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While a very substantial body of literature concerned with the regulation of banking has developed over recent years, dealing with both its fundamental motivation and specific forms and applications of such regulation, a similar intellectual effort concerned with insurance regulation is lacking to a considerable extent. It is the aim of this paper to work towards closing this gap.



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Regulation and intervention in the insurance industry – fundamental issues

*by E. Baltensperger, P. Buomberger, A. A. Iuppa,
B. Keller, and A. Wicki*

The Geneva Association (The International Association for the Study of Insurance Economics)

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Insurance, banking and the capital market

Insurers and banks are both suppliers of financial services and constitute together the bulk of the financial services industry. As such, they share certain common traits and, consequently, are often analyzed together. At the same time, they differ markedly in certain respects, insurance and banking being basically distinct types of businesses. Given today's trend towards an integrated financial markets supervision (in Switzerland, for example, represented by the FINMA project), it becomes all the more important to clearly sort out what is common and what is different.

Insurers and banks both operate in the context of the capital market, a network of trading arrangements employed by innumerable anonymous agents to exchange financial assets, i.e. claims and liabilities of various sorts. Let us begin with an, admittedly simplistic, textbook like picture of insurance, banking, and the capital market.

Insurance

Insurance is an arrangement providing individual protection against the risk of losses resulting from various perils, or hazards, through pooling of risks. Characteristically, we think here of 'real' events resulting in 'physical' loss to particular agents, and of risks which are not (highly) correlated across agents, so that the law of large numbers applies (at least reasonably well). Economic agents face numerous risks day in, day out, such as health risks, risk of invalidity or death (one's own or a family member's), unemployment, theft, fire, and many more. Some of these risks may influence their economic well-being (income, wealth, consumption opportunities) drastically and even endanger survival in extreme cases.

Insurance is socially valuable. Insurers provide risk sharