INTERNATIONAL MONETARY FUND

Issues in Reserves Adequacy and Management

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(In consultation with other Departments)

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October 15, 2001

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I. INTRODUCTION[1]

1. **Recent international financial crises have shown that holding and managing sufficient reserves and disclosing adequate information on them to markets helps a country to be able to prevent and weather external crises, especially those stemming from the capital account**.[2] The Fund has worked to assist its members in the assessment of reserve adequacy and in reserve management through three key initiatives: the focusing of reserve adequacy assessment on capital account vulnerability; the preparation of guidelines for foreign exchange reserve management; and the establishment of a standard for public disclosure of data on international reserves and liquidity (Box 1).[3]

2. **This paper presents the potential implications of focusing reserve adequacy assessment on the capital account for reserve management.** It responds to the demands identified during recent outreach activities on reserve adequacy and is intended as background for the forthcoming Board discussion on the assessment of external vulnerability.[4] Also, the Board has requested more work in the area of reserve adequacy as well as in identifying best practices in reserve management.[5] The paper focuses on emerging market countries—although capital account vulnerability is key to reserve policy in any country with access to capital markets, emerging market countries face far greater uncertainties in this access than industrial countries. The purposes of the paper are twofold:

- First, to summarize the capital account approach to assessing reserve adequacy in emerging market economies[6] and describe outreach thus far on this topic (which has been conducted in close collaboration with the World Bank).

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[1] The main authors of this paper are Ydahlia Metzgen, Christian Mulder, and Natalia Tamirisa (PDR) and Peter Dattels, Shyamala Gopinath, Arne Petersen and Jodi Scarlata (MAE).

[2] For a broader discussion of policies that can contribute to preventing crises, see *Report of the Managing Director to the International Monetary and Financial Committee: The Fund's Crisis Prevention Initiatives,* (IMFC/Doc/4/01/10, 11/14/01).

[3] See *Report of the Managing Director to the International Monetary and Financial Committee on the IMF in the Process of Change*, (IMFC/Doc/3/01/10, 4/25/01); *Fourth Review of the Fund's Data Standards' Initiatives*, (SM/01/208, 7/3/01); and *Guidelines for Foreign Exchange Reserve Management*, (SM/ 01/264, 8/17/01).

[4] *Approaches to Vulnerability Assessment for Emerging Market Economies*, (SM/01/301, 10/03/01).

[5] See *Concluding Remarks by the Acting Chair, Guidelines for Foreign Exchange Reserve Management, Executive Board Meeting 01/91, September 7, 2001.*

[6] See *Debt- and Reserve-Related Indicators of External Vulnerability*, (SM/00/65, 3/23/00), *The Acting Chairman's Concluding Remarks on Debt- and Reserve-Related Indicators of External Vulnerability*, (BUFF/00/69, 5/9/00), and *Report of the Managing Director to the IMFC on the IMF in the Process of Change*, (IMFC/Doc/3/01/10, 4/25/01)

- Second, to draw out and discuss technical implications of reserve adequacy considerations for reserve management, highlighting the case of emerging market economies. This builds, in part, on country practices (selected practices are highlighted in Box 2 and Appendix II), and is intended to assist countries in formulating strategies for investing reserve assets and managing risk, and to complement existing guidelines on reserve management.[7]

Box 1. Disclosure of Data on International Reserves and Foreign Currency Liquidity

Experience during the financial crises of the 1990s demonstrated that timely and accurate disclosure of information on official reserves is critical to fostering early policy adjustment by country authorities and to allowing markets to assess risks. In response, the Fund, in collaboration with the Committee on the Global Financial System of the Group of Ten central banks, developed a template, for disseminating data on international reserves and foreign currency liquidity. The template, which is part of the SDDS standard, provides for the comprehensive coverage of both assets and drains. It serves as a benchmark against which to assess the provision of reserves data to the Fund for the purpose of surveillance. All subscribers to the SDDS are now disseminating template data over their national websites. The Fund's website contains links to the data of all 49 SDDS subscribers and also redisseminates the template data of 43 countries in a common format.

At the time of the latest review of the Fund's data standards initiatives, the Executive Board agreed that the current prescriptions for monthly periodicity and monthly timeliness should be retained. The staff will be discussing with national authorities the difficulties associated with the dissemination of reserves data with weekly periodicity and timeliness. Directors asked the staff to report on this issue at the time of the next discussion on data provision to the Fund for surveillance around February 2002. 1/

1/ *The Fourth Review of Data Standards Initiatives* (SM/01/208, 7/3/01) and the *Acting Chairman's Summing Up on the Fourth Review of Data Standards Initiatives* (BUFF/01/115, 7/31/01).

II. Reserve Adequacy Assessment with a Focus on the Capital Account

3. **From a crisis prevention perspective, the most relevant indicator of reserve adequacy for emerging market countries is the ratio of international reserves to short-term external debt by remaining maturity**.[8] As a predictor and an explanation of the depth

[7] These implications were discussed briefly in Stanley Fischer, *Opening Remarks* at IMF/World Bank "International Reserves: Policy Issues Forum", April 28, 2001.

[8] The focus on short-term debt was proposed by Mr. Greenspan, the chairman of the United States Federal Reserve Board, and Mr. Guidotti, see for example, Alan Greenspan, *Efforts to Improve the Architecture of the International Financial System,* May 20, 1999, Testimony before the Committee on Banking and Financial Services, U.S. House of Representatives, and Alan Greenspan, *Currency Reserves and Debt*, remarks before the World Bank Conference on Recent Trends in Reserves Management, Washington, D.C., April 29, 2000, www.bog.frb.fed.us.

of recent emerging market crises, this ratio empirically outperforms other indicators, including ratios of reserves to imports or to broad money.[9] For countries with uncertain access to capital markets, the Executive Board endorsed the use of a simple benchmark that targets the coverage of short-term external debt of all residents and in all instruments and currencies measured by remaining maturity.[10] A country with a balanced current account and no capital flight will have sufficient reserves to honor its debt obligations for a full year even if inflows of portfolio and other capital cease and creditors refuse to roll over old debt. This benchmark, however, is only a starting point for the analysis.

4. **Other factors have an impact on reserve adequacy as well**. Higher levels of reserves would be preferable in countries with problematic characteristics—e.g., weak macroeconomic fundamentals (such as large external current account deficits that raise financing needs and overvalued exchange rates that can lead to capital outflows), high levels of short-term public domestic debt (especially where there are no effective capital controls or other mechanisms that create captive markets), derivative positions of the public sector, [11] and weak banking systems that can contribute to capital flight—although it will likely be difficult for such countries to build reserves. Considerations that *limit* the need for reserves include: the presence of a flexible exchange rate regime to stem capital flight;[12] management of the actual exchange rate policy in a manner that discourages high foreign exchange exposure by the private sector; a public sector that borrows in domestic currency from non-

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[9] As discussed in SM/00/65 (see footnote 3), these results were found in tests of the Fund's Early Warning System model and research on the depth of crisis (Matthieu Bussiere and Christian Mulder, *External Vulnerability in Emerging Market Economies: The Trade-Off Between Fundamentals and Liquidity*, IMF Working Paper, WP/99/88, 1999). The latter work also found support for the ratio of one and provides specific parameters for augmenting the reserve ratio in the presence of a current account deficit and an appreciated exchange rate. These results can be used both in analyzing reserve adequacy and in gauging external vulnerability during systemic shocks. Evidence for short-term debt over reserves as a crisis indicator is also found in, *Short-Term Capital Flows*, 1999, a paper prepared for the World Bank ABCDE conference by Dani Rodrik and Andrés Velasco; Jason Furman and Joseph E. Stiglitz, *Economic Crises: Evidence and Insights from East Asia*, *Brookings Papers on Economic Activity*, No. 2, 1998, pp. 1-114.

