Insurance and the Credic Crisis: Impact and Ten Consequences for risk Management and Supervision

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Preprint Series: 2009-13

Fakultät für Mathematik und Wirtschaftswissenschaften
UNIVERSITÄT ULM

Insurance and the Credit Crisis:

Impact and Ten Consequences for Risk Management and Supervision

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Abstract

Although the insurance industry is less affected than the banking industry, the credit crisis has revealed room for improvement in its risk management and supervision. Based on this observation, we formulate ten consequences for risk management and insurance regulation. Many of these reflect current discussions in academia and practice, but we also add a number of new ideas that have not yet been the focus of discussion. Among these are specific aspects of agency and portfolio theory, a concept for a controlled runoff for insolvent insurers, new principles in stress testing, improved communication aspects, market discipline, and accountability. Another contribution of this article is to embed the current practitioners' discussion in the recent academic literature, for example, with regard to the regulation of financial conglomerates.

JEL classification: G01; G15; G20; G22

Keywords: Credit crisis; integrated risk management; principles-based supervision; financial conglomerates; regulatory arbitrage

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1. Introduction

In this paper, we address the credit crisis from the perspective of the insurance industry. Our aim is to highlight the impact the crisis had on insurance companies and to derive consequences for risk management and insurance regulation. The prudent and conservative business policies that most insurers engage in have proven the industry to be quite resistant throughout the crisis. We thus believe that the insurance industry is generally in a strong position that will improve in the coming years, especially compared to other financial services providers. However, not all insurance market participants have followed a prudent strategy (e.g., AIG or Yamato Life). Hence, the crisis has revealed several deficiencies in the fields of risk management and supervision.

Based on these observations, the aim of this article is to formulate ten consequences for risk management and supervision. Many of these consequences reflect current discussions in academia (see, e.g., Felton/Reinhardt, 2008; Schanz, 2009) and practice (see, e.g., CRO Forum, 2009; CEA, 2008), but we also integrate a number of new ideas that have not yet been the focus of discussion regarding the credit crisis. Among these are some basic lessons from agency theory and portfolio theory, the consideration of a controlled runoff for insolvent insurers, new principles in stress testing, and improving communication, as well as aspects of market discipline, and accountability—especially in respect to rating agencies. Another contribution of this article is to embed practitioners' discussion in academic literature, for example, with regard to management compensation or the regulation of financial conglomerates. Most consequences we discuss are applicable not only to the insurance industry, but also to other sectors of the financial services market. We think that one of the most fundamental lessons to be learned from the credit crisis is that financial services should take place in an integrated marketplace that combines integrated risk management and supervision. The separate regulation of banking, insurance, and other financial services providers can always create options for regulatory arbitrage, which was one of the roots of the credit crisis.

Table 1 provides an overview of the impact the financial crisis had on insurance companies and the ten consequences we see arising from the current crisis. The ten lessons are not easily separated into those more applicable for risk management and those applicable for supervision; instead, we see supervision as an element of integrated risk management. We thus believe that Solvency II and the Swiss Solvency Test (SST)—both of which aim at integrating supervision and risk management—are steps in the right direction toward risk-based capital standards.

Impact of the credit crisis on insurance companies
- Crisis emerged in the banking industry (Lehman, Fannie Mae, Freddy Mac, among others)
- Insurers less affected than banking, but nevertheless serious impact (AIG, Yamato Life)
- Impact on assets: losses on stock and bond markets; increase in credit risk
- Impact on liabilities: insurance in credit markets, reinsurance, D&O, E&O, reduced demand for insurance
- Crisis revealed deficiencies in risk management and supervision
Ten consequences for risk management and supervision
1) We need to strengthen risk management and supervision
2) We need to take care of model risk and nonlinearities
3) We need easy to use and understandable risk management
4) Take heed of the lessons from agency theory—the right incentives are needed
5) Take heed of the lessons from portfolio theory—risk, return, and diversification
6) Principles instead of rules-based regulation—Solvency II and SST are steps in the right direction
7) A concept for a controlled runoff in the insurance industry is needed
8) Financial conglomerates need to be supervised at the group level
9) No regulatory arbitrage in financial services markets
10) Transparency, market discipline, and accountability are needed

Table 1: Impact of the crisis and consequences for risk management and supervision

The remainder of this article is structured as follows. In Section 2, we present a short overview of the emergence of the crisis and its impact on insurance companies. In Section 3, consequences for future risk management and supervision of insurance companies are derived. We conclude in Section 4.

2. Impact of the credit crisis on insurance companies

Due to differences in business models, insurance companies are less affected by the credit crisis than is the banking industry. Insurance companies are generally not at risk of a bank run given that, for example, in non-life insurance, payments are linked to claim events. In addition, insurers are funded in advance. In life insurance, surrendering a contract has disadvantages, such as lapse costs, so that the policyholder has a limited incentive to terminate the contract. Furthermore, most insurers do not have significant exposure to mortgage-backed securities and other forms of securitization and thus have not been directly affected by the credit crunch that was at the root of the current financial crisis (see, e.g., CEA, 2008). Underwriting risk comprises a high proportion of an insurer's overall risk. The liability portfolio is diversified and in many lines of business largely uncorrelated with the asset side (and, hence, to the capital market in general). Again, this is an important difference from the banking industry, where the portfolio of outstanding loans is highly correlated with general economic factors (see Pan European Insurance Forum, 2009).

Nevertheless, the insurance industry has suffered substantially in the recent crisis, on both the asset and the liability side. Insurers are among the largest institutional investors on the capital

market and thus negative development regarding asset value is almost unavoidable. On the liability side, insurers can be adversely affected through insurance in the credit market, by directors and officers (D&O) as well as errors and omissions (E&O) insurance, or by a reinsurers' default. Furthermore, in a situation of economic downturn, insurers will suffer a decline in demand for insurance products (see, e.g., Grace/Hotchkiss, 1995; Chen/Wong/Lee, 1999).

Figure 1 shows the Dow Jones 30 index for the years 2005 to 2009 along with some of the most frequently mentioned events of the financial crisis. The lower part of the figure emphasizes events affecting the insurance industry.

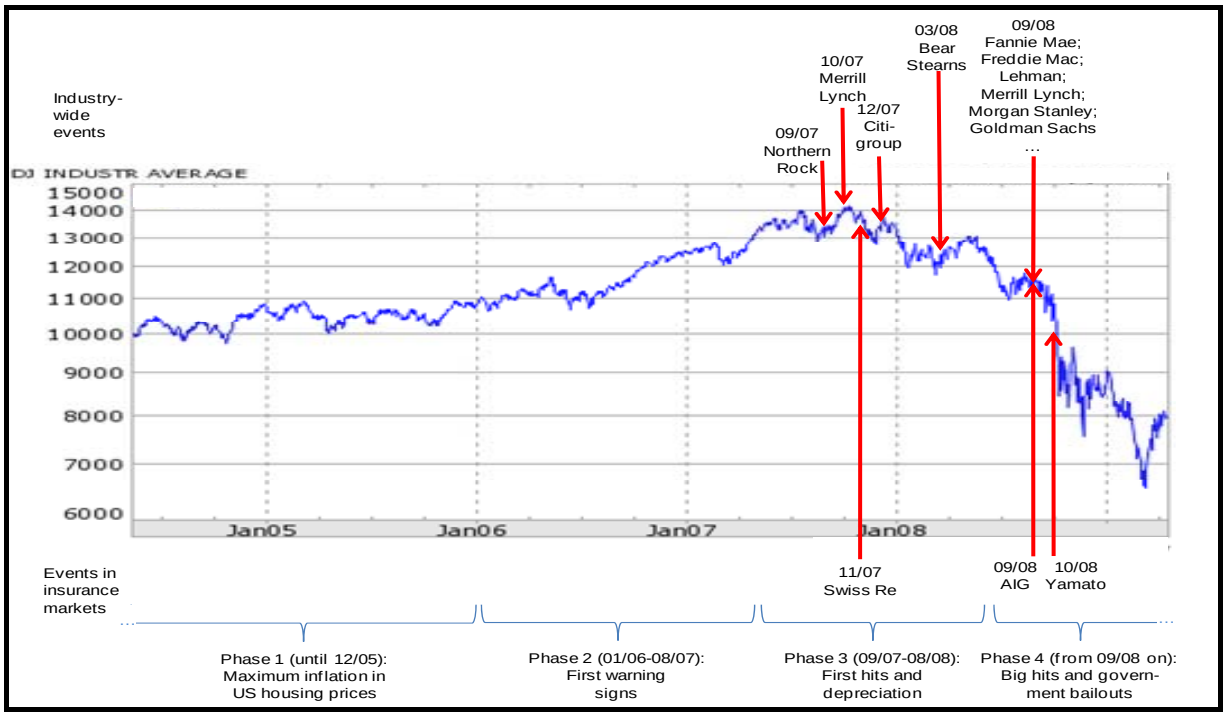

Figure 1: Dow Jones 30 index and main events of the financial crisis

The financial crises can divided into four phases. The first phase was a time of low interest rates and increasing U.S. housing prices (reaching its maximum in 2005). Warning signs then appeared in Phase 2 (2006 until August 2007), e.g., with a flat and then inverse yield curve. The subprime crisis in U.S. housing then started in the summer of 2007 (see Reinhart/Rogoff, 2008). One of the first visible events in respect to the financial crisis was the bank run on Northern Rock in September 2007 and the consequent support from the Bank of England (beginning of phase 3). At that time, many market participants in the banking and insurance industry reported large write-downs due to mortgage defaults or related problems in credit markets. Among these were Merrill Lynch (with a loss of $8 billion), Citigroup ($18 billion), and Swiss Re ($1.1 billion; Swiss Re is only one of many insurers to suffer write-downs, but it was the first large write-down in the insurance sector and is thus mentioned).

In March 2008, the Federal Reserve Bank of New York provided an emergency loan to Bear Stearns in order to avert a sudden collapse of the company. The fourth phase of "big hits" and government bail-outs began in September 2008 with the federal takeover of Fannie Mae and Freddie Mac (September 7), the bankruptcy of Lehman Brothers (September 15), and Federal Reserve support of the American International Group AIG (September 16). Furthermore, Merrill Lynch was sold to the Bank of America (September 14) and Morgan Stanley as well as Goldman Sachs changed their status from investment banks to traditional bank holding companies (September 21). Among the subsequent events were the Royal Bank of Scotland announcing the biggest corporate losses in U.K. history (January 2009) and AIG reporting the biggest corporate losses—almost $62 billion—in U.S. history (March 2009).

