

PRESENTED BY THE **Society of Actuaries, Casualty Actuarial Society and
Canadian Institute of Actuaries**



Risk Management: Part Two
**SYSTEMIC RISK, FINANCIAL REFORM, AND
MOVING FORWARD** from the Financial Crisis



1ST EDITION

Actuaries
Risk is Opportunity.®

Introduction

Systemic risk is the risk of the collapse of an entire financial system or market as opposed to risks associated with any one individual entity. Risk systems consist of social institutions, laws, processes and products designed to facilitate the transfer, sharing, distribution and mitigation/hedging of risks between various buyers and sellers. Historically, risk systems have been rarely analyzed in a manner that looks at the ability of a system to survive extreme risk events and still carry out its function – creating an ongoing market for the exchange of risk.

On behalf of the Society of Actuaries, the Casualty Actuarial Society and the Canadian Institute of Actuaries, we are pleased to provide a series of essays on *“Risk Management: Part Two - Systemic Risk, Financial Reform, and Moving Forward from the Financial Crisis.”*. This e-book is a collaboration of the following organizations:

- The Joint Risk Management Section of the Society of Actuaries, the Casualty Actuarial Society and the Canadian Institute of Actuaries;
- The Investment Section of the Society of Actuaries;
- International Network of Actuarial Risk Managers (IN-ARM);
- Enterprise Risk Management Institute International (ERM-II);

The intent of this publication is to offer thought leadership on the ERM discipline and the essential elements needed to maintain risk transfer systems in times of unusual stresses and unlikely events. Included herein are the opinions of a number of authors written in response to our call for essays. An essay is, essentially, a short non-fiction form of writing expressing the often subjective opinion of the author. The thoughts and insights shared herein are not necessarily those of the Society of Actuaries, the Casualty Actuarial Society, the Canadian Institute of Actuaries, or the authors’ employers.

In the first e-book published at the end of 2008, *“Risk Management: The Current Financial Crisis, Lessons Learned and Future Implications,”* we published 35 short essays highlighting key lessons learned, in the interest of inspiring prudent risk management practices for years to come. We learned how operational risk can combine with other risks and to precipitate a collapse of an entire financial system. We learned the need for a risk culture that balances incentive compensation with desired performance. We also learned the need to align the authority to make decisions with bottom line accountability. Ultimately, it became a story of risk that manifests itself through the decisions and behavior of people, and not necessarily through exogenous events.

The U.S. Congress recently passed the most sweeping financial reform measure since the Great Depression. The purpose of this legislation is intended to prevent the risky behavior and decision-making that led to the financial crisis, and to prevent future crises. In reflecting on the events of the last two years, is it possible to effectively develop early warning indicators that trigger beneficial actions in advance of a complete collapse of an entire financial system or market? Does it make sense

Introduction continued ...

to have a chief risk officer of, say, the United States of America, whose role it would be to manage/mitigate this risk? Does this legislation solve the problems of the past? Are there other issues not addressed? Does this legislation cause other concerns? You'll find these and a myriad of other questions confronted in these essays. We hope these essays will provide thought-provoking discussion and commentary in the months and years to come. We congratulate the following essayists whose essays were selected as the top three prize winning essays for this Call:

- First Prize: The Financial Crises: Why Won't We use the F(raud) Word? By Louise Francis
- Second Prize: Perfect Sunrise—A Warning Before the perfect Storm By Max Rudolph
- Third Prize: Who Dares Oppose a Boom? By David Markel

Sincerely Yours,

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Note: *The thoughts, insights and opinions shared in these essays are not necessarily representative of the views of the Society of Actuaries or the authors' employers.*

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- **A Tale of Two Density Functions**
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- **Who Dares Oppose a Boom?**

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Company Management/Board Governance

The following essays discuss the role and best practices of company boards of directors and company management. How can companies best strive for prudent strategic organized behavior within imperfect human constraints? These and other questions are addressed.

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- **The Financial Crises: Why Won't We use the F(raud) Word?**

by Louise Francis



- **Perfect Sunrise- A Warning Before the Perfect Storm**

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- **Strengthening Systemic Risk Regulation**

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A Tale of Two Density Functions

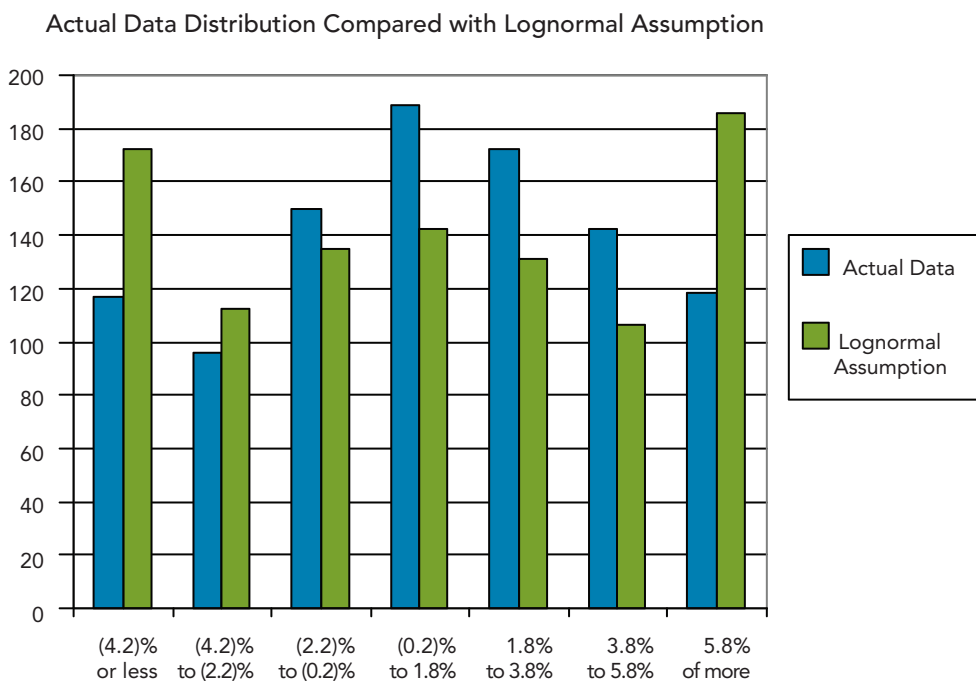
by Dick Joss

It has been common in modern academic finance to assume that investment returns may be described by the lognormal probability density function. Using this tool it is possible not only to provide an expected rate of investment return, but a complete distribution of such returns. In short, using the tool one could say that the expected return on stock investments might be 12 percent, but that there is a 30-percent chance that your equity investments could exceed a return of 25 percent for the year. On the down side, it is also possible to say that there is a 30-percent chance that your equity investments could lose money for the year.

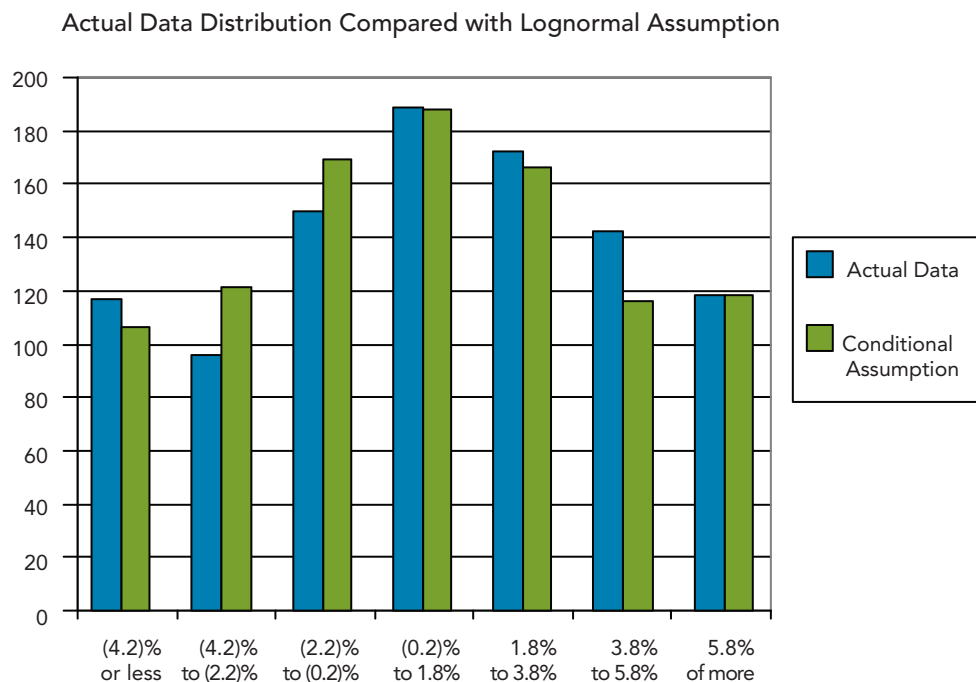
To select the lognormal probability density function parameters, finance textbooks provide detailed instructions using the arithmetic mean and sample standard deviation from a set of historical returns. What is often missing, however, is a comparison of the actual historical results, and the expected results provided by the lognormal probability density function. This comparison is

not as good as one might expect given the widespread use of this particular model. To illustrate this point, the *2008 Ibbotson and Associates S&P 500 Yearbook* provides a history of 984 months of stock return data. The chart below compares the distribution of the actual data with the expected distribution provided by the “best estimate” lognormal density function.

As an example of the difference between the two distributions, the actual distribution shows that for 118 of the 984 months (12 percent of the total) stock returns were 5.8 percent or more for the month. Whereas the “best estimate” lognormal density function assumes that 189 out of 984 months (19 percent of the total) will have a return that is 5.8 percent or more. This is a substantial difference. It calls into question the use of the basic lognormal probability density function to describe the historical data.



A Tale of Two Density Functions *by Dick Joss*



As one contemplates the source of historical investment return data, it is clear that they are periodic observations of a single, long-term historical asset growth. As such, the mathematical theory of probability and statistics would place this single observation at the mean of long-term results, with each of the periodic returns being described by a conditional lognormal probability density function. When this one change is made, the comparison between the actual historical results and those described by the probability density function improves dramatically, as is shown in the following chart.

Not only is the comparison significantly improved, but this one change helps explain the disastrous 401(k) plan results that have been seen. This change in density function causes

the best estimate rate of return to change from an arithmetic mean of historical returns to the lower geometric mean of historical returns. Given that employee participants have been led to believe that they would receive the higher arithmetic mean returns, it is not surprising that they are disappointed with the actual geometric mean results.

In addition, the change in probability density functions provides a new explanation for the spectacular collapse of Long-Term Capital Management and the more recent collapses of Bear Stearns and Lehman Brothers Holdings. Until this issue is addressed fully, and corrected, the possibility of similar problems will always be on the horizon, and another “financial crisis” may be just around the corner.

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The Systemic Risk of Risk Capital (Or the “No matter what” premise)

by Charalampos Fytros and Ioannis Chatzivasiloglou

When regulators examine financial institutions, one of the most important areas on which they focus is capital requirements.

It has become almost common sense that the more resilient you want to have a financial system, the higher the capital requirements of the financial institutions should be set. It has also become common sense that capital requirements should not be set “just higher,” but they should be closely related to the risk each institution has assumed. The link between the level of risk and the capital requirements is achieved via the determination of three parameters: the risk measure, the time horizon and the confidence level.

The choice of a specific risk measure (e.g. VaR, TVaR etc) should take into account issues such as the stability of the computations, its ability to easily and sensibly aggregate and decompose the risk, the level of understanding by senior management of the financial institutions. The time horizon reflects issues such as the liquidity characteristics of the assets and liabilities, the holding period of the risk, the type of the risk, the risk management needs. Finally, the confidence level determines the probability of the capital to be adequate. For example, if a financial institution is setting its capital requirements as “99.5 percent VaR over one year,” this means that it should hold capital so as the actual losses it may suffer over a one-year period are expected to be lower than its capital amount with a probability of 99.5 percent. Or in reverse, it means it should hold capital so as the actual losses it may suffer over a one-year period are expected to be higher than its capital amount with a probability of 0.5 percent. But if actual losses exceed the available capital, the financial institution will not be able to honor the excess obligations, so it is considered to have defaulted.

As it can be seen, the confidence level a specific financial institution is using for its risk capital calculations is closely linked with its desired probability of default. And, in effect, when a confidence level is determined by regulators for a financial system in total, the probability of default of the system has also been determined. If we want to gain insight of the implications from the choice by regulators of the confidence level, we should focus more on the “probability of default” notion. Setting the confidence level, for example, at 99.5 percent means that regulators would wish that, no matter what, the probability of default of each financial institution should be 0.5 percent. What is important to note is the “no matter what” premise, which is often concealed, not mentioned or in most cases forgotten at all.

Let’s examine the “no matter what” premise so as to better understand possible implications:

When we want a specific financial institution to hold risk capital so as to maintain a specific probability of default, all we ask to have is this specific probability of default in all cases over each time period. That is, we demand to hold risk capital corresponding to the same probability of default in calm times and in turbulent times, in times characterized by stability and in times of crises, in times with low volatility and in times with high volatility. That is, regulators have fixed the required probability of default regardless of the position on the economic cycle the economy is found to be—no matter what.

The burden of such requirement (i.e. no matter what) is significant but manageable, as long as the financial institution is able either to raise as much capital it wants or to diversify and mitigate the risk it has assumed, so that at the end, is

The Systemic Risk of Risk Capital ... by *Charalampos Fytros and Ioannis Chatzivasiloglou*

able to match the available capital with the required capital. But problems seem to arise when capital becomes a scarce resource, diversification opportunities are limited and risk mitigation cannot be effectively achieved. When does that happen? During turbulent times, or when the circle hits its lower parts. A fixed regulated minimum probability of default (say, 0.5%) requires then, that financial institutions absorb liquidity, exhaust scarce diversification opportunities and shed their risks, consistent with a risk-mitigation strategy. That is, it requires financial institutions to adapt a strategy that positively contributes to the overall turbulence – in effect, boosting cyclicity. What is even more interesting, is that the more regulators push the probability of default towards nil (that is the higher the confidence level is put), the more responsive and cyclical-contributor does the financial institution become: a unit of increase in the overall systemic volatility drives financial institutions, already regulated to work deep in the tail (i.e. already required to always maintain a fixed and low probability of default), to upload numerous (that is, more than one) units of their risks to the overall system. And even if they finally make it, you end up with a “healthy” financial system and no real economy.

We are used to believe that we can assess systemic risk by properly aggregating two systemic components: the regulated minimum probability of default of financial institutions (1st systemic component) and their mutual correlation (2nd systemic component).

Yet, we are not used to recognize the following trade off:

- (a) Should you regulate for a low default probability, lower than a critical probability L , you can bring individual default probability (1st systemic component)

down, but don't be sure at all that mutual correlation (2nd systemic component) will decrease or even stay the same. By bringing the default probability down, you actually stress and narrow down financial institutions' strategic options: in fact, you coordinate responses. That is, mutual correlation is going up.

- (b) Should you loosen default probability, higher than a critical probability U , mutual correlation is expected to fall back. But you can't soften your requirements for long – a high probability of default means exactly that: many financial institutions will eventually go down.

And so, here is what we get:

In case of regulating for a low default probability (lower than L), a marginal decrease of default probability leads to a higher marginal increase of mutual correlation – net effect being the increase of systemic risk.

In case of regulating for a high default probability (higher than U), a marginal increase of default probability leads to a lower marginal decrease of mutual correlation – net effect being, again, the increase of systemic risk.

We name the space between L and U , “window for business”. That is, we can't push for neither too high nor too low default probabilities. Regulate too high and you introduce rigidity to the system: you choke the economy. Regulate too low and you introduce softness in your foundations: they cannot for long sustain the economy.

And so, what's the conclusion? The crisis taught us that our individualized model, our “institution by institution”

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model of supervision, is not enough. We learned that an LU window for business should be sought. Thus, systemic risk should be overseen. And so, we created a watchdog. Is that all? No. A question remains: why such a window exists in the first place?

The answer is, because mutual correlation (that is, correlation between institutions) is not stable – it changes too as a function of the regulated minimum default probability generating opposite systemic effects. And that creates a net effect, a functionality which is specified by the relevant incremental moves of both the 1st and 2nd systemic components, as described above. But why does that happen? Because the actual flow of risk does not follow a down-up direction – it follows a top-down one. That is, *systemic risk conditions* are the ones that provide a basis for meaningful changes in both of our systemic components. Systemic risk is not the net effect of such incremental changes: instead, such incremental changes are the *net effect of systemic risk conditions*. Which means, systemic risk can only be the condition for regulating individual financial institutions – not the other way around. We cannot anymore ignore that a fixed, “no matter what”, systemic-free probability of default does only but produce cyclical instability right when you don’t need one: when liquidity dries out, financial institutions are

asked to absorb and retain as much of it as possible; where risk has already been spread all over, financial institutions are asked to dump their own as fast as possible.

Instead, financial institutions should be asked to follow a flexible, systemic-dependent probability of default, within a window for business. Financial institutions should strive to behave as automatic stabilizers within a systemic-dependent confidence level – not systemic-free. Rigidity should be sought for the confidence level; softness for the systemic-dependent approach. Under such a policy mix, both the overall oscillation limits itself, and the institution is given a leeway to breathe.

Can such systemic-dependent regulation result in contractionary effects during good times? Perhaps. But this eventually depends on the mix of our regulations, which again, should be systemic-dependent: supporting for example capital increases instead of asset shrinking, wanes the appearance of such side effects. Which means, no room for “no matter what” premises exist, as long as meaningful institutional supervision can only be derived on the basis of a systemic background reality.

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Disclaimer: The present article reflects authors’ own views and should not in any case be perceived as reflecting official theses of any of the European or National Regulatory or Supervisory Institutions and Committees.

Actuaries and Assumptions

by Jonathan Jacob

The recent financial crisis has highlighted the ability of the actuary to manage risk. After all, professionals in the world of finance were to blame for the crisis by taking on excessive risk through leverage and illiquid assets. As actuaries were busy managing risk profiles for insurance companies and pension plans the investment professionals were piling more risk on and in different formats.

But are actuaries and the actuarial profession truly blameless?

In any model, assumptions are necessary to generate output. Typically, the model is run with varying assumptions to determine how sensitive the output is to the input. But what if the philosophy of generating assumptions is flawed?

Actuarial assumptions are based on historical analysis. Mortality rates used for annuities and for life insurance premium calculation are based on historical death rates, usually with some augmentation for expected longevity improvement which is also based on historical improvements. These rates are obviously different, perhaps accounting in some sense for what financial practitioners would call “bid-offer” but in the actuarial world the term used is adverse selection. There is a greater likelihood a buyer of an annuity will live longer than a buyer of life insurance:

“...set of results acknowledges that annuity purchasers tend to have a mortality experience that differs from that of the general population. Whether this is the result of those who have information that they are likely to be long-lived purchasing annuities, or simply a function of different (and potentially observable) characteristics of annuitants and non-annuitants, is not clear. In any case, because annui-

tants have longer life expectancies than the broader population, insurance companies have developed a second set of mortality tables.”³

While this sense of accounting for adverse selection has been well utilized in the realm of mortality, it may be coincidental due to “different characteristics of annuitants and non-annuitants”. In fact, one can posit that if historically observable mortality rates for annuitants were higher than those of life insurance buyers the insurance companies would use those higher mortality rates for annuity premium calculations. Leaning on historical observable data for generating assumptions permeates the actuarial world from lapse rates to pension fund discount and return assumptions to models for guaranteed minimum death benefits.

In the investment world, however, the base assumption is maximization of economic utility. In other words, every participant will exploit financial products to maximize its value for him or herself. For example, given the choice of refinancing his or her mortgage, the consumer will account for the cost of the refinancing as well as the rate differential to determine if the decision to refinance is financially optimal. The mortgage issuer realizes a loss at the time of refinancing as the present value of cash flows is now lower than it was prior to the refinancing. However, the issuer has likely taken two important steps prior to the refinancing. First of all, the mortgage was priced with the value of the option embedded into the price and the value of the option assumes that the consumer will exercise the refinancing option when it is optimal to do so. Second, the issuer has likely hedged the risk of rates declining and the likely refinancing that would occur at that time. This means that in practice the mortgage issuer does not realize a loss when the mortgage refinances; rather, the issuer is actually realizing a gain

³ J. Brown, O. Mitchell, J. Poterba “Mortality Risk, Inflation Risk and Annuity Products”, Working Paper 7812, NBER Working Paper Series, July 2000

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whenever the consumer does not refinance since optimal re-financing was a pricing assumption.

Over the past 20 years, insurance companies have waded into the capital markets with outright financial products and hybrid products, such as segregated fund guarantees, variable annuities and guaranteed minimum death benefits. Unfortunately, some of these products have cost insurance companies dearly. The assumptions underlying many of these products were generated by historical experience rather than maximizing financial utility, which may have distorted both the pricing and the hedging of these products. Some examples where actuaries can improve assumptions:

- An owner of a policy will not lapse unless the present value of future payments exceeds the present value of expected cash flows;
- Conversely, the policy owner will lapse once the present value of future payments exceeds the present value of expected cash flows;
- An owner of a product with a guarantee who can choose from an array of assets, will always choose the asset with the highest volatility;
- Since a financial product or index has not behaved in a certain way in the past, one cannot assume this will always be the case;
- The best estimate of forward yields can be extracted from the current yield curve.

Implications of this shift in methodology would be significant. Pricing of products would increase significantly and the products would no longer be financially viable to consumers.

Furthermore, the strongest counterargument to adopting this methodology is the fact that consumers do not behave optimally. Products with embedded life contingencies should continue to see suboptimal behavior from consumers with respect to the financial component of the product, since the life contingencies component is the main reason for purchasing the product.

While the above may be true, an investor in life insurance companies would be disappointed to learn that the profitability of the company rests on consumers behaving in a suboptimal fashion. Or an investor in a manufacturer with a relatively significant pension plan may be shocked to learn that actuaries valued the plan assuming a return of 8 percent when the expected return based on the yield curve for fixed income and long-term expectations for the stock market should be closer to 6 percent.

There is no right answer when dealing with assumptions in financial models. However, both actuaries and investment professionals can agree that if the input is inappropriate the output will certainly not add value. If assumptions are based on historical behavior, one can argue that behavior changes over time. The Internet, for example, provides a forum for experts to instantaneously disseminate information to consumers on how to optimally take advantage of insurer products. It should be acknowledged that it may not be appropriate in all areas of practice for actuaries to assume that consumers behave in a way which maximizes their financial utility. But it is time for actuaries to learn from investment professionals with respect to the assumptions used in models.

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Managing Financial Crisis, Today and Beyond

by Vivek Gupta

People develop an economy with their production and consumption, and people are organized in bigger units of family, city, state, country and the world. Therefore, a comprehensive analysis of the current economic crisis must consider the social and political behavior of people.

Actions Required at the Insurance Industry Level:

The current financial crisis teaches us that companies ought to develop a comprehensive risk-mitigating culture. However, if a company decides to implement such strategies on its own, most likely it will be priced out of the market. Practically, risk-mitigating culture must be adopted at the industry level. There has to be a level playing field for all participants, otherwise companies will hesitate to be the first one to make this shift.

Regulations of Pricing Assumptions:

Appropriate pricing is the most effective risk management tool. The pricing assumptions for insurance products should be regulated the way actuarial assumptions are regulated for calculating reserves. Companies can achieve flexibility in pricing by fine tuning their expected profit margins.

- The main argument in favor of not regulating pricing assumptions is that companies can charge whatever they want for their products, as long as they maintain an appropriate level of reserves to protect the policyholder's interest. This argument is based on the fact that companies will take care of their own interests and will not cut prices too much to avoid prohibitive reserve increases. During the current financial crisis, it has been noticed that the concept of "Homo Economicus" did not work very well. Therefore, the phenomenon of self-preservation to provide sufficient safeguards cannot be relied upon.
- There is a severe pricing war going on in the insurance industry. Under market pressure companies are *adjusting* one of the actuarial assumptions (mortality, lapse, expenses and interest) to achieve the desired price level as well as the desired profit target. This pricing methodology enhances risks of not realizing the *adjusted* assumptions and also creates a false sense of security.
- To deal with low interest rates on the fixed income assets, companies are incorporating equities in their asset portfolios to back their liabilities. By doing so, they can assume higher rates of return relative to fixed income assets and lower their prices. Appropriate regulation will force companies to pass the cost of low interest rates to the buyers.
- When the pricing assumptions are regulated, companies will be forced to adjust their profit margin to achieve the desired price level. In that case, either companies will not cut prices significantly or they will not offer an unviable product.

Appropriate role of equities in reserves:

Equities are to be allowed to back only the pass-through portion of the reserves for the UL policies. Remaining life insurance and annuity liabilities should be backed only with high-quality, fixed-income assets.

- Buyers of insurance do not expect exposure to the stock markets; therefore they should not be exposed to the market risk. If they need such exposure they can achieve it on their own. Policyholders expect absolute certainty of payment of insurance benefit and meeting this expectation should be the objective of any insurance company. It is understandable that in the short-term insurance companies might be concerned about the increase in

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reserves due to the proposed asset allocation. However, once this change is made it will make everyone feel more secure, and hence, more comfortable.

- In an environment where risk-free interest rates are hovering around 1-2 percent, companies are still allowed to assume 9-10 percent equity returns forever to calculate their reserves. Earning an equity risk premium of 8-9 percent over an indefinite period is just impossible.
- Proponents of equity investment generally reason that the entire equity risk premium can be earned by someone who has a long-term investment horizon and can withstand short-term market volatility. Hence, over the long-term there is no equity risk. This assertion is against the principles of financial economics.
- Once the liabilities are discounted with risk-free rates under IFRS rules and the assets are still invested in equities, the equity risk will be hidden. The reserve level will be appropriate; nevertheless, risk of significant depreciation of asset values will still remain.

Stochastic models should be used to create scenarios only.

Rationale for not using stochastic models to calculate reserves, even for segregated funds:

- Each assumption used in the model is subject to some uncertainty; therefore results produced by combining such assumptions are also uncertain. However, we do not communicate that combined uncertainty. Actually, no one knows what that number is. We imperfectly communicate that one thousand scenarios generated by our model have covered what will actually happen over the next 100 years. Therefore, applying statistical measures like CTE 97.5 or CTE 99.5 to a set of one thousand uncertain scenarios create false sense of credibility

in the results generated by stochastic models.

- Stochastic models hide the subjectivity used in the development of the variables and other logics deployed in the models. For example, we subjectively select the last 50 years of data to calculate average interest rates or average equity premium. No matter how long the period of history chosen, the future is going to be different than the past. The world is changing so fast that historical data is losing its predictive power.
- For the sake of convenience, it is commonly assumed that the variables are normally distributed and are independent. Just because it is practically impossible to calculate the correlations of many variables used in a model, modellers make a subjective call to assume zero correlation among most of variables. There is no empirical proof that the economic variables used in most actuarial models are normally distributed.
- The entire historical period gets the same weighting; therefore, emerging trends get little recognition. Recent trends reveal that the market volatility is increasing; it is expected to stay high and likely to keep increasing. Most stochastic models use fixed and prescribed volatility.
- Stochastic models are prone to mismanagement.

The Society of Actuaries published my article “Stochastic Model: A Telescope or a Kaleidoscope?” in the February 2004 issue of *Risks and Rewards*. This article concludes that a kaleidoscope made with red and green pieces of glass will show a red and green “view” no matter how many times one turns it. The current financial crisis has highlighted the weakness of financial models to quantify risks. **Let us not navigate our ships through rough waters by mistaking a kaleidoscope for a telescope.**

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Action Required at the System Level

Pension Reform

Due to ever increasing mortality, let alone the corporations, even the governments cannot pay for the ever increasing cost of pensions. In the current economic environment, low interest rates and volatile equity markets have further exacerbated the pension deficit. To bring the pension contributions under control, pension benefits have to be cut for the present and future pensioners.

Rebalancing Consumption and Production

Essentially, the current trade deficit in the United States represents an imbalance in production and consumption. The “optimistic” economists complacently downplayed this imbalance by saying “the country which prints the world currency does not have to worry about the deficit.” Now we know that the world is searching for an alternative to the USD as a reserve currency. This imbalance must be corrected in the next few years by increasing production so that the USD is once again considered the unquestionable reserve currency for the world.

Controlling the Stock Speculations

Shareholders are borrowing to speculate in the stock market to maximize their returns in the shortest possible time. The low interest rates, ease of online trading and low cost of transactions have turned the stock markets into big casin-

os. The rules to protect the shareholders will only work if the shareholders have an “ownership” interest in the long-term viability of the corporation. If the shareholders keep speculating with irrational exuberance, no rule will be able to protect them.

Escaping the Debt Vortex

Type of debt:

- If I borrow and invest that money in a way which increases my net worth, that is a good debt.
- If I borrow and spend that money in a way which decreases my net worth, that is a bad debt.
- If I have to borrow to pay the interest on my existing loan, I am in a debt vortex.

The municipal, state and federal governments have trillions of dollars of visible debt and trillions of dollars worth hidden debts to cover their promises of the Social Security, Medicare and government pensions. All three levels of governments are relying on the same tax payer to pay off this debt with interest. Most businesses are under debt and are relying on the same citizen to consume their products to justify their debt. And, the citizens are taking their own personal debt to pay taxes and to consume products. Each successive layer of debt becomes more and more expensive. All entities must manage their good debt and take steps to eliminate bad debt. This debt lasso must be cut before it starts pulling countries toward the debt vortex.

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What Did We Learn from the Financial Crisis of 2008?

by Shibashish Mukherjee

Its two years since the fall of 2008 during which, ironically enough, the world witnessed with both shock and awe the fall of Lehman Brothers. What did we really learn from that economically devastating episode that led to the bankruptcy of one of the biggest investment banks of Wall Street and created a domino effect that led to the credit crunch? That chain of events started much before the fall of Lehman Brothers. The real story began in China.

The emergence of the Chinese economy since its economic liberalization was mainly based on export of manufactured goods for the consumption of the western consumers. Post two decades of high growth China amassed huge wealth of foreign reserves. They did invest a lot of money in their infrastructure but still they were left with a sizable amount of liquidity for investments. U.S. treasury bonds have had the reputation of being risk free therefore the Chinese started investing in them essentially making the cost of money cheaper for the U.S. banks to borrow from. As a result of some aggressive lobbying and the resultant low interest rates regime and favourable policy decisions on regulations by the U.S. congress played a crucial role in making the borrowing cheaper for the big banks of Wall Street. This cheap money prompted these banks to look for avenues to invest and they found the realty market especially lucrative. With access to cheap money the big investment banks together with other financial institutions like mortgage banks etc. started giving discounted mortgage loans to prime then eventually sub-prime borrowers. The basic assumption was that the price of property such as a house does not and will not go down.

It turned out to be a great business model for the first half of the 2000s. Banks gave loans to the sub-prime borrower,

then made a portfolio of these loans tagging along with prime loans and sell it in the secondary market to the investment banks. These investment banks then re-package these loans and name it *Collateralized Debt Obligations* (CDO) which they insure with Credit Default Swaps (CDS) (as insurance) and sell them to the overseas lender, such as the cash-rich Chinese investors who were looking for avenues to invest in apart from the low-yielding treasury bonds of the U.S. government. When the sub-prime borrower could not afford to pay back their loans, they would file bankruptcy and the property goes to foreclosure and finally sale. The demand for home mortgages created an artificial high demand in the property market resulting in the quick appreciation of the property prices. Post foreclosure these banks will still come out with a healthy profit at the end of the cycle. This went on for some time making everyone from investment bankers, retail and mortgage bankers, and realty agents on the way wealthier with an exception of the poor borrowers. Soon other players also joined in the bandwagon like the British banks, German banks, and Japanese banks etc.