[10] *The Acting Chairman's Concluding Remarks on Debt- and Reserve-Related Indicators of External Vulnerability Executive Board Seminar*, (BUFF/00/69, 5/9/00). Short-term debt should be measured by remaining maturity, and should cover both public and private sector debt, and all debt instruments to nonresidents, regardless of the currency of denomination.

[11] The notional value of short-term public sector derivative positions, which lead to short positions in foreign currency, are comparable to short-term foreign currency debt. However, if these positions are subject to margin calls, they can generate instantaneous demands on reserves, and therefore should normally be deducted from reserves for reserve adequacy analysis (see paragraphs 36 and 50 and Annex II of SM/00/65).

[12] It should be noted that in practice a flexible rate does not negate the need for reserves and servicing debt.

residents, and can do so in case of liquidity need; conditions that ensure private sector access to foreign capital such as sound private sector risk management and banking supervision.[13]

5. **To take such additional factors into account and allow a better understanding of the interaction between reserve adequacy, vulnerability, and country-specific factors and policies, the benchmarking of reserves to short-term debt should be complemented by stress testing of the balance of payments**.[14] Indeed, the ratio of one for reserves to short-term debt—in effect, a simple stress test of lack of market access for a year—is a sensible point of departure for more complex stress tests. More complex stress tests can reflect: different market access for each type of inflow (such as FDI or trade credit); the risk of capital flight;[15] and the need to finance a current account deficit. Stress tests can use maximum historical variations as a basis for potential variations in specific balance of payments flows. They can also reflect the impact of shorter or longer periods of limited market access and the impact of adjustment measures on the current account. Results of these stress tests can serve as key inputs in the reserve adequacy analysis. (See for an example the discussion of Hungary's experience in Box 2).

6. Accurate measurement of current and capital account stocks and flows are critical to assessing reserve adequacy. In this regard, efforts are underway to help emerging market countries improve this information (including on the level and composition of private sector debt, see Box 1). In addition the application of the Data Quality Assessment Framework, developed by Fund staff, provides a standard diagnostic tool for evaluating the methodological soundness, accuracy and reliability of data on the current account, capital account and financial account of the balance of payments.[16]

7. **The increased appreciation of the importance of reserves and the need to assess reserve adequacy is reflected in the fact that emerging market countries have raised their reserve holdings markedly in recent years**. The ratio of reserves to short-term external debt has risen from about 100 percent at end-1997 to 180 percent at end-2000,

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[13] Many of the factors that limit the need for reserves—especially the governments' ability to borrow quickly, and in large amounts from non-residents—apply to industrial countries. The approach discussed in this paper is therefore not focused on industrial countries.

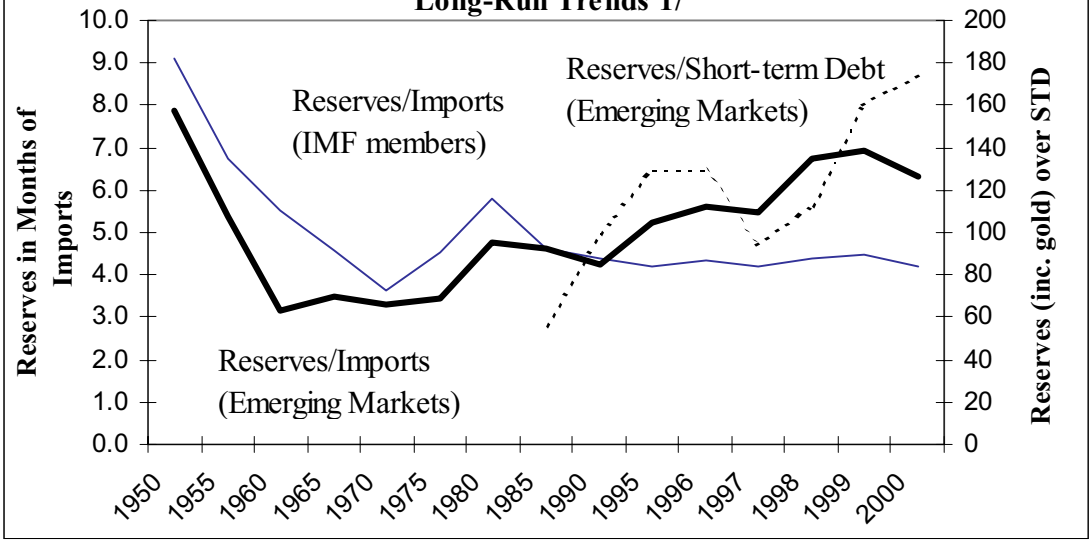
[14] In the absence of reliable debtor data on short-term private debt, a useful source of debt data are the Joint BIS-IMF-OECD-World Bank data on debt compiled from the creditor side. Stress tests or other assumptions can take into account the extent to which data over or underestimate exposure.

[15] Capital flight is particularly difficult to measure and predict. In a stress test, a percentage of M2 or M3 can be used as a proxy for potential capital flight, along the lines suggested in *Reserve Adequacy in Emerging Market Economies*, by J. Onno de Beaufort Wijnholds and Arend Kapteyn, IMF Working Paper, WP/01/143, 2001.

[16] See Fourth Review of the Fund's Data Standards Initiative (SM/01/208, 7/3/01).

reflecting both an increase in reserves and a decline in short-term debt. In terms of import cover, by end-2000, reserves in emerging market countries had risen to slightly over 6 months of imports on average (see Figure 1).

Figure 1. Reserves over Imports vs. Reserves over Short-Term Debt, Long-Run Trends 1/



1/ Short-term debt is based on the Joint BIS-IMF-OECD-World Bank external debt data (i.e., based on creditor side reporting) and includes claims by banks, and in the form of bonds and trade credits. It does not include other bilateral or multilateral obligations. Reserves include gold. The Reserves over imports data are unweighted averages. The reserves over short-term debt data are the median observations.

8. **Feedback from outreach activities conducted by the Fund and World Bank on reserve adequacy issues has confirmed that emerging market countries generally support the focus of reserve adequacy on capital account vulnerability (Appendix II).** In particular, they viewed the ratio of reserves to short-term debt as a useful indicator of reserve adequacy. Many emerging market countries have started to incorporate considerations pertaining to the capital account into their operational systems of reserve adequacy analysis (see Box 2). Discussions with country authorities suggest that, while the proposed approach to reserve adequacy analysis is generally relevant for emerging market countries, its practical application, particularly the selection of an appropriate benchmark and the design of stress tests, needs to be tailored to country-specific circumstances and to take into account the implications for reserve management.

