	1%	0%	0%
1 - 3 Y	1.26	34%	29%	23%	9%	0%	0%	0%	0%
1 - 5 Y	1.73	35%	30%	23%	8%	0%	0%	0%	0%
3 - 5 Y	2.36	36%	30%	22%	10%	0%	0%	0%	0%
5 - 7 Y	3.01	37%	28%	20%	11%	0%	0%	0%	0%
7 - 10 Y	3.28	36%	29%	22%	15%	2%	0%	0%	0%

Sources: Merrill Lynch and IMF staff calculations

### B. The Current Interest Rate Environment and Prospective Returns

The foregoing analysis considered the range of outcomes suggested by historical data. It sought to put the long-run average performance of bond portfolios in perspective by undertaking a VaR analysis and stress tests, and highlighting the performance of bond portfolios during past tightening cycles. This section considers the implications of the current interest rate environment for prospective returns. This environment is characterized by four noteworthy features.

- Although yields have increased since their trough in mid-2003, they remain more than one standard deviation below their 1989–2005 averages (Table 7). As a result, prospective coupon income is likely to be lower than the historical analysis suggests, and bonds are susceptible to loss if yields revert to their long-term mean.
- Actual yield volatility is also more than one standard deviation below its 1989–2005 average (Table 7). To avoid underestimating future volatility, the VaR analysis and stress test undertaken above used longer term volatility, rather than the lower volatility experienced recently.
- The zero interest rate policy in Japan creates an exceptional environment. Given that yields cannot fall below zero, risks are asymmetric. In this environment, extending maturities exposes the portfolio to capital loss without the cushion of significantly higher coupons, or the prospect of significantly higher bond prices. To avoid this asymmetric risk, it appears desirable to place the yen component of the portfolio in a cash account, even if the maturity of the portfolio’s other currency components are extended.<sup>8</sup>

<sup>8</sup> This approach is followed in the case of the investment of PRGF and PRGF-HIPC assets.

Table 7. 1989-2005 Average and Current Yield and Volatility Levels

Portfolio	Yield (in percent)				Volatility (in basis points)			
	1989-2005 Average		Current Apr-05		1989-2005 Average		Current Apr-05	
	Yield	Standard Deviation 1/	Yield	Standard Deviation 1/	Volatility	Standard Deviation	Volatility	Standard Deviation 1/
1 - 3 Y	4.80	1.92	2.76	-1.06	66	21	41	-1.23
1 - 5 Y	4.96	1.85	2.87	-1.13	69	19	44	-1.30
3 - 5 Y	5.18	1.77	3.02	-1.23	74	20	46	-1.42
5 - 7 Y	5.50	1.62	3.54	-1.21	72	18	48	-1.36
7 - 10 Y	5.72	1.52	3.65	-1.36	69	18	41	-1.58

1/ Current levels expressed in number of standard deviations below the 1989-2005 average.

Sources: Merrill Lynch and IMF staff calculations

- The U.S., whose currency represents some 40 percent of the SDR basket, is currently in a tightening stance. Financial markets project that the tightening cycle will continue. On this basis, the synthetic SDR interest rate will increase by about 0.8 percent by the end of 2006 from 2.5 percent at end-April 2005 (Table 8).

Table 8. Yields Expectations (In percent)

	USD	EUR	JPY	GBP	SDR
Weights	39	36	13	12	100
May-05	3.00	2.00	0.00	4.75	2.46
Sep-05	3.71	2.13	0.09	4.64	2.78
Dec-05	3.86	2.17	0.11	4.53	2.84
Jun-06	4.04	2.36	0.20	4.42	2.98
Dec-06	4.17	2.60	0.34	4.46	3.14
Jun-07	4.21	2.77	0.49	4.49	3.24

Date: May-23

Sources: Bloomberg, IMF staff calculations.

### Probability of negative returns in the current environment

Given the expected level and volatility of yields, portfolios with a maturity of up to 1–5 years appear to have a low probability of negative returns.<sup>9</sup> The 1–3 and 1–5 year portfolios have less than a 1 percent and 3 percent chance, respectively, of generating a negative return over the next 12 months (Table 9). A probability below five percent can be viewed as consistent with a low risk tolerance.

