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Procyclical Behavior of Institutional Investors During the Recent Financial Crisis: Causes, Impacts, and Challenges

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Monetary and Capital Markets Department

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Abstract

This paper (i) provides evidence on the procyclical investment behavior of major institutional investors during the global financial crisis; (ii) identifies the main factors that could account for such behavior; (iii) discusses the implications of procyclical behavior; and (iv) proposes a framework for sound investment practices for long-term investors. Such procyclical investment behavior is understandable and may be considered rational from an individual institution's perspective. However, our main conclusion is that behaving in a manner consistent with long-term investing would lead to better long-term, risk-adjusted returns and, importantly, could lessen the potential adverse effects of the procyclical investment behavior of institutional investors on global financial stability.

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I. INTRODUCTION

The global financial crisis caught many financial market participants by surprise. Institutional investors, by and large, were no exception. As the crisis intensified, concerns about capital preservation arose, and several investors responded by abandoning long-term investment strategies, reducing risk exposures, and switching to safer asset classes, usually with the intention to switch back as soon as market conditions improved. Exceptions certainly exist, but as a group, institutional investors tended to move with the rest of the market. This “institutional herding” is what we refer to in this paper as procyclical investment behavior.²

It is well documented that the financial system is inherently procyclical, and that this procyclicality can be economically and financially harmful, especially in a downturn (Borio, Furfine, and Lowe, 2001; Rochet, 2008; BIS, 2008; Hardouvelis, 2010; Danielsson, 2013). The Financial Stability Forum (FSF, 2009) refers to procyclicality as “the dynamic interactions (positive feedback mechanisms) between the financial and the real sectors of the economy. These mutually reinforcing interactions tend to amplify business cycle fluctuations and cause or exacerbate financial instability.” As the global financial crisis has reaffirmed, this instability can easily feed through into the real economy.³ The banking sector is especially prone to this procyclicality, as high leverage, in combination with rigid market-based risk management systems and capital requirements, triggers a tightening of credit standards in an economic downturn (Persaud, 2000; Gerlach and Gruenwald, 2006; Brunnermeier, 2009; Fernandez de Lis and García-Herrero, 2010).⁴

Many institutional investors have long investment horizons, which allow them to ride out short-term volatility in asset prices. In theory, they should be able to avoid the pitfalls of herding, which tends to hurt performance in the long run. Recent financial stress episodes have, however, demonstrated that various types of institutional investors are not immune to herd behavior (Table 1 and Section III).

² Herding or investing procyclically is closely related to momentum investing. The former refers to investors buying and selling the same assets at the same time. Momentum investing refers to buying assets that were past winners and selling those that were past losers. Evidently, there is significant overlap between the two concepts.

³ The notion that financial markets and the real economy can be mutually reinforcing is known as the *financial accelerator*. The term was introduced by Bernanke, Gertler, and Gilchrist (1996), but the concept dates back to Fisher (1933).

⁴ Efforts to make the financial system less procyclical have concentrated on the banking sector (FSF, 2009, and various publications of the Basel Committee on Banking Supervision—BCBS). The initiatives taken by the BCBS include an analysis of the impact of countercyclical capital buffers on credit supply in good and bad times. Countercyclical bank buffers, it is argued, mitigate bank procyclicality; in particular, they reduce credit availability in good times and increase it in bad times, in general, for macroprudential purposes.

Table 1. Examples of Selected Institutional Investors' Herd Behavior

Categories	Selected Evidence
Pension Funds	Pension funds in some advanced economies were net sellers of equities during the recent financial crisis.
Life Insurers	Life insurance companies contributed to the downward spiral in the equity markets' fall in 2001–03, when they sold equities in an attempt to bolster their balance sheets. Similar behavior was observed during the recent financial crisis.
Endowment Funds	Harvard Management Company decreased its uncalled capital commitments by roughly US\$3 billion, and adjusted its strategy for the internally managed domestic fixed income portfolio and a subset of external hedge fund managers, to ensure higher liquidity.
Mutual Funds	A micro-level dataset from EPFR shows that both client investors and fund managers tend to show procyclical behavior, reducing their exposure to countries during bad times and increasing it when conditions improve.
Sovereign Wealth Funds (non-budget stabilization)	Some sovereign wealth funds (SWFs) decided to reduce exposures to, in particular, U.S. and U.K. banks in the second quarter of 2009.
Central Banks	Central bank reserve managers joined the flight to quality and collectively pulled out more than US\$500 billion of deposits and other investments from the banking sector from December 2007 to March 2009.

Sources: Harvard Management Company (2009); Impavido and Tower (2009); Miracky and Bortolotti (2009); OECD (2010); Raddatz and Schmukler (2011); and Pihlman and van der Hoorn (2010).

The issue of institutional investors' herding behavior is important, especially during periods of global financial distress, when investors' procyclical strategies can accentuate the fragility of the financial system. In particular, prolonged very low interest rates and unconventional monetary policy measures could push many institutional investors' risk appetite to the point of creating significant adverse side effects, including possible mispricing of credit risk and underestimation of liquidity risks. Moreover, global and national financial sector regulation and supervision have yet to play a significant role in restraining such risks to the global financial system.

Avoiding procyclical behavior at the peak of a crisis may be difficult. From an individual perspective, procyclical behavior may even be rational, in particular for investors who have pursued risky investments during a boom period and face an urgent need for liquidity in a crisis. This difficulty can become more serious when asset owners lack proper financial markets expertise or do not have an appropriate asset allocation framework. Moreover, when they face extremely uncertain market conditions and significant time pressure, investors may rush to asset-allocation decisions that are not optimal. This tendency for procyclical behavior may be due to a number of factors, including underestimation of liquidity needs, pressure on short-term performance, principal-agent problems, the accounting cycle, and difficulties in

risk assessment and projection. Overcoming these constraints requires changes in behavior, as well as in the institutional set-up.

This paper analyzes the procyclical investment behavior of a wide variety of classes of institutional investors during the recent crisis. Their individual and collective behaviors can create the tendency for the whole system to act in a certain way. Our focus is on identifying the key causes of herd behavior and exploring possible good practices that address herd behavior. In particular, we try to develop a framework that could help long-term institutional investors set up their investment policies in ways that avoid purely individualistic procyclical behavior which undermines financial stability. The paper advocates an approach that is based mainly on prevention (i.e., minimizing ex ante the likelihood that an investor may behave procyclically ex post).⁵ This mainly entails a combination of a more forward-looking strategic asset allocation, portfolio rebalancing, sophisticated risk management, appropriate incentive structures for portfolio managers, and sound governance.

Based on these considerations, a broad framework for sound investment practices for typical institutional investors is proposed (see Appendix). These practices are intended to help institutional investors determine their investment policies on the basis of sound financial risk and return-related considerations, taking into account key lessons from crises and uncertainties in the financial markets. In this way, long-term investors can avoid, for example, a “herd” sale of assets to cover liquidity shortfalls, which might have been caused by excessive risk taking during a boom period. Also, these practices are not meant to be a “one-size-fits-all” investment policy (e.g., long positions only), as policies would need to be adapted to each institutional investor’s unique characteristics (e.g., objectives, liabilities, capacity, home country regulations).

The paper is organized as follows. Section II provides taxonomy of long-term institutional investors and explains their main characteristics. Section III presents evidence of procyclical behavior during the recent global financial crisis. Sections IV and V discuss, respectively, the main reasons for investors’ procyclical behavior and the implications of such behavior. Based on this analysis, Section VI presents several options for minimizing procyclical behavior, and Section VII addresses some special considerations for sovereign investors. Finally, Section VIII provides concluding remarks on the benefits for institutional investors of taking global financial stability considerations into account.

II. LONG-TERM INSTITUTIONAL INVESTORS

Financial markets theory presumes rational behavior of both short-term and long-term investors for the efficient allocation of capital. Typically, short-term investors trade

⁵ The paper does not attempt to provide policy remedies, either domestic or international, to curb procyclical behavior by long-term institutional investors, including at times of financial distress.

frequently and thus contribute to market liquidity, which facilitates price discovery. They intend to exploit mispricings, thus making markets more efficient. On the other hand, long-term investors can provide stable sources of funding to governments and companies, as well as to critical long-term projects for economic development such as infrastructure and research and development investment (World Economic Forum, 2011). The maturity structure of liabilities usually separates long- and short-term investors. Many long-term investors, especially some SWFs, have relatively longer-term liabilities or sometimes no (explicit) expenditure requirements. The OECD (2013) argues that institutional investors generally benefit from a stable net income flow and can follow a less cyclical investment pattern.

We define long-term investors as those who have the intention of holding an asset for multiple years and are not expected to liquidate their positions in the short term. This definition does not rule out selling assets before they mature. Even long-term investors may need to dispose of part of their assets under certain conditions, including (i) portfolio rebalancing; (ii) unexpected events (e.g., accounting fraud, natural disasters); (iii) tactical positioning for overvalued or insolvent assets; and (iv) legally mandated liquidations (e.g., conservatorship on issuers). What is important is the decision-making process and intention at the time of purchasing an asset.

Long-term institutional investors typically include pension funds, life insurance companies, endowment funds, mutual funds, non-budget stabilization SWFs, and central banks (Table 2). The classification as short-term or long-term investors may evolve over time. Pension funds, for instance, can migrate from long-term to short-term as their membership matures. Similarly, the horizon of SWFs capitalized by non-renewable natural resources shortens as these resources are exhausted. Banks are not considered long-term investors, even though as maturity transformers they do have long-term assets. Their share of capital allocated to long-term investing is limited by regulatory and capital constraints on the maturity mismatch between their assets and liabilities. Other private sector investors, such as hedge funds and private equity firms, are also excluded from our analysis as they follow a wide range of asset management strategies which are different from those of traditional institutional investors.⁶

Regarding asset size, mutual funds, pension funds, and life insurance companies dominate, while foreign reserves of central banks and assets of SWFs are increasing rapidly, especially in emerging economies (Figure 1). Table 2 shows some of the main characteristics of various institutional investors. For example, endowment funds have few (explicit) liabilities and are not subject to regulatory constraints, enabling them to pursue a very long investment horizon with a significant allocation to illiquid assets. Pension funds have relatively limited needs for short-term liquidity beyond predictable payments to existing beneficiaries, due to their long-term liability structure, but they are typically under a stricter regulatory framework for the

⁶ In many cases, classifying their strategies is difficult because their asset management styles change and evolve rapidly.

protection of pension beneficiaries. Sovereign investors face liquidity needs, mainly for monetary and balance of payment (BoP) purposes or for assisting domestic authorities in performing their financial market stabilization mandates. These roles, which derive mainly from their sovereign nature, imply a higher priority for financial stability, particularly during a period of financial distress. Further, mutual funds are intermediate in terms of both short-term liquidity needs and regulatory constraints. Nevertheless, market competition brings high peer pressure to most asset managers and, in turn, potential for “herd” behavior.

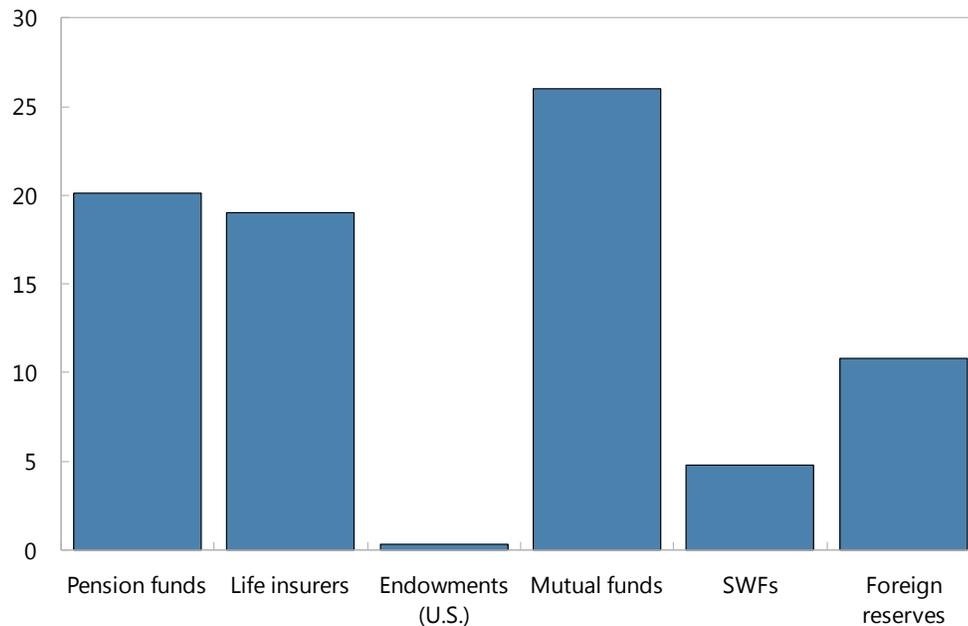
Table 2. Characteristics of Institutional Investors

Institutional Investors	Short-term Liquidity Needs	Regulatory Constraints	Peer Pressure	Financial Stability Responsibilities
Pension funds	L	H	M	L
Life Insurers	L/M	H	M	L
Endowments	L	L	M	L
Mutual funds	M	M	H	L
SWFs	L	L	M	M/L
Central banks	M/H	L	M/H	H

Source: Authors' compilation.

Note: H = high, M = medium, L = Low. An L indicates that other responsibilities or constraints that hamper a truly long investment horizon are low. An H indicates the opposite.

Figure 1. Asset Size of Selected Institutional Investors
(In trillions of U.S. dollars)



Sources: OECD Global Pension Statistics (end-2011), IAIS (2011), National Center for Education Statistics (end-2010), Investment Company Institute (2012:Q3), Deutsche Bank (2013), and IMF Currency Composition of Foreign Exchange Reserves (COFER, 2012:Q3).

PROCYCLICAL INVESTMENT BEHAVIOR: EVIDENCE FROM SOME INSTITUTIONAL INVESTORS

Our analysis of procyclical investment behavior starts around the time that central banks in advanced economies announced measures to address liquidity problems in the market, (i.e., 2007–08). This period marks the realization that the imbalances built up in the preceding period were unsustainable (Kjaer, 2010). Certainly, behavior prior to 2007 was equally procyclical. We focus on the downturn, as this is where procyclicality is the most harmful because of the tendency of the imbalances to unravel uncontrollably in a short period of time.

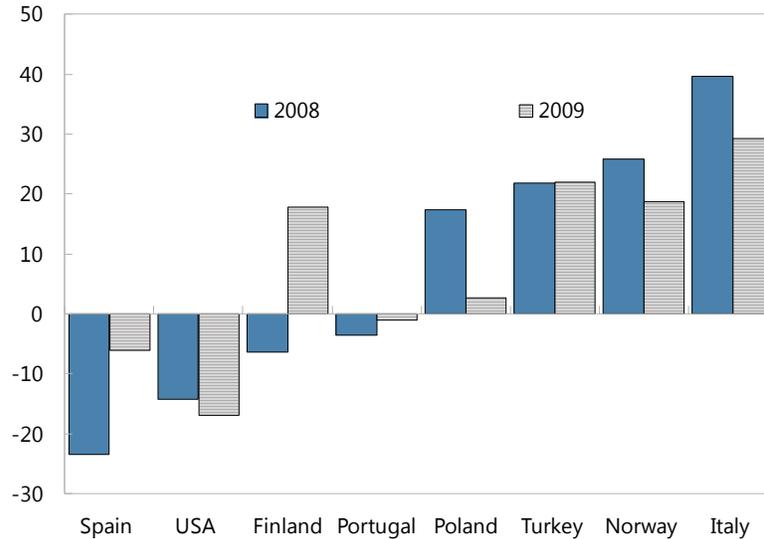
The empirical evidence that we have collected (some of which is anecdotal) from various data sources and studies, although incomplete, suggests that many institutional long-term investors engaged in procyclical investment actions during the recent crisis, though the extent of such behavior varied depending on investment styles and market conditions. We discuss below some of the actions of the main global institutional investors such as pension funds, life insurance companies, endowments, mutual funds, SWFs, and central banks (reserve managers).

A. Pension Funds

Many defined contribution (DC) pension funds with rate of return guarantees tend to have similar benchmarks, thereby creating an incentive for herd behavior. Such behavior can have a spillover impact on capital markets through trading activities. According to the World Economic Forum (2011), these institutions “feel that their countercyclical role in the markets has begun to change as regulatory and accounting changes (e.g., mark-to-market accounting and strict solvency regimes) have forced institutions to be concerned with short-term changes in market prices. Therefore, the investment strategies and behaviors of these institutions have become more procyclical.”

OECD data shows a mixed picture of pension fund behavior in member countries. Some pension funds use portfolio rebalancing strategies, tempering both upward and downward movements in equity markets, which is beneficial to financial stability. Investment flow data shows that pension funds in several countries (e.g., Norway, Italy, Poland, and Turkey) acted in a countercyclical manner during 2008–09, engaging in large net equity purchases as markets tumbled and reducing the intensity of net purchases as markets recovered (OECD, 2010). On the other hand, pension funds in the United States (defined benefit funds), Portugal, and Spain were net sellers of equities, reflecting a move towards more conservative asset allocations (Figure 2).

Figure 2. Net Purchases of Equities by Pension Funds in Selected Countries
(Annual change in percent)



Source: OECD Global Pension Statistics.

B. Life Insurance Companies

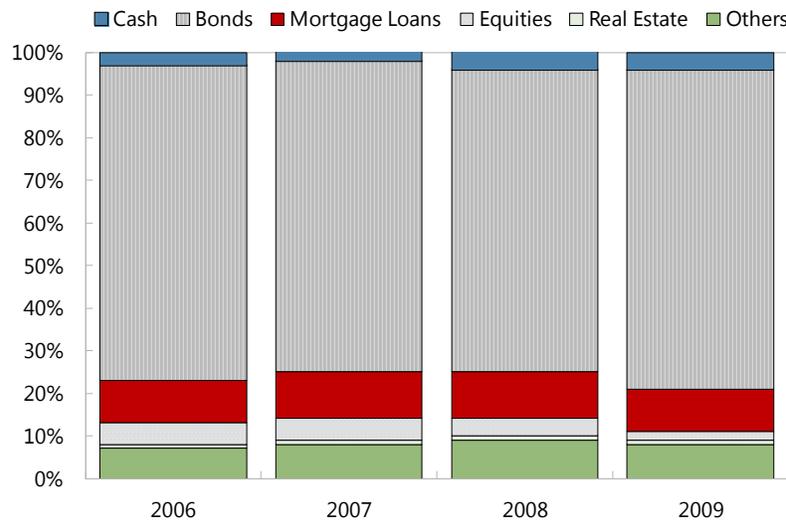
Life insurance companies tend to have a long-term investment orientation, due to the long-term nature of their liabilities, and take limited investment risk.⁷ A relatively strong regulatory framework has contributed to maintaining life insurers' conservative asset allocation (Rudolph, 2011). Nevertheless, risky activities grew in retirement savings products in some advanced economies during the past decade. Annuity products, offering return guarantees, increased substantially in the United States, reflecting in part marketing strategies designed to compete with other pension products like the 401(K).

Further, some insurance-dominated conglomerates conducted investment bank-like lending activities. The systemic relevance of these groups was magnified by activities that went beyond the traditional insurance business field. One prime example was the credit default swap (CDS) business conducted by AIG Financial Products, a non-insurance subsidiary of AIG. These companies were not immune to liquidity risk, especially when negative developments (e.g., a rating downgrade) triggered collateral calls or liquidity shocks rapidly led to increased claims over available liquidity. Under these circumstances, some life insurance companies turned to procyclical asset sales to mitigate the respective adverse effects on their balance sheets.

⁷ In contrast, non-life insurance companies are generally not regarded as long-term investors, as they often need to liquidate their assets to cover short-term drains on their portfolios when big accidents or natural disasters hit.

However, the evidence of life insurance companies' procyclical behavior during the recent financial crisis is mixed. Rudolph (2011) found that U.S. life insurance companies' asset allocations stayed remarkably steady through 2001–10, with only about 3 percent moving from equities to bonds (+ 2 percent) and cash (+ 1 percent) in 2007–08, although this may reflect valuation effects and was partially reversed in 2009 (Figure 3). On the other hand, Impavido and Tower (2009) found that life insurance companies contributed to the downward spiral during the equity markets' fall in 2001–03 when they sold equities in an attempt to bolster their balance sheets that led to further declines in the market.⁸ According to the latter study, sales of equities and other financial instruments by this class of institutional investors have been more widespread in the recent financial crisis.

Figure 3. U.S. Life Insurance Companies' Asset Allocation



Source: Rudolph (2011).

C. Endowment Funds

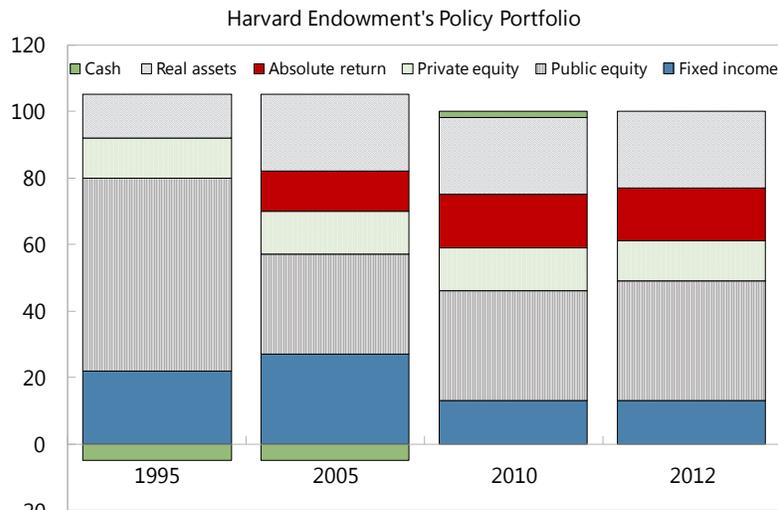
For many years before the crisis, wide portfolio diversification with a focus on alternative asset classes was a prevalent trend in endowment investing. Following Yale and Harvard and inspired by the pioneering work of Swensen (2009), many endowments allocated an increasing share of their portfolios into illiquid assets such as private equities, hedge funds, and real assets. However, the global financial crisis caused large losses and a shift of their strategies away from illiquid assets.

Asset allocation data from Harvard and Yale show that their overall strategic asset allocation has remained consistent with their long-term investment objectives (i.e., a stable allocation toward alternative assets). However, both endowment funds' negative cash position during

⁸ IAIS (2011) also finds that U.K. life insurers came under pressure due to the significant fall in equity prices and, thus, needed to sell their assets into an already unstable market.

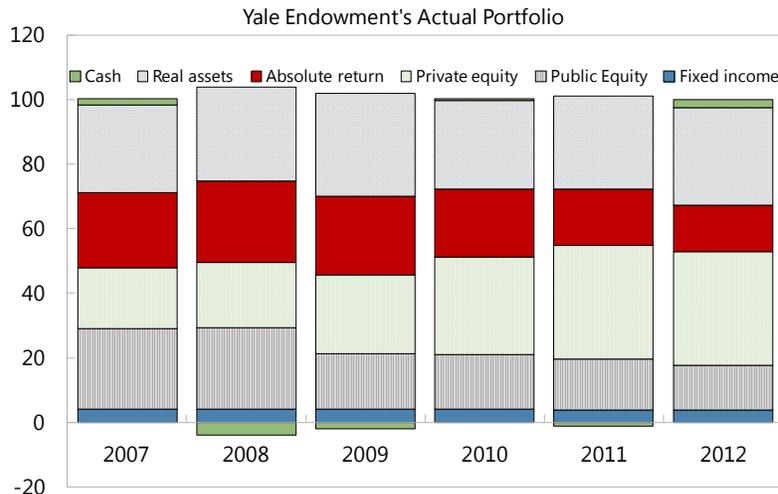
the pre-crisis period reversed after the crisis (Figure 4), which reflects renewed perceptions of the importance of a cash buffer. Harvard Management Company decreased its uncalled capital commitments by roughly US\$3 billion and adjusted its strategy to secure more flexibility.⁹ In late 2009, Stanford Management Company tried to sell up to US\$1 billion of its US\$6 billion in illiquid investments. Although this sale plan was not implemented, it implicitly shows the endowment fund's need for more liquidity and a portfolio adjustment.

Figure 4. Harvard and Yale Endowment Fund Portfolios
(In percent of total assets)



Source: Harvard Management Company.

Note: Real assets include real estate, natural resources, and commodities.



Source: Yale Investment Office.

Note: Absolute return aims to achieve a certain level of return regardless of overall market conditions.

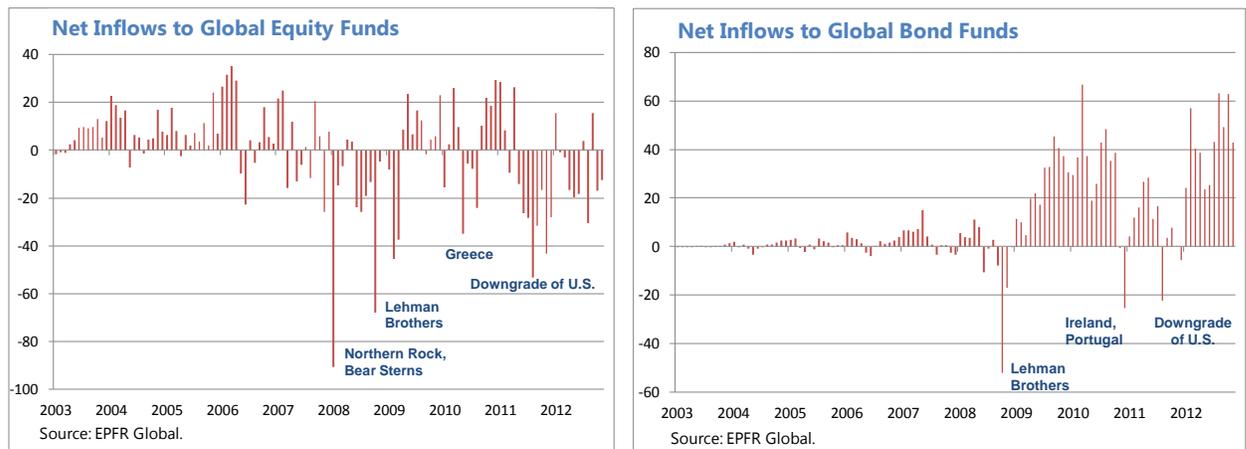
⁹ Harvard Management Company, in its annual report for fiscal year 2009, stated, "With perfect hindsight we and most other investors would have started this year in a more liquid position and with less exposure to some of the alternative asset categories that were hardest hit during FY 2009."