Box 2. Capital Account Considerations in Determining Reserve Adequacy

Colombia

Following a severe crisis in the late 1990s, the Colombian authorities have redoubled efforts to identify measures, to help reduce external vulnerability. Besides the change to a flexible exchange rate regime, the authorities have revisited their approach to reserve adequacy. Specifically, after extensive consultations, the authorities have introduced a new approach for targeting reserve adequacy in which reserves cover short-term debt with a mark-up to reflect unfavorable macroeconomic fundamentals: i.e., the potential for an increasing current account deficit and real exchange rate appreciation. The former is especially critical for Colombia as it is a major commodity exporter. Augmentation of reserves for the potential increase in the current account is approximated using one standard deviation of the current account deficit as a measure of past variation. The authorities adopted this approach after a review of Fund work on reserve adequacy, and country-risk models of rating agencies, and major broker houses.[1/] The authorities are now also considering bringing the currency composition of reserves closer in line with that of the stock of short-term debt (see below under reserve adequacy immunization).

Hungary

The National Bank of Hungary (NBH) conducts a systematic assessment of reserve adequacy and uses it as an input in its reserves and risk management guidelines approved annually by the NBH Board. The NBH pays particularly close attention to drains from the capital account and has quantified the potential drains, which it includes in the evaluation of the reserve level using techniques such as stress tests. The drains include: (i) short-term liabilities of the central bank; (ii) exposures from hedges of public debt; (iii) open foreign exchange positions of the banking and corporate sectors; and (iv) non-residents' holdings of government bonds and to a lesser extent equities (based on recent experience, in particular the 1998 Russian crisis). The data are updated monthly, in line with their availability, and the NBH Board reviews the parameters for this exercise annually. There is an institutional framework in place to bring the debt management perspective into the process of formulating the reserve policy. The NBH meets regularly with the Ministry of Finance and, if needed, can request public borrowing to meet reserve objectives.

1/ Research at the Fund finds that rating agencies pay increasing attention to the reserves-to-short-term debt ratio since the Asian crisis, Christian Mulder and Roberto Perrelli, *Foreign Currency Sovereign Ratings in Emerging Market Countries*, IMF Working Paper, 2001, forthcoming.

9. Outreach also identified a need for further guidance on implications of focusing reserve adequacy assessment on the capital account for the management of reserves, notably the selection of benchmarks for portfolio composition in terms of asset classes and currencies. Reserve managers welcomed sharing new insights, experiences with implementing novel approaches, and best practices.

III. Implications for Reserve Management

10. **Reserve adequacy analysis has important implications for the design of investment strategies and the management of risks.** The potential interruption of capital market access poses special demands for reserve management, an issue that is especially

important for emerging market countries. The implications described below are consistent with the recently approved guidelines for reserve management.[17]

A. Implications for Reserve Management Policies

11. **The growing appreciation of the role of reserves in crisis prevention and as a buffer to manage exchange rate volatility has given reserve management a more central role in national economic policies.** In many emerging market countries, greater efforts have been made to coordinate related policies, including external debt management, with reserve management. The determination of an adequate level of reserves, the means by which reserves are funded, and the policies that govern when and for what reasons reserves are used, require the development of a consistent set of supporting policies for reserve management (Appendix I and Box 3).[18] In turn, this supports one of the principal aims of reserve adequacy—to promote and sustain internal and external market confidence in a nation's economic policies.

B. Considerations Affecting Reserve Management Strategies

12. A range of factors affecting the adequacy of reserves—including the volatility of capital flows, the size and composition of external debt, the cost of borrowing, market confidence, and the stage of development of domestic foreign exchange markets—influences both reserve management policies and the parameters that determine the investment of reserves, as highlighted below.

13. **The determination of the highly liquid portion of reserves builds upon the assessment of external risks and potential volatility of capital flows, undertaken as part of determining the overall level of reserves adequacy.** It has been argued that the more adequate the reserves are, the less likely they would be called upon and thus the smaller the proportion of reserves that would need to be invested in highly liquid assets.[19] [20]

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[17] See *Guidelines for Foreign Exchange Reserve Management* (SM/01/264).

[18] Appendix I, *Reserves Management Policies, Objectives, and Strategies in Selected Countries* outlines key elements of reserve management policy and is based on contributions by the authorities of the respective countries.

[19] Highly liquid assets are those that can be liquidated immediately without incurring significant costs or reposed for cash without incurring a significant haircut (see the discussion in para 16).

[20] See paragraph 63 of the *Guidelines for Foreign Exchange Reserve Management (SM/01/264); also Debt- and Reserve-Related Indicators of External Vulnerability*, (SM/00/65, 3/23/00) and the empirical studies cited therein, for example, Matthieu Bussière and Christian Mulder, *External Vulnerability in Emerging Market Economies: How High Liquidity Can Offset Weak Fundamentals and the Effects of Contagion*, IMF Working Paper, WP/99/88, July 1999.

Box 3: Policies and Institutional Arrangements that Support Reserve Management

An elucidation of objectives for holding reserves helps guide the determination of an adequate level of reserves and the overall strategy for the investment of reserve holdings (see Appendix I). As discussed in section III, for countries with less than certain access to international markets, holding adequate reserves can help to reduce external vulnerabilities. Reserve management strategies complement such objectives by ensuring that reserves are available when they are needed most.

Sustainable funding and sound financial arrangements are part of reserve management policies. Adequate reserve holdings need to be funded in a way that does not pressure the reserve manager to pursue unrealistically high returns. In emerging market economies in particular, the buffer of reserves may be sizeable in relation to the central bank's balance sheet. Accordingly, the cost of domestic monetary liabilities and foreign borrowings that fund reserves and their implication for the financial position of the central bank, need to be assessed, and reserve management policies underpinned by sound financial arrangements between the government and the central bank, that ensure the financial health of the reserve management entity, and by coordination with external debt management.

Countries that borrow on international markets to raise or supplement reserves have sought to both lower costs and diversify funding sources so as to ensure a stable funding base and bolster market confidence. 1/ In addition to traditional syndicated borrowings on international markets, countries have expanded the range of programs; several countries, for instance, have developed Euro note programs and special programs for borrowing in US markets. Policies are also put in place to govern the spreads at which funds are borrowed and set limits for borrowing in order to assure that markets are not saturated and the country name, as issuer, retains its "scarcity value".

Transparency and accountability have become an essential part of reserve management policy and strategies that also support market confidence. 2/ Reserves management policies are critical for both the maintenance (security) of reserves and contributions (investment returns) to adequate reserve levels. As reserves are entrusted to the reserve manager (usually the central bank), the net income (or losses) that result from investment activities undertaken by the reserve manager have warranted regular explanation (usually found in annual reports) to help ensure the credibility and sustainability of reserve management policies. The Fund's *Data Template on International Reserves and Foreign Currency Liquidity* provides a regular and transparent standard for the reporting of the market values of reserve assets.

1/ Ideally reserve levels and reserve management strategies are determined within an explicit cost-benefit framework. However, while benefits are great, they are difficult to quantify. Therefore, the general approach above emphasizes adequate rather than optimal reserve levels. This does not mean that costs are not important, but these considerations would need to be reflected in country specific reviews of benefits and costs.

2/ See paragraph 23 of the *Guidelines for Foreign Exchange Reserve Management*, (SM/ 01/264, 8/17/01).

