XI. Israel

A. Background

631. Israel's foreign-exchange reserves are owned and controlled by the central bank, Bank of Israel (the Bank), which is therefore the "reserve management entity", as defined by *Guidelines*. Within the Bank, the Foreign Currency Department (Department) is responsible for performing the reserve management function, under the direction of the Governor of the Bank.

632. The size and role of Israel's foreign-exchange reserves have evolved over the 17 years since the 1985 Stabilization Program, which marked a watershed in the country's economic history. The early years of this period were characterized by a fixed exchange rate, which served as a nominal anchor for the price-level and a target for monetary policy, accompanied by a strict currency-control regime and the absence of significant interbank trading in foreign currency. In this environment, the reserves portfolio served as a "buffer" for capital flows, with the Bank intervening in the market on a daily basis.

633. Over the last decade or so, the focus of monetary policy moved from exchange-rate targeting to inflation-targeting, the exchange-rate regime was gradually liberalized, foreign-currency controls were all but eliminated (with the last restrictions due to be lifted at the end of 2002), and an active interbank foreign-exchange market, in which the Bank has not intervened for several years, developed. The exchange-rate regime is now defined by a band for the value of the shekel against a basket of currencies, with the lower bound fixed, while the upper bound increases by 6 percent per year. As of early 2002, the width of the band, relative to its midpoint, was around 45 percent. The Bank has declared a policy of nonintervention within the band, but is committed to defending the band's limits until such time as it is formally abolished. The past decade was also witness to a substantial increase in the size of the reserves, which trebled in dollar value from 1994 to 1998, while the ratios of the reserves to various other aggregates increased by lesser degrees. This increase was primarily due to intervention by the Bank in the local foreign exchange market, to defend the limit on shekel appreciation set by the band.

B. Governance and Institutional Framework

Objectives, scope, and coordination of Israel's reserves management

Objectives

634. In conjunction with the evolution of economic policies and circumstances described above, the Bank's understanding of the purposes served by the foreign-exchange reserves has changed and developed, a process which remains ongoing. Based on the experience of other countries and the relevant academic literature, the Bank has identified four principal goals which are served by holding the reserves portfolio:

- **Reducing the probability of a crisis in the local foreign-exchange market**. Although, as noted, the Bank's stated policy is not to intervene within the limits of the band, the knowledge that it has access to substantial reserves of foreign currency serves to reassure both residents and foreign investors, on the one hand, while deterring speculative attacks on the other. However, it should be emphasized that the importance of the reserves in this regard is secondary to that of sound and credible macroeconomic policies which support economic and financial stability.
- **Providing a strategic reserve of liquidity**, for use in a market crisis—should one nevertheless develop—together with other tools, such as the interest rate, or for use in a national emergency. In such situations, a high level of reserves improves the resilience of the economy and expands the range of options available to policy-makers.
- **Improving the standing of the country in international capital markets**, where many of the players view the level of a country's foreign-exchange reserves as an important indicator of its financial stability.
- **Providing the government with a degree of flexibility in managing the composition of public-sector debt**. Since the government can buy foreign currency from the Bank at will, it could choose to fund part of its foreign-currency expenditures (debt service or other expenses) from local-currency sources (taxes or borrowing) rather than from income or new borrowing in foreign currency. However, excessive use of this option could impair the ability of the reserves to serve the other goals listed.

635. In contrast with the evolving state of the Bank's purposes for *holding* reserves, the Bank's objectives in *managing* the reserves have remained fairly stable over the years, although the means of achieving them have been refined and adapted to changing circumstances. Though not formally adopted in this language, the Bank's investment policy has been developed on the basis of the following objectives for reserves portfolio management:

- **Preserving the real foreign purchasing power of the reserves**. This goal finds expression in the currency composition of the reserves, the management of their interest-rate risk, and the limitations on credit risk.
- **Maintaining a high degree of liquidity**. This goal is met mainly via limits on the types of assets which may be included in the reserves portfolio.
- **Subject to meeting the first two objectives, earning a reasonable rate of return on the portfolio**. This goal has influence on the choice of portfolio duration, the level of credit risk accepted, and the decision to employ active management.

636. A further objective of the reserves management process, though one clearly subordinate to the three listed above, is the accumulation of information and expertise which

can be of value to other core functions of the Bank, such as the formulation of monetary policy or exchange-rate policy (as noted in *Guidelines*, Sec. I, Par. 2.).

Scope and coordination

637. Management of the foreign-exchange reserves is closely linked with the formulation and conduct of exchange-rate intervention policy, with a number of individuals at various levels having involvement in both.[37] As noted above, the reserves management process also provides valuable information resources to the makers of domestic monetary policy.

638. Under current policy, the Bank is not involved in liability management,[38] nor are the reserves managed with a view to hedging the interest-rate exposure of Israel's foreign-currency liabilities. Israel's foreign-currency borrowing is managed by the Ministry of Finance. Traditionally, the maintenance of a "Chinese wall" between the reserve manager and the liability manager has been seen as an important safeguard for the reserves' unencumbered status, the value of which outweighed any advantages that might be obtained from coordination between the Bank and the Finance Ministry. (This issue is currently being reexamined.) However, the currency composition of Israel's short-term debt service is a factor in setting the currency composition of the reserves (see paragraph 649 below).

The institutional framework

Legal foundation and structure of internal governance

639. The Bank of Israel's authority to own and manage the foreign-exchange reserves of the country is based on The Bank of Israel Law, 5714–1954, and on the legal interpretations which have been developed around it over the course of the years. It should be noted that the law and its interpretations primarily address the types of foreign-currency assets that the Bank may own and the counterparties with whom it may transact.[39] Thus, many aspects of the Bank's investment policy and governance framework for the reserves are matters of internal Bank policy.

640. The main directives regarding management of the reserves portfolio in its various aspects, and the degree of leeway allowed to the Department in each aspect, are set by the Foreign Currency Committee, which is chaired by the Governor and includes senior

[37] However, under the Bank's current policy of nonintervention, "conduct" of intervention policy is limited to information-gathering activities, so long as the exchange rate is within the band.

[38] Other than the use of short-term repurchase agreements for tactical liquidity management.

[39] In brief, the Bank is permitted—within the framework of the reserves—to own gold, foreign currency, and securities which are issued or fully guaranteed by a foreign government, to invest in bank deposits and CDs, and to utilize derivatives such as futures and options, provided the underlying asset is of a type that the Bank is permitted to own.

managers from various departments of the Bank. The Department reports to the Foreign Currency Committee on current developments in international markets, on the performance of the portfolio and the various investment decisions made by the Department, and on any alterations in the parameters of the Bank's investment policy which the Department wishes to propose.

641. Investment decisions of the Department, within the boundaries set by the Foreign Currency Committee but beyond the leeway allowed to individual portfolio managers, are discussed in the Investments Committee, which is chaired by the Director of the Department and attended by staff members of the front and middle offices and by back-office managerial staff. The Investments Committee meets weekly to review market developments and front-office positions, as well as to consider investment decisions within its purview and recommendations to the Foreign Currency Committee. *It should be noted that the role of both the Investments Committee and the Foreign Currency Committee is advisory, rather than authoritative, since responsibility for their decisions is ultimately borne by the officers chairing them (the Director of the Department and the Governor, respectively.)*

642. Investment decisions within the boundaries set by the Investments Committee are made by portfolio managers, with the approval of the head of the front office (which is normally always given). Senior portfolio managers are responsible for one or more non-overlapping portfolios, typically defined by currency and range of maturities. They are assisted in this by junior portfolio managers, who may be given responsibility for part of a portfolio, and by trader-analysts (see below). No organizational separation is made between trading and portfolio management activities. The application of the above principles to active management of the reserve portfolio is discussed further in paragraph 662, below.

Staff

643. As stated in the *Guidelines* (Sec. IV, Par. 36), "appropriately qualified and well-trained staff, following sound business practices" are an essential element of the framework for reserve management. The Department's personnel policy in recent years has been based on the following principles:

- The Department's goal is to employ tenured, long-term employees who become known well. Thus, staff members of the front, middle, and back offices are regular employees of the Bank, governed by the same collective-bargaining agreements as staff members of other departments.
- When vacancies occur in the front office, they are normally filled by probationary employees who are recent MA-level honors graduates in economics or finance, *without* prior financial market experience. Practical training as a trader-analyst thus takes place on a *tabula rasa*, and is oriented toward the specific needs of the Bank. A combination of internal and external training is employed. Needless to say, all employees must be eligible for appropriate security clearances.
- At the end of a four- to five-year probationary period, trader-analysts who show exceptional ability are offered permanent employment as portfolio managers.

Those who are not offered permanent appointments typically find that the experience gained in reserve management is well respected by potential employers in the private financial-services industry. A similar employment cycle applies to the middle office.

- Compensation is on the same pay-scales as professional staff with graduate training in other departments of the Bank. As a matter of policy, there are no direct incentives to employees based on trade performance.
- Front and middle office staff members with permanent appointments generally remain in their positions on the order of a decade (with quite substantial variation around this mean.) Rotation to posts in other departments of the Bank (including managerial positions) is an option for those who come to desire a change or suffer professional burnout. In past years, front and middle office "alumni" have also moved on to senior economic posts in other branches of the public sector.

Transparency and accountability in the reserves management process

Operational risk management

644. As a manager of public funds, the Bank is particularly sensitive to issues of security and operational risk, and it strives constantly to maintain high standards of practice in this area, consistent with the norms of the financial services industry in the developed world and with reasonable cost-benefit trade-offs. Among the most important aspects of the Bank's control procedures are the following:

- **The organization of the Foreign Currency Department and its established work practices**. These have been designed to reduce the possibility of loss due either to human error or to intentional misconduct. Standard working procedures, which are documented and enforced, include routine verification and authorization procedures. The use of computer systems, which include automated controls procedures, is extensive. And there is an almost absolute division of authority and responsibility, on both an organizational and personal level, in the Department's primary tasks—transacting trades, processing trades, sending payment instructions, accounting, and auditing—so that a single individual does not have the ability to process a trade, send payment instructions, or alter records.
- **Control functions carried out by various units within the Department**. In addition to the back office, which performs a number of checks in the regular course of processing trades, and the Department's auditing section, which reconciles all transactions after settlement, there is a staff member—the System Controller—who follows all transactions processing on a real-time basis, and who reports directly to Department management.
- **Monitoring by authorities outside the Department**. These include the Comptroller's Department, which prepares the Bank's daily financial statements, checks accounts and authorizes the proper accounting scheme in the general ledger, the Bank's Internal Auditor, who performs regular comprehensive

examinations of specific topics within the Foreign Currency Department, reporting to management of the Department and the Bank, and the public accounting firm employed as External Auditor by the Bank, which audits the Department's activities once a year and reports its findings in writing to the Governor of the Bank.

- **Management's follow up**. Every irregular occurrence in the operational process is documented, with instructions for corrective action to prevent a recurrence. Once a year, a general overview of control procedures is undertaken. Needless to say, any recommendations of the external and internal auditors are also given the most serious consideration.
- **Codes of Conduct**. All Foreign Currency Department employees are subject to the Bank's rules of conduct, which include special rules on conflict-of-interest for staff with market contact. Such staff members are also required to be familiar with, and to follow, the ethical codes of the markets in which they trade. The Department is currently studying this issue, with a view to drawing up a Departmental Code that would incorporate all the existing rules and possibly extend them.

Disclosure

645. For many years it was the Bank's practice for the Department to prepare an Annual Report for use within the Bank, which was submitted to the Governor and members of the Foreign Currency Committee (see paragraph 640), with a very brief summary included in the Bank's Annual Report. In 2001, the Department's Annual Report was published separately, and in 2002 it was included in full in the Bank's Annual Report. These documents provide the public with extensive information on the Bank's objectives, investment policy (not including precise currency composition), and investment performance in absolute terms and relative to benchmark. They can be viewed on the Bank's website, at http://www.bankisrael.gov.il/publeng/publeng.htm. Up-to-date monthly data on the foreign-exchange reserves, in the form prescribed by the IMF Template, can also be found there, at http://www.bankisrael.gov.il/deptdata/mth/imf/imfdata.htm.

C. Assessing and Managing Risk

Investment policy and benchmark portfolio

646. The Bank of Israel's investment policy comprises the standards and procedures adopted by the Foreign Currency Committee which ensure that management of the reserves is in accord with the Bank's long-term preferences, objectives, and strategies. It provides for conservative limits on the portfolio's exposure to various financial risks, the main ones being currency risk, interest-rate risk, and credit risk. (There are additional risks, such as liquidity risk (paragraphs 667–669) and operational risk (paragraph 644).) The Bank's investment policy defines a risk-neutral **benchmark portfolio** for the reserves, and limits the deviations of the actual portfolio from the benchmark in terms of the various financial risk factors. These deviations may be the result of **active management,** or may be due to the operational

limitations of transacting in financial markets. The limits on each risk factor are applied independently; synergistic risk measures such as Value at Risk (VaR) are monitored, but currently have no formal role in the investment policy. The Department investigates new risk measures as they are developed; measures examined in recent years include partial duration and spread duration (not adopted) and option-adjusted duration (adopted for mortgage-backed securities).

647. The sections that follow give a brief introduction to some aspects of the Bank's investment policy. More complete information may be found by consulting the sources listed above in paragraph 645.

Neutral currency composition

648. The neutral currency composition of the reserves is known as the *numeraire*. It is defined by fixed percentages of various currencies, with the number of units of each one allowed to vary as exchange rates change (in contrast to a currency basket, such as the SDR, in which the number of units is constant from day-to-day while the percentages vary.) The composition of the numeraire is reviewed at least once a year.

649. When first adopted, the composition of the numeraire was based on the geographical distribution of goods and services imports. This composition was considered to preserve the real foreign purchasing power of the reserves, since imports constitute the foreign currency component of Israel's total final uses of funds.[40] A few years later, another element was added to the composition of the numeraire, namely, the currency composition of external debt service for the coming year. A further consideration in determining the currencies included in the numeraire has been that they are "reserve currencies," that is, those of countries with a tradition of economic stability and responsible policies in various fields.

650. The currency composition of the numeraire described here has changed over time only moderately, and it bears a reasonable resemblance to the currency composition of the total reserves held by official institutions. Nevertheless, over the past several years the Bank has reexamined the definition of the numeraire from time to time. To date, there has been no change in it, *inter alia* because the other systems reviewed yielded currency compositions that could change radically from year-to-year, making them very difficult and expensive to implement.

[40] This system was based on the 1979 study by A. Ben-Bassat, *The Management of Foreign Exchange Reserves, Israel's Experience*, Research Department, Bank of Israel (Hebrew), an abridged English version of which was published in the May, 1981 *Bank of Israel Economic Review*.

Neutral duration

651. The interest-rate risk of a portfolio in a particular currency is defined by its duration, and by the distribution of that duration along the yield curve. The Bank of Israel has defined a neutral duration for each currency in the numeraire by using a modified shortfall approach.

652. Under the shortfall method, a portfolio manager sets a minimum threshold for acceptable holding-period yields. Since the future course of yields-to-maturity in the market is uncertain, it is impossible to rule out capital losses with absolute certainty (unless one invests in zero-duration assets such as cash), but only with a certain probability, known as the confidence level. The minimum threshold and confidence level set by the portfolio manager, on the basis of his inclinations and risk-aversion, together with the assumed distribution of yields to maturity in the market, determine the maximum allowable portfolio duration, or shortfall duration.

653. Unfortunately, for a given threshold and confidence level, the shortfall duration can vary significantly from month to month, as the yield curve shifts. In order to find a duration that would have acceptable characteristics in various financial climates, staff of the middle office conducted the following study: For each month of the period from January 1984, to June 1998, the shortfall duration was calculated, using a confidence level of 95 percent and a minimum threshold equal to one-half the yield on a risk-free asset. For U.S. dollars, this was defined as a three-month Treasury bill and for other currencies as the one-month LIBID interest rate. The resulting series of monthly shortfall durations was then examined, and a value selected which is lower than 95 percent of them. This gives a duration which, 95 percent of the time, would have given an *ex ante* probability of *at least* 95 percent of earning no less than one-half the risk-free rate.

654. After doing this calculation separately in each currency, and after further minor technical adjustments, a single neutral duration was set for the currency portfolios comprising the reserves. This duration is 16 months.

Formulation of neutral benchmarks

655. The core element of the Bank's investment policy is the neutral benchmark of the reserves portfolio. Control of currency risk and interest-rate risk (and, to a limited extent, credit risk) is exercised via limits on the allowable deviations of the actual portfolio from its neutral benchmark (see paragraph 662), and it constitutes a risk-free portfolio for the Department, when it does not wish to have open positions, and provides a criterion for assessment of the Department's performance (paragraphs 664–666).

656. The overall neutral benchmark is constructed on the basis of benchmark portfolios in the various currencies of the numeraire, each one being represented in proportion to its numeraire weighting. Each of these component currency benchmark portfolios has a neutral duration (see above), and is composed of assets which are characterized by low risk and high liquidity, features which reflect the Bank's long-term investment strategy. Each currency

benchmark portfolio is based on two components: the first, having a short duration, includes assets of up to one year to maturity, while the second, which has a longer duration, includes assets of between one and five years to maturity. The weights of the two components are then set such that the total duration of the currency benchmark portfolio is neutral. The assets included in the currency benchmark portfolio are government bonds of the currency's country. However, in currencies where the market for government securities maturing up to one year is not liquid, the short-term component contains indices which reflect the interest paid by the Bank for International Settlements (BIS).

657. Although the Bank's use of active management (paragraph 662) implies that there is usually a gap between the yield of the reserves portfolio and that of the benchmark, this difference is generally small. This means that the expected profit on the reserves portfolio is determined primarily by the composition of the benchmark portfolio, rather than by the quality of the Bank's active management. Therefore, periodic adjustment of the benchmark portfolio to ongoing changes in the global financial environment is a necessary process, and is one of the major challenges confronting the Bank.

Limitation of credit risk

658. As is true of many official institutions, the Bank of Israel's sensitivity to credit risk is greater than its sensitivity to other financial risks. This is primarily due to the judgment that its ability to use diversification to limit the scope of losses is more limited in this area than it is *vis-à-vis* other types of risk, such as interest-rate risk. Additional reasons for heightened sensitivity would include: the possibility of correlation between losses due to credit risk in the portfolio and the need to make use of the reserves (e.g., in a global financial crisis), the limitations of currently available tools for quantifying credit risk, the desire to avoid having to seek legal redress in the courts of a foreign country, and the fact that credit risk is "optional" (in that it could be almost completely eliminated by investing only in the securities of sovereign states in their local currencies), while other risk factors are not.

659. Investment of the reserves portfolio causes it to be exposed to the credit risk of various types of institutions—governments, international organizations, clearing systems, commercial banks and broker-dealers. Investment in the securities of a foreign government creates exposure to the issuing country, while investments in bank deposits, time differentials in the settlement process, and trades involving delayed settlement (e.g., currency forwards) create exposure both to private firms and to the countries in which they operate. The Bank's willingness to assume exposure falls as the risk of experiencing a loss increases (i.e., as credit quality declines), as the time over which the risk extends increases, and as the type of entity to which the exposure pertains is thought to be less resilient (e.g., banks vs. governments).

660. The Bank uses a variety of tools to manage the credit risk of the reserves portfolio. Of these, the most important is the **System of Limits and Quotas**, which defines for each institution (bank, country, etc.) the maximum quantity of various types of credit exposure which may be assumed. It sets the minimum levels of credit quality for individual institutions of various types and also assures appropriate diversification across firms and countries, in

line with their relative size and credit quality. Additional tools for control of credit risk include: a ceiling on the total exposure of the reserves portfolio to the world banking system, limits on the permitted quantity of investment in “spread assets”, such as Eurobonds, and limits on the maximum time for which certain types of exposure can be assumed (e.g., on the term-to-maturity of bank deposits).

661. Once a year, the System of Limits and Quotas is updated by the Department and submitted to the Foreign Currency Committee for approval. If an institution’s quota is added or enlarged during the course of the year, the change must be approved by the Foreign Currency Committee. However, the Department may cancel or reduce a quota on its own initiative at any time, if changes in the institution’s status warrant doing so. It should also be noted that the Bank’s relations with financial institutions are anchored in legal agreements, most of which have been signed in the past few years.

Scope for active management[41]

662. In investing the foreign exchange reserves, the Department is authorized to use **active management** or **position-taking**, that is, to decide to depart from the overall benchmark portfolio, in terms of currency composition, duration, kinds of assets, and their distribution along the yield curve, with the goal of earning a higher yield than that of the benchmark portfolio. The leeway allowed for active management is defined separately for each type of exposure, and is based on the principle of limited delegation of authority and responsibility in the investment decision-making process from each level to the level below. In managing any type of position, it is customary to impose a maximum potential loss (“stop-loss”), with the position being closed if the cumulative loss on it reaches the limit. In recent years, the main focus of active management has been on asset allocation and security selection, which have formed an important part of the total contribution from active management.

- In the area of **currency risk**, the numeraire is viewed as a risk-free portfolio, and any deviation from it is defined as a position. Currency positions of more than limited scope must be authorized by the Foreign Currency Committee; however, the Foreign Currency Committee has not utilized this authority in recent years. The Department may decide on limited positions around the currency composition determined by the Foreign Currency Committee; within this boundary, the front office is permitted very limited positions around the currency composition set by the Investments Committee.
- The neutral **duration** for all currencies is set by the Foreign Currency Committee, and a deviation from it by the Department is considered a position. The Department is authorized to open positions of limited scope *vis-à-vis* the neutral duration in the various currency portfolios. The range of permitted durations is asymmetrical, as the Department is allowed greater leeway in reducing duration

[41] This section should be read in conjunction with paragraphs 639–642, above.

than in increasing it. Within this boundary, the front office is permitted very limited positions around the duration set by the Investments Committee.

