Concepts for Successful Regulation of Systemic Risk

Management of systemic risk is a process of creating accountability and transparency through the identification, measurement and management of risk.

It is now widely understood that our current financial crisis, with all its various contributing factors, represents a massive failure of systemic risk management. Our nation's regulatory framework requires fundamental change in order to better anticipate and contain future systemic failures.

The American Academy of Actuaries'[1] Risk Management and Financial Reporting Council believes that such fundamental regulatory change should incorporate sound risk management principles. In this paper, we elaborate on what we consider to be the key requirements for effective regulation of systemic risks:

- Identification of systemic risk
- Measurement and monitoring of risk
- Management of systemic risk

A new systemic risk regulatory function should provide early warnings to functional regulators and policy-makers on the existence and impact of risks to the financial system, such as the risks created by large or rapidly increasing excess leverage, illiquidity, and concentration. The supervisory scope of this new systemic risk regulator should include all segments of the financial services industry, so as to eliminate regulatory arbitrage through the shifting of risk to unregulated or less regulated segments.

Currently a single holding company can include several segments of financial services, e.g., insurance, banking, brokerage, and investment operations. However, the current regulatory framework does not adequately monitor the systemic risks created by these large, complex financial institutions or financial holding companies. Any revamped regulatory framework should provide for systemic risk oversight across all segments within the financial services industry. The systemic risk regulator should monitor rapidly changing risk concentrations, leverage levels, and other measures at the entity or holding company level that could indicate growing systemic risk to the overall financial system.

[1] The American Academy of Actuaries is a 16,000-member professional association whose mission is to assist public policymakers by providing objective expertise and actuarial advice on risk and financial security issues. The Academy also sets qualification, practice, and professionalism standards for actuaries in the United States.

Our purpose in preparing this discussion paper is to help promote a sound regulatory framework regardless of the regulatory authority chosen to oversee systemic risk. We believe it is important that regulators have the pertinent information and tools to perform timely analysis and testing to anticipate the impact of possible systemic events. An effective systemic risk regulatory function should be able to mitigate future systemic threats using these tools.

This document introduces and provides comments on several relevant topics. Taken individually, these risk management topics are not necessarily new or revolutionary. However, the integration of these concepts and the deployment of these tools into a comprehensive and systemic process is new – and an imperative.

In addition, we see a significant need to reorient the regulatory role from one of merely monitoring and verifying information at the individual firm level to a more active role of managing risk across institutions who may contribute to systemic risk. Individual firms will continue to have the sole responsibility for managing their risks, but there will also be a regulator focused on risks that could materialize with greater consequences for the broader economy.

We have organized this paper into the following sections:

- Identification of Systemic Risk
- Risk Measurement and Monitoring
- Managing Systemic Risk
- Building on Insurance Practices
- Concluding Thoughts

Section 1: Identification of Systemic Risk

➢ 1.1 Definition of Systemic Risk

As a working premise, we define systemic risk to be the risk of a failure in a transaction or series of transactions extending beyond the parties directly involved, impacting many or most participants in the marketplace. And the public gains awareness of these systemic effects on the larger group only after the breakdown has occurred. The successful identification of systemic risk needs to include the consideration of the impact of risks that are currently considered highly improbable or not measurable.

➢ 1.2 Causes of Systemic Risk

In the following section, we describe causes that have been observed as contributing to systemic failures.

1) High Levels of Leverage. Firms often finance business operations with debt resulting in leverage. Leverage can also be created through options, futures, use of margins and other financial instruments. Leverage helps both the investor and the firm to expand or operate; however, leverage comes with greater risk. If an investor uses leverage to make an investment and the investment moves against the investor, the firm's loss is

greater if the firm is leveraged. Leverage magnifies both gains *and* losses. Depending on the nature of the leverage, a firm's losses can have effects well beyond the counterparties to the transactions.

2) High or Rapidly Increasing Levels of Risk Concentrations. High levels of concentration, such as rapidly increasing amounts of mortgages placed with higher risk borrowers or concentrated in one part of the country, can create systemic risk for the broader economy. When one institution dominates a market, other market participants may have difficulty finding the necessary resources to step in and replace a failed entity. Institutions with large concentrations of risk may be considered "too large to fail" when the first, second and subsequent impacts are evaluated in the event of failure. An effective systemic risk system should identify and mitigate the impact of when an institution deemed "too large to fail" actually fails.