What everyone missed in this whole process was the rise of systematic risk of the entire financial system. Markowitz's Portfolio Theory (MPT) gave rise to the concept of diversification. Essentially it means that the idiosyncratic¹ risks that investors face can be diversified away. If we accept this argument then China, Britain, Germany, etc. did the right thing in investing in U.S. treasury bonds and CDOs. That way they thought to be diversified. At the height of this lucrative business hundreds of billions of dollars entered the U.S. market from all major economies around the world. The real factor that changed the systematic risk dynamics was the scale of investments being made by both national

¹ Sharpe, W. E. (1963); A Simplified Model for Portfolio Analysis, *Management Science*, Vol. 9, No. 2 (Jan., 1963), pp. 277-293

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and international investors in the CDOs. The benefit of diversification was being eroded with the massive scale of investments and from the same five or six big players in the market. This phenomenon gave rise to the Endogenous Risk² that can be constituted as a systematic risk inherent in the market but invisible unless something to the scale and scope of investments in the CDOs and CDSs happens. As Danielsson and Shin described it Endogenous Risk refers to the risk from shocks that are generated and amplified within the system. The rise in the foreclosure rates prompted a fall in demand for homes thereby decreasing the home prices in the U.S. home mortgage market. That created a domino effect in terms of confidence in the CDO and CDS markets thereby giving rise to the latent Endogenous Risk that immediately gripped the market by freezing the flow of credit. At one point banks were not ready to lend to other banks³ for fear of uncertainty of their exposure to mortgage backed securities. This further increased the problems of the banks as they were unable to meet the demands of their lending operation or for that matter regular banking operations giving rise to further rounds of uncertainty until the Federal Reserve had to pitch in to ensure liquidity flow to the cash-strapped banks. While all this was going on there was hardly any information available in the market about these fancy new financial derivatives. Even the investors who were investing into these products were unaware of the true nature of these derivatives. This created a huge information asymmetry⁴ but the returns generated by these derivatives were far too good to let go, giving rise to a herd mentality of the investors with billions of dollars. Rational decision-making ability was thrown out of the window and everyone bought into the illusion of a safe investment

as claimed by the Wall Street banks and confirmed by the rating agencies that showered these derivatives with their best ratings possible essentially making them risk free but with high returns. The result of all that hype was the Great Financial Crisis of 2008.

So what did we learn from this Great Financial Crisis? The main lessons that we should draw from this crisis are as follows: (i) the importance of voluntary and involuntary disclosures on financial products, or the lack of both, (ii) the importance of regulators and how important it is for them to regulate and have an oversight of the macroeconomic indicators, (iii) existing risk management practises especially for the big banks and rating agencies, (iv) the most important of all, it is the exercise of rationality while making large investment decisions by the investors.

From a policy-making perspective the crisis has been a wakeup call for the regulators who have until now ignored the Keynesian economic model that speaks about free market economy along with strong oversight. In fact the accounting regulation body such as the Financial Accounting Standards Board (FASB) have completely failed to keep up with the pace at which firms have evolved in the recent years. There are some legitimate concerns such as the fair value accounting of non-tradable assets, etc. However, the big picture is still that the market value of the banking firms far exceeds in their intangible assets value than their tangible assets and still the accounting regulations do not require these firms to disclose sufficiently on their intangible assets especially when it comes to exotic derivatives such as the

² Danielsson, J., Shin, H. S. (Sep 2002); Endogenous Risk, London School of Economics (www.riskresearch.org)

³ Samuelson, R. J. (2010); Was the Great Panic of 2008 preventable?, *Washington Post*

⁴ Healy, P. M., Palepu, K. G. (2001); Information Asymmetry, corporate disclosure, and the Capital Markets: a review of the empirical disclosure literature, *Journal of Accounting and Economics* 31 (2001) 405–440

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CDO and CDS. This is the leading factor that creates a huge information asymmetry in the market where the investors have a limited knowledge about the instruments in which they are making large investments, and definitely before the crisis the scale was unprecedented. There are some who might argue that a little information asymmetry is good for the market as complete or absolute information will make banking firms highly correlated, thus eroding the benefits of diversification. However, the scope information asymmetry is plenty in the banking sector that starts from processes, culture, human capital and the capacity for the bank to be innovative. These asymmetries are constructive asymmetry and can benefit the investors from the diversification perspective. What is not recommended is that investors are deliberately kept in the dark because of lack of reporting

standard about derivatives such as CDOs and CDSs, which can be lucrative investment vehicles and banks are able to sell these instruments in enormous quantities creating a shift in the systematic risk quotient of the market.

Therefore, it is absolutely essential for the U.S. banks in order to remain globally competitive regulators have to fix the shortcomings of the financial reporting standards and market oversight policies. This should motivate banks to formulate their risk management and disclosure strategies rather carefully. With more information and understanding about seemingly complicated derivative products perhaps investors will also make better choices and informed decisions.

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Financial Reform: A legitimate function of government?

by John Wiesner

“Does it make sense to have a chief risk officer of, say, the United States of America, whose role it would be to manage/mitigate this risk?”

A prior fundamental question, less practical in its root, is whether or not it is a legitimate function of government to regulate financial institutions. The answer can guide how any new checks and balances should be developed to mitigate future financial disruption. At the same time as these questions are being considered, statements are being made that no institution should be “too big to fail,” which implicitly points to answers.

This essay will first speak analogically about government function, then relate those analogies to our current crisis.

Driving on the right side of the road is more than just a convention in this country, it is the law. Does it need to be the law? When vehicles moved much more slowly, when walking was the most common method of moving around, there may not have even needed to be conventions about “going to your right” when passing by an on-coming person. Clearly there is no morally right or wrong answer about driving on the right side or the left side of the road, as we see parts of the world that have the exact opposite convention. However, it is arguable whether or not someone should decide what the convention should be. The point here is not which direction is correct, the point is whether or not it is a legitimate function of government to make that determination.

When people primarily walked, there was not as much danger of injury if there was no convention, but as technology has made transportation so much faster, and thereby increased the risk of harm when people collide, it seems that a convention is at least good, if not necessary.

If everyone driving a vehicle had to re-decide which direction to go every time they approached an oncoming vehicle, accidents would abound and people would drive more slowly. Transportation would therefore be slower, dangerous and far less efficient. Technology has at least made the need for a safer convention necessary.

It seems fairly self-evident that it is a primary function of government to protect its people. Therefore, it does not seem outrageous to argue that it is a legitimate function of government to have passed laws dictating on which side of the road people should drive. Even though there may well have been a time when a government’s dictating on what side you pass by an oncoming ambulatory would have been considered over-reaching, the increased risk of harm due to technology seems to make the case that the government should dictate a convention by law, and enforce that law.

Just as technology has made transportation both more efficient and more dangerous, so likewise has technology made our financial world more efficient, but also more dangerous to all in the event of a crisis. Everything moves much more quickly throughout the world. Collisions of two entities, “accidents” such as AIG or Lehman, have a much bigger impact than they would have had a century ago. Our global economies and monetary systems are as interconnected as a fine Swiss watch, and it seems that a grain of sand can threaten to halt the whole system.

That begs the second analogy, that of a clock. Many centuries ago water clocks existed that kept time “well enough.” They were very large, not very precise, and not very efficient. Now we have highly efficient, and highly accurate watches and clocks. A water clock would hardly have been affected by a grain of sand getting into it, but a grain of sand can halt and even destroy a fine Swiss watch. The in-

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creased efficiency and precision of the Swiss watch makes some level of protection, some “guard” if you will, necessary; hence the glass face cover.

Similar to glass face covers on watches, our financial system needs safe guards and protections. Further, it may very well be a legitimate function of government to dictate certain norms, such as driving on either the right side or the left side of the road, for financial transactions.

Leveraged derivative transactions are much like 800 horsepower engines in a vehicle. They are a very useful tool, but they can also be a weapon by which the operator could harm both himself and others if he does not use them properly.

Should the government outlaw either leveraged derivatives or 800 horsepower engines? Of course not. None-the-less, it would be preferable to be certain that those who use leverage have a sufficient mastery of the tools so that they are less likely to hurt someone by misuse. So there may well be an argument that it is a legitimate function of government to regulate the financial world.

The push toward centralized clearing and open market trading can provide some of these safeguards without much government intervention. Centralized clearing gives a for-profit industry the incentive to watch for systemic risk. Centralized clearinghouses need not be a government agency, but it seems that not enough financial institutions availed themselves of centralized clearing before the crisis. If a safe convention does not arise naturally from the market place, it might be necessary for the government to dictate the norm, by law.

Open market trading can help users avoid hurting themselves. If there is enough open competition, it is less likely that a misinformed buyer will systematically over pay for an instrument. One-off OTC transactions leave open the possibility that one party or some oligopoly can systematically over-charge for certain instruments, if for no other reason than that there is not enough competition to shed light on the real value of the instrument. Having access to a wider liquidity pool can at worst only increase the depth of the market; more likely, it will provide the opportunity for price improvement. This practice of price discovery can actually make the whole environment safer for all the users, without government intervention. But again, if entities do not avail themselves of these better conventions, it may be necessary for a government to force the issue, due to its duty to help protect the people.

Centralized clearing and open markets can help mitigate the pain of future defaults of financial institutions. The domino effect of a series of individual counter-party relationships is diffused by centralized clearing. It seems almost childish to say that mutualization of risk has great value in an essay for an audience that is primarily composed of actuaries. The entire existence of the insurance industry is predicated on that one fact. Nevertheless, financial transactions should likewise be mutualized. They could have been and still have not been. So it may be necessary to actually state the obvious: large financial institutions need to mutualize their counter-party risk through exchanges and into centralized clearinghouses.

The free-market natural evolution has not brought about this correct convention, at least not effectively enough; and so governments, legitimately, are now demanding this convention...by law.

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This legislation begs the next question, should governments actually be the overseeing body of the risk? Should the government actually run the centralized clearing of all financial transactions? I say “NO!”

A government-run centralized clearinghouse would not have the incentive to work with the financial institutions to foster creativity, and would probably just slow down the whole economy. A non-governmental central clearing entity wants to both stay in existence and to foster new business of its mutualized members. In this way, provided that the financial institutions are willing to subject themselves to one another’s mutualized risk, the government’s role can be no more than dictating that this practice must be done, without actually having to do the work for people.

Going back to the driving analogy, I believe it is important that we all drive on one side of the road, and I agree that it is a legitimate function of government to enact,

and even enforce, such a rule, but I do not think that the government should actually drive the vehicles for us.

The government should allow institutions to fail if they either do not properly manage their own risks, or even if they simply are not competent enough to profit. The large institutions’ thinking that they are too big to fail has caused them all to have an arm’s race of risk-taking, just to stay ahead of their competitors who think the same way. Giving ALL institutions the possibility of failure should help collectively curb the overactive risk-taking that we have seen in past decades.

Combining both the legitimacy of government regulation on how to mutualize counter-party risk and the real possibility of failure for large institutions should help mitigate overactive risk-taking. Keeping the actual job of mutualizing that risk at exchanges and central clearing houses, rather than within some new government agency, should likewise leave open the possibility of profit, innovation and free capitalism.

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The Economy and Self-Organized Criticality

by Matt Wilson

Many different complex systems experience self-organized criticality with collapses that follow the power law distribution. These include forests, sandpiles, financial markets, wars, earthquakes and more. Looking at how some of these systems actually collapse can give us insight into the economic collapse of 2008. They suggest that society has two choices: small and intermediate collapses, or big collapses. The suppression or mitigation of small and intermediate collapses means that much bigger collapses will occur instead.

In the summer of 1988 Yellowstone National Park experienced a fire unlike anything ever seen before in that park. Initially, there was no indication that this fire was going to be exceptional. It started off like any other fire, but by the time the fire was ultimately put out over 1.5 million acres of land was burned. Prior to that fire the biggest fire ever recorded in Yellowstone was in 1886 where 25 thousand acres burned. Between 1886 and 1988 the policy of the forestry department was to put out or mitigate every fire (stabilize the forest). Paradoxically, this policy pushed the park into complete collapse.

In 2010 economists are trying to figure out how they can prevent the next collapse. When the U.S. financial system was prevented from collapsing in 1997 (the Long Term Capital Management collapse), we got the tech market collapse of 2000-02. When the Fed did everything to mitigate the collapse of the tech market, we got the housing bust of 2007-09. When the housing bust turned into the global financial crisis, the government did everything it could to mitigate the collapse. Now many are wondering if we will experience a double-dip recession in 2011-12.

The process by which some complex systems automatically go from a stable state to a critical state is called self-

organized criticality (SOC). The overall system provides a feedback loop over time that drives the system to collapse. The distribution of collapses by size follows the power law distribution (Pareto's distribution). A graph of the power law looks similar to a bell curve, but it has fat tails.

Understanding System Feedback

Systems that exhibit SOC include properties of system feedback. System feedback occurs when the current system environment, including history, at least partially influences future events. Buying a stock after checking a chart of past prices, or moving to a city based on its size are examples of system feedback.

An example of a system that does not include SOC would be a marble pile. The marble system is not able to transmit historical information to new marbles being added. The newly dropped marbles just roll off most existing marbles. Sandpile systems do exhibit SOC.

In 1998 several geologists decided to develop a computer model of how forests work. They built a computer model with squares, and randomly placed trees on the squares. Each tree sprouted new seedlings in the surrounding squares from time to time. System feedback occurs because new trees can only grow in blank squares. The computer randomly dropped matches on squares from time to time.

When a match hit a square with a tree in it, the surrounding trees were burned up as well. If a tree was relatively isolated then the fire wasn't able to spread. However, as surrounding trees proliferated, the probability of large fires grew. Eventually, the board would reach a critical state where one match could literally wipe out everything on the board.

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Then the geologists started playing around with the rate that matches were dropped. For example, what would happen if you slowed down the rate at which matches were dropped – effectively the same as putting out fires? They found the small fires decreased, but very large, critical state (supercritical) fires increased.

Scientists also looked at computer sandpile models. The modeling of sandpile collapses also follows the power law just like forest fires. System feedback occurs because new grains of sand must land on top of prior grains with minimal rolling. If you color code areas of steepness, then you can see fingers of instability develop over time which connect one area with another. This ensures that a collapse in one area will be transmitted around the entire sandpile. The exact cause of a collapse is unimportant. It is the state of the sandpile system before the collapse that is most important.

In a July 22, 2010, article titled, “Agents of Change”, *The Economist* magazine discussed how economists have been looking at agent-based models to better explain how our economy works. An agents’ behavior is partially influenced by interactions with other agents. The effect of herding, commonly found with investors, is automatically modeled in an agent-based model. Effectively, agent-based models seek to model how the interaction between people—system feedback—affects future behavior. It is this type of feedback that drives markets to collapse over time.

Understanding Collapses

A system will reach a pre-collapse state before a collapse actually occurs. However, once it reaches a pre-collapse state the damage has already been done even though no collapse has actually occurred. Trying to suppress a collapse from a pre-collapse state will make the system unstable and prone to larger collapses in the future.

Current U.S. government policy is to place a put option under the economy in order to create economic stability. The U.S is not alone in seeking economic stability. European countries, Japan and China all seek to maintain economic stability through the suppression of collapses.

Japan’s lost decade(s) is an example of an economic crash that has been heavily mitigated. China may be in an even worse situation. It needs to consistently produce a yearly economic growth rate of 8 percent or more in order to maintain a stable society. This requirement pretty much puts China on the expressway to a supercritical crash. We may see this sooner rather than later because China’s real estate markets are overheated and may come crashing down in the next year or two.

What is the solution to economic collapses? Embrace small collapses in order to avoid large collapses. Consider forcing a collapse if a natural collapse has not occurred within the last five to seven years.

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Systemic Risk Arising from a Financial System that Requires Growth in a World with Limited Oil Supply

by Gail Tverberg

In July of this year, Lloyds of London issued a white paper on the risks of peak oil, noting that we are headed toward a global supply crunch.¹ In September 2010, a paper was published in *Energy Policy* called “Global oil depletion: A review of the evidence.”² It concludes, “A peak of conventional oil production before 2030 appears likely, and there is a significant risk of a peak in oil production before 2020.” In other words, the world’s conventional oil production may start declining in not too many years.

It seems to me that if we are in fact reaching limits with respect to oil supply, this should be of considerable concern. We have a financial system that demands economic growth, for reasons that will be discussed later in this paper. At the same time, as we approach limits with respect to oil production, the ability of the world’s economy to grow becomes constrained, because in order for economic growth to occur, we will need to do more and more, with less and less oil.

The conflict of these two forces—a need for economic growth in a world that can no longer provide growing oil supply—sets the financial system up for a systemic risk of collapse. Furthermore, there is significant evidence that the financial problems of 2008 were early signs of this systemic risk affecting the financial system. If oil supply should actually begin to decline in the future, we can expect financial problems of 2008 to return and worsen.

Oil’s Connection to the Economy

Oil is used for a huge number of purposes—transportation fuel, heating fuel, fuel for extracting minerals of all types, lubricant, and raw material for asphalt for road paving, plastics, synthetic cloth, medicines, fertilizer, pesticides, and herbicides, to name a few things. A declining oil supply, or even a level supply, should be a serious concern, with the world’s rising population.