- The **distribution of assets along the yield curve** is also a source of interest-rate risk, together with duration. The neutral distribution is that of the benchmark portfolio, while differences from it in the reserves portfolio represent positions. This type of position is normally decided on by the front office and monitored by the Investments Committee.
- Decisions on **asset allocation** may also create positions, as part of the reserves may be invested in types of assets which are not represented in the benchmark portfolio, such as Eurobonds, bank deposits, mortgage-backed securities, etc. Asset allocation decisions are normally made by the front office. However, in the case of asset allocation positions which are of unusually large scope, or which are of a long-term nature, responsibility for the position may be taken by the Investments Committee.
- Finally, decisions on **security selection—**the actual choice from among several alternative debt instruments to fulfill a specific role in the portfolio—of course are made throughout each workday by the staff of the front office, constituting an important component of active management.

663. The decision to employ active management is based on a number of considerations. First, and most importantly, the cumulative experience of the past fifteen years or so suggests that the Bank's use of active management has made a modest but statistically significant positive contribution to overall portfolio return. In addition, active management requires those involved in it to be constantly up-to-date as regards market developments. This incentive helps to assure that the Department's focus does not, over time, become too narrow, and it hones the skills needed for periodic adjustment of the benchmark portfolio and for other tasks, such as the formulation of intervention policy. Finally, the use of active management helps the Department to create an interesting and challenging work environment for front- and middle-office staff, assisting it to attract and retain highly qualified professionals.

Performance attribution

664. The contribution of various investment decisions to the overall difference in yield between the reserves portfolio and the neutral benchmark over a given period is measured by the middle office, using the capabilities of the recently-acquired portfolio management information system (paragraphs 670–677) together with a data-warehouse system developed in-house. (For a description of how performance attribution was done before the implementation of this system, see Box 1.6 of the Department's Annual Report for 2000, at the address given in paragraph 645.) The system is used to maintain portfolios which reflect the components of the neutral benchmark and portfolios which match the Bank's actual holdings, classified by maturity and asset type, including "leverage" portfolios, which are used to track the profit or loss of certain types of positions. Portfolios can be aggregated in hierarchies, so that the aggregate of actual holdings can be compared with the aggregate benchmark.

665. Leverage portfolios include long and short positions (though in its actual holdings the Bank never sells short a security). For example, the profit and loss on a currency position would typically be tracked using a leverage portfolio which includes a short position in cash in one of the currencies of the numeraire and a long position in cash in another currency (which may or may not be in the numeraire.) By contrast, the performance of a particular asset class (e.g., inflation-linked securities) would be calculated by comparing the yield on a portfolio including all the Bank's holdings in that asset class with a component portfolio of the benchmark.

666. The returns on portfolios are normally available to management and to the front and middle offices on command. An exception to the rule outlined above is the excess return on certain types of spread assets (e.g., bank deposits). Due to technical limitations, this is calculated only after the fact; however, the principles by which it is calculated are similar. Certain elements of yield curve positioning and security selection are necessarily calculated as the residual of other contributing factors and the total difference in return, but the middle office seeks to minimize the scope of this factor as far as possible.

The role of efficient markets

667. As noted, an important goal of the Bank in managing the foreign exchange reserves is that they should have a high overall level of **liquidity**, defined as the ability to realize assets without delay and without diminishing their value. The liquidity of the various markets in which the assets comprising the reserves are traded is regularly assessed by the middle office, based on two criteria. The first is the width of the "bid-ask" spread between buying and selling prices; a narrow spread implies low transaction costs, relative to the midpoint price. The second is the ability to transact in large volumes without affecting the market price. In an illiquid market, an investor's attempt to buy or sell in large volumes will cause the spread to widen and the midpoint price to move in the direction unfavorable for the investor; thus, assets can only be sold in quantity at an average price lower than the one which prevailed before the investor began to sell.

668. Based on these criteria, the Bank classifies the assets of the reserves portfolio into four groups:

1. **Highly liquid**, including securities with a spread of 0–2 basis points or 0–2 cents and various demand deposits.
2. **Liquid**, including securities with a spread of 3–5 basis points or 4–6 cents.
3. **Short maturity**, including securities, deposits and repurchase agreements with term of less than a month.
4. **All others**, most of which are tradable and can be realized, however. This group has included, among others, GNMA mortgage-backed securities, TIPS (U.S. inflation-linked securities), and some types of Eurobonds.

669. During the years 1999-2001, the first group has typically accounted for no less than 20 percent of the reserves, and the first three groups together for 75–90 percent of the reserves.

Portfolio management information system

670. Without doubt, the Bank's most significant move in recent years to enhance the quality of its reserve management and to improve transparency and accountability was its decision to acquire a new portfolio management information system. Although space limitations do not allow a full description of this project, which extended over more than three years and involved direct and indirect costs of well over US$1 million, the main aspects of it can be briefly sketched.

671. **Recognizing the existence of a problem** was the first task, and probably the hardest. Even in ideal conditions, computer systems are often in flux, as front, middle, and back offices adapt to changing financial-market conditions. How, then, does one identify the transition point from routine imperfection to a fundamental problem requiring a more radical solution? One important warning sign was the proliferation of ad-hoc solutions, often developed by end-users, to track risk measures and the profit and loss of positions. When the staff assigned to examine this problem formally mapped the Department's workflow, and counted between *five and ten distinct manual entries* to these independently maintained programs that were required *for a single trade*, it was clear that the risks had become unacceptably large. Among them,

- Substantial increase in the probability of human error, which could remain undiscovered for a considerable time.
- Inconsistency in the meaning of data across multiple systems, which sometimes were based on different concepts.
- Variation in the quality and maintenance of systems developed by end-users without professional IT training and responsibility.
- Blurring appropriate separation of responsibility, as, for example, when front-office staff, who were the only people with the expertise and access to data feeds required, built ad-hoc systems to implement new compliance rules.

672. One bright spot was that the problems were found to be concentrated in the front and middle offices, with the situation of the back office judged quite acceptable.

673. **Defining the needs of the Department**, in a very detailed way, based on the gap between the current state of affairs and the desired one, was the next stage. This was done by an interdepartmental team chaired by the head of the front office and including senior people from the front and middle offices and the IT Department. The high professional level of this team proved essential to the success of the project. The team's analysis served as a guide for the general RFI (Request For Information) and the more detailed RFP (Request For Proposal) that were written at a later stage.

674. **Buy or build** was the next decision to be made, and it was not an easy one. Building a complex customized system “in-house” would have meant recruiting or contracting for substantial additional personnel in the IT area for a very lengthy project, with no guarantee that it would result in an ideal solution. On the other hand, experience to date suggested that most of the “off the shelf” systems in the market would not meet the Bank’s needs. In the end, the team recommended that the possibility of purchasing a system should first be thoroughly explored, and only if a detailed examination of the available systems showed they were inadequate should the option of building in-house be revisited.

675. **Searching for systems, sending out the Request For Information (RFI) letter,** and **composing a short list based on the responses** were the subsequent stages of the project. The project team identified possible candidates through discussions with market participants and companies, and by searching the Internet and industry publications. The RFI letter included a general description of the Bank’s needs and the framework of reserve management, the layout of the IT systems in use, and a list of 12 questions that summarized the requirements of end-users and IT staff. Vendors were strongly encouraged not to limit themselves to just answering the questions, but rather to send publications, documentation, or other written material regarding the relevant modules of their system, as well as information on pricing, training and support. During this period, the Bank did not honor vendor requests to demonstrate their systems, and also found it necessary to decline various offers by companies to serve as consultants or implementation sub-contractors. Based on the written responses to the RFI, a short-list of candidate firms was drawn up. **Interviews** with two current clients of each short-listed candidate were then conducted by conference call, based on a list of questions faxed to them in advance, *without* the participation of the vendors firms.

676. Following these interviews, each candidate was invited to demonstrate its system, using a detailed **simulation** of initial portfolios, benchmarks, and a (fictional) day of trading activities provided by the Bank. Throughout the simulated day, cash flow, holdings, risks and performance were measured. The simulations took place at the Bank’s premises, with each vendor receiving three days in which to conduct its presentation. The program of three days was divided into carefully defined sessions, with each session relating to one of the main issues (e.g., markets, compliance, performance measurement, etc.). Each vendor was required to install its system at the bank for the occasion, so that the entire simulation was performed and demonstrated on each system. The simulation was of critical importance to the process. It gave the vendors greatly improved insight into our needs and the suitability of their systems to meet them. As a result, two companies realized that their systems were unable to perform the simulation, thereby reducing the shortlist. The simulation also enabled the project team and management to have the closest look possible at the suitability of each system to the Bank’s requirements.

677. The **competitive tender** or **Request for Proposal (RFP)**, required by Israeli law for purchase of goods or services by public sector bodies such as the Bank, was issued to the three candidates that participated in the simulation. The tender was very detailed with regard to the contractual terms of purchase (including warranty and maintenance issues), as well as the criteria for choosing a system and the future milestones of project implementation. An

integral and important part of the tender was the Specification Matrix, consisting of about 500 specification line items regarding the quality and functionality of the system. In their replies, the vendors were expected to define the extent of their systems' capabilities by entering predefined codes for each line item (Supported, Not Supported, etc.) Where relevant, they could also add free-form comments. This detailed list helped to rank the proposals, and served as the basis for the implementation of the chosen system later on. The final choice of system was made based on considerations defined in the tender documents, with the weight of each component set prior to the review of the proposals. These included, among others, the quality of the system and its suitability for the Bank's intended uses, its price, warranty terms, and reputation.

D. Conclusion

678. The preceding sections have not attempted to provide a comprehensive description of the Bank of Israel's reserve management process, but only to throw light on a few aspects of it which may be of particular interest to other official institutions. The Bank continues to explore numerous issues influencing reserve management. Some of these have been noted in the text; others include aspects of **legal risk, operational risk,** definition of the **universe of permissible assets**, and the **process of benchmark specification**. It should be emphasized that the Bank's approach to reserve management was not established in its present form all at once, but is the result of a long-term process of growth and development. In this regard, and bearing in mind that every institution's needs are unique to it, leading to various approaches, it is worthwhile to mention some of the fundamental conditions which underlay the development of reserves management at the Bank of Israel:

- An absolute commitment, at all levels of the organization, to maintaining the highest standards of integrity and professionalism.
- An organizational culture which encourages creativity and does not penalize those who question the "conventional wisdom."
- A collegial working environment, encouraging full discussion of major decisions before their implementation.
- A commitment on the part of both staff and management to the professional development and continuing education of members of the organization.

679. An institution which is able to nurture these values will most likely enjoy excellent prospects for successful fulfillment of its responsibilities, whether or not the specific solutions it arrives at are similar to those described above.

XII. KOREA, REPUBLIC OF

A. Developing Sound Governance and Institutional Framework

Reserve management objectives

680. The Bank of Korea (BOK) holds foreign exchange reserves to maintain a capacity for intervention in the foreign exchange market, to cope with internal and external shocks, and to preserve the value of the national wealth. Therefore, the BOK puts the focus on safety and liquidity, while also endeavoring to generate high returns.

681. Subsequent to the Asian financial crisis in 1997, the foreign exchange regime in Korea moved from a market average exchange rate system to a free-floating rate system, and this reduced the central bank's need to intervene in the foreign exchange market. However, it became imperative to increase the volume of foreign reserves, since they play an important role in alleviating shock in times of financial crisis and can also enhance Korea's national credibility.

682. Although the current level of foreign reserves is sufficient to make any necessary foreign payments, such as for short-term foreign debt redemption or for withdrawal of foreign investment funds from the equity market, we believe that it is desirable to increase the amount of our foreign reserves even more, considering the efforts being put into improving the Korean financial system as well as our developing relationship with North Korea.

Table 20. Reserves and Foreign Exchange Rates

	End of '96	*End of '97*	*End of '98*	*End of '99*	*End of '00*	*End of '01*
Foreign Reserves (billion U$)	33.2	20.4	52.0	74.1	96.2	102.8
US$/KRW	844.9	1,695.0	1,204.0	1,138.5	1,264.5	1,313.5

Scope of reserves management activity, and coordination with monetary and external debt policy

683. The foreign reserves that the BOK currently manages are the portion of Government and BOK assets which are readily available for foreign payments, and consist of foreign currency-denominated fixed income instruments, deposits, gold and SDR.

684. The BOK manages its foreign reserves in a manner so as not to hinder domestic monetary policy. When the BOK intervenes in the foreign exchange market, it observes the

domestic interest rate and currency flows carefully so as to be in harmony with the open market operations.

685. The currency composition of the BOK's and the Government's foreign debt and its duration are taken into consideration when determining the currency composition and target duration of the foreign reserves, so that foreign exchange rate and interest rate risk can be reduced.

Institutional framework

686. As outlined in the pertinent laws, Korea's foreign reserves are comprised of funds from the BOK and the Government (Foreign Exchange Stability Fund).

- The BOK's authority to hold and manage the foreign reserves is outlined in the Bank of Korea Act and the Foreign Exchange Transaction Act, which are open to the public.
- In accordance with the Foreign Exchange Transaction Act and the Budget and Account Act, the Government maintains the Foreign Exchange Stability Fund in order to stabilize the foreign exchange rate, and has entrusted the fund to the BOK to manage.
- Hence, the BOK, founded in June 1950, has been the sole reserves management entity for Korea's foreign reserves.

687. On the other hand, the BOK works closely with the Government on issues pertaining to policy decisions such as intervention in the foreign exchange market and monitoring foreign debt, in accordance with the Foreign Exchange Transaction Act.

688. In accordance with the regulations set forth by the Monetary Policy Committee, the highest decision-making body in the BOK, the Reserves Management Department (RMD) and the International Department of the Bank are responsible for foreign exchange management-related tasks. One Assistant Governor oversees both Departments.

689. The RMD oversees all aspects of reserves management, including benchmark selection, investment guidelines establishment, risk management, portfolio management, accounting and performance attribution. The department is structured based on the three major functions (front, middle and back office), and is divided into 6 teams.

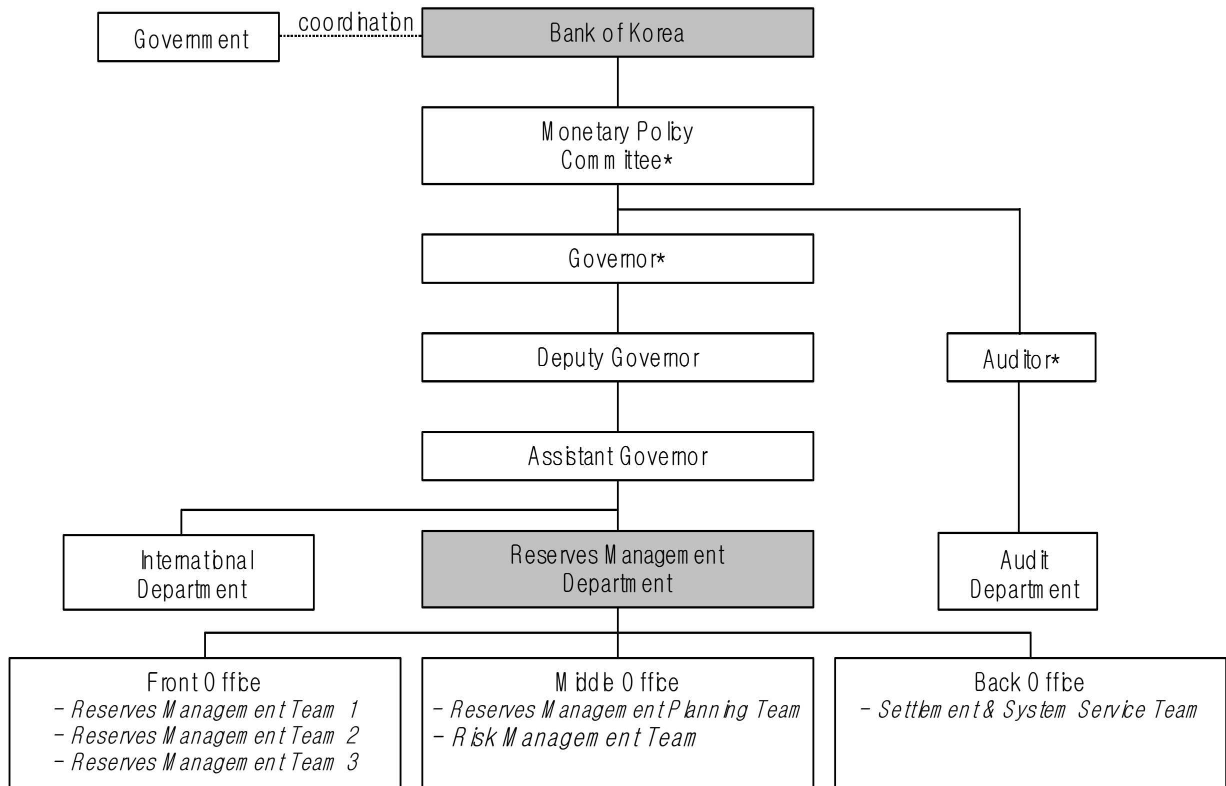
- The Reserves Management Planning Team formulates investment guidelines and the benchmark, and determines the currency composition and range of investment products.
- The Risk Management Team establishes the risk limits on the commercial financial institutions, monitors various types of risk and carries out performance analysis.

- Reserves Management Teams 1, 2, and 3 manage the portfolio in accordance with the investment guidelines and benchmark.

- The Settlement and System Service Team carries out settlement and accounting and looks after the IT systems.

690. Some of the major responsibilities of the International Department include the monitoring of foreign exchange transactions and of supply and demand, intervention in the foreign exchange market, and reviewing the volume of foreign reserves and reporting on this to the public.

Figure 9. Organization Chart



* appointed by the nation's President

Accountability and transparency

691. To minimize the investment risk and achieve greater investment efficiency, the BOK assigns responsibilities in a hierarchical manner, in accordance with the BOK's internal regulations set forth by the Governor.

- The Governor determines the investment guidelines and the benchmark including the currency mix and range of investment products, and approves the annual management plans.

- The Assistant Governor establishes the quarterly management plans within the parameters approved by the Governor. He also mediates to harmonize the foreign reserves management plan and the foreign exchange policy that the International Department is responsible for.

- The Director of the Reserves Management Department and the heads of the three reserves management teams set and execute the weekly and daily investment plans.

- The Benchmark and Management Plans are established after approval of the Reserves Management Committee and the Investment Committee.

692. The major tasks of foreign reserve management are carried out in accordance with the "Regulation on Foreign Reserves Management" determined by the Governor, and the detailed procedures are performed in accordance with the "Code of Foreign Reserves Management Procedures" set forth by the Director of the RMD.

693. The segregation of the accountabilities is achieved through defining the responsibilities of each function clearly, as described above. Moreover, strict firewalls have been established between each function, and each team has an independent reporting line.

694. The Risk Management Team prepares the risk management reports and submits them to the Assistant Governor on a monthly basis and reports the detailed management transactions and performance to the top management on a quarterly basis.

695. The auditing of Reserve Management activities is performed in two different ways, by means of internal audit and by external audits as follows:.

- The internal audit is performed by the Risk Management Team and the Audit Department. The Risk Management Team reviews reserves management details on a daily basis to check for any breach of the investment guidelines or excess of risk limit, and ensures that the accounting is performed properly. In addition, they also measure the VaR numbers. The team reports the results to the Director.

- The Audit Department of the BOK reviews the management details daily, through the Bank's internal IT network, and performs an audit annually. The department is operated independently under the supervision of the Auditor appointed by the

President, and the results of the annual audit are reported to the Governor and the Monetary Policy Committee as well as to other Government bodies.

- An external audit is performed at least once a year by the Board of Audit and Inspection, which is directly responsible to the President. Its purpose is to review both the accounting procedures and the foreign reserves management. The National Assembly also audits the foreign reserves management annually through the national audit.

696. The BOK calculates the size of the nation's foreign reserves daily and reports on this to top management and the Monetary Policy Committee on an ad-hoc basis. In compliance with the IMF's SDDS, the BOK discloses the size of its foreign reserves twice a month, to the public as well as the IMF.

697. The general investment philosophy and direction is disclosed to the public through annual reports. However, we do not disclose details such as our benchmark, currency mix, portfolio composition or portfolio returns, as to do so might adversely affect our foreign reserves management.

698. The BOK publishes an annual financial statement expressed in the domestic currency; however, this statement does not include the comments of the external auditors.

Retaining qualified staff

699. Staff are selected from among the existing BOK staff based on the BOK's general human resources guidelines, and trained. No external professionals are hired.

700. The staff selected are encouraged to remain in the department long-term, in order to strengthen their expertise. They are also encouraged to participate actively in the training programs sponsored by various domestic and foreign institutions.

701. The BOK has not adopted a performance-based compensation system. Therefore, the professionals in the foreign reserves management teams are subject to the same compensation and promotion system as other staff members of the Bank.

B. Establishing a Capacity to Assess and Manage Risk

Risk management

702. To monitor the different types of risk associated with foreign reserves management, the BOK has the following procedures in place:

- Credit Risk: Investment is only permitted in instruments with credit ratings of AA or above, and the trading counterparties are selected based on strict criteria.

- Liquidity Risk: The size of the liquidity tranche is maintained at an appropriate level at all times, and all investments are made in liquid and marketable securities such as sovereign bonds.

- Market Risk: The criteria for the currency mix and target duration and the permitted deviation range are determined in advance and monitored closely on an on-going basis. The VaR system is also utilized to track and monitor the greatest possible loss at a certain confidence level.

703. Since 1997, the BOK has separated its reserves into three different tranches and established different benchmarks for each tranche.

- The liquidity tranche is managed to meet the ad hoc foreign payment demand using U.S. dollar-denominated money market instruments. The optimal size of the liquidity tranche is determined quarterly based on the statistical analysis of the foreign reserves cashflow.

- The investment tranche is managed for the purpose of enhancing returns, and its assets are usually invested in mid- to long-term fixed income instruments.

- The trust tranche is the assets outsourced to internationally-recognized asset management companies for the purpose of transfer of investment knowledge or know-how as well as enhancement of returns.

704. The currency composition of each tranche is determined based on the following principles:

- The entire liquidity tranche is composed of a single currency, U.S. dollar, as most of the foreign exchange transactions are settled in U.S.dollars, and the U.S. money market is very well developed.

- The investment tranche is determined considering 1) the currency composition of the Government's and the BOK's foreign debt, 2) the currency composition of the current account payments, and 3) the size of the global sovereign bond market. In addition, other central banks' currency compositions are also used for reference.

- The trust tranche maintains the same currency compositions as the market index benchmarks employed for the respective investment strategies.

705. The BOK does not hedge its currency exposure, following the generally accepted principle that currency exposure is neutral if the currency composition is maintained as determined in advance. The BOK employs a strategic currency management strategy on a long-term basis for the purpose of rebalancing (adjusting) the portfolio, rather than engaging in short-term (tactical) currency trading.

Investment instruments

706. In accordance with the BOK's internal regulations, investment in deposits and marketable securities are permitted for reserves management as follows:

- For marketable securities, investment is limited to securities with AA or above credit ratings—sovereign bonds, agencies, supranationals and financial debentures. Stocks, corporate bonds, ABSs and MBSs are not permitted.

- With regard to deposits, they may be made only with financial institutions having credit ratings of A or above.

- However, outsourced assets are allowed to be invested in corporate bonds, ABSs and MBSs, provided that their crediting ratings are AA or above.

707. Although strategically the BOK adopts a passive investment strategy that usually does not deviate much from the benchmark, active strategies are undertaken occasionally depending on market conditions.

708. To facilitate such active investment strategies, the deviation range of the benchmark is determined in advance for the currency composition and duration, and sufficient range is permitted for achieving the optimal active strategies.

709. In addition, the BOK is measuring and monitoring absolute VaR and relative VaR numbers on a daily basis, as a complementary tool for more effective risk management.

Recent trends and challenges

710. The globalization of the securities market has deepened the coupling effect of interest rate risk, resulting in a diminished diversification effect in bond investments. Portfolio managers aspire to maximize diversification through careful analysis of the correlations between bond markets.

711. The BOK employs the book value system as part of its accounting standards, but performance and risk management are measured using the daily market prices. Therefore, we do not foresee any problem even if the accounting standard is changed to the market price valuation system.

Benchmark selection

712. The BOK uses different benchmarks for different tranches, and they are determined by the Governor.

- For the liquidity tranche, we have developed a benchmark composed of deposits and short-term U.S. treasuries.

- For our investment tranche, we have modified the JP Morgan Government Bond Index to suit our investment guidelines.

- For our trust tranche, the Lehman Brothers Global Aggregate Index and Lehman Brothers U.S. Intermediate Government/Corporate Index are employed.

713. The benchmarks are reviewed annually in consideration of changes in the market environment. However, we try to keep the strategic benchmark stable, unless the market environment changes are significant.

Assessment of performance

714. The performance of our reserve management activities is measured using market valuation and compared to the performance of the benchmark. Starting from 2002, the information ratio is used to measure risk-adjusted returns. Performance is evaluated quarterly. The performance evaluation is reported to the Assistant Governor quarterly and to the Governor annually.

External management

715. Along with a benchmark, the BOK provides very strict investment guidelines to the fund management institutions to manage the risk. Separating the fund management bodies and the custodian banks also helps to reduce the operational risk.

716. In addition, the transaction details are received from the custodian banks and fund management companies and reconciled daily, to monitor risk as well as any breach of investment guidelines.

Management information systems

717. The daily risk reports are submitted to the Director of the RMD and the monthly risk reports are submitted to the Assistant Governor. The quarterly performance reports to top management include some of the risk-related indexes such as currency composition, duration, VaR numbers, and risk adjustment measurement index, as well as the performance figures.

718. The BOK conducts stress tests and measures the changes in asset value of the foreign reserves daily using scenarios in which historical events that had significant impact on the market (e.g., Black Monday, the Asian financial crisis, and the September 11 terrorist attacks) recur, or hypothetical scenarios in which market conditions change dramatically (such as the yield on U.S. treasuries goes up by 50 basis points). The results are submitted to top management regularly through risk reports.

719. To reduce operational risk, the BOK has established strict firewalls between functions, which provides a system of checks & balances among the teams. In addition, all dialogues over the phone are recorded.

720. The custodians and counterparties are selected based on strict guidelines, and their credit ratings and corporate governance are closely monitored and reported to the Director of the Reserves Management Department.

Efficient markets

721. In order to maintain the liquidity of the foreign reserves, the BOK trades in the markets where large-sized transactions can be executed without severe price distortions. The BOK trades in the regional markets located in the same time zone—Tokyo, Hong Kong SAR, Singapore—and in some of the European markets like London and Frankfurt that have time zones which overlap with Korea. For the New York market that is in a different time zone, the BOK's New York representative office just executes the orders from the headquarters, in the name of the head office.

722. The BOK's investment instruments are restricted to high investment grade bonds that are usually very liquid and marketable, and therefore traded actively in all major international financial centers.

XIII. Latvia

A. Governance and Institutional Framework

Reserve management objectives and coordination

723. Reserves at the Bank of Latvia are managed according to three primary requirements: stability, liquidity, and income. Clearly, there are tradeoffs between income versus stability (or capital protection) and liquidity. In practice, the Bank of Latvia has set an investment benchmark that represents and communicates the Board of Governors' views on these three conflicting goals. The specific aspects of this strategy will be discussed later; but it is important to note at the outset that the Bank of Latvia puts relatively significant emphasis on the income portion of reserves management.

724. Any analysis of appropriate risk/return tradeoffs for central bank reserves management needs to incorporate reserves adequacy and potential intervention needs. Latvia's foreign exchange and monetary regime is a quasi-currency board. The bank pursues a fixed exchange rate target (vs. the SDR), with a ±1 percent intervention band. Latvia is a quasi-currency board because we also have and use a number of open market instruments to manage domestic liquidity, which wouldn't be the case in a traditional currency board.

725. On the one hand, automatic interventions at relatively tight intervention bands would necessitate the need for highly liquid reserves. On the other, it is highly unlikely that we would ever see interventions of such size that would entail the sale of the entire money base; and therefore, it would appear that we have a good deal of reserves that would not be necessary for intervention purposes, that could be invested with a higher degree of risk, in exchange for increased expected returns.

726. The use of reserves in Latvia is generally restricted to maintaining the defense of the foreign exchange policy, and generating income for the central bank and the State Budget (through existing profit retention arrangements). Since Latvia has a vibrant banking sector with a large amount of international business, official reserves are rarely needed for current account needs or to provide foreign exchange for local enterprises. The amount of foreign exchange in local bank balance sheets is more than enough to satisfy the needs of importers, exporters and other financial institutions. All of these factors have been analyzed at the Bank of Latvia, and influence the specific reserves management practices, which will be discussed later.

727. As stated in the law on the Bank of Latvia, central bank has the sole mandate to manage the foreign exchange reserves of the country (the mandate also permits us to engage external managers to manage a portion of the reserves). As a quasi-currency board, the size of the reserves is entirely dependent on automatic intervention operations, and therefore coordination with monetary policy is not much of an issue. The Bank of Latvia has, at times, offered foreign exchange swap products to the local market, and these operations are always coordinated with monetary policy.

728. The Bank of Latvia works closely with the State Treasury and Finance Ministry to coordinate debt policy, but reserves management is not influenced by the currency composition or maturity of the government's external debt. Each institution is responsible for managing its foreign exchange and interest rate positions. The Bank of Latvia is the fiscal agent for the State Treasury and Finance Ministry, however, and frequently manages money on behalf of these institutions, but these funds are managed in separate portfolios and do not influence the central bank's reserves portfolio. Any non-reserve foreign exchange in the central bank's balance sheet (such as Finance Ministry money or funds from foreign exchange swap operations) is run on a matched-book basis, to minimize any adverse effects on the bank's income statement. While requiring the management of several portfolios with different investment characteristics complicates the foreign exchange management process at the bank, this arrangement allows a very clear understanding of every risk taken on the balance sheet from foreign exchange operations.

Organizational and decision making structure

729. Investment guidelines for reserves management are set by the central bank's Board of Governors. More specific guidelines (such as allowable risk parameters for other portfolios, for example) are set by the Executive Board. All reserves management operations are undertaken in the Foreign Exchange Department. Great care is taken to ensure that all levels of management are aware of the results of reserves management operations. Monthly performance reports are given to the Executive Board. The Board of Governors analyzes the effects of reserves management on the bank's budget at its meetings, and all management has access to daily accounting reports on the bank's intranet. The central bank is currently installing a new treasury system, which will provide more detailed management information. The system should be live by year-end 2002. Furthermore, the Governor of the Bank of Latvia and the Chairperson of the Executive Board are members of the bank's Investment Committee (along with members of the Foreign Exchange Department), which meets weekly. Therefore, the highest levels of management are always informed of any developments positively or negatively affecting the reserves portfolio.

Transparency and accountability

730. Foreign exchange reserves operations are audited by external auditors and the State Control annually and by internal auditors more frequently. Disclosure of performance and positions is quite transparent. The central bank's published monthly financial statements will reflect all market value changes in all portfolios, and the annual statements are quite specific, offering detailed reports of currency position and also credit quality. While the Bank of Latvia, like most central banks, does not publish results in accordance with International Accounting Standards, the amount of transparency is very high, with footnotes to the financial statements being very detailed, providing any reader of the financial statements possessing a modest amount of accounting knowledge with all the information necessary to analyze the true performance from reserves management. And while relative performance numbers versus the benchmark are not specifically published, the benchmark itself is not

confidential, and all of the data that would be needed to make such an analysis is publicly available.

B. Capacity to Assess and Manage Risk

Risk management and benchmark portfolio

731. As the Bank of Latvia uses reserves to defend a fixed exchange rate target (against the SDR), the neutral currency composition mirrors this target. Specifically, the reserves benchmark consists of the components of the SDR currency basket, weighted as in the SDR. When the reserves portfolio is invested according to the neutral currency weights, then there are no valuation fluctuations due to currency movements.

732. Regarding interest rate risk, the benchmark consists of the 1–3 year government bond index in each component currency. This maturity sector was chosen for various reasons. First, extending duration, and having a market, not cash, benchmark, markedly increases the return on reserves over the long run. Obviously, increasing expected return leads to an increase in expected volatility. However, the 1–3 year sector was chosen to mirror the risk tolerance of the Board of Governors of the Bank of Latvia. The 1–3 year sector offers notable return enhancement, but volatility is limited—during the time periods available in most financial databases, the 1–3 year maturity sector has never ended a 12- month period with a negative return. Clearly, sub-zero returns can be observed in shorter time periods.

733. Liquidity is, of course, a primary concern. The Bank of Latvia has several liquidity constraints in its reserve management guidelines, which result in the purchase of instruments that can be realized in times of market stress. Unlike other central banks, however, the Bank of Latvia does not maintain separate liquidity and investment tranches in its reserves portfolio. We have found that the addition of extremely liquid short-term instruments for a liquidity portfolio is not economically justified in our case. The instruments we hold in longer term maturities are more than liquid enough to satisfy any intervention (or even working capital) needs, and any perceived negative effects from increased transaction costs from liquidating market instruments in times of stress are more than offset by increased long-term returns. Maintaining separate liquidity and investment tranches in effect puts the reserves portfolio in a “barbell” strategy. And while such a strategy offers increased portfolio convexity, convexity has a price, and such a portfolio will be suboptimal in the long-term, as it will not outperform a duration-neutral “bullet” strategy.

734. Within limits set by the Board of Governors and the Executive Board of the Bank of Latvia, the portfolio managers are allowed to take active positions away from the benchmarks, in the aim of profits from expected rate moves. The long-term strategic benchmark is set by the Board of Governors, and the Investment Committee (comprised of Foreign Exchange Department staff, the Chairperson of the Executive Board, and the Governor of the Bank) meets weekly to set tactical benchmarks. The Investment Committee also holds a quarterly meeting to discuss strategic themes. Individual portfolio managers are

free to trade instruments in a range around the tactical benchmark set by the Investment Committee.

Instruments

735. The central bank uses futures, options, swaps and other derivatives in the management of currency, interest rate and credit risks. Derivatives can be used for hedging purposes, to quickly and efficiently restructure the risk parameters of the portfolio, and for taking active positions. Leverage limits are set by the Board of Governors' investment guidelines.

736. A certain portion of reserves tends to be invested in "spread product"—agency and supranational paper, corporate bonds, mortgage-backed and asset-backed securities, commercial paper, and similar products. Our studies have shown that greater long-term risk-adjusted expected return can be gained from "moving down the credit curve", than by adding duration, or taking active currency positions. Our investment guidelines limit the amount of credit risk allowable in the portfolio, and limit liquidity and concentration risk as well. With a minimum allowable long-term rating of A-, all of the instruments the Bankof Latvia purchases for its reserves portfolio are safely in the "investment grade" category.

Staff

737. The management of a portfolio with such diverse products requires front, middle and back office staff that can understand, measure and manage the various risks involved. The Bank of Latvia has been able to attract and maintain extremely competent staff; turnover in the reserves management department has been limited. The central bank is able to offer its reserve management staff sufficient salaries—while not necessarily exceeding those available in the private sector, salaries are at least competitive. It is also possible for reserves management staff in some cases to earn higher salaries than senior management members, or department heads in other bank areas. Furthermore, we have found that allowing more complicated investments tends to keep reserves management staff interested and motivated—it would be much harder to retain our best specialists if the reserves portfolio were limited to, say, only government paper.

738. To maintain a high standard of professionalism in the reserves management staff, every single member of the front and middle office (and the department head), as well as some back office staff, are enrolled in, or have completed, the Association for Investment Management and Research's (AIMR) Chartered Financial Analyst (CFA) program. This program is a series of annual exams (three years minimum) that cover all aspects of the investment process, including accounting, taxes, corporate finance, fixed income, equity management, derivatives, portfolio management, ethics, financial analysis, etc. All AIMR members also adhere to a Code of Conduct regarding conflicts of interest in asset management and analysis, and annually sign professional conduct statements.

Risk and performance measurement

739. Information systems are also crucial to the management of these risks. The Bank of Latvia currently has specialized systems covering position management, risk analysis, performance attribution, exception reporting, and accounting requirements for all reserves management operations. Obviously, these systems are capable of processing all the allowable instruments in the bank's reserves and other foreign exchange portfolios. The central bank is currently installing a new bank-wide treasury system, which will further integrate these processes, and a new risk management package, to be installed by year-end 2002, will further supplement our existing risk management efforts.

740. The Bank of Latvia employs external asset managers to manage portions of the reserves portfolio. These managers are subject to the same investment guidelines and limits as our internal managers, and every external manager transaction is also entered into our in-house information systems. As a result, the managers provide good external benchmarks for our internal managers, and everyone's performance is measured using the same data and methodology. We have found our external manager program to be quite successful—at first, the managers provided valuable technical assistance and training; now, besides providing external benchmark data, they can be used to discuss investment strategies and ideas. Since every manager has the same goals, in trying to outperform the same benchmark, these discussions can be more fruitful than with some sell-side counterparties that may not know our specific needs at best, or may be trying to sell their specific inventory at worst.

741. Compliance with limits and guidelines is monitored constantly, for both internal and external manager portfolios. Exception reporting is automatic; in the case of a limit breach, the department head, Chairperson of the Executive Board and Governor are notified electronically. Daily asset mix reports, that show various deviations from strategic and tactical benchmarks (within permissible limits) are also distributed electronically.

742. Portfolio performance is measured on an absolute basis (for accounting purposes), and relative to the benchmark (for investment management purposes). Our performance attribution system disaggregates composite returns into returns from specific strategies, and these reports are always available online in our information systems, and e-mailed weekly to reserves management staff, the Governor and Chairperson of the Executive Board.

743. Operational risk and legal risk are constantly managed, and also addressed in several department and Executive Board procedures documents. All reserves management operations undergo an annual external audit, and specific aspects are audited more frequently by the Bank's Internal Audit department.

C. Conclusion

744. The Bank of Latvia places a focus on the return aspect of reserves management, which necessitates excellent staff, excellent systems, and the willingness of senior management to understand and sanction relatively higher risk levels. We feel the systems and

staff at the Bank of Latvia are more than capable of managing the assumed risks, and our performance to date has tended to justify this attitude. The nature of reserves management is always evolving, and the Bank of Latvia will continue to invest resources in staff and systems.

XIV. Mexico

A. Developing a Sound Governance and Institutional Framework

Reserve management objectives and coordination

745. The main objective for Banco de Mexico (the Bank) in the management of its reserves is the maximization of returns subject to liquidity needs and constraints. With the implementation of a floating exchange regime in 1995, the Bank has been increasing the weight that it places on return enhancement, while also placing high attention to other risks involved in its investment decisions.

746. There is no explicit coordination between monetary policy decisions and external debt management. However, in the past, when the Bank had liabilities with the IMF, reserves were split to allow the synthetic purchase of an SDR denominated portfolio in order to hedge the currency risk. Additionally, the Bank, as a financial agent for the Federal Government, has a mandate to invest and manage the resources that were pledged as collateral in the Federal Reserve Bank after the 1989 negotiations of the Mexican Brady Bonds; in performing these duties, the Bank must observe restrictions imposed under the "Collateral Pledge Agreement".

Transparency and accountability

747. The Bank publishes its Reserves on a weekly basis in its Summarized Balance, and its Assets and Liabilities on a monthly basis in the Data Template on International Reserves (foreign currencies).

748. However, with respect to a more detailed disclosure, the Bank considers the effort required to explain the technical issues related with reserve management to the public to be very costly. Instead, that effort should be placed in addressing more important topics of national interest.

749. External audits are performed once a year and the results are delivered only to the Congress and the President.[42]

750. Internally, the audit department monitors operations on a daily basis to verify if the bank norms are being met. However, the middle office is responsible for monitoring whether investments comply with the guidelines set by the Board of Governors on a daily basis as

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[42] Chapter VII, Article 51, subindex III of Banco de Mexico's Law (BDML) states: "In April of each year, a report on the implementation of monetary policy during the second semester of the previous year and, in general, on the activities of the Bank throughout said year, within the context of the domestic and international economic situation".

there are degrees of freedom that allow some deviations from the benchmarks. These deviations are limited using a value at risk approach.

751. The Bank keeps a formal documentation of every topic approved by the Board of Governors. The General Direction of Central Banking Operations also gives authorizations in writing. Finally, both the General Director and the Director of Operations are constantly informed of every investment strategy put in place, and of the performance generated against the benchmarks on a daily basis.

752. Recruiting employees with high business ethics and high professional skills is the way to ensure sound management of internal operations. Due to the confidential nature of the work within the Direction of Operations, a particular effort is taken in selecting personnel. Training the staff by sponsoring them to graduate studies, as well as sending them to highly recognized Central Bank Seminars are ways of confronting the difficulty of retaining high quality staff. At the end, however, the most efficient tools to avoid this situation have been a challenging work environment and an increased level of responsibility.

Institutional framework

753. The Constitution of Mexico gives total autonomy to the central bank and defines the control of inflation as its main objective.

754. According to Banco de Mexico's Law (BDML), reserves are wholly owned by the Bank in order to facilitate the accomplishment of the objective mentioned above.

755. The BDML also gives power to the Bank's Board of Governors to define policies and standards in order to perform its duties, including the management of reserves. The type of operations, the definition of reserves and the authorized assets on which to invest are defined in BDML Articles: 7, 19 and 20 respectively (see Box 1).

756. Even though the "Exchange Rate Commission" (integrated by the members from the Ministry of Finance and Banco de Mexico) is the highest decision authority on exchange rate policy and the management of foreign reserves, in practice, it is the Bank's Governing Board who authorizes the main investment guidelines. The Governing Board is informed semi-annually of the investment performance; nevertheless, reports are available daily at their request.

757. An Investment Working Group formed by senior operating staff is responsible for the oversight of ongoing operations. Weekly meetings are held to evaluate and decide on the investment strategy to be followed by headquarter-based staff.

Box 1. Banco de Mexico's Law

BDML ARTICLE 7 states, among other things, that Banco de México shall be entitled to perform activities such as:

I. Deal with securities;
II. Make deposits in either domestic or foreign credit institutions or security depository institutions;
III. Purchase those securities provided for in Article 20 Section II, issued by international financial institutions or legal entities with foreign domiciles;
IV. Carry out transactions involving foreign currency, gold and silver, including repurchase agreements.