The three most often reported events of the crisis for the insurance industry are the government bail-out of the American International Group (AIG), the write-downs at Swiss Re (due to reinsurance in credit portfolios), and the insolvency of Yamato Life Insurance (due to severe risk management failures in asset management). All three events have different characteristics and illustrate that insurers' balance sheets were affected by different aspects of the crisis. These three cases show on the one hand that an adverse scenario can include a combination of negative developments on both the asset side and the liability side. On the other hand, however, the different nature of these three events also reveals that they had only a limited systematic impact at the global industry level, which occurred on the asset side of the balance sheet: almost all insurers were hit by negative developments regarding asset values within the capital market. Only some insurers were directly affected from investments in structured credit products, but most felt an indirect impact from the losses in many investments during the recent capital market plunge. That these effects on asset management can produce a threatening economic situation is illustrated by the Japanese life insurer Yamato Life Insurance: this company experienced losses in the subprime area and losses due to a high investment in stocks. From the underwriting side, however, no specific problems have been reported.

One advantage of the continental European insurance industry in this context is that traditionally its asset allocation is conservative and it invests a relatively low portion of assets in stocks. Therefore, these insurers were not too adversely affected by the stock market plunge when, for example, there was a reduction of 30–50% in 2008 for all major stock indices, including the Dow Jones 30, the Nikkei, the FTSE 100, and the DAX 30. It appears that insurers had learned a valuable lesson from their bad experience with the stock market plunge at the beginning of this century. However, a main difference between the current capital market

plunge and other stock market plunges, especially in 2002, is that these days it is not only stock markets that are negatively affected; there are also adverse reactions in bond markets and a massive increase in credit risk for products and institutions previously considered safe. An example is the default of Lehman Brothers, in which a number of insurers were deeply involved (e.g., the German health insurer Landeskrankenhilfe with an asset volume of around 4 billion Euro had invested 200 million Euro at Lehman Brothers; see Fromme/Krüger, 2009). Some insurers (e.g., the U.S.-based Aflac) were also engaged in hybrid capital and other subordinate debt issued by banks, resulting in large write-downs (see Mai/Bayer, 2009).

The liability side of the insurance industry has also been affected by the financial crises, but less severely, with effects largely dependent on the insurer's line of business. If the insurer is engaged in credit markets, then it could suffer a negative impact due to the sudden increase in credit risk, which is what happened at Swiss Re with a depreciation of $1.1 billion in November 2007. The loss resulted from two credit default swaps (CDS) designed to provide protection for a client against a fall in the value of a portfolio of mortgage-backed securities (see Swiss Re, 2007). Insurance companies such as AIG, MBIA, and Ambac first suffered ratings downgrades when mortgage defaults increased their potential exposure to CDS losses. AIG had CDSs insuring $440 billion of mortgage-backed securities (see Harrington/Moses, 2009; Baranoff/Sager, 2009). Thus, following the subprime crisis, AIG had depreciations of $11 billion on its credit portfolio in the fourth quarter of 2008 and a quarterly loss of $5.3 billion, finally resulting in the government bailout (for more details on the AIG case, see Sjostrom, 2009). In addition to these impacts on the insurance and reinsurance sector, there are also worries with D&O insurance. Many U.S. insurers have already begun to set up reserves for potential claims following the financial crisis (see Fromme, 2008). Another aspect that is especially relevant for life insurers is that the uncertainty surrounding the macroeconomic environment and interest rates pose difficulties for providing investment guarantees and hence may lead to the necessity of redesigning life insurance products (see AM Best, 2009).

Overall, European insurers are not significantly exposed to credit risks and thus have not been directly affected by the credit crunch that was at the root of the financial crisis. However, as some of the largest institutional investors, they have suffered from the dramatic write-downs of financial assets. Moreover, the insurance industry could certainly be affected by group contagion effects, by an increase in D&O claims, and by a fall in the sale of insurance products due to the economic slowdown (see CEA, 2008, p. 4).

3. Ten consequences for risk management and supervision

Issues related to supervision and corporate governance have often been deemed causes of the crisis. These issues include pro-cyclicality and similar behavior due to regulatory rules, regulatory arbitrage, inappropriate accounting rules based on historical acquisition costs, lack of transparency, and inadequate management decisions, probably driven by wrong incentives. While insurance regulation has already been the subject of reform in Europe (Solvency II, Swiss Solvency Test), the ongoing financial market crisis has focused even more attention on risk management and regulation in financial services, both in academia and practice. In this section we derive the ten main consequences that we see arising from the crisis.

1) We need to strengthen risk management and supervision

Identifying, measuring, and valuing risk is at the core of the insurer business model and should not be delegated to a third party. Although there is evidence that rating agencies are relatively successful in identifying financial distress compared to regulators (see Pottiers and Sommer, 2002), the financial crisis has made clear that relying heavily on ratings can be misleading and dangerous. Insurers and regulators should thus be aware of substituting a rating for their own due diligence as rating agencies' methodologies are not really transparent. In contrast to Solvency I, ratings are essential in the SST and under Solvency II, e.g., for deriving the credit risk of the insurer's bond portfolio and for determining the default risk of reinsurance exposure and regulators need to review these rules (see, e.g., Eling/Gatzert/ Schmeiser, 2008).

