



SOVEREIGN ASSET-LIABILITY MANAGEMENT—GUIDANCE FOR RESOURCE-RICH ECONOMIES

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EXECUTIVE SUMMARY

Ample natural resource revenues create both opportunities and challenges for a sovereign to transform its natural resources into well-managed financial assets.

Hence, inter-temporal smoothing of revenue and consumption/investment moves to the center stage of macroeconomic policies. The questions arising from natural resource wealth accumulation are becoming more pressing for many countries, given the need to achieve intergenerational equity in a context where commodity prices may not continue their upward trajectory of the past decade. Addressing these questions requires a flexible sovereign asset-liability management (SALM) framework that integrates various macroeconomic and financial trade-offs with the aim of containing financial risk to the sovereign balance sheet. The framework and policy advice aims to guide policymakers across different institutions in weighing those trade-offs.

Although separate asset and liability management strategies may be optimal for individual institutions, it is suboptimal to manage isolated balance sheets.

Mismatches in the financial characteristics of sovereign assets and liabilities may expose the sovereign to risks, including interest rate and exchange rate risks. Although challenging, coordination among institutions managing sovereign assets and liabilities is desirable. In practice, many countries implement partial SALM, such as coordinating reserve and debt management decisions in terms of the currency mix and duration.

Investment objectives for different pools of assets should be clearly articulated to take into account explicit or implicit liabilities associated with them.

In the context of resource-rich countries, smoothing the impact of volatile commodity prices on government revenues requires investing financial wealth in safer and more liquid assets. On the other hand, building assets to meet future or contingent liabilities would require a longer-term investment strategy with higher returns. Sovereign funds aimed at smoothing consumption or building wealth for future generations should have a clear investment mandate and transparent governance structure, with appropriate delineation of responsibility between the owner of the fund and its management.

The policy advice builds on existing guidance to manage separate pools of assets and liabilities, while providing a holistic view of the sovereign balance sheet.

While important policy guidance is available on managing specific asset pools—as official reserves and sovereign wealth funds—and implementing sound debt

management, the distinguishing element of an integrated SALM is that management of assets and liabilities is coordinated based on the whole sovereign balance sheet. Sovereign wealth management in this context requires reconciling various objectives under a comprehensive framework that takes account of various options to manage risk and return. The value-added of the paper is to operationalize some of the key principals of an intergraded SALM approach and showcase country experience in implementing these principals. The paper provides policymakers with a practical framework to consider the various opportunities and challenges that arise in the context of managing natural resource wealth, and provides practical advice for managing sovereign assets and liabilities with well-defined objectives.

A number of broad principles could be considered when implementing a (partial) SALM framework, particularly:

- To the extent that sovereign assets/reserves exceed levels needed for shorter-term liquidity purposes, this excess could be invested in less-liquid/higher yield instruments to preserve wealth for future generations, preferably in a dedicated savings fund subject to appropriate institutional safeguards.
- Even in cases where natural-resource wealth meets fiscal financing needs, there may be merit in issuing domestic debt in order to promote a liquid local-currency debt market and to assist in responding to volatile capital flows and commodity prices. However, decisions on this front would need to take into account the cost of domestic debt relative to the return on financial assets, and the institutional capacity to manage a domestic debt program.
- The structure and nature of contingent and implicit liabilities should inform the investment objectives and strategies of sovereign assets. This will be reflected in the type of savings fund and associated investment horizon, mandate, and risk profile.

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Glossary

ALM	Asset-liability management
BoP	Balance of payments
BoD	Board of directors
CEO	Chief executive officer
CIO	Chief information officer
GPFG	Norwegian Government Pension Fund – Global
HKMA	Hong Kong Monetary Authority
IFSWF	International Forum of Sovereign Wealth Funds
IWG	International Working Group of Sovereign Wealth Funds
MCM	Monetary and Capital Markets Department of the IMF
NBIM	Norges Bank Investment Management
NZSF	New Zealand Superannuation Fund
PRF	Pension Reserve Fund, Chile
TTF-MNRW	Topical Trust Fund on Managing Natural Resource Wealth
SAA	Strategic asset allocation
SALM	Sovereign asset-liability management
SWF	Sovereign wealth fund
TA	Technical assistance
TGT	Total government take

BACKGROUND

- 1. The International Monetary Fund's (IMF) Monetary and Capital Markets Department has been providing significant technical assistance (TA) in the area of natural resource wealth management.** IMFTA focuses on managing the trade-offs between enhancing the returns on investment at acceptable levels of risk; ways of direct and indirect hedging of natural resource revenues; and the appropriate management of long-term liabilities in the context of ample asset accumulation. As demand for integrated asset-liability management (ALM) in natural resource-rich countries is on the rise, a comprehensive framework to guide future TA, and IMF policy advice more broadly became warranted to ensure consistency of policy advice both in TA provision and IMF surveillance. The distinguishing element of ALM in this context is that management of assets and liabilities is coordinated based on the whole sovereign balance sheet, including the central government, the central bank, and other public sector entities involved in exploitation and management of the natural resource(s). These could include state-owned enterprises, regional governments, or sovereign wealth funds (SWFs). Wealth management in this context requires reconciling various objectives under a comprehensive ALM framework that takes account of various options to manage risk and return.
- 2. In the context of the IMF's externally-financed TA, module four of the Topical Trust Fund on Managing Natural Resource Wealth provides funding for TA on investment strategies for natural-resource wealth, including strategic asset allocation (SAA), risk management framework, and governance aspects of managing and investing natural resource wealth.** This guidance paper complements this type of TA. The paper covers key elements on the sovereign balance sheet, including official reserves and other pools of financial assets, as well as debt and other contingent liabilities management issues facing the sovereign in the context of ample natural resource wealth.
- 3. The paper discusses issues related to SALM from the perspective of natural-resource rich economies, yet the conceptual framework presented is flexible enough to incorporate a wide range of trade-offs facing the policymaker with broader applicability for other countries, including those with large current account surpluses and ample fiscal reserves.** The different trade-offs are discussed with reference to country examples, and the case of Norway is showcased throughout the analysis as a model to illustrate the different stages in the process of accumulating and investing natural resource wealth. Norway was chosen as a model case given its successful history of managing natural resource wealth and the governance structure of its SWF. The case study of Norway is narrated in the blue boxes throughout the paper.
- 4. This work was completed with financial assistance from the donors to the TTF-MNRW, including Australia, the European Union, Kuwait, the Netherlands, Norway, Oman, and Switzerland.** The paper incorporates input from the TTF-MNRW donors, as well as government officials impacted by the issues presented in the paper.

5. The structure of the document is as follows: Section 2 presents the main elements of the sovereign balance sheet and defines the scope of the paper; Section 3 discusses the asset side of the sovereign balance sheet, presenting the investment objectives and strategies for different types of asset pools; Sections 4 briefly presents the main elements of sovereign liability management, before turning to the heart of the paper in Section 5 to analysis the linkages and interactions between the different elements on the balance sheet and discuss risk management considerations in an integrated framework. Section 6 is dedicated to governance and risk management issues of SWFs, and Section 7 concludes with the main policy recommendations.

SOVEREIGN ASSETS, LIABILITIES, AND SALM FRAMEWORK

6. Sovereign assets and liabilities can be narrowly defined in terms of financial assets on the government’s balance sheet, including contingent liabilities.¹ This definition includes foreign exchange reserves, public sector debt, and where possible, contingent liabilities. For analytical purposes (and considerations of ALM), the balance sheet of the government and the central bank could be consolidated to understand how the two institutions’ financial exposures interact with one another. A more comprehensive view of the sovereign balance sheet could be based on an economic rather than a financial perspective, accounting for the underlying inter-temporal objective of the sovereign and including future income and expenditures (Table 1). For the purposes of this paper, the narrower definition of the financial balance sheet will be adopted given the focus on financial wealth management. The application of the SALM framework in Section 5 will incorporate elements of the “economic” balance sheet, such as future imports and future flows from natural resources extraction.

7. The decision to consume, save, or invest the revenues from natural resource wealth is based on a number of factors including the country’s level of development, population growth and characteristics, and the economy’s absorptive capacity. The fiscal framework governs the pace of public spending and guides the transformation of natural resource wealth into financial or physical assets. Box 1 sheds light on some of these elements (see IMF 2012 for detailed analysis).

8. On the asset side, resource-rich economies often accumulate “excess reserves” beyond precautionary motives. This reflects the fact that the process of extracting and selling natural resources often represents a transformation of nonrenewable natural resource wealth into financial assets, in which case, the country is building “strategic reserves” rather than excess reserves for

¹ Generally, governments do not produce sovereign balance sheets, but rather publish annual fiscal budgets along with balance sheets of key institutions (e.g., central banks, state-owned enterprises). There has been more progress in advanced economies, where (i) most governments produce a consolidated financial balance sheet; (ii) many produce a full balance sheet; and (iii) a few produce a full balance sheet that consolidates the central bank.

precautionary motives. Sound management of these strategic reserves, thus, becomes an important issue for resource-rich countries, including the establishment of dedicated savings funds with a mandate to optimize return on these financial assets.

Table 1. Stylized Economic-Risk Balance Sheet of the Sovereign

Assets	Liabilities
Present Value of Incomes:	Present Value of Nondiscretionary Expenses:
Taxes	Social and economic development
Fees	Economic development
Seniorage	Government administration
Balances:	Balances:
Cash	Monetary base
Currency reserves	Government debt
Investments (pension and wealth funds)	In domestic currency
	In foreign currency
Government-owned enterprises	Pension liabilities
Infrastructure	
Real estate	
Natural resources	
Other assets	
	Contingent claims (explicit and implicit):
	Guarantees to banks and nonbanks
	Guarantees on retirement income
	Guarantees on social welfare
	Net worth
	Net financial worth

Source: Adapted from Merton (2007).

9. Liabilities on the sovereign balance sheet typically include public debt, explicit pension liabilities, and often implicit contingent liabilities. These liabilities may have significant impact on the resilience of the sovereign balance sheet in the face of adverse shocks. At the same time, they may be difficult to monitor and manage, especially contingent liabilities, since they are often not reported in government accounts.

10. From the risk-return perspective, it is suboptimal to optimize isolated balance sheets rather than the consolidated sovereign balance sheet. Although separate asset-liability objectives and strategies might be optimal for each institution (e.g., ministry of finance and central bank) in terms of local risk-return profiles, it may not be the case from the sovereign balance sheet perspective. Mismatches in the financial characteristics of sovereign assets and liabilities may expose

the sovereign balance sheet to a wide range of risks, including interest rate and exchange rate risks. Although challenging, close coordination among institutions involved in the management of sovereign assets and liabilities is desirable to better manage risks, with appropriate legislation and policy guidelines.

Box 1. Saving and Investment Decision in the Context of Natural Resource Wealth

A nation can save either in financial assets (by accumulating claims on other countries) or in domestic assets that increase consumption possibilities in the future. These domestic assets could be either physical assets, such as infrastructure, or increased human capital in the form of better health care or education. When a country transforms wealth in the form of natural resources into savings for future generations, it is thus, in principle, faced with a choice between accumulating financial assets and/or accumulating other forms of wealth.

In general, many poorer, resource-rich countries have been constrained in their access to credit, so many profitable investments in, for example, education, healthcare, or infrastructure have not been undertaken. When income and consumption are already at low levels, reducing consumption to finance investments to foster growth is often not an option. In this way, a combination of constrained credit and low income can lead to a poverty trap.

In principle, increased revenues from natural resources can be a way of breaking out of this trap by channeling some of the extra revenues into domestic investments to promote growth. To the extent that such investments have been constrained in the past, these domestic investment opportunities will often yield higher returns than alternative investments in foreign financial assets.

However, there are several factors that will constrain the optimal level of such domestic investments:

First, it should be noted that—by definition—one dollar of increased exports from the resource sector in a country has to be matched by a combination of

- Reduced exports from other sectors of the economy; and/or
- Increased imports; and/or
- Increased claims on other countries in the form of an accumulation of financial assets.

Thus, if the government decides not to accumulate assets in a fund, the result must be either increased net imports or increased net accumulation of financial assets by the private sector. These effects will be brought about by changes in prices, wages, and equilibrium exchange and interest rates. Increased net imports will have to come about through real exchange rate appreciation which will have to be reversed when resource income falls, leading to risk of Dutch disease problems. Accumulation of financial assets in a fund helps reduce this risk.

Second, it should be noted that even if many domestic investments may seem profitable on an individual basis, the sum of all projects might be considerably less profitable. This is because of the effect of the investments on equilibrium prices, wages, and exchange and interest rates as described above.

Third, while projects may be profitable for society as a whole, they may erode government finances over time. This is because the costs of these investments typically are borne by the government, while the benefits accrue to the private sector. If mechanisms for sharing the returns from such investments with the government in the form of taxes and user tariffs are weak, the optimal level of such investments may be lower.

All of these issues should be addressed in a unified framework that assesses optimal domestic investment levels within a broader macroeconomic context, including longer-term growth and fiscal sustainability issues.

11. In practice, a partial SALM framework can be adopted to identify and manage financial risks to the sovereign. Many countries implement partial SALM without identifying an explicit form of the sovereign balance sheet or establishing SALM objectives. For instance, the authorities may implement debt management or reserve management strategies by matching the currency mix and duration for at least some part of these portfolios in order to reduce currency and interest rate risks across the sovereign balance sheet (e.g., Canada, New Zealand, and Mexico).

12. These issues are especially relevant for resource-rich countries. Many countries build up various forms of funds to address macroeconomic challenges connected with inflows of resource revenues. This will in itself raise issues about appropriate coordination with monetary policies and reserve management, as well as coordination with debt management. Furthermore, the resources themselves can be viewed as part of the sovereign balance sheet in a larger sense. The SALM framework can be usefully employed to address these issues.

ASPECTS OF ASSET MANAGEMENT

13. Resource-rich countries face significant challenges in transforming their natural resource wealth into well-managed financial assets with equitable intergenerational distribution. With limits to the absorptive capacity of the economy, the volatility and lumpiness of revenue flows constrain macroeconomic policy choices to save, invest, or spend these resources. Box 1 discusses some aspects of these macroeconomic choices. The subsequent policy question is how to optimize return on assets once a decision to save and invest has been made.

14. The rest of Section 3 will discuss the different investment objectives of the sovereign that are influenced by the nature of the liability on the sovereign balance sheet; risk-return considerations; and the different types of sovereign funds. Section 4 will provide a brief overview of liability management considerations that are relevant for the discussion, before Section 5 elaborates the coordination of sovereign asset and liability management in an integrated framework.

A. Investment Objectives

15. Investment objectives for funds and other pools of assets, including those based on natural resource revenues, should be clearly articulated. This is a necessary first step towards formulating an investment strategy. The investment objectives will reflect the policy objective of the assets in question and should take into account any explicit or implicit liabilities associated with them. For instance, volatile commodity prices require smoothing the impact of revenue volatility on the government budget and investing in safer and more liquid assets. On the other hand, building assets to meet future or contingent liabilities would require a longer-term investment strategy with higher returns.

16. The investment objectives will typically distinguish longer-term investments from the existing foreign reserves pool. Foreign reserves have to be available to the central bank for monetary policy purposes and will typically be managed with an objective of preserving nominal

value and keeping reserves liquid. In the event countries accumulate reserves in excess of those needed to meet external obligations and for monetary policy purposes, an investment strategy that boosts returns on excess reserves is often employed, including defining an investment tranche of reserves or establishing a dedicated fund with a mandate to increase returns given a moderate risk profile (Box 2).

Box 2. Reserve Management

Central bank reserves have the primary purpose of facilitating balance of payment (BoP) transactions, supporting the implementation of monetary policy, and providing liquidity during a crisis. To fill this role, the primary objective of reserves management is to keep reserves liquid while minimizing the opportunity costs of holding them. In practice, reserves that need to be immediately available to the central bank are held in short-maturity instruments issued by high-rated governments in one of the major international reserve currencies.

The composition of international reserves, from an SALM perspective, should be derived from the type of shocks that they are meant to offset. Typically, a portion of highly liquid reserves is determined through an assessment of the potential liquidity needs, based on BoP stress tests and past interventions. Also, countries that have limited international market access may structure their reserves so that they match the currency composition of their future imports. In countries where reserves provide coverage for short-term debt, the currency composition should match the currency composition of their short-term debt.

Many central banks have reserves over and above the level needed for monetary policy purposes in the short term (see IMF 2011 for a comprehensive discussion on reserve adequacy and metrics). To minimize the opportunity cost of reserve accumulation, excess reserves can be invested with somewhat less emphasis on the need for liquidity and with a view to improving returns subject to reasonable risk. Relevant assets could include longer-maturity fixed-income instruments (to pick up a term premium), fixed-income instruments issued by lower-rated issuers (to pick up a credit premium, but usually still investment grade rating), or fixed-income instruments that are less liquid (to pick up a liquidity premium). There is also an increasing trend to include nonfixed income, particularly equities, in the investment tranche. Of course, many assets will be exposed to all these risk factors simultaneously. The risk factor approach outlined in Appendix I is, then, a useful tool to keep track of the overall exposure to different risk factors across all assets in the portfolio.

17. There are mainly five types of SWFs based on stated policy objectives: (i) stabilization funds, which are set up to insulate the budget and the economy from volatile commodity prices (usually oil); (ii) savings funds, which are intended to transfer wealth (e.g., nonrenewable assets transformed into diversified financial assets) across generations; (iii) development funds, which allocate resources to priority socioeconomic projects, such as infrastructure; (iv) pension reserve funds, which target pension and/or contingent-type liabilities on the government's balance sheet; and (v) reserve investment corporations, which are intended to reduce the negative carrying costs of holding reserves or to earn higher return on ample reserves while the assets in the funds are still counted as reserves (e.g., China). For each of these different SWF types, there will be different investment objectives and, hence, different optimal investment strategies.² The following section will discuss the different types of funds in more detail.

² Some funds have dual or multiple objectives (e.g., saving and stabilization).

Box 3. Strategic Asset Allocation for Sovereign Wealth Funds

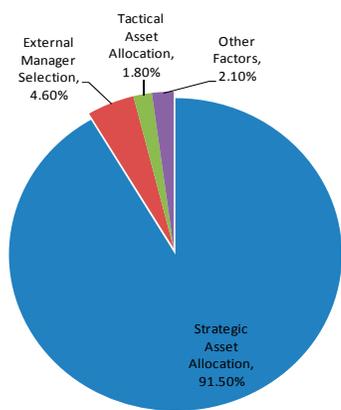
SAA refers to a portfolio of financial assets that meets a pre-specified investment objective. The SAA is an allocation that maximizes expected investment return subject to a set of risk parameters, taking into account the uncertainty of flows in and out of the fund, and effectively captures the fund owner’s trade-off between long-term risk and return. The SAA captures the largest component of portfolio risk (Figure 1), as shown by Brinson and others (1986). More recent analysis also supports this result. Ibbotson and Kaplan (2005) show that asset allocation explains about 90 percent of the variability of a fund’s return over time, but it explains only 40 percent of the variation of returns among funds, which points to the importance of the choice of an optimal portfolio.

SWFs can be broadly categorized as stabilization and savings funds.¹ The purpose of a stabilization fund is to stabilize a country’s budgetary and fiscal policies by isolating them from volatile government revenue linked to an underlying commodity. In contrast, while savings funds also receive contributions from the excess government revenue, their purpose is to transfer resource wealth across generations. Thus, resources of savings funds are not expected to be used for other purposes in the short to immediate term. As a potential source of budget revenue in the short to medium term, stabilization funds have an investment horizon that is broadly reflective of an underlying commodity price cycle. Funds for future generations have a much longer horizon that results in much greater risk-bearing capacity of the funds.

To meet the investment objective of providing liquidity during down cycles, stabilization funds typically invest in less risky instruments (e.g., high-grade fixed-income) meeting not only the funds’ objective of capital preservation over a short- to medium-term horizon, but ensuring high liquidity. Savings funds have a much greater risk tolerance for inter-temporal income volatility and, as a result, are in a position to invest in riskier and less liquid assets (e.g., public and private equity, and alternative investments). Figure 2 illustrates how investment horizons affect extreme outcomes.

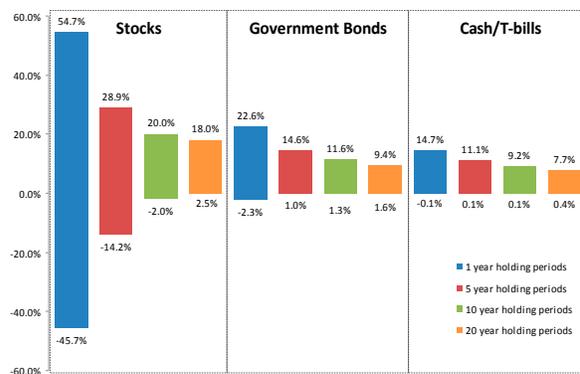
While serving different objectives, stabilization and savings funds can be managed jointly. When managed within the same fund structure, the difference in appropriate SAA for the two funds could be achieved by allocating the fund between liquid and longer-term tranches in accordance with both objectives. If the size of the fund is such that most of the resources could be used for stabilization purposes, it would be prudent to start with investing the entire fund with a capital preservation objective in mind. As the fund grows in size, it could start diversifying into higher-risk assets, consistent with a longer-term objective.

Figure 1. Strategic Asset Allocation is the Key Driver of Long-Term Investment Returns



Source: Brinson, Hood, and Beebower (1986).

Figure 2. Extreme Return Outcomes for Stocks, Bonds, and Bills (1926–2006)



Source: Ibbotson Associates (2007) and Bloomberg for U.S. Stocks, Bonds, and Bills.

¹ Here we categorize all long-term SWFs, including pension reserve funds and reserve investment corporations, as savings funds.

18. The time horizon of investments is an important determinant of investment objectives.

As SWF assets grow, their objectives may change to hedge risks originating in different components of the sovereign balance sheet. For example, a SWF may originally be set up as a stabilization fund

to smooth fiscal revenue or sterilize foreign currency inflows in a natural resource exporting country. As the assets in the SWF continue to grow beyond the level needed for the purpose of stabilization, the government may carve out a portion of the assets, revisit the objectives, and redesign the structure of the SWF to broaden its objective and related investment mandate. Ultimately, the accumulation of financial resources in a SWF should be strongly linked to the government's overall fiscal surplus; otherwise there is an expansion of the sovereign balance sheet leveraged by new debt. This situation would undermine the stabilization objective of a SWF, given the procyclicality of market access by resource-rich countries.

19. The explicit or implicit liabilities of an SWF will guide the optimal asset allocation. For asset pools set up to cover explicit liabilities—for instance a pension fund—the growth of liabilities over time provides the relevant benchmark for the return on assets. Moreover, other properties of the liabilities will be important for asset allocation decisions. For instance, the net present value of future pensions in a defined benefit system will depend on the interest rate. Lower interest rates increase today's value of future pensions and, thus, the liabilities of the pension system. A prudent asset allocation would imply matching the interest rate sensitivity of the assets with that of the liabilities, so that the solvency of the system is as stable as possible through periods of changing interest rates.

20. Most SWFs do not have explicit liabilities, but they will usually have some *implicit* liabilities in the form of expected future transfers to the fiscal budget. However, from the perspective of an integrated sovereign balance sheet, expected future transfers are the primary purpose of the SWF. Thus, the projected time profile of these transfers will provide important guidance for the fund's investments. A good understanding of these liabilities is necessary for setting an investment strategy.

21. At the outset, it is important to establish solvency of a fund with fixed, explicit liabilities. For instance, in an environment in which public pension funds are underfunded and have assets with a shorter duration than their liabilities, some institutions (particularly in the United Kingdom) have put in place a program of systematically increasing asset duration as yields increase from current levels (and funding ratios improve)—this ensures that underfunding is not locked in. Put differently, institutions should be

Case Study: Norway

When the first deposits to the Norwegian Government Pension Fund—Global were made in 1996 (at the time called the Government Petroleum Fund), the expected time horizon of investments was unclear. The economy had just come out of a deep recession, and the prospects for government finances were changing rapidly due to strong growth in the mainland economy and increasing revenues from the oil sector. At that time, it was thought prudent and sensible to invest the Fund under the same guidelines as were used for investing the currency reserves of the central bank, with an emphasis on high-rated liquid, sovereign bonds. Updated long-term forecasts for government finances were presented in the long-term program document in 1997. The baseline scenario in that document foresaw a significant accumulation of government assets in the subsequent years, with government net assets growing past 100 percent of non-oil GDP circa 2010 and reaching around 150 percent of GDP in 2020. The actual growth of government assets has been even higher than the baseline scenario from 1997. With the new projections for the size of the GPFG, it was clear that the investment horizon would be several decades. This prompted the first major review of the investment strategy of the GPFG fund, leading to an increase in the equity portion of the GPFG from 0 to 40 percent in 1998.

careful not to blindly close down a duration gap at the expense of future solvency.

22. The investment strategies of any pool of assets must be supported by an appropriate governance structure. This is essential to set risk tolerance and to have proper monitoring and reporting of risk and returns. There must also be sufficient robustness in the governance structure to allow for a consistent implementation of investment strategies over time. Further aspects of governance and risk management of SWFs are covered in Section 6.

B. Investment Strategies for Various Pools of Sovereign Assets

23. Once the investment objectives for a particular pool of assets have been clarified, the next step in formulating an investment strategy is to set an appropriate risk tolerance. This is challenging for several reasons: “risk” is a complex concept, and the risk of an investment strategy cannot be fully captured by one single number or indicator. It is necessary to have a broader approach and to use several indicators to assess the riskiness of a particular strategy. Moreover, there is no right level of risk because there is no right level of risk aversion. For sovereign assets, setting an investment strategy requires some way of ascertaining the risk tolerance of the (political) bodies that are designated as stewards of these assets. As the relevant risks may be difficult to capture by simple indicators, this is often a challenge in itself.

24. The most common indicator of risk is volatility of returns. This may be a useful indicator of risk, as most investors would be concerned about variation and unpredictability of returns. It is, however, not the only relevant measure of risk. It also has significant limitations as a measure of risk, because it implicitly assumes that returns are normally distributed. In reality, asset returns are generally not normally distributed—large losses occur much more frequently than one would expect based on an assumption of normally distributed returns. Measures of risk that are based on volatility should therefore be interpreted with great care.