BDML ARTICLE 19 states: The reserve provided for in the previous article shall be composed of:

I. The foreign currency and gold, property of the Central Bank, that are free of all lien and whose availability is not subject to any restriction;
II. The amounts resulting from the difference between Mexico's participation in the International Monetary Fund and the balance of unpaid contributions to said institution that are payable by the Bank, when this balance is less than the aforementioned participation, and
III. The foreign currency procured through financing obtained for exchange regulatory purposes from the legal entities referred to in Article 3 Section VI To determine the amount of the reserve, the foreign currency not yet received from the sale of domestic currency will not be taken into consideration; and the Bank's liabilities in foreign currency and gold, except for those liabilities with maturities over six months and those corresponding to the financing referred to in Section III of this article, will be deducted.

BDML ARTICLE 20 states that reserve investments must be made in securities, deposits or other obligations issued by highly rated foreign institutions

Pursuant to this Law, the term foreign currency includes: foreign bank notes and metallic coins, bank deposits, negotiable instruments, securities and all types of credit documents payable abroad and denominated in foreign currency, as well as international means of payment in general. The foreign currency qualified to be part of the reserve is only the following:

I. Foreign bank notes and metallic coins;
II. Deposits, negotiable instruments, securities and other liabilities payable outside national territory that are considered to be first rate in international markets, denominated in foreign currency, and payable by international financial institutions, foreign entities and governments other than the Mexican Government, provided they are highly liquid or redeemable within a term no longer than six months;
III. Credits payable by central banks, redeemable within a term no longer than six months, and which are current, and
IV. The special drawing rights issued by the International Monetary Fund.

758. External fund managers act independently based on the same guidelines placed by the Board for internal operations. There are no predetermined proportions on the amount of reserves that can be placed with external managers; although currently approximately 5 percent of total reserves are delegated to five different institutions. These institutions provide a list of all the operations executed on a daily basis, and deliver a performance report on a monthly basis.

759. In addition to the Investment Working Group, a Risk Management Unit, which is independent from the Operations Department, supervises to ensure that risks and limits in the management of reserves are met on a daily basis by both the external managers and the Operations Department. Within the Operations Department, foreign exchange dealing operations are executed independently from the investment reserves management activities.

760. A Counterpart Working Group that assembles every six months, led by the General Director of Operations and formed by the Operations Department and the Risk Management Unit, is responsible for evaluating and approving the addition or deletion of counterparts from a predefined authorized list.

B. Establishing a Capacity to Assess and Manage Risk

Risk management

761. The main risks that the Bank faces are liquidity, credit, currency and interest rate risks. To deal with all of them the Bank has a specific approach. The Board of Governors defines the strategic asset allocation embodied in two benchmark portfolios: one for the investment portfolio and the other for the foreign exchange diversification of reserves. Once the benchmarks have been defined, the Board sets the guidelines that will apply to the active management of the international reserves.

762. The investment benchmark has been modified several times, currently it is composed of U.S. Treasury instruments (65 percent), U.S. agencies debt (32.5 percent) and AAA credit card ABS (2.5 percent), and a 1.25 year duration. Securities lending is permitted and is executed through three securities lending agents (that happen to be three of the Bank's custodians) and the income generated is considered part of the return that is compared against the performance of the benchmark.

763. The foreign exchange benchmark is normally modified on a yearly basis, and currently it is composed of 88 percent dollars and the remaining 12 percent in other G-7 currencies and Swiss Franc, but historically the average has been 90 percent dollars vs. 10 percent non-dollars. The use of derivatives is authorized as part of the foreign exchange active management.

764. For both benchmarks Value at Risk (VaR) methodology is used to estimate on a daily basis the portfolios' exposure to market risk. VaR is estimated for a one-month horizon period with a 95 percent confidence interval. The maximum amount of risk allowed is

equivalent to 0.25 percent of the difference portfolio VaR. Additionally if the maximum cumulative underperformance on any calendar year, or any part of a calendar year, reaches 50 basis points (or more) below the return of the fixed income benchmark (or 100 million dollars (or more) worse than the foreign exchange benchmark) the portfolio will be managed passively thereafter so as to replicate the benchmark for the remainder of the calendar year. For both benchmarks, the middle office marks to market the positions daily in order to verify that investments comply with the guidelines set by the Board of Governors.

765. In relation with liquidity, credit, currency and interest rate risk:

- Liquidity risk: the Board has chosen G7 currencies and Swiss franc for foreign exchange operations and as those that constitute the Central Bank Forex Benchmark. For investment decisions the Board has chosen assets with deep secondary markets and high credit quality (such as US treasury instruments, agencies, industrialized country debt). Additionally the Bank splits its reserves in several tranches. Out of the 88 percent of the international reserves that are held in U.S. dollars, 6 percent are in a liquidity portfolio with a very short duration.[43]

- Credit risk: The investment guidelines do not allow the purchase of sovereign securities lower than Aa2 as rated by S&P in their long-term debt, placements with foreign banks must be in A2, P2 institutions as rated by S&P and Moody's respectively in their short-term debt, and the total exposure to bank risk can not exceed 50 percent of the international reserves. Finally the investment in AAA credit card asset backed securities is allowed. Ratings are reviewed semiannually as well as limits for individual bank exposure. These limits are based on their relative credit rating against the rest of authorized bank institutions and also based on their market competitiveness.

- Currency risk: Due to the nature of the Bank's Balance expressed in Mexican pesos, foreign exchange movements in the peso-dollar market have a direct impact on the Banks results. In the internal management of international reserves, however, currency risks arise from deviations against the foreign exchange benchmark.

- Interest rate risk: The exposure to interest rate risk arise from deviations against the investment benchmark, even though in this particular portfolio the use of derivatives is not allowed. The value at risk methodology described above is used to monitor and control risk. Additionally, the investment staff is not authorized to buy more than 10 percent of any individual security and the maximum maturity investment is 10 years.

[43] The liquidity portfolio considers investments with maximum maturities of three months (although investments in instruments such as U.S. treasuries and U.S. agencies can be made liquid on same day basis).

Operations in efficient markets

766. The Bank agrees that undertaking transactions in deep and well-established markets ensures that reserve-related transactions can be easily absorbed at market determined prices without undue distortions or adverse impacts on the level and availability of foreign exchange reserves. That is why the currencies and assets used by the Bank comply with this requirement. Nevertheless, the Bank recognizes that there could be extreme situations such as LTCM or September 11 events that can cause liquidity to disappear at any time, not being able to avoid this distortions for the management of international reserves.

XV. NEW ZEALAND

767. This report outlines the framework for managing foreign reserves in New Zealand. We cover matters raised in the IMF's guidelines on reserves management under two broad themes: developing a sound governance and institutional framework and establishing a capacity to assess and manage risk.

A. Developing a Sound Governance and Institutional Framework

768. The responsibility for foreign reserves management rests with the central bank—Reserve Bank of New Zealand (the Bank). Two major benefits arise from this arrangement. First, synergistic benefits arise with a single organization taking responsibility for monetary policy, financial system oversight and foreign reserves management. Second, the Bank's independence from the government means that the management of foreign reserves is undertaken at arm's length from the political process.

769. The Minister of Finance has important roles in setting the range within which the Bank must maintain foreign reserves and can direct the Bank to intervene in the foreign exchange market.

Objectives and strategies

770. The Bank's reserve management objectives are to actively manage the foreign reserves portfolio to:

- Meet the immediate liquidity needs for any foreign exchange market intervention.
- Maximize risk-adjusted net returns (or minimize risk-adjusted net costs), subject to the first objective.
- Develop and maintain a broad skill base in foreign securities and foreign exchange dealing to support the Bank's capability for conducting foreign currency market intervention or responding to other crises, and to enhance the Bank's general understanding of financial markets, instruments and practices.

771. These objectives are long standing—they were first developed in the late 1980s. The objectives have been subject to review since then, but have remained substantially the same because the principles which underlie them have remained relevant through time. These principles are that the Bank should:

- have both the funds and expertise to be able to intervene effectively in times of extreme market disorder; and
- manage public assets prudently and cost effectively.

772. These underlying principles are reflected in the reserves management objectives in the following ways. First, the primary objective for reserves management is to maintain liquid assets so that even in the event of extreme market disorder in both the foreign exchange market and global bond market the Bank has the capacity to undertake effective foreign exchange intervention.

773. Second, the Bank actively manages foreign reserves. It does so because it believes that active management:

- generates positive returns (in excess of compensation for risk and of active management overheads) and so reduce the costs of holding reserves; and

- encourages the dealers to actively participate in a wider range of instruments and markets than would otherwise be the case and so improves the Bank's market intelligence and contacts, knowledge of market practices, and foreign exchange intervention and risk management skills. The skills and experience gained from reserves management have been of value to the Bank in the context of its other roles too. For instance, foreign reserves dealers were able to provide valuable input when the Bank, in the context of its financial system oversight responsibilities, was managing the sale of a derivatives portfolio of a failed financial institution. It is not possible to be precise about how much added-value is obtained from active management but, in time of crises, extensive market knowledge, contacts and experience become invaluable.

774. The key strategic issues arising from New Zealand's reserves management centre around two issues: the level of reserves and the funding of reserves.

Level of reserves

775. The Bank manages reserves at a level agreed with the Minister of Finance—currently this is SDR 1.5b–SDR 1.8b. The level of reserves is determined in the context of our exchange rate/monetary policy implementation strategy and foreign exchange intervention strategy. New Zealand operates a free floating exchange rate regime—the Bank does not enter the New Zealand dollar (NZD) market to support a level or range for the NZD which it may consider appropriate in the context of monetary policy.

776. The level of reserves also reflects our intervention strategy. We hold reserves to preserve the functioning of the market for NZDs in time of crisis—i.e., when the market ceases to make a two-way price (bid and offer) for NZDs. If price makers exit the NZD market, the Bank may enter the market as a temporary "price-maker of last resort". The aim would be to facilitate early re-entry of price-makers, by taking on foreign exchange risks which arise in price making in time of heightened foreign exchange or financial market uncertainty, until a new price-clearing level for the NZD is determined. The Bank would maintain control over the transaction sizes used to determine a market clearing price. The

Bank has not had to intervene in the foreign exchange market since the NZD was floated in March 1985.

777. Our base-line level of reserves was first approved in the late 1980s. Much has happened since then including the Asian crisis and a greater understanding internationally of factors influencing macro-financial stability. The Bank is embarking on a review of reserves levels with these lessons in mind.

Funding reserves

778. The Bank funds its foreign reserves by way of foreign currency borrowing. The benefit of this strategy is that the Bank is not as exposed to significant foreign exchange risk as it would have been had it funded reserves from NZD liabilities (including notes and coins).[44] This assists the Bank in maintaining its independence as it is less exposed to political risks that arise (rightly or wrongly) when a government or public sector entity reports large losses from risk positions. A strategic issue for the Bank to consider in the future is whether costs of holding reserves could be reduced by financing reserves from notes and coins and/or fixed rate borrowing in the local market (where the Government's AAA rating gives it a competitive advantage). The Bank would enter into a currency swap to continue to hedge its foreign exchange risk.

Institutional framework

779. As noted at the outset, the Bank is the entity responsibly for foreign reserves management, however, it has a working relationship with the Treasury and in particular the Treasury's Debt Management Office (DMO) in two respects. We discuss this relationship and then outline the institutional arrangements within the Bank.

The Bank and Treasury

780. The relationship with the Treasury arises in two contexts. First, the Minister of Finance has the power to direct the Bank to intervene in the foreign exchange market. It is anticipated that in a foreign exchange crisis, the Bank will be intervening with the approval of the Minister of Finance, although the Bank has the power to intervene in the foreign exchange market of its own accord, if required.

781. The Bank also has a close working relationship with the DMO in the context of funding reserves (among other functions—e.g., government cash management and bond tendering). The Bank decides on the timing and nature of reserves funding (i.e., fixed or

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[44] This funding arrangement requires the Bank to spread its borrowing requirements to minimize its exposure to refinancing risk—i.e., minimize the risk that the Bank has to finance a substantial portion of reserves at a time when an extreme event in international markets has a significant adverse affect on borrowing (refinancing) costs.

floating rate, maturity, currency), consistent with its reserves management strategy, but it is DMO who raise the funds (borrowing is undertaken in the Government/Crown name). The proceeds of the borrowing are passed to the Bank by way of loans from DMO to the Bank and in this way the risks arising from the reserve assets and liabilities are managed by the Bank.

Arrangements within the Bank

782. Foreign reserves management is carried out across two departments. Financial Markets Department conducts front office operations (e.g., dealing, portfolio and asset/liability management, counterparty relationship management) and some middle-office operations (e.g., risk management policy, contract maintenance, counterparty credit rating reviews). Financial Services Group conducts back-office operations (e.g., settlements, treasury and financial accounting) and some middle-office operations (e.g., compliance monitoring, risk and exposure reporting, risk system maintenance).

783. Other departments and committees also play important roles in the management of foreign reserves. The Risk Assessment and Assurance Department (RAA) participates in high level strategic reserves management issues, acting as the Governor's advisor on risk frameworks and architecture. This department also contains the internal audit function. Reserves Oversight Committee (ROC) comprises Governors and senior managers and reviews the appropriateness of the portfolio structure, approves new business initiatives (including new financial instruments), and monitors active management and passive benchmark performance. Risk Management Committee (RMC) comprises Governors and senior managers and reviews the risk management arrangements in respect of all the Bank's operations including reserves management.

Accountability through governance and transparency

784. Accountability for the cost-effective management of reserves in accordance with performance expectations and risk tolerances is achieved through formal governance arrangements and transparent reporting of results and processes.

Governance

785. The Bank's powers, authorities and accountabilities are contained in the Reserve Bank of New Zealand Act 1989 (the Act). The Bank's powers and authorities are vested with the Governor who delegates appropriate authorities to relevant staff. The Bank conducts its foreign reserves operations in accordance with a mandate from the Governor. The Mandate for the Management of the Foreign Reserves Portfolio (the Mandate) contains the: purpose, objectives, reserves level, performance expectations, risk management policies and key management responsibilities and delegations with respect to reserves management. The Mandate which was implemented in September 2000, was designed to avoid any misdirection of focus toward detailed and immaterial risk and procedural issues. It was felt that a succinct, high level mandate modeled along funds management industry lines would

emphasize high level, strategic focus on risk and return issues with respect to the foreign reserves management function. Based on the experience of two years of operations, the Mandate appears to be serving its purpose.

786. The Bank's Board of Directors[45] (which comprises a majority of independent directors) has responsibility for, among other matters, keeping under constant review the performance of the Bank in carrying out its functions. Unlike boards of most entities which have a capacity to direct and influence the entity's functions and operations, the Bank's board may only advise the Governor with respect to matters relating to the Bank's functions and exercise of its powers. However, if the board considers the Bank is not adequately carrying out its functions, it may recommend to the Minister of Finance that the Governor be removed from office. Senior managers report to the Board monthly on the financial results of foreign reserves management. The Board's Audit Committee also meets regularly to monitor the audit function within the Bank, receive reports from the Bank's external auditor, review the Bank's financial statements and advise the Board on the Bank's accounts.

787. Head of Financial Markets, who reports to the Governor, is accountable for reserves management performance and compliance with risk management arrangements. ROC assists the Governor in monitoring performance and portfolio structures at a high level. The Chief Financial Officer (who heads Financial Services Group and reports to the Deputy Governor) is accountable for, among other matters, settlement operations, reserves accounting/financial reporting, and monitoring Financial Markets Department's compliance. Reserves operations in both Financial Markets Department and Financial Services Group are subject to both internal and external audit.

Transparency

788. The Bank publishes an annual report which lays out the governance arrangements, reports on the key performance indicators in respect of its functions (including reserves management), contains a report from the non-executive directors, and includes audited financial statements prepared in accordance with New Zealand generally accepted accounting practice (GAAP). New Zealand GAAP requires compliance with New Zealand accounting standards which are at least as rigorous as international accounting standards. In addition, the Bank applies relevant financial risk disclosures recommended by the Basle Committee on Banking Supervision. The key financial reporting implications of these policies are:

- Foreign reserve assets and foreign currency liabilities funding those assets are valued in the Statement of Financial Position (Balance Sheet) on a marked to market basis with gains and losses booked to the Statement of Financial Performance (Profit and Loss). This fair value methodology is employed because we regard the reserves as

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[45] The Bank's Board is about to undergo a restructuring—a non-executive director will replace the Governor as Chair of the Board and Deputy Governors will no longer hold Board positions. This follows an independent review of the operation of monetary policy in New Zealand.

available for sale (intervention). Liabilities are valued using the same methodology as the assets so that the financial statements capture the effects of the quality of our financial risk management—gains/losses from unhedged risk positions are booked to P&L.

- Extensive disclosures are provided in the notes to the accounts on a range of reserve management matters—e.g., risk management policies, quantitative risk exposures (including credit risk and market risk losses including from tail (extreme) events), net reserves management income (active management performance and passive or risk neutral performance are separately identified).[46]

B. Establishing a Capacity to Assess and Manage Risk

Benchmark portfolio and instruments

789. The Bank's framework for managing all risks arising from foreign reserves management is documented in the Risk Management Document. The main risks the Bank faces from this activity are business risk, liquidity risk, credit risk, market risk (interest rate and foreign exchange risk) and operational risk (including custodial risk). The key elements of the strategy for managing these risks are outlined below. This section concludes with a discussion of active management performance monitoring and controls.

Business Risk

790. This encapsulates the political and infrastructural risks arising from the markets in which, and instruments with which, we manage reserves. We aim to minimize reputational risk by limiting authorized instruments to "plain-vanilla" fixed income instruments and derivatives. The derivatives activities encompass only futures and swaps. We do not invest in non-fixed income instruments such as equities. Nor do we invest in options or fixed income securities with material option risk such as mortgage backed securities.

791. The markets in which we operate are in essence restricted to those of well developed countries (mainly U.S. and Germany although we have scope to participate in G-10). We do not operate in emerging markets.

Liquidity Risk

792. Reserves are not divided into tranches to meet different objectives per se. However, reserves are actively managed within the overriding constraints that reserves must be liquid and diversified primarily across U.S. and Germany. This means that the base-level of reserves must be invested in specified classes of liquid assets in these markets—i.e., Government securities (including central bank deposits), reverse repos (with government

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[46] Note, the effects of translating reserves management performance back into NZD is not material (but is separately disclosed) because foreign reserves are funded by foreign currency liabilities.

security collateral) and CD/CP's (primarily by issuers rated AA- or better). In broad terms, at least a third of the liquid reserves must be held in Government securities and no more than a third of the liquid reserves can be held in CD/CP's. The investment of a significant proportion of reserves in CD/CP's instead of Government securities significantly reduces the cost of holding reserves (the CD/CP investment yield is close to the funding costs), without significantly reducing credit quality (given the credit rating criteria we apply and the short maturity of the instruments) or materially altering our liquidity (since our holdings represent a small proportion of turnover and amount on issue).

793. The currency composition of reserves is determined by the intervention strategy and risk preferences. The U.S. dollar is our intervention currency so the majority of our liquid assets are denominated in this currency. The proportion of reserves held in other major currencies varies depending on prevailing risk conditions and net borrowing costs. Depending on local market conditions we may hold reserves in only one currency other than the U.S. dollar. Currently, we hold liquid reserves in U.S.dollar- and euro denominated assets.

794. The instrument composition of reserves is reviewed periodically in the context of liquidity risk stress scenarios—e.g., widening of credit spreads and bid/offer spreads. Risk Management Committee reviews underlying assumptions about extreme market conditions, our intervention strategy under those conditions and the financial cost of liquidating reserves under such conditions. Based on this analysis, the instrument composition of liquid assets is agreed.

Credit Risk

795. The risk of loss from counterparty default is managed by way of individual counterparty and aggregate credit risk limits. Individual counterparty limits are determined in accordance with the Governor's strategic tolerance for loss—the loss from default of a non-sovereign counterparty should not exceed the Bank's capital. In practice, this means we set the counterparty limit for AAA/AA+ rated entities at a level just below Bank capital. Limits for counterparties with a lower rating are assigned a proportionately lower limit based on the relative default rate for entities with that lower rating. For instance, if the probability of default of a single A rated entity was three times higher than that of a AA+ rated entity, the limit for the single A rated entity would be one third the limit of the AA+ rated entity. We do not permit credit exposures to entities rated lower than A-.

796. Concentration of credit risk is controlled by aggregate credit limits—primarily country limits and, in some cases, bank or corporate sector limits within countries. The thresholds for aggregate credit limits are set on the basis of judgments about political risks arising from losses in the event of sector or country crises. We are in the processing of supplementing these judgments with a quantitative analysis of counterparty default correlation. Our aggregate credit limits also include a cap on the aggregate amount of credit exposure we have to all single A rated counterparties to ensure that the credit quality on the reserves portfolio is maintained at a high level.

797. Credit exposures relative to limits are generally reported on a gross basis—exposures are only reported on a net basis where there is a legally enforceable netting contract.

Market Risk

798. The market risks the Bank is exposed to are interest rate risk and foreign exchange risk. Both these risks are controlled by the same market risk limit framework. The (parametric) value-at-risk (VAR) methodology is used to measure and control market risk. The VAR limits are set well within the Governor's stated tolerance for market risk losses in a year to allow for both accumulated market risk losses over a year under normal market conditions and losses from extreme movements in market prices or "tail-events". The accumulated losses over a year allow for poor active management performance and (mark to market) losses on the passive portion of reserves due to adverse interest rate trends (narrowing credit spreads). The allowance for tail-events is based on an analysis of simulated worst single day losses on a diversified portfolio over the 1990s, scaled-up to allow for unobserved tail-events. This simulation/stress test analysis is conducted annually. Given that we invest in instruments which are highly liquid (even in extreme/stress scenarios) we believe it is appropriate to measure market risk (including tail-event market risk) with only a one day holding period.

799. Actual daily P&L results are compared with estimated gains and losses from the VAR model each month. The results of the "backtesting" analysis are reported to the Reserves Oversight Committee quarterly.

800. The VAR-based framework for managing market risk has been in operation since 1998. It is a considerable improvement on our in-house duration and convexity market risk model which it replaced because VAR captures spread risk and FX risk. We have found VAR a very useful "common-ruler" for measuring market risk on a range of different instruments and positions and most helpful in communicating to senior management about the quantum of risk (under normal market conditions). VAR presents challenges for us in terms of understanding where our market risk exposures lie and what are our key risk factors (nature of and changes in interest rate and exchange rate volatilities and correlations). We are in the process of developing management reports to get better insights of our risks that lie behind VAR. Senior management are aware of market risks that lie beyond VAR—the results of the annual tail-event analysis are reported to them and estimates of extreme losses are published in the annual report. We also find (parametric) VAR less useful for capturing the risks over time on the passive portion of reserves because the main market risk on this portion of reserves—credit spreads - is mean-reverting. This means scaling parametric VAR by time overstates risk. VAR derived from historical simulation is our preferences for the future, but system and database management issues constrain our desire to move in this direction in the foreseeable future.

Operational Risk

801. Minimizing operational risks in the management of reserves is of critical importance in two respects:

- Maintaining a continuous intervention capacity; and
- Minimizing financial loss and reputation damage from fraud.

802. In order to maintain a continuous intervention capacity the Bank sets internal controls and processes in respect of system and data integrity (e.g., data reconciliation), disaster recovery planning (including maintaining an off-site capacity and crisis procedures and contacts), and key person risk (including succession planning, mentoring, knowledge sharing and information dissemination). The Bank is also dependent on its securities custodians effectively managing their operational risk. We review custodians' controls before we place securities with them and, on an ongoing basis, test their systems (with their co-operation) by executing securities transfers instructions from time to time to simulate cash raising in time of intervention. In addition, we have a policy of diversifying our security holdings across a few custodians so that our intervention capacity is not entirely exposed to operational risks or disaster scenarios with respect to a single custodian.

Fraud

803. The Bank has in place a number of operational controls to minimize the financial and reputational damage from fraud. These include separation of front and back office operations, logged dealer phones, tracking of deal tickets, transaction and position reconciliation across P&L and risk reporting, and confirmation and settlement instruction matching with counterparties. The Bank also places considerable importance on front, middle and back office operations having a good understanding of the nature of, and risks arising from, the instruments in which we deal so transactions will be subject to reasonableness checks along the process chain. The aim here is to not rely too heavily on any one person (particularly in the front office) for advice on appropriate processing of transactions. This widespread understanding of appropriate processes is an objective we are continually striving to achieve.

Active management

804. As noted above, the Mandate includes provisions for active management of reserves and clearly outlines the performance expectations which must be met to continue this activity. Active management takes the form of interest rate and currency trading over short term (ranging from intra-day to up to three months) and medium term (three to 24 months) horizons. Positions are entered into at the discretion of dealers and on the basis of rule-based analytics. Given the rather limited range of instruments and markets in which we can operate, we strive for diversification by trading with different investment horizons and by using different decision processes (dealer discretion and rule based analytics).

805. Active management returns and risks are measured against a benchmark (comprising both assets and corresponding liabilities) which is constructed within the Bank, independently of the front-office, to reflect the composition of reserves and funding under passive management—the risk neutral position. The benchmark is managed within broad risk parameters defined by the Governor and with the objective of minimizing costs, consistent with a passive management strategy. Portfolio managers must actively manage reserves in a manner which adds value—i.e., generates a return which exceeds the benchmark and covers charges for additional risks from active management as well as additional costs arising from active management. Performance is measured on a rolling three-year basis, but regard is also had for performance in a financial year to monitor the Bank's political risk exposure that may arise when it publishes results of operations in the annual report. Active management performance is also monitored relative to that of comparable (external) fund managers, six monthly. Information ratios are used for this purpose. This enriches our understanding of our portfolio managers' performance; however, it is not the relative performance of portfolio managers which determines whether we continue with this activity, it is their absolute performance—they must add value (as defined above).

806. Active management risks are controlled using the same framework used to control the risks on the entire reserves (active and passive reserves), as outlined above. Market risk is the only area where we have separate active management limits. VAR and stop loss limits are applied at the portfolio and aggregate (all portfolios combined) level.

807. The Bank does not currently use external fund managers as we believe that this would constrain our capacity to meet the objective of reserves management to increase the Bank's knowledge of instruments and market practice and maintain market contact; divert scarce resources to managing the relationship; and not significantly increase returns if the managers were subject to the same risk constraints as our portfolio managers.

808. However, we would consider using external fund managers if there were markets or instruments in which we wished to participate but did not have the expertise to do so directly. In these circumstances, we would expect that external fund managers would not only improve active management risk-adjusted performance, but also provide a means by which we could learn from their activities.

809. We do make use of overseas investment banks' bond lending services. The Bank undertakes this activity itself, but time zone differences mean that it is economic for us to outsource this activity to entities which operate in markets at night in New Zealand.

C. Conclusions

810. The Bank's management of foreign reserves is continually evolving. There are a number of strategic issues which underlie reserves arrangement and it is the Bank's (and government's) practice to review these issues periodically. Reserves management in New Zealand also evolves in light of market developments in financial instruments and risk management practices, and of our own experiences and lessons. We recognize that our

practices differ in many significant respects from the practices in other countries (there are also significant similarities too). We believe that this is appropriate because, while there are core principles underlying reserves management, the practices adopted in meeting those core principles should vary according to countries' public policy, institutional frameworks, skills and resources.

XVI. NORWAY

A. Background

811. At the end of 2001, Norway's central bank the Norges Bank (the Bank) managed funds worth NKr 795 bio (US$88 billion) in the international capital markets. The bulk of this capital was the Government Petroleum Fund (NKr 613 billion /$68 billion), which is managed on behalf of the Ministry of Finance, and the Bank's international reserves (NKr 170 billion/$19 billion). Norges Bank's international reserves comprise of the foreign exchange reserves, gold reserves and claims on the IMF. In addition, the Bank manages the Government Petroleum Insurance Fund (NKr 11 billion /$1 billion) on behalf of the Ministry of Petroleum and Energy.[47]

812. The foreign exchange reserves (NKr 157 billion /$17 billion) are split into four sub-portfolios;

- the *liquidity portfolio* (NKr 37 billion /$4 billion), which is to be used in connection with the conduct of monetary policy (for potential foreign exchange interventions and to influence liquidity and interest rates in the Norwegian money market)

- the *long-term portfolio* or investment portfolio (NKr 106 billion/$12 billion), which should also be available for market operations, but should be invested on the basis of more long-term considerations

- the *immunization portfolio* (NKr 6 billion/$1 billion), which is equivalent to government foreign currency debt and is intended to neutralize foreign exchange and interest rate risk associated with this debt

- the *Petroleum Fund buffer portfolio* (NKr 7 billion/$1 billion), which receives capital daily, and is transferred to the Government Petroleum Fund on a monthly basis.

813. The liquidity portfolio is managed by Norges Bank Monetary Policy (NBMP) by the Market Operations Department (MOD). All other funds/portfolios are managed by Norges Bank Investment Management (NBIM), which was established as a separate wing in January 1998, to meet the Bank's challenges of having been delegated the responsibility for managing the Petroleum Fund. NBIM's sole purpose is to function as investment manager and thereby take advantage of the benefits inherent in being a large institutional investor. Economies of scale made it natural to assign NBIM the responsibility for handling a large part of the foreign exchange reserves. To prevent duplication of internal resources, NBIM delivers settlement and IT services to NBMP/MOD.

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[47] Guidelines and performance reports for the foreign exchange reserves and various funds managed by the Bank and invested in the international capital markets are presented on Norges Bank's website (www.norges-bank.no).

814. In addition to being responsible for the management of the liquidity portfolio, NBMP/MOD also carries out the purchases of foreign exchange to the buffer portfolio. This ensures that these responsibilities are viewed in conjunction with the department's activities in implementing monetary policy.

815. The way the Bank carries out the mission of managing the Petroleum Fund has also contributed to a more professional management of the foreign exchange reserves with more focus on performance, and has influenced the investment strategy of the long-term portfolio (as compared to the old strategy back in 1998 equities are now included, the number of markets is larger, and the duration of the fixed income portfolio is higher).

B. Developing a Sound Governance and Institutional Framework

Reserve management objectives and coordination

816. The objectives of reserves management are: (i) funding intervention, (ii) managing national wealth (high return), and (iii) immunization of government foreign currency debt.

817. In the monetary policy, a formal inflation target was adopted in March 2001. The interest rate is the main monetary policy instrument, but interventions may be considered in special circumstances. Measured in months of imports, Norway has quite large reserves. Both the size of the reserves and the change in the monetary policy imply that it is more appropriate with a longer investment horizon.

818. The Executive Board of the Norges Bank establishes guidelines for the management of the foreign exchange reserves. The aim of the management is to maximize the return within the constraints specified in the guidelines. From 2001 onwards, a part of the long-term portfolio (20 percent) has been invested in equities. The Executive Board has decided to further increase the equity share, and to include non-government securities in the bond portfolio.

819. The management of the foreign exchange reserves is coordinated with the Ministry of Finance's management of government foreign debt. The way this is carried out is that a small part of the reserves—the immunization portfolio—has been set aside to be equivalent to government foreign currency debt. In 2004, the existing government foreign debt (worth only NKr 6 billion at end-2001) will be settled in its entirety.

820. One may therefore conclude that objective (i) and (iii) mentioned above have become less important over time and (ii) more important.

Institutional framework

821. Pursuant to the Norges Bank Act, Norges Bank shall invest the official foreign exchange reserves with a view to maintain the foreign exchange policy that has been established. The King in council may issue rules concerning the investment of the official

foreign exchange reserves. In practice, however, Norges Bank's Executive Board has laid down guidelines for the investment of reserves.

Transparency and accountability

822. There is a clear division of responsibilities which is reflected in the organizational set up and well documented in written guidelines, mandates and job instructions. The overall responsibility for operations rests with the Executive Board, which sets the overall strategic guidelines (including major risk limits) and receives quarterly management reports.[48] The Board has delegated to the Governor to set supplementary guidelines. The Governor has in turn delegated further specifications to the responsible manager (wing leader).

823. Instrumental to the establishment of a clear distribution of roles and responsibility is the division between strategy formulation on the one hand and operational management with a clear responsibility for performance on the other. A separate unit within Governor's staff has been given the responsibility for preparing advice on the strategic guidelines and benchmark portfolios of the reserves and the Petroleum Fund.[49] The leader of the respective wing has responsibility for the performance results of the portfolio(s) under management. This principle of decentralized management is an important characteristic of Norges Bank's general management model. This may contrast with various other central banks where investment management decisions may be based (more or less) on investment committees with members from different parts of the organization. Responsibility for internal control lies with the wing as part of the line based management model.

824. NBIM is a separate management unit which does not have access to market sensitive central bank information ("Chinese walls"). The manager reports directly to the Governor, like the other wing leaders. Within NBIM, there is sharp line between the departments that make decisions regarding investment, and the Investment Support Department, which takes charge of transaction settlement, risk measurement, return measurement and accounts. Responsibility for control rests with the front office departments. These constantly monitor the internal and external management. Independent control of market and credit risk is carried out in the Investment Support Department. The Legal and Compliance Department overviews the internal control functions, and is a primus motor in compliance work.

825. NBIM's most important objective is to achieve the highest possible return pursuant to applicable mandates and limits. It is easy for the delegating authorities and other observers to

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[48] Until 2000 the Executive Board delegated to the Governor to define the benchmark portfolios and the limits for relative risk (tracking error), as well as credit risk (minimum rating level). These fundamental limits are now placed with the Board itself.

[49] For the reserves the guidelines prepared by Governor's staff is set by the Executive Board or the Governor. For the Petroleum Fund the guidelines are given by the Ministry of Finance, except supplementary guidelines for credit risk which are set by the Governor.

assess whether the performance targets are attained. Assignments are clearly defined in written mandates, and NBIM's results can be compared with defined benchmark portfolios. The establishment of NBIM as an independent unit in Norges Bank makes its responsibility for performance more transparent.

826. In NBMP/MOD, risk control and return measurement is carried out in a separate unit independent of the front unit. The middle office unit reports to the head of MOD.

827. Outside NBMP/MOD and NBIM, the Governor of Norges Bank has a staff to supervise and monitor compliance, and as mentioned, to formulate strategy. Previously the Governor also had a special advisory committee from departments other than NBIM, NBMP/MOD and Governor's staff to assist the Governor in this work. Recognizing that the work of the advisory committee was overlapping with the work of the Governor's staff, the committee was removed in 2001.

828. External auditing is performed by Norges Bank's separate Audit Unit, the Central Bank Audit, which reports to the Bank's Supervisory Council, which is appointed by the Parliament. The Central Bank Audit is responsible for the operational auditing of investment management, as well as the statutory financial audit of the Bank's accounts. In its mandate the Central Bank Audit is also asked to do work which is ordinarily considered the responsibility of an internal auditor. The audit is carried out in accordance with recognized auditing standards in Norway, which are based on international auditing standards.

829. The Supervisory Council is responsible for ensuring that the rules for the Bank's activities are observed, including general monitoring and follow-up of the Executive Board. The Executive Board and the Supervisory Council receive a quarterly report on the management of the reserves consisting of detailed reports on each of the subportfolios and a concentrated report extracting the most relevant information in the sub-reports (see below). It may also be pointed out that the Governor receives a monthly report from NBIM on the performance of all NBIM portfolios. The Governor also has a special monthly follow-up meeting with NBIM, where performance and other topics relevant for the Governor in evaluating NBIM are addressed.

830. Detailed accounts of the foreign exchange reserves are presented in the Bank's annual report, including book value (i.e., market value) and return in Norwegian kroner (NKr) of the total reserves and the different sub-portfolios, as well the currency composition of the total foreign exchange reserves. The annual report also contains a separate chapter describing investment management in Norges Bank; including the percentage return attained on each of the sub-portfolios and compared with the benchmark return.

831. Since 2001 Norges Bank has, via the Internet, extended the public information about the reserves.[50] The reason for the change in policy is that the Norwegian Government applies

[50] Most of the web-pages are available in English.

a principle of transparency to the Bank's management of the Petroleum Fund. The foreign exchange reserves may also be considered as part of public funds subject to openness. The new information includes guidelines for the investment of foreign reserves issued by the Executive Board, as well as supplementary guidelines set by the Governor. In addition, the quarterly concentrated management report mentioned above is presented on the web as from 2000/Q4. This report displays size and return of the different sub-portfolios (and relative return compared to the benchmark portfolio) as well as actual asset class and currency composition, and portfolio risk exposure compared with limits. Returns are measured both in the currency basket of the benchmark portfolio and in NKr. The more detailed management reports for each of the sub-portfolios in the reserves are not made public.

832. Norges Bank is aware that managing the Government Petroleum Fund and the foreign exchange reserves requires active use of salary and personnel policy incentives. The market for persons with experience in financial and investment management is characterized by a high salary level with an element of performance-related pay in combination with extraordinary demands for focused work. The Bank's success in achieving good management results will depend very strongly on its ability to recruit, develop and retain highly qualified personnel from this market. The Bank is very conscious on developing the competence of own employees.

833. Part of the salary of employees with responsibility for the results of investment decisions are based on performance. In 2001, this was the case for more than one third of the NBIM employees. This pay system has been extended to key personnel in investment support functions.

834. To a lesser degree, NBMP/MOD has implemented a payment structure where payment partly is based on performance (on a broad basis).

835. It is part of the IT-strategy that top skills are bought where they are found, whether by own employees or outsourcing. All technical support and a large part of systems development and applications support are performed by external suppliers, both outside and inside Norges Bank's premises. NBIM has defined the type of core competence the unit would like to have itself. Other functions will be outsourced if possible.

C. Establishing a Capacity to Assess and Manage Risk

Benchmark portfolio

836. The level of risk derived from the investment strategy comes from two sources: the long-term strategy specified by the benchmark portfolio and the short-term strategy or the permissible deviations from the benchmark. By far the most important is the benchmark portfolio. The level of risk in the benchmark is determined by the currency distribution, asset classes (equities, bonds), type of securities, and duration of bonds. The benchmark for the liquidity portfolio reflects that the portfolio is to be used for interventions: high liquidity, short duration. The benchmark for the long-term portfolio reflects the intention of managing

wealth (high return): bonds and equities, global diversification. Risk is also affected by the maximum allowable deviations from the benchmark. This is handled in the strategic guidelines by specifying limits for tracking error, asset class mix, currency-and market distribution, duration, and minimum level of ratings, etc. See our web-site for the detailed benchmarks and limits.

837. The investment strategy for the long-term portfolio (which includes equities) is based on analysis of portfolio return and risk, using an in-house simulation model. In the calculations estimates of expected portfolio return are based on historical data, and alternatively on simplified subjective judgments. Risk is measured as the annualized standard deviation of the portfolio return, based on a covariance matrix of historical returns. In addition, the probability of having a negative portfolio return in any single year is calculated. The analysis showed that including a small part of equity exposure would enhance the portfolio return without significantly increasing the risk.

838. The asset weights of the benchmark portfolio floats with the market prices, and rebalancing the benchmark weights means that managers will incur transaction costs in the actual portfolio. A specific risk analysis has therefore been performed to determine optimal rules for rebalancing the benchmark.

839. The liquidity portfolio is to be used in connection with the conduct of monetary policy. It is important that the portfolio is invested in liquid currencies. Euro is the most relevant currency for interventions and U.S. dollars is the most relevant currency for operations in currency swaps to influence liquidity and interest rates in the Norwegian money market. Currency swaps are only a supplementary instrument in the domestic liquidity operations. Because of diversification purposes the liquidity portfolio is also invested in sterling and Japanese yen. The distribution of the liquidity portfolio is as follows: 50 percent in euro, 25 percent in U.S. dollar, 20 percent in pound sterling, and 5 percent in Japanese yen.. The managing wealth motive of the long-term portfolio means more emphasis is laid on global diversification, with eight currencies in the fixed income benchmark and 12 currencies (22 markets) in the equity benchmark.

Instruments

840. The guidelines set by the Executive Board specify the allowable asset classes for each portfolio. Within the asset classes there is no list of allowable instruments, given that certain general requirements are fulfilled: Sound risk systems and control routines must exist for the instruments used in the management of the foreign exchange reserves. In addition, it must be ensured that there is sufficient expertise in all areas of activity.

841. Interest-bearing securities in the liquidity portfolio shall be issued by nation states, enterprises with government guarantees or international organizations with a high credit rating. Investment is also permitted in bonds from other issuers related to the public sector, and which may be included in the Lehman Global Aggregate Government Index. Permissible interest-bearing securities in the long-term portfolio are bonds that may be included in the

Lehman Global Aggregate Index (investment grade): including corporate bonds, mortgage- and asset-backed bonds. Bond issuers and counterparts in bank deposits etc. are subject to a minimum rating level. Equities in the long-term portfolio must be listed on a stock exchange in one of the countries listed by the Board.

842. Before trading in a new instrument commences, documentation must be available which identifies the various types of risk associated with use of the instrument, and which confirms that provision has been made for adequate expertise, risk systems and control routines. Derivatives may be used to the extent that the ensuing financial exposure does not exceed the exposure that would have resulted from investing directly in the underlying instruments. Overall risk management is to be undertaken in which the exposure in derivatives is integrated with the exposure from underlying instruments.

843. In practice it will be up to the leader of the respective wing to specify a list of allowable instruments.

844. Both interest rate and equity derivatives have been used extensively to attain desired positions in a cost effective manner. In the transition in 2001 from 0 to 20 percent equities within the long-term portfolio, equity index futures were applied before converting the equity exposure to physical shares. Interest rate derivatives include bond futures, LIBOR-futures, options on futures, and interest rate swaps. Activity in derivatives must obey the rules mentioned above.

Risk and performance measurement

845. As mentioned, the objectives of holding reserves are multiple. Therefore the reserves are divided into four different sub-portfolios, and separate guidelines are drawn for each portfolio.

846. Market risk is calculated as the expected annual standard deviation of the portfolio returns based on portfolio holdings and time series of historical market prices. Credit risk is primarily measured by the ratings from the leading rating agencies.

847. Interest rate risk is measured by modified duration. The liquidity portfolio has short duration (about 1.5). The level of duration for the long-term portfolio (approximately 5.5) mirrors the duration of the market (indices), and reflects both the long-term investment horizon and the fact that in some bond markets empirical studies indicate that the maturity premium has been positive and rising for durations up to 2–3 years, with the rise in premium slowing thereafter and even stabilizing.

848. The reserve portfolios are, as mentioned, split between two different wing leaders, and the responsibility for managing risk in Norges Bank is with the wing leader. Therefore we do not quantify the expected return and risk for the total reserves. Instead, the Bank's return/risk objectives are reflected in the way reserves are divided into different sub-portfolios and the way the separate guidelines are designed.

849. The main strategic choices for both the liquidity and the long-term portfolio are defined by means of benchmark portfolios. These are constructed portfolios with a given country distribution and specific securities from the various sub-markets. A benchmark portfolio is used to manage and monitor risk exposure, and also serves as a point of reference for evaluating the actual return achieved on the reserves.

850. We use external benchmarks (Lehman Brothers for bonds, FTSE for equities). For ease of comparing portfolios the policy is to use the same index-provider for the various portfolios unless we have good reason to deviate. Benchmarks for the liquidity portfolio and the long-term portfolio are defined by the Executive Board and are to some extent made more precise by the Governor. The wing leaders are measured against the "official" benchmark, but they are free, of course, to apply sub-benchmarks for their different sub-activities.

851. Possible criteria for choice of an index are: ease of access, transparency, clarity of selection criteria, investibility, breadth of coverage, quality of data, availability of historical data, customer service/support, quality of analytics, ability to customize.

852. The Executive Board has stipulated that management of the foreign exchange reserves shall be aimed at achieving the highest possible return within the limits set out in the guidelines. Far the most important factor influencing returns is the benchmark portfolio. There are two reasons for allowing deviations from the benchmark portfolio. The one is cost-effective management (index-related). The other is active management.

853. An upper limit has been set for the actual portfolio's deviation from the benchmark. This limit is a measure of relative risk (tracking error). In practice, this means that the difference in returns on the actual portfolio and the benchmark will normally be small. The upper limit for expected tracking error is 0.5 percentage point for the liquidity portfolio and 1 percentage point for the long-term portfolio.[51]

854. In NBIM internal fixed income management is divided into two main areas: indexing and other index-related management on the one hand, and active management on the other. Within these two areas, activities are further divided into various special functions.

855. The objective of index management is to efficiently purchase the benchmark, while taking advantage of special pricing situations to achieve some excess return (enhanced indexing). The earnings potential of lending fixed income instruments from the portfolio is utilized. Another important task is to correct undesirable deviations from the benchmark in the most efficient way possible.

[51] In simplified terms, a tracking error of 1 percentage point means that the actual difference between the returns on the benchmark and the actual portfolio will be between -1 and +1 percentage points in 2 out of 3 years on average.

856. One objective of active management is to take advantage of systematic price differences between bonds with almost identical properties in order to achieve an excess return. Another strategy for achieving an excess return is to take positions that depend on future interest rate movements. An important objective of management is to ensure breadth in the active fixed income management positions so that the return will not be overly dependent on individual explanatory variables.

857. The equity portfolio of the long-term portfolio was established in 2001. The entire portfolio has until March 2002 been managed internally as an enhanced index portfolio, taking advantage of special pricing situations, as for example in relation with the significant changes in the FTSE-index that occurred in June 2001. Like for fixed income the earnings potential of lending equities is utilized. In March 2002 part of the equity portfolio was converted to external equity mandates. See below for a discussion of external management.

858. The total level of active risk within the long-term portfolio has until now been quite modest, mostly within the interval 20–40 basis points as measured by expected tracking error. In practice the liquidity portfolio has tracked the benchmark portfolio very closely, around 10 basis point as measured by expected tracking error.

859. Returns on the actual portfolio and the benchmark portfolio are calculated according to the market value principle.[52] For the long-term portfolio multiple historical performance horizons are applied to measure the average excess return. Monthly data goes back to the beginning of 1998 when NBIM was established. An information ratio is calculated for the long-term portfolio.[53]

860. Management costs for the sum of the three reserve portfolios managed by NBIM are presented in quarterly reports. The costs incurred by NBIM's management activities consist partly of fees to external managers and custodian institutions, and partly by Norges Bank's internal operating costs. Similar calculations of the costs of managing the liquidity portfolio have not been made. One of the reasons for this is that portfolio managers in NBMP/MOD perform other tasks in addition to investment management.

861. For the long-term portfolio the Governor has set a target (in basis points) for the yearly excess return above benchmark. When compared with the target the actual excess return is adjusted for taxes, and transaction costs that may have resulted from changes in investment strategy. In the management of the liquidity portfolio, a part of the narrow risk

[52] The detailed methodology for calculating the returns on the various portfolios Norges Bank manages are described in the appendix of the Government Petroleum Fund quarterly report. The report is accessible on our web-site.

[53] We define "information ratio" as the average monthly excess return over time divided by the standard deviation. This figure is annualized.

limit of 50 basis points is utilized. It is set a target (internally) for yearly excess return that reflects the use of tracking error.

862. In Norges Bank's accounts foreign exchange reserve items are valued based on their "fair value", i.e., their market value in Norwegian kroner. The accounting profit/loss includes both unrealized and realized gains and losses (in NKr). This means changes in market prices on such as currencies, bonds and equities will impact the Bank's profit/ loss account and the Bank's own capital. Though NKr is the relevant currency in the accounts, the return on the long-term portfolio and the liquidity portfolio is both measured in NKr and by local currency (weighted by the benchmark portfolio's currency basket). The reason is that return measured in NKr is not relevant to an evaluation of developments in the international purchasing power of reserves, which is of particular interest for the long-term portfolio.

External managers

863. According to the guidelines external managers may be used in the management of the long-term portfolio. Such managers must have adequate internal ethical guidelines for their own activity.

864. In NBIM there was internal fixed income management from the start, while equity management on behalf of the Petroleum was out-sourced to external managers. Subsequently, external managers have been assigned responsibility for portions of the fixed income management (both on behalf of the Petroleum Fund and the long-term portfolio), while internal equity management has been built up. Today NBIM manages equities internally on behalf of the Petroleum Fund and the long-term portfolio.

865. At the end of June 2002 about 10 and 47 percent of the long-term portfolio's fixed income and equity portfolios respectively were managed externally. These are all active mandates, except one enhanced index equity mandate. The reason for using external managers in the reserves is to contribute to the objective of maximizing returns (above benchmark). It is natural to take advantage of the experience Norges Bank has gained in selection and follow-up of external managers in the Petroleum Fund also in the management of the reserves. When selecting individual managers Norges Bank applies the same general standards for the managers in the reserves as for the Petroleum Fund.

866. Requests for applicants are posted on the Internet. Manager selection is based on a four-stage process: (1) screening of applicants by 10 criteria (based on questionnaire one) which results in a short list of candidates; (2) analysis and selection by four groups of criteria (based on questionnaire two and interviews) give a further reduction to the finalists; (3) optimization process to select the managers (by a manager combination tool); and (4) ongoing monitoring and control.

867. The external portfolios form an integral part of the risk management of the long-term portfolio, and are subject to the following principles of monitoring: (i) performance and risk positions are monitored daily; (ii) all transactions are monitored weekly; (iii) monthly

analysis of risk profile, value statistics and earnings expectations; (iv) monthly/quarterly transaction monitoring (trading, momentum and liquidity risk); and (v) yearly due diligence.

Management information systems

868. An integrated risk measurement system is used to assess and monitor relative and absolute risk. Expected annualized tracking error is calculated weekly for the long-term portfolio and the liquidity portfolio, to control that risk exposure is within the limits. The system is also used to measure absolute risk (standard deviation) of the actual portfolio and the benchmark portfolio, as well as the modified duration of fixed income portfolio.

869. Important elements in the Norges Bank's use of management information systems are: (i) daily updated information on holdings and prices in both internal and external portfolios; (ii) daily measurement of performance relative to benchmark; and (iii) daily/weekly monitoring of risk. Information on all internal and external managed portfolios is updated daily in the central data-warehouse.

Stress tests

870. Apart from the quantitative analysis performed when strategy is reviewed, we do not use formal ongoing stress tests for the potential impact of specific scenarios. If we judge that a change in market conditions may have a negative impact on the reserve portfolios, we are prepared to amend investment strategy to protect the reserves from potential losses.

Operational risks

871. The degree of operational risk will depend on the organizational structure chosen (as described above), the procedures and technical systems used and the expertise in the organization. Norges Bank places emphasis on managing this type of risk by establishing sound internal control procedures, a sound organization of activities with clear authorizations and a clear distribution of responsibility, recruitment of specialists with practical and theoretical qualifications, satisfactory training of personnel, technical standby solutions and a sound set of legal agreements.

872. Once a year each wing makes a special report to the Governor's staff on the quality of the internal control. The objective is to detect major risks that may potentially be an impediment to the wing in reaching its goals, and to ensure that management is focused on managing those risks. An example of a risk that is given attention is NBIM's follow-up of external suppliers of various services.

873. Examples of measures established to reduce operational risks are routines for preventing unauthorized transfers and securities transactions, guidelines for staff involved in investment management to restrict their personal affairs and potential conflicts of interest, and contingency plans (e.g., in case activities at head office in Oslo should be prevented,

NBIM's management office in New York is prepared to step in and undertake simplified management services).

Efficient markets

874. The part of the reserves that is the first to be drawn upon in interventions—the liquidity portfolio—is invested only in the very liquid currencies/markets: euro, the pound sterling, U.S. dollar and Japanese yen. The 50 percent weight in euro in the benchmark portfolio is split equally between the liquid bond markets of Germany and France.

875. Liquidity is of less importance for the long-term portfolio, but even this portfolio should be available for interventions. Compared to the liquidity portfolio the fixed income part of the long-term portfolio has a few additional, minor currencies, considered to have liquid bond markets.

876. The equity part of the long-term portfolio is invested in 22 markets which are all classified as developed markets (i.e., they all meet some specified minimum standards related to settlement systems, legislative regulation, size and liquidity). As for bonds the liquidity of equity investments depends both on the possibility of selling large amounts in short time, and the possibility of using repo-markets. The opportunity for selling shares on short notice without impacting prices depends, inter alia, on the turnover in the secondary market. It is not easy to judge precisely the liquidity of equities vs. bonds. Normally a diversified bond portfolio will be more liquid than a diversified equity portfolio. A moderate proportion of reserves invested in equities spread among many markets, would not, to any substantial degree, weaken the possibility for raising liquidity when needed.

XVII. Oman

A. Governance and Institutional Framework

Reserve management objective and coordination

877. The objectives of management of reserve are three-fold:

- Provide liquidity for intervention in the local foreign exchange market.
- Earn reasonable rates of total return without exposing the reserves to excessive credit and market risks.
- Earn good current income so as to achieve healthy accounting profit.

878. Oman is a small oil exporting country with its currency pegged to the U.S. dollar. Maintenance of the credibility of the fixed peg is of paramount importance for macroeconomic stability. The reserve management policy objectives have been designed primarily with a view of optimizing U.S. dollar resources to provide a credible cushion against current and capital account shocks, while at the same time clearing the local foreign exchange market on a day-to-day basis. These objectives have remained in place since the inception of the Central Bank of Oman (the Central Bank) over 25 years ago.

879. The Central Bank does not target any particular level of reserves. The current level of foreign exchange reserves at around US$2.5 billion provides import cover of about 4.5 months, which is considered adequate, given the fact that external debt of Oman is very low and is declining.

880. The scope of reserve management activity is confined to achieve the objectives of liquidity and growth/current income.

881. For the Central Bank, the most important monetary policy goal is to maintain the fixed peg of Rial Omani with the U.S. dollar. This is recognized as such in reserve management policy. Moreover, reserve management operations take notice of domestic liquidity conditions and the position of government balance with the Central Bank. Local banks are allowed short-term U.S. dollar-Rial Omani buy-sell swaps as a mechanism for augmenting Rial Omani liquidity, in case of need.

882. The imperatives of the monetary policy are reflected in the manner in which the foreign exchange reserves portfolio is structured. Currently, the external reserves are divided into four sub-portfolios or Tranches:

> **(i) Liquidity Tranche**: This is an all U.S. dollar portfolio which is meant for providing liquid resources for market intervention. As such, this Tranche is invested in very short-term high quality instruments, like deposits and CDs of top-class banks and U.S. Treasury Bills. All inflows/outflows (which do not represent

income/realized profit) in respect of the external reserves take place in the Liquidity Tranche.

(ii) Bridge Tranche: This is also an all U.S. dollar portfolio which is intended to provide support to the Liquidity Tranche in case of need. The size of the Bridge Tranche is generally kept within a maximum of 25 percent of the external reserves, excluding gold and SDRs. This Tranche is invested in short-to-medium-term high quality instruments, like deposits and CDs of top-class banks and U.S. Treasury Bills and also U.S. Treasury notes with remaining maturity up to and including three years.

(iii) Income Tranche: This represents the stable portion of the reserves, which is a multi-currency portfolio, with the neutral share of U.S. dollar at 75 percent. The other permissible currencies are euro and pound sterling. Till recently, Japanese yen was also a permissible currency for this Tranche. However, with effect from January 1, 2002, Japanese yen ceased to be a permissible currency in view of the continuing weakness of the Japanese economy. The permissible instruments for the Income Tranche include bank deposits, CDs, treasury bills and dated securities representing debt obligations of top-quality sovereign and supranational institutions whose residual maturity does not exceed 10 years.

(iv) Bullion Tranche: This Tranche contains the gold holding of the Central Bank, which currently constitutes around 3 percent of the external reserves. The gold, which is located at an overseas center is placed in short-term lease(deposit) with top-quality banks.

883. There are performance benchmarks for the Liquidity, Bridge and Income Tranches, which take into account the investment objectives, liquidity requirements and constraints. The investment policy in respect of the external reserves are reviewed from time to time, taking into account, among other things, fixed income and foreign exchange markets outlook.

Institutional framework

884. Reserve management activities of the Central Bank are carried out under the over-arching provisions of the Banking Law, which also cover other activities of the Central Bank. The Law mandates a fixed par value for the Rial Omani and also stipulates maintenance of a minimum ratio between external reserve and currency in circulation. This Law has specific provisions regarding eligible currencies and instruments for deployment of reserves. The Law also mandates that international accounting standards be applied for accounting purposes in respect of the external reserve. The Board of Governors of the Central Bank is the highest body for policy decisions in respect of management of external reserves. The relevant provisions of the Banking Law with regard to the above are quoted below:

Level of External Reserves

885. Article 31 states that the Central Bank shall at all times maintain a reserve of external assets which shall be related in value to the value of currency notes and coins in circulation in such ratio as may be prescribed from time to time by the Board of Governors, subject to approval of His Majesty The Sultan.

Categories of External Assets

886. As per Article 32, the reserve of external assets may consist any one or more of the following, provided they adhere to all limits, classifications, constraints, restrictions and qualifications whatsoever laid down by the Board of Governors:

a. Gold or silver coins, which are legal tender.
b. Bullion of gold, silver or such other precious metals as may, from time to time, be utilized as a monetary asset and freely traded on international exchanges.
c. Foreign currencies or basket of currencies.
d. Bank demand and time deposits, certificate of deposit and acceptances denominated in freely convertible foreign currencies.
e. Treasury bills, commercial papers and any other short-term money market instruments denominated in freely convertible foreign currencies and issued by foreign banks, foreign governments, foreign public agencies or supranational organizations.
f. Floating rate notes denominated in freely convertible foreign currencies and issued by foreign banks, foreign governments, foreign public agencies or supranational organizations.
g. Fixed interest securities and notes denominated in freely convertible currencies and issues/guaranteed by foreign banks, foreign governments, foreign public agencies and supranational organizations.
h. Any internationally recognized reserve asset, including SDR, issued by the IMF.

Accounting

887. Article 38 provides that the amount of profits, losses, credits, debits, depreciation, funded and unfounded reserves and other financial analysis … shall be determined according to the generally accepted principles of accounting, including the International Accounting Standards insofar as they do not contradict any provisions of the Law, agreed by the Auditors appointed pursuant to Article 18(c) of this Law and approved by the Board of Governors.

Parity

888. Article 41 specifies that:

(a) The par value of the Rial Omani shall be determined from time to time by His Majesty, The Sultan.
(b) The par value of the Rial Omani, or any change thereof, shall be declared in terms of gold, units of SDR, a foreign currency, or a basket of currencies or an internationally recognized unit of account for currencies, provided, however, that any such determination shall be in accordance with the conditions of any international monetary agreement to which the Sultanate (of Oman) is then a party.

889. In Oman, foreign currency revenues of the government, arising mainly out of export of oil and gas with unit sales realization up to the price of oil and gas fixed annually for budget purpose (the *budgeted price*) are generally sold to the Central Bank against Rial Omani which serve as inflows into the reserves and are thus monetized. Any revenue of the government in excess of the budgeted prices of oil and gas are kept separately in a fund, to be utilized if there is a budget short-fall subsequently. This portion of the external reserve of the country is owned and managed directly by the government. The name of the fund is State General Reserve Fund (SGRF). There is an institutional arrangement for consultation between the Central Bank and the SGRF on various investment-related issues, like composition of benchmark, portfolio performance etc.

890. There is a well-defined organizational structure within the Central Bank for all decisions regarding the external reserves. As mentioned earlier, the Board of the Central Bank is empowered to take all decisions with regard to investment policy, investment guidelines, including performance benchmark etc.

891. The highest decision-making body for all investment decisions, in terms of the policy/guidelines approved by the Board is the Reserve Asset Management Committee (RAMC), which is chaired by the Executive President (CEO of the Central Bank). The composition of this Committee is as follows:

Table 21. Committee Composition

Executive President	Chairman
Senior Vice President	(In-charge of Treasury, Investment and Settlement Departments)
Manager	(In-charge of Treasury & Investment Department)
Senior Manager	(In-charge of Financial Management Department, which is responsible for maintenance of accounts for the Central Bank)
Senior Manager	(In-charge of Systems, Procedure and Operations Department, which performs management services functions)
Investment Expert	In-house consultant on reserve management

892. The RAMC decides on all issues concerning reserve management, including fixation of medium-term strategic (MTS) benchmarks with regard to currency allocation and duration.

893. The responsibility of the Central Bank with regard to management of external reserves arises exclusively out of the provisions of the Banking Law. The external reserves are owned by the Central Bank and as such there is no agency arrangement between the government and the Central Bank for this purpose.

894. The three main aspects relating to investment of external reserves, viz. guidelines, decision-making process and procedure for operations in respect of transactions in the front office and their follow-up at the back office, have been established and documented. There is a system for periodic review of these documents.

895. There is a good deal of decentralization of decision-making power for risk decisions. The Central Bank has adopted a Document delineating the powers and responsibilities of officials at various levels connected with decision-making. The delegation of power and the chain of authority are well documented.

896. Internal control and audit systems for the reserve management functions and operations have been designed on sound governance lines. Major elements of the internal control systems are:

(i) Management Information Reports in respect of transactions, risk exposure and exceptions (breach of guidelines, delegated powers and procedure for operations) have been prescribed. These are intended to cause flow of critical information from the reserve management departments to the senior management (including CEO) on a regular basis. The Board of Governors are

kept informed at periodic intervals about all important aspects of reserve management, including portfolio performance vis-à-vis benchmark.

(ii) There is an internal audit system which periodically examines the operations at the front office and the back office and reports to the CEO. Compliance of audit observations within a time-frame is ensured.

897. Financial accounts of the Central Bank, including accounts relating to reserve management are audited by external auditors at least once a year. With effect from January 1, 2002, the Central Bank has implemented the provisions of International Accounting Standards 39 in respect of all its financial assets and liabilities, which are in conformity with the Banking Law, referred to earlier. The audited accounts and the findings of the external auditor are reported to the Board of Governors. The Central Bank's policy and procedure in respect of internal control and audit are well documented.

898. Information on foreign exchange reserves are provided in an annual audited accounts and reports of the Central Bank. The present policy of the Central Bank does not envisage more disclosure in respect of reserve management.

899. Staff involved in reserve management are subject to code of conduct and guidelines on conflict of interest regarding the management of their personal affairs.

900. The staff of the departments responsible for reserve management are all well trained and experienced. New staff are taken on the basis of very strict criteria for academic qualification and after through and comprehensive screening. Central Bank devotes considerable resources for upgrading the knowledge and skill of its personnel. The Central Bank has not found feasible the idea of offering better compensation package to reserve management personnel in order to attract and retain reserve management specialists. The present policy of uniform service rules and compensation package for staff of all the departments of the Central Bank is working satisfactorily.

901. Retention of experienced staff has not been a problem so far, although some movement of staff, in search of better and well-paid jobs in the private sector, have been noticed in recent years. The present policy is to offer better career opportunities in the Central Bank for the talented and well performing staff.

B. Establishing a Capacity to Manage Risk

902. The external reserves are exposed to currency, credit, liquidity as well as interest rate risks. The approach toward risk exposure have been shaped by the following elements:

- Provisions of the Banking Law with regard to currency diversification and choice of instruments.

- Low appetite for downside risk with regard to currency revaluation, mark-to-market portfolio valuation and income.

- An empirically observed fact in respect of interest rate risk that the expected risk-adjusted return is optimal around a portfolio duration of 2.5 years for major markets.

- Aversion toward credit risk so as to keep the probability of getting involved in any default to the minimum.

903. The current investment guidelines embody the above approach with regard to prescriptions for the different types of risk exposures. The relevant provisions of the investment guidelines are as follows:

Currency Diversification

904. In the Income Tranche, the proportion of holding in the approved currencies shall always remain within the maximum and minimum limits as indicated in the table below.

Approved Currencies	Neutral (percent)	Maximum (percent)	Minimum (percent)
U.S. dollar	75	100	60
Euro	20	30	0
Pound sterling	5	10	0

Duration

905. The neutral duration of investments in the Bridge Tranche shall be one year around which a maximum deviation of plus or minus 6 months will be permitted. The neutral or benchmark weighted-average duration of investment in the three approved currencies (in Income Tranche) shall be as indicated in the table below:

Approved Currencies	Benchmark (in Years) (percent)	Maximum (in Years)	Minimum (in Years)
U.S. dollar	2.5	3.5	2
Euro	2.5	3.5	0
Pound sterling	2.5	3.5	0

Credit Risk

906. At the time of purchase, short-term money market instruments shall be rated not lower than F3 and the issuing banks rated not less than C (individual) and 3 (Legal) by FITCH-IBCA or their equivalent. At the time of purchase, long-term instruments shall not be rated lower than A by Moody's or its equivalent.