In light of the challenging capital and insurance market environment, strong enterprise risk management (ERM) is a crucial element in maintaining financial strength and ensuring a safe insurance industry. Risk management must be proactive, independent, and have sufficient power and authority. Independence is important because of the possibility of conflicts of interest, including those between the underwriting sector, the sales department, and risk managers. Risk management must play a leading role in each insurance company, which could be accomplished by transferring the concept of "responsible actuary" ("verantwortlicher Aktuar"; implemented in Germany, Austria, and Switzerland) or "appointed actuary" (in the United Kingdom, Belgium, and the Netherlands; see Daykin, 1999) to that of an "appointed risk manager." By law, the responsible actuary has a predefined function, responsibility, independence, and reporting requirements with regard to the board. Defining a corresponding "appointed risk manager" as a specific function with a wider role in an insurance company might help to more clearly organize what risk management is and what it should do. The "ap-

pointed risk manager" could also be a contact person for the regulator in order to ensure that regulatory rules are embedded within an integrated risk management scheme. Those with actuarial skills are well suited for such a position because of their training in analyzing various forms of risk, and their ability to judge the potential for upside gain, as well as downside loss, associated with these forms of risk (see D'Arcy, 2005). However, such a position could also be filled by nonmathematicians with a business or economics background. Note that in some countries the function of risk management is one of the duties of the "appointed actuary." In such a case we either need to separate the tasks of the "appointed actuary" from those of the "appointed risk manager" or combine both jobs into one position enjoying greater power and authority. We believe that splitting this large and important task into two positions will work best: the "appointed actuary" being responsible for adequate premium and reserves calculation amongst others, and the "appointed risk manager" being responsible for risk modeling, risk management, and implementing the results in an integrated risk management process. Clearly defined responsibilities, along with close collaboration between these two important functions, are two prerequisites for successful risk management.

2) We need to take care of model risk and nonlinearities

One of the greatest pitfalls of risk models and solvency approaches is model risk. For instance, there is always the possibility that the underlying risk distributions have been wrongly specified. This can occur when there is not a sufficient number of historical observations available (a smaller data set, ceteris paribus, increases the probability of a misspecification). Moreover, the underlying distribution might not be stable over time and, hence, probability distributions observable in the past provide very little information about the future. In addition to misspecifications as to the "true" probability distributions, the chosen stochastic model itself might be inappropriate.

To guard against too much faith being placed in a specific risk model/solvency approach and its assumptions, we believe that it is important to vary the implicit model parameters in some specified range, similar to what is done in stress testing. By doing this, risk managers and regulators can obtain a much better understanding of the sensitivity of specific results of the solvency model and provide additional information regarding an insurer's main sources of risk. A first step in this direction—one that has less to do with model risk, and more to do with the economic environment—has been taken in the scenario testing concept given of the SST. Insurance is a risky business, making it necessary to think in terms of confidence intervals rather than in terms of expected values.

The results of risk models and the quality of decisions based thereon depend on an appropriate modeling of the stochastic behavior of assets and liabilities. In this context, mapping nonlinear dependencies is a point of concern (see Eling/Toplek, 2009). Many risk models and most practitioners still focus on linear correlation even though the literature suggests that solely considering linear correlation is inappropriate when modeling dependence structures between heavy-tailed and skewed risks, which are frequent in the insurance context (see, e.g., Embrechts/McNeil/Straumann, 2002). These risks are especially relevant in case of extreme events, such as the September 11, 2001, terrorist attacks that resulted in large losses for insurance companies both from their underwriting business and the related capital market plunge (see, e.g., Achleitner/Biebel/Wichels, 2002). We believe that the current financial crisis is another example of a situation in which some insurers have sustained large losses from their investments, e.g., in mortgage-backed securities, as well as from insuring structured credit products such as collateralized debt obligations. These complex interactions may not be adequately captured by linear dependencies (Ashby/Sharma/McDonnell, 2003) and hence the current crisis emphasizes the relevance of modeling nonlinear dependencies.

Another question in the modeling context is what risks should be considered. The most dangerous risks, of course, are those that are unforeseen. However, most models focus on market risk. There are models for credit and underwriting risk, but the credit crisis has shown that we do not have sufficiently good models to handle liquidity risk (see, e.g., Rudolph, 2008). We thus need to develop new models for liquidity risk management and we need to take into consideration new risk sources that have not yet been the focus of discussion. In addition, we need to remember that one of the main assumptions of many pricing and risk management models is a liquid market. If a liquid market does not exist (anymore), the use of such models is highly questionable.

3) We need easy to use and understandable risk management

The interaction between risk models, the risk management process, and managerial decisions can be improved. The best risk models are useless if the results are not understood by the people who make decisions based on them. A serious problem in this context is the communication gap between risk managers and decision makers on the executive board. Risk managers and actuaries develop and implement risk models and it is likely that most of them are aware of the underlying assumptions and limitations of the model when interpreting its results. However, the executive board may not have the same degree of competence in this particular area or the time to develop it. They thus require easy to use and understandable statistics.

However, due to the inherent problems of models as discussed above, regardless of how well presented, their results should not be the sole basis for management decisions. Model results

are best employed as supporting, either for or against, different strategies. How the statistic output of a risk model is communicated to top management is crucial and cannot be stressed enough. Here, we believe that the communication skills of risk managers and actuaries can be improved, e.g., by using more intuitive forms of communication, such as graphs and diagrams instead of long lists of numbers and complicated tables and equations. However, management also needs to be a little more flexible in its decision-making process, looking at things more in terms of "probable" than "certain," for example ("thinking in confidence intervals"). Effective communication of results and effective use of results can be hugely important to a firm's success (see Eling/Parnitzke/Schmeiser, 2008). Communication is another area that might benefit from the concept of an "appointed risk manager" with independence, a clear function, and reporting requirements to the executive board (see consequence No. 2)). In this respect, the financial crisis makes a strong argument for improving the education of model users and decision makers. Even the best model can become a dangerous tool if it is used by people who do not understand the implication of its results, possibly resulting in a false sense of security or a course of action based on results believed to be accurate when they are really just rough approximations.