According to Preqin’s survey report in 2009, 57 percent of endowments had altered their private equity strategy through, for example, more stringent due diligence, reductions in commitments, and postponement of investments. Some endowments, despite their very long-term investment horizon, faced liquidity issues during the financial crisis. A Center for Social Philanthropy and Tellus Institute (2010) study of six university endowments found evidence of taking on excessive risks and investing in overcrowded asset classes prior to the crisis. The study argues that the funds played a role in magnifying certain systemic risks in the capital markets. The study reports that during the crisis “illiquidity in particular forced endowments to sell what few liquid holdings they had into tumbling markets, magnifying volatile price declines even further.”

D. Mutual Funds

Mutual funds have various investment objectives, but many invest for the medium to long term. Data on flows in and out of various mutual funds show that ample liquidity and low financial market volatility during the pre-crisis period increased investors’ risk tolerance and led to continuous inflows to mutual funds. However, Emerging Portfolio Fund Research (EPFR) Global data show that there was subsequently a clear pattern of rapid drawdowns from mutual funds, especially after the collapse of Lehman Brothers in September 2008 (Figure 5). Although, in principle, bond flows are more prone to destabilizing reversals than investments in equities, arguably because the stronger re-pricing of equities endogenously moderates outflow pressures, EPFR Global data show more volatility in equity funds than bond funds during this period. Possible explanations include fund managers’ difficulty in liquidating assets because of a liquidity dry-up in some bond market segments, asset switches within debt securities (e.g., a switch from high-yield corporate bonds to sovereign bonds), and client investors’ adoption of a hold-to-maturity approach in the face of market turmoil.¹⁰

Figure 5. Net Inflows to Various Mutual Funds
(In billions of U.S. dollars)



¹⁰ If bonds are in a hold-to-maturity account, investors can hold those bonds until maturity without having to report a loss, as long as the issuer does not default and the debt is not restructured.

Raddatz and Schukler (2011) analyzed micro-level data on mutual funds and found that both client investors and fund managers tend to show procyclical behavior, reducing their exposure to countries experiencing turmoil during bad times and increasing it when conditions improve. They conclude that capital flows from mutual funds did not seem to have a stabilizing role by, for example, generating large reallocations during the global financial crisis. Also, there is some evidence that a retrenchment of U.S. money-market mutual funds from European countries contributed to the rise in funding costs experienced by banks in the euro area in the fall of 2011 (Jenkins, 2011).

E. Sovereign Wealth Funds

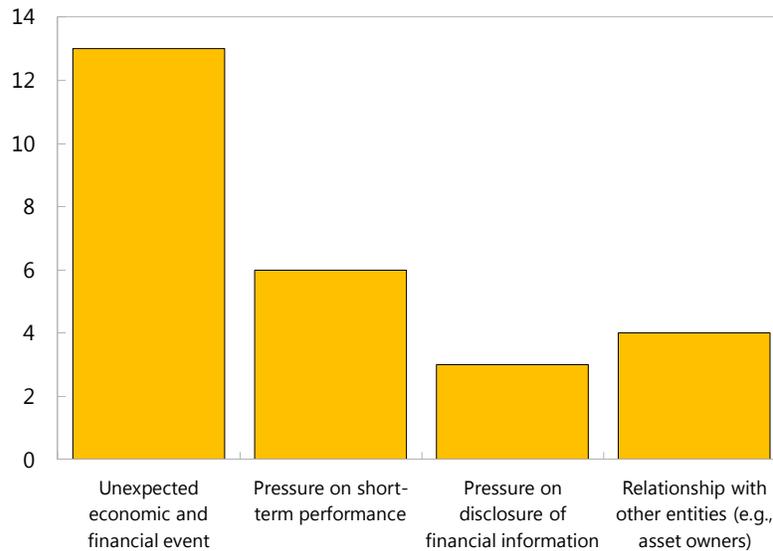
The long-term investment strategy of non-budget stabilization SWFs enabled most of them to maintain their stance on asset allocations during the crisis. However, Miracky and Bortolotti (2009) describe how several SWFs decided to reduce exposures to, in particular, U.S. and U.K. banks in the second quarter of 2009. In retrospect, these SWFs may have liquidated part of their holdings at the worst possible moment and thus could have missed the subsequent (albeit temporary) recovery that followed. Although these SWFs were certainly countercyclical when they invested in bank stocks, the liquidations shortly afterward seemed to have been procyclical. Further, Bernstein, Lerner, and Schoar (2009) find that SWFs often pursue assets at home when domestic equity prices are already relatively higher and thus engage in “trend chasing.”

The crisis also brought significant changes in the implementation of SWFs’ stated strategies. Kunzel and others (2011) analyzed the asset allocation changes of a subset of SWFs and found evidence of some SWFs liquidating positions in an effort to support domestic economies or to increase the share of liquid instruments in their portfolios. Some SWFs, especially stabilization funds, have shown patterns of a flight to quality by increasing their exposure to high-quality sovereign assets, reflecting increased risk aversion. Measures to alleviate credit risk include a reduction of the portfolio allocated to bank deposits, early expiration of deposits, and shortening of the maximum maturity of deposits. They also adopted a more stringent process for the selection and approval of counterparties.

In other cases, assets from long-term SWFs were used to support domestic banks by providing liquidity to the banking system (by depositing their assets in domestic banks) and to help with bank recapitalization. For example, Ireland’s National Pensions Reserve Fund (NPRF) liquidated its assets in two tranches in 2011 to realize €10 billion cash, which was used to recapitalize the domestic banking sector (NPRF’s annual report for 2011). The Russian government used US\$22 billion of the National Wealth Fund (NWF), whose mission is to co-finance the voluntary pension systems of the population, to support the domestic banking sector (Kazakevitch and Trishkina, 2010). While this behavior can be considered countercyclical, it does highlight the challenges in keeping to intended mandates during a crisis. Indeed, according to the International Forum of Sovereign Wealth Funds (IFSWF, 2011), some SWFs have experienced challenges in maintaining consistency

between their investment policies and the underlying objectives of the fund, especially during periods of market turbulence (Figure 6). The debt crisis in the euro zone also posed a challenge to many SWFs in striking a reasonable balance between long-term investing and short-term flexibility (Park and van der Hoorn, 2012).

Figure 6. Difficulties in Maintaining Consistency in Investment Policy
(Number of SWF respondents)

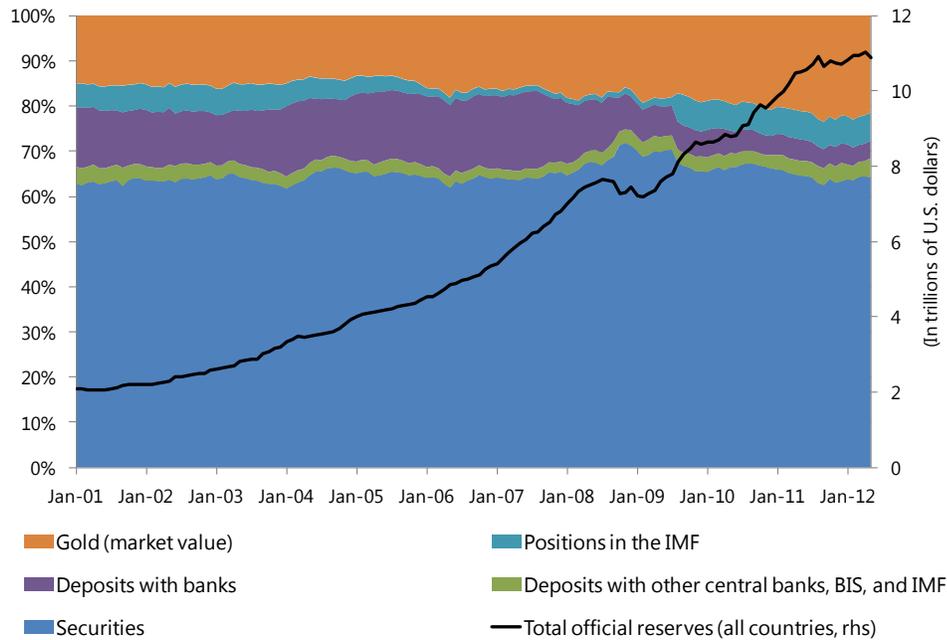


Source: IFSWF (2011).

E. Central Banks (Reserve Managers)

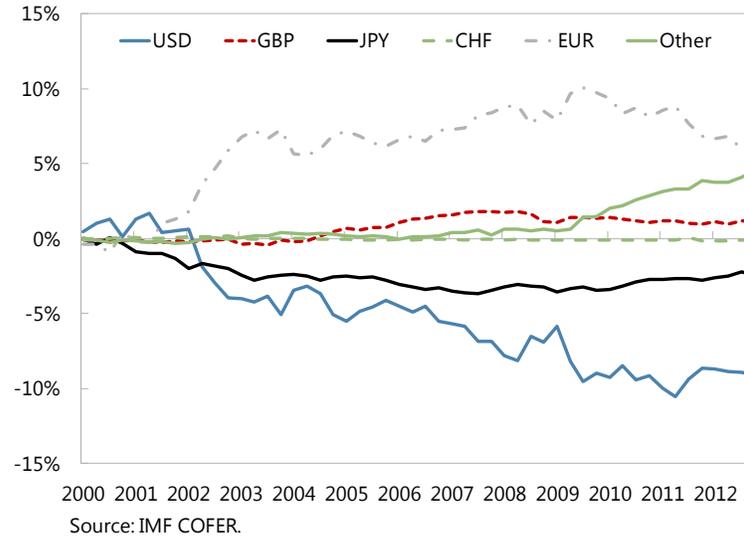
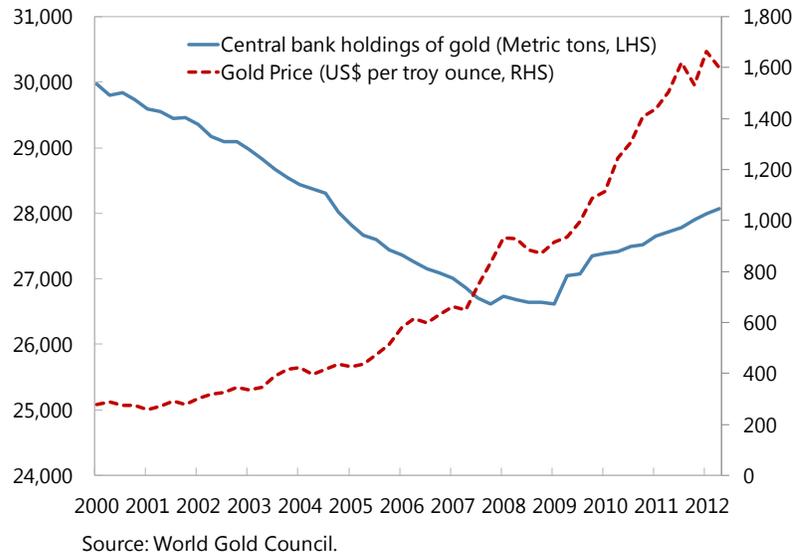
Central banks hold official foreign exchange reserves for various reasons. These include “self-insurance” against financial shocks and sudden stops in accessing the international capital markets, and enhancement of the credibility of monetary policy. Thus, the primary objectives of reserve management are safety (i.e., preserving the value of the reserves) and a high degree of liquidity.

Prior to the crisis, as reserves grew rapidly, an increasingly larger share was invested with a more prominent return objective (sometimes separated in an “investment tranche” as opposed to a “liquidity tranche” with more traditional objectives). In particular, reserve managers started to take more credit risk to enhance investment returns. Borio, Galati, and Heath (2008) and Bakker and van Herpt (2007), among others, observe that central banks’ weight on the return objective has generally increased over time, for example, by showing a preference for asset-backed securities, increasingly using derivatives, and hiring more external managers. This trend was sharply reversed in the wake of the crisis. Pihlman and van der Hoorn (2010) find evidence of procyclical investment behavior by central bank reserve managers, who collectively pulled more than US\$500 billion of deposits and other investments out of the banking sector between December 2007 and March 2009 (Figure 7).

Figure 7. Composition of Global Reserves

McCauley and Rigaudy (2011) document how exposure to government-sponsored enterprises (GSEs) was reduced and securities lending programs were scaled back. Reserve managers' investment in assets under market pressure was also reduced when credit rating downgrades breached the minimum level for inclusion. The debt crisis in the euro area has also had a profound impact on the composition of reserves. Pringle and Carver (2012) find that central banks reduced their holdings of some euro area issuers' debt or exposure to the euro more broadly. Currency composition data show that in the midst of the crisis the long-term trend of a decrease in the U.S. dollar share of global reserves came to a temporary end and flight to quality led to a short-term increase in the share of the dollar. More recently, reserve managers' allocation to the euro has decreased since 2010, when sovereign risks in the euro zone periphery materialized, with the biggest "beneficiary" being the share of other currencies, which mainly consist of the Australian dollar and Canadian dollar (Figure 8).¹¹ Central banks' holdings of gold have also changed. Since 1965, central banks had been net sellers of gold. This trend came to end during the global financial crisis when central banks turned into net buyers of gold. On average, the new buyers are willing to pay a significantly higher price than that prevailing at the beginning of the 2000s (Figure 9).