3) Markets and transactions with a high degree of correlation or interdependence. Globalization has created a vast set of interdependencies. International markets connect the United States with other jurisdictions, creating linkages between the national economies. The price of financial instruments is based, in part, on historical correlations. Major systemic events or major events within a particular jurisdiction can shift the historical relationships between financial markets (e.g., stock indices, fixed income products, currency). If historical relationships shift, the value of instruments will shift, but not necessarily as expected.

4) Misguided or misunderstood accounting rules. No accounting system will satisfy all of the needs of risk management. Certain accounting rules are not consistent with fundamental risk management. These accounting rules may create incentives for shifting or retaining risk inappropriately. For example, certain accounting conventions can create corporate incentives to report short-term accounting profits while increasing long-term risks or risks may be hidden entirely through the use of "off balance sheet" entities. Regulators may therefore not be aware of the potential risks that could materialize over the long term until all companies encounter similar problems at the same time.

5) Mispriced risk. Certain risks may not be adequately factored into the valuation of securities in the initial transaction, or in subsequent valuations. For example, market participants may not reflect the impact of extreme tail risks or catastrophic events in the pricing of securities. Mispricing risk may be the result of unsophisticated market participants or may be an arbitrage strategy with the intent of earning "free profit". Either example of mispricing can contribute to a systemic failure.

6) Misalignment of incentive compensation with risk. Can occur when incentives are based on sales or short term profits and can create systemic risk, particularly in large institutions.

7) Legislation or regulation. Legislation or regulation that is designed to help or penalize one aspect of a market that does not consider the systemic implications on the larger market.

➢ 1.3 Role of Systemic Risk Regulator in Identifying Risks

A primary function of the systemic risk regulator is to monitor a set of metrics representing certain market events and transactions whose change could signal an increase in systemic risk. While the causes listed above are evident to many in retrospect, many causes were observable ahead of our current systemic risk challenges. History shows that when accounting and/or compensation practices in a business are based on the illusion of having found a "free lunch" and the free lunch can then be leveraged or concentrated, conditions are ripe for a systemic failure . While a simple concept in hindsight, this concept is fundamental for building an effective early warning process to mitigate or forestall future systemic failures.

Section 2: Risk Measurement and Monitoring

We anticipate the design of a system that requires reporting the key economic risks of complex institutions and other institutions that can contribute to systemic risks. The reporting system would include all risks, on and off the balance sheet, and would aggregate results across all legal entities. The system would not allow risks to be ignored even if the risks are not required to be reported on a balance sheet or the risks are moved outside the purview of a particular functional regulator. In order for systemic risk regulation to be effective, the information must be based on fundamental risk analysis rather than on reported results that conform to a specific accounting regime. It is essential that the reporting of risks be transparent and traceable from creation of the risk through each transaction where risk is transferred.

The economy needs a structured and organized system for reporting potential contributions to systemic risk by complex financial institutions. The information reported should include measures of key risk exposures and indicators of potential future systemic risk. We envision a reporting process that also includes the results of scenario testing (i.e., results over a range of economic scenarios) and stress testing (i.e., results over specific, deterministic scenarios). Projecting financial consequences over a range of economic scenarios or specific stress tests will provide information to the systemic risk regulator on the impact of tail, or catastrophic events (e.g., 40 percent drop in stock indices).

This information would lay a foundation for considering public policy options to minimize the impact of a systemic failure. However, specifically defining this information will be a major undertaking, similar in scope and concept to the creation of large, integrated risk reporting functions that have been implemented in several national and international financial conglomerates.

➢ 2.1 Risk Measures & Other Indicators of Systemic Risk

The monitoring of certain risk measures should be a primary responsibility of the systemic risk regulator. In addition, the systemic risk regulator should monitor the financial marketplace for new

business activities (e.g., entrance into new product lines) or regulations that might give rise to increased systemic risk exposure. For example, monitoring the growing size and complexity of the credit default swap market could have indicated an increase in systemic risk that could have prompted action to appropriately limit that growth.

The scope of this monitoring function should include, as requested by the systemic risk regulator, a summary of a firm's key risk exposures where those exposures are evaluated in the context of information about the general economy. While additional criteria can also be considered, the following list of economic information would facilitate the monitoring of critical elements contributing to systemic risk:

- Leverage in the economy (e.g., household debt/GDP)
- Leverage within institutions (e.g., total assets/capital)
- Counterparty concentrations within institutions (e.g., creditors, major customers, reinsurers or other business partners, distributors)
- Money supply measures (including changes in these measures)
- Market data (e.g., US Treasury yields, LIBOR rates, equity indices, foreign exchange rates, credit spreads and returns in major asset sectors, commodity prices)
- Volatility, turnover and bid spreads in major financial markets
- Default and prepayment trends in the real estate market
- Growth in derivatives markets – particularly options
- Counterparty positions of dealers in the derivative markets
- Major changes in product mixes, market sectors (e.g. geographic concentrations)
- Equity dividend yields
- Residential property affordability

This list is not exhaustive, but intended to capture metrics that indicate a shift in the risk-taking paradigm. In addition, the systemic risk regulator should work closely with the functional regulators to gather other pertinent measures from financial institutions.

➢ 2.2 Role of Systemic Risk Regulator in Measuring and Monitoring Risks

With the above information, the systemic risk regulator can assemble a broad view of potential risks to the overall economy. The systemic risk regulator can and should identify changes in spreads from historical trends and changes in the incidence of profit taking. The regulator should also "raise a yellow flag" over indications that incentives and risk-taking are misaligned. These developments would signal to the systemic risk regulator that additional analysis and possible actions may be needed. This action could take the form of instructions to the functional regulator to review developments under their authority or, if needed, requests for new regulation or recommended legislation.

Section 3: Managing Systemic Risk

Management of systemic risk involves actions at three levels with three different objectives. While there is nothing particularly new about this process, it is an important organizational starting point:

- Level One involves the management of systemic risk when there are no risks of the severity that could cause systemic problems, if materialized. In this stage, the objective of systemic risk regulation should be to discourage growth of risks to a magnitude with limited potential to create a systemic failure.
- Level Two involves the management of risks whose magnitude could create a systemic problem but where no problem has yet occurred. In this stage, systemic risk regulation would focus on reducing such risks through actions that decrease the likelihood of these large risks materializing and/or through actions that would strengthen the resiliency of the system to absorb the losses.
- Level Three involves the management of systemic risks that have materialized and where large losses are occurring. In this stage, systemic risk regulation would focus on getting the system back into Stage One or Two through encouragement of recapitalization of the system or transfer of the risks/losses outside of the system.

This section will focus on Stages One and Two. Stage Three corrections are outside the scope of this discussion paper.

➢ 3.1: Focus of Systemic Risk Regulation

The focus of financial regulation has been at the legal entity level. The focus of systemic risk regulation needs to be at the total system level. Systemic risk regulation needs to focus on all of the risks in each segment of the financial market as well as on each specific type of risk, regardless of the entity creating or holding the risk. Finally, it must be consistently implemented across all entities. For example, inconsistencies in regulation exist between financial guaranty insurance and credit default swaps, even though the basic risk is the same, merely packaged differently.

We believe that the systemic risk regulator can and should work in tandem with the functional regulators of each segment of the financial services industry. The systemic risk regulator function will need access to the expertise that exists with those regulators.

The systemic risk regulator will need to understand how risks are transferred within financial segments and across financial segments. Each financial segment has different risk stabilization activities (e.g., reserve requirements, margin and collateral requirements, risk-based capital requirements) that will need to be factored into any recommendation from the systemic risk regulator.

➢ 3.2: Possible Actions by the Systemic Risk Regulator

The systemic risk regulator may be empowered to act directly or may act through existing functional regulators (e.g., state insurance departments, FDIC, etc.). For ease of discussion only, the following is framed as if the systemic risk regulator is given authority to act. In the event that is not the case, these suggestions can be restated as recommendations that the systemic risk regulator would make to another regulator.

As noted above, the responsibilities of the systemic risk regulator could fall into several categories:

a. Establishment of systemic risk tolerance;

b. Actions to discourage the growth of risks;
c. Actions to encourage the shrinkage of risks;
d. Actions to increase the resiliency of the system.

3.2.1 Establishment of Systemic Risk Tolerance

Systemic risk tolerance needs to be established in consultation with the functional regulators and should be set based upon the aggregate resilience of a particular financial segment. This resilience is a function of the resources of the systems, the strength of the risk management within each segment, and the objectives of each functional regulator, potentially including international regulators. As risks are transferred from one system to another, or aggregate resilience changes, the systemic risk regulator needs to make sure that the risk tolerances are adjusted appropriately.

While setting the risk tolerance for systemic risk is a difficult exercise, we believe that it is essential for these discussions to take place. Risk tolerance defines how much "pain" the system is willing to absorb and helps direct the necessity of when to take action. Setting a specific, numerical risk tolerance level will be difficult. However, in our experience, we have found tremendous value in conducting the exercise and considering the impact of various tolerance levels, along with a range of possible mitigating actions.

In addition, the systemic risk regulator should work with the functional regulators to develop the potential actions that will be considered as risk levels approach and exceed the risk tolerance of the systems. In some cases, clear disclosure of these risk tolerance thresholds and potential actions may themselves trigger market reactions that keep the risks from approaching the risk tolerance levels.

The process of monitoring systemic risk should be one that is expected to be a continuous cycle of identifying risk, measuring its impact and then evaluating action options. It is essential to discuss potential action plans before there is a need to execute these plans. The systemic risk regulator function will not succeed if nothing is done before a systemic event occurs.

3.2.2 Encouragement of Shrinkage of Systemic Risks

Regulators can encourage the shrinkage of risks using various mechanisms it has within their control, such as increasing minimum reserves, collateral, or capital or by setting maximum leverage standards for a specific risk. In addition, the regulators should have the authority to directly limit the level of a risk for firms in a system. The cost of risk-taking could also be increased through changes to tax policy, required contributions to guaranty or insurance funds, or by increasing the cost of borrowed funds.

3.2.3 Increasing System Resiliency

Many of the methods suggested for shrinking the growth of risk also increase system resilience. Increasing quality standards for allowable capital, increasing the levels of required reserves, collateral, capital or setting maximum leverage standards for a specific risk are examples of such methods. Regulators should also investigate the possibility of

taking counter-cyclical actions by requiring greater resiliency during times of lower risk so that the resiliency will be available during adverse times.

➢ 3.3: Summary of Systemic Risk Regulator Role in Managing Systemic Risk

Once again, these practices are not new to firms practicing sound enterprise risk management. What is new is the expectation that they would also be used by the regulator to fulfill their role as systemic risk managers. An example of using this new kind of regulatory authority occurred in the work of the Australian Prudential Regulatory Authority (APRA) regarding how scenario testing can work to prevent future problems. In 2003 the APRA realized:

> "Looking ahead, the main potential source of risk to financial stability would be a substantial correction in the housing market, impacting on the balance sheets of authorized deposit-taking institutions through mortgage defaults. The concern would be a sharp jump in mortgage defaults …"[2]

Therefore, APRA requested that its banks and mortgage insurance companies execute a series of stress tests, which included a 30 percent one-year reduction in housing prices plus an increase in defaults. This stress test identified several weaknesses within the system, which resulted in changes being made to capital requirements and reductions to acceptable concentration risks. As a result, today, PMI Australia has a rating higher than that of its parent and Australia has obtained international recognition as a strong and robust bank and mortgage insurer market. [3]

The role of the systemic risk regulator will evolve along with advances in the practice of risk management. The systemic risk regulator should work to improve risk management practices in the economy as a whole. Through regular interaction with industry, professionals, and academics, the systemic risk regulator should enhance industry systems and techniques to understand how the various operational risks interact with each other. Also, the systemic risk regulator should establish and support research efforts to keep risk evaluation techniques and systems "state of the art."

Section 4: Building on Insurance Practices

By way of background, we share this section to illustrate the risk management practices that have contributed to a reduced impact of the current systemic crisis on the insurance industry.

➢ 4.1 Role of the Actuary

At a very basic level, insurance is a transfer of risk from one party to another party. An important factor has been the role the actuary has played in assuring the soundness of the risk transfer

[2] http://www.apra.gov.au/Speeches/03_20.cfm.

[3] It is true that the Australian financial system is increasingly impacted by the disruption in international financial markets, including the slowdown in funding flows in the banking system and declines in the equity markets as well as the broader economic impacts from a global recession. However, economic commentators are suggesting that Australia is better placed than elsewhere as they have more room to use monetary and fiscal policy to address any slowdown in growth as their interest rates are higher and their budget is in surplus.

process to both parties in the transference of risk. This role is unique compared to the role of many other risk managers in the financial services industry. In addition:

1. Actuarial training and experience require the development of skills that balance short-term financial objectives with the longer-term objectives of funding obligations to policyholders.
2. Because of the longer term nature of insurance obligations, actuaries have also developed the ability to balance risks and rewards as well as the conflicting objectives of various stakeholders.
3. Actuaries have developed tools to monitor the economic risks created by the products sold and the actions taken to satisfy the conflicting objectives of various stakeholders.
4. Being involved with most strategic business decisions made by an insurance company, actuaries have developed an understanding of both the quantitative and qualitative aspects of evaluating risk/return decisions.
5. Last, actuaries also understand that the company's culture may be the most important dimension in successfully managing risks. Unless the culture encourages thorough analysis, open discussion, and the willingness to take risks in a disciplined fashion, the company's success in managing risk could be in significantly jeopardized.

➢ 4.2: Insurance Company Mechanisms

The following tools have been successfully developed and implemented by actuaries in balancing the risks in the insurance business that can threaten a firm's solvency and ability to satisfy its obligations to stakeholders. The tools described in this section are elements of the risk management practices followed in most insurance companies

- Articulation of financial objectives, expressed in both accounting and economic terms
  - Annual profit or return objectives
  - Liquidity and capital requirements, based on the firm's risk profile, regulatory minimums, and desire for free capital
  - Leverage targets
  - Firm risk tolerance, generally expressed relative to earnings at risk or capital

- Required underwriting guidelines, designed to minimize claims risk
  - Classification ratings
  - Individual risk ratings
  - Limits placed on the amount of insurance issued on a single life or risk

- Investment policies and operating guidelines, designed to minimize market risk
  - Asset diversification requirements
  - Asset class limitations
  - Requirements governing hedging and derivative transactions, including collateral

- Reinsurance counterparty requirements (use of assets placed in trust, letters of credit or other collateral arrangements), designed to minimize business risk

- Internal risk reports, models, and analyses, designed to understand strategic business risks
  - Rating agency reviews and supporting material

- ERM processes including key risk indicators, breaches in policy, and action plans
- Asset/liability analysis showing a company's net cash flow position under a range of economic scenarios
- Analysis of company's financial performance, including an attribution analysis of the sources of earnings from the asset and liability portfolios
- Economic capital analysis
- Projections of financial results (e.g., projected annual profits, capital ratios) under a range of economic and strategic scenarios
- Capital adequacy assessment, based on the results of the technical risk analyses
- Internal model requirements and governance over the use of modeling results, designed to provide a feedback loop on the quality of risk information.

Actuaries have provided insurers with much of the technical expertise for the development of risk modeling capabilities, including required scenario and sensitivity testing, the analysis of actual-to-modeled results, the use of independent processes or measures to validate internal model results, and the justification and documentation of model assumptions (e.g., historical basis, correlation assumptions, etc.)

➢ 4.3: Regulatory Mechanisms

The following tools have been effectively used by insurance regulators to ensure risks are managed and do not threaten a firm's solvency and its ability to satisfy its obligations to policyholders or threaten the health of the insurance industry. In the insurance industry, actuaries have worked closely with regulators to design and/or implement many of these tools.

- Minimum risk-based capital and reserves to be able to satisfy policyholder obligations
- Guaranty funds, to provide benefits to policyholders whose companies have failed
- Catastrophe risk pools, to spread risk across the entire insurance system
- Approval of reinsurance risk-transfer facilities
- Compliance with filed business plans, to monitor new insurance companies or business ventures
- Risk-focused examinations performed by regulators
- Audit requirements for public companies, including SOX certifications
- Statutory accounting rules limiting the admitted value of assets and requiring conservative funding assumptions to ensure company solvency
- Published financial statements (statutory statements, 10K, SEC filings, MD&A)

➢ 4.4: Summary of the Applicability of Insurance Company Practices

Risk management practices have been generally successful in preventing significant systemic risk failures in the insurance sector. The central and essential role of the actuarial profession is generally recognized and highly valued in prudently managing risks within the insurance industry. Several of these actuarial tools can be adapted from their traditional insurance applications to be very useful in managing systemic risks in the broader financial services industry.

Section 5: Concluding Thoughts

We support the creation of a financial services systemic risk regulator. Quite simply, the objective of the systemic risk regulator should be to look into the future and determine threats to the financial system in the near and longer term.

In order to implement effective systemic risk management, companies whose size or complexity contribute to systemic risk will need to report their key risk exposures to the systemic risk regulator. We believe that, organized correctly, this reporting can be done in a straightforward manner. In this paper, we have provided examples of the type of information that could be used by a systemic risk regulator and the manner in which that information could be used. Additional work is ongoing at the Academy on these issues. We are committed to working with all stakeholders on these topics.

While the measurement and management of systemic risks for the financial markets may be a new focus, there is value in leveraging tools that have been proven effective. The actuarial profession, by its focus on the need to balance the short-term and longer-term business and solvency needs in insurance, recognizes the importance of balancing the quantitative and qualitative aspects of risk management. We believe that actuarial principles and approaches can provide an important perspective, as well as practical tools and skills, to the challenges of systemic risk regulation.