14. To determine the proportion of highly liquid assets, therefore, many central banks analyze potential liquidity needs based on past interventions and stress tests of worst case scenarios. Different scenarios may be used to construct a range of probable outcomes that could help identify the share of highly liquid assets that the central bank would hold for a given confidence level. The capital account framework for the assessment of reserve adequacy suggests that the extent of liquidity within reserve assets needs to be based especially on the impact of a potential closure of access to international capital markets for those countries that have less than fully certain access.

15. **A factor in determining the liquid portion of reserves is the level of intervention capacity needed to address conditions of excessive volatility in exchange markets.** In the case of developing and emerging market countries where foreign exchange markets in the domestic currency are underdeveloped, the capacity of these markets to bear shocks is limited and they are prone to becoming dysfunctional under stress. Dealers and participants may withdraw from the foreign exchange market leading to a widening in bid-ask spreads or one-sided and disorderly conditions. Therefore, sufficient liquid reserves, which can be rapidly called upon by the central bank, are needed to support intervention policy consistent with the exchange rate regime.[21]

16. **As part of liquidity management, reserve managers generally hold a portion of reserves in cash (or near cash) in order to ensure that foreign currency is available to meet maturing liabilities of the central bank, and other liabilities and contingencies.** [22] Such cash management operations can also be facilitated by the issuance of short-term liabilities or derivative instruments such as swaps (against domestic currency). However, the use of such funding mechanisms, especially by emerging market economies, has its own risks: it may not be available during times of market stress and may lead to an erosion in market confidence.[23]

17. **The determination of the choice of allowable assets and their weighting in the reserve portfolio, should take into consideration the performance of various assets in extreme market conditions**. Experience suggests that central banks of emerging market countries may particularly need reserve assets at times of turmoil and stress in international

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[21] See Section 1.3 of the *Guidelines for Foreign Exchange Reserve Management*, (SM/ 01/264, 8/17/01) for a discussion of reserve management strategies under different exchange rate regimes.

[22] Cash includes very short-term deposits and maturing reserve assets. Known cash commitments include settlement of bond market transactions, debt servicing payments, and minor foreign currency expenditure by the government.

[23] As recent experiences have highlighted, derivatives should be used with caution especially if they are of short maturity or subject to margin calls. The exposure to such instruments can rapidly undermine the reserve position in cases of adverse exchange rate movements, and it may stimulate self-fulfilling speculation against the exchange rate.

financial markets. Such occasions are marked by sudden shifts in investor preferences and risk appetite, causing both market volatility and liquidity risks to rise. Under such conditions, some asset classes cannot be readily transformed into cash at fair market prices because of: widening spreads between bid and ask rates that increase transaction costs; thinning market conditions that make it difficult to sell the desired amount of securities; drying up of funding available in markets for repurchase agreements; and widening spread differentials between various asset classes as risk preferences change. Traditional measures of risk and return do not evaluate these risks well under extreme conditions. Historic data on returns suggest that highly rated securities perform relative well under such conditions. Therefore, the allocation of a portfolio across asset classes should incorporate considerations of both liquidity characteristics and access to markets in and out of crisis periods (Box 4).

18. **The selection of the benchmark for the currency composition of reserve assets depends closely on the approach to determining reserve adequacy.** Where reserves are held to provide adequate coverage of short-term (private and public) debt—as discussed in Section III of this paper—reserves might be held in the same proportion of currencies as is reflected in the denomination of short-term debt in order to avoid fluctuations in reserve coverage of short-term debt arising from changes in currency cross rates.[24] Of course, there are complicating factors that need to be taken into account. Private borrowers use of derivatives can alter the currency exposure of external liabilities, while information on the levels of private external debt, maturities, and currency exposures may not be complete, complicating the implementation of the above strategy.[25] Furthermore, countries may take broader considerations into account, including currency exposures that may arise from domestic capital flight, the exchange rate regime and whether the peg overweights a specific currency compared to the current and capital account composition, and other country-specific circumstances, such as the financial risk management capabilities of private and public sectors. Various common approaches to reserve composition are highlighted in Box 5.

[24] Derivative instruments, such as swaps, can also be used to achieve the same effective currency composition as the benchmark.

[25] The external debt category of the SDDS prescribes dissemination of information on external debt of the private sector, broken down by maturity and by instrument, as set out in *the Balance of Payments Manual*, Fifth Edition. SDDS subscribers have until March 31, 2003 to meet these requirements. The SDDS also encourages a currency breakdown of external debt. See *Summing Up by the Acting Chairman on the Review of the Fund's Data Standards Initiatives*, (BUFF/00/52, 4/3/00).

Box 4: Assessment of Market Liquidity and Return Risks

Assessments made by central banks and others confirm that under conditions of *market stress*, the liquidity and performance of securities differs from *normal times*. For example, an assessment of U.S. securities markets under extreme conditions, presented at a recent policy forum on reserves co-hosted by the Fund and the World Bank, shows that transactions costs increase for all securities but disproportionately for lower quality asset classes and assets that trade in less deep and less liquid markets (Table 1a). As a result, liquidity may be less available for some reserve assets when it may be needed the most. In crisis periods, market volatility increased but less so for higher quality assets. During recent crises in emerging market countries (the Tequila crisis in 1994, the Asian crisis in 1997, and the Russian crisis in 1998), high quality U.S. securities benefited from a flight to quality.

Table 1b shows that returns increased substantially across U.S. government and agency securities. The analysis suggests that higher quality assets perform well or better than lower quality assets, and that such assets are also supported by deeper markets and have lower execution risks. It was also noted that the performance of instruments would vary depending on the type of crisis. (For instance, during crises in the 1990s, U.S. Treasuries benefited from a flight to quality; however, during the 1970s, a period of high inflation, longer maturity U.S. Treasuries performed particularly poorly.) Such analysis can be used as an input into the determination of the trade off between risk and return and as a determinant of highly liquid assets.

Table 1a. Securities Comparison: Execution Risk and Liquidity Raising Properties

Security	Liquidity and Execution Risk Bid-Ask Spread (in basis points)			Liquidity-Raising Properties	
	Normal Market Conditions	Illiquid Conditions	Extreme Conditions	Repo Market	Daily Volume (in billions of USD)
U.S. Treasury	1-3	2-4	5-10	Yes	750
U.S. Agencies	1-3	2-4	10-15	Yes	150
Sovereign and Supranationals	Na	Na	Na	No	--
Corporate (AAA/AA)	2-10	15-20	20-200	No	--
Mortgage Backed	2-4	5-10	15-20	Yes	250

Source: Hong Kong Monetary Authority.

Table 1b. Securities Comparison: Normal Versus Crisis Periods 1/

Asset Class	Entire Period (July 1992-June 2000) (in percent annualized)			Crisis Periods (in percent annualized)		
	Return	Volatility		Return	Volatility	
3M US T-Bill	4.7	0.2		5.3	0.2	
GOV 1-3 year	5.4	1.6		8.7	1.8	
GOV 5-7 year	6.7	4.8		15.3	5.2	
GOV 15+ year	9.0	9.1		23.9	9.1	
Agencies 1-3 year	5.5	1.4		8.4	1.5	
Agencies 5-7 year	6.6	3.4		12.1	3.7	
Agencies 15+ year	8.5	8.4		22.7	8.3	
Mortgages	6.4	3.5		12.6	3.3	
S&P500	17.0	14.6		24.1	16.2	
MSCI World Free	13.6	12.4		13.1	15.5	
MSCI EM Free	6.4	19.3		-25.8	27.3	

Source: The World Bank

1/ These statistics are derived from weekly data and annualized for presentation. Asset groups classified by maturity are not fully comparable owing to differences in the average duration within the asset groups.