907. The current thinking with regard to Income Tranche envisages a gradual elimination of diversification into non-U.S. dollar currencies and non-U.S. markets over a period of time. This is driven by a desire to stabilize earnings in U.S. dollar terms, with low downside risk.

908. Forward foreign exchange contract is the only permissible derivative instrument. Short sale is prohibited. Further, although repo is a permitted instrument, it has not been used so far. However, in recent years bond lending activity has been undertaken for a large portion of the external reserves including lending against cash collateral for the U.S. Treasury portfolio. The objective here is to earn additional income, while keeping the risk exposure at a low level. The approach with regard to any new activity has been to first understand and internalize the risk characteristics, put in place the necessary IT systems and internal controls and then undertake it. This has been followed in the case of bond lending against cash collateral by ensuring that the risk on investment of cash collateral is always at an acceptable low level by prescribing suitable investment guidelines for this purpose.

Liquidity Risk

909. Liquidity risk has been addressed by creating a three-tranche structure, as described earlier. In creating this structure, historical inflow/outflow data was analyzed to find out the liquidity requirement for undertaking intervention in the domestic market under a 'worst case' scenario. Further, to avoid issue concentration, which can have adverse liquidity implication maximum holdings for individual issue of debt securities have been prescribed.

Benchmarks

910. There are performance benchmarks for Liquidity, Bridge and Income Tranches. All of these have been constructed on the basis of publicly available market indices. For the Liquidity Tranche, the benchmark is one-month U.S. Treasury Bill rate. For the Bridge Tranche as also for the Income Tranche, the performance benchmarks are composite of market indexes, reflecting the neutral currency and duration configurations. The criteria for selection of the performance benchmarks are the following:

- The benchmarks should correspond to the passive or neutral risk profile.
- The benchmarks should reflect the broad pattern of investments.
- The benchmarks should not have any inherent bias for over/under performance.

911. The performance benchmarks are prescribed in the investment guidelines for external reserves, which have been approved by the Board of Governors.

912. For the purpose of calculation of rates of return, the U.S. dollar acts as the base/numeraire currency. Calculation of return in respect of the investment portfolios and also the benchmark is outsourced at present. This is done primarily with a view of ensuring that the returns are calculated independently by an external agency. Return calculation is accompanied by full attribution analysis once in a quarter to highlight the factors responsible for over/under performance vis-à-vis the benchmark.

913. Active risk-taking for value addition vis-à-vis passive configurations in respect of currency and duration are also undertaken. For this purpose, there are two levels of decision-making. At the level of Reserve Asset Management Committee (RAMC), monthly currency and duration benchmarks (known as Medium-term Strategic Benchmarks or MTS) are set, which are intended to beat the neutral performance benchmarks. At the level of the Department, deviation from the MTS benchmarks are permitted within prescribed limits in order to add value vis-à-vis the MTS.

914. Although the Central Bank is essentially a long-term investor, especially in respect of the Income Tranche, the investment horizon for all intents and purposes is one year at a time, reflecting the accounting year (January to December). The broad accounting principles currently applied in terms of IAS 39 in respect of the Liquidity, Bridge and Income Tranches are the following:

- All coupon, discount earnings as well as realized profit/loss on sale of securities are taken to the P/L.
- All unrealized gain/loss on currency revaluation are booked under an equity head.
- All unrealized gain/loss on mark-to-market valuation of securities/outstanding forward exchange contracts are booked under another equity head.

915. Premia/discount on bonds and Treasury Bills at the time of purchase are amortized following effective interest rate method.

916. Interest earning on gold deposits and realized gain/loss (against cost price) on sale of gold are taken to the P/L. Unrealized gain/loss on revaluation of gold holding is booked under the same equity head as for currency.

917. As Rial Omani is pegged to the U.S. dollar, rates of return in terms of domestic currency are similar to that in U.S. dollar terms.

918. Gist of quarterly performance and attribution analyses are reported to the Board of Governors.

919. The Central Bank has a policy for engaging external managers for discretionary management of a small segment (there is a ceiling of 10 percent for this purpose) of the external reserves. The investment guidelines prescribed for the external managers have been given higher duration and also different performance benchmarks. External managers can

hold debt securities with remaining maturity up to and including 30 years. This has been done on the basis of the facts that they have the requisite expertise and advantage of location to assume higher interest rate risk for the purpose of value addition.

920. Management information system to assess and monitor risks consist of the following:

- A daily statement, showing the portfolio summary in respect of the three Tranches which provides details, such as, duration and currency composition vis-à-vis their respective neutral and MTS benchmarks, aggregate investment pattern, etc.

- A monthly statement, giving a stress test for interest rate risk.

921. There is a plan to set up an independent Middle Office with well-defined responsibilities for managing various risks in respect of external reserves. Also, steps have been taken to identify operational risks for the Central Bank as a whole for setting up appropriate systems and mechanisms for managing them. At present, custodial risks are minimized by appointing only the most reputed institutions as custodians.

922. For the purpose of undertaking buy/sell transactions in currencies and securities and for placement of deposits, etc, there are approved centers, most of which are in major OECD countries. Also, there are concentration limits for exposure to banks located in different centers. Moreover, transactions in currencies and securities are required to be undertaken only with approved counterparties, which are selected on the basis of their credit, reputation, market share and relationship with the Sultanate of Oman in general and Central Bank in particular.

XVIII. Tunisia

A. Developing a Sound Governance and Institutional Framework

Objectives and coordination

923. The strategic reserves management objectives of the Central Bank of Tunisia (CBT) are based on the following key points:

- Guarantee of the external liquidity of the economy;
- Preservation of the reserves holdings; and,
- Maximization of return on reserves.

Liquidity

924. Liquidity of reserves is the main management objective of CBT. Liquidity is required to ensure financing of external payments imbalances and to intervene in the local exchange market, in order to avoid sharp adjustments of Tunisian dinar exchange rate.

925. The liquidity objective is met by targeting appropriate investment instruments and currency structure. Currency structure of reserves is set in accordance with the currency structure of the settlement balance as well as the CBT and government liabilities.

Security

926. In order to safeguard reserves, the CBT has implemented a rigorous selection policy of markets, assets and counterparts. In addition, an operating control system is in place to monitor exposure limits for credit and market risks. Furthermore, CBT has forbidden short position taking and financial instrument short sale practices. The use of derivatives is only allowed for hedging needs.

Return

927. The CBT aims to maximize reserves portfolio return subject to its liquidity and security constraints. Investment policy focuses on a dynamic allocation of reserves, using permissible instruments, in line with international capital markets outlook.

928. Tunisia has low foreign exchange intervention needs, given the floating managed exchange rate regime of the Tunisian dinar and capital movement restrictions. This provides some flexibility in reserves investment policy. Thus, the CBT has stretched the upper limit on money market from three to six months and has extended investment activity to international bond markets. In an attempt to limit the exposure to bond market risks, especially with respect to the two primary objectives of liquidity and security, the investment scope has been limited to government and supranational bond markets with a deep and liquid secondary

market which guarantee the highest level of security, (i.e., U.S., German, and French government bond markets).

Institutional framework

929. According to Tunisian law, management of foreign reserves comes under the Tunisian Central Bank's purview. There is no other independent entity in charge of it. Governance, management and surveillance of the Central Bank of Tunisia are undertaken by the Governor appointed by the President of the Republic, the Board of Directors, and a censor who is appointed by decree, respectively. The Governor sets the bank's organization. The last administrative chart gives the following configuration of the reserves management department:

Governor

Deputy Governor

General Manager of External Finance

Deputy General Manager charged of Payments and Follow-up

Manager of External Financing and Market Operations

Deputy Manager of Market Operations
Department of International Market Operations
Department of Domestic Market Operations

Deputy Manager of External Financing
Department of Private Financing and Specialized Organizations
Department of Public Financing

Manager of International Relations and Treasury

Deputy Manager of International Relations
Department of International Organizations
Department of Banking Relations and Counterparts Follow-up

Deputy Manager of Treasury
Back Office
Department of Treasury Projections

Manager of Payments and External Debt

Deputy Manager of Current payments

Deputy Manager of External Debt

Manager of External Transactions Follow-Up

Deputy Manager of External Payments Follow-Up

Swift and Messages Unit

930. Strategic decisions on overall objectives and principles of reserves management policy are set by the Governor on proposal of the concerned departments (currency distribution, asset classes, limits, risk monitoring, etc.)

931. The operational framework of the policies adopted, and all decisions regarding investment strategy, currency exposure, credit risk, dealing counterparties, custodian arrangements, permissible instruments, etc., have to be approved by senior managers and by the Governor, on proposals of the concerned departments.

932. The managers of reserve management department ensures that all operational guidelines are followed, and senior management is kept informed of all deals done, on a daily basis. Portfolio position is communicated daily to senior management, and weekly to the Governor.

933. There is an explicit separation among Front office, Back office and the entity responsible for swifts and messages. Pursuance of Treasury orders are immediately checked by the back office. Observance of limits (credit limits, permissible instruments, etc.) is checked through controls from the chief dealer, the back office, senior management, the banking relations department, and through frequent reporting to the Governing Board.

Management of operational risk and controls

934. Supervision of risks is conducted through a system of formal limits and several controls.

935. First, dealing is centralized in a single location: the dealing room. Dealing risks are minimized by a formal separation between front office, back office and Swifts and messages unit. Formal deposit limits are set for each counterparty in terms of amounts and maximum deposit periods. Settlement risk for bond operations is reduced through a systematic and immediate checking of counterparty's confirmations (security type, accrued interest, nominal and net amounts, value date), prompt processing, and settling through receive (or deliver) against payment settlement procedures. Custodial risk is reduced by choosing good international clearing institutes (Federal Reserve Bank of New York, Euroclear, Clearstream, Bank of Tokyo Mitsubishi), and by undertaking a thorough custodian follow-up and systematic control of custodian statements.

936. Information technology risk is reduced by limiting access to data files and information system, a daily backing up of data files, and similar precautions. Financial errors are minimized through prompt transaction processing and recording, back office control measures, as well as accounting checks on a daily basis.

Transparency and accountability

937. To enhance the efficiency of reserves management policy and to trim down operating risks, CBT has implemented an appropriate operational system based on risk exposure limits, cautious and prompt settlement processing, control measures and frequent reporting. This operational system is managed by means of a computer system.

938. Regarding settlement processing, short-term investment operations on the international money market are generally settled next day. Long-term deposits and foreign exchange transactions are treated on spot value date basis. Concerning securities, transactions are done on a three-day settlement basis. Nevertheless, instruction of all the transactions have to be processed the same day in order to provide the required time to follow up on the settlement and to intervene in case of misstatement.

939. In other respects, the CBT has centralized the settlement processing through the main correspondent for each currency to have standard settlement instructions. This has allowed cutting the misstatement risk, especially from counterpart's side. The CBT has also diversified custodial risk by holding three security custody accounts with different institutions (Federal Reserve Bank of New York, Euroclear, Clearstream, Bank of Tokyo Mitsubishi). The terms and provisions governing the relationship of CBT with these correspondents and custody institutions point out clearly their responsibilities vis-à-vis CBT and the reporting arrangements.

940. To improve the reserves management operational efficiency (either at the processing level or at the monitoring one), the CBT has implemented an integrated computer system. This system integrates the management of front and back office functions, and accounting of the operations in international capital markets. The system guarantees real-time transaction processing. It produces all the required statements to confirm and settle the transactions done by the front office, updates the treasury statements, generates book entries and manages formal limits. The system also produces a variety of reporting statements for control and follow-up of the commitments.

941. The system also provides a large range of activity, treasury and statistical reports. These reports allow control of transactions processing, and follow-up of risk and return management tools such as limits, duration and performance.

942. The system structure separates front and back offices functions. At the Front office level, transactions done are booked into the system. The Back office has the charge of checking the deal's accuracy and entries before the final validation of the transaction. Swifts and messages unit is independent from the Back office, offering thus an additional way to

reduce settlement risks. The Back-office also copes with the follow-up of accounting records, and the reconciliation of all received reports from correspondents and custodians.

943. This computer system provides a hierarchical authorization system, based on passwords and random codes access controls which restrict the scope of access of operators according to their function needs. Besides, the system referential is centralized and managed exclusively at the back-office level.

944. Data backup system is processed on a daily basis into the general specified server and periodically on separate magnetic supports. Furthermore, the system is highly protected with sophisticated virus detection software, and with assistant auxiliary server. In addition, CBT dealing room is protected with card access system and equipped with fire detection instruments.

945. Audit function is led by an internal entity. This entity undertakes periodical missions in order to assess reserves management operations processing, in accordance with objectives, principles and operational procedures approved by the Governing Board of the Bank. No external auditing has till now been undertaken.

B. Establishing a Capacity to Assess and Manage Risk

Risk Management

Liquidity risk

946. Liquidity is guaranteed through an appropriate asset allocation and an adequate time horizon for investment operations. About 5 percent of foreign currency reserves is maintained liquid to face unanticipated treasury needs. Excess liquidity is invested daily in short-term bank deposits (TomNext or OverNight). About 65 to 70 percent of the reserves are invested in the money market, through bank deposits of 1-week to 6-month periods, on the basis of anticipated fund flows. The remaining 25 to 30 percent of the reserves are invested in AAA sovereign government and supranational bonds.

Credit risk

947. Credit risk is managed through on adequate choice of counterparts with a sound financial background. These counterparts are constantly followed up especially through several rating agencies reports. Quantitative limits on deposit amounts and investment periods are set for each counterparty according to its rating. A continuous follow-up of the counterparties is ensured by an independent department, and limits are updated accordingly. Credit risk is controlled through constraints on permissible investment instruments. Only sovereign AAA government and supranational issues are allowed. Agencies and corporate bonds are excluded from the bank's assets.

Market risks

948. Foreign exchange risk is managed by matching the structure of reserves currencies to the currency structure of the balance of settlements. Adjustments are made when major discrepancies from the objective structure arise, or to take profit from substantial differentials in interest rates, or the Governor's decision after proposals of the reserves management department. Equities are completely excluded from asset portfolio, making the portfolio immune from stock market risks.

949. Interest rate risks are diminished through a choice of a double duration limits: one on the global portfolio of reserves (nine months), and the second on the bond portfolio (two to three years). Long maturity bonds (above 10 years) which are most sensitive to interest rate movements, are excluded from the portfolio. Constraints on permissible instruments are also a factor diminishing interest rate risks.

950. The use of financial derivative instruments (swaps and options) is made only for hedging purposes.

XIX. TURKEY

A. Developing a Sound Governance and Institutional Framework

Reserve management objectives and coordination

951. Before 1980, Turkey had a fixed exchange rate regime with strict foreign exchange controls. Reserves were used mainly for current needs. With the liberalization policies of the early 1980s, exchange controls were eliminated and banks as well as other institutions and individuals were allowed to hold foreign exchange. With these changes, reserves began to serve additional purposes such as intervention in domestic currency and providing a level of confidence to domestic and international markets.

952. The accumulation of foreign reserves during the second half of 1980s made clear the need to improve portfolio management skills at the Central Bank of Turkey (the Central Bank). To this end, the Central Bank employed a few external fund managers to manage fixed income portfolios as part of the learning and training process for its own staff. The main function of those managers was training and providing advisory services about the developments in international markets. External manager services were discontinued from 1995.

953. With the liberalization of Turkish economy, there was growing need to keep up with rapidly changing financial environment and central banking principles in the rest of the world. Accordingly, reserve management concept has fully evolved into a new stage at the Central Bank with the implementation of modern management principles. The Central Bank takes into account the priorities of safety, liquidity and return, in that order, while managing reserves. Risk awareness and management have become primary concerns.

954. Reserve assets managed by the Central Bank consist of readily available and marketable foreign assets that are controlled completely by the Central Bank.

955. The reserve management strategies at the Central Bank are influenced by different factors. One such factor is the Central Bank's liability structure, which is somewhat different from most central banks. The Central Bank carries a relatively large amount of liabilities in foreign exchange which consist of savings deposits opened by Turkish citizens living abroad. These accounts were opened in late 1970s to help Turkey overcome foreign exchange bottlenecks. They proved to be a stable source of foreign exchange over the years, even in times of financial crises. The Central Bank also has other liabilities in foreign exchange to domestic (e.g., reserve requirements) and international institutions. These liability accounts have a major impact on the design of the reserve management strategies.

956. Another factor that influences the reserve management strategies is the monetary and exchange rate regimes that are in place. The current Central Bank Law dictates that reserves should be managed in line with the monetary policy objectives. In the last 20 years or so, Turkey adopted different forms of intermediate exchange rate regimes between fixed and

floating, all of which needed liquid reserves to be sustained. Therefore, providing liquidity for intervention had been the driving factor in designing reserve management strategies. At the end of 1999, Turkey announced a disinflation program, supported by the IMF. Under this program, the Central Bank started implementing a pre-announced crawling peg and a rule based monetary policy. During that period, reserve management was structured in such a way that the liquidity aspect of reserves was even more pronounced because of the need to defend the crawling peg. Hence, the reserve management strategy was based mainly on liquidity. However, the crawling peg regime had to be abandoned in the aftermath of the two crises and the Turkish lira was floated on February 22, 2001.

957. Under the current floating exchange rate regime, the Central Bank is committed to intervene only to smooth out extreme movements in exchange rates, which allows for a more efficient liquidity management of the foreign exchange reserves portfolio.

958. Another important factor that influences the reserve management strategies is the external cash flows that arise mainly from foreign debt payments executed on behalf of the Turkish Treasury who is responsible for debt management. Under the current institutional framework, asset and liability management functions rest with different institutions. While the Treasury manages the government's foreign debt, the Central Bank is responsible for the management of foreign reserves. This framework makes sovereign risk management a challenging task. However, the Central Bank solves this problem by taking expected foreign debt payments within next year into account when designing the global benchmark and by establishing a close coordination with the Treasury. The coordination between the two institutions is expected to develop even further with the new Debt Management Office, which has recently been set up within the Treasury. The Debt Management Office is responsible for managing the government debt and associated risks.

Legal and institutional framework

959. The current legal framework of reserve management is defined by the Central Bank Law which gives the Central Bank the authority and the responsibility to manage the country's foreign exchange and gold reserves. The Law, which was recently amended in order to strengthen the Central Bank's independence, cites the reserve management objectives as safety, liquidity and return in that order, and authorizes the Central Bank to do transactions in international financial markets.

960. The Central Bank is the only institution authorized to manage the official foreign reserves of the country with principles and investment criteria determined by the Bank Board. The Central Bank acts as a financial agent for the Government. In this capacity, the Central Bank accepts foreign exchange deposits from and executes payments on behalf of the Government.

Organizational Structure

961. The Central Bank Law defines the Central Bank's Board as the highest decision making body within the Bank. Based on this authority, the Central Bank's Board has taken several decisions in the past with regard to the reserve management operations, including the current investment guidelines. The Investment Guidelines include allowable financial instruments and transactions, minimum external credit ratings and transaction limits for different groups of counterparties.

962. Following recent trends in international markets, the Central Bank restructured its reserve management process in 1998 in order to separate risk and investment management functions. Foreign Exchange Risk and Investment Committee was set up to shape the strategy and to take first layer strategic investment decisions in reserve and risk management. The Committee is composed of a Vice Governor, the General Manager and the two Assistant General Managers of the Markets Department who are responsible for reserve and risk management. The Committee approves the global benchmark, sets and monitors risk limits and reviews performance reports.

963. Also in 1998, Foreign Exchange Risk Management Division was created within the Markets Department that would be responsible for managing financial and operational risks inherent in reserve management operations. Based on the Board's and the Committee's decisions, Foreign Exchange Transactions and Foreign Exchange Risk Management divisions of the Market Department carry out front, middle and back office functions.

Transparency and accountability

964. Transparency and public disclosure of the Central Bank operations have gained importance in recent years. Turkey provides weekly data on reserves through weekly balance sheets, monthly information on foreign currency reserves and short-term possible drains through the IMF's Special Data Dissemination Standards (SDDS) Reserve Data Template and annual reports. Additionally, the Central Bank is having its financial statements audited by an external auditor according to internationally accepted accounting standards since 2000.

965. Finally, the Central Bank is currently working on an entirely new approach of internal auditing, which will include the reserve management operations in the regular audit reports, as an effort to further improve the reserve management accountability. This project is planned to be put into practice in late 2002.

B. Establishing a Capacity to Assess and Manage Risk

Sources of risks

966. Considering the management policy objectives and the financial markets that the Central Bank is involved in, liquidity, credit and market risks have been identified as major

financial risks inherent in the reserve management process. It has also been accepted that the Central Bank is exposed to certain operational risks during this process.

967. For most central banks, especially in emerging market countries such as Turkey, it is very difficult to estimate the timing of a possible run on foreign reserves, which makes liquidity management very difficult. Therefore, liquidity is a required criterion for any instrument to be included in the reserve portfolio. The Central Bank faces credit risk in the form of direct credit risk, settlement risk and replacement risk arising from its operations in international money, currency and securities markets. As for the market risk, fluctuations in foreign exchange rates and interest rates constitute the two main sources of risk for the Central Bank.

Risk management

968. The Central Bank Law dictates that foreign reserves should be managed with safety and liquidity objectives ahead of return. To this end, the Central Bank has adopted an asset-liability matching strategy for minimizing currency and interest rate risks in reserve management operations. Although this may not be the best option for every central bank, it provides a good approximation toward a minimum risk exposure portfolio for the Central Bank since its balance sheet is somewhat different from that of a typical central bank in that it carries a relatively large amount of savings deposits in foreign exchange that belong to Turkish citizens living abroad. However, the Central Bank has also considerable amount of external cash flows such as foreign debt payments executed on behalf of the Treasury, foreign exchange inflows from the Treasury's borrowings and foreign exchange interventions that make asset-liability matching somewhat difficult. This obstacle is overcome to a certain extent by treating such outflows as if they were liability accounts. The currency distribution and duration target of the global benchmark are set to match the currency distribution and maturity structure of the on-balance sheet liabilities and expected external cash flows within next year. Duration and currency limits are used to control deviations from these targets. An overall bank limit is also included in the global benchmark to control the credit risk.

969. The global benchmark also includes the eligible instruments and transactions that can be used in reserve management. These instruments and transactions currently include:

- Sovereign bonds with minimum AA or equivalent credit rating and maturity up to 10 years,
- Supranationals and BIS instruments with maturity up to 10 years,
- Time deposits placed with central banks and commercial banks with minimum A1/P1 or equivalent credit rating,
- Spot and forward foreign exchange transactions with commercial banks with minimum A1/P1 or equivalent credit rating.

970. The Central Bank is currently in the process of expanding the range of products used in reserve management to achieve more diversification.

971. The liquidity risk is also addressed within the global benchmark in two steps. First, considering the extremely high costs of possible liquidity shortfalls, only the most liquid instruments such as certain government obligations and very short-term bank deposits are included in the global benchmark as permissible asset classes. Second, the reserve portfolios in major reserve currencies are divided into "tranches" each providing liquidity in different time horizons. While the operational portfolios meet day-to-day liquidity or working capital needs, the liquidity portfolios provide liquidity in the short term. Although they are relatively small in size, the investment portfolios are managed with return maximization objective while staying within the overall risk limits.

972. Once the global benchmark is determined as a long-term passive investment strategy, the sub-portfolio benchmarks are constructed in order to communicate the risk/return targets of the global benchmark to the investment unit (Foreign Exchange Transactions Division). The sub-portfolio benchmark compositions are determined with optimization of return and risk (return volatility) based on historical return statistics of external indices.

973. Portfolio managers are allowed to deviate from the target duration to reflect their market strategies. However, such deviations are controlled through the use of portfolio duration limits, which are set in accordance with the global benchmark limits.

974. In order to further control the credit risk, the overall bank limit set within the global benchmark is distributed into individual credit limits for each counterparty. These limits are determined using an Internal Scoring Model. The Internal Scoring Model incorporates several information about the counterparties such as external credit ratings by different rating agencies, financial data, country ratings and support status of the institution in order to calculate a composite score. Based on this score and the capital size, each counterparty is assigned a certain credit limit.

975. The custodial risk is also addressed within the credit risk management. The Central Bank prefers other central banks and international custodians for safekeeping its reserve assets.

976. In recent years, the Central Bank has paid special attention to eliminating any deficiencies that may create operational risks. Within this context, the Central Bank restructured its existing back office in order to prevent possible operational losses due to human or system errors. As an additional measure against operational risks, the Central Bank has recently set up a "Disaster Recovery Site" that could become operational in a very short time in case the current systems become unusable for any reason. Finally, the risk management unit is working on issuing a "Code of Conduct" for reserve management staff.

Reporting and Monitoring

977. Once the overall level of risk that the Central Bank is willing to bear has been decided on through the global benchmark, current risk exposure is measured, monitored and reported on a regular basis. As mentioned before, the portfolio managers are allowed to take positions against their benchmarks based on their short- term investment strategies. However, these positions should not go beyond the preset limits both on the sub-portfolio and the global levels. The currency risk is monitored through the use of currency limits which are set within the global benchmark in order to control deviations from the target currency composition. The interest rate risk is controlled through duration limits that are set both at the global and the sub-portfolio level. The usage of these limits is reported to the Foreign Exchange Risk and Investment Committee on a regular basis.

978. As a future step, the Central Bank is planning to use Value-at-Risk limits to improve the market risk control. Value-at-Risk has been used at the Central Bank for reporting purposes for the last couple of years.

979. The monitoring of credit risk is done by "*Real Time Limit Monitoring System*" which is developed in-house. This system is designed to warn traders if the trade exceeds the remaining limit and captures each deal in terms of amount and exposure period by counterparty. The system not only takes into account the direct credit risk arising from deposit transactions but also considers "replacement risk" and "foreign exchange settlement risk". The system tracks limit usage and violations, and produces related reports by counterparty, rating category and country.

980. As for the performance measurement, the Central Bank has adopted a risk-adjusted performance measurement methodology that considers additional risks taken to achieve the realized return.

Human resources

981. Central Bank employs highly qualified staff in the reserve and risk management area and gives considerable importance to further training of the staff. In addition to the in-house training programs, the staff benefits from seminars held by other central banks and major financial institutions. The Central Bank has also adopted a policy of providing selected staff members with scholarships for postgraduate programs at major universities abroad.

Information Technology

982. As for the information system needs, the Central Bank has adopted a policy to develop its own systems where possible. The Central Bank has a relatively large IT Department with highly qualified staff. The IT Department has developed the current systems used in reserve and risk management. However, for meeting sophisticated and specific software needs, such as certain risk measurement tools, developing products in house

may not be the most efficient option. In such cases, the Central Bank prefers outsourcing this service by trying to search for the most suitable product in the market.

XX. United Kingdom

A. Reserve Management Objectives and Coordination

983. United Kingdom official holdings of international reserves are owned by Her Majesty's Treasury (HMT) and comprise gold, foreign currency assets, International Monetary Fund (IMF) Special Drawing Rights (SDRs), and the U.K.'s Reserve Tranche Position (RTP) at the IMF. With the exception of the RTP, these reserves are held in the Exchange Equalization Account (EEA). The Bank of England manages the reserves as agent for HMT, as well as providing advice on reserves management issues, including liability management.

984. The EEA was established in 1932 as a fund for stabilizing the exchange value of sterling. Any U.K. government exchange rate intervention would therefore be conducted through the EEA.[54] The EEA also provides foreign currency services to Government Departments and Agencies, i.e., sales of foreign currency to Departments with foreign currency obligations and purchases of foreign currency from Departments with foreign currency receipts.

985. The U.K. Government has published a Service Delivery Agreement (SDA) target to minimize the cost of holding reserves while reducing risk. The performance relative to this target is reported in detail in HMT's annual report on the expenditure plans of the Chancellor of the Exchequer's Departments.

Institutional framework—the Annual Remit

986. The Bank of England manages the reserves in accordance with criteria set out by HMT in an annual Remit, the main text of which is published in the Debt and Reserves Management Report, which is published by HMT at the time of the Budget. The Remit summarizes the benchmarks which the reserves are actively managed against; the investment constraints within which the Bank operates; the framework for risk control; and the arrangements for the audit of the EEA. The Bank is also set a profit target, net of management costs, for active management against the benchmark; this target is not published.

[54] In addition to the United Kingdom's Official Reserves the Bank of England manages its own holdings of foreign currency assets and gold. As set out in the Chancellor of the Exchequer's letter of 6 May 1997 to the Governor of the Bank of England, the Bank can intervene m support of its monetary policy objective using the Bank's own resources rather than those of the EEA. The Bank of England Act 1998 sets out rules governing the disclosure of any such intervention.

Administration and control

987. The Bank reports to HMT on investment performance at a monthly meeting chaired by the head of HMT's Debt and Reserves Management team. The Bank's Foreign Exchange (FED) and Risk Analysis and Monitoring (RAMD) divisions account for the returns made, and for market and credit risks incurred. Any outstanding operational or policy issues are also discussed. Every six months, there is a meeting at which the EEA Accounting Officer and the Bank of England's Executive Director for Market Operations or delegated senior officials review investment performance, discuss strategy and agree analysis to be commissioned by HMT and undertaken by the Bank. Meetings to discuss individual issues, including changes to the Remit, may be proposed at any time by HMT or by the Bank.

988. Every quarter, an independent opinion of the adequacy and effectiveness of the system of internal and financial control is provided to the Bank's Executive Director for Market Operations by the Head of the Bank's Internal Audit. The Bank's Executive Director sends these reports to the EEA Accounting Officer. At the same time, the Executive Director provides the Accounting Officer with a management report on the operation of the control framework. Separately, the U.K. National Audit Office undertakes an external audit of the EEA on an annual basis.

Bank of England reserves management structure

989. The reserves management operation is ultimately headed by the Executive Director for Market Operations, to whom the heads of FED and RAMD report. It is an important principle that neither the middle office (RAMD) or the back office report to the front office (FED).

990. FED and RAMD senior management are responsible for implementing and reporting the results of the strategy agreed between HMT and senior management at the Bank. Decisions on specific investments and the degree of latitude for individual portfolio managers, in addition to general staffing and budget issues, are taken at this level.

991. Dealers and portfolio managers within FED provide active day-to-day management of the foreign exchange and asset portfolios, involving tactical positioning and direct contact with market counterparts. Market positions and overall investment performance are formally reported to senior management and to HMT on a monthly basis.

992. This delegation of responsibilities and decision-making is captured within the formal benchmark process, where higher levels of management shape the benchmark for the next level down. This approach enables the attribution of overall returns to the decisions taken at each level and provides a direct and highly *visible* link between decisions taken and profits earned. This gives essential feedback in analyzing performance and acts as an important motivator for reserves managers.

993. As well as reporting directly to the Executive Director for Market Operations, RAMD has a reporting line to the Deputy Governor for Financial Stability in the latter's capacity of Chairman of the Bank's Asset and Liability Committee. This reinforces the independence of the middle office. The operational independence of RAMD is considered to be an important prerequisite for its effectiveness.

994. RAMD is responsible for legal, regulatory and ethical issues of compliance (external control) as well as risk measurement and monitoring (internal control). It ensures that detailed benchmarks, limits and controls are in place which are consistent with the risk limits set by HMT in the Remit. It also establishes the compliance and reporting procedures that managers should follow and sets up all the necessary legal agreements and documentation.

995. Operational procedures are documented in a handbook that is frequently updated and made available to all staff involved in the management of reserves. These include new products procedures, to ensure that investment managers and dealers only trade in instruments that can be handled by settlement, risk, accounting and IT systems. The rules governing insider dealing and the declaration of personal financial transactions are also circulated. All staff employed in the management and control of the reserves are required to sign these declarations on a frequent basis.

996. RAMD is responsible for ensuring that investments are correctly recorded and for monitoring any breach of limits, controls or other elements of compliance. All breaches are reported to senior management. In addition, RAMD calculates the profits and loss figures, which are reported to senior management and HMT.

Training and retaining staff

997. The Bank of England devotes considerable resources to training its staff in the specialist skills required for reserves management. This includes regular participation in internal and external courses in finance and portfolio management techniques. Like other bank employees, staff involved in reserves management have their basic salary structure enhanced by a flexible package of financial and nonfinancial benefits, and individual effort is rewarded through a system of discretionary bonuses (though as a considerably smaller proportion of total remuneration than in the private sector).

Transparency and accountability

998. The presentation and accounting basis of the U.K. reserves has changed radically in recent years. The United Kingdom has been at the forefront internationally in promoting openness and transparency in reserves data. In September 1997 the Chancellor of the Exchequer announced that he was "opening up the books" on the U.K. reserves of foreign currency and gold. The ensuing quarterly report, which was initially published with a two-month lag, provided a breakdown of assets and liabilities into broad currency blocs, SDRs and gold. Since April 2000, reserves data have been published on a monthly basis in accordance with the IMF/G10's Special Data Dissemination Standard (SDDS). Data from

July 1999 onwards can be found on the Bank of England website. This data records the value and composition of the U.K.'s gold and foreign currency assets, liabilities and derivatives on a "marked-to-market" basis (that is using current market valuations). The press release also reports the size(s) and date(s) of any intervention in the foreign exchange markets, either by the EEA or by the Bank of England, and gives an explanation of any intervention carried out.

999. As a further enhancement of transparency, in January 2000, the first set of EEA annual accounts was published, covering 1997–98; these financial statements are audited by the National Audit Office. HMT now has a statutory obligation, as set out in the Finance Act 2000, to publish a full set of financial accounts for the EEA every year and, after examination and certification by the Comptroller and Auditor General, to lay the accounts before each House of Parliament by the January 31 following the end of the financial year to which the accounts relate. The financial accounts for 2000–01 were the first to be published within this framework. Although this is the fourth year for which the accounts have been published, it is the first time they have been published under accruals accounting consistent with U.K. Generally Accepted Accounting Practice (U.K. GAAP).

B. Establishing a Capacity to Assess and Manage Risk

An asset/liability approach

1000. HMT's foreign exchange assets and liabilities are managed jointly on a day-to-day basis by the Bank of England. However, whereas the assets are held in the EEA the liabilities are liabilities of the National Loans Fund (NLF), which funds the EEA's assets through a combination of sterling and foreign currency borrowing. The Exchange Equalization Account Act does not permit the EEA to borrow.

1001. Any NLF exposures relating to the foreign currency reserves are managed alongside those of the EEA by the Bank of England, which also acts as HMT's agent for foreign currency liability management. For example, when the NLF borrows in a foreign currency to fund the reserves it assumes the currency and interest rate risk as it sells the foreign currency to the EEA for sterling. Through its investments the EEA will take an offsetting currency and interest rate position so that the government's exposures as a whole are hedged.

1002. EEA reserves fall into two differently funded categories: "borrowed reserves" on which the currency exposures have been hedged and "net reserves" which are funded out of un-hedged sterling.

Funding the borrowed reserves

1003. The "borrowed" reserve assets are financed both by foreign currency and sterling-denominated liabilities, the latter swapped into foreign currencies. Cost is the main determinant of whether the foreign currency reserves are funded by issuing foreign currency liabilities or by sterling swapped into foreign currencies. The least cost method of funding can be determined by comparing, on a swapped basis, the cost of issuing bonds of a given

maturity and nominal amount in dollars, euros and yen with the cost of issuing a similar bond in sterling. The EEA seeks to control the exposure in these borrowed reserves by matching the risk characteristics, for example maturity, of its foreign currency assets to those of the foreign currency liabilities. Any residual risk is managed by swapping the exposure of the asset into that of the liability through currency or interest rate swaps.

Recent Trends in Financing the Borrowed Reserves

1004. From March 2000 a program was implemented which replaced maturing foreign currency debt issues with sterling debt swapped into foreign currencies to finance the reserves. At prevailing interest rates and swap rates this offered a more cost-effective means of financing than borrowing directly in foreign currency. As central government net cash requirements for 2000–01 were revised down substantially, further swaps were undertaken to prefinance some of the foreign currency debt maturing in 2001 to 2003. This policy continued through 2001–02.

1005. Prefinancing led to a temporary rise in the gross reserves but did not increase the U.K.'s net foreign currency exposures, because all transactions were hedged. As the prefinanced liabilities are redeemed, the level of gross reserves will fall back. Redemption of the longest dated prefinanced foreign currency obligation in January 2003 is expected to bring the level of gross reserves down to $35 billion by the end of March 2003, from a recent high of $43 billion at the end of September 2001.

Net Reserves

1006. The net currency reserves are effectively financed by unhedged sterling, and by the EEA's net SDR liability. HMT sets a benchmark for net currency exposures that takes into account past patterns of risk and return, as well as other macroeconomic factors such as trade flows and the likely currencies used in any intervention. In 2001–02, this was 40 percent U.S. dollar, 40 percent euro and 20 percent Japanese yen (excluding SDRs), which has been unchanged since accounts were first published in 1997–98.

1007. Interest rate risk in the net reserves has largely been managed by investing in short-dated instruments. Recently, however, the duration of some of the net reserves benchmark has been extended to reflect a revised view about the best trade-off between risk and return.

Composition of reserve assets

1008. Under the Exchange Equalization Act, funds in the EEA may be invested in any assets denominated in the currency of any country; in the purchase of gold; or in the acquisition of SDRs.

1009. In May 1999, the Government announced a restructuring of the reserves involving a program of gold sales by auction to achieve a better balance in the portfolio by increasing the proportion held in currency. This program continued until the end of 2001–02. Following

each auction, the proceeds of gold sales were invested in foreign currency interest bearing assets and retained in the reserves broadly in the proportion 40 percent dollars, 40 percent euros and 20 percent Japanese yen.

Securities and other eligible instruments

1010. The statutory obligation of the EEA dictates that investments must be highly liquid, so they may be made available quickly for intervention purposes if necessary. They must also carry acceptable credit risk. Essentially this means that the bulk of the assets are securities issued by the national governments of the United States, euro area countries and Japan.

1011. The EEA also makes use of other instruments, however, including:

i. Bonds issued by highly rated supranational organizations and selected official sector agencies;
ii. Foreign currency spot, forward and swap transactions;
iii. Interest rate and currency swaps;
iv. Bond and interest rate futures;
vi. Forward rate agreements;
vii. Gold deposits, gold loco and gold quality swaps;
viii. SDRs;
ix. Certificates of deposit and bank and corporate commercial paper; and
x. Bank deposits.

1012. Options are not currently permissible investments for the EEA.

Liquidity policy

1013. To determine the benchmark asset allocation for the EEA, the Bank employs an asset allocation model that explicitly trades-off liquidity and return: the model determines an asset mix that maximizes expected return for given levels of expected liquidation costs. Potential liquidation costs include both bid-offer transaction costs, which are dependent on the size of liquidation, and price movements, which are primarily driven by market conditions at the time of liquidation. Liquidation costs are incurred only if there is a call on the reserves. A 'call' on the reserves is defined by three parameters: the size of the call, the probability of the call occurring and the length of time available to meet the call. In the absence of such a call, the reserves are assumed to be held to maturity and yields between asset classes can be compared on a spread-to-Libor basis (taking into account the basis swap if assets are denominated in different currencies). Various call scenarios are assumed, based on historic events and future potential needs. A core level of liquidity is also specified in the model, leading to minimum holding thresholds in particular asset classes such as U.S. Treasury bonds.

1014. The results of the liquidity model are used to determine the neutral position of the borrowed reserves, and this forms the benchmark for active management.

Active management benchmarks

1015. The Bank actively manages both the borrowed and net reserves in order to enhance returns relative to benchmarks. Deviations from benchmarks are capped by the VaR limits set each year by HMT in its annual Remit. The benchmark returns on borrowed reserves comprise the returns to the hedge portfolios held against the NLF foreign currency and returns generated by the sterling swaps program.

1016. The benchmarks for active management are adjusted for any positions taken by higher levels of management such that the returns to active risk-taking are properly identified for each portfolio. Such management positions count against the overall VaR limits.

Active Management

1017. Portfolios are divided into major currency blocs—dollars, euros and yen—and portfolio managers establish tactical positions by buying and selling securities against their individual currency benchmarks. They are also permitted to establish positions using derivatives including futures and swaps although not, currently, options.

1018. A range of positions including outright longs and shorts, curve positions, spread switches and relative value switches are taken at the active level. The decision to take profits on trades and to unwind loss-making positions, in most instances, belongs to the portfolio manager although, exceptionally, senior management may ask for positions to be closed in order to avoid a build-up of unacceptable risks. Positions are monitored on a frequent basis by the direct line management of the active traders.

Market risk

1019. Market risk is the exposure to movements in market variables. For the EEA, these variables are primarily interest rates and exchange rates. Since 1999 the Bank has monitored and controlled market risk using a VaR model, which predicts, at a specified confidence level, the maximum likely loss for the portfolio over a certain time period. The Bank applies a 99 percent confidence interval and a ten-day holding period, which predicts that in 99 ten-day periods out of a hundred, losses should not exceed those suggested by the model. These VaR estimates are based on the past volatility of returns on different asset classes and on how the returns on each asset class are correlated with other positions held in the portfolio.

1020. The Bank measures the EEA's VaR exposure on a regular basis throughout the day. It also calculates the Delta exposure at the same frequency. Delta measures the change in value of the portfolios for each one basis point shift in the relevant yield curve. It supplements the VaR measure, and helps to test the sensitivity of the portfolio to changes in interest rates. Market risk reports are produced daily.

1021. Furthermore the Bank conducts regular stress tests, to explore the vulnerability of the EEA to hypothetical severe market movements and to estimate the potential losses in these extreme conditions. The results of these tests are reported to senior management.

Credit risk

1022. The management of the reserves involves exposure to the creditworthiness of banks and of the issuers of sovereign, supranational or commercial paper. The creditworthiness of these banks and issuers is subject to regular scrutiny by the Bank. Although the Bank takes account of published Agency ratings, it sets its own internal limits, which limit the maximum exposure to each bank and issuer in terms of both amount and maturity. Such exposures are monitored in real time against the limits. A report of any limit excesses is sent to HMT each month. In addition, there are limits to contain exposure to each country's banking system and on instrument types.

1023. Where bonds are owned by the EEA, but held by custodians, these custodians may be authorized to use them in their bond lending programs. These programs involve lending the bonds against collateral consisting of either other bonds or cash. The authorized custodians are permitted to invest cash collateral in money market instruments. The investment of this cash collateral is subject to credit limits determined by the Bank. The amounts delegated to the custodians are deducted from the limits available to the Bank for its own EEA management activities. Any maturity mismatch between the collateral held and the corresponding investments is strictly limited. Daily reports are received by the Bank, which allows compliance with the investment constraints to be checked.

1024. The EEA also exercises its right to call collateral each time exposures to swap or repo counterparties rise above contractually defined thresholds. Unsecured credit risk on such transactions is thereby kept to a minimum.