<sup>9</sup> The probability of loss is calculated by combining the market’s expectations of current bond income with the expected dispersion of bond prices, using the implied volatility of one-year swaptions to measure the expected dispersion of bond prices and forward interest rates to calculate current income.

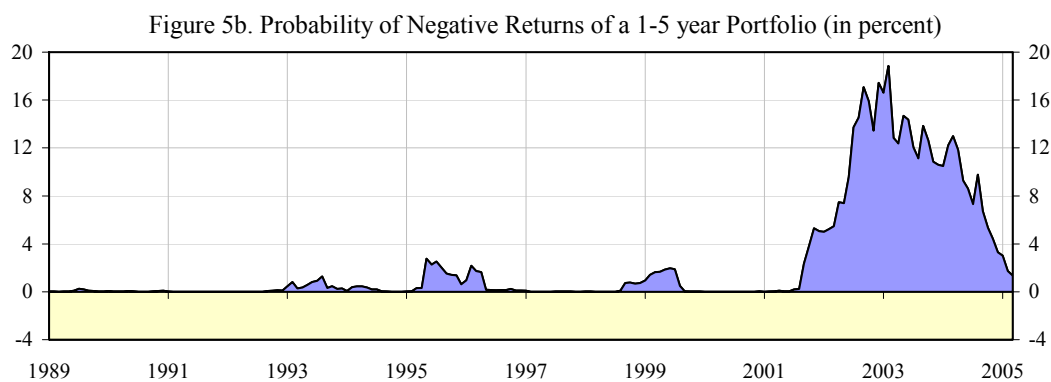
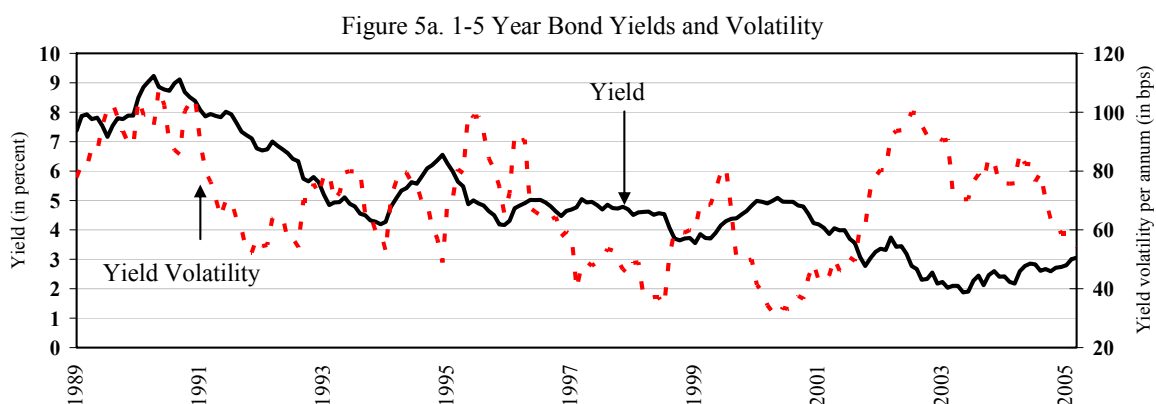


Table 9. Probability of Negative Returns of SDR Portfolios over One year

	1 - 3 year	1 - 5 year	3 - 5 year	5 - 7 year	7 - 10 year
Yield (in percent)	2.61	2.89	3.05	3.57	3.68
Implied Volatility (in bps)	57	59	61	65	61
Probability of negative returns	0.4%	2.7%	8.5%	14.0%	19.3%

Sources: Merrill Lynch, Bloomberg and IMF staff calculations

The probability of loss has declined significantly in recent quarters, owing to the positive combination of higher yields and lower volatility. The peak probability of loss (19 percent) was reached during 2002–03 when expected yields were approaching a trough and volatility was relatively high (Figures 5a and b).



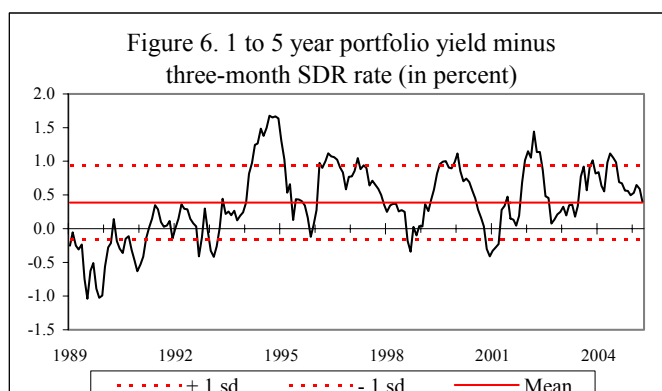
Sources: Merrill Lynch and IMF staff calculations

This analysis is subject to two caveats.

- First, the estimated probability of negative returns is based on a normal distribution of probabilities. In practice, returns are not normally distributed and display fat tails.
- Second, the analysis assumes that yields increase in one shot. This approach is conservative since a more gradual increase would lower the probability of negative returns.

### Breakeven analysis

The spread between the average yield on the 1–5 year portfolio and the three-month SDR rate matched its 1989–2005 average (0.40 percent at the end of April, Figure 6). Given this spread, the yield on the 1–5 year portfolio can increase by 20 basis points before the return on the 1–5 year portfolio would equal the three-month SDR rate (Table 10).



Sources: Merrill Lynch and IMF staff calculations

Table 10. Break-even Analysis for a 1-5 year Portfolio over one-year Horizon

Currency	SDR Weight	Current 1-year Yield (a)	Current 1-5 year Yield (b)	Yield Differential (c) = (b) - (a)	Modified Duration (d)	Roll Down (e) = (c) * (d)	Breakeven Increase (f) = [(c) + (e)] / (d)	Breakeven Rate (b) + (f)
USD	0.38	3.78	3.89	0.11	2.32	0.25	0.15	<b>4.04</b>
EUR	0.37	2.12	2.37	0.25	2.54	0.64	0.35	<b>2.72</b>
JPY	0.13	0.05	0.23	0.18	3.09	0.55	0.23	<b>0.46</b>
GBP	0.12	4.25	4.14	-0.11	2.59	-0.29	-0.16	<b>3.98</b>
SDR	1.00	<b>2.74</b>	<b>2.88</b>	<b>0.14</b>	<b>2.54</b>	<b>0.37</b>	<b>0.20</b>	<b>3.08</b>

(a) The one-year rate is the risk-free rate over 1-year horizon.

It includes the future path of the 3 month rate over the next four quarters.

(e) The roll down is the return generated by the shortening of the maturity of the bond over the period.

(f) Breakeven means by how much the average yield of the 1-5 portfolio can increase from the current level to breakeven with the cash rate over a one-year horizon.

Sources: Merrill Lynch, Bloomberg and IMF staff calculations

Although the level of protection appears small in an environment of rising yields, the break-even analysis rests on two conservative assumptions: (i) that yield increases occur in full at the end of the period, and (ii) that the investment is implemented in one shot. In practice, yields are likely to increase gradually, thus lowering the risk of underperforming the

three-month SDR rate. Moreover, phasing the investment in longer maturities over a period of months would further reduce the risk of loss.

### C. Diversification into Medium-Term Instruments

#### Past MTI performance

An MTI is a fixed income security issued by the BIS whose yield is based on swap rates minus a margin.<sup>10</sup> MTIs are a spread product with two sources of return (and risk): the return associated with underlying movements in government bond yields and that arising from the credit spread on MTIs. The extra return offered by the MTIs over government bonds is supposed to compensate the investor for taking on this small credit risk. MTIs perform relatively better than comparable government bonds when swap spreads narrow and vice versa.

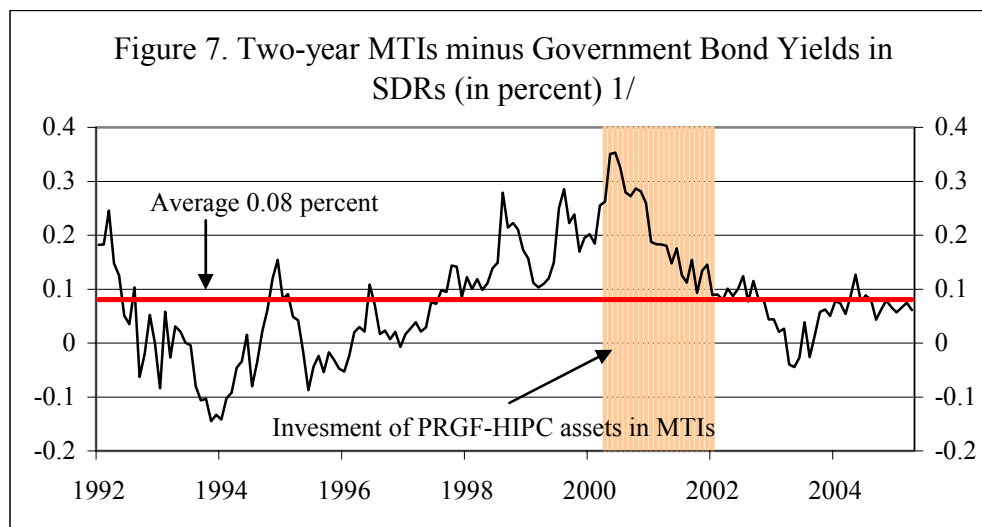
Actual performance data for MTIs cover the period April 2000–January 2002 during which some PRGF-HIPC assets were invested in 1–3 year MTIs. During that period, MTIs generated an annualized excess return of 0.57 percent over the 1–3 year government bonds (Table 11). This strong performance was driven by a sharp narrowing of the credit yield spread during that period (Figure 7). Additionally, the imperfect return correlation between MTIs and the 1–3 year government bond benchmark (with a correlation coefficient of 0.89 during the period under review) brought some diversification gains.

Table 11. MTIs and Government Bond Performance  
April 2000-January 2002

	Annualized Return (in percent)	Standard Deviation (in percent)	Risk-adjusted Return
1 - 3 Year MTIs	6.08 6.65	1.14 1.28	5.34 5.18
Excess Return	0.57		
Correlation	0.89		

Sources: BIS, Merrill Lynch and IMF staff calculations

<sup>10</sup> The swap yield curve is based on AA-rated credits.



1/ SDR-weighted MTIs with a margin of 24.5 bps for USD and GBP, 16.5 for EUR and 0 for JPY.

Sources: Merrill Lynch, Bloomberg and IMF staff calculations

### MTIs in the current market environment

Yield spreads between MTIs and government bonds are broadly in line with their long-term average (see Figure 7). There appears to be relatively little scope for a further narrowing of swap spreads, following the significant compression of spreads since 2001. Nevertheless, the small yield pick up and the limited diversification afforded by MTIs suggest that it would be advantageous to allocate IA assets to MTIs.

Simulations of an optimal allocation to MTIs using historical returns and current yields with constant risk and correlation parameters would favor an allocation of about 20 percent to MTIs. Such an allocation would yield the best ex ante risk-adjusted return for the total portfolio (Table 12).

Table 12. Diversification in MTIs - Portfolio Allocation

MTIs weight	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
Historical Return											
Portfolio Return	6.08	6.14	6.19	6.25	6.31	6.36	6.42	6.48	6.54	6.59	6.65
Portoflio Risk		1.14	1.15	1.15	1.17	1.18	1.19	1.21	1.23	1.26	1.28
Risk-adjusted return	5.16	5.38	5.40	<b>5.42</b>	5.41	5.40	5.37	5.34	5.29	5.24	5.18
Current yield											
Portfolio Return	2.75	2.76	2.77	2.78	2.79	2.80	2.81	2.82	2.83	2.84	2.85
Portoflio Risk	1.14	1.14	1.15	1.15	1.17	1.18	1.19	1.21	1.23	1.26	1.28
Risk-adjusted return	2.416	<b>2.419</b>	<b>2.417</b>	2.41	2.39	2.38	2.35	2.32	2.29	2.26	2.22

Sources: BIS, Merrill Lynch and IMF staff calculations

#### D. Conclusions and Recommendations

During 1989–2005, all of the bond portfolios considered generated a substantial excess return over the three-month SDR rate. The amount of excess return increased with maturity. But so too did the magnitude of relative underperformance.

The bond portfolios tended to generate excess returns more consistently as the investment horizon was extended. The analysis using a standard 1-year investment horizon found that the 1–3 year and 1–5 year portfolios performed better than the SDR interest rate in about three quarters of the rolling 12-month periods during 1989–2005. These portfolios did not generate negative returns in any rolling 12-month period. However, over shorter (quarterly and semiannual) investment horizons, the frequency of underperformance increased and negative returns were experienced, albeit rarely.