¹¹ This trend has generally remained despite some fluctuations in the exchange rate of the euro. While advanced economies' allocation ratio to the euro also has decreased, the degree of adjustment has been relatively modest compared to that of emerging economies. This data does not include "unallocated reserves." See also Harding (2013).

Figure 8. Evolution of Currency Composition of Reserves**Figure 9. Evolution of Global Central Bank Gold Holdings**

III. WHAT DRIVES PROCYCLICAL INVESTMENT BEHAVIOR?

Pro-cyclical investment behavior has been widely studied. Research can be traced back to at least 1936 when Keynes observed that long-term investors may be reluctant to act according to their own beliefs and objectives, fearing that a contrarian view might damage their reputation when they are wrong. Bikhchandani, Welch, and Hirshleifer (1992) point to “information based herding and cascades” saying that individuals try to infer a parameter from the observations and decisions of other players. Scharfstein and Stein (1990) provide “group pressure” as another motivation and say this behavior can be rational from the perspective of managers who are concerned about their reputations. Brennan (1993) argues that compensation based on a comparison with others distorts the individual’s behavioral

incentives. Bikhchandani and Sharma (2000) also provide theoretical and illustrative explanations about three key drivers (e.g., information cascade, reputation, and compensation) behind herding. Ilyina (2006) argues that investors show herding behavior as they take into account actions of other market participants and certain portfolio constraints (e.g., benchmark-based performance criteria), which can create a transmission mechanism for propagating shocks. Various empirical studies have confirmed this notion (e.g., Arnswald, 2001, and Smit and van den Berg, 2006).

There are numerous studies about investors' herd behavior during the crisis. Beber, Brandt, and Kavajecz (2009) argue that during periods of large flows into or out of the bond market, liquidity explains a large proportion of sovereign yield spreads. They also suggest that, while credit quality matters for bond valuation, in times of market stress investors chase liquidity. Broner and others (2010) argue that total gross capital flows retrench significantly during a crisis, especially during severe ones. Chian and Zheng (2010), by applying daily data for 18 countries, observe that a crisis triggers herd activity in the crisis country of origin and then produces a contagion effect, which spreads the crisis to neighboring countries. According to Kremer (2011), financial institutions herd more on the sell side, resulting in a rise in the volatility of stock prices. Rösch and Kaserer (2012) find that there is a positive relationship between credit risk and liquidity risk and that in times of increased market uncertainty the impact of credit risk on liquidity risk intensifies.

Five main factors can be identified as major drivers of the procyclical investment behavior of the major institutional investors, namely (i) underestimation of liquidity needs; (ii) difficulties in assessing market risk and macroeconomic forecasting; (iii) principal-agent problems and managers' incentive structure; (iv) reporting and disclosure policies; and (v) regulations and market convention.

A. Underestimation of Liquidity Needs

Long-term investors sometimes face short-term liquidity needs. For example, central banks hold all or part of their foreign reserves in short-term liquid assets because reserves may need to be mobilized to provide necessary foreign currency (e.g., during a BoP crisis or for servicing external debt). Also, the open-ended structure of mutual funds means that client investors can redeem their shares on short notice, which leads fund managers to maintain a certain level of liquid assets rather than allocate all the fund's assets to long-term securities.

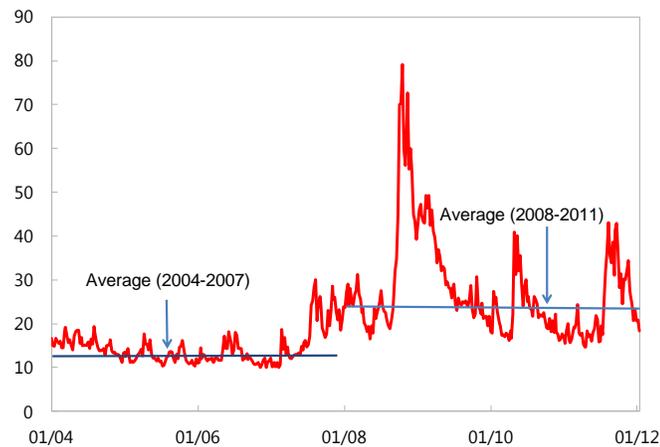
Managing liquidity is an integral part of asset and liability management (ALM) modeling. Usually, liquidity needs can be anticipated and projected with reasonable accuracy (e.g., pension payments or life insurance claims). However, asymmetric assessment of liquidity risk could lead to procyclical behavior. In the pre-crisis period, there was considerable liquidity in the financial system, and competitive pressure led to an underestimation of required liquidity buffers. From an individual investor's point of view, piling up sufficient cash can be a costly approach, lowering the asset manager's short-term performance and

sending a negative signal to clients about the manager's capability. These constraints lead asset managers to underestimate liquidity buffer needs and allocate more to illiquid and risky assets. When favorable conditions are abruptly reversed and market funding conditions deteriorate, almost all investors are forced to sell investments quickly in order to raise cash. This brings serious disruption to long-term investors' existing portfolios.

B. Difficulties in Assessing Market Risk and Macroeconomic Forecasting

In the wake of the crisis, macroeconomic, political, and financial sector risks increased significantly and have led to prolonged high volatility in the market (Figure 10).¹² Under the increased volatility and concerns about remaining risks, it has become more difficult for investors to make a clear distinction between temporary price fluctuations and more fundamental changes in risk. Moreover, materialization of many unprecedented and previously unthinkable scenarios (e.g., large global financial institutions' failures, the euro area sovereign debt crisis, and the U.S. sovereign rating downgrade) have reshaped investor perceptions about safe assets and increased their concerns about tail risks.

Figure 10. Evolution of VIX on S&P 500



Source: Bloomberg.

Macroeconomic forecasting models have a poor track record in predicting the timing of recessions or turning points in the business cycle.¹³ The recent crisis also exposed the weaknesses in risk management systems and models. Traditional risk measurement methodologies (e.g., Value at Risk (VaR)) tend to underestimate underlying risks because an increase in asset prices often comes with lower volatility. With declines in estimated risk, investors have incentives to increase leverage or invest in illiquid assets. Once the economic

¹² The VIX S&P 500 is a measure of market expectations of fluctuations in the S&P 500 index and is often used to indicate sentiment towards market risk.

¹³ See Andersen (1997) and Artis (1996).

or credit cycle reaches the peak, the subsequent decrease in asset prices results in greater asset price volatility.

A traditional risk measurement system does not see risks “through the cycle” and leaves investors vulnerable to rising risk premiums and higher volatility if market liquidity dries up. This causes greater investor losses than in normal credit cycles. Ang and Kjaer (2011) point out that California Public Employees’ Retirement System’s (CalPERS) internal control system did not work well when real estate markets surged during the 2000s, and their use of leverage peaked with the real estate market. Gorton and Ordoñez (2012) show that investors start to rigorously assess underlying default and liquidity risks only after financial distress materializes. As uncertainty increases substantially and issuers become more reluctant to provide information, investor analysis requires much greater efforts to gather adequate information, process complex data, and prepare for the risk of an unexpected event. In normal conditions, default risk of investment-grade issuers is considered remote and attracts insufficient attention (Economist, 2008).

C. Principal–Agent Problems and Manager Incentive Structures

Principal-agent problems occur at various levels in the investment management industry—between asset owner and asset manager and between internal manager and external manager, to name but a few. Principal-agent problems occur when the agent has better information than the principal, and the principal cannot fully monitor or control the actions of the agent (moral hazard). Benchmarks and annual performance targets are common instruments to address the latter issue, but they often lead to a focus on short-term returns and thus reduce the investment horizon of the manager.

Exposure limits are another common instrument but often are calibrated based on normal or stable market conditions, resulting in risk tolerance that can be overstated or short-sighted. With short-term performance targets and loose risk control systems, managers may have an incentive to increase investments in illiquid assets or use excessive leverage (e.g., the classic example of selling deep out-of-the-money options). This behavior leads to an excessive focus on short-term results at the expense of long-term benefits, reducing the incentive of managers to evaluate the long-term fundamental values of assets or potential losses under market volatility.¹⁴ More generally, although institutions may have long-term horizons, their asset managers may not necessarily have the same perspective owing to the nature of their compensation (e.g., annual bonuses based on one year’s performance).

Relative performance targets (index-based benchmarks or average returns in a peer group) stimulate herd behavior. This observation inspired the well-known model of Scharfstein and

¹⁴ Marginson and McAulay (2008) define such short-termism as “a preference for actions in the near term that have detrimental consequences for the long term.”

Stein (1990), who demonstrate that asset managers show herd behavior due to reputational concerns. As Trichet (2001) observed: “Some operators have come to the conclusion that it is better to be wrong along with everybody else, rather than take the risk of being right, or wrong, alone.” The negative impact of procyclical behavior can be more profound when the compensation structure is biased. Rajan (2005) argued that a biased compensation structure—more reward on the upside and less penalty on the downside—leads managers to invest in more risky assets, which may contribute to building asset bubbles. In the buildup of global imbalances, lenders offered risky loans but disregarded the long-term credit risks, because financial intermediaries created exotic products that generated large up-front payments (Bair, 2011).

D. Reporting and Disclosure Policies

Reporting requirements and disclosure policies affect investment behavior in two directions. On one hand, asset owners/boards of trustees who understand the investment objectives and benefits of long-term investing are more likely to allow asset managers to maintain existing asset allocations until asset values have recovered after a crisis. For example, Norway’s Government Pension Fund Global, though experiencing temporary large losses during the financial crisis, implemented its strategic allocation plan to increase the share of equities from 40 to 60 percent and expanded the benchmark portfolio to include small-cap companies. This implementation was backed by the asset owner’s clear understanding of investment philosophy and good communication with related stakeholders.

On the other hand, reporting requirements or disclosure policies may sometimes lead to procyclical behavior. Investor concerns about monthly or quarterly reports can make them adopt a shorter-term investment horizon than the period consistent with their original objectives. This could result in losing the opportunity to gain long-term investment premiums and increasing reinvestment risk. Jin (2005) argues that in the mutual fund industry disclosure of underperformance on a quarterly or annual basis puts fund managers at risk of being dismissed. New fund flows are sensitive to past performance, and fund outflows lead to the liquidation of assets. This implies that asset managers who focus on long-term performance may not see long-term gains realized.¹⁵

Even for institutional investors with explicit long-term mandates, disclosure requirements on a short-term basis tend to create implicit pressure. For example, if asset owners are tempted to publish information on good short-term performance or do not fully understand the linkages between investment objectives and their portfolios, they may encourage managers to add more risky assets even if an asset bubble is building up or to liquidate assets at the worst possible moment, adding to volatility in financial markets. This concern has led some SWFs

¹⁵ As formulated by Buffett (1969): “A swelling interest in investment performance has created an increasingly short-term oriented and (in my opinion) more speculative market.”

(e.g., the Government of Singapore Investment Corporation (GIC) and the Abu Dhabi Investment Authority (ADIA)) to disclose only long-term performance in their annual reports.¹⁶ While reporting quarterly returns, Future Fund is also trying to educate its stakeholders on focusing on the longer-term returns. The headline risk (e.g., disclosing actual losses) seems to be an important consideration for sovereign investors who need to respond to the general public. This complexity also suggests that increasing attention should be given to finding a reasonable balance in information disclosure and frequency.

E. Regulation and Market Convention

Regulatory and accounting changes can force investors to become more short-term oriented and make them more vulnerable to market volatility. For example, strict mark-to-market valuation-based accounting rules or rigid capital requirements may constrain long-term investors' ability to ride out short-term volatility.¹⁷ Asset valuations affect investors' decision making process, because valuation affects financial statements and thereby investors' risk tolerance. The World Economic Forum (2011) argues that mark-to-market accounting and pension regulations are pushing pension fund managers away from long-term investing, and Solvency II and other regulations will discourage life insurers from making longer-term investments.

Convention in the investment management community is also an important factor. For instance, the investment models used by many long-term institutional investors may be similar, which could be a factor contributing to herd behavior.¹⁸ Over-reliance on credit rating agencies can be a factor driving procyclicality as credit ratings are embedded in regulatory requirements and various financial contracts. Prudential regulation typically allows for less capital to be held against highly-rated bonds.¹⁹ Central banks use credit ratings to determine the eligibility of collateral for monetary policy operations. Bond portfolio manager performance is frequently benchmarked against standard indices that are composed on the basis of credit ratings.²⁰ A bond downgrade to below the investment-grade threshold often triggers immediate liquidation.

¹⁶ On its website, GIC states: "The government wants GIC to focus on the 20-year real returns. We are not providing the 1-year returns as these are too short-term in relation to GIC's 20-year investment horizon."