Box 5. Currency Composition of Reserves

The strategy for determining the currency composition of reserve assets is related to the purpose for which reserves are held and the maintenance of reserve adequacy.

Short-term debt coverage approach

Countries that have begun to focus on holding reserves to cover short-term debt as a proxy for the main capital account risks, might therefore hold the currency composition of reserve assets in the same proportion as that of short-term debt (see also footnote 18). Accordingly, reserve coverage would be insulated from movements in cross currency exchange rates.

Other approaches to the determination of currency composition include:

Optimization/diversification approach

Exchange rate movements and interest rate differentials are the main factors determining returns and risks. Thus, some reserves managers, especially those in industrial countries, focus on risk and return assessments in determining the strategic allocation of reserves across assets and currencies, as do portfolio managers. Accordingly, reserve assets are typically held in more than a single currency in order to enjoy the benefits of increased diversification (of currencies and assets). An optimization process, using historic parameters, determines the benchmark investment portfolio.

Purchasing power approach

Some countries, in particular those that lack access to capital markets to adjust to shocks in the current account, and whose future imports or external debt payments are denominated heavily in a single currency or a few currencies, might take into account the foreign currency denomination of these imports and debt payments when constructing a currency benchmark. This approach seeks to maintain the purchasing power of reserves in terms of obligations.

Cost-of-carry approach

In countries where reserves are borrowed, the investment objective frequently is to minimize the cost of carry on those reserves while keeping strict risk limits on the net reserve position. Accordingly, investments may be matched with the foreign liabilities funding those assets in terms of duration (a measure of interest rate risk) and currency composition.

19. **As a country increases reserve holdings sufficiently to cushion against the identified external vulnerabilities, investment strategies may put greater emphasis on seeking higher returns over medium to longer runs, in addition to preserving capital and ensuring liquidity**. The more adequate reserves are, even in the presence of adverse shocks, the higher the proportion that can be invested with a longer-term outlook, as the cushion to accept short- term price volatility is larger and the risk of bearing potential liquidation costs are lower. Earning adequate returns over the medium-term is an essential element of sustainable reserve management policies. As reserves have increased in size, reserve managers have tended to diversify across different asset classes in a search of higher

returns within well-defined and prudent risk limits.[26] Some of the implications of higher reserves for investment strategies are highlighted in Box 6.

Box 6. Implications of Higher Reserve Levels for the Investment Strategy

Higher reserves levels as well as structural changes in traditional markets for reserve assets have prompted several reserve managers to reassess eligible investments and "widen the credit net"1/ Reserve managers have sought to diversify asset classes in a search of higher returns within well-defined risk limits. Moreover, a concentration of reserves in single asset classes, even if of a high quality, for example, U.S. Treasuries, has been found to increase risks of idiosyncratic changes in securities prices and liquidity conditions. 2/ Also, with the stock of U.S. Treasuries shrinking and the spread to other asset classes widening, reserve managers have been encouraged to switch to higher yielding investments. Several central banks, for instance, have expanded eligible asset classes for U.S. dollar investments to a range of sovereign issuers, and supranational agencies and are exploring investments in asset-backed securities.

Lengthening of the average duration has generally been associated with rising reserve levels. As reserve managers have accumulated larger reserves, their policies have generally increased the average acceptable duration. With a positively sloping yield curve, higher returns are normally associated with longer duration as a reward for assuming more interest rate risk.

The development of repo, swap and derivative markets has opened new avenues for central banks to manage liquidity when conditions in the market are not conducive to disposal of assets. Access to these markets provides reserve managers with greater comfort in seeking higher returns of longer maturity and duration assets. Currency swaps have enabled central banks to make decisions on currency composition based on risk/return considerations and provided flexibility in tapping various markets for funding.

Countries with well-developed risk management frameworks and experienced market personnel have, in some cases, allowed reserve managers limited leeway in exercising discretionary judgment on the investments of reserve assets "Active" portfolio management can result in added gains or losses in relation to the strategic allocation of reserve assets embodied in the benchmark portfolio. Such activities should be approved at the highest level of central bank management and monitored closely. The total return is determined by setting the benchmark with only marginal deviations permitted for active management.

1/ The term "credit net" refers to the level of credit risk of the type of issuer that is eligible to be included in reserves investments.
2/ See International Capital Markets Report: Developments, Prospects and Key Policy Issues, *World Economic and Financial Surveys*, International Monetary Fund, 2001 (July).

20. **Most of the implications of reserve adequacy for reserve asset management outlined above are relevant for all member countries.** In particular, the principles determining the liquid portion, selection and allocation of asset classes, and the risk-return tradeoff is fairly general. However, the derivation of currency composition based on specific considerations of reserve adequacy is less widely applicable as short-term debt is only a

[26] Reflecting such strategies, a number of central banks have adopted a tranched approach to holding reserves that distinguishes between liquidity tranches and investment tranches (see Appendix I).

starting point for the countries with significant but uncertain access to capital markets. Reserve management issues pertaining to countries with little or no access to capital markets are highlighted in Box 7.

Box 7. Reserve Adequacy and Implications for Reserve Management for Countries with Limited or No Access to Capital Markets

Countries that in the main do not have access to private foreign capital reserve management practices are less affected by the capital account based insights on reserve adequacy. However, limited access to private markets does mean that a country needs to rely more on its own resources (i.e., reserves) than on international borrowing to smooth adjustment to shocks. The potential for such shocks is thus a key ingredient in the setting of reserve goals for this group of countries.

Traditionally, three months' coverage was often used as a rule of thumb to assess adequacy, and the question arises if this measure is still applicable. While such a measure of the import coverage provides some basic indication of the degree of volatility that can be covered, it does not provide much insight into the potential of shocks. This potential for shocks is often high for this group, as it includes many countries that are heavily dependent on agricultural production and commodity exports. **Therefore it is essential to supplement basic import coverage measures with analysis of past volatility and the potential of shocks that affect current account flows**:

- Measures of the past volatility are provided by the changes in reserves experienced at times of large shocks and by statistical concepts such as the standard deviation of the level of reserves.

- The impact of potential shocks can be examined using stress tests. For instance commodity producers can use potential ranges for commodity prices and their experience with the impact of such shocks on other flows to assess the expected change in reserves and the need for a buffer. Countries with important tourist revenue or workers remittances can also take potential shocks to these revenue sources into account. A key aspect here is review whether shocks to various line items are likely to coincide or offset each other.

Moreover, capital account transactions such as debt payments, while limited, tend to be relatively predictable for these countries and, some coordination of debt with reserve management is likely to be helpful. So would some consideration of the volatility of aid inflows. Even with long-term concessional debt, reserve mangers will still want to plan ahead—e.g., to take account of any maturity bunching in repayment schedules, and possible delays in concessional cash loan disbursements. As regards currency composition of reserves, the currency composition of current payments would presumably continue to be the most important factor, outweighing the influence of the currency composition of debt servicing.