Considering real-world complexity and communication, we also believe that it is important to keep simple "manual" management rules in mind. Limits on asset allocation is a very simple and intuitive way of ensuring diversification of risk. If all market participants had engaged in diversification, some of the most recent tremors in capital markets could have been avoided, especially with regard to the accumulation of certain types of risks such as mortgage-backed securities. Another simple instrument that prevents excess risk taking is risk sharing, e.g., via retention. A very problematic development during the financial crisis was the excessive securitization and retrocession of risks. Risks were transferred from one party to another without any amount of risk retained, leading to poor, if any, underwriting and risk classification. Generally, retention is a very effective way to delimit moral hazard and the adverse selection problems that are inherent in such transactions. In this context, it is important to require a retention scheme for retrocession.

4) Take heed of the lessons from agency theory—the right incentives are needed

According to Jensen/Meckling's (1976) theory of the firm, ownership structure, management incentives, and monitoring of management are important determinants of risk taking (see, e.g., Fama/Jensen, 1983; Chen/Steiner/Whyte, 1998). For example, management ownership in the company might increase or decrease risk taking; theoretically, it is not clear which effect dominates. On the one hand, when managers' stake increases, their interests become more

aligned with those of shareholders and equityholders have an incentive to increase the value of their equity call options by increasing risk (see Saunders/Strock/Travlos, 1990; Doherty/Garven, 1986). On the other hand, however, Smith and Stulz (1985) argue that most managers will not hold a well-diversified portfolio and thus may become more risk averse as managerial ownership increases.

Compensation based on options has often identified as a problem during the crisis as such can create an incentive to increase risk taking to an unacceptable level. Agency theory suggests that since the value of option-based compensation is positively connected with the underlying stock variance, granting option-based compensation to CEOs will motivate them to take on higher levels of risk (see, e.g., Belghitar et al., 2007, as well as Coles/Daniel/Naveen, 2006 and Low, 2009, for empirical evidence). As mentioned above, agency theory indicates that this increase in risk taking is acceptable and not undesired by shareholders. However, in an insurance context there is a need to protect policyholders that must be accounted for, especially in comparison with other industries.

We agree with the CRO Forum (2009) that the principle of performance-related compensation is the right one, but it must be correctly applied. Performance-based compensation can be a powerful way to align the interests of employees, shareholders, and policyholders. However, it can also encourage excessive risk taking inappropriately employed. In this context, a consequence is that compensation based on options should not be short term in nature, but instead oriented to the long-term success of the company. Setting incentives is a good idea, but we need to make sure that they are the right incentives. For example, variable compensation should not be the largest part of the salary.

5) Take heed of the lessons from portfolio theory—Risk, return, and diversification

Two of the best-known and accepted lessons from portfolio theory are (1) that there is a positive relationship between risk and return and (2) that one should not put all one's eggs in one basket. While most insurance companies follow a prudent business policy, we believe that some market participants have not taken these two lessons to heart in recent years.

There is a natural relationship between risk and return in capital markets and no market participant can expect an unusually high level of return without a corresponding high level of risk. If there arises an opportunity to achieve "higher than usual" gains, all market participants will quickly reallocate their funds in the direction of that investment opportunity. The massive and sudden increase in market price then eliminates the opportunity. In other words, at least in theory, there is no free lunch in capital markets (see, e.g., Bodie/Kane/Marcus, 2008). This basic rule should be true for other markets as well, for example, securitization.

Portfolio theory also illustrates the advantages of investing in different assets, regions, and markets. One problem revealed as the crisis developed was that many instruments considered to be very safe actually were not. But even if certain instruments are absolutely safe, diversification is still the best policy. Adequate diversification across different instruments, regions, and markets should be a part of every prudent investment strategy. As mentioned, AIG had CDSs insuring $440 billion of mortgage-backed securities—a situation that in no way reflects diversification.

6) Principles instead of rules—Solvency II and SST are steps in the right direction

Learning from the shortcomings of Solvency I, Solvency II and the SST focus on an enterprise risk management approach in order to obtain equity capital standards (for an overview of the Solvency II process, see, e.g., Eling/Schmeiser/Schmit, 2007). A total balance sheet approach is used in which the capital requirements are derived based on a comprehensive analysis of risks, taking into account the interaction between assets and liabilities, risk mitigation, and diversification (see CEA, 2007). Furthermore, early-warning signals give notice of potential threats to an insurer's solvency before they materialize. In addition to the quantitative model framework of Solvency II and SST, other important factors, including the suitability of the insurer's management, corporate government practice and codes, risk management processes, and—to some extent—operational risks, are taken into account in these regulatory systems. Furthermore, the regulation is designed to enhance market discipline within the insurance market (see also consequence number 10 below).

In our opinion, taking steps toward more principle-based regulation is a move in the right direction for reducing the effects of the financial crises. Given the specific rigidities of the existing regulatory rules, a more flexible scheme seems warranted. Principle-based regulation (as opposed to rules-based regulation) has been discussed both in academia as well as in practice (see Eling/Gatzert/Schmeiser, 2008; recently, the CRO Forum also proposed a move toward principle-based regulation; see CRO Forum, 2009). The idea behind principle-based regulation is that the regulator provides only a set of principles to follow, but does not prescribe exactly how to implement the principles.

A major drawback of standard rules-based models is that they do not have the flexibility to handle individual situations and thus might not be very effective in assessing the wide range of insurance risk profiles. Generally speaking, a principle-based approach is more flexible and better able to capture an individual risk profile, e.g., by using insurer-specific model parameters instead of ones predetermined by the regulator. A principle-based approach may also trigger innovation, such as when insurers need to develop their own risk models. Furthermore,

the principle-based approach provides the insurer with the opportunity to integrate regulatory requirements into its risk management process. Business and regulatory objectives are then more closely aligned and should lead to more efficient regulation. Another advantage of using principles instead of strict rules is that doing so has the potential to reduce the danger of similar behavior and, in turn, systemic risk within the market. However, a principles-based approach is not without its downside. Relying on principles could increase the complexity and costs of regulation, both for the insurer and for the regulator, the latter needing sufficient resources to appraise all the individual models instead of one standard model (see Eling/Gatzert/Schmeiser, 2008).

In conclusion, principles-based regulation is likely to yield a variety of risk strategies, limiting the probability of systemic risk inherent in using a single standard model for all or even most insurers. Similarly, flexibility is likely to encourage innovation. Table 2 summarizes the main pros and cons of principles- and rules-based regulation.

	standard rules-based regulation	principle-based regulation
Idea	regulator provides a detailed set of rules to follow and a model to implement	regulator provides only a set of principles to follow and no information on how to implement
Example	Solvency I	Swiss Solvency Test
Systemic risk	pro-cyclicality and similar behavior problematic	pro-cyclicality and similar behavior less problematic
Reflection of risk	one-size-fits-all model cannot capture the full spectrum of individual risk profiles	individual model to capture true, individual risk profile of the insurer
Flexibility	low flexibility for handling individual situations	higher flexibility for handling individual situations
Innovation	little room for innovation	might trigger innovation, e.g., internal risk models (insurers need to develop to some degree their own risk models based on the principles)
Integration in risk management	no integration, regulatory requirements and insurers RM are mostly separate systems	integration of regulatory requirements into the risk management process
Model arbitrage	more effective	Less effective
Predictive power	Low	High
Complexity	Low	High
Implementation costs	Low	High
Data requirement	Low	High
Implementation	Easy	Difficult
Practical application	Easy	Difficult
Comparability	High	Low
Model risk	High	Low
Up to date-ness	Low	High
Systemic risk	High	Low

Table 2: Rules-based versus principles-based regulation

In general, the debated over rules-based versus principles-based regulation reflects the debate over standard models versus internal models. In principle, rules-based standard models are simple to implement and easy to use, whereas internal models—which are subject to specific principles by the regulator—are much more complex. For example, the Swiss Solvency Test

provides a standard model, which is especially useful to small insurers without the resources to develop an internal risk model, but encourages all insurers to develop their own internal models as these are expected to better reflect the true risk profile. Consequently, there is a standard model only for life insurance, health, and property-casualty and none for reinsurers as these are expected to have sufficient know-how and resources to develop such internal risk models. In general, we anticipate that models with great predictive power will be more complex (see, e.g., Eling/Schmeiser/Schmit, 2007).

Even though rules-based standard models have advantages as to transaction costs and comparability between insurers, we believe allowing insurers to use internal risk models is a move in the right direction, for two reasons. First, as mentioned, the use of different approaches may prevent "systemic risk" within the capital markets. More precisely, the risk of identical reactions given an unusual market event (e.g., stock crash) is reduced (see Cummins/Doherty 2002). Thus, it might make sense to have multiple solvency models, allowing market competition to determine which ones work best. Recently, the CRO Forum analyzed the pro-cyclical nature of Solvency II and proposed a solution to address the problem (see CRO Forum, 2008): in times of distressed markets for certain assets, the solvency capital requirement SCR is temporarily complemented by a reduced capital requirement, documented under Pillar 2 and subject to disclosure under Pillar 3 of Solvency II. The lower capital requirement shall only be applied in case management intends to hold these assets over the duration of the liabilities it covers (i.e., typically longer than the one-year planning horizon of Solvency II). We believe this to be an appropriate way to counteract market downturns.

Second, another problem with standard rules-based models—and one that can be handled much more easily with internal risk models—is up to date-ness. For example, Daníelsson (2008) claims that Basel II is state-of-the-art—for 1998 that is. In the insurance industry, this problem is even more severe. The length of the Solvency II process in the European Union is a good example of how difficult it is to introduce an innovative regulatory system (see Eling/Klein/Schmit, 2009). The shortcomings of the Solvency I rules have been known, both in academia and in practice, for many years (Farny, 1997), and yet that system is still in place 30 years later. Political decision making takes time, and usually needs a triggering event to actually occur. In the EU, this trigger was the formation of the common financial services market in 1994, but even so the new framework is not expected to be introduced until at least 2012.

7) A concept for a controlled runoff in the insurance industry is needed

In addition to the entry of new market participants, another aspect of a free market economy is the failure of unsuccessful companies. In general, insolvency of a financial institution is much more severe compared to insolvency in other industries. For instance, the solvency level of an insurer has a strong influence on product quality. Furthermore—and this is especially true for life insurance companies—benefits to the customer may not occur until far into the future and hence the ability to meet these obligations is crucial. In addition, a policyholder might cause a claim by a third party. However, that third party has no control over the policyholder's choice of insurer and may suffer if the policyholder purchased the insurance from a financially weak (but cheap) insurance company.

Solvency capital requirements can only reduce the probability of insolvency; they cannot prevent it. If insolvency occurs, policyholders bear the consequences—in principle, the discrepancy between liabilities and assets—since equityholders enjoy limited liability. However, if stakeholders are aware of their burden in the event of insolvency—in other words, there is no information asymmetry—fair pricing of equityholder claims should take place in a competitive market (see, e.g., Doherty/Garven, 1986).

In the case of financial distress of financial institutions, defaults have been (partly) covered by the governments. Such action, which basically means that the taxpayers have to pay any discrepancy between liabilities and assets, eliminates an important element of a free market economy. In a competitive market, such action will create wrong incentives for policyholders, equityholders, and the management of an insurance company.

To allow a controlled runoff for insurance companies, an insurance guaranty fund is an option. In contrast to the way it is done in some countries, risk-adequate premiums—for instance, based on the default put option value—are required for the funds in order to avoid cross-subsidization (see Cummins, 1988; e.g., the existing German guaranty fund for life insurance, Protector, is funded ex post depending on the size of the insurer). Guaranty funds can create a put-option-like subsidy to equityholders, which also might create incentives for risk taking (see Cummins, 1988; Lee/Mayers/Smith, 1997). A risk adequate fair pricing of the guaranty fund premium in a competitive market is thus an important prerequisite for a guaranty fund.

Since the creation of such a guaranty fund will, ceteris paribus, lead to an increase in policyholder premiums, it is necessary that all major insurance markets be subject to similar rules,

including the banking industry, since insurance companies and the banking industry sell many similar products. However, both the creation of a guaranty fund and advanced solvency rules lead to a high degree of regulation and, consequently, high transaction costs, so the costs and benefits of regulation should be weighed carefully before it is implemented.

8) Financial conglomerates need to be supervised at the group level

Given the increasingly frequent consolidation activity in the insurance market, the advantages and risks of corporate diversification have become a focus of regulatory authorities. As stated in the literature, conglomeration leads to a diversification of risks—the so-called diversification benefit—but, at the same time, to a decrease in shareholder value—the conglomerate discount—(see Gatzert/Schmeiser, 2008). To obtain accurate information about the safety level of a financial conglomerate, analyses must be conducted at both the single legal entity level and the enterprise level. In particular, capital and risk transfer instruments used between different legal entities within the financial conglomerate need to be taken into consideration.

Additionally, noninsurance entities (banks or nonsupervised companies) that are a part of the conglomerate need to be investigated by regulators in order to judge whether they substantially influence the overall risk situation of the conglomerate. In this respect we support the Pan European Insurance Forum (2009), which argues that—at a global level—group supervision should be achieved through multinational recognition of foreign supervisory activities. This will necessitate a set of general standards for the main insurance markets so as to avoid market distortion within different countries.

9) No regulatory arbitrage in financial services markets

Globalization and deregulation have led to an integrated financial services market and consumers have generally benefited from the lower prices and higher quality services made possible by increased competition (see Eling/Luhnen, 2008). However, it is hardly possible to distinguish business activities between different financial services providers and across different countries. The credit crisis has illustrated that financial services are one integrated market, one that is in need of integrated risk management and supervision. Separate regulation of banking, insurance, and other financial services providers invariably creates opportunities for regulatory arbitrage, which was one of the roots of the crisis. This holds not only for different parts of the industry (banking, insurance, pension funds, and other financial services providers) but also across countries.

To ensure a safe and sound financial services industry in the future it is necessary that regulation itself becomes "globalized." We need international cooperation and coordination and an international regulatory institution. The playing field must be globally level for the same types of business, irrespective of the exact business type or specific region where it is conducted. This is an important requirement not only to protect policyholders but also to ensure fair competition in a global industry (see Flamée/Windels, 2009).

10) Transparency, market discipline, and accountability are needed

The main focus of Solvency II has been on quantitative models to capture the risk profile of an insurer (Pillar 1 of Solvency II) and the implementation of these models in a risk management system (Pillar 2 of Solvency II). There is a third pillar of Solvency II, however, that has not received much attention to date. This pillar deals with market transparency and disclosure requirements aimed at promoting market discipline. The expectation is that a transparent process will require less overt regulatory intervention as market participants themselves will enforce appropriate insurer behavior. Market discipline, i.e., the influence of customers, brokers, rating agencies, and investors on firm behavior, could be a substantial building block of the new Solvency II and be a big step toward creating a strong and solvent insurance industry (see Eling/Schmit, 2009; see also Epermanis/Harrington, 2006, for an analysis of market discipline in the U.S. insurance market). We believe that the credit crisis has revealed the necessity of taking a closer look at transparency in financial services markets.

Transparency is crucial for complex financial products. Particularly in case of retrocession, it is essential that the underlying risk and its nature are known. It should be completely clear as to which market participants are involved in the transaction, starting with the original risk carrier and listing all intermediaries between the buyer of a risk and the original risk carrier. The buyer of a risk should be aware of all the "classical Greeks" from option pricing theory, i.e., how does the risk react to a sudden increase in interest rates, volatility, and so forth. Also, interdependencies with other types of risk in the investment portfolio should be unambiguous.

Rating agencies, also, are in need of much greater transparency. Even before the crisis, it was clear that the existing self-regulatory framework for rating agencies based on the 2004 IOSCO Code of Conduct was inadequate and that further regulatory measures were needed (see GDV, 2009). Therefore, it is essential to introduce international-level regulation for rating agencies, especially with regard to disclosure requirements and conflicts of interest.

Moreover, the insurance industry itself will benefit from more transparency. Reputation in general and customer and shareholder trust specifically are key assets of an insurance company (see Schanz, 2009). We think that enhancing market discipline should be encouraged and that it will be rewarded with increased trust on the part of consumers. Toward this end, we suggest more disclosure with regard to the valuation of assets and liabilities. In this context, a unified framework for a market-consistent valuation of assets and liabilities and a transparent disclosure of all underlying assumptions would be beneficial (see De Mey, 2009). Above all, however, more transparency is needed in the area of off-balance-sheet obligations as these are now known to be crucial in determining the insurer's risk situation. To recover full confidence in the financial services markets, an accurate disclosure of all risk-related information is needed.

Additional disclosure requirements will enable market participants to better understand the risk situation of an insurance company and, as a consequence, effective risk management will be appreciated by the market, risky behavior sanctioned. More information also reduces agency conflicts, i.e., information asymmetries between insiders (management) and outsiders (analysts, stock holders, policyholders) and thus uncertainty. Reduced uncertainty will be reflected in lower variations in stock prices. Ceteris paribus, this should increase shareholder value for risk-averse investors.

However, more information is not necessarily better information. We will achieve better information only if the additional information is understandable and easy to access. The information must also be presented appropriately, for example, in a standardized format so that comparisons are possible. Furthermore, because providing information is costly, coordination should be encouraged where appropriate with other relevant disclosures, such as, e.g., the international financial reporting standards (IFRS).

Accountability is another important aspect not too much discussed so far.[1] One idea, for example, is to introduce accountability for rating agencies. Rating agencies might take more care with their ratings if they faced liability for the consequences incurred by making inaccurate ratings (for instance, if availiable and relevant information is not taken into account). It might be that the potential liabilities arising from a wrong rating decision are higher than the capital that rating agencies have. However, a solution for such a "low frequency, high severity" situation is insurance. Insurance premiums might have to be quite costly, but the price could be lowered, e.g., by retention and other safety measures such as internal risk control.

[1] We are grateful to Hans-Joachim Zwiesler for highlighting the aspect of accountability.

We believe that all these measures that would accompany accountability would create the right incentives and improve the safety of the financial services industry. The same mechanisms might also be considered for D&O insurance or for regulators. For example, a substantially high retention to be paid by the managers themselves might have helped avoid the excess risk taking observed with some market participants in recent years.

One of the most important aspects is that there should be a direct connection between those who make the decisions and those who have to bear the (negative) financial consequences. It was lack of this connection that is responsible for at least part of the current financial crisis. We thus believe that more consideration of accountability—of regulators, rating agencies, and managers—is an important step that can be taken, even more important than imposing yet another set of regulations.

4. Conclusion

The current credit crisis and the consequent economic downturn are often described as unique events in economic history (see Reinhart/Rogoff, 2008). In fact, what started with the subprime crisis in the U.S. housing market has now become a global economic recession. The latest estimates from the International Monetary Fund (IMF) suggest that write-downs could reach $4 trillion, most of which involves banks (see IMF, 2009). Only a few insurers have needed government aid and typically not because of their underwriting business but due to their financial services division (see Swiss Re, 2008). For example, while a great portion of AIG was comprised of insurance operations, it was the company's unregulated financial division that finally required a large federal capital infusion (see Grace, 2009).

Many academics, practitioners, and policymakers claim that economic theory and models failed and are responsible for the severe problems that we are facing today. They call for new instruments, theories, and models adequate to address the adverse situation. We can only partly agree with this point of view. Theory and models are not per se wrong; those employing them need to understand exactly what the theory is about and what decisions can be based on the outcome of a specific model. Economic models are very complex and they are based on assumptions that do not necessarily reflect reality in all cirumstances, especially in a situation of crisis. Our call is thus for simple, understandable, and easy to use instruments for both risk management and regulation. Another issue is education, i.e., people might not be enough informed and educated to understand complex financial models and the consequences of using them. The financial crisis thus makes a strong argument for improving the education and training of model users as well as line and top management. In our discussion of potential

consequences this is reflected by the idea of creating the new position of “appointed risk manager” comparable to the “appointed actuary” and with predefined responsibility and independence. Institution of such a position might also help to overcome the communication gap between risk management and decision makers in top management.

A wide range of proposals for reforming risk management and regulation are now being considered. It is important to emphasize that more regulation is not necessarily better regulation. Good regulation leaves companies room to develop and encourages innovation, or at least does not repress it. More complex regulation is also not necessarily better. We thus recommend keeping the costs and complexity of regulation firmly in mind and the implementation of concepts that are easy to understand. For example, risk sharing via retention is in general an easy-to-understand concept that reduces moral hazard and adverse selection inherent in securitization and retrocession. More focus on accountability should also help to reduce excess risk taking, enhance responsibility, and set right incentives to support a strong insurance industry.

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