¹⁷ For example, the share of bank assets under fair market valuation has been substantial in recent years. In the United States, the share among bank holding companies ranged from 26 to 30 percent between 2002 and 2008 (Joint FSF-CGFS Working Group, 2009).

¹⁸ For example, the Black-Litterman (BL) model has been widely used in the asset management industry (Bertsimas, Gupta, and Paschalidis, 2012).

¹⁹ For instance, under the Basel II framework, the standardized approach to assess credit risks allowed banks to apply zero percent risk weight to their claims on highly rated sovereigns (AAA to AA-).

²⁰ For example, only investment-grade-rated (BBB-/Baa3 or better) instruments make it into the Barclays Euro Government Bond indices.

IV. IMPLICATIONS OF PROCYCLICAL BEHAVIOR

Long-term investors can earn risk premiums not available to short-term investors by investing in illiquid, long-dated assets. They bring stability to markets and provide a stable source of funding for projects with a long horizon and potentially high longer-term returns. These benefits disappear when long-term perspectives are overshadowed by short-term risk aversion or constraints. In the recent global financial crisis, many investors found themselves exposed to unexpected liquidity and credit risks that were very difficult to define, quantify, and manage. They were unable to efficiently unwind positions in certain markets. Interruptions in funding sources may have had negative consequences for the long-term viability of some economies and institutions. In this context, we discuss problems arising from procyclical behavior in relation to the financial system as well as individual institutions.²¹

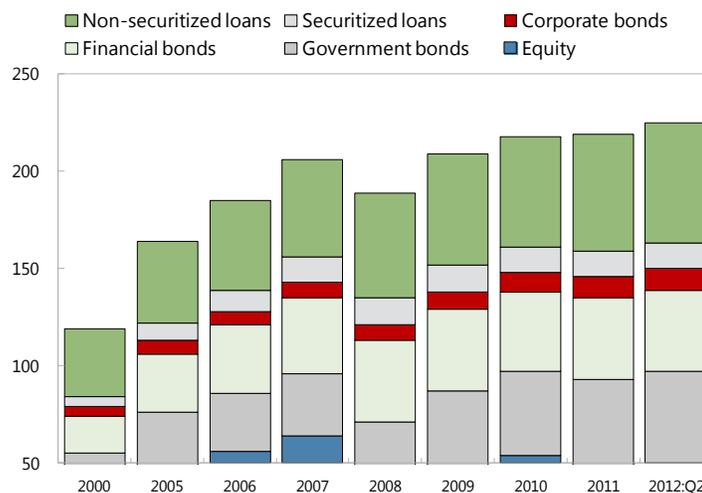
A. Implications for the Financial System

Various studies (e.g., Borio, Furfine, and Lowe, 2001; Joint FSF-CGFS Working Group, 2009) confirm that procyclical investing can be harmful for global financial stability. Although this is true for long-term as well as short-term investors, procyclical behavior by long-term investors is less expected by market participants, and the fact that they are also typically large can, therefore, cause more market disruptions. Procyclicality tends to overvalue short-term gains and put relatively less value on long-term projects. Specifically, during an upward phase of the cycle, assets can be allocated to investments with marginally positive or even negative net present value, mainly due to increased competition. In contrast, during a downturn even some investments with positive net present value cannot receive financing from investors, due to excessive risk aversion.

Further, procyclicality in asset allocation can make swings in financial asset value and economic activity more intense. From an individual investor's point of view, procyclical behavior can be rational, especially if short-term constraints become binding or if the investor can exit earlier than others. However, the collective actions of many investors may lead to increased volatility of asset prices and instability of the financial system (Claessens, 2013). Figure 11 manifests to a large extent how procyclical behavior could have been reflected in the growth of global financial asset values since 2000. The value of various financial assets increased rapidly during the mid-2000s, but it contracted sharply in 2008, with the growth in recent years being moderate.

²¹ The full implication of long-term institutional investors' behavior on the real economy of the respective countries, as well on the global economy, is outside the scope of this study.

Figure 11. Growth in Global Financial Assets
(In billions of U.S. dollars)



Source: Mckinsey Global Institute.

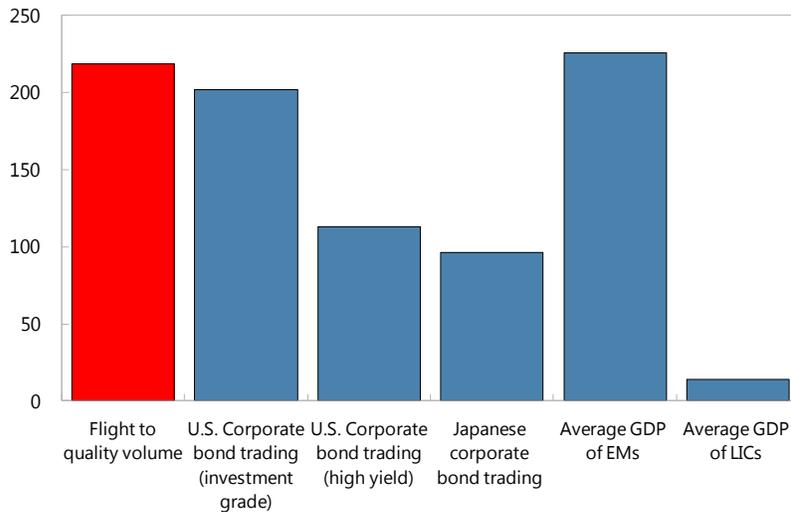
Increased market volatility driven by procyclicality can, in turn, affect the real economy through supply and demand factors.²² Factors that encourage institutional investors to shorten their investment horizon often lead to a reduced supply of long-term funding, which raises costs for all borrowers. The quantification of these effects is complicated and must address the endogeneity of the problem. The causality from procyclical investing to instability works in both directions: investors respond to heightened volatility and by doing so they contribute to the problem. The challenge is to disentangle these mutually reinforcing processes.

One measure of the potential impact of procyclicality on financial stability is the magnitude of global investors' flight to quality compared with selected indicators. We use the changes in foreign investors' holding of U.S. treasury securities—still considered to be the safest assets in global markets—for quantifying investors' overall collective behavior. The average monthly growth rate in foreign investor holdings of U.S. treasury securities was about 1.3 percent from 2002 to 2011. However, this growth rate recorded 4.2 percent and 6.4 percent in September and October 2008, respectively. These numbers are about two and three standard deviations from the average, respectively, and therefore the deviation can be used as a proxy to gauge the extent of non-U.S. investors' procyclical behavior under extreme market volatility.

²² The debt-deflation theory of Fisher (1933), inspired by the Great Depression, attributes crises to the bursting of a credit bubble owing to procyclical behavior. In essence, over-indebted firms sell assets to reduce debt, which triggers a downward spiral of lower asset prices, net worth of companies, profitability, output, trade, and employment. A related theory is based on the concept of the financial accelerator, introduced by Bernanke, Gertler, and Gilchrist (1996). Firms' ability to borrow depends on their net worth, as investors demand collateral to offset the risks from having imperfect information on borrowers' behavior. A fall in the net worth of the borrower increases the need for external funding and raises the cost of it.

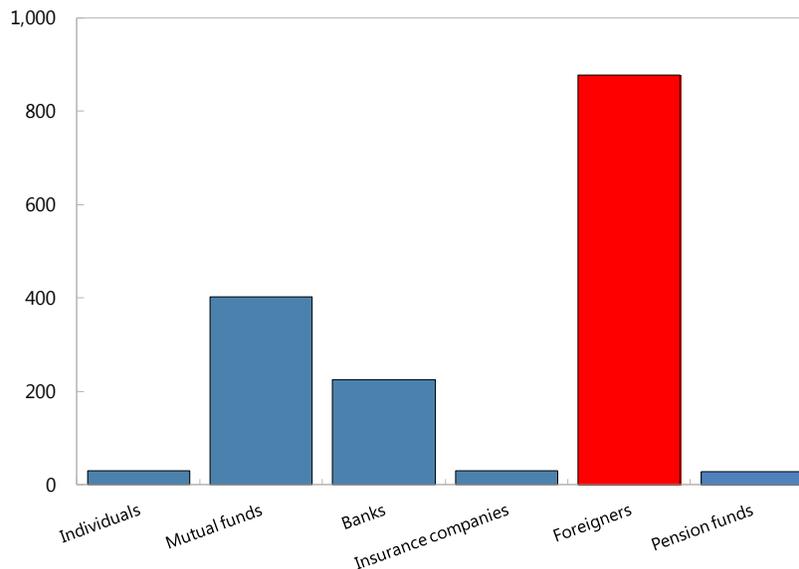
Figure 12 shows that foreign investors' flight to quality reached almost US\$220 billion during September–October 2008, an amount larger than the monthly trading volume of corporate bond markets in the United States and Japan. From a macroeconomic perspective, the amount of foreign investors' flight to quality is the equivalent of 97 percent of 79 emerging economies' average GDP and is 16 times larger than 70 low income countries' (LICs) average GDP in 2008. The annual change in holdings of U.S. treasury bonds also shows foreign investors' flight to quality behavior (Figure 13).

Figure 12. Flight to Quality and Selected Indicators
(In billions of U.S. dollars)



Sources: U.S. Treasury, Treasury International Capital (TIC) data; Securities Industry and Financial Markets Association (SIFMA); Asias Bonds Online; and the IMF.

Figure 13. Change in Treasury Securities Holdings (2008 vs. 2007)
(In billions of U.S. dollars)



Source: SIFMA.

B. Implications for Individual Institutions

Long-term investors can reap the premium embedded in longer-dated assets or illiquid assets. Historically, asset classes associated with long-term investments have outperformed short-term assets, although long periods of underperformance also exist (Table 3). Further, it is widely accepted that an equity risk premium exists. Ilmanen (2011) has found the equity risk premium to be in the range of 300–800 basis points over long-term treasuries.

Table 3. Historical Performance of Selected Assets
(Annualized returns, 1928–2011)

	U.S. Stocks	Treasury Bills	Treasury Bonds
Mean	11.20%	3.66%	5.41%
Median	13.31%	3.20%	3.63%
Standard Deviation	20.11%	3.04%	7.78%

Source: Damodaran (2012).

Procyclical behavior and interruption of long-term investment strategies may lead to worse performance in at least two ways. First, a shorter investment horizon leads to more frequent trading and, thus, higher transaction costs. The illiquidity of some asset classes in the portfolios of long-term investors compounds these costs, which can become a significant drag on performance. Barber and Odean (2000) found that between 1991 and 1996 the equity portfolio of households that traded most often, underperformed the average portfolio by 500 basis points annually. Compared with the most passive investor, the underperformance was even larger: approximately 650 basis points. Second, procyclicality can become a buy-high, sell-low strategy. Long-term investors take risks that are expected to materialize over very long horizons. When they do, investors lose on a marked-to-market basis. Reducing exposures in a crisis implies that losses are realized and therefore not recovered when markets turn. Evidence on poor timing decisions and missed recoveries is fragmented. Ang and Kjaer (2011) report, for example, that CalPERS bought high in real estate, as it implemented an aggressive expansion strategy shortly before the outbreak of the crisis. It then sold low, when the equity allocation was reduced in late 2008 in order to raise cash. Miracky and Bortolotti (2009) confirm that the latter was a widespread problem, as the first half of 2009 was marked by high SWF net divestments.

In the short run, investing procyclically can be profitable. Wermers (1999) found that stocks bought by investors qualified as herds outperformed those that they sold by an average of 4 percent in the following six months.²³ Sias (2004) found that institutional investors' demand for a security in a quarter is positively correlated with their demand in the previous quarter. He attributes this to institutional investors following each other into and out of the same

²³ Funds are considered to exhibit herding behavior if stocks tend to have large imbalances between the number of buyers and sellers.

securities. In the longer run, however, a reversal is observed that dominates the short-run price dynamic. Gutierrez and Kelly (2009) report that this reversal takes place in the second year after herding, but that the magnitude depends on market conditions. They also found that institutional buys appear to be more informative than sells, as the former have a larger permanent impact on prices than the latter. Brown, Wei, and Wermers (2012) found that the reversal can be attributed to career-concerned fund managers responding to analyst revisions. Dasgupta, Prat, and Verardo (2011) note that the effect is concentrated among smaller stocks and that it is stronger for stocks with higher institutional ownership.

This issue also has close linkages with investors' original objectives and interests. For example, assets in SWFs should contribute to smoothing shocks from cyclical movements of commodity prices, meeting long-term pension liabilities, and securing adequate resources for future generations. For SWFs with longer investment horizons, fire sales of assets are likely to realize losses and jeopardize the original rationale for the SWF. Central bank reserve managers' procyclical behavior (e.g., pulling out deposits from the banking sector) during the crisis could help them avoid large losses—at least temporarily. However, their collective actions contribute to a more prolonged freeze of the global funding markets to which private sector participants need to regain access. This will ultimately require central banks' to take offsetting policy measures that can lead to more financial costs and a burden on their own balance sheets.