25. For sovereigns, a more relevant approach to risk is defining it as the probability of failing to meet some predetermined policy objective. For a SWF set up

to transfer wealth to future generations, it may be misleading to think in terms of “safe” low-volatility fixed-income instruments and “risky” higher-volatility equities. Short-term volatility is not the most relevant indicator of risk in this case. Higher expected returns from equities will make it more likely that the fund will be beneficial to future generations. Locking in very low or even negative expected real returns in a fixed-income portfolio would not be in the interest of future generations—in this sense, it is a risky strategy since it makes it unlikely that the principal objective of passing wealth on to future generations will be met. The same argument can be made for assets

Case Study: Norway

Since 2007, the Norwegian Ministry of Finance has published an annual report to parliament, which discusses investment returns in the previous year and sets out strategy options for the future.¹ In this context, risk and return issues are presented to Parliament and illustrated using both a forward-looking model-based approach and historical simulations.

¹ The reports are available on <http://www.regjeringen.no/en/dep/fin/Selected-topics/the-government-pension-fund/hoyremeny--statens-pensjonsfond/report-to-parliament-on-the-management-o.html?id=698212>.

invested to meet future liabilities in a defined benefit scheme. If the investment strategy locks in low returns in a fixed-income portfolio, the risk that future liabilities will not be met becomes high. This strategy is thus risky, even if the assets are “safe.”

Risk targeting versus return targeting

26. One important aspect of strategy formulation is the choice of risk targeting versus return targeting. It is generally assumed that there is a positive relationship between risk and expected return. As long as the relationship between risk and expected return is constant, risk targeting and return targeting are equivalent approaches. For any level of risk, there is one (optimal) expected return and vice versa; so to target, for instance, a real return of 4 percent, or a risk level corresponding to an equity portion of 60 percent, would result in the same portfolio, assuming that a 60 percent equity portion yields an expected return of 4 percent.

27. However, the relationship between risk and expected return is not generally stable. In principle, risk and return targets will work very differently when the relationship between risk and expected return changes. In a strict risk-targeting system, this shift in the risk/return relationship is translated into higher/lower expected returns. If returns are targeted, however, more risk has to be taken to keep expected returns constant in the face of a deteriorating risk/return relationship. This implies that more risk is added as the return per unit of risk falls. In the factor framework outlined in Appendix I, this can be interpreted as increasing the exposure to systematic risk factors when the expected returns to these factors are lowest. In this sense, a pure volatility-targeting approach may be pro-cyclical.³ Instead, measures of risk premia rather than volatility could be used to guide the investment strategy.

Case Study: Norway

In Norway, the Ministry of Finance, as formal owner of the assets of the GPF, sets the mandate for the operational manager, Norges Bank Investment Management (NBIM). NBIM is a separate asset management unit within the Central Bank of Norway. The mandate prescribes the asset allocation for the GPF by setting a benchmark allocation and sets limits for deviations from this benchmark. In this way, the overall risk level of the GPF is determined directly by the formal owner. The overarching guideline for the ministry’s work on asset allocation has been to find an investment strategy to maximize expected returns given a moderate level of risk. The actual interpretation of “moderate” risk is given implicitly by parliament by expressing consent to any major changes in the strategy for the GPF before the ministry implements them.

³ There may be important systemic implications related to widespread use of return targeting and the resulting pro-cyclical behavior, but these fall outside the scope of this paper.

28. The choice between risk and return targeting may have important implications for the governance structure of the fund. In a situation where the owner of the fund sets the risk level directly through setting the SAA, the process leading up to the allocation should in itself ensure that the strategy is consistent with the risk preferences of the government as owner. However, where asset allocation is delegated to a manager with a mandate to achieve a specific (or minimum) level of expected returns, risk in principle becomes an endogenous variable. It is therefore important to ascertain that the risk required to meet the return objective is indeed within the risk tolerance of the owner.

29. In any case, a clear and well-designed investment process is necessary, along with clear channels of oversight and communication between owners and managers of the fund.

Managers will normally be closer to the financial markets in which assets are invested and will have valuable information to inform the choice of risk or set a reasonable level of expected return. This, in itself, is an important argument for delegation in asset management. Managers should have a right and obligation to dissent if they identify inconsistencies in the owner's estimates of risk and expected return. It is also important that the governance structure of the fund allows for a sufficiently long-term mandate for fund management. In addition, clear communication to the public about the objectives of the fund and related investment strategy and risks are important, given that both realized risk and return outcomes may fluctuate significantly over time (Box 4).

30. Modeling tools, such as stochastic simulation, are often used for risk analysis.

With a model of this kind, one can simulate the return paths of alternative investment strategies and assess the probabilities of accumulated returns being over or below a certain level over some specified investment period. However, these types of models will have to rely on some assumptions on the probability distribution of asset returns and will only give meaningful results if these assumptions are realistic.

31. In addition, historical simulation is a useful tool.

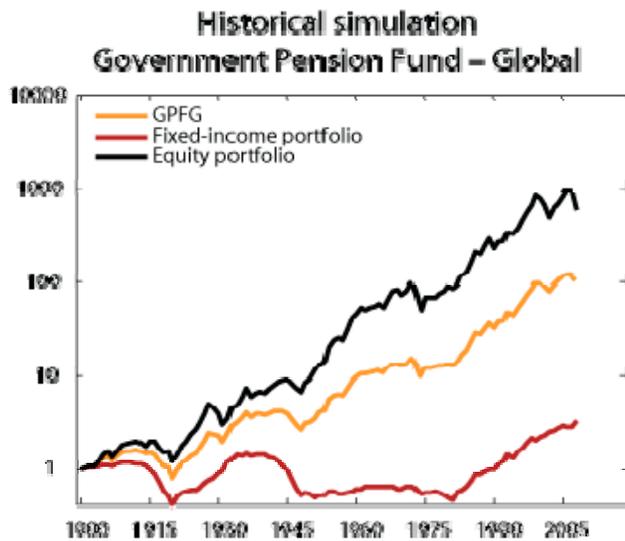
This approach is based on back-testing a specific investment strategy using historical return data for various assets. With this approach one can answer questions such as, "How would this strategy have performed during the recent financial crisis?" or "How many years of the last 100 would this strategy have yielded negative real returns?" This has the advantage of not putting restrictions on the probability distribution of returns, because actual return data are used. These results may also be more easily and intuitively explained to policymakers and the general public when strategy is communicated. However, one should be careful not to predict future returns only by extrapolating history. For communication, it is also helpful to emphasize long-term rolling returns, for instance over a 10- or 20-year horizon, such as was done in the case of Australia's Future Fund.

Case Study: Norway

The Norwegian Ministry of Finance has developed a stochastic simulation model that is used to illustrate risk and return properties of different asset allocation strategies. The model gives probability distributions for returns of various investment strategies based on expected returns, risks, and correlations for various asset classes. The model allows for regime switching and "fat tails" (i.e., probability distributions with a higher occurrence of extreme outcomes than in the standard normal distribution). The results of the model have been used as part of the material given to parliament as a basis for evaluating proposed changes to the strategy of the GPF, for instance when it was decided to increase the equity portion of the GPF from 40 to 60 percent in 2007.

Box 4. An Example of Historical Simulations—Norway

One way of illustrating the risk of an investment strategy is to use actual, historical returns on various assets and calculate the return the strategy would have yielded over the relevant period. The Norwegian Ministry of Finance has regularly published data for risk and return for a hypothetical Government Pension Fund—Global (GPF) established in 1900 (rather than in 1996). The historical simulations below are calculated on the basis of annual real rates of return for the period from 1900 to 2012.



The strategic benchmark portfolio of the GPF is assumed to consist of 60 percent equities and 40 percent bonds, distributed across a large number of countries and currencies. The charts below illustrate the return such a portfolio would have had for the period from 1900 to 2012.

Reorganizing annual data to look at rolling 15-year averages of real returns yields a striking picture: the actual, historical real return for this portfolio was around 4 percent, close to the assumed long-term average return for the GPF. However, there were long periods with significant deviations from this long-term average. The governance framework around a fund must be robust enough to handle such deviations if an investment strategy with these fluctuations around long-term average returns is to be sustained.

It is also instructive to decompose portfolio returns into equity and bond returns, respectively. The second chart shows the trajectory of asset values on a logarithmic scale with an index value of 1 in 1900. For the entire period as a whole, the performance of the equity markets was significantly better than the bond markets. But the trajectory of real returns to fixed-income instruments has varied considerably over time. Over the entire period, the real return was around 1½ percent per annum. However, the accumulated real return over the first 85 years of this period was close to zero, while the return over the last 30 years was around 6½ percent per annum. This reflects the erosion of purchasing power through high inflation after the two world wars and in the mid-1970s, and repricing of bonds through lower yields in the subsequent period. While historical simulations are useful as a tool to illustrate past outcomes, great care must be taken when using past performance as a guide to future returns. Observed historical returns will be very dependent on the choice of observation period, and even long samples may not be representative.

Stabilization funds

32. Stabilization funds are set up by natural-resource rich countries to insulate the budget and economy from volatile commodity prices (usually oil). They will usually be governed by rules stipulating under what circumstances allocations and withdrawals from the fund should be made. For instance, there could be certain oil price thresholds that trigger inflows to and outflows from the fund to the government budget. Thus, the expected time horizon of the investments in the fund would be comparatively short (depending on the threshold values), and the actual time horizon as unpredictable as the oil price itself. Caution is needed when setting price-contingent rules, given the volatility of commodity prices.

33. For asset pools of this type, the primary emphasis should be on liquidity for easy access to funds on short notice. The nature of these types of funds is very similar to the nature of regular central bank reserves. For a resource dependent economy, a sharp fall in the price of the main export could potentially trigger a BoP crisis. Thus, the circumstances under which central bank reserves would be needed are typically very similar to those under which there would be withdrawals from a stabilization fund. It is, therefore, natural that the optimal investment strategies for these types of funds are similar to those of ordinary central bank reserves. In practice, the investment strategies of stabilization funds are very similar to those of central bank currency reserves.

Savings funds

34. Savings funds are intended to transfer wealth (e.g., nonrenewable assets transformed into diversified financial assets) across generations. They are often formed when the assets of a stabilization fund or central bank reserves grow beyond what is reasonably needed as a buffer for managing price volatility of natural resources in the short and medium term.

35. The long-term aspect of savings funds requires an approach to investment strategy that is fundamentally different from that of stabilization funds. The emphasis should be on assets that are capable of generating returns to protect and enhance the purchasing power of assets over the longer term. Issues of liquidity and short-term volatility in returns have lower priority. Experiences with investment strategies for SWFs are discussed in Box 5.

36. As financial assets grow in size, the savings aspect will become more pronounced, and this should gradually be reflected in changes to the investment strategy. Savings funds should be fully integrated with the government budget and may fulfill a stabilization role and a savings role simultaneously. While all SWFs will have a gradual development of investment strategies over time, these shifts are particularly pronounced for saving funds, since the investment objectives change as the funds grow in size.

Box 5. Changes in Investment Strategies Over Time

It is normal for investment strategies of savings funds to change over time. These changes may have several justifications:

- An increase in the size of the fund relative to the size of the economy may in itself increase the ability and willingness to adopt strategies that give higher volatility in short-term returns but higher expected returns over time.
- A longer time horizon for the fund's investments can have the same effect, but it also increases the importance of adopting strategies that protect against the effects of inflation on the purchasing power of the fund over time.
- It may be difficult to gauge the true willingness of political bodies to accept investment risk. A prudent approach may be to increase risk levels only when experience shows that there is some tolerance for short- and medium-term fluctuations in value.
- The capacity of the management organization to manage more complex assets and strategies may be constrained. It will then be prudent to let strategies develop gradually in line with increased experience and capacity.

In practice, many funds have had a gradual development of investment strategies for their SWFs: Norway made its first investments in high-grade government bonds in 1996. A 40 percent allocation to equities was introduced in 1998, and the following years saw several changes in strategy, including adding emerging markets and lower-grade fixed-income instruments. The equity portion was gradually increased to 60 percent from 2007, and the first investments in real estate were made in 2010.

Timor-Leste started with a pure bond portfolio in 2005, and in 2012, the Petroleum Fund Law was amended to allow for up to 50 percent allocation to equities. The operational target is 40 percent, in addition, a wider portfolio of bonds and other assets is allowed.

Chile's PRF was established in 2006 with a portfolio of government bonds and money market instruments, but the strategy was changed in 2012 to include a 15 percent allocation to equities and a 20 percent allocation to corporate bonds.

In general, the changes in strategy follow a pattern of gradually moving from nominal, liquid assets like high-grade government bonds to less liquid, real assets. This reflects the SWFs' gradually increased capacity to pick up a liquidity risk premium and to accept higher volatility of returns in the short term. It may also reflect increases in the investment horizon and concerns about the possible effects of inflation on the purchasing power of funds over the longer term.

37. Integrating savings funds into the government budget process requires instituting a transparent rule-based system for the transfer of resources from the fund to the budget.

Typically countries institute fiscal rules to regulate the inflow and withdrawal of resources, often in the form of either nonresource balance rules or resource price-based rules. To enhance credibility in an uncertain environment over commodity price volatility, fiscal anchors and associated targets should be flexible and focus on procedural rules rather than fixed numerical targets. For example, Chile's framework identifies the fiscal variable to be targeted (structural balance). In Timor-Leste, the Petroleum Fund Law sets out a rules-based

Case Study: Norway

The investment strategy of the GPF has evolved gradually over time. From a pure bond portfolio in 1996, concentrated on high-graded liquid sovereign bonds, the fund has gradually increased the exposure in equities to 60 percent, and credit bonds have been introduced as well as emerging market assets. The GPF is in the process of building up a real estate portfolio of 5 percent of the fund.

approach for withdrawals, where withdrawals can be increased under certain circumstances within a transparent process.⁴

38. For many resource-rich economies, savings funds have become a significant part of the sovereign balance sheet over the last decade, due to generally high commodity prices. The optimal investment of these assets should not be analyzed on a stand-alone basis, but rather in the context of the sovereign balance sheet as a whole. Aspects of SWF investing in a SALM framework are covered in Section 5.

Development funds

39. Development funds allocate resources to priority socioeconomic projects, such as infrastructure. Their funding can come from a variety of sources, including cash transfers from government, privatization revenues, bond issuance, or combinations of these.

40. Development funds vary considerably with respect to mandates and investment activities and pose important challenges to public finance management. Their mandates may be linked to the development of different sectors of the economy, and their portfolios are less commercially driven and typically focus on investments such as specific infrastructure projects, energy supply, development of key industries, or funding for small enterprises. For some funds, investing assets in domestic and/or international financial markets is a way to finance their primary development activities. In other cases, the investment activities themselves are the main focus of operation, for instance, in the form of managing ownership stakes in strategically important industries. From the perspective of sound public finance management, it is important to integrate the activities of development funds into the government budget.

41. Nevertheless, there are some general principles for sound management of such funds. These include an appropriate governance system with a clear, well-defined mandate that is coordinated with fiscal policy strategies. The investment activities must reflect the nature of explicit and implicit liabilities. Typically, these liabilities will consist of future disbursements to the development projects in a fund's portfolio. Thus, it is necessary to build the investment strategy on a thorough analysis of future withdrawals from the fund to make sure that sufficient cash will be available when needed. When development projects to be financed by the fund have a significant import content, it may also be appropriate to invest in a way that matches future foreign currency needs.

42. In a SALM context, it is of particular importance to be aware of any contingent liabilities stemming from the operations of a development fund. These contingent liabilities may arise, for instance, if the fund is allowed to issue guarantees for private funding of projects. They may also arise if a project is undertaken as a joint venture, and the joint venture partner in the project turns out to be unable or unwilling to meet its obligations, giving the development fund a larger

⁴ For detailed analysis of fiscal anchors and related withdrawal rules from savings funds, see Baunsgaard and others (2012), and IMF (2012).

than anticipated role in the project. The risk of these types of contingent liabilities must be carefully managed through appropriate rules and regulations on the activities and permitted instruments of the fund, and through appropriate reporting.

Pension reserve funds

43. Several resource-rich countries have explicitly linked the investment mandate of their savings funds to specific contingent liabilities, such as pensions. These funds seek to build assets to cover an identified liability, often related to an aging population. An aging population is a cause of future economic vulnerability and expenditure, often related to entitlements that were funded by a pay-as-you-go system resulting in high economic and social cost. A prudent response to such challenges is to accumulate assets now, so as to offset the projected higher liability related to sustaining pensions and social welfare in the future. This approach can be found, for example, in Australia, Chile, and New Zealand, all resource-rich countries. Depending on the macroeconomic framework, these assets can often be invested abroad, so that they can be disinvested and used for imports when the domestic population comes of age.

44. The optimal investment strategy for this class of funds depends on the nature of the liabilities it is meant to cover. Typically, such funds are used to pre-fund expenditures commitments well into the future, with little or no call on funds in the short and medium term. This implies a long time horizon for investments and relatively high tolerance for assets with high volatility in returns and/or low liquidity. The appropriate investment strategy will thus be to harvest risk premiums that reflect the high risk-bearing capacity. The New Zealand Superannuation Fund, for instance, has an equity portion of 75 percent in its reference portfolio, reflecting the fund's long time horizon and ability to absorb volatile returns in the short and medium term.

SOME ASPECTS OF LIABILITY MANAGEMENT

45. The primary objective of issuing government debt is to ensure financing of the budget at the lowest possible cost subject to an acceptable level of risk.⁵ The core of the optimization problem for debt issuance is the trade-off between low cost and various forms of risk. When yield curves are upward sloping, rolling over short-term debt can be cheaper than financing at the longer end of the maturity spectrum, but refinancing risks will also be higher. Concentrating borrowing in a few liquid benchmark loans will increase liquidity and lower issuing costs, but it also implies the risk of having to refinance large loans at the same time.

46. The trade-offs can be viewed from a self-insurance perspective, in which higher expected borrowing costs can be seen as an insurance premium against adverse liquidity events. In this way, the analysis of optimal borrowing strategies is closely linked to other insurance and risk factors related to the sovereign balance sheet.

⁵ These issues are covered extensively in other IMF publications, such as IMF and World Bank (2009).

47. In resource-rich countries, large foreign exchange flows may impact liability management decisions in a number of ways. Currency composition of debt is an important aspect of risk management and may also have significant macroeconomic implications. With debt denominated in foreign currency and revenues primarily in domestic revenue, foreign borrowing exposes the government to the risk of adverse movements in exchange rates. A notable exception is resource-rich countries, where a significant portion of government revenues are in foreign currency. In this case, borrowing in foreign currency may offset foreign exchange risk on the asset side.

48. Emerging and low-income countries often face higher borrowing costs when borrowing in local currency. Domestic financial markets may not be deep enough to facilitate a government borrowing program, and the credibility and liquidity of domestically issued instruments is typically insufficient to attract international investors.

49. However, a domestic debt market contributes to financial deepening and stability. Local-currency debt instruments are generally considered to be the “risk-free” investment alternative in the domestic economy, fulfilling an important role as a store of value and as a reference price for other financial assets. They may also be used as collateral in money market transactions. A well-functioning and liquid market for government bonds may have significant positive externalities and is usually a prerequisite for the development of a domestic capital market. A well-functioning domestic bond market can reduce risk to the sovereign balance sheet; the ability to borrow in domestic currency and to manage risk using money market instruments will give government (and private participants) more flexibility in ALM operations. Therefore, even resource-rich countries may consider issuing sovereign debt for reasons other than deficit financing.

LINKAGES AND INTERACTIONS

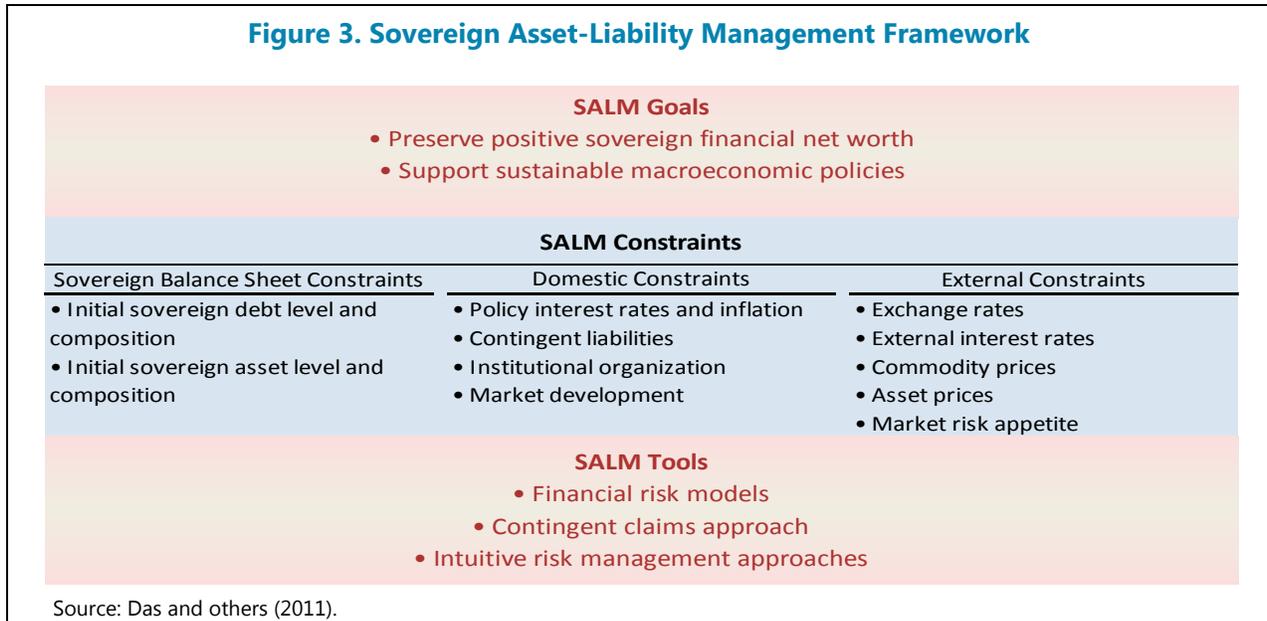
50. The discussion of ALM in the previous sections analyzed issues primarily at the level of individual pools of sovereign assets and liabilities. In this section, we outline a more holistic approach by considering linkages and interactions across assets and liabilities in the context of a partial SALM approach.

A. Sovereign Asset-Liability Management Framework

51. An integrated SALM framework is a holistic approach that aims to minimize vulnerability of government finances in the face of potential shocks.⁶ The main objective of sovereign liability management is to ensure financing of the budget at the lowest possible cost subject to an acceptable level of risk. In contrast, sovereign asset management aims to ensure that cash balances meet commitments and maximize the purchasing power of long-term capital given a moderate level of risk. The basic idea of the SALM approach is to choose the size and characteristics of sovereign assets and liabilities to meet macroeconomic and developmental objectives, while

⁶ See Das and others (2011) for a broader presentation of this framework.

preserving positive sovereign financial net worth, subject to acceptable costs and risks. It also entails, inter alia, monitoring and quantifying the impact of movements in exchange rates, interest rates, inflation, and commodity prices (Figure 3).



52. From a portfolio perspective, the SALM approach could help detect sovereign risk exposures. Although the concepts of ALM and a balance sheet are commonly understood by financial institutions and companies, sovereigns also face risks that may be similar to those in the private sector. However, risk management practices and tools in the case of sovereigns differ from the private sector in complexity and precision. Foreign reserves are a major component on the asset side, while public debt is a major claim on the liability side (for some countries, monetary base or pension liabilities are also relevant). As the management of sovereign assets and liabilities are entrusted to different institutions with their own risk-return considerations and strategies, an integrated risk management framework that takes into account the risk characteristics of both assets and liabilities would be more effective in managing risk and providing simple natural hedges. It can also lead to higher risk-adjusted returns on assets and/or lower financing costs.

53. While it may not be explicitly recognized, many countries apply at least partial SALM concepts. Examples include matching currency of central bank reserves with government external debt, setting guidelines for holdings of public pension funds affecting the choice of their debt instruments, or managing the levels of government cash balances for debt repayment.

54. The SALM approach will typically involve several institutions that should have some degree of autonomy. The main institutions involved will normally be the government (represented by a ministry of finance) and the central bank. Other institutions may include government pension funds, SWFs, and other managers of government-related assets. These institutions usually have a high degree of operational independence to pursue specific objectives. A challenge in applying the SALM framework is to institute coordination mechanisms while respecting the integrity of each

institution. In practice, this is usually done through information sharing, the establishment of coordination committees, or setting mandates and regulations for government asset managers.

55. Resource-rich economies face particular challenges in managing financial assets.

Prudent management of revenues from nonrenewable sources will often require building up financial assets in the public sector. This poses a number of challenges in investment strategy, governance, and risk management, in addition to macroeconomic policy issues. SWFs have become common practice in many of these countries, and ought to operate in close coordination with other government institutions. SWF assets—and the returns they generate over time—can have a significant effect on public finances, monetary conditions, external accounts, and balance sheet linkages with the rest of the world. By influencing public sector wealth, SWFs have an important role in macroeconomic and fiscal management, and should be integrated in monetary and fiscal policy frameworks.

B. SALM Application

56. Many governments apply a partial SALM approach, in which several elements of the sovereign balance sheet are considered simultaneously, even in the absence of a comprehensive or formal framework.

In these cases, governments often determine specific debt management or reserve management strategies that reduce certain exposures and overall balance sheet vulnerabilities. The main financial assets and (explicit) liabilities to consider include government funds, central bank reserves, and public debt.

57. Many of the SALM issues discussed in this paper can be analyzed as liquidity risk management in some form and addressed in an insurance framework.

Liquidity risk will in practice be an important risk factor on the government balance sheet. The most valuable assets that the government holds (like the right to tax its citizens) are illiquid by nature. Balance sheet management is, to a large extent, a question of making sure that liquidity is available to meet cash demands on the government. Periods of tight liquidity in global markets may occur rarely, but are severe when they do occur. For this reason, there is generally a willingness to pay, in the form of lower expected returns, to hold liquid assets. Conversely, investors that are able and willing to live with lower liquidity in their portfolios should expect higher returns over time (but large losses in times of tight liquidity). This can be thought of as buying or selling insurance against a liquidity event occurring. In this paper, this trade-off appears in a number of guises:

- Should countries have a higher exposure to illiquid assets in their SWF portfolios to get higher returns over time, at the cost of suffering losses if and when a liquidity event occurs?
- Should countries build high reserves to reduce the risk of loss in output during a financial crisis, even if there is an opportunity cost to holding those reserves?
- Should countries build up liquid reserves with excess revenues rather than repaying debt, even if the cost of servicing debt is higher than expected return on reserves?

- Should countries faced with an upward-sloping yield curve try to contain costs, borrowing at the short end of the curve, or pay a maturity premium to avoid rollover risk over periods of tight liquidity?

58. The rest of this section will discuss SALM issues in the context of resource-rich countries, although the analysis is applicable in a wide range of situations. The focus will be on providing an overview of the various trade-offs facing the sovereign with practical examples and policy guidance. The discussion will explore links between the main financial assets and liabilities (reserves, savings funds, pension liabilities, and public debt) on the sovereign balance sheet. Subsections G and H will touch on some of the implicit liabilities, such as future imports.