C. Implications for Risk Management

21. **Higher reserve levels, expanding asset classes, more sophisticated financial instruments, and more volatile financial markets, all increase the need for more sophisticated frameworks for risk management**. [27] In response, central banks in many

[27] For a discussion of key elements of risk management frameworks see Section 4 of the *Guidelines for Foreign Exchange Reserve Management*, (SM/ 01/264, 8/17/01).

emerging countries are adopting modern risk management techniques, including the stress testing of portfolios. A sophisticated risk management framework and the means to monitor risk positions are essential for those central banks that practice more active strategies.

IV. CONCLUSION

22. **Outreach conducted by the staff suggests reserve adequacy assessment that focuses on capital account vulnerability is a useful framework for evaluating reserves in the presence of uncertain access to capital markets**. This approach to reserve adequacy assessment has implications for management of reserves, including the selection of assets in the reserve portfolio and currency composition, particularly a closer alignment of currency composition with debt obligations and other potential capital account needs. Clearly, no single investment strategy will suit all countries or even groups of countries. Making appropriate judgments in setting the investment strategy involves assessing vulnerabilities and their implications for the use of reserves in a country-specific context.

23. **More work in this area is needed**. Staff envisage further work on the factors that influence appropriate reserve levels and ratios. Staff also plan to collaborate with reserve managers from member countries, the World Bank, and other international institutions to develop and share insights gained from different approaches to reserve management. Coordination of reserve management policies with the management of external debt, as part of overall liquidity management, will also be explored. In addition, the development of a supporting document for the guidelines on reserve management is intended to provide a wealth of information on best practices in reserve management. This ongoing work will be useful in underpinning technical assistance on reserve portfolio management.[28]

[28] Including through the Reserve Advisory Management Program, a new World Bank program on technical assistance in reserve asset management.

Reserves Management Policies, Objectives, and Strategies in Selected Countries[1/]

		Australia	*Botswana*
I.	Objectives of holding reserves	Reserves are held for intervention purposes.	Reserves are held to meet transaction demands and as store of wealth.
II.	Policy coordination between debt and reserve management	There is no formal coordination between debt and reserve management.	There is no coordination as the size of the official debt is negligible and any repayments can be met from the short-term funds without having to match the assets to liabilities.
III.	Transparency practices	SDDS subscriber. Reserve management policy, benchmark portfolio and actual returns are disclosed in annual report.	Reserve levels and currency composition are disclosed in annual report.
IV.	Reserves management strategy		
	A. Objectives	Assets are managed to achieve the highest return within defined risk parameters taking into account the need to ensure funds at short notice when required for intervention.	To maintain purchasing power of the foreign exchange reserves, ensure timely availability of adequate resources to meet all commitments, and maximizing total return within a framework of acceptable risks.
	B. Currency composition Rationale	Financial modeling based on historical patterns of volatility and return in the very large foreign markets in which it operates led the central bank to decide some years ago that, for the level of risk it is willing to assume, returns over time would most likely be maximized by holding 40% of the funds in US assets, with 30% each in German and Japanese assets. Identical ratios have been adopted in regard to the currency exposures across US dollar, euro and Japanese yen. These benchmark allocations are periodically reviewed to ensure that they still represent the optimal risk/return trade off.	The currency composition differs for the short-term fund and the long-term fund. In 2000, currency composition was U.S. dollar 61%,GBP 13.3%, and S.A. Rand 14.5% for the short-term fund. The South African Rand is mainly for transaction purposes. The currency composition of the long-term fund (Pula Fund) was: USD 48.9% Euro 25.2% GBP 11.1% Yen 11.9% Canadian dollar 2.9%
	C. Asset classes	Government securities and commercial bank deposits. Over 90% of the assets are in US, German and Japanese government securities. The benchmark is US markets 40%, Japanese markets 30%, European markets 30%.	Global fixed income and equities (equities externally managed).
	D. Tranche approach	No tranche approach.	Yes. Liquidity Portfolio (two tranches: transactions investment tranche and liquidity investment tranche) and Pula Fund which is the long-term investment (growth) portfolio.
	E. Benchmark	Yes. Currency, assets and duration benchmarks are defined.	Yes
	F. Active management	No. Passive – close to benchmark.	Yes. Active and passive mandates for fund managers.

[1/] This appendix outlines key elements of reserve management policy in selected countries, and is based on contributions by the authorities of the respective countries.

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		Canada	*Colombia*
I.	Objectives of holding reserves	Reserves are held primarily in Government account called Exchange Fund Account (EFA). Reserves are held to provide foreign currency liquidity to meet international requirements and unforeseen obligations at all times. It may also be used for intervention that is limited to promoting orderly conditions in the foreign exchange market during episodes of excessive fluctuations.	Reserves are held to provide a level of confidence to markets that the country holds sufficient level of foreign currency liquidity to meet its short-term external obligations (the value of one year's public and private debt amortizations and a provision for the standard deviation of the long-term component of the current account). It is also recognized that an objective of reserves is to support and maintain confidence in the policies for monetary and exchange rate management, including the capacity to intervene in support of national currency.
II.	Policy coordination between debt and reserve management	The Government raises foreign currency reserves by borrowing in international capital markets. Bank of Canada manages the EFA as agent for Government. A Risk Management Unit, established jointly by the Bank of Canada and the Department of Finance, implements the risk management program for most of the government's financial risk exposure.	There is limited coordination on management policies since the objectives for holding reserves differ from those for debt management. However, the currency composition of reserves does take into account the currency of external debt.
III.	Transparency practices	SDDS subscriber. Reserve management practices are disclosed in reports.	SDDS subscriber. Reserve management policies and performance are disclosed in semi-annual public reports to Congress.
IV.	Reserves management strategy		
	A. Objectives	Achieving a low funding cost subject to prudent practices is the main objective of liability management. Minimizing the cost of carry of reserves while maintaining an adequate level of liquidity and ensuring safety of capital is the main objective of asset management.	Obtain the highest level of return subject to quantitative constraints on risk that limit credit exposure (quality, sector and issuer), level of liquidity and volatility of returns.
	B. Currency composition rationale	Foreign currency assets closely match the foreign currency liabilities. About half of total reserves are held in USD (75% of liquid reserves—see below).	Currency composition of the benchmark is determined by the expected denomination of the balance of payments outflows estimated each year out of the past three year's observed rolling average, in order to maintain the value of the reserves in terms of expected outflows. In 2000, the currency composition was USD 80.4%, Euro 15.3%, Yen 4.2% and other currencies 0.1%.