In recent years, there have been many attempts to try to find substitutes for oil, but with very limited success. Ethanol from corn has probably been the biggest success, but in 2009, its use in the United States amounted to only 660,000 barrels a day³, compared to total consumption of oil products of 18.8 million barrels a day⁴, or 3.5 percent of the total. Raising this percentage is proving difficult for several reasons: manufacturers’ warranties only permit the use of 10 percent ethanol in gasoline; ethanol tends to be more expensive than gasoline without subsidies; and there are relatively few stations offering E-85 gasoline.

Other so-called replacements for oil are only very partial replacements, and are still very far away from being full-scale solutions. Biofuel from algae is being investigated, but it is still very expensive, and not yet scalable. Electric cars are being developed, but they still are many years from being ready to replace our huge fleet of cars with internal combustion engines.

¹ Lloyds of London, Sustainable Energy Security: Strategic risks and opportunities for business, Chatham House, London. http://www.chathamhouse.org.uk/files/16720_0610_froggatt_lahn.pdf

² S Sorrel, J Spiers, R Bentley, A Brandt, and R Miller, Global Oil Depletion: A review of the evidence, *Energy Policy*, Vol 38, Issue 9, 5209-5295.

³ U.S. Energy Information Administration, refiners inputs of ethanol, http://www.eia.gov/dnav/pet/pet_pnp_inpt_dc_nus_mbbldpd_a.htm

⁴ U.S. Energy Information Administration, product supplied, http://www.eia.gov/dnav/pet/pet_cons_psup_dc_nus_mbbldpd_a.htm

Systemic Risk Arising from a Financial System that Requires Growth ... by Gail Tverberg

It should be noted that the problem with oil supply is really an economic one. There is a great deal of oil theoretically available—in the oil sands in Canada, for example, and in the oil shale in the U.S. West, and perhaps in the Middle East. But in order for this oil to be available now, huge investments would need to have been made starting at least 10 years ago. Also, in order to justify this investment, the cost of the finished oil products would need to be very high—high in terms of the energy required to extract the oil, and high relative to people’s salaries. At some point, we reach limits in both of these areas (energy use and dollar cost), and we may already be approaching those limits.⁵

Timing

Many observers would like us to believe that limits on oil and other resources are still a long way off, but this is not really true. World crude oil production has already stopped rising. Oil production has been essentially flat from 2005 to 2010,⁶ meaning that more and more cars and trucks must compete for the same fuel supply.

Period	World Crude Oil Supply in Million Barrels per Day	Cost per Barrel of West Texas Intermediate
1970	45.9	
1975	52.8	
1980	59.6	

1985	54.0	
1990	60.5	\$24.53
1995	62.4	\$18.43
2000	68.5	\$30.38
2005	73.7	\$56.64
2010 YTD	73.4	\$77.70

Impacts

While crude oil supply has not yet begun declining, it has been essentially flat since 2005, and this lack of growth is putting tremendous pressure on the world’s financial system, since we now must do more and more with essentially the same oil supply. Oil prices have risen, and this is one source of financial problems, because higher oil prices have a disruptive impact on balance of payments, and can also cause a reduction in profits of companies.

But higher oil prices can also lead to recession and debt defaults. High oil prices don’t give ordinary citizens more salary to spend, so they have to cut back on something else. One possibility is a cutback in discretionary spending, which will tend to lead to recession. If the cutback is in buying new homes, the price of new homes can be expected to drop. James Hamilton wrote a paper called, “Causes and Consequences of the Oil Shock of 2007-2008” showing that the run up in oil prices in the years prior to 2008 was sufficient to cause the major recession we have recently experienced.⁹

⁵ David Murphy, “Further Evidence of the Influence of Energy on the U.S. Economy”, The Oil Drum, April 16, 2009. <http://netenergy.theoil drum.com/node/5304>

⁶ U.S. Energy Information Administration, International Petroleum Monthly, Crude and Condensate from Table 1.1d. <http://www.eia.doe.gov/ipm/supply.html>

⁷ U.S. Energy Information Administration, International Petroleum Monthly, Crude and Condensate from Tables 1.1d and 4.1d. <http://www.eia.doe.gov/ipm/supply.html>

⁸ U.S. Energy Information Administration, Cushing, OK WTI spot price FOB. <http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=rwtc&f=a>

⁹ James Hamilton, Causes and Consequences of the Oil Shock of 2007-2008, Brookings Papers on Economic Activity, 2009. http://www.brookings.edu/economics/bpea/~media/Files/Programs/ES/BPEA/2009_spring_bpea_papers/2009_spring_bpea_hamilton.pdf

Systemic Risk Arising from a Financial System that Requires Growth ... by Gail Tverberg

If oil prices rise, they may also cause debt defaults. This occurs because people's salaries don't rise correspondingly, so they need to cut back somewhere, and some will default on debts. Businesses may also be more at risk of debt defaults, if their cash flow is declining. The lower values of homes may also play a role in increasing defaults.

While one cannot prove that the aforementioned problems were the only causes of the financial crisis of 2008, there is certainly a strong similarity between the expected problems and the types of problems we have recently seen.

It should be noted, too, that a seeming over-supply of oil should not be surprising. As higher prices give rise to recession, this causes a cutback in demand. Reduction in credit availability also tends to reduce demand. So the oil available may be more expensive than what individuals and businesses can afford. If the oil available were cheaper, the oversupply would disappear.

Economic System's Need for Growth

Our current economic system includes a huge amount of debt. Money is loaned into existence. Debt is used to finance many business expansions. Governments rely heavily on debt.

The U.S. economy has been growing for many years, with only brief interruptions, so nearly all of our experience

with borrowing money, and paying it back with interest, has been during periods of economic growth.

Borrowing from the future is relatively easy when the economy is growing, because when the time comes to pay back the debt, the debtor's economic condition is likely to be as good as it was when the loan was taken out, and may even be better. So defaults are relatively uncommon, and the growth in the economy between the time the loan was taken out and the time it is repaid provides some contribution toward the interest payments.

But what if we start encountering a very different kind of world, one with a decline in oil supplies? If oil resources constrain economic growth, debt defaults can be expected to rise, and the whole debt system underlying our financial system is at risk. Insurance companies are very much at risk too, because many of their assets are bonds. In the past, these bonds would have been repaid with interest, but in a world with little economic growth, and perhaps economic decline, the risk of default becomes much higher.

Even if we should discover a way around our problems—say a new technology, which permits more oil extraction at lower cost, or a better substitute for oil, financial institutions—including insurance companies—are still likely to encounter substantial systemic risk related to debt defaults in the next few years.

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Managing Systemic Risk in Retirement Systems

by Minaz H. Lalani

Retirement systems are built on three foundational pillars:

- employer-sponsored pensions
- government pensions
- pensions provided by personal savings.

Historically, the total pension consists of the following distribution: 50 percent coming from employer-provided pensions; 25 percent from government benefits; and the remaining shortfall of 25 percent being provided from personal savings¹.

Employer-sponsored pensions have gradually been shifting pension risk² to individuals by moving from defined benefit plans to defined contribution plans³. The effect is that the portion contributed by employer-sponsored pensions toward the retirement pillar is expected to be significantly reduced to around 30 percent (from 50 percent). In addition, government pensions are under review and the long-term expectation is that government pensions will be reduced, or paid at a later retirement age so as to reduce the cost of these government programs. The anticipated shortfall (in excess of 50 percent), due to the reduction in employer-sponsored and government pensions, is expected to be recovered from personal savings.

For the short to medium term, employers and the government will be transferring the provision of retirement to individuals who will be ill-equipped to have adequate savings for retirement⁴. The inadequacy of savings will be compounded by the fact that individuals will require more savings as a result of increased life expectancy, transfer of post-retirement medical costs onto individuals, and the expectation of lower investment returns in the “new normal” world⁵. In combination, these trends will yield unintended consequences. In my view, without any explicit actions, these trends will result in social unrest (society may not accept these changes), sociological impact (e.g., society will have declining living standards), organizational workforce impact (employees will be unable to afford retirement, thus working longer and deferring their retirement age), institutional impact (financial companies will have to restructure their product offerings) and restructuring of the economy (financial regulators will have to deal with the decline of corporate defined benefit pension plans as a major player in the financial market).

In this essay, potential actions are recommended for key stakeholders to manage the unintended consequences of a systemic risk “brewing” within the retirement system today.

¹ For simplicity, the rounded percentages are determined on a generalized framework of pensions in Canada for a career individual earning \$55,000 with 35 years of service. Of course, such percentages will differ by salary bands, service periods, and eligibility to government pensions and by country. Despite this, the commentary in this essay is still applicable for most circumstances and for other countries with a mature retirement system.

² **Pension Risk:** a complex and multi-faceted concept. It incorporates the following key risks: investment, interest rate, inflation, salary, longevity, demographic, retirement adequacy, governance and regulatory.

³ **Defined-Benefit Plan:** a plan which provides a pension based on a defined accrual formula based on years of service and salary history; usually, an employer will take most of the pension risk (e.g. volatility of on-going contributions, or payment of any solvency deficiency) related to such a plan.

Defined Contribution Plan: a plan based on a defined-contribution formula, which grows with investment return over the individual's working period to provide an accumulated fund for provision of pension; usually the individual is responsible for most of the pension risk (e.g. investment risk) related to such a plan.

⁴ Canadian Institute of Actuaries (2007), *Planning for Retirement: Are Canadians Saving Enough?*, CIA and University of Waterloo.

⁵ “New Normal” is the phrase coined by PIMCO to describe an economic environment of de-leveraging, re-regulation and de-globalization resulting in slower, long-term economic growth.

Managing Systemic Risk in Retirement Systems *by Minaz H. Lalani*

Governments

In countries where a pay-as-you-go approach is used to deliver government pensions, it is imperative that such governments stay at arm's length and facilitate a process to fund future pension obligations through a separate trust apart from the general revenues of the government. Countries may want to adopt Canada's approach, as it has in place an effective working model consisting of a separate trust and robust governance structure. In addition, all countries should remove uncertainty and have a long-term policy clearly articulated in legislation that states the level of government pension, which individuals can expect to receive. This would allow individuals and their pension advisors to better focus on retirement planning for the future. Since the expectation is that individuals should be directly responsible for a significant portion of their retirement income, governments could also provide meaningful incentives (e.g. tax credits) to individuals who attain a threshold level of savings for adequate retirement as prescribed (after collaboration and agreement with pension experts), or to individuals who participate and complete a certain prescribed set of educational courses on retirement planning. Governments could consider sponsorship of voluntary programs to facilitate provision of retirement for small to medium size companies who currently do not provide pensions to their employees⁶.

Employers

In most countries, it is a fact that employers have been moving to defined contribution plans. This is due to increasingly complex pension funding rules and unclear, am-

biguous surplus ownership rules for defined-benefit plans. The result has been the underfunding of pension plans to minimize future actuarial surpluses. It may be too late to reverse the trend away from defined benefit plans; however, simplicity and clarity of pension legislation could slow the trend. Most employers have introduced auto-enrolment, auto-deductions and other auto-features in defined contribution plans to ensure that their employees adequately save for retirement. This is a great start; however, the underlying issue is that employer contributions to defined-contribution plans are significantly less than defined-benefit plans. Employers should be voluntarily asked to revisit their defined contribution plan designs and mirror the aggregate contributions paid into the defined benefit plans. Failing that, minimum defined contributions should be legislated so that all employers contribute toward an employee's retirement account whether it is in a registered/qualified or non-registered/non-qualified account. Of course, there will be push-back and resistance from employers, but governments need to consider the long-term social and societal impact of inadequate retirement income. Some forward-looking employers may welcome such an initiative, as it could allow such organizations to effectively manage their workforce. In other words, employers will be able to develop robust growth plans to manage attrition and retirement in a socially acceptable manner (employees would have adequate income to retire on).

Financial Institutions

Investment managers/counsellors, life insurance companies and trust companies are key stakeholders in the retirement industry. Traditionally, each of them has fulfilled an

⁶ Ambachtscheer, Keith (2008), The Canada Supplementary Pension Plan, Towards an Adequate, Affordable Pension for All Canadians," C.D Howe Institute Commentary No. 265.

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important role of managing assets and/or administering defined benefit pension plans. Also, in the emerging defined contribution market, these stakeholders have continued to be major players fulfilling similar roles. However, these institutions need to switch their focus on delivering innovative retirement and investment products, and implementing creative retirement educational programs. For example, an innovative retirement retail product would allow employees to manage their longevity risk and crystallize their retirement income by an annual/periodic purchase of deferred annuities over the employee's working lifetime. Creative retirement education programs could incorporate dynamic modelling of employee's retirement income, taking into account employee's income from all sources, and incorporating expenses from personal data and comparative mainstream data. Currently, pension funds are very active in the financial markets from an investment and governance standpoint. With the decline of defined-benefit plans, and subsequently the maturity (pension outflows will exceed contribution, expenses and investment) of these plans, there will be a material impact on the role of pension funds in the financial marketplace. It would be prudent for market regulators to anticipate the consequences and develop strategies for a revised financial infrastructure.

Individuals

Retirement risk has the most impact on individuals who have to make provision for their retirement either as pension plan members or non-pension members, and as citizens who have to fund government pensions directly (via pension contributions) or indirectly (via tax payments). Unfortunately, individuals do not have the ability to take actions to minimize systemic risk. However, individuals can take steps to understand their personal affairs and make adequate provision to save for retirement. An individual can be helped with retirement with proper education from the government, employer and financial institutions (as stated earlier). Collectively, individuals who care about retirement risks can vote out non-performing governments, or choose their employer, however, this is a "tall-order" and it is easier said than done.

At present, we do not "appear" to be in an immediate crisis mode on retirement, therefore, none of the above approaches may seem relevant. Unfortunately, retirement risk is an emerging and "silent" systemic risk; such a risk if left unaddressed, will creep into our society with damaging consequences. Prudence dictates that all stakeholders should take immediate action to evaluate the systemic risk posed by a retirement crisis.

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Worry About Your Own Systemic Risk Exposures

by David Ingram

You would not know it from the news, but in fact, a very large number of financial firms and a few regulators did correctly identify the looming problems that led to the financial crisis and took reasonable steps to avoid excessive losses.

Almost all of the media attention has been on the firms and regulators who missed the crisis until it was much too late. Now, everyone is talking about how to avoid the next crisis and the focus seems to be on the regulators and the largest firms—in short, those who got it wrong just a few years ago.

But if you are not someone who is in charge of a major financial system, you should be focusing on those who got it right and discerning what you could be doing to prevent your firm from experiencing excessive losses in future crises. *This article is NOT written for the Chairman of the Fed, or the head of the ECB, IMF or World Bank.*

Systemic risks

For the financial system to be disrupted, two things need to be true:

1. There needs to be an exposure that everyone believes or suspects will turn into a loss of an amount that exceeds the capacity to bear losses of a large number of participants in the system.
2. There needs to be either a high degree of interdependency in the system or else widespread direct exposure to the loss-making large exposure. The system may seize up because the losses are known and the institutions are known to be insolvent or more commonly, because the losses are unknown.

Unknown losses can potentially bring the system to a halt at a much lower amount of loss than known losses. But withholding information about the exposures and the losses

is a very common strategy that firms employ when (a) they are not completely sure about the amount of their losses, or (b) when they are sure, and they are insolvent.

The emerging risk approach

Financial crises and the associated systemic risks can be treated in exactly the same way as any other emerging risks. Emerging risks are those risks where there might be a very large potential adverse impact but where frequency is either unknown or presumed to be very low. A typical emerging risk management process would involve:

1. Brainstorming potential risks
2. Choosing risks for further work
3. Identifying the potential impact of selected risks
4. Determining the drivers of risks and potential risk mitigants for those risks where impact is seen to be of concern
5. Identifying leading indicators of increasing likelihood of occurrence
6. Developing a plan for adoption of risk mitigants if/when certain likelihood indicator triggers are met
7. Monitoring risk indicators
8. Testing risk mitigation plans (if possible)
9. Repeating the cycle periodically

This type of process could easily be applied to potential systemic risks. Remember the two issues mentioned above that are needed for a system to be disrupted. The emerging risk that one is looking for in this case is one that could create a massive loss among highly interconnected firms.

The exposures that led to the losses which created the systemic problems in 2008 and the rush into tech stocks in 2001 both seemed to be good business choices prior to each

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crash. But it is only by employing emerging-risk thinking that the risk manager can view the market from the outside and see if anything is amiss.