C. Government Assets and Central Bank Reserves

59. A fundamental issue from the SALM perspective is the link between central bank reserves and other pools of sovereign assets. Central bank reserves and other assets, such as SWFs, constitute the main financial assets on the sovereign balance sheet. Countries with structural current account surpluses, due to natural resource revenues or other factors, will experience growth in reserves. At some point, when reserves are ample, the issue of how to invest “excess” reserves will surface. This is not just an investment strategy issue, but also requires a reassessment of the appropriate institutional set-up to separate and manage two pools of assets.⁷

60. Countries have adopted different approaches in this area. Some countries with large reserves have carved out parts as a basis for a SWF (e.g., China). Others have divided central bank reserves into separate investment tranches and co-managed the investment tranche with the SWF (Botswana, Norway). In yet other countries, central bank reserves have not been used to form a separate fund, but excess reserves are managed by the central bank in higher-yielding assets with higher risk/longer time horizons (Hong Kong). In designing the investment framework, some basic questions should be addressed, including (i) an assessment of excess reserves; (ii) the investment strategy; and (iii) an appropriate institutional arrangement to support the implementation of that investment strategy.

Assessing ample reserves

61. A growing stock of official reserves, beyond precautionary purposes, could trigger an assessment of reserve adequacy and of whether assets should be invested differently. The adequacy of official reserves should be assessed before other institutional arrangements, or change in the investment strategy, should be considered. From a crisis prevention perspective, the most relevant indicator for emerging market economies is the ratio of international reserves to short-term external debt. For countries with uncertain access to international markets, a simple benchmark is the one that targets the coverage of short-term external debt of all residents and in all instruments and currencies measured by remaining maturity. This means that a country with a balanced current

⁷ These issues are elaborated in Das and others (2009).

account and no capital flight will have sufficient reserves to cover its obligations for a full year even if it is cut out of external capital inflows. Countries may want to go beyond standard metrics to build additional buffers, especially in cases of running current account deficits, high levels of short-term public domestic debt, derivative positions of the public sector, and weak banking systems. However, at some point, the cost of carrying excessive reserves would outweigh the benefit, and other investment strategies should be considered.

62. The cost of maintaining excess reserves may usefully be addressed in an insurance framework. On the one hand, reserve assets can help reduce the probability and cost of a crisis in terms of output loss. On the other hand, the typically low return of these assets implies an opportunity cost of holding them. This is a parallel framework to the factor-based investment framework discussed in Appendix I, and it is also useful in discussing the issue of optimal debt levels in a situation with increasing reserves (Section D).

Investment strategies for excess reserves

63. In some cases, the size of central bank reserves may warrant investment strategies that are similar to those of long-term savings funds. However, the limited tolerance for reporting losses, combined with marked-to-market accounting standards, may limit the risk and the size of the investment portfolio on central banks' balance sheets. These are factors that may make it appropriate to carve out reserves to manage under other institutional arrangements, for instance in a SWF. Similar to the case of Norway, the Central Bank of Botswana and the Hong Kong Monetary Authority created separate investment accounts for excess reserves. The Central Bank of Botswana established a separate investment tranche for its reserves—the Pula Fund, which was formally launched in 1993—in view of the growing size of reserves derived from mining revenues. The objective of the Pula Fund was to ensure that Botswana's national savings are deployed to support long-term development of the economy by diversifying income away from commodities into global financial assets. The fund can also be tapped to finance priority domestic investment projects, taking account of the country's absorptive capacity of investments. The Bank of Botswana maintains a liquidity tranche equivalent to six months of imports. Should the holdings of this tranche fall below the target, the first line of defense would be macroeconomic policy adjustment, followed by a withdrawal from the Pula Fund based on specific criteria. Similarly, there would be rebalancing in favor of the fund should the reserves in the liquidity tranche exceed the target. The HKMA separates foreign reserves into two portfolios, the Backing Portfolio and the Investment Portfolio. Assets in the Backing Portfolio are invested in highly liquid and short-term U.S. dollar-denominated fixed-income securities. Assets in the Investment Portfolio are invested in a more dynamic way, including investment in equities.

Case Study: Norway

In Norway, the central bank (Norges Bank) has established a separate investment tranche for its reserves that are managed by the bank's investment arm, NBIM, which also manages the country's SWF, GPF. The investment guidelines set by the board of the Norges Bank for this part of the reserves are broadly equivalent to the guidelines set by the ministry of finance for the GPF.

Institutional issues

64. Several factors should be considered before setting up a SWF to manage excess reserves. The building of a new institution is a considerable investment in time and human capital in many countries and will only be a reasonable approach if excess reserves are judged to persist for some time. Therefore, it is necessary to review the origins of the ample reserves, the longevity of these sources, and the other assets and liabilities of the sovereign to make a judgment as to whether it is appropriate to set up a SWF as a separate institution.

65. With excess reserves managed by a SWF, the issue of coordination with central bank reserves becomes important. Providing liquidity during a BoP crisis is the objective of a country's official foreign currency reserves and not that of a typical SWF. Contingent calls for liquidity support could potentially prevent the SWF from pursuing a long-term investment horizon and holding less liquid assets, thus undermining the objective of setting up a separate fund. If the SWF needs to provide BoP support, a clear policy and supporting rules and procedures should be established consistent with that purpose. This promotes transparency and accountability of the SWF.

66. Some countries set up guidelines for assets in SWFs to be used for BoP purposes. For example, the Pula Fund in Botswana has agreed on trigger points that allow the funds to be drawn down in the event that macroeconomic policy adjustments have proved insufficient to stabilize the reserve level in the Liquidity Portfolio. In the case of Korea Investment Corporation, assets are qualified as reserve assets and could be used for BoP purposes. Typically, commodity funds also result in disbursements when commodity prices are weak and, thus, tend to support BoP needs even when there is no explicit mandate to do so.

D. Optimal Debt Levels with Government Financial Assets

67. A common issue in the context of ample government revenues is how to optimize government debt levels. It is an issue of particular relevance for many countries in the early stages of natural resource extraction; they will often have an existing stock of debt, when resource revenues come on stream, and may even increase debt to finance investments in exploration and development of resource extraction facilities. When resource revenues materialize, they must decide how to allocate any financial savings between repayment of debt and building up of financial assets.

68. The core of this issue is a balance sheet optimization problem. The net financial assets of the government may not be affected by the decision on debt repayment strategies, but the size of the balance sheet will be. Faster repayment of debt shrinks the sovereign balance sheet relative to a strategy of accumulating financial assets in an SWF, while the magnitude and pace of asset accumulation will depend on the generation of fiscal surpluses. The issue is relevant primarily for the choice between accumulating foreign assets and repaying external debt. For domestic debt, other issues come into play as discussed below.

69. This optimization problem can also be considered in an insurance framework. On the one hand, building up financial assets would provide more flexibility in the execution of fiscal policy. In particular, it would provide financial resources during a crisis, when other sources of funding may be scarce. On the other hand, the risk-adjusted return on financial assets will, in most cases, be lower than the cost of servicing the debt. This net loss coming from building reserves, rather than repaying debt, can be thought of as an insurance premium against situations where government policies would be constrained by lack of immediate access to funds, for instance to respond to a financial crisis, a sudden drop in commodity prices, or weak external demand for the country's main export commodity. In this context, a sufficient build-up of financial assets to fend against external shocks would be warranted before reducing external debt.

70. The effects of asset accumulation on debt servicing costs should also be considered. As reserves and other pools of sovereign assets grow, the resilience of the economy in the event of adverse shocks increases. This may have a positive effect on credit ratings and the costs of servicing debt, making the "insurance premium" for building financial assets lower. A dynamic approach to assessing the pros and cons of reserve accumulation and investment strategies of financial assets versus debt repayment may, therefore, result in a somewhat higher preference for reserve accumulation at the early stages of natural-resource extraction. For instance, in August 2012 Moody's indicated the possibility of upgrading the sovereign rating of Angola on the basis of reduced vulnerability to shocks after the establishment of a fiscal stabilization fund to cushion the impact of external shocks on the government finances.

71. The debt profile and asset management capacity will also influence the decision and pace of optimal debt repayment. Long-dated loans, for instance, imply less refinancing risk. Low-income countries that have been granted concessional debt may be better off accumulating financial assets with higher expected returns compared with the low cost of debt service, essentially making the insurance premium negative. Furthermore, the institutional capacity and cost of setting up reserve management should be considered. When the institutional capacity to manage significantly larger reserves in a prudent way is lacking, debt repayment can be an optimal strategy for improving the net asset position of the government until the capacity for asset management is improved.

72. Coordination of asset allocation strategies with debt characteristics may be useful to control and reduce risk. When a government chooses to build international reserves as an alternative to repaying (external) debt, the risks and costs of this strategy can be reduced by coordinating asset and debt characteristics. When the composition of assets reflects liabilities with respect to, for instance, currency composition and duration, risks associated with currency and interest rate movements are reduced.

73. Some countries have opted to shrink their debt stock or reduce balance sheet risk and carrying cost by matching the composition of assets and liabilities. Prompted by negative income results in 2004 and 2005 as a result of both the carrying cost and currency revaluation, the Central Bank of Mexico used excess reserves to repay loans from the Inter-American Development Bank and the World Bank, in essence shrinking the overall balance sheet. In Denmark, exchange rate movements caused large fluctuations in the value of external debt and foreign currency reserves.

Between 1992 and 2001, coordinated management of external debt and reserves took place at quarterly meetings of the Danish Ministry of Finance and Danmark Nationalbank, where the decisions on currency exposure were taken on an aggregate basis. This reduced net valuation adjustments to external debt and foreign reserves. In 2001, the authorities decided to move towards maintaining only exposure to the euro in both portfolios, eliminating the need for close coordination.

E. Domestic Debt in an SALM Framework

74. Resource-rich countries typically do not face a financing need that warrants issuing domestic debt. However, there could be other objectives, also in the context of ensuring against future shocks, which motivate the sovereign to issue debt domestically to develop a domestic debt market while accumulating foreign assets. Expanding the sovereign balance sheet in this form will depend on the cost of domestic debt and the return on accumulating additional financial assets. It is important in this trade-off to bear in mind the institutional framework and capacity to manage growing financial wealth and sound debt management principals. Where such capacity is lacking, the authorities may opt for less debt accumulation, while building capacity.

75. In parallel with the issuance of government debt, central banks may issue their own debt instruments to manage domestic liquidity. Both types of debt are typically close substitutes, requiring close coordination between the monetary and fiscal authorities to maintain liquidity in both segments and reduce financing costs. Countries try to mitigate some of these problems through a clear market segmentation approach: The central bank issues instruments with relatively short maturity, while the government finances itself at longer maturity. This approach also helps build a full “risk-free” yield curve in domestic currency, off which other instruments can be priced to aid the development of the domestic bond market. This approach requires close coordination between the government and the central bank.

76. An alternative approach is to centralize debt issuance with the government and use treasury instruments for liquidity management. In Brazil, increasing sterilization costs and negative central bank capital in 1999–2000 led to adopting a fiscal responsibility law (2000), incorporating central bank debt into public debt, and prohibiting central bank issuance of its own debt instruments. This enabled the treasury to determine the characteristics of government bonds in the domestic debt market, and the central bank to use those bonds for monetary policy implementation. As a result, quasi-fiscal costs of monetary and foreign exchange management are transparent and effectively transferred to the national budget every six months.

F. Domestic Pension Funds in an SALM Framework

77. Many countries face implicit or explicit pension liabilities that should be integrated into the government financial management framework with an appropriate investment strategy. There may be implicit government guarantees of private pensions or direct liabilities of a public pension system that remain off-balance sheet. Either would require additional government funding to secure pension payments in the event of significant investment losses. In these cases, an

actuarial assessment of accrued liabilities could be calculated. In other situations, government pension expenditures may be policy-dependent universal old-age support where the timing and present value of expenditure is at the government's discretion. Identification and valuation of these liabilities is, therefore, an important issue from a SALM perspective. The liabilities will typically have a very long time horizon, often running several decades into the future. In a defined benefit system, the net present value of liabilities will, thus, be highly sensitive to changes in the discount rate used to convert future outflows into present liabilities. Historically, long-duration, fixed-income instruments have formed an important part of the investment strategy for funds linked to such liabilities.

78. At the same time, there may be important links to the rest of the sovereign balance sheet that need to be addressed. These funds often hold significant investments in domestic government bonds due to regulatory and prudential requirements and because government bonds are typically among the few long-dated investment options available to match the time horizon of pension liabilities. This often raises the issue of investment diversification on the balance sheet of pension funds, especially as bond yields have been very low in recent years, raising concerns over pension funds' ability to meet their long-term liabilities. In a low interest rate environment, significant holdings of government bonds make it challenging for funds to achieve the returns needed to meet future pension obligations.

79. The Pension Reserve Fund (PRF) in Chile provides a good example to illustrate these issues. The PRF was established in 2006 in response to Chile's new demographic scenario and the growth of the state's obligations arising from the government guarantee of basic old-age pensions. The PRF's principal objective is to generate resources to finance part of the fiscal pension liabilities. Given the size and timing of the liabilities it is designed to finance, the PRF has a medium to long-term investment horizon, with an SAA that has included equity (15 percent) and corporate bonds (20 percent) since 2012. Before 2012, the PRF had a more conservative SAA policy, emphasizing high levels of liquidity and low credit risk and volatility.