The current environment of historically low yields, low volatility, and low credit spreads suggests that care should be taken when using past bond returns to guide expectations for future performance. Nevertheless, the analysis of the probability of loss over a one-year horizon given current expectations for yields and yield volatility suggests that the risk of loss is low. This risk can be further mitigated by phasing in any bond investments over a period of months, rather than in one shot.

MTIs have provided an additional return over government bonds and some diversification gain which together have fairly compensated for bearing a small credit risk exposure.

### **Benchmark recommendation**

Both the 1–3 and 1–5 year bond benchmarks appear consistent with the investment objective of performing better than the SDR interest rate under most market conditions while minimizing the risk of loss in any year. These benchmarks have similar durations—1.7 years in the case of the 1–3 year index and 2.5 years in the case of the 1–5 year index—and are commonly used by reserve asset managers.

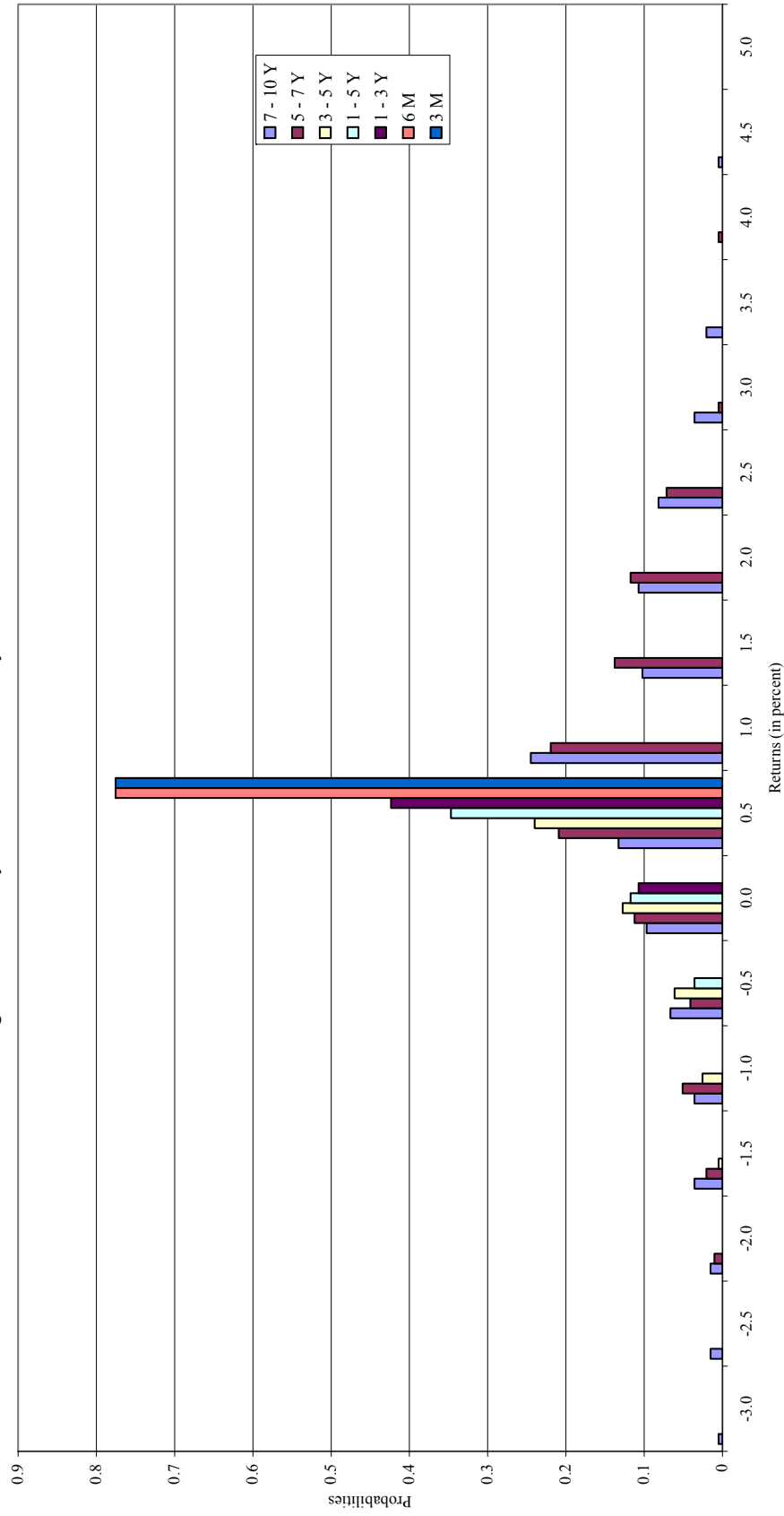
- Both benchmarks consistently earned positive returns in every rolling 12-month period over the past sixteen years. Their low probability of negative returns in the current environment also appears consistent with the risk tolerance of the investment objective.
- During 1989–April 2005, the average annual excess return over the SDR interest rate was 130 basis points for the 1–3 year benchmark and 170 basis points for the 1–5 year benchmark. Both benchmarks consistently generated an excess return over the three-month SDR interest rate over a two-year horizon. Over shorter horizons, these benchmark indices fell short of the three-month SDR interest rate in about one out of every four years, and in one of every three quarters.