Right now, there are at least four possible sources of next systemic problem: sovereign debt, especially that of the weaker Eurozone governments, Chinese real estate, U.S. commercial real estate and the additional U.S. mortgage loan losses that are still not being recognized. These processes for identifying potential firm exposures to loss from these sources can and should be employed by firms. The steps that can be taken if identified in time could make the difference between a bad quarter and participation in the next round of bailouts, if there is one.

Systemic counterparty risk

Most efforts to protect a firm from systemic risks should be focused on direct exposures to large risks that might become a trigger for future systemic problems. But the other major source of systemic risk exposure is through counterparties. Avoiding excessive exposures through counterparty due diligence is a major source of pillar three market discipline. Fleeing over-exposed counterparties is usually seen as a very last stage gambit in an impending systemic breakdown. But if in the future firms are serious about avoiding systemic losses, they will lighten their exposure to the counterparties who are over-concentrating on the risks that are most likely to be the next systemic problem long before the classic rush for the door.

Bubbles

One of the major shortcomings of neo-classical economics is its blindness to asset bubbles. Two major asset bubbles happened in the past 10 years. Both were completely missed in advance because of an underlying approach that

is based on the assumption that market prices **MUST** be correct. Because asset bubbles are quite likely to be at the heart of future financial crises and systemic risks, it will be important for firms to develop their own indicators for asset bubbles.

One place to look for help with developing a process for identifying potential bubbles is the 2000 book *Irrational Exuberance* by Robert Shiller. He devotes over 200 pages to identifying the tech market bubble of the late 1990s while it was still forming.

Note however, that the tech bubble did not create a market disruption. It was more than large enough, but the exposure to the assets was not concentrated in the banks. Insurers held very large positions, but not large enough that the drop in stock prices disrupted the insurance part of the financial system.

Systemic loss tolerance

Together with the board, management must decide between maximizing profit as the next bubble forms and protecting against losses when the bubble eventually pops. Actions that provide protection against losses from the popping bubble will limit the degree to which the firm enjoys the full gains on the upside. CEOs of some banks that were active in the sub-prime mortgage securities that were the trigger for the financial crisis claimed that if they had restrained their bank's activities in that market, the lower profits that they would have reported relative to their peers would have resulted in their eventual removal from their positions.

The emerging-risk approach described here provides a forum for bringing the potential downside from some new rapidly growing opportunity into the risk discussion. A risk tolerance for each emerging risk can be established as a part

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of step six in the emerging risk approach. The tolerance can be established in relationship to some pre-determined stress test so that if exposures grow rapidly due to explosive growth of that risk in the marketplace, the tolerance may be breached, triggering the planned mitigation steps.

With that simple extension of your definition of emerging risks to include large systematic risks, you may be able to help your firm to stay on the right side of the next systemic crisis.

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Systemic Risk as a Negative Externality

by Rick Gorvett

The recent financial crisis was a significant, but not a unique or inconceivable, event. The inherent uncertainty of economic and financial processes, along with the ever-increasing interconnectedness and interdependence of economies and financial markets, suggests that crisis events are always possible, and, in the end, probably inevitable. Most likely, the best we can do is attempt to minimize the frequency and severity of market-wide financial distress.

The new Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 has numerous provisions involving oversight and monitoring of financial activities and stability, with an eye toward reducing the potential for systemic financial distress. Perhaps one of the more interesting provisions is the liquidation of troubled financial firms by the Federal Deposit Insurance Corporation (FDIC), while limiting the ability of government entities and regulators to implement bailouts and similar interventions. It is certainly unclear at this point how effective this new law will be (in part because of the large number of studies and rules which still must be promulgated by government regulators and agencies).

But one thing is clear: actuaries are well-positioned to contribute significantly to risk management efforts in the area of systemic risk. Many of the products and techniques in insurance and risk management have great potential for helping to identify, measure, and manage systemic risk – especially when that risk is examined within a broader economic context.

Systemic Risk as a Negative Externality

Systemic risk is the risk of significant impairment of the overall economy or financial markets, resulting from actions of the financial intermediary system. In particular, the failure or collapse of one or more financial intermediaries, due to interdependencies and interconnectedness across

firms and economies, can result in financial market instability at a macro level. This instability largely stems from liquidity and flight-to-quality issues.

Thus, systemic financial risk can be viewed, from the perspective of economic theory, as a “negative externality.” A negative externality occurs when a transaction between two parties results in costs which accrue, in part, to one or more third parties – e.g., to society as a whole. In other words, the total cost of a decision by a firm is not borne by that firm, but rather in part by another party. Negative externalities are sometimes referred to as local or neighborhood costs – especially in cases where the externality is most impactful to those who are geographically proximate to the activity or transaction. The classic example of a negative externality is pollution.

The existence of a negative externality may be known at the time of the transaction or activity, or it may be initially unknown and only emerges and is recognized when the transaction or activity is consummated. In general, consumers and society end up paying higher prices and/or taxes in the presence of a negative externality.

Financial intermediary activities which increase the risk of financial distress, instability and crisis may actually benefit a financial firm. But, of course, such increased systemic risk is potentially costly to other firms, consumers, and the economy and financial markets at large. Thus, systemic risk can be viewed as a negative externality.

Reducing Negative Externalities

There are several ways to attempt to address and reduce a negative externality. One is to provide an incentive for

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the firm to avoid or reduce the activity which produces, or causes, the externality. This incentive results from placing a tax on the externality-producing activity. This is referred to as a Pigovian tax, after economist Arthur Pigou. By basing the level of the tax (at least conceptually) on the marginal cost of the societal damages produced, the true cost of the cause of the externality is recognized; assuming that the firm engaging in the activity is the one which pays the tax, the tax forces the firm to internalize the activity's true cost. With respect to systemic risk, such a tax could be risk-based (determined as a function of an individual financial intermediary's specific characteristics – its financial attributes, liquidity situation, and modeled contribution to macro risk), pre-assessed (so that the tax is paid by all firms, including and especially those firms most likely to fail and thus to impose macro costs on the overall markets), and collected for the purpose of partially offsetting future systemic loss costs.

Another approach to reducing a negative externality is through regulation and control. This is indeed a technique which has been, and will continue to be, used with respect to financial market stability and systemic risk. The issue here is that regulation has largely focused on individual fi-

ancial intermediaries; however, the risk of financial market crisis is a function of multi-firm interconnectedness. It is important that regulations directed toward systemic risk focus on the marginal cost to society of adding an additional unit of systemic risk to a firm's operations. As with the Pigovian tax, this quantification can be aided by appropriate economic and financial risk modeling.

A third approach is a market approach – a system involving permits (which are tradable) for engaging in the externality-producing activity. A carbon tax and permit market is an example of such a facility. One issue with the application of this approach to systemic financial risk would be how the level of “acceptable” overall systemic risk would be determined (and then distributed or allocated to the various financial intermediaries). However, if such a quantity can be determined, this approach would allow systemic risk to become an optimization problem: how to optimize societal benefits (or minimize societal costs) within specified risk-level constraints. Again, actuarial modeling, especially as it is evolving within the context of enterprise risk management, can provide techniques of significant value to such a process.

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Who Dares Oppose a Boom?

by David Merkel

At the very heart of financial regulatory reform, an error was made at the very beginning. As is common in American culture, the assumption was made that our laws and regulations were inadequate, rather than existing laws and regulations were inadequately enforced. As such, the law that was eventually passed largely strengthened the strictures against the crimes that happened.

But, the same regulators were left in place. Almost no one was fired for the incompetence demonstrated in not using the regulations that already existed for preventing shoddy loan underwriting. The SEC had the right to set capital ratios at 12 to 1, but waived that right and allowed the investment banks to be unlimited in their leverage. The GSEs took far too much credit risk, but who, if anyone, was fired for allowing them to do so? Or, who was fired for doing so?

The trouble is this: during boom times, it is virtually impossible to get regulators to oppose politicians who are being lobbied by financial services organizations when they are making gobs of money, and it all seems riskless, as the bubble expands. This is endemic to human nature; it is politically impossible to oppose booms. I for one wrote extensively about the coming housing bust, but all I received was derision. I wrote about the blowup coming in subprime residential mortgage bonds, but all I got was a yawn.

So, unless we get a new set of regulators that are willing to be junkyard dogs, I don't care what laws we put in place. Laws are only as good as those that are willing to enforce them.

Problems with the Financial Regulatory Reform Bill

Aside from a lack of change in the regulatory apparatus and personnel, my biggest difficulty with financial regulatory reform bill was a lack of change dealing with risk-based

liquidity. We don't get runs on banks because of the insurance from the FDIC. But banks often find themselves facing a run if they use a lot of repo funding. Funding long-term assets short term is a recipe for disaster. The bill made no effective change with respect to this.

And though there will be higher levels of capital required of banks, which is good, there was not enough thought given to the riskiness of assets and how much capital they require. Basel III basically kept the same structure as Basel II, but did not make significant corrections to the differences in risk regarding assets. Further, they still allow companies to evaluate their own risks, rather than having a conservative and standardized approach for evaluating risk.

And to the degree that Americans believe that the financial regulatory reform bill will it prove the situation, it has given them a false sense of security. And that could be the worst problem of all.

Creating an Early Warning System

There is great demand for an early warning system that could highlight whether systemic risk is getting too high for the financial economy overall, or whether risk is getting too high for any given subclass of financial risks in the economy. I am happy to say that creating an early warning system would be easy. Consider the differences between fresh produce and financial assets:

- **Time horizon**—fresh produce is perishable, whereas most risky assets are long-dated, or in the case of equities, have indefinite lives.
- **Ease of creation**—new securities can be created easily, but farming takes time and effort.

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- **Excess supply vs. excess demand**—with a bumper crop, there is excess supply, and the supply is typically high quality. Now to induce buyers to buy more than they usually do, the price must be low. With financial assets, demand drives the process. Collateralized debt obligations were profitable to create, and that led to a bid for risky debt instruments. The same was true for many structured products. The demand for yield, disregarding safety, created a lot of risky debt and derivatives.
- **Low supply vs. low demand**—with a bad crop, there is inadequate supply, and the supply is typically low quality. Prices are high because of scarcity. With financial assets, low demand makes the process freeze. What few deals are getting done are probably good ones. Same for commercial and residential mortgage lending. Only the best deals are getting done.

Fresh produce is what it is, a perishable commodity, where quantity and quality are positively correlated, and pricing is negatively correlated. Financial assets don't perish rapidly, quantity and quality are negatively correlated, and pricing is often positively correlated to the quantity of assets issued, since the demand for assets varies more than the supply. Whereas, with fresh produce, the supply varies more than the demand.

When I was a corporate bond manager, one of the first things that I learned was that when issuance is heavy, typically future performance will be bad. Whenever there is high growth in debt in any sector of the economy, it is usually a sign that a mania is going on. But it is very hard for a corporate bond manager who is benchmarked to an index to underweight the hot sector.

It is also very hard for a loan underwriter at a bank to stay conservative when he is being pushed for volume growth

from his superiors, and most of his competitors are being liberal as anything. It is hard for anyone in the financial services arena to not follow the prevailing tendency to lower credit standards during a boom.

So if I were to give advice to the new office studying systemic risk, I would give this one very simple bit of advice: look for the sector where debt is growing faster than what is ordinary. It's that simple.

If they want to get a little more complex, I would tell them this: when a boom begins, typically the assets in question are fairly valued, and are reasonably financed. There is also positive cash flow from buying the asset and financing it ordinarily. But as the boom progresses, it becomes harder to get positive cash flow from buying the asset and financing it, because the asset price has risen. At this point, a compromise is made. The buyer of the asset will use more debt and less equity, and/or, he will shorten the terms of the lending, buying a long-term asset, but financing it short-term.

Near the end of the boom, there is no positive short-term cash flow to be found, and the continuing rise in asset prices has momentum. Some economic players become willing to buy the asset in question at prices so high that they suffer negative cash flow. They must feed the asset in order to hold it.

It is at that point that bubbles typically pop, because the resources necessary to finance the bubble exceed the cash flows that the assets can generate. And so I would say to the new office studying systemic risk that they should look for situations where people are relying on capital gains in order to make money. Anytime an arbitrage goes negative, it is a red flag.

Who Dares Oppose a Boom? by David Merkel

The new financial regulatory reform bill did create an office for analyzing systemic risk, and created a council that supposedly will manage it. Would it be smart to concentrate the efforts into one leader who will both analyze and control systemic risk?

For better or worse, Americans tend to look for one strong leader who will lead them out of their problems. Anyone who might be chief risk officer of the United States, would have to have control over the Federal Reserve, which creates most of the systemic risk that we have through its monetary policy, and its lack of leadership in overseeing the banks. I don't think it's politically possible to put a risk manager in charge of the Fed, though it might be desirable to do so. The Federal Reserve always gets what it wants.

Summary

I don't have a lot of hope that the current financial regulatory reform bill will improve matters much. The same regulators are in place, who did not use the laws that they had available to them to prevent the last crisis.

Systemic risk can be prevented if regulators focus on areas where debt is growing dramatically, and where cash flow from buying and borrowing is diminishing dramatically. But it is intensely difficult to stand in the way of a boom, and tell everyone "Stop!" The politics just don't favor it.

Finally, it would be difficult to create a chief risk officer of the United States. The current politics do not favor creating such a strong office, because it would have to control the Federal Reserve.

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Risk Management and the Board of Directors: Suggestions for Reform

by *Richard Leblanc*

The causes to the global financial crisis are multiple and interdependent. What is reasonably clear however, is that the directors on boards of significant financial institutions in the US and UK did not possess level of understanding of risk necessary to properly oversee management and the complex products and risks being approved. This lack of understanding is a result of the dominance of agency theory and regulations implemented after WorldCom and Enron in 2002 (including S-Ox and the NYSE listing standards). These regulations and listing standards emphasized structural independence of boards of directors and board leadership. What this means is that complex investment banking boards and board committees were led and populated with non-executive chairs and CEOs of unrelated industries who were regarded as formally “independent,” yet many lacked solid banking experience. Boards did however comply with regulatory requirements at this time.

Regulators lacked sufficient communication and resources to oversee (or even in some cases understand) the complex systemic risks and derivative products. Scholars were of the view (Dalton, 2009, in press) and did express concern in 2002 (Westphal) that research does not support a causal or systemic relationship between board independence and leadership on the one hand, and effectiveness of the board and performance for shareholders on the other. A director could sit on – or indeed chair – the risk committee or the board of a large investment bank without risk literacy.

The rules and regulations have since changed in the US and UK. In the US, in citing the author’s work, a new SEC rule now requires disclosure by listed companies of incumbent and prospective director qualifications, skills and experience. In the UK, a new Code provision calls for a balancing of

director skills, experience and knowledge of the company, with director independence, in constituting the board.

In Canada, based on the author’s work, he had recommended to regulators and institutional shareholders that a regime be implemented focusing on position descriptions for board and committee chairs of listed companies, a competency-based recruitment model for individual directors, and that individual directors be assessed on an individual basis based on the achievement of their relevant position descriptions and the competencies and skills each director is expected to bring to the board. These practices have since permeated to government and not for profit boards, including linking the re-nomination of a director with that director’s assessment by other directors. Banking institutions have had to recruit and assess directors on the basis of competency since 2005.

What is clear now is that standard-setters – including the Basel Committee on Banking Supervision, the Financial Stability Board, the Senior Supervisors Group, the UK Corporate Governance Code and others – have begun to emphasize the individual competencies of directors and board chairs, including specifically in respect of banking knowledge and risk management.

The adjustment of performance metrics (ex ante) and awards (ex post) as a result of risk is developing. Metrics such as TSR, revenue, profit, turnover, market share per se lack robust adjustments for risk, in financial institutions in particular. Compensation committees, management and advisors should be tasked with implementing robust risk-adjusted compensation and meaningfully disclose the achievement of this to regulators and other stakeholders.

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Second, the stature, compensation, independence and reporting structure of the risk function within the organization should reflect the importance attributed to this role for the company. The risk function (e.g., CRO, or otherwise) should have a direct line of reporting to key board committees and the board itself.

Third, directors on a board should have unambiguous authority to insist upon, as and when necessary in the board's or a committee's discretion, independent, combined assurance for any material business risk and related internal controls and accountability being attested to by management, both for financial and non-financial (or sustainability) risks. The assurance provider should report directly to the board or

committee, and funding should be provided by the company. When education on risk management and internal controls is required, it should be provided to the board, relevant committee or individual director, as requested.

The foregoing reforms – including the recruitment and assessment of directors with a view to their knowledge of the industry and risk management and leadership qualities; the proper reporting of risk by management; the implementation of a risk-adjusted compensation regime; and the retention of assurance providers over risk, would go a long way to ensuring the effective governance of risk by a board of directors. Risk managers have a key role to play.

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Victory at All Costs

by Jin Li and Tim Cardinal¹

“Upon this battle depends the survival ... If we can stand ... all ... may move forward into broad, sunlit uplands. But if we fail, then the whole world, ... will sink into the abyss ... Let us therefore brace ourselves to our duties, and so bear ourselves that, if ... {we} last ... men will say, “This was their finest hour.” Winston Churchill on the advent of the Battle of Britain in his famous “Their Finest Hour” speech on June 18, 1940.

Today our financial and market systems are beset by challenges. The second *Risk Management Call for Essays* asks many questions. In general the answers are yes. However, historical experience suggests there are significant obstacles. A fundamental obstacle is one that has been around for a long time – we are human. The second *Risk Management Call for Essays* seeks “thought leadership on the ERM discipline and the essential elements needed ...” and previously comments, “Ultimately, it becomes a story of risk that manifests itself through the decisions and behavior of people.” We could not agree more.

A quintessential element is integrity—trust in doing the right thing. The fundamental foundation of a sovereigns’ financial and risk systems and corporations’ insurance products is trust in delivering on long-term promises. Long-term implies a process (ERM) to balance and manage risks and economic growth. Decisions are not made by governments, institutions, corporations or policies. Decisions are made by people. Laws, policies and regulations attempt to legislate moral behavior, but common knowledge states, “You can’t legislate morality.” Even if permissible, it might be okay to do but might not be the right thing to do or may be the wrong thing.

The financial crisis had a dramatic impact on many individuals, companies and institutions that all responded in some

fashion. Governments passed legislation. Regulators found overlaps and omissions in oversight and also revisited and/or accelerated regulations. In the insurance sector, the NAIC’s Solvency Modernization Initiative and EU’s Solvency II have extensive requirements including embedding ERM into culture, decision making and business activities.

Government institutions and regulators face similar ERM challenges as corporations: integration of silos (jurisdiction, regulatory, etc.), acquisition of (risk) intelligence, behavior/culture, and decision making. The crisis has illustrated that embedding ERM is difficult to effectively implement in reality for both corporations and governments as does recent experience: Madoff, Toyota and BP. Behavioral hindsight critiques remind us of Steven Kerr’s classic management article, “The Folly of Rewarding A While Hoping for B.”²

The first *Risk Management Call for Essays* called for lessons learned. We pose four questions for the reader. Did we learn our lesson? Would post-crisis actions and developments, while worthy endeavors, have made a difference? Was government intervention or non-intervention appropriate—was it proactive, disciplined, well-thought-out and well-executed? Was the crisis severe enough?

¹ In this essay, the authors incorporated material from two forthcoming articles: Cardinal, T. and Li, J., *ERM & BI – Lessons From WWII Codebreakers*, forthcoming Contingencies 2011 Issue and Cardinal, T. and Li, J., *The Softer Side of ERM*, forthcoming *The Actuary* 2011 Issue

² Kerr, S. *The Academy of Management Executive*, 1995 Vol. 9 No. 1 7-14.

Victory at All Costs by Jin Li and Tim Cardinal¹

Convergence is a theme that has been gaining momentum. Supervision, reporting, solvency and capital standards are converging within and across jurisdictions world-wide as well as becoming less rules-based and more principle-based. Convergence has and will unleash a Pandora's box. The *hope* saving us from *panic* is encapsulated by collaboration, wisdom and judgment. ERM acquires and implements business intelligence (BI) in making business and regulatory decisions in the face of ambiguity. These become useful when put into action resulting from collaborative choices made by an organization's decision makers exercising judgment. Thus ERM is inexorably tied to strategic organizational behavior (SOB).³

SOB is people and process centric: it studies how people, processes, teams and organizations behave, collaborate and make decisions to obtain sustainable competitive advantages resulting in performance. The hard sciences focus on things, mostly quantitative, and rules/policies and are necessary but not sufficient for successful ERM implementation and execution. Much attention is given to the acquisition of (risk) intelligence, such as the second *Risk Management Call for Essays'* question, "is it possible to effectively develop early warning indicators." We must also consider how intelligence is put into action. There are five stages to formulate and make intelligence useful⁴: 1) acquisition, 2) delivery, 3) acceptance, 4) interpretation and 5) implementation.

We can learn lessons by the responses to perhaps the most severe crisis, WWII. The Allies' early effort in ac-

quiring and using intelligence has the same plot as ERM and the financial crisis. Initially, the degree of collaboration between Intelligence Decryption and Interpretation departments and commanders (end users) and between the Allies was neither extensive nor effective. Various departments and military branches operated in silos each with inadequate resources and staffing. They learned that silos were ineffective and that intelligence was only as good as its interpretation and the use made of it.

The British included all who needed to know, shared best practices, varied techniques, invoked new technologies, and had an impressive degree of unification, communication and collaboration—an extraordinary singleness of purpose. In contrast the Japanese and Germans withheld information, were not as flexible or adaptable, confined direction to a small group and fixated on ideas and strategies made obsolete by events.

The Allies' response during WWII was multi-faceted. In addition to investing heavily in technologies, they recruited non-military people and industries to utilize resources and ingenuity from manufacturing, logistics, and transportation, etc. They changed work culture, facilitated an unprecedented coordination of silos, fostered transparency, and created collaborative high involvement cross-functional teams. They exemplified adaptation, flexibility, responsiveness and being learning organizations. We can learn from and apply all these lessons today.

³ The SOB material is derived from Hitt, M., Miller, C. and Colella, A. *Organizational Behavior: A Strategic Approach*, 2nd edn. Hoboken NJ: Wiley, 2008.

⁴ The military material is derived from Keegan, J. *Intelligence In War*, New York: Knopf, 2003.

Victory at All Costs by Jin Li and Tim Cardinal¹

Supervisory agencies, like modern intelligence agencies, have become formidable bureaucracies staffed with full-time professionals. They often operate in silos not sharing what they know from their companion agencies. During Hurricane Katrina, various federal, state and local agencies were ineffective—disaster emergency plans were nice in appearance but ugly in substance. Before and during the financial crisis, regulatory supervisors operated in silos. Conventional wisdom says knowledge is power. However, foreknowledge is no protection against disaster. ERM indicators, supervision and frameworks are necessary but not sufficient for efficacy. Intelligence needs to be accepted, interpreted, and implemented, and implemented with force.

Centralized networks such as traditional command-and-control hierarchal management are appropriate for simple tasks requiring efficiency, speed and accuracy. Decentralized networks such as high-involvement management that integrates within and across organizational units and hierarchies are appropriate for solving complex problems and are better at timely and reliable intelligence and response time.

Supervisory ERM implementation and execution obstacles include communication barriers, decision-making pitfalls and conflicts. Organizational communication barriers include information overload, noise, time pressure, information distortion and cross-cultural barriers which include time zones, different languages and different regulatory jurisdictions. Intelligence distortion such as withholding or filtering intelligence vertically and horizontally severely limits the use of BI and ERM. Single node connections between silos, hierarchies and

BI stages exacerbate distortion. In contrast, transparency incorporates the process of enlarging internal circles of engagement and information sharing.

Decision-making pitfalls include individual biases such as cognitive, confirmation, anchoring, ease of recall and sunk-costs and organizational pitfalls such as group-think, common information-bias, diversity-based infighting, and risky shifts (group decisions tend to shift toward increased risk more often than toward increased cautiousness). Appropriate responses to conflict, which can be dysfunctional or functional, are situational. Rules and policies have limits. Effectiveness relies on people, processes, collaboration and judgment.

Historical experience teaches us the odds are stacked against us to avoid repeating mistakes resulting in crises. Globalization and the power information and decisions made by individuals via the internet have increased speed and correlations. Risk profiles and appropriate measures and indicators can rapidly change, reducing time and complicating responses. New issues and situations will arise. Creation of risk indicators, new agencies or supervisor CROs could be in vain or self-inflict problems. Done right, it could result in quickly bringing the right people together at the right time, sharing the right intelligence, asking the right questions, having the right dialogue, making the right decision, applying the right resources and taking the right actions.

Our advice is to focus on characteristics of a commitment organization encapsulated by the table below. In

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building an effective Supervisory ERM framework, in addition to what and why focus on the how. How will the indicators and other intelligence be robust, adaptable, timely, understandable, useable, relevant, timely, tangible and actionable? Political pressure will be intense.

Respond and/or intervene too slow, too fast, too heavy or too light and pressure will intensify. How will there be transparency, collaboration, checks and balances, and what will be the decision-making process and with what authority?

Control ERM & BI

- Silos
- Centralized communication networks
- Single points of connectivity
- Power resides in positions
- Need to know; secretive
- Club member only
- Separation/Partition
- Exclusive
- Withhold intel downstream
- Filter/censor up
- Top dictates solutions; bottom carries out orders
- Reports far-removed from source
- Non- & Miscommunication
- Single perspective/measures
- Delays
- Fixated beliefs
- Limits sharing
- Cost minimization

High Involvement ERM & BI

- Enterprise/global
- Decentralized communication networks
- Multiple connectivity points
- Power resides in interactions
- Transparent
- Wide circles of engagement/delegation
- Collaboration
- Inclusive
- Take in confidence/information sharing
- Inform, Alert
- All levels engaged; top receptive to bottom-up ideas
- Reports from/close to the source
- Dialogue
- Multiple perspectives/measures
- Speed
- Receives & explores alternatives
- Promotes sharing best practices
- Investment maximization

It is possible to have strong leaders in a decentralized, high-involvement, high-commitment, high-performance organization. Lincoln and Churchill come to mind as individuals we would choose as Supervisory CROs. In the

end it is victory that matters. As Churchill said, “Victory at all costs ... victory however long and hard the road may be; for without victory, there is no survival.”

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The Financial Crisis: Why Won't We Use the F-(raud) Word?

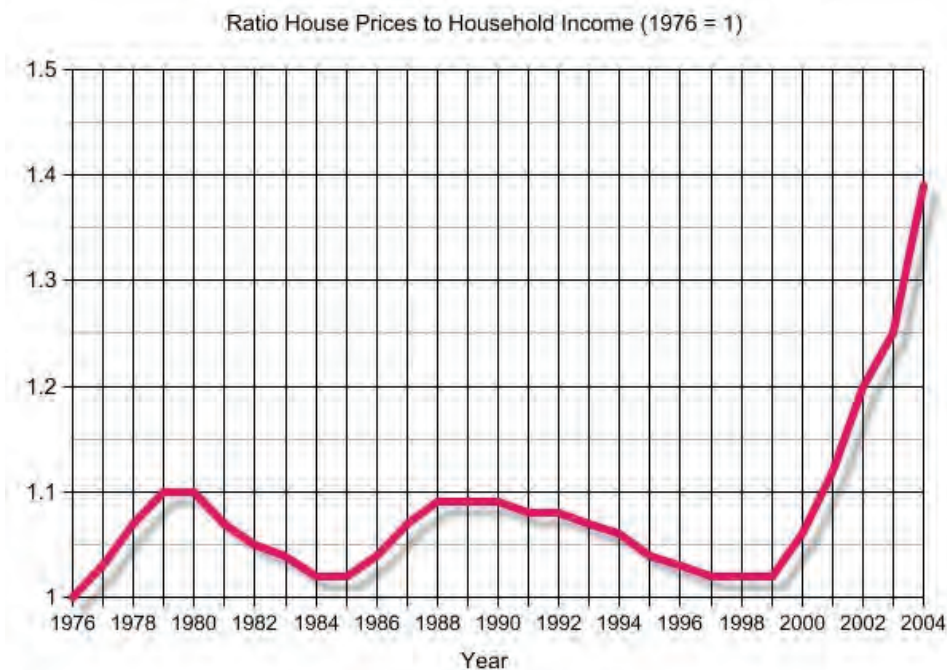
by Louise Francis

In the late 1980s and early 1990s many parts of the United States experienced a housing bubble followed by a bust. The history of the bubble as manifested in southern California is cataloged in “History of a Housing Bubble,”¹ where newspaper headlines change from “Housing Sales Boom Keeps Inventories Slim” in 1986 to “County’s New Home Sales Plunge 42 Percent in Quarter” in 1991. In the mid 2000s another housing bubble occurred in many parts of the United States and the bursting of that bubble, beginning approximately in 2007, precipitated a global financial crisis (GFC).

The Joint Risk Management Section² (JRMS) also sponsored a research project “The Financial Crisis and Lessons Learned for Insurers.”³ The project placed primary blame on

the key assumption utilized both by modelers and the banks when they assessed and priced the massive risk that caused the crisis. That assumption was that housing prices never go down. “This optimistic belief was shared by policymakers, economists, and market participants in general, permeated the models used by rating agencies to assign inflated ratings to securities built from subprime mortgages, and was reinforced, for a time, in market prices through a self-fulfilling prophecy.”⁴ What is most stunning about this assumption is that it refutes the actual lived experience of many people, i.e., the housing bubble and bust in the late ‘80s and early ‘90s. In addition, publically available statistics could readily have been used to carefully assess the critical assumptions about housing prices. An example displaying housing prices relative to median household income is shown in Chart 1.

Chart 1: Ratio of House Price to Household Income⁵



¹ http://rntl.net/history_of_a_housing_bubble.htm

² a collaboration of the Society of Actuaries, Casualty Actuarial Society and Canadian Institute of Actuaries

³ Klein R., Ma G., Ulm E., Wei X. and Zanjani G., “The Financial Crisis, Lessons Learned for Insurers”, 2009, <http://www.soa.org/research/research-projects/finance-investment/research-fin-crisis.aspx>

⁴ *ibid.*, Klein et al, 2009, Executive Summary

⁵ Graph from <http://photos1.blogger.com/photoinclude/img/243/2888/640/Ratio.jpg>

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Lewis⁶ makes clear that some investment professionals were stunned at the impropriety of the assumption and believed that at least some of the principals involved knew or suspected that a bubble was underway and that mortgage-related assets were overpriced. The widespread use of inappropriate assumptions invites an examination of the behavior of individual actors in the GFC. Numerous authors have implicated incentive compensation and moral hazard as playing a key role in the GFC. For instance the publication *Risk Management: Current Financial Crisis, Lessons Learned and Future Implications* sponsored by the JRMS presented the views of 35 authors about the roots of the GFC. Some of the causes cited by authors included:

- moral hazard resulting from transferring risk to others, through securitization, leading to a complete failure to underwrite and manage the risks
- compensation incentives that encouraged taking on imprudent risk exposures
- systemic failure of regulatory system
- lack of confidence resulting from accounting opacity and gimmickry
- a bubble of historic proportions that could have been predicted from information available to bank managers and regulators at the time
- inappropriate use of models without consideration of their limitations and without scrutinizing their assumptions for reasonableness

The items on this list are suggestive of significant lapses in good management (accompanied by accommodative lapses in good regulation), if not outright fraud. Compared to past finan-

cial debacles, such as the S&L crisis and the Enron bankruptcy, the role of fraud in the GFC seems not to have received much scrutiny. Even in Senate hearings that were highly critical of some of the large investment firms' behavior, there seems to have been an unwillingness to use the F-(raud) word⁷.

A former regulator (during the S&L crisis) William Black⁸ has been very outspoken about the role of fraud in the GFC. A brief list of some of the evidence of fraud is:

- The regulator of Long Beach (a WaMu subsidiary) found it to be one of the 13 worst institutions in 1997 through 2003⁹. In 2003, the company had so much trouble that WaMu temporarily stopped securitizations from it. However, operations were soon resumed, and Long Beach was to cost WaMu many billions of dollars in losses.
- Lewis documented that the rating agencies performed a minimal analysis of the mortgage securities underlying the pools they rated and refused to develop detailed databases that could have been used for a rigorous evaluation of mortgage loan portfolios.
- Levin and Black¹⁰ cite a memo of S&P management to their employees demanding that they not request loan level data from the companies. Black accuses the rating agencies, as well as the managements of companies that securitized the loans of having a "don't ask, don't tell" policy that limited their exposure to negative data and information that would contradict the high-quality ratings that were assigned.
- Lewis describes how the investment banks devised strategies to convince the credit rating agencies to

⁶ Lewis, Michael, *The Big Short*, 2010.

⁷ Levin, Statement to Senate Permanent Committee on Investigations, April, 2010

⁸ Black is author of the book *The Best Way to Rob a Bank is to Own One*, that describes his experience with fraud during the S&L crisis, and lessons that should have been learned from it

⁹ Levin, 2010

¹⁰ Black, William, interview by Bill Moyers, *Bill Moyers Journal*, April 23, 2010, Black William, "Epidemics of Control Frauds Lead to Intensifying Financial Crises", 2010, www.ssm.com

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assign A or better ratings to subprime pools that did not merit the high ratings. These securities could then be packaged and sold to pension funds and ordinary investors as high-quality fixed investment products.

- Black (2010) refers to certain kinds of mortgages, such as those dubbed by the industry as “liar loans,” as negative expected value products. That is, the product is structured so as to create adverse selection that guarantees a loss.
- The investigative journalism organization ProPublica¹¹ published a report describing how a hedge fund named Magnitar colluded with brokers and investment banks to select some of the most toxic securities to be included in Collateralized Debt Obligations that they then bet against using credit default swaps (CDSs). Their investigation indicated that the Magnitar deals helped to keep the bubble going for an extra two years.

Many Americans have been angered at the extravagant compensation reaped by the managements of the firms that caused the crisis. Prins¹² reported that the CEOs of three firms that experienced subprime related problems, Countrywide, Merrill Lynch and Citigroup, earned a total of \$460 million between 2002 and 2006.

A key environmental condition necessary for financial fraud to become widespread is toleration on the part of legislators and regulators. Markopolis¹³ observed that a revolving door exists between the SEC and Wall Street, with inexperienced employees expecting to spend a few years as regulators followed by a move to much more lucrative jobs on Wall Street with the firms they were regulating. Black notes that for the

past couple of decades federal regulators have been hostile to enforcement of anti-fraud regulations. He notes that the regulators believe that fraud regulation is unnecessary as the market will ultimately correct such abuses, despite abundant evidence from such debacles as the S&L crisis, Enron and other early 2000s frauds, as well as the recent Madoff Ponzi scheme, that refutes this belief. The anti-regulatory ideology is responsible for some of the legislation that fostered the GFC, such as the elimination of Glass-Steagall and the passage of the Commodities Futures Modernization Act (that prohibited regulating derivatives such as CDSs).

William Black is one of only a very few academics in calling for routine monitoring for fraud and suggests that the SEC needs a “chief criminologist.” He points out the SEC is a law enforcement agency, but it is predominantly staffed with lawyers and economists with little expertise in fraud. It therefore needs staff with the experience, expertise and desire to pursue fraud (which will require eliminating the revolving door). He believes that the task of detecting fraud is relatively simple, as “red flag” indicators of fraud are well known and the information required is relatively easy to gather and review.

The Financial Reform bill of 2010 creates new systemic risk regulation. The systemic risk regulator is empowered to collect data, recommend new regulations and intervene when a company is considered to pose a risk. However, much of the new regulatory authority is invested with the Federal Reserve, an organization that some believe enabled the GFC and repeatedly refused to intervene. As Black pointed out, the Fed has the power to intervene in the subprime crisis but chose not to. It knew of deceptive account-

¹¹ Eisenger and Berstein, “The Magnitar Trade: How One Hedge Fund Kept the Bubble Going”, www.propublica.org, April, 2010.

¹² Prins, N, *It Takes a Pillage*, 2009.

¹³ Markopolis, H. *No One Would Listen*, 2010.

⁹ Levin, 2010

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ing manipulations perpetrated by Lehman¹⁴, but chose not to make them change their published financials. Its previous chair Alan Greenspan bluntly told another regulator, Brooksly Bourne¹⁵, that he does not believe in pursuing and prosecuting fraud. Such a fraud friendly environment is bound to enable and even promote fraud. Thus, the author feels that the recently passed financial reforms may be ineffective in addressing a key factor in the GFC: fraud.

Regulators must search for and prosecute fraud. Increasing the emphasis on enforcement and on detecting fraud before it creates a system-wide crisis can be accomplished without any new legislation, though legislative changes in the late 1990s and early 2000s appear to have removed some barriers to fraud. The author of this essay suggests that if fraud is not addressed, future crises, perhaps even worse ones, will occur.

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¹⁴ Valukas, Anton, "Report of the Anton R Velukas, Examiner", United States Bankruptcy Court, March, 2010

¹⁵ Zacchino, N and Scheer, R, "The Woman Who Blew the Whistle on Wall Street", Ms Magazine Fall 2009

Perfect Sunrise: A Warning Before the Perfect Storm

by Max J. Rudolph

The term *Perfect Storm* originally described intense storms that seemed to find the most vulnerable areas. It was made popular by the Sebastian Junger book (and movie) that described a powerful hurricane that hit New England hard. This same term has increasingly been used to describe events during a financial crisis. Pundits claim that markets align in an unimaginable way, creating a *Perfect Storm* of risks that they were powerless to have predicted or prepared for.

Asset managers describe these events as the rarest of rare events. Their models may predict a one in 10,000 year occurrence. Severe overuse of the term *Perfect Storm* has caused it to lose much of its original meaning.

Similarities to Earlier Bubbles and Crashes

The Roaring '20s, Internet era and housing bubble each showed gains over several years and the familiar retort "It's different this time!" But it never is. Greed and easy money dominate the news at those times much as fear and dread dominate during crises.

Each of the three peacetime stock market drops since the creation of the Federal Reserve Bank system have something in common—they followed periods of low volatility and positive returns. Agreement about bubble formation appears only in hindsight, but positively correlated returns were there for all to see. A keen observer saw plenty of warning signs and made better decisions as a result. Surging financial markets eventually mean revert. Contrarian thinking that avoids the herd mentality can be used to seek out mispriced assets, earning a competitive advantage by challenging the consensus.

The period 2003-07 was one of consistently positive returns, from housing to stocks. Yet little concern about stars

aligning was heard. Why? People like to hear good news. Those who warn of impending doom do not get invited to cocktail parties. It is safer for investors to follow the herd than to develop and act upon their own opinions. Few economists or analysts lose their job after agreeing with the misguided majority. The good times act as a warning. Much as a beautiful sunrise appears prior to a storm, outlier market returns provide indicators that should not be ignored.

Dodd-Frank Reform

The recent Dodd-Frank financial reform legislation is a positive step toward reducing systemic risk, but does not go nearly far enough. These suggestions would improve outcomes if built into the regulations.

Improve transparency

Lack of transparency was a major factor in the recent crisis. Dodd-Frank requires more derivatives to trade on public exchanges. This is a good idea, but firms accepting counterparty risk should have knowledge of all material exposures. When government entities have insider knowledge of a firm's shaky finances, efforts should be made to disclose this information publicly. Institutional counterparty risk should never be fully guaranteed by the government. For a fully functioning financial system, counterparty risk must allow credit losses. The market will not reward investors with higher spreads if there is no downside risk.

Those who claim the ability to evaluate company financials including accrual items without fully disclosed assumptions and methods used are fooling themselves. Accrual accounting practices need improved transparency, and ideally this would include public peer review. Too many firms and regulators hide behind tightly defined rules that do not fully address the risks accepted.

Perfect Sunrise: A Warning Before the Perfect Storm by Max J. Rudolph**Focus on the Risks Taken**

Large investment banks were a focus of the recent crisis due to the risks they accepted. Too Big to Fail should be replaced by Too Risky Not to be Allowed to Fail. A firm's size should not be the primary driver for intervention. A firm that engages in proprietary trading should not be a candidate for government bailouts. Guarantees should cover retail deposits at utility-type banks. Regulations for banks with proprietary trading operations should focus on ways to orderly shut down a bankrupt firm. During the buildup to the recent crisis, investment bankers increased systemic risk by providing advice to other entities. They found buyers for securitized assets and recommended aggressive borrowing practices to investors. Dodd-Frank has opened the discussion about advisors having a fiduciary responsibility to retail clients. This seems obvious and should be extended to investment bankers and institutional clients. All financial professionals should be held accountable through aligned incentives.

Compounding and interacting with other systemic risks is leverage. Large-scale borrowing practically guarantees eventual failure, especially when combined with short term funding that requires a continuously liquid market. The market can stay irrational longer than a borrower can stay solvent, and when trouble hits it quickly becomes clear that buying on margin allowed no room for error.

Required Capital and Stress Testing

Capital should be regulated at the group level, with regulation and peer review by teams of experts looking at prioritized risks across multiple time horizons. Growing risks should be addressed before their exposure levels become large.

Ideally, regulatory stress tests should focus on the primary systemic risk driver, concentration. When "all your eggs are in one basket" there is no built-in redundancy. Preven-

tive measures include spreading the risks around, having multiple products, vendors, geographic locations and generally diversifying the risk. These risks will also interact, sometimes in unexpected ways. Contrarian thinkers should be welcomed as stress tests are developed. Their peer review will challenge assumptions, improve brainstorming activities, and ultimately help an entity make better decisions. Concentration risk also occurs based on the way regulators or risk managers view risk. A focus on a single metric or report will seem to work well until it doesn't work at all. For example, Value at Risk (VaR) is an excellent metric when used without the knowledge of the business unit being measured, but is easily manipulated when managers become aware of its use for incentive compensation. In another example, liquidity in short-term borrowing facilities was assumed to always be present and when it shut down surprised almost everyone.

Systemic Risks

Some can identify systemic risks in advance, but it takes an independent mindset and broad latticework of knowledge and historic context. History does indeed repeat itself. The analyst must look skeptically at recent successes to see if they are sustainable. Those who identify bubbles as they form will perform well over a long-time horizon but underperform in many periods. This will be hard for those in publicly traded firms, even though it provides a competitive advantage in the long run. Scenario planning looks at a variety of events that drive outcomes. This will help identify some unintended consequences of a seemingly benign product as it marginally interacts with existing business plans.

Regulators are tied to the political process, so an independent mindset at the new Financial Stability Oversight Council is unlikely to prevail. During boom times a politician's incentives are to feed the fire, not put it out. Congress

Perfect Sunrise: A Warning Before the Perfect Storm by Max J. Rudolph

works on a seniority system, so mere survival is rewarded with power. This discourages contrarian thought.

What should governments do to reduce future systemic risk events? Holding officials accountable for past actions would be a good start but is unlikely. The federal government should create an independent risk office that considers contrarian views as well as those of the majority to identify potential emerging risks and coordinate action plans. This office should be spread geographically around the world to avoid concentration of ideas such as occurs “inside the beltway” in Washington, DC. Systemic risks are best managed at the federal level with one regulator rather than with the states and multiple regulators. Fraud will find weak practices and exploit them.

Both countries and firms should debrief and look forward after events occur. The recent pandemic provided a great learning opportunity. What was done well, and by whom? What could be done better? Is this knowledge transferable

to other risks? The value of having thought about an event is to maintain flexibility. Being able to adjust as events develop provides more value than a plan built around a single scenario that is unlikely to play out exactly as imagined.

Conclusion

When an outlier event occurs, it often follows a period of stability that lulls most into a false sense of security. Risk assessment is an art, not quantifiable science. Experience matters. Firms and countries alike should seek out views that disagree with the consensus and look for indicators that a change is near. Much like the sunrise that is beautiful to look at but warns of impending storms, boom times do not last forever and actually predict the eventual crash. Innovators make great wealth when the masses adopt their idea, but beware when followers join the party late in a bubble. Those who recognize the *Perfect Sunrise* as a warning are better able to reduce their risk exposures. Those who arrived late will enjoy the *Perfect Sunrise*, but when the storms come they will be pummeled by the next *Perfect Storm*.

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Strengthening Systemic Risk Regulation

by Alfred O. Weller

In 1942 after the second battle of El Alamein, Winston Churchill said, “Now this is not the end. It is not even the beginning of the end. But it is, perhaps, the end of the beginning.” In this context, United States regulation of systemic risk is at the start of its beginning. This note describes some of the challenges to be overcome.

Federal law, as of January 3, 2007, addresses systemic risk in Title 7 Agriculture (Commodity Futures Trading Commission), Title 12 Banks and Banking, Title 15 Commerce and Trade (Commodity Futures Trading Commission), and Title 22 Foreign Relations and Intercourse (Treasury reports to Congress on international monetary system). On July 21, 2010 HR 4173 the Dodd-Frank Wall Street Reform and Consumer Protection Act became Public Law 111-203. The new law provides for consideration of systemic risk in review of hedge funds, in liquidation proceedings, and in reports to Congress by the Financial Stability Oversight Council. Further, it provides for possible collection of data on systemic risk by modifying the Investment Advisers Act of 1940.

These laws define the start of the beginning. Although systemic risk is commonly defined as risks leading to the collapse of a financial system or market, current legal definitions are not yet broad enough to comprehend all possible reasons for the collapse of a financial system or market. In fact, a strong argument can be made that insofar as finance exists to support industry and trade, systemic risk should be defined in terms of the collapse of an economy (or sub-economy) and not just financial features of an economy. Evolution of systemic risk regulation will involve definitions, scope and tools.

1. INCIDENCE

We begin with a historical example of Enterprise risk management. In October 1936 the USS Enterprise was launched

at Newport News. She became the most decorated United States ship in World War II because of her service in managing a systemic risk known as Japan. Countries including the United States, the United Kingdom and Australia also had to deal with this systemic risk, not to mention the valiant men and women who served in the military forces of these countries. In this example, the enterprises affected by the systemic risk include people, organizations and countries. The point is that systemic risks affect different enterprises differently and the enterprises subject to systemic risk are not homogeneous or uniform. Successful regulation of systemic risk must recognize the diversity of the individual participants in the system that is at risk and protect each of them. None are expendable. In actuarial terms, the quantification of potential incidence by participant is a traditional actuarial exercise known as individual risk rating. Producing comparable estimates for groups of participants across geographic areas or industries is more commonly termed rate-making. Systemic risk regulation without this actuarial support regarding incidence is necessarily handicapped. Regulators need to know who and what are at risk.

2. MARKET DATA

The model for systemic risk in the earlier United State laws is Long-Term Capital Management (LTCM), a hedge fund that became insolvent in the last millennium. The Federal Reserve decided that its demise posed a systemic risk to many Wall Street firms and implemented a sort of bailout by lowering interest rates. For this reason, early laws on systemic risk view systemic risk as arising from trades by a single enterprise and therefore “preventable” by closely monitoring individual enterprises. More recent laws view systemic risk as a market phenomenon and therefore look to “mitigate,” not “prevent,” systemic risk. But the U.S. laws still address monitoring individual enterprises and have not yet evolved to collecting market data in order to monitor systemic risk as a market phenomenon. Data collection

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relating to evaluation of risk has long been the province of professional actuaries. Data collection and review on a market basis constitute a second key step toward effective systemic risk regulation that depends on actuarial skills.

In regard to market perspective, systemic risk can arise from causes analogous to the Yellowstone eruption, the New Madrid earthquake, tsunamis associated with island volcanoes, and other catastrophic events that affect many enterprises simultaneously and are not revealed by review of individual institution data. Market data can be crucial to successful identification of such systemic risk phenomenon. For example, is the long-term decline in U.S. employment and average wages a reduction in aggregate demand and a contributing cause to current economic problems? Identification of exposure to high frequency low individual severity systemic risk is not yet directly addressed by U.S. law, but corresponding stop-loss aggregate insurance protections have long been a reinsurance product managed by actuaries. Such analysis will be an important part of data collection and review on a market basis.

3. TIME DEPENDANCE

Systemic risk also varies over time. The probabilities associated with systemic risks are anything but constant. Systemic risk requires ongoing monitoring of data to enable prompt regulation as needed. Such assessment is apt to be crucial to regulation keeping pace with market phenomena. Early indicators of evolving risk and the need for corrective regulation are again an area in which actuaries offer special skills and abilities. Assessing changes in systemic risk in order to facilitate early regulatory action is a challenge that also parallels traditional areas of actuarial practice.

Generally systemic risk arises in the context of an inventory of unexpired business and new business. Current mar-

ket positions can be risky because of a lack of synergy with earlier trades and conversely. Such phenomena are familiar to any actuary who has ever worked on a self-insurance program, a pension, or an insurer financial statement. Actuaries are trained to recognize the interaction of contracts maturing or developing and estimates of potential loss affecting an enterprise. Analysis of data at various stages of maturity is an important issue in understanding systemic risk and virtually a daily activity of actuaries. Properly recognizing temporal changes in systemic risk will require such analysis.

4. MONITORING EFFECTS OF REGULATION

Actuaries do not just make predictions; they monitor what happens and refine their predictions over time. Measurement of systemic risk would not be worth much if the effectiveness of regulatory actions could not be tracked and honed to control problems that are discovered. For example, quarterly financial statements requiring quarterly checking of the accuracy of actuarial estimates is common. Systemic risk measures may need more frequent tracking and honing. Regulators will need to monitor the effects of their action. Actuaries are trained not just to assess systemic risk but also to assess the effectiveness of regulatory measures in controlling systemic risk. Need and ability match.

5. MEASURING SYSTEM STRENGTH

Today's U.S. laws discuss systemic risk but are silent on measuring the strength of systems and how this strength compares to the corresponding systemic risks. Measures for systems need to be created. Capital requirements for individual enterprises exist throughout the world and have generally been created with input from actuaries. Measuring system strength (indeed simultaneously measuring the strength of multiple systems) is not yet a solved problem, anymore than colonies on Mars are a solved problem. But

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just as we have confidence that our scientists can solve the problem of interplanetary travel, the writer believes that actuaries together with other professions will solve the problem of assessing system strength as a key step in regulating systemic risk.

* * *

To summarize, we are at the dawn of systemic risk regulation with many issues to resolve. These paragraphs argue that actuarial contributions can significantly accelerate progress in systemic risk regulation. Issues such as incidence and scope of risk, design of market data collection and review, recognition of time dependence of systemic risk, monitoring effects of regulation, and designing measures of strengths for relevant systems are used to illustrate possible actuarial roles.

Systemic risk offers an opportunity to apply actuarial science to improve our nation because there is a need for ac-

tuarial services in order to do the job properly. Actuarial involvement will be driven by need, not compliance considerations. Current U.S. laws barely define systemic risk, let alone the need for actuarial services to properly regulate it. No section of U.S. laws mandates that an actuary or actuaries be part of the Financial Stability Oversight Council (or even part of the Office of Financial Research). We are at the start of the beginning of systemic risk regulation. Actuaries will become involved in systemic risk regulation because the people on the Financial Stability Oversight Council will be expected to and will want to do their jobs well. In this case, well means rapidly establishing a sound regulatory framework, which in turn means involving professional actuaries and their skills in risk management.

The best America is yet to come. Systemic risk regulation has an important role to play in building a better United States. Systemic risk regulation will get there faster with strong professional actuarial contributions.

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It's Securitization, Stupid

by Paul Conlin

The financial reform undertaken since the 2008 Financial Crisis and subsequent economic downturn contains many commendable elements, especially the partial standardization of the credit default swap marketplace. But, as pointed out by many critics, it does not address the (only) two institutions that have no intention of paying back their bailout money – Fannie Mae and Freddie Mac. Further, it did not address a related issue – the securitization of residential mortgages.

Securitization of American residential mortgages has harmful effects at the Main Street-, Wall Street-, and international-levels.

On Main Street, it facilitates and reinforces the removal of the source of funds from the uses of funds. Rather than local lending officers making an evaluation of credit standards in their local community, they can quickly and easily sell their loans in the international financial markets. Gone forever are the days of the local lending officer, like Jimmy Stewart in “It’s a Wonderful Life,” understanding the credit needs of his local community and directly funds, not too little and not too much, to productive investment. The originating lending institution should have significant skin in the game when it makes a loan – the securitization process removes this important financial control.

On Wall Street, the investment banks have too much of an incentive to make money packaging, mis-rating, and trading the resulting securities, and derivatives (credit default swaps) on those securities. And the more opaque and volatile the instruments are, the larger are the fees. Even the best regulation can only mitigate this temptation and incentive, not remove it.

Internationally, securitized mortgages facilitate the funneling of huge amounts of funds from developing-country savers to American home-owners. This both reduces the yields on the funds of those (relatively low income) savers, and encourages price bubbles in the assets of the (relatively well-off) suburban home purchasers. There is no economic value in artificially reinforcing this cycle.

When insurance companies cede their liabilities, they remain on the hook, should the assuming reinsurer fail. They can never wash their hands of a liability they originated. Residential home loan originators should not have this privilege either. It needs to be removed.

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I Want You to Feel Your Pain!

by Dr. Krzysztof Ostaszewski

As time passes from the gripping moments of panic in the financial markets in the fall of 2008, the question of the legacy of the crisis remains with us. The Panic of 2008 has wrought the Great Recession, the first economic crisis since the 1930s in which the United States has experienced two years in a row with unemployment of near 10 percent or more. For some, this is a convincing evidence of excesses of unhampered greed. For others, the events that unfolded provided convincing evidence of pursuit of unlimited power. But the institutional legacy of the crisis appears rather clear: Greatly increased role of the Federal Government of the United States, and the Federal Reserve System, in the economic and financial systems of the United States and the world. In those gripping moments of panic, these two institutions acted mainly in one capacity: As insurers of last resort for systemic risks undertaken by economic and financial decision makers. True, one could view what happened as *retroactive reinsurance*, but regardless of terminology, the actions undertaken are now a part of the path leading to the future, permanently.

Insurance is, as I see it, the most fascinating of all business activities. I hold this view, because I firmly believe that both the public image and the self-image of the insurance industry are at odds with its economic nature. In order to explain my claim, allow me to pose this question: What is the contribution that the insurance industry makes to the economy and to the society? According to the unfortunate public image, there is no contribution: after all, property/casualty companies pay back to their customers about 65 cents for every dollar received in premium, and health insurance companies pay back about 80 cents for each dollar in premium. I always defend those actions to prospective actuarial students by explaining that those poor companies have no choice, they need the money to pay exorbitant salaries of actuaries, but that argument does not always work with the general public.

On the other hand, according to, equally unfortunate, self-image of the industry, the contribution is *protection*. We are paid for providing security, peace of mind, financial well-being, to our customers. When combined with increasingly common compulsion of insurance purchase, this does not create the best of images either.

I humbly submit that both of these propositions are false. The insurance industry, at least of non-compulsory type, would not exist if as a result of its activities the wealth of the entire society did not expand. True, an individual insurance transaction does not create wealth, it merely redistributes the cost of loss, while moving the major portion of the risk from the insureds to the insurer. The funds paid for expenses and profits of the insurer are a net loss to the insureds. How can any value created then? In order to see the source of the value created we should ask ourselves: Why did this transaction happen in the first place? This is very similar to asking the question: Why is ice cream with half the fat and half the calories produced? Obviously, the answer is: So that we can eat twice as much ice cream.

By shifting the risk from the insureds to the insurer, we affect the behavior of the insureds. Once the consequences of the risk are absorbed by someone else, the insureds can assume more risk. For some strange reason, the industry calls this process a *moral hazard*. It is, of course, most of the time, a *moral security*. Having the protection of an insurance contract, the insureds can undertake more economic projects. They can build more factories, or more parks, or more homes. They can plan new enterprises in Utah, in Botswana, in Indonesia, or, one day, on Mars.

In other words, our industry's mission, our contribution to the society, is to get people to do more crazy (well, at least risky) things. We should call this *moral security*, as opposed to the derogatory term: *moral hazard*.

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So why is the industry so concerned with the issue of moral hazard? Actually, by doing so, the insurance industry is expressing a deeper understanding of the nature of its business. An insurance transaction produces three effects:

- A portion of the risks faced by the insured, as specified in the contract, are absorbed by the insurer,
- A portion of the financial resources of the insured are paid to the insurance company, and
- As the result of the transaction, aggregate risks undertaken in the society increase.

The third result is commonly called moral hazard, but if the risks undertaken result in more economic output, greater happiness, greater wealth, etc., the society benefits. The best possible scenario is the situation where wealth created by the new crazy activities undertaken is greater than the expenses and profits of the insurer. And the worst possible scenario is when additional risks created by the insurance contract reduce the overall wealth of the society. An insurance firm entering into a contract has limited information as to whether provision of insurance will result in moral hazard, or moral security. It also has limited tools at its disposal to address that dilemma. Those tools are: the structure of the contract and the pricing of it. The key issue is that the insureds creating moral security should be rewarded, and those creating moral hazard should be punished. As in all areas of economy, the solution is expressed in an immortal quote from a great work of American Art, the 1985 film masterpiece: *Back to the Future*. After his unexpected time travel from 1985 to 1955, the hero of the masterpiece, Marty McFly enters a 1950s diner and is promptly instructed by its proprietor that if he wants to remain at the premises, he should order something. So he orders a 1980s novelty: Pepsi-Free. The proprietor responds: “You want Pepsi buddy, you gotta have to pay for it!”

But what if the economic decision makers want their Pepsi-Free, or rather a new financial product that might be called *Risk-Free*, but do not want to pay for it? The private insurance industry will not willingly enter into such foolhardy transactions, thus protecting the entire society from moral hazard calamity. But the economic agents that desire *Risk-Free* can capture the government and have the funds needed for their purpose created out of nothing by the central bank.

The legacy of the Panic of 2008, and the legacy of all bailouts of institutions that have been deemed *too big to fail*, is that the United States Federal Government and the Federal Reserve System, have permanently become providers of the *Risk-Free* product, below cost, or at no cost, and under direction of political forces.

And let us not forget that every insurance transaction, whether formally recognized as insurance, or informally created as a bailout, increases overall risk. Additionally, the portion of risk absorbed by the provider of insurance, is always in excess of that remaining with the insureds.

Thus, the lasting legacy of the crisis is the situation where the United States Federal Government and the Federal Reserve System are repeatedly increasing systemic risks, and simultaneously assuming responsibility for increasingly larger share of them. And let us remember that, unlike for Goldman Sachs or Citibank, there is no backstop for the United States Federal Government or the Federal Reserve System. Nobody will bail them out. Let us ponder for a moment what a failure of these institutions would mean.

But, luckily, there is a magic bullet. Realizing that the United States Federal Government and the Federal Reserve System cannot find a reinsurer for their insurance business,

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and cannot properly price existing business, we should simply acknowledge that no new insurance business should be written by them, and the existing business should be unwound, or run-off at the lowest possible cost.

To those still using their political power to seek cheap or free protection, the Feds must simply say: *I Want You to Feel Your Pain!*

Of course, given the recent excesses of rampant and omnipresent grabbing of resources of the United States Federal

Government and the Federal Reserve System by anyone with powerful enough political connection, one might wonder if this is possible.

But let us not fool ourselves that the current *Risk-Free* joy ride can continue. The magic bullet resolution is bound to happen, one way or another, maybe gradually, maybe with a bang, or maybe with a whimper.

There will come a time when Uncle Sam will say: *I Want You to Feel Your Pain!*

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Federal Reform Bill and the Insurance Industry

by David Sherwood

Dodd-Frank – Impact on insurers now and in the future

“Now this is not the end. It is not even the beginning of the end. But it is, perhaps, the end of the beginning.” Sir Winston Churchill, November 1942.

This affects you

The new Dodd-Frank Act (Dodd-Frank) or the (Act) signed into law on July 21, 2010, is a significant and complex piece of legislation, containing more rules than Sarbanes Oxley, which has been compared to Gramm-Leach-Bliley as one of the more sweeping public policy reform packages affecting the financial services sector since the Glass-Steagall Act 1933. An outside observer may argue that, relative to banking, the insurance sector was not heavily impacted by the financial crisis and that the Act leaves the insurance industry breathing a collective sigh of relief.

What are some of the reasons why the financial services sector may be overlooking insurance in the short term?

- **Misperception of how insurance companies work**—A common perception is the insurance sector is very different from the banking and securities sectors for which the majority of the Dodd Frank reform was focused. Issues in the insurance sector have often arisen from the liabilities side of the balance sheet. For example, products with embedded guarantees/options are often based on assumptions that are not always correctly anticipated or insured liabilities may not emerge for many years after the event. Unlike many of the issues impacting the banking and securities sectors, issues impacting insurance companies can take many years to manifest.
- **A belief that the Act was not aimed at insurance companies**—the relative lack of specific mention of Insurers in the Act relative to other financial services sectors, with some notable exceptions, can lead the reader to believe that it is intended for “other” financial services sectors. For example, the Consumer Financial Protection Bureau does not cover insurance products. In addition, the public policy issue of an “optional federal charter” was not heavily debated in Congress due to other pressing financial services’ legislative issues.
- **Misperception that insurance companies were not engaged in the activities covered by Dodd Frank**—certainly in terms of specificity, the sector is a clear second; but there are many ground-setting measures put in place by the Act that may not seem immediately evident. It is not uncommon to find an insurance company with other financial services interests such as a thrift or broker dealer; therefore, insurers with ancillary activities are dealing with implications of Dodd-Frank in a number of different business areas as well as those parts of the Act that deal with insurers directly.
- **Primacy of state regulation**—in the majority of cases, insurance companies are state regulated and not federally regulated. The regulatory framework for insurers is currently dominated by the primacy right of the state.
- **Misperception that insurance companies are less impacted by changing global regulation**—in relation to their position as being deemed systemically risky.

The beginning of a long journey

The reality is that Dodd-Frank provides a mechanism for potential federal and further state regulation of insurance companies. Title V of the Dodd Frank Act establishes the

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Federal Insurance Office (FIO) within the Treasury. At this stage the FIO's powers are limited and it will act in more of an advisory capacity.

FIO will have responsibility for all forms of insurance other than health insurance, certain long-term care insurance and crop insurance and, among other things, the authority to:

- recommend insurers to the Financial Stability Oversight Council (FSOC) for supervision by the Federal Reserve as systemically risky nonbank financial companies;
- monitor all aspects of the insurance industry, including identifying issues or gaps in the regulation that could contribute to a systemic crisis in the insurance industry or the financial system;
- monitor the extent to which traditionally underserved communities and consumers, minorities and low- and moderate-income persons have access to affordable insurance products;
- coordinate federal efforts and develop federal policy on prudential aspects of international insurance matters;
- coordinate with the states on matters of national and international importance, and determine whether state insurance measures are preempted by certain international insurance agreements; and
- advise the Secretary of the Treasury on major domestic and international policy and prudential insurance issues.

Dodd Frank will impact some activities of an insurance company in a number of ways.

- An insurer that owns thrift will face the challenge of a change in regulators from the Office of Thrift Supervision (OTS) to the Office of the Comptroller of the Currency (OCC). This will also entail the thrift

holding company being regulated by the Federal Reserve Board (FRB) even if this is an insurer.

- The Volker Rule prohibits a banking entity defined as insured banks or thrifts, or company that controls an insured bank or thrift from undertaking proprietary trading activities and limited investments in private equity, hedge funds and other private pools of capital. While insurance companies were able to gain certain exemptions from their own activities, this did not apply to the activities of any bank or thrift that they may own.
- Registration of advisors to private pools of capital would impact insurance companies to the extent they act as advisors in asset management functions. There are certain thresholds; however, generally funds with assets under management of greater than \$100 million would be required to register with the SEC if not already registered.
- A provision in the Act that may impact insurers is the SEC ruling that would cause the move to a fiduciary standard for retail broker dealers and registered security products (variable life and variable annuities). The SEC is tasked with completing a study on this issue and making recommendations for implementation.
- New capital requirements to address systemic risks will affect insurers who are deemed systemically important nonbank financial companies.
- Lastly, Dodd-Frank includes many governance reforms for publicly traded companies addressing executive compensation, proxy access, risk committees and investor protections.

Further regulation to come?

Perhaps one of the most interesting aspects is the requirement of the FIO that within 18 months of enactment, the

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office director must conduct a study and submit a report to Congress, which includes recommendations on steps to modernize and improve regulation of the insurance industry giving consideration to:

- systemic risk;
- capital and liquidity standards;
- consumer protection, including gaps in state coverage;
- national uniformity of state coverage;
- consolidated supervision;
- international coordination; and
- factors associated with federal regulation.

Government studies are may be a precursor to future legislative changes.

In reading Dodd-Frank you may conclude that the insurance sector was not heavily impacted by the Act but as the saying goes, “the devil is in the details.” Depending on the structure of a particular insurance company, several provisions could be applicable.

One question to be asked today is, “what’s next”? Dodd-Frank laid the framework for the creation of the Federal Insurance Office and potentially further regulatory reform. As the 112th Congress convenes in January 2011, and as reports, studies and the rulemaking process move ahead, what-next clarity may be forthcoming and if so will need to be understood in the marketplace.

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