	C. Asset classes	Securities of highly rated minimum AA sovereign governments, agencies and supranationals. Short-term investments in deposits of highly rated commercial banks.	Sovereign government securities, supranationals, mortgages, agencies, asset backed securities, banks and corporations deposits and corporate paper denominated in hard currencies. The use of futures and forward agreements for interest rates and exchange rates is also allowed.
	D. Tranche approach	Yes. Liquidity Tier dedicated to meet EFA's core liquidity requirements. Investment Tier, which is larger than the Liquidity Tier, seeks to closely match the duration of the assets and liabilities.	No formal tranche approach. However, in order to ensure immediate foreign currency availability, it maintains working capital that is invested in highly liquid assets and which may fluctuate within a range. The investment portfolio is managed by the bank and also entrusted to external managers.
	E. Benchmark	Yes. Investment performance evaluated against benchmarks based on the portfolio's liabilities.	Yes. Benchmarks prescribed by the Board.
	F. Active management	No. Asset switching to reduce cost-of-carry. No outright interest rate or foreign exchange exposure.	Yes. Within approved deviations from benchmark for each type of risk.

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		Hong Kong SAR	***Hungary***
I.	Objectives of holding reserves	Reserves are held in the Exchange Fund and are managed by the Hong Kong Monetary Authority. Reserves are held as a backing for monetary base and to maintain the stability and integrity of the monetary and financial system.	The objectives of holding reserves are mainly to support monetary policy, being a small open emerging market economy with open capital account and debt service obligations.
II.	Policy coordination between debt and reserve management	There is currently no official debt other than a nominal amount of notes and bills issued to maintain a domestic yield curve.	The coordination is through cross representation in policy meetings. Representative of Ministry of Finance takes part in the meetings when Central Bank Monetary Council decides about reserve management policy. Also, representative of the Central Bank is invited to forums where public debt management policy is set.
III.	Transparency practices	SDDS subscriber. The Exchange Fund also publishes bi-annual financial accounts, including returns performance. .	SDDS subscriber.
IV.	Reserves management strategy		
	A. Objectives	To back the monetary base, preserve capital, and maintain long-term purchasing power.	To achieve the highest risk adjusted return without jeopardizing liquidity needs rising from monetary policy implementation.
	B. Currency composition rationale	The long-term asset allocation strategy of the Fund is dictated by the investment benchmark, which defines the allocation of investments to different asset classes by country, as well as the overall currency mix for the Fund. The currency benchmark is: USD 80% Euro 15% Yen 5%. Predominance of USD is due to the link of the local currency to the USD.	Currency composition is based on asset liability considerations, external trade and HUF basket. The currency benchmark dominated by the euro.
	C. Asset classes	The Fund assets are invested in OECD bond and equity markets. The Fund can invest in 20 international bond markets, 10 equity markets and 18currency markets. The investment benchmark is: bonds 80% and equities 20%. (Also see backing portfolio below.)	US treasuries, EMU Governments AAA and AA, and EU sovereign securities, other AAA rated assets and AA assets.

	D. Tranche approach	Yes. The Backing Portfolio has been established to hold highly liquid USD denominated interest-bearing securities to fully back the monetary base. The Investment Portfolio is invested in OECD bond and equity markets to preserve the Fund's value for future generations.	Yes. Liquidity tranche and investment tranche.
	E. Benchmark	Yes. Benchmark for total Fund is customized through portfolio optimization. The total fund is comprised of different types of portfolios. Market benchmarks are used for types of portfolios.	Yes. Currency benchmarks and Portfolio benchmarks.
	F. Active management	Yes. Tactical deviation from overall benchmark within pre-defined risk-based limits.	Yes. Within limits.

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		Israel	*Korea*
I.	Objectives of holding reserves	The objectives of holding reserves are to reduce the probability of a crisis in the foreign currency market and to serve as the country's international liquidity for dealing with a crisis should one arise or for use in a national emergency.	The objectives of holding reserves are to maintain intervention capacity, meet unexpected external shocks and preserve value of national wealth.
II.	Policy coordination between debt and reserve management	Debt and reserves are independently managed by the Ministry of Finance and the Bank of Israel, respectively.	To achieve policy coordination, the reserve management policies for asset allocation and reserve adequacy take into account external debt and short-term capital flows.
III.	Transparency practices	SDDS subscriber. Reserve management operations and performance of portfolio relative to a preset benchmark are publicly disclosed.	SDDS subscriber.
IV.	Reserves management strategy		
	A. Objectives	The priority is on high liquidity and low risk. The objective is to maintain real value of reserves in relation to currency risk of external debt and current account currency exposure.	Generating high return while ensuring maximum safety and liquidity.
	B. Currency composition rationale	The benchmark comprises pre-set weights of several currencies, determined more or less in accordance with the currency composition of imports and debt service expenditure in the coming year.	Diversified currency composition: currency composition is based on the currency of external debt, current payments and market depth and size of reserve assets.
	C. Asset classes	Bonds issued or fully guaranteed by foreign governments, deposits with overseas commercial banks, tradable CDs, sovereign CPs, MBS with explicit government guarantee, and derivatives where underlying asset is one that the Bank is entitled to hold.	Global and US fixed income instruments--bonds and deposits.
	D. Tranche approach	Yes. About three quarters of the reserve portfolio is invested in very liquid assets. The other quarter is invested in assets with slightly lower liquidity. The ratio is set in relation to the level of reserves and an assessment of the possible need for liquidity.	Yes. Liquidity Tranche, Investment Tranche and External Tranche (for external managers).
	E. Benchmark	Yes. Benchmarks for each currency portfolio are specified and for certain asset classes.	Yes. Benchmark portfolio for each tranche.
	F. Active management	Yes. Within limits approved by management.	Yes. Within limits approved by management.

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		New Zealand	***Norway***
I.	Objectives of holding reserves	The objective of holding reserves is not for direct intervention but rather the concern for a potential loss of liquidity in forex markets in the face of rare but very large shocks. The potential policy benefits from even rare interventions justify the annual expense of holding reserves.	The main objectives of holding reserves are to support monetary policy, for meeting government's debt obligations and for returns. Reserves are sub-divided into separate portfolios according to purpose. (Please refer to section IV for a description of the sub-portfolios. All sub-portfolios are to be available for monetary policy purposes if necessary).
II.	Policy coordination between debt and reserve management	The RBNZ manages its forex assets and liabilities so that there is only modest FX and interest rate risk on its balance sheet. The FX liabilities are FX loans from the Treasury, with the currency and maturity determined by the RBNZ. The Treasury has some foreign currency assets in addition to the FX loans to RBNZ. All these FX assets are funded by foreign currency borrowing (or NZ dollar swapped into foreign currency). Hence the size, currency and maturity of the reserves are taken into account in determining the composition of the government debt.	The immunization portfolio (see item IV. D below) is coordinated with central government foreign debt to neutralize the currency and interest rate risks. The specific guidelines for the immunization portfolio are issued by the Norges Bank (Executive Board) in consultation with the Ministry of Finance.
III.	Transparency practices	The level of overall intervention capacity, which includes foreign reserve assets and committed credit lines, are made public. The net benchmark return/costs and overall returns/costs are disclosed.	SDDS subscriber. Reserve management policies and investment returns are disclosed in annual report. Guidelines for the investment of foreign reserves issued by the Executive Board, as well as supplementary guidelines set by the governor, are made public. Quarterly management reports that display size and return of the different sub-portfolios (and relative return compared to the respective benchmark portfolio) as well as risk exposure are available on the web site.
IV.	Reserves management strategy		
	A. Objectives	To actively manage the foreign reserves portfolio (including the funding of FX liabilities): a) to meet the immediate needs for any FX intervention; b) to maximize the risk-adjusted net returns subject to (a); and, c) to develop and maintain a broad skills base in foreign securities and foreign exchange dealing.	*Liquidity portfolio:* to ensure liquidity for foreign exchange operations in connection with the conduct of monetary policy. *Investment portfolio:* reserves are invested according to longer-term return considerations. *Immunized portfolio*: reserves are invested to immunize against currency and interest rate risks of government foreign debt.