V. STRATEGIES TO MINIMIZE PROCYCLICALITY AND PROMOTE LONG-TERM INVESTMENT

The main decision facing long-term investors, who need to liquidate assets, is which assets to sell first. Selling liquid assets has the obvious advantage of minimizing costs and market impact; selling illiquid assets may be attractive if the investor expects to have to sell more assets at a later stage and under more deteriorated market conditions, but the latter option is likely to be procyclical. Moreover, decisions have to be made under time pressure, with imperfect information, and under difficult market conditions.

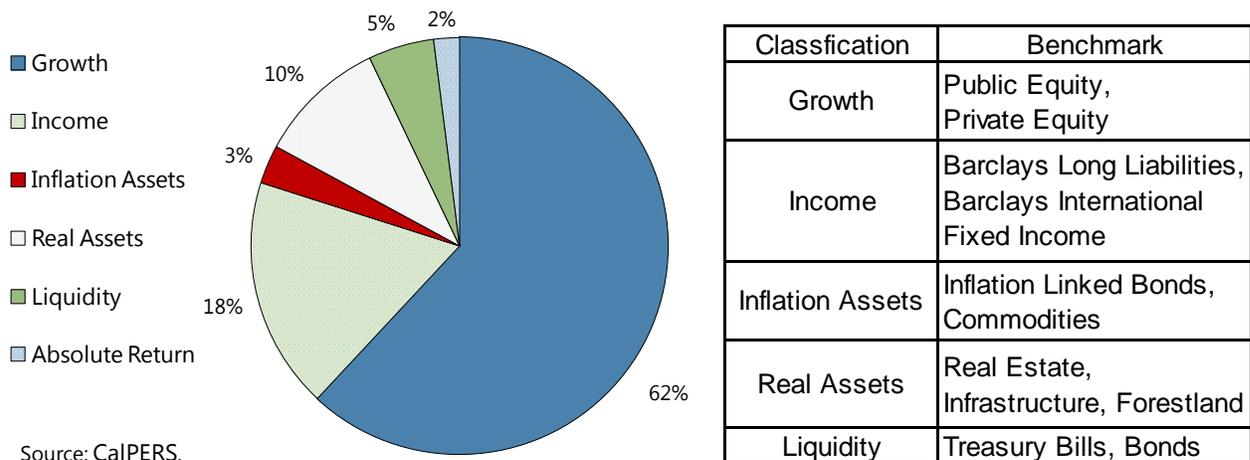
Therefore, the focus of this section is on ex ante measures to minimize procyclical investment behavior. In particular, we discuss below the roles of (i) investment strategies and the strategic asset allocation (SAA); (ii) portfolio rebalancing rules as natural stabilizers; (iii) more advanced risk management systems; (iv) governance (principal-agent problems and managers' biased incentive structures); and (v) national and international policymakers. In addition, we consider the role of transparency and other critical issues specific to sovereign investors. Building on these considerations, we develop a framework for a long-term approach to investing (Appendix).

A. Investment Strategies and Strategic Asset Allocation

SAA is fundamental to ensuring sustainable long-term investing and minimizing procyclicality. The first step in the SAA process is to determine the objectives and liabilities of a long-term investor, which, in turn, determines the investment horizon. An accurate estimate of the true investment horizon reduces the probability that a significant share of assets will need to be sold unexpectedly or at short notice in response to movements in benchmark indices. For example, pension funds should focus on beneficiaries' retirement horizon and risk tolerance in constructing their products, and all factors, including liabilities, benefit payments, operating expenses, and employer and member contributions, should be taken into account in determining the appropriate asset allocation mix.

A well-defined ALM approach is needed to derive the SAA of a long-term investor. An ALM approach aims at matching assets and liabilities, so that a long-term investor can invest in assets that mature when cash is needed, thus minimizing financial risks and avoiding procyclical behavior. Ideally, long-term investors could invest most of their assets in illiquid securities or loans. However, uncertainty about financial market conditions may imply that a long-term investor needs to hold liquid assets as well, as a buffer to accommodate potential liquidity needs (see Appendix: bullet 1.d.). For example, CalPERS allocates the majority of its assets to growth-oriented assets, but also maintains a certain amount of income-generating and liquid assets (Figure 14).

Figure 14. CalPERS' Strategic Asset Allocation

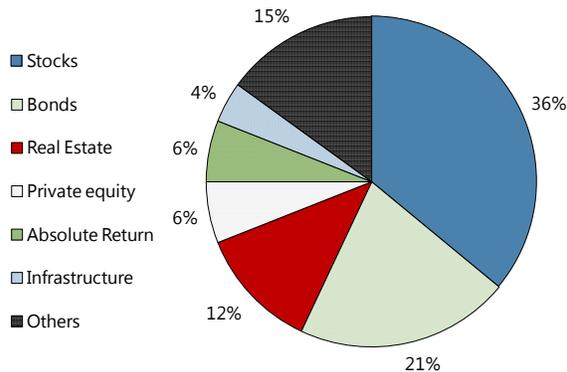


In designing an SAA, institutional investors should be especially careful with credit-related instruments. The recent crisis suggests that complex credit risk dynamics in securitized products were at the center of both the risk transfer and the accompanying buildup of leveraged positions that turned out to be unsustainable. Valuation of such complex instruments is often difficult, in particular at times of market distress. When investors include illiquid assets in their portfolio, they should ensure that there are sufficient risk premiums or protection clauses, which may be difficult for many complex instruments.

A risk factor-based approach could be one of the methods to complement the traditional asset class-based SAA (see Appendix: bullet 1.f.). This methodology focuses on underlying risks embedded in assets rather than simple diversification across different assets. Ang, Goetzmann, and Schaefer (2009) argue that a risk factor focus allows a better understanding of risk-return trade-off. This approach is appropriate for long-term investors, since a deeper understanding of how each risk factor evolves in a different horizon could help build a more robust portfolio that helps asset owners avoid having to change their strategy in an inconsistent way. The Alaska Permanent Fund Corporation has adopted a risk factor-based approach and decided to group its investments by risk and return profiles (Figure 15), with a view to assessing risk in areas beyond volatility, such as liquidity risk, currency risk, and company exposure.²⁴

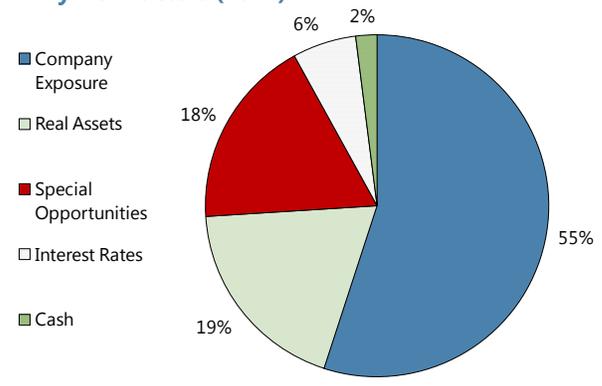
Figure 15. Alaska Permanent Fund Corporation's SAA by Asset Class and Risk Factor

SAA by Traditional Asset Class (2012)



Source: Alaska Permanent Fund Corporation.

SAA by Risk Factors (2012)



Source: Alaska Permanent Fund Corporation.

Operational procedures should be well-defined in designing and implementing SAA. Key considerations include the following: (i) the investment objectives and time horizon should be in line with the asset owner's objectives; (ii) risk tolerance should be established to clearly delineate the amount of absolute and relative risk that asset managers can utilize to achieve the investment objectives; (iii) the risk-bearing capacity of an institution and managers should be assessed before a formal risk tolerance limit is established; (iv) the SAA should encapsulate the spectrum of investment risks that the fund is designed to take; (v) the SAA should reflect the changing nature of each risk factor among eligible assets; (vi) the unique characteristics of each risk factor should be reviewed in choosing an appropriate mix of assets;²⁵ and (vii) the constituent asset classes should be subject to separate decisions on how they should be managed.

²⁴ The traditional asset classes have not been abandoned. They (e.g., government bonds, private equity) are listed under the new groups (e.g., interest rate, company exposure).

²⁵ For example, assets with little exposure to credit and liquidity risks could provide insurance against severe credit and equity market correction and could act as a deflation hedge.

B. Portfolio Rebalancing

Portfolio rebalancing creates investment discipline and can help avoid procyclical behavior or even make behavior countercyclical.²⁶ The SAA is implemented via a benchmark or target allocation to which the actual asset allocation needs to be rebalanced periodically to keep risk exposures constant (see Appendix: bullet 2.b.). Rebalancing involves selling assets that have risen in price and buying those that have declined, thus preventing a single asset class from dominating the portfolio if its value keeps rising. Rebalancing also helps to avoid herd behavior. If asset prices mean-revert, then rebalancing benefits from buy low-sell high dynamics, which increase returns over the long run. Norway's Government Pension Fund Global provides a prime example of an institutionalized rebalancing framework. The ministry of finance has set rules for full rebalancing back to the strategic weights. These specify the maximum permitted deviation between the weights in the actual benchmark portfolio and the strategic benchmark portfolio before the fund must be rebalanced.

Rebalancing rules can be further improved by incorporating forward-looking risk and return measures. Traditional rebalancing is based on realized (ex post) returns and fixed weights for asset classes or risk factors. A long-term investor can benefit from time-varying risk premiums, for instance by increasing the allocation to asset classes or risk factors beyond the normal level when risk premiums are unusually high. These more sophisticated rebalancing rules require adequate forward-looking, risk-adjusted valuation models.

C. Risk Management

The global financial crisis brought important challenges for risk management. First, because of the magnitude and breadth of the shock, correlations between the returns of almost all asset classes increased, and thus the benefits of diversification failed to protect asset values. Second, many investors failed to anticipate the contagion to economic growth and risky assets throughout the world. Third, it was difficult to assess liquidity risks, because this depends to a large extent on macroeconomic factors and tail events rather than asset composition itself. Fourth, traditional models assume that distributions of losses are not correlated over time, but sizable losses at one moment led to a severe lack of liquidity and confidence, which resulted in larger losses in the following periods.

Learning from the recent crisis, institutional investors can strengthen their risk management in several ways:

²⁶ There is also the opposite possibility if market indices are being used. For instance, every year (typically) the composition of equity indices is reviewed, and a limited number of new companies may be added to the index while others drop out. When that happens, all index trackers need to buy the new companies and sell those that leave the index. This can be procyclical.

Gain a more complete assessment of risk

This experience suggests that institutional investors need to take a long-term perspective and a more sophisticated approach to risk management. Risk managers should fully understand the strengths and weaknesses of all the risk metrics and apply them in line with the characteristics of their portfolios. For example, it is not appropriate to choose a time horizon that is not consistent with the liquidity of the assets in the portfolio. If long-term institutional investors fail to take account of whole economic cycles in advance, they may underestimate the potential risk of crisis. CalPERS, in early 2009, enlarged the concept of risk to include additional measures such as counterparty risk, concentration risk, leverage, and liquidity risk. These measures were intended to supplement the existing volatility measures and provide a more complete assessment of risk.

Adopt a broader approach to rating downgrades

Automatic rating triggers that induce fire sales of downgraded assets must be used with much care. Many investors use a single rating threshold to determine eligibility of issuers and counterparties. A downgrade—especially from investment to non-investment grade—can spark fire sales by index investors and trigger so-called cliff effects. A simple rating corridor with different thresholds for investing and divesting reduces the probability that a portfolio will have to be adjusted excessively. Better still would be to use a rating downgrade (or negative outlook, for instance) as a trigger for reviewing the risk and expected return of the entire portfolio, rather than simply inducing a fire sale of downgraded instruments.

Strengthen and complement traditional risk assessment models

The recent crisis also showed that a significant event can change the nature of a return distribution for a given period as well as across periods. Traditional VaR models can fail to estimate the true loss distribution, if they assume a normal distribution of returns and stable volatility, and thus can give signals that contribute to procyclicality. One method to address this issue can be a regime-switching volatility model that assumes different market regimes with various volatilities.²⁷ Institutional investors should complement traditional models with scenario analysis or stress testing (see Appendix: bullet 3.d.). Scenario analysis requires inputs and prudent judgment from professionals who have a solid understanding of not only economics, but also human behavior. Back testing, which compares losses predicted by the model to those actually experienced over the sample testing period, could also be used for making the risk assessment model more reliable.

²⁷ Guo and Wohar (2006) found multiple structural breaks in the mean level of market volatility. Arisoy, Salih, and Akdeniz (2012) found that portfolio betas change significantly when aggregate market volatility is beyond a certain threshold.

In New Zealand’s Superannuation Fund, stress tests and scenario analyses have become an integral tool for their risk management practices by providing the board with an estimate of the scale of maximum losses, testing the ability of the fund to maintain the portfolio under specific macro shocks, and considering potential downside risks around specific investment opportunities. Australia’s Future Fund is maintaining its long-term risk management framework by focusing on the risk of significant capital loss over the medium term (e.g., the worst 5 percent of potential outcomes over the next three years) rather than just trying to offset the pension liabilities.

Consider the potential impact of one’s actions on capital markets

Large investors need to carefully manage the risk of the potential impact on capital markets caused by their own investment actions (see Appendix: bullet 3.e.). The extent of market impact is determined not only by the relative size of their investment actions, but also by the overall transaction volume, pace of portfolio adjustments, and other market participants’ reactions. If large investors aggressively join the market’s overall downward trend, their actions may accelerate price movements and cause large transaction costs through drying up market liquidity. Large prominent investors, who are well recognized by other participants, should also pay attention to the impact of indirect signaling on other players in the market. These risks need to be included in the risk management framework.