80. From a SALM perspective, diversifying pension funds' investment portfolios may have implications for the consolidated government balance sheet. Broadening the investment mandate of pension funds to riskier assets will result in diverting resources away from the government debt market. From an integrated balance sheet perspective, this implies increasing the size of the general government balance sheet by financing increased exposure to risky assets through higher gross debt. This may have significant implications for the overall robustness of the government balance sheet in the face of adverse shocks.

81. When the issue is international diversification of the assets, even more factors must be considered. In the case of a small economy, a significant switch from domestic to foreign assets for a large domestic pension fund will affect capital flows (in both directions) with implications for exchange rates and monetary policy operations. For instance, increased demand by pension funds for foreign currency to acquire foreign assets will force the central bank to consider whether it should sterilize the effects of the pension fund's demand for foreign currency through drawing down its own currency reserves or accept the associated exchange rate movement stemming from the

pension fund's transactions. To the extent that increased currency exposure in the pension fund is offset by lower central bank reserves, there may be consequences for the resilience of the overall balance sheet in the face of adverse shocks as pension fund assets typically will be less liquid than central bank reserves. On the other hand, expected returns may well be higher. For the sovereign balance sheet this is, again, an example of how risk and expected return must be assessed at an aggregate balance sheet level rather than at the level of each individual institution.

82. Coordinating issues should be resolved by providing an appropriate investment mandate for the pension fund.

There are important reasons for giving pension funds operational independence in the execution of investment strategies analogous to the case of the SWF discussed below. At the same time, there are legitimate reasons for coordinating the investment strategies of government pension funds with ALM in other government institutions. This coordination will

normally best be achieved by setting investment guidelines for the pension fund which reflect the effects of pension fund management on other parts of the government balance sheet.

Case Study: Norway

The GPFN in Norway was established as part of a funded public pension scheme in the 1960s. At the time, the government had a financing requirement which in part was covered by government bond purchases by the fund. Later, in the 1970s, the funding of the scheme was discontinued, and the scheme was put on a pay-as-you-go basis. However, the assets of the fund were kept as government funds and reinvested over the years, but without any formal links to the pension system. Under a reform of the organizational structure of the fund in 2006, it was decided to reduce the balance sheet of the fund and cancel parts of the claims on government, essentially deleveraging the sovereign balance sheet.

G. Future Imports as an Implicit Liability

83. Countries with high revenues from natural resources will often have twin surpluses—both government budget surpluses and current account surpluses. Thus, the accumulation of assets in an SWF does not only reflect financial savings for the government, but also savings for the country as a whole. In this context, future imports may be considered as an implicit liability for the SWF. When looking at the overall economy, the role of current account surpluses is to finance imports at some point in the future. In situations where the SWF assets represent the bulk of a country's total claims on the rest of the world, those assets will also be an important source of financing for future imports, with some implications for how assets are managed.

84. Considering future imports as implicit liabilities goes beyond the SALM analysis in a strict sense.

Future imports are not liabilities for the sovereign balance sheet as only a portion of these goods and services will be imported and consumed directly by the government sector. Nevertheless, considering future imports as an implicit liability will reflect the macroeconomic role of a SWF set up to reinvest foreign currency income from resource extraction. This function could be reflected in the performance metrics used to measure returns of the SWF. If the ultimate objective of the SWF in a macroeconomic sense is to finance future imports, the relevant metric for its value is the

Case Study: Norway

The real returns of the GPF are calculated using nominal returns in the currencies of the portfolio deflated by a weighted average of inflation in the benchmark currencies of the fund.

development in the international purchasing power of the portfolio, measured as real return in a basket of currencies corresponding to import weights. In practice, many funds report real return figures in which nominal returns in international currency are deflated, using international inflation in some form (Ghana, Norway, Singapore, and the United Arab Emirates).

85. If purchasing power parity holds, import patterns should not be an important consideration in determining the geographical distribution of assets. The basis for expecting international purchasing power parity to apply is the “law of one price,” which states that similar products, traded internationally, will have similar prices in different countries (calculated in a common currency). If the price difference were disproportionately large, the cheapest products would begin to outcompete the most expensive. Over time there would be a trend towards price equalization. The larger the initial price difference, the stronger the competition from the cheapest products, and the stronger the price-equalization trend. International purchasing power parity will continue to be a reasonable approach, as long as the law of one price applies to a wide range of goods and services that are traded internationally. And if this is the case, the geographical distribution of assets will not, in itself, affect the purchasing power of those assets.

86. In practice, purchasing power parity may be a reasonable assumption for a long-term investor. The deviations from parity may be significant in both the short and the medium term. If, however, exchange rates tend to return to stable equilibrium levels, exchange rate risk will be relatively smaller for long-term investors. Some SWFs are set up with withdrawal rules that imply annual transfers to the government budget, in principle, indefinitely. This implies less vulnerability to exchange rates at a particular time in the future and that the average level of exchange rates over longer periods will be more important for the SWFs total international purchasing power. International purchasing power parity means that the exchange rates can be expected, on average, to be close to their long-term equilibrium levels over the relevant investment period for the SWF.

87. For equity investments, it is also unclear how one should properly define geographical distribution and currency exposure. In traditional financial theory, a market-weighted portfolio gives the best balance between expected returns and risk. This portfolio will give exposure to a representative share of the traded productive capacity of the global economy. It will comprise ownership interests in companies with operations in many countries. Accordingly, it is less meaningful to assign a geographical association or currency to the companies on the basis of the location of their head office or where they are listed.

88. If the implicit liability for an SWF is future imports, buying a representative share of the productive capacity that will produce those imports becomes a reasonable hedging strategy. This argument links back to the issue of relevant risk discussed in Section 3. While equities may seem risky in the sense that their market value fluctuates, they may represent a good hedge—and thus reduce risk—if the implicit liabilities of the SWF are future imports of goods and services.

H. Natural Resources in a SALM Framework

89. The SALM framework can usefully be extended to the analysis of nonfinancial assets, such as natural resources. The net present value of the government’s cash flows from such resources constitutes an asset on the sovereign balance sheet. In this context, the issue is whether there are implications for the optimal management of other assets and liabilities in having natural resource assets on the sovereign balance sheet. Specifically, transforming the natural resource to a financial asset would smooth the overall volatility of the sovereign balance sheet, as the present value of the natural resource in the ground is derived from commodity prices, which typically exhibit higher volatility than that of income-producing financial assets.

90. Income volatility is a major challenge for most resource-rich countries. Countries have different strategies for coping with this volatility, but in a growing number of countries, various forms of buffer or stabilization funds have become a central part of volatility management. Some countries (e.g., Mexico) have, from time to time, also used financial instruments (options or forward contracts) to put a “floor” under resource revenues or reduce their overall volatility.

91. The design of the system for “total government take” (TGT) will have a large influence on the level of income volatility.⁸ In this respect, income volatility can be seen as a policy variable, where countries choose optimal volatility levels based on risk preferences and capacity, as well as assessments of expected returns.

92. The issue of optimal design of a system for TGT can usefully be evaluated in a SALM framework. The TGT system will not only determine the division of revenues between the government and private sector companies in the extractive sector, but also the division of risks. In general, when government shifts risk to private sector companies through reliance on TGT elements like royalties that have low correlation with profitability, government must also compensate companies through higher expected returns—and thus a higher share of the overall resource rent—to keep the risk/return trade-off sufficiently attractive for them. Conversely, a government that is prepared to take more risk through the TGT system should expect to get a higher share of the resource rent. In a SALM framework, the value of holding liquid reserves in a buffer fund increases if it allows the government to rely more on TGT elements, like profit taxes that provide more volatile revenues but a higher share of the resource rent over time.

93. Some countries with SWFs and petroleum reserves have chosen to exclude petroleum-related assets from the portfolios of their SWFs. The argument for this is that the government’s total petroleum price risk will be unnecessarily high through financial investments in this sector, since the value of the SWF will be correlated with the value of the government’s revenues from oil and gas and the level of activity in the economy in general.

⁸ TGT is defined as the sum of all income to the government from a natural resource, including taxes, royalties, dividends, and income from direct participation.

94. Other countries have chosen *not* to exclude petroleum-related investments from their pools of financial assets. The Norwegian Ministry of Finance published an analysis of the issue in 2009 (see Norwegian Ministry of Finance, 2009). The ministry noted that, given the investment strategy of the GPFG and the characteristics of the Norwegian petroleum wealth, the effects on oil price risk of excluding oil- and gas-related assets from the GPFG would be negligible. In the ministry's view, the analysis of the issue did not provide grounds for changing the current investment strategy, which entails a broad and well-diversified exposure to the world's equity and bond markets across various countries and sectors. The effect of excluding a large portion of the equity market would be a significant increase in the weight of the other sectors (where the financial sector is still the largest sector). Somewhat less exposure to the price of oil would be achieved, but there would be greater exposure to other sectors and risk factors. In practice, these risk factors (e.g., liquidity) could be more correlated with other parts of the sovereign balance sheet. In addition, many petroleum companies are in the process of transforming themselves into broader based energy companies, with significant investments in new and renewable sources of energy. Excluding large, listed petroleum companies will also reduce exposure to these parts of the energy sector.

95. Both approaches may be warranted, depending on specific country circumstances. Among petroleum producing countries, there is great variation in the role petroleum plays in the national economy and as part of the sovereign balance sheet. For countries with SWFs, there are also significant differences with respect to investment strategies and with respect to the size of the SWF relative to the domestic economy. When a SWF functions as an effective buffer against volatility in oil prices, that, in itself, will be a significant risk-reducing measure, which may reduce the benefits of alternative risk-reduction strategies.

96. In any case, it would be a recommended practice for resource-rich economies to integrate the analysis of natural resource assets in an SALM framework. This is of particular importance in situations in which countries have both substantial resource assets and large financial reserves and in which the resource sector is a significant part of the national economy. An explicit analysis of possible implications of resource wealth for optimal management of other assets (and liabilities) could provide a valuable tool to mitigate risks and improve the overall resilience of the economy and the sovereign balance sheet.

GOVERNANCE AND RISK MANAGEMENT OF SWF

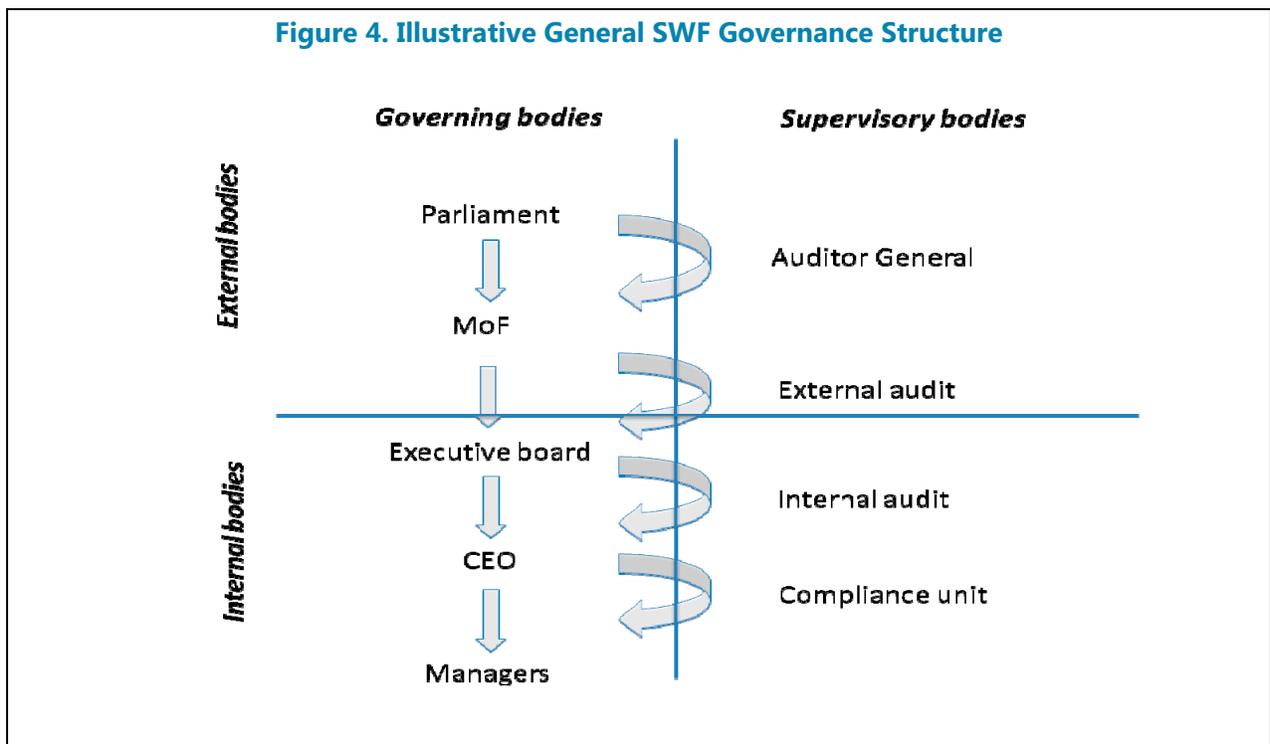
A. SWF Governance Structure

97. The legal framework of an SWF should include a clear ownership structure, management responsibility, and an investment mandate. In most cases, the SWF manager is acting on behalf of the beneficiary and legal owner, which is often the central government, and

operates under conditions prescribed by the owner.⁹In other cases, the SWF is the legal owner of the assets under its management.