	B. Currency composition rationale	The bank funds its reserves by borrowings in the same currencies as it invests. This provides a natural hedge or protection against exchange rate changes.	*Immunized portfolio*: matches currency of government foreign debt (match government foreign currency debt and neutralize the currency and interest rate risk associated with this debt). *Liquidity portfolio:* the short-term horizon implies the portfolio should have a few, liquid currencies. Of the four currencies in the portfolio, euro is the most relevant for interventions and has been assigned a 50% weight in the benchmark. *Investment portfolio* (the long-term portfolio): This portfolio has a longer investment horizon and is substantially larger than the liquidity portfolio. This implies that more emphasis is laid on risk diversification and therefore the investment portfolio has a larger number of currencies than the liquidity portfolio. (The investment portfolio has 8 currencies in the fixed income part and 12 in the equities part). *Buffer portfolio*: The currency composition is determined by the currency mix of the Petroleum Fund.
	C. Asset classes	About a third of reserves must be invested in G3 Government securities or cash balances at central banks. The next third must be invested in the same instruments or reverse repos (with G3 government securities as collateral) or with the BIS. The remainder can be invested in CDs. A small amount can be invested in other securities. All investments must be "AAA" or "AA" rated, except for about 5%, that can be invested in "A" rated securities.	The benchmark portfolio for the investment portfolio consists of 20% equities. Part of the buffer portfolio (item IV D. below) is also exposed to equity risk (in the form of equity futures) to reflect the asset classes in the Petroleum Fund. Otherwise, investments are only in fixed income instruments.
	D. Tranche approach	No tranche approach, as such. Holding reserves involves a cost, as it has to pay more for it's borrowing whereas it invests only in high quality assets. The aim is to reduce the cost by carefully structuring the overall portfolio supplemented by modest trading.	Yes. The reserves are divided into four sub-portfolios: an *immunization portfolio* to match foreign currency debt; a *buffer portfolio* to accumulate foreign currency purchases for transfer to the Government Petroleum Fund; a *liquidity portfolio* to be used for operations in the foreign exchange market; and a *long-term portfolio* which is to be available for interventions but to be invested according to more long-term considerations.

	E. Benchmark	Yes. There are benchmark asset and liability portfolio.	Yes. A benchmark is specified for each portfolio except the buffer portfolio that is coordinated with the Petroleum Fund.
	F. Active management	Yes. Within limits approved by management.	Yes. Within limits laid down for each portfolio (except for the immunized portfolio and the buffer portfolio).

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		Sweden	***United Kingdom***
I.	Objectives of holding reserves	The objective of holding reserves is for foreign exchange policy purposes. An additional (but minor) purpose is to have reserves in the event of crises.	United Kingdom's official foreign currency reserves are held in the Exchange Equalization Account (EEA) and are managed by the Bank of England as agent for HM Treasury. The EEA was established to provide a Fund which could be used for "checking undue fluctuations in the exchange value of sterling" and for other "national interests." The Bank of England also has a smaller pool of foreign currency assets on its own balance sheet.
II.	Policy coordination between debt and reserve management	To some degree the management of reserves is coordinated with the Swedish National Debt Office (SNDO). The main reason for this coordination is that the SNDO is not allowed to do transactions in the foreign exchange market (also in IV.A). Instead the Riksbank act as their agent in the market and this has a direct effect on the size of the FX reserves (as well as the Riksbank's monetary policy operations etc). There is also some coordination concerning repayments, etc. on the foreign debt.	There is close coordination between the Government Debt Management Office and the Bank. The reserves are managed in accordance with the criteria set annually by the Treasury in a document known as the Remit.
III.	Transparency practices	SDDS subscriber. Reserve management policy and returns are fully transparent and disclosed in annual report and also in other publications.	SDDS subscriber.
IV.	Reserves management strategy		
	A. Objectives	Managed with the aim of providing a good yield within acceptable risks. The reserves are also used to service government's foreign currency debt.	Investment approach spelled out in the Remit.
	B. Currency composition rationale	Intervention consideration, EMU consideration and diversification purposes determine currency composition. Benchmark is USD 35%, Euro 35%, GBP 15% and Japanese Yen 15%.	Overall currency composition determined by the benchmark $40%, Euro 40% and Yen 20% for the net reserves combined with the composition of the National Loans Fund's foreign currency liabilities.
	C. Asset classes	Assets with a government guarantee in the four currencies, bonds issued by international organizations, and other government guaranteed securities so called Eurobonds, US agencies (TVA, FHMLC, FNMA and FHLB).	The reserves are mainly invested in highly rated and liquid government, supranational and agency bonds. There is a small exposure to very short-term bank and corporate debt.

	D. Tranche approach	Yes. The reserves are divided into liquidity portfolio and investment portfolio. The liquidity portfolio comprises foreign currency held to meet inflows and outflows that arise, for instance, for interest payments and loan repayment on behalf of Swedish National Debt Office. The investment portfolio is invested in bonds. The aim is to generate the best possible long-term return within approved risk levels.	
	E. Benchmark	Yes. Customized benchmark (provided by Salomon Smith Barney) with a target duration (modified duration) of 5.25% (rebalanced annually).	The Remit specifies the benchmarks for investing the reserves with limits to the Bank's discretion to take currency or interest rate positions relative to those benchmarks.
	F. Active management	Yes. the mandate delegated from the board is that the modified duration must stay inside within a duration interval of 4-6.5%. Then different mandates are delegated throughout the organization.	Yes. Within limits defined in the Remit.

Outreach on Reserve Adequacy

In collaboration with the World Bank, Fund staff conducted a number of outreach activities during the past year to familiarize member country authorities further with reserve adequacy analysis focused on the capital account, and to solicit feedback on this approach. [1/] These included:

- Staff presentation at regional conferences on international reserves (in Istanbul and Bangkok in May 2000);
- A roundtable on reserve management jointly sponsored by the Fund and the World Bank (January 2001);
- A forum on policy issues in international reserves designed for Governors of Central Banks, jointly organized by the Fund and the Bank during the 2001 Spring Meetings; and
- Bilateral discussions with authorities from several member countries on reserve adequacy and management, including Bulgaria, Colombia, Israel, Latvia, and Romania. [2/]

[1/] This is in addition to the outreach on the reserve management guidelines described in *Guidelines for Foreign Exchange Reserve Management*, (SM/01/264, 8/17/01), which did not deal explicitly with the determination of reserve adequacy.

[2/] To reach a wide audience of reserve managers, the staff presented reserve adequacy analysis at training seminars for reserve managers conducted by the World Bank and the New York Federal Reserve Bank and published on the topic, for instance, see Christian Mulder and Ydahlia Metzgen, *Reserves Should be Adequate to Reflect Increase in Capital Flows, Need for Crisis Prevention*, IMF Survey, February 19, 2001.