The 1–5 year benchmark had a higher risk-adjusted return than the 1–3 year index. During 1989–2005, the 1–5 benchmark generated average returns of 43 basis points a year over the 1–3 year portfolio while maintaining a broadly similar level of risk. In addition, the 1–5 year benchmark offers more latitude to manage positions along the yield curve.

The 1–5 year benchmark appears to strike a comfortable balance between generating meaningful excess returns over time, while limiting inevitable short-term periods of reversal. It also appears that it would be advantageous in most market conditions to include MTIs in the portfolio.

### I. Probability Distribution of Monthly Returns 1989–2005

Figure 1. Probability Distribution of Monthly Returns 1989–2005



Sources: Merrill Lynch and IMF staff calculations

## II. Performance of SDR Portfolios over Various Periods

Table 1. Absolute Performance of SDR portfolios over various periods

Portofflio	Rolling one-year period			Rolling three-year period			Rolling five-year period		
	Average Return	Standard Deviation	Risk-Adjusted Return 1/	Average Return	Standard Deviation	Risk-Adjusted Return 1/	Average Return	Standard Deviation	Risk-Adjusted Return 1/
3 M	4.54	2.06	2.21	4.86	1.86	2.61	4.99	1.59	3.13
6 M	4.64	2.05	<b>2.26</b>	4.53	1.55	2.92	4.47	1.09	4.09
1 - 3 Y	5.85	2.60	2.25	6.03	1.67	3.61	6.15	1.32	4.67
1 - 5 Y	6.33	3.07	2.06	6.47	1.76	<b>3.67</b>	6.60	1.30	5.08
3 - 5 Y	6.99	3.84	1.82	7.06	1.99	3.56	7.17	1.32	5.41
5 - 7 Y	7.66	4.87	1.57	7.69	2.30	3.34	7.82	1.38	<b>5.65</b>
7 - 10 Y	7.94	5.79	1.37	7.95	2.56	3.10	8.06	1.47	5.50

1/ Best in bold italics

Sources: Merrill Lynch and IMF staff calculations

Table 2. Performance over three-month SDR rate of SDR portfolios over various periods

Portofflio	Rolling one-year period			Rolling three-year period			Rolling five-year period		
	Average Return	Standard Deviation	Sharpe Ratio 1/	Average Return	Standard Deviation	Sharpe Ratio 1/	Average Return	Standard Deviation	Sharpe Ratio 1/
6 M	0.10	0.16	0.62	0.09	0.09	1.01	0.11	0.06	1.86
1 - 3 Y	1.26	1.72	<b>0.74</b>	1.12	1.10	1.03	1.12	0.65	1.71
1 - 5 Y	1.73	2.41	0.72	1.55	1.45	1.07	1.54	0.86	1.80
3 - 5 Y	2.36	3.35	0.70	2.12	1.90	1.12	2.10	1.10	<b>1.91</b>
5 - 7 Y	3.01	4.52	0.67	2.73	2.42	<b>1.13</b>	2.72	1.42	<b>1.91</b>
7 - 10 Y	3.28	5.50	0.60	2.97	2.77	1.08	2.95	1.66	1.78

1/ Best in bold italics

Sources: Merrill Lynch and IMF staff calculations