Undertake a prudent due diligence process before undertaking new investment activities

A prudent due diligence process is critical when institutional investors move into new investment markets and instruments (e.g., financial derivatives and alternative assets). Competition pressure may lead them to rush into new areas regardless of deficiencies in the risk control framework. A structured process helps establish strong discipline in ensuring that sufficient analysis, time, and resources are devoted to the introduction of new investment activities. For example, investing in alternative assets or derivatives has become popular in the investment community. They can help in the further diversification of assets, implementation of active strategies, and hedging of unwanted risks. Nevertheless, due to leverage and complexity, they may cause large financial and reputational losses if not appropriately controlled.

D. Governance

Investment policies must be anchored with and understood by the owners/boards of trustees, who should feel comfortable with the risks taken also in “bad times.” Investment decisions, including allowing deviations from the benchmark (in the case of active management), are

typically taken by the manager.²⁸ Active portfolio management can bring financial and non-financial benefits, but it is hard to align the incentives for portfolio managers (as agents) with the long-term objectives of the fund owners (as principals). Through active management, portfolio managers aim to outperform a benchmark over a given horizon. This horizon is, by construction, shorter than the horizon of the fund itself. Active management creates incentives for short-term profit seeking and, potentially, less aversion to short-term loss. Although active positions tend to be relatively small when compared with overall SAA decisions, collectively they may contribute to procyclical volatility in the market. The optimal degree of active management depends, however, on the size of the fund and the markets in which it operates (Malkiel, 2003).

Further, empirical evidence in favor of the financial benefits of active management is limited at best. Ang and others (2009) and Ibbotson and Kaplan (2000) found that the contribution of active management to the overall return that is genuinely idiosyncratic is very small. The reported risk reduction that took place during the crisis was, in many cases, a timing decision, as investors returned to the market when the “worst” of the crisis appeared to them to be over. However, market timing can be very risky and often tends to be costly. Active management can be profitable in less efficient markets where arbitrage opportunities remain, but, because of the lower liquidity, procyclical investment behavior can be disruptive. Nevertheless, financial markets still need some active managers, as not all portfolios can be managed passively. A certain share needs to be managed actively to ensure liquidity and price discovery in the markets. Very large investors may not be able to manage their portfolios in a totally passive manner for this reason.

Owners/boards of trustees of long-term funds could design active/tactical management mandates to be countercyclical (i.e., allow explicitly for exploiting the periods of illiquidity or dislocations in the market to provide liquidity and buy long-term assets cheaper at a time of (temporary) market dislocation). The Future Fund (2012) for example, as one of the lessons learned from the crisis, explicitly recognizes the option value of cash: “With the benefit of operating the portfolio for the past few years, recognition of the value of having the ‘dry powder’ to respond opportunistically to attractive investments has grown.”

Whether or not to allow active management by managers and the exact nature of these mandates is a key decision to manage the risk of procyclical behavior. It is important that incentives for the manager are compatible with those of the owner, so that the manager does not inappropriately adjust risks if that is not in the long-term interest of the owner. This can be achieved, for example, by giving shares to managers or requiring them to invest in the

²⁸ In principle, governance distinguishes between decision making by the owner/board of trustees and implementation by the manager(s). Contracts of asset managers should be designed to minimize principal-agent problems between owners/boards of trustees and managers and be consistent with the long-term objectives of the institution. The owner of the assets bears the risks and is therefore responsible for the investment policy, including the SAA and the risk control framework.

fund, so that they become owners as well, perhaps with a lock-up period for personal investments (see Appendix: bullet 4.c.). Extending the performance measurement period for multiple years (e.g., an annual bonus on the basis of rolling medium- to longer-term performance) should be encouraged, rather than using short-term performance-based targets. The OECD (2013) supports the view that the performance of fund managers should be evaluated over a period of several years, taking into account ALM objectives and the level of implied risk. Some institutional investors (e.g., SWFs) have adopted performance measurement policies to discourage short-termism and foster long-term orientation in investing (Table 4).

Table 4. Performance Measurement System of Selected Investors

Fund	Performance Measurement or Compensation
CalPERS	<p>In 2009, CalPERS sent a memo to its hedge fund partners suggesting improvements in governance, including manager compensation. Some of the suggestions included:</p> <ul style="list-style-type: none"> • The imposition of cash-type hurdle rates or a lower performance fee over a zero hurdle. • A structure where performance fees “vest” and are crystallized fractionally over a set number of years. • A rolling performance fee structure, perhaps over three or four years. • A requirement that managers reinvest a given percentage of performance fees in the fund.
GIC (Singapore)	<p>The primary metric for evaluating GIC’s investment performance is the <i>rolling 20-year real rate of return</i>. It takes a long-term view when assessing external managers by evaluating a steady application of their investment philosophy and process <i>throughout market cycles</i>.</p>
Government Pension Fund Global (Norway)	<p>Performance-based pay is calculated on the basis of the performance of the fund, with the group and individuals measured against set targets over a period of <i>at least two years</i>. Half of the accrued performance-based pay shall be paid the year after it was accrued, while half shall be held back and paid over the <i>following three years</i>.</p>
Future Fund (Australia)	<p>The Board interprets the requirement to achieve a return of at least CPI + 4.5 percent per annum over the long term <i>as meaning over rolling 10-year periods</i>. <i>The Board explicitly rejects the concept of peer risk</i> (the risk of underperforming other institutional investors over the short term) as being inconsistent with the mission and mandate of the Future Fund.</p>
Alberta Heritage Savings Trust Fund (Canada)	<p>The Fund’s performance is measured on one-year performance numbers and <i>on a five-year annualized rolling basis</i>. The Fund has a long-term goal to achieve a return of the <i>Canadian CPI + 4.5 percent</i>. The policy target is set to meet this goal <i>over the long term</i>.</p>

Sources: Annual reports of individual SWFs.

Governance relating to the risk control framework, which aims to ensure that the actual portfolio stays relatively close to the strategic asset allocation and that action is taken when risk exceeds predefined ceilings, could also restrain procyclical investment behavior. Asset

owners/boards of trustees should have a firm understanding of how asset allocation creates risks, what risk factors are behind each asset class, and how managers' risk taking is compensated in terms of expected return (see Appendix: bullet 4.e.). To this end, managers should have frequent communication with asset owners by providing adequate information about the portfolio construction process. Ang and others (2009) argue that Norway's Pension Fund Global could have reduced its losses in 2008, if key risk factor exposures in the pre-crisis period had been better communicated and the asset owner had had a good understanding of the potential drawdown of these factors. Finally, the risk from procyclical behavior should be considered when owners make important decisions on the investment framework and compensation system.

E. National and International Policymakers' Role

Since the global financial crisis, many countries and international institutions have made extensive efforts to strengthen regulation and supervision with the purpose of enhancing financial stability. One of the many objectives is to reduce excessive risk taking and prevent procyclical behavior. In the banking sector, the countercyclical capital buffer under the Basel III framework intends to promote the buildup of capital in good times, which can be drawn down in periods of stress. A similar measure (Solvency II) was introduced in the European insurance sector.

There has been relatively little discussion of how to promote institutional investors' role in avoiding procyclical behavior and providing stable long-term capital. On the contrary, some regulatory measures can bring unintended costs or discourage long-term investment activities. For instance, a strict mark-to-market rule may lead long-term investors to focus on short-term gains or losses in asset values, rather than their investments' long-term valuations, making it difficult to properly match their long-term liabilities with long-term assets. Adding an ALM perspective to regulatory issues may help strike the right balance between reducing short-term vulnerability and promoting long-term investment. For example, regulators could apply a differentiated approach to investors depending on their liability structures (e.g., banks: short-term liabilities, pension funds: long-term liabilities).

Institutional investors' increased presence in the global capital markets has also raised concerns about the implications of their potential procyclical investment activities, especially with regard to the recent huge capital flows across countries. A surge in capital inflows or outflows can pose challenges to policymakers: the former can create financial market volatility, asset bubbles, and rapid exchange rate appreciation, while the latter can lead to currency collapse, the loss of foreign reserves, and disruption in financial markets. Responding to these problems, some authorities have introduced capital flow management (CFM) measures. These measures can be necessary when a country has specific external vulnerabilities, but they need to be balanced with benefits in long-term cross-border investments. Thus, policymakers' flexible approach to different types of investments (e.g., in

terms of maturity or sector) could promote long-term investment while reducing procyclicality in capital flows.

The issue of procyclical investment behavior was debated in a working group (WG) of central banks and other official institutions that revised the IMF's Guidelines on Foreign Exchange Reserve Management (2013). However, the members of the WG refrained from concluding that financial stability should be explicitly stated as one objective of the mandates of reserve managers as this could be in conflict with their fiduciary duties to protect the safety of foreign reserves, thus providing motivation for further research in this area. Also, the OECD Task Force on Institutional Investors and Long-Term Financing (2013) recently released, "Draft High-Level Principles of Long-Term Investment Financing by Institutional Investors," which aim to help policymakers design a policy and regulatory framework that encourages institutional investors to act in line with their longer-term investment horizon, thereby enhancing their capacity to provide a stable source of capital for the economy and facilitating the flow of capital into long-term investments.

VI. ADDITIONAL CONSIDERATIONS FOR SOVEREIGN INVESTORS

The long-term horizons of most sovereign investors are not fundamentally different from other investors when it comes to investment strategies and risk management. For example, SWFs hold, manage, or administer *financial assets* to achieve *financial* objectives, and employ a set of investment strategies that include investing in foreign financial assets (International Working Group of Sovereign Wealth Funds, 2008). Many SWFs also explicitly state that they are financial investors pursuing sound long-term returns.

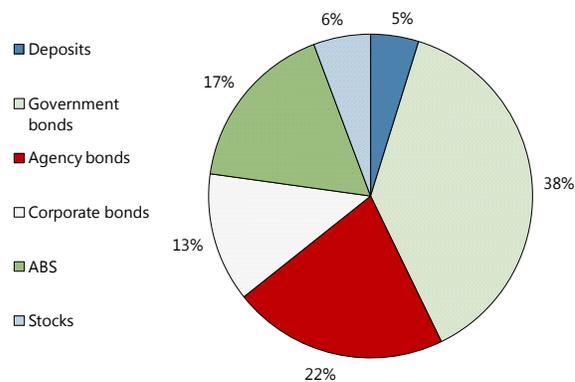
Nevertheless, sovereign investors have some unique characteristics that distinguish them from private investors. First, they are created by governments for macroeconomic purposes, and therefore their operations are primarily affected by macroeconomic conditions such as the fiscal balance, balance of payments, exchange rate, commodity prices, and external debts. Second, sovereign investors are institutions managing a critical part of the sovereign balance sheet. They intend to contribute to sustainable economic growth by preserving the balance sheet against the risks mentioned above. Third, sovereign investors are accountable to their asset owners (i.e., the general public), because the source of funds is typically BoP surpluses or fiscal surpluses to which tax payers could ultimately argue their claims.

The ALM framework can be applicable to sovereign investors by adding sovereign specific characteristics. A sovereign ALM (SALM) framework typically includes all assets and liabilities (including contingent liabilities) under the control or responsibility of the sovereign, including the net present value (NPV) of future revenue streams and expenditures. In an SALM approach, the share of liquid assets should be a function of the country's specific risk factors, the potential loss under stress scenarios, the costs of liquidating assets,

alternative options to generate liquidity, and the willingness to actually use liquid assets.²⁹ Sovereign investors need to take account of not only financial loss, but also other additional consequences such as reputational damage and negative impact to the country's macroeconomic policy framework. This discipline in asset management could help reduce procyclicality. Further, Korea's case shows that its reserve manager and SWF have different investment mandates under an SALM framework, and therefore each one establishes its own asset allocation: the reserve manager is more focused on securing liquidity and preserving asset values, while the SWF intends to maximize real purchasing power in the long-term (Figure 16).

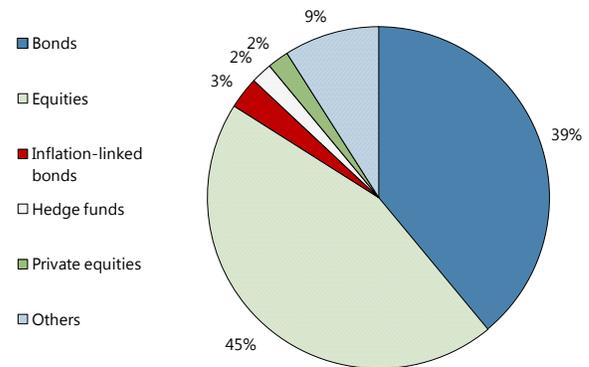
Figure 16. Asset Compositions of Korea's Foreign Reserves and Korea's SWF

Asset Composition of Korea's Foreign Reserves (2012)



Source: Bank of Korea.

Asset Allocation of Korea's SWF



Source: Korea Investment Corporation (2012).

Sovereign investors could also reduce procyclicality by taking account of country specific risk factors in estimating potential financial drains (see Appendix: bullet 5.b.). Sovereign investors' exposure to risk factors and liquidity needs partly depend on the country specific factors. Advanced economies may face risks associated with an unfunded pension liability due to an aging population, structural issues in the healthcare system, and/or contingent liabilities arising from large financial institutions or state-owned companies. Emerging or low-income countries, especially those that rely heavily on external demand and capital inflows, are exposed to risks arising from capital flight and external demand shocks. Greater vulnerability requires sovereign investors to prepare for contingent liabilities and to consider this in developing their SAA. In this regard, reserve managers' SAA needs to be based on their forward-looking assessment of various scenarios for macroeconomic development, financial market conditions, and implications for each asset class by considering the relationship between their country's vulnerabilities and the risk-return profile of assets. Thus,

²⁹ Goodhart (2008) illustrates why liquidity is useless if it cannot be used, or if the asset owner is unwilling to use it: "The most salient metaphor and fable in prudential regulation is of the weary traveler who arrives at the railway station late at night, and, to his delight, sees a taxi there who could take him to his distant destination. He hails the taxi, but the taxi driver replies that he cannot take him, since local bylaws require that there must always be one taxi standing ready at the station. Required liquidity is not true, usable liquidity."

trade relations and external debt compositions can be important factors in reserve managers' decisions about currency diversification.

Sovereign investors face unique challenges in designing the SAA and risk management framework. While private sector companies usually have clearly defined balance sheets (e.g., assets, liabilities, and equity), sovereigns sometimes do not have fully consolidated balance sheets, especially when some related entities (e.g., pension plans, local governments, and public corporations) are not included in the reporting system. Many financial variables, such as the exchange rate, interest rates, and inflation rate, are closely related to the country's macroeconomic policies, providing additional constraints on sovereign investors' asset allocation. Failures in sovereign investors' risk management could have spillover impacts on other entities in the private sector, and this may lead to procyclical behavior. For example, the lack of adequate liquidity in the central bank's foreign reserves could trigger a financial and economic crisis, leading to an increased burden on private sector financing activities.³⁰

Ensuring accountability is critical for maintaining a long-term investment horizon and avoiding pressure for procyclical behavior. Sovereign investors' asset allocation should be clearly communicated, in easily understandable language, to the general public. Disclosure should include not only financial numbers, but also the detailed information about how their objective, return target, risk tolerance, asset mix, and performance correlate with each other. An adequate level of transparency could help key stakeholders and the public understand sovereign investors' operations and maintain confidence in long-term asset management. Several SWFs have found that ex ante public support for the risks they were taking allowed them to keep these positions during the crisis, and in some cases to even increase the risks after prices had fallen. These SWFs benefited when the markets recovered. Building this level of trust and credibility takes time, though, and it was the more established funds that benefited most (World Economic Forum, 2011). The following quote from the Norwegian SWF's report to the Norwegian Parliament shows how important communication is for maintaining long-term investments, especially under market uncertainty (Management of the Government Pension Fund, 2011).

“It is important that we succeed in maintaining a long-term investment strategy during periods of unrest in the financial markets. Broad support for how the Government Pension Fund is managed provides a solid foundation for long-term management. The Storting's consideration of the annual report on the management of the Government Pension Fund is part of this. Transparency is a prerequisite for securing widespread confidence in the management of the Government Pension Fund. The risk which is assumed in management activities must be presented properly.”

³⁰ For the countries perceived as vulnerable by markets, an adverse feedback loop could occur, with widening sovereign credit spreads and increasing concerns about banks' exposures to those sovereigns. This perception would drive up counterparty risk and lead to higher funding costs for banks.

Finally, sovereign investors' crisis experience suggests that they face a complex relationship among their several objectives: return objectives, domestic financial stability, and global financial stability (IMF, 2013). This complexity can arise within an individual institution (e.g., central bank) mainly because in many cases asset management, risk management, financial reporting, and the financial stability function are conducted by different units. An ex ante framework to resolve this potential issue and a well-defined decision-making process could help reduce inadvertent costs from potential conflict between functions. Competition among sovereign investors, who want to exit from specific asset markets earlier than others during the crisis, can lead to a more serious situation in the market. Information exchange or coordination (e.g., notification to recipient countries in case of a large-sized portfolio adjustment) between sovereign investors can contribute to a reduction in market uncertainty from unexpected actions. Also, sovereign investors should be aware of the signaling effect and financial stability implications of their large-scale asset sales before taking action. The IMF, based on its global membership and its mandate to ensure the stability of the international monetary system, can play an important role in coordinating the interests of different countries.

VII. CONCLUDING REMARKS

The role of long-term institutional investors in preventing procyclical patterns is becoming more important in light of the anticipated increased demand for long-term investment. In many advanced economies, an increased life expectancy and accompanying retirement wave, especially in the baby boomer generation, is fueling investment demand from pension and healthcare systems. Also, many emerging economies and low-income countries need to invest more in their infrastructure and human capital, as they seek to promote long-term growth potential. Further, a large amount of new infrastructure needs to be built over the next few decades. According to Ottesen (2011), at least US\$40 trillion will be needed in the coming 20 years for urban infrastructure investments globally.

Moreover, recent global market developments present challenges to institutional investors. Although some confidence in the global financial system has returned, market participants are now concerned about the impact of the phasing out of quantitative easing (QE) in advanced economies, which has pushed volatility to low levels and accelerated some investors' shift toward high-risk assets or emerging markets. According to the IMF (2011), positive growth prospects and falling risks in the recipient countries were the main factors driving investors' long-term real-money asset allocations, while a decline in global risk aversion had increased investment in the equities and bonds of emerging markets. It also suggests that a negative shock to these markets could potentially lead to a reversal of investment flows, which could be similar in scale to the outflows they experienced during the global financial crisis. Anecdotal evidence suggests that some institutional investors are now turning from public to private equity or to financial products with built-in leverage, which may lead to another round of procyclicality (Corkery, 2012). Also, hedge fund managers are

becoming more bullish about the financial markets and potentially high return opportunities, thus raising the risk of heightened procyclical investment behavior (Jones, 2013).

Institutional investors are now facing a wide range of risks and structural changes. The prevailing low interest rate environment is crystallizing structural weaknesses in pension funds and life insurance companies. Stringent regulations make it difficult to re-price products on the liability side, and there is not much pricing power in premiums, creating pressure to take additional (credit) risk. The increased variability of returns, especially under rigid mark-to-market accounting rules, may make some investors' asset allocation more volatile, leading to procyclical investor activity and a risk of sudden reversals that may adversely affect financial stability. Also, reserve managers noted that the level of secondary market liquidity in European government bonds, agency bonds, and supranational bonds is lower than pre-crisis levels (Pringle and Carver, 2012). A turn in the current low interest and ample liquidity cycle may trigger exaggerated price declines or an inability to exit, creating pressure for procyclical behavior. This has already been evidenced by the recent outflows from emerging market equity and bond funds prompted by the U.S. Federal Reserve's statement on *potential* tapering of their QE measures.

Our analysis of procyclical institutional investment behavior, aligned with important lessons from the crisis, could be important to address these challenges and promote long-term investing. The crisis has shown that inappropriate responses to market dynamics resulted in excessive risk taking and rapid reversals in positions. Long-term investments make it possible to reap risk premiums that are difficult to achieve in the short run. However, a number of constraints, such as pressure on short-term performance, principal-agent problems, governance, and difficulties in risk assessment, can be obstacles in realizing this benefit of the long-term horizon. Such procyclical investment behavior may be understandable and considered rational from an individual institution's perspective. However, our main conclusion is that appropriately addressing these issues and behaving in a manner consistent with long-term investing would lead to better long-term risk-adjusted returns and, importantly, could lessen the potential adverse effects of the procyclical investment behavior of institutional investors and public entities on global financial stability.

Taking full advantage of the benefits of more long-term and less procyclical investment actions requires rigorous efforts in a number of areas:

- **ALM approach.** A well-defined ALM approach is needed to derive the optimal SAA of a long-term investor. This process should go beyond asset classes and use the underlying factors (e.g., macroeconomic, political) that drive risk premiums as the basis for portfolio construction.
- **Rebalancing process.** In implementing the SAA, the rebalancing process can create investment discipline and therefore help avoid procyclical behavior.

- **Risk management.** Asset owners should make a strategic decision on the level of risk to be taken and the key sources of risk premiums to be exploited. Risk managers should fully understand the strengths and weaknesses of all the risk metrics and apply them in line with the characteristics of their portfolios.
- **Governance.** Countercyclical investing requires strong governance structures to withstand the temptation to sell when asset prices drop. It is important that incentives for the manager are compatible with those of the owner, so that the manager neither seeks excessive short-term risk nor inappropriately adjusts the level of risk.

However, whether regulators should intervene in each of these areas (e.g., ALM, governance, risk management) with specific regulatory measures remains an open question that needs to be analyzed further and the findings reported in a subsequent study.

Finally, several considerations should apply to investors, especially sovereign investors who are managing part of the sovereign balance sheet for macroeconomic purposes. Sovereign investors should deeply analyze country-specific risk factors in estimating potential financial drains, as well as in designing sovereign SAA. Ensuring accountability is critical for gaining the public's confidence and maintaining a long-term investment horizon, thus ensuring financial stability through less procyclical investment activities. Financial stability can then contribute to the achievement of a higher risk-adjusted return in the long run, because, in a stable market, investors can minimize the risk of abrupt redemption requests from asset owners and thereby maintain their original long-term investment horizons. This would ultimately help them enjoy higher risk premiums to which short-term investors cannot easily gain access.

APPENDIX. FRAMEWORK FOR SOUND INVESTMENT PRACTICES FOR LONG-TERM INVESTORS

1. Design appropriate investment strategies and SAA

- a) Define investors' objectives and liabilities clearly, in order to determine the investment horizon over which risks and expected returns are measured.
- b) Use conservative economic scenarios to estimate the investment horizon in order to reduce the probability that a significant share of assets may need to be sold unexpectedly or at short notice.
- c) Derive an optimal asset allocation in line with any liabilities the fund may have. Take a long-term, through-the-life-cycle approach to minimize procyclical behavior.
- d) Secure an appropriate level of liquid assets, given uncertainty in the investment horizon and potential unexpected liquidity needs.
- e) Ensure an adequate level of risk premiums in illiquid assets, especially when investments involve considerable discretion for external managers.
- f) Consider using a risk factor-based approach, as this can complement traditional asset class-based SAA models by focusing on underlying risks embedded in each asset class.
- g) Ensure that operational procedures are well defined in designing and implementing the SAA.

2. Develop effective portfolio rebalancing rules

- a) Institutionalize portfolio rebalancing rules, in order to create investment discipline and avoid procyclical behavior.
- b) Establish a framework in which the actual portfolio maintains a risk exposure in line with the policy portfolio. In this context, it is important that (i) the risk tolerance is not reduced in adverse market scenarios and (ii) countercyclical rebalancing is encouraged.
- c) Incorporate forward-looking risk and return measures so as to further improve the SAA and rebalancing rules.

3. Build a robust risk management system

- a) Note key lessons from the financial crisis and implications (e.g., limited benefits of diversification and the contagion effect) for institutional investors' risk management.

- b) Adopt a long-term horizon and take account of whole economic cycles in designing a risk management system.
- c) Understand the strengths and weaknesses of each risk metric and apply risk management models in line with the characteristics of portfolios.
- d) Use traditional risk management models with complementary methodologies (e.g., scenario analysis and stress testing).
- e) Manage with great care the risk of the potential impact of one's own investment decisions on capital markets (applicable to very large investors in particular).
- f) Undertake a prudent due diligence process before investors move into new investment markets and instruments.

4. Establish an appropriate governance structure

- a) Investors (asset owners) bear the risk and are therefore responsible for the investment policy, including the SAA and the risk control framework.
- b) Asset owners' access to accurate and relevant information is essential to an effective accountability framework.
- c) Asset managers' incentives should be compatible with those of the owners, so that they do not inappropriately adjust risks if that is not consistent with the owners' long-term interests.
- d) A long-term performance measurement, covering multiple years, should be encouraged rather than using short-term performance-based targets.
- e) Asset owners should have a firm understanding of how asset allocation creates risks, what risk factors are behind each asset class, and how managers' risk taking is compensated in terms of expected returns.
- f) Timely communication and reporting from risk managers to asset owners, without distortion by intermediaries, is essential for optimal strategic decisions.

5. Consider country-specific factors in developing the investment strategy (for sovereign investors)

- a) An SALM framework should start from the sovereign balance sheet and include all assets and liabilities under the control or responsibility of the sovereign.

- b) Take account of country-specific risk factors in estimating potential financial drains.
- c) The share of liquid assets is a function of all sovereign assets and liabilities, the costs of liquidating certain assets, alternative options to generate liquidity, and the willingness to actually use liquid assets.
- d) Vulnerability in the sovereign balance sheet requires sovereign investors to identify contingent liabilities and consider them in developing their SAA.
- e) Sovereign investors' asset allocation should be clearly communicated, in easily understood language, to asset owners and the general public.
- f) Disclosure should include not only financial statements, but also detailed information about how objectives, return targets, risk tolerance, asset mix, and performance are related to each other.
- g) Note the complex relationship among sovereign investors' several objectives: return objectives, domestic financial stability, and global financial stability.

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