98. It is useful to distinguish between governing bodies and supervisory bodies in the organization of SWFs. The authority to invest is delegated from the top of the governance system through the various governing bodies down to the individual (internal or external) asset managers. The delegation implies a gradual increase in the granularity of regulations as one moves down the system. Each governing body should establish a supervisory body to assist in supervising the governing body directly below. The role of the supervisory body is to verify that the supervised unit is acting in accordance with the regulations set by the governing body immediately above it in the governance structure.

99. It is also helpful to distinguish between those bodies that are internal to the organization and those that are external. While the internal bodies are part of the legal structure of the SWF, external bodies are (or belong to) other legal persons who have a clearly defined role in managing the SWF, for instance as owner or external auditor (Figure 4).



⁹ “Central government” is also called the “state” in a unitary state and the “federal government” in a federal state. Also, the “republic,” “kingdom,” or just the “government” may be used to denote the central government.

100. In a generic SWF set-up, we can distinguish between five governing bodies at different levels:

- The **owner** of the SWF is the central government. The parliament adopts the laws that establish the legal structure of the fund and, thus, the legal basis for its operations. Depending on the general division of roles and responsibilities between the parliament and the executive branch of government, the parliament may also have a role in determining the appropriate aggregate risk level of the fund.
- In most cases, the full **government** (i.e., the cabinet or the council of ministers) or the minister of finance will be carrying out the functions of the owner of the SWF. This role implies inter alia the task of setting a mandate for the investment organization within the general framework provided by the parliament.
- The **executive board** is the highest governing body inside the legal structure of the management organization. It sets internal rules and regulations (e.g., investment guidelines) within the mandate and legal constraints set by the owner. It also appoints the chief executive officer (CEO) of the investment organization.
- The **CEO** is the administrative head of the investment organization. He/she is responsible for day-to-day operations within the guidelines set by the board.
- The individual **managers** (internal and external) operate within risk limits set by the CEO and his/her staff. Normally, the CEO will delegate the running of the investment department to a chief investment officer (CIO) that operates within the investment guidelines, with each level down in the hierarchy having a narrower investment mandate up to the individual manager level.

101. The governing bodies have supervisory bodies working for them to verify that the level immediately below operates within the rules and regulations that have been set for it.

This will typically include:

- In most countries the **auditor general** is established by the parliament to audit and control the activities of the executive branch of government. In this context, one of its roles will be to verify that the ministry of finance (or other body acting as formal owner) operates within the laws and regulations laid down by the parliament and that reports to the parliament are correct and relevant.
- The **external auditor** will usually be appointed by the governing body representing the owner (often the ministry of finance). The auditor audits the accounts of the SWF and verifies that the fund is managed within the rules and regulations set by the owner. The external auditor can also, on an ad hoc basis, perform other control activities, for instance assessing the quality of the internal control system.

Case Study: Norway

The governance structure of the GPFG follows this generic structure with one exception: Since the manager is the central bank, it is the Supervisory Council of the bank that appoints the external manager, not the ministry of finance.

- The **internal auditor** is appointed by and reports to the executive board. The internal auditor supports the board in supervising the management of the SWF and verifying that internal regulations are adhered to.
- The **compliance unit** is a tool for the CEO to verify that all activities are in compliance with the rules and regulations governing the SWF's operations.

102. This setup supports a clear division of roles and responsibilities between the different governing bodies. If supervisory bodies are charged with supervising several governance levels simultaneously, there is a risk that the governing body receiving the audit report from this supervisor will also be seen as responsible for addressing any shortcomings detected by the auditor, regardless of at which level in the governance structure the shortcoming exists. This risks blurring the division of roles and responsibilities and preventing sufficient delegation in the governance chain. When—due to practical considerations—one supervisory body does supervise more than one other governing body, care should be taken to ensure that any negative side effects are minimized.

103. The actual set-up of SWFs varies from country to country due to differences in political institutions. For instance, the nature of the relationship between the parliament and the ministry of finance in the governance structure will depend on the general relationship between the legislative and executive branches of the government. In a parliamentary system, the interactions between the two branches of the government may be different from a system in which the two branches are elected separately. However, there are common principles that are essential to well-governed SWFs. The legitimacy of an SWF's operations is underpinned by a solid legal basis and the establishment of a chain of governing bodies from the legislature down to the individual asset managers with accountability at each level.

104. The differences in political institutions may also affect the structuring of supervisory bodies. In particular, the role of the auditor general and the coordination of audit processes between the auditor general and an external (private) auditor for the SWF is an important issue. Several options are available, including separating the functions of auditing the body charged with exercising ownership of the SWF (usually the ministry of finance) and the auditing of the SWF activities, or establishing a joint audit between the auditor general and a private sector external auditor. The complexities of auditing SWFs with extensive foreign investments would often, in any case, make it useful—in an appropriate formal arrangement with the auditor general—to draw on the resources of a private sector external auditor with experience in auditing other asset managers.

105. There must be a clear and transparent division of roles and responsibilities between the different governing bodies to achieving accountability and legal certainty. Both regulatory gaps and overlaps in duties and responsibilities should be avoided. In particular, care must be taken to distinguish between the owner and the manager of SWF assets. The central government is the owner of the SWF's assets on behalf of the people. The duties of the owner are normally vested in a governing body below the parliament, usually the ministry of finance, although other bodies, like a board of trustees or guardians, could fill this role. These governing bodies are outside the legal structure of the asset management organization. In this respect, they can be regarded as principals, with the management organization being the agent in the operational asset management.

106. It can also be useful to distinguish between the government’s role as owner of the asset management institution and its role as owner of the managed assets. When SWFs are managed as a pool of assets, for instance by a central bank, there is a clear distinction between the SWF as a pool of managed assets and the institution in charge of the operational management of those assets. This distinction between management organization and managed assets can also be useful when a single-purpose institution is set up to manage SWF assets. In this regard, clarity about roles and responsibilities and a clear accountability framework would help protect professional asset managers of the SWF from political pressure.

107. There is an important distinction between a corporation with paid-in capital, managing what is formally its own assets, and an asset management company, where managed assets constitute a liability to the central government as owner of the SWF. There may be advantages and disadvantages to both approaches.¹⁰ By setting up a SWF as a fund management entity, the SWF could usefully serve as manager of different portfolios under separate mandates. For instance, a separate portfolio for stabilization purposes could be established alongside a savings portfolio with a more long-term investment horizon.

B. Risk Management for SWFs

108. There must be appropriate delegation of investment decisions from the owner to the asset manager and within the management organization. Asset management is highly skill-intensive, and proper delegation to professional staff is required for successful implementation of investment strategies. Delegation also serves to focus the attention of each governing body on the issues that are critical for success at its level in the governance system. While a sound and robust strategy is necessary for successful management of the SWF, there must be flexibility in the implementation of the strategy to deal with changing market conditions. In many cases, this will require faster decision-making processes than a highly centralized system could provide.

109. At the same time, the governance structure must allow the owner to determine the appropriate aggregate level of risk. While investment professionals can make qualified statements about the relationship between risk and expected return in financial markets, financial theory in itself cannot provide a definitive answer on the appropriate level of risk for the SWF. This level depends on the level of risk aversion of the ultimate beneficiaries of the SWF—the people. This implies that the level of risk should be set by a process which allows political bodies like the parliament and/or the ministry of finance to establish at least broad guidelines for the appropriate level of risk for the SWF’s investments.

¹⁰ There may also be important legal considerations, especially for countries in currency unions where members may be required to surrender (some categories of) foreign currency assets to the central bank of the currency union.

110. In this respect, the formulation of the investment mandate by the owner is a key decision.

The investment mandate forms the basis for the investment process and can take several forms, depending on the level of delegation from the owner to the manager. In the most delegated form, the mandate empowers the manager to determine the SAA himself, often under the restriction of minimizing risk for an explicitly stated return objective. A less delegated approach is to set explicit benchmarks for each eligible asset class and weigh them together to form an overall benchmark portfolio with explicit limits on allowed deviations from the benchmark (active management). An intermediate approach is to set out broad intervals for allocations to various asset classes and give quantitative and/or qualitative regulations on risk.

Case Study: Norway

For the GPF, the ministry of finance, as the owner, has set a relatively detailed mandate for the central bank's management of the fund. The mandate specifies allocation to various asset classes and sets benchmarks and risk limits, as well as requirements for risk management.

111. The formulation of the mandate will determine whether the asset manager should focus on absolute or relative returns.

An absolute return objective gives the manager responsibility for the absolute returns of the portfolio over time, which in principle would align the incentive structure of the asset manager with the interest of the owner, provided that the return objective is consistent with a level of risk that is acceptable to the owner. However, while there is a positive correlation between risk and expected return, there is no correlation between risk and actually *realized* returns over the short and medium term. The governance structure, therefore, must be robust enough to tolerate potentially substantial deviations from the stated return targets for long periods of time. With a benchmark and risk limits set by the owner, there is more direct control over SAA from the owner's side. The fluctuations in returns over time will then, to a large extent, be attributable to the asset allocation decisions made by the owner through setting the benchmark, rather than to the investment decisions made by the manager within the given mandate. The focus of the manager in this structure would be not on the absolute returns, but on the returns relative to the benchmark.

112. Guidelines for internal and external reporting must be integrated into the governance framework.

A good system of internal reporting is necessary for good risk management and accountability at the different levels of governance. At the same time, transparency in the form of good external reporting will increase the legitimacy of the SWF and provide disciplinary pressure on the manager.

Basic principles

113. The approach to risk management should build on the same principles as the rest of the governance system.

This implies a framework for risk management characterized by clearly delegated mandates, defined roles and responsibilities, accountability, transparency, and professionalism. The scope of risk management should cover all material aspects of risks affecting investment operations and should include financial (e.g., credit, market, and liquidity risks), operational, and reputational risks.

114. A SWF needs to have a strong risk management culture, in which senior management is engaged in developing and enforcing the risk management process. Adherence to high standards in risk management with sound operational controls and systems are necessary to meet the objectives of the SWF and to preserve legitimacy domestically. It will also be seen by the international community and markets as necessary in achieving the aim of preserving international financial stability, as well as maintaining a stable, transparent, and open investment environment. This risk management process would typically consist of the following components:

- *Risk policies and procedures:* a set of written principles that are endorsed by the board of directors (BoD), implemented by the CEO, and disseminated within the institution.
- *Risk identification:* the process by which a SWF defines the nature of the risk it faces and an essential part of the risk management process.
- *Risk measurement:* a measurement methodology that allows comparison across the different dimensions of risk and enables risk considerations to be factored into performance measurement and investment management decisions.
- *Risk monitoring:* the operational process by which the SWF ensures that it operates within its defined risk policies and procedures.
- *Risk reporting:* typically refers to an internal reporting process.
- *Risk verification and audit:* the component of the risk process that ensures the risk management systems and techniques are effective.

115. In assessing appropriate risk levels, it is helpful to distinguish between risks that are rewarded or desirable and risks that are not. As discussed above, various forms of market risk are rewarded through positive expected returns. The so-called consequential risks, such as operational and legal risks, are the risks that inevitably arise as a result of being in the financial/investment management industry.

116. The owner or the governing body of the SWF typically determines risk objectives. Broad risk principles are generally established within the law governing the SWF or by the owner of the fund. Consistent with the SWF's overall objective(s) (i.e., whether the fund serves the objective of economic stabilization, saving for future generations, or other), the owner of the fund would need to formulate and articulate consistent risk tolerance parameters, such as the fund's investment horizon and its overall risk tolerance. Risk tolerance exemplifies the hypothetical line between acceptable and unacceptable investment outcomes and should reflect the fund's ability to take risk in the operating environment. Subsequently, the risk tolerance is translated into a quantifiable risk measure that

could be expressed as a shortfall probability, the probability of not achieving a certain return target or worst case outcome at a certain confidence level.¹¹

117. The operational investment management must be carried out by investment professionals.

It should be delegated from the owner to the fund, which would implement the asset management function through internal and/or external portfolio managers with clearly defined operational mandates. The choice between internal and external managers will usually reflect costs and access to relevant skills. There are large economies of scale in fund management, so larger funds may find it cost efficient to develop internal management to cover most of their needs. For smaller funds, the issue is

often whether sufficient skilled labor is available to build competent internal management at a cost that is competitive with external management. Similarly, resource-rich developing countries may face human-resource constraints in managing investment operations, suggesting the need to delegate investment to external managers. In this context, it is also relevant to consider important principal-agent problems that arise when fund management is outsourced, which calls for a minimum level of oversight and capacity by the owner to supervise the manager. For developing countries with limited oversight capacity, it would be advisable to start by a simple and transparent benchmark for SAA and avoid unnecessary risk-taking or sophisticated risk-management strategies.

Case Study: Norway

For the GPF, the focus is on returns relative to the benchmark set by the owner. The board of the central bank has set quantitative regulations on the acceptable level of operational risk within the bank, including for the management of the GPF. In Norway, the investment management arm of the central bank, NBIM, manages both the GPF, under a mandate from the ministry of finance, and the investment tranche of the central bank's own reserves, under a separate mandate given by the board of the bank.

118. Unlike financial risks, operational risks will not be rewarded, so the objective of operational risk management is to mitigate (residual) risks to an acceptable level.

While exposure to financial risks leads to greater volatility in the market value of investment assets, but is expected to lead to higher returns over time, operational risks could potentially lead to significant losses of principal or even to the failure of the firm.¹² Operational risk is largely endogenous to the SWF. Apart from external events, such as natural catastrophes, it is linked to the business environment, nature, and complexity of investment activities, the processes and systems in place, and the quality of the management and of the information flows. Operational risks cannot be completely avoided or eliminated, and even if operational risk has no expected return, there will be costs associated with reducing it. There is, thus, a trade-off to be made between the cost of accepting risk and the cost of mitigating it, which should be made explicit in risk policy documents and is often based on an impact and likelihood analysis.

¹¹ Examples of specific risk parameters are, inter alia, probability of achieving a return in excess of the domestic inflation rate, expected annual shortfall relative to long-term domestic inflation, probability of negative return at the end of 3 years, probability of achieving return target over 20 years, or probability of negative accumulated real return after 15 years.

¹² Recent examples of the failure of operational risk management at Societe Generale in January 2008 led to estimated losses of €4.9 billion when there was no appropriate separation of controls between the front- and middle-office functions.

119. The most important operational risk management tool is appropriate internal organizational structure with clear segregation of duties. The organizational structure should be designed to achieve appropriate segregation of duties between execution of portfolio transactions and operations, including compliance monitoring, performance measurement and reporting, and settlement and accounting. This could be achieved by setting up separate departments with the head of each department reporting directly to the CEO, who would then delegate specific and clearly defined roles and accountabilities to each group and position. To support reporting and enforce segregation of duties, the framework should include reliable information technology systems, parts of which access to should be limited to only the people with the appropriate authorization (e.g., in the back office). Public disclosure of the SWF's approach to its risk management policies and key actions related to governance and the soundness of its operations helps in reassuring domestic and international stakeholders that the SWF adheres to a high standard of managing operational, regulatory, and reputational risks.

CONCLUSION

120. The paper analyzed the various investment and liability management decisions facing the policymaker, presenting a conceptual framework for an integrated SALM framework with the aim of minimizing vulnerabilities on the sovereign balance sheet. The paper also analyzed and illustrated the evolution of these decisions, focusing on relevant country examples.

121. Given the variety of country circumstances, a number of broad guiding principles can be distilled from the analysis of the interlinkages across elements of the sovereign balance sheet, particularly:

- In cases where reserve adequacy assessment points to ample reserves, there is merit in carving out a portion for long-term investment strategies in dedicated savings funds, taking account of the appropriate institutional framework and coordination mechanism.
- Optimizing the sovereign balance sheet should take into consideration the stage of asset accumulation. Expanding the sovereign balance sheet by allowing reserve accumulation and building financial wealth would be advisable during the early stages of extraction, while a policy of reducing sovereign debt would become more appropriate in situations where the cost of external debt is high and/or the carrying cost of reserves exceeds the self-insurance benefit and alternative arrangements for investing reserves are not feasible.
- Although resource-rich countries typically do not face a financing need that warrants issuing domestic debt, there could be other objectives that motivate the sovereign to issue debt domestically, including developing a domestic debt market, while accumulating foreign assets. Expanding the sovereign balance sheet in this form will depend on the cost of domestic debt, the return on accumulating additional financial assets, institutional capacity to manage growing financial wealth, and sound debt management principals.

- The structure and nature of contingent and implicit liabilities should inform the investment objectives and strategies of sovereign assets. This will be reflected in the type of savings fund and associated investment horizon, mandate, and risk profile.
- Sovereign funds should favor a clear mandate and legal structure, transparent governance, and appropriate and clear delineation of responsibility between the owner of the fund and its management. Clarity about the fund's investment mandate and managers' accountability should also be ensured.

Appendix I. Risk and the Pricing of Financial Assets

122. The value of a financial asset will reflect expectations of future cash flows from that asset. All financial assets represent a claim to a future cash flow. For instance, the cash flow accruing to the holder of equity is the future stream of dividends from the stock. The cash flow from a fixed-income investment is interest (coupons) and the value of the bond at redemption. Cash flows are in many cases uncertain. An investor, for instance, will not know in advance the value of future dividends from a company and, thus, must form expectations about this. Some cash flows are contingent—the holder of an option will only receive payments if the value of the underlying object is over or below some preset threshold at or, in some cases, before maturity.

123. These expected cash flows must be discounted back to today's value to give a "fair" price for the asset. This discount rate will generally have two components: a risk-free rate that compensates the investor for the deferred nature of the expected cash flows and a risk premium that compensates for the associated risk of those cash flows. When either of these changes, the fair value of an asset will also change.

124. Thus, movements in asset prices can generally be attributed to changes in expected future cash flows or to changes in the discount rate used to calculate the net present value of that cash flow.¹³ Traditionally, the emphasis in academic literature was on understanding the impact of changes in expected cash flows on asset prices. Modern financial theory puts more emphasis on understanding how changes in risk premiums affect pricing in financial markets.

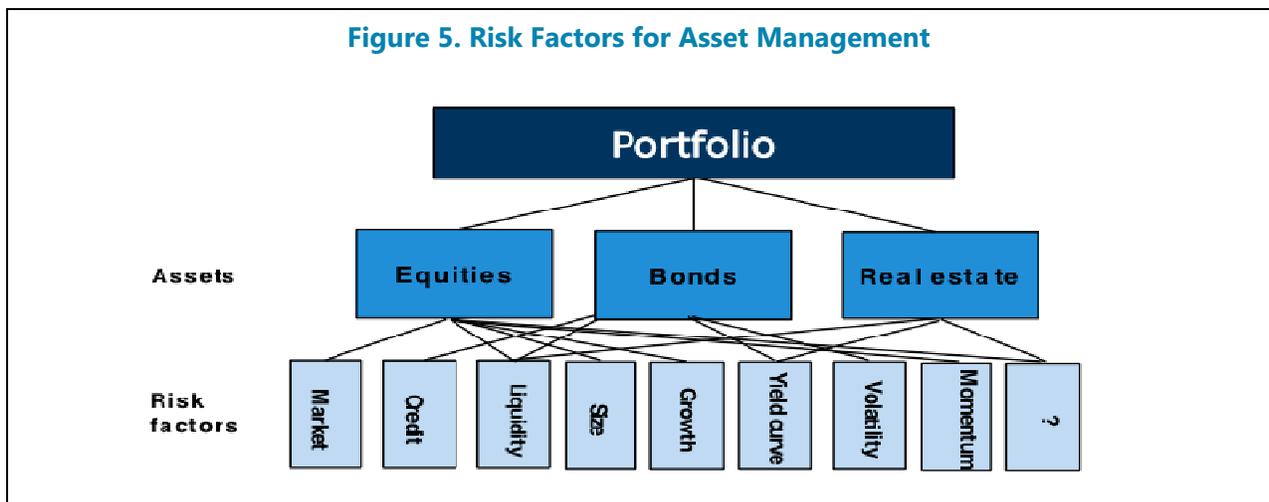
125. Changes in risk premiums will reflect investors' ability and willingness to take risk. Some investors may operate under regulatory constraints that force reduced risk-taking in periods of market stress. For instance, life insurance companies may have to draw down their exposure to risky assets if their capital buffers are reduced by negative returns. Other investors may not be willing to take risks without higher expected returns in periods with greater uncertainties about the outlook for the economy, even if they are not bound by regulatory constraints. Whatever the reasons, higher perceived risk and/or lower appetite for risk must imply higher expected return in equilibrium to balance supply and demand for risky assets. For given expected cash flows, asset prices must fall to a level at which expected returns are high enough to clear the market. One implication of this is that when assets are repriced to reflect changes in risk appetite, expected returns are higher after assets have fallen in value.

¹³ There will also be an element of random noise, but this element is less important for a portfolio of assets than at the individual asset level.

Risk factors

126. Risk factors can be seen as the building blocks of expected returns. They represent various forms of systematic risk that cannot be diversified away and that an investor will thus expect to get rewarded for taking over the longer term.

127. In this framework, different assets can be seen as vehicles for accessing various risk factors that are rewarded through higher expected returns in equilibrium. This is illustrated in Figure 5 below. The individual assets can be described as bundles of underlying risk factors, and the properties of the assets will reflect the degree to which they are exposed to these different factors.¹⁴ The risk premiums used to calculate the fair value of an asset, thus, would reflect the risk factors to which that particular asset is exposed.



128. Generally recognized risk factors are illustrated in Figure 5. Some risk factors, like credit and liquidity, may have particularly skewed return distributions. Exposure to these factors will generally give investors modest, yet positive, returns most years, but a few shorter periods of significant losses. The pay-off structure for exposure to such factors is similar to the pay-off investors would receive if they sold insurance against the credit or liquidity events that trigger losses connected to exposure to these factors.

129. By definition, the average investor must hold the market-weighted average of all available assets in the financial markets. Any investor who holds more than his or her fair share of exposure to systematic risk factors would, therefore, in most years, earn higher returns than the average market return, but have significant losses compared to the average investor in periods when

¹⁴ A helpful analogy may be to think of assets as various food products and risk factors as the nutrients that determine the nutritional content of each item of food. There is an important asymmetry here: for each bundle of food, there is one and only one, particular amount of nutrients, but one particular amount of nutrients may be accessed through several different bundles of food. The relationship between assets and risk factors is the same.

there is a credit or liquidity event or some other event that triggers a drawdown in value connected to exposure to factors with skewed return distributions.

130. Thus, we can restate the investment problem in an insurance framework. The issue of choosing whether to take more or less risk than the risk in the market portfolio can be equivalently formulated as a question of whether one would want to buy or sell insurance against, for example, a credit or liquidity event. Those who are selling insurance would expect higher returns over time, but would have to cope with periods of potentially significant losses. The buyers of insurance would have to live with below-average returns over time, but would be protected against large losses in “bad” years. This can be a useful starting point for a discussion of the capacity of an SWF to take various forms of risk.

131. The risk factor approach also gives a useful perspective on the increase in correlations between asset prices, which is often observed in market stress situations. This increase in observed correlations can be seen as a result of assets being exposed to the same underlying risk factors, for instance, liquidity. When a liquidity event occurs, the price reaction related to this one factor can be so large that it overwhelms all other factors that contribute to the pricing of the assets that are exposed to it. We observe that all assets that have exposure to the liquidity factor suddenly seem more correlated, but this is only a manifestation of an underlying common exposure to a particular risk factor that was there all along. In this way, careful monitoring of exposure to underlying risk factors can help investors avoid being caught by unexpected changes in correlations between returns at the asset level.

Appendix II. The Santiago Principles

132. The International Forum of Sovereign Wealth Funds was established by the International Working Group of Sovereign Wealth Funds in April 2009. Since then, the IFSWF members have met annually to exchange views on issues of common interest and facilitate an understanding of the SWFs' generally accepted principles and practices as outlined in the Santiago Principles and the SWFs' activities.

133. The key issues and considerations of this report are guided by the Santiago Principles. The guiding objectives of the Santiago Principles are to: (i) build a transparent and efficient governance structure that ensures adequate operational controls, risk management, and accountability; (ii) invest on an economic and return-related basis; (iii) conform to all regulatory and disclosure requirements in recipient countries; (iv) ensure free flow of capital and investment; and (v) preserve global financial stability.

134. Albeit voluntary, the Santiago Principles assist in identifying, developing, and enhancing governance and accountability frameworks, as well as the conduct of investment practices. Even though the key elements of the Santiago Principles have been drawn from a review of international codes and guidelines, and common practices and principles existing among SWFs, the implementation of each principle is subject to applicable home country laws and may require an appropriate transitional period, especially for newer SWFs. The ultimate aim of the Santiago Principles is to support the institutional framework, governance, and investment operations of SWFs that are guided by their policy purpose and objectives, and consistent with a sound macroeconomic policy framework.

135. The Santiago Principles broadly cover three key areas (Box 6). These include: (i) the legal framework, objectives, and coordination with macroeconomic policies; (ii) the institutional framework and governance structure; and (iii) the investment and risk management framework. These areas are closely interlinked, where a clear legal framework and objectives underpin a robust institutional framework and governance structure that assist in developing investment strategies consistent with the SWF's stated policy objectives.

136. Several SWFs have conducted and published self-assessments to confirm their degree of adherence to the Santiago Principles. These assessments help to assure home and recipient countries that SWFs' activities are solely based on economic and financial considerations. This understanding aims to contribute to the stability of the global financial system, reduce protectionist pressures, and help maintain an open and stable investment climate. The self-assessments also intend to enable SWFs to develop, review, and strengthen their organization, policies, and investment practices.

Box 6. Main Elements in the Santiago Principles

- **Governance and accountability**
 - A clear objective.
 - A sound legal framework.
 - Adequate reporting systems.
- **Integration in domestic policy formulation**
 - Appropriate coordination.
 - Clear rules on funding and withdrawal.
 - Incorporating SWF data into macroeconomic datasets.
- **Management of the nation's wealth**
 - A clear investment policy.
 - Diligence, prudence, and skill in investment practices.
 - A robust risk management framework.
- **Investment motivation**
 - Public disclosure of policy purpose, governance framework, and relevant financial information.
 - Refraining from pursuit of any objectives other than maximization of risk-adjusted financial returns.
 - Public disclosures of general approach to voting and board representation.
- **Fair competition in markets**
 - Respecting and complying with all applicable host country rules, laws, and regulations.
 - Not seeking advances of privileged information.
- **Impact on global imbalances and capital movements**
 - Disclosure of relevant financial information.
 - Description of the use of leverage or disclosure of other measures of financial risk exposure.
 - Execution of ownership rights consistent with the SWF's investment policy.
 - A transparent and sound operational control and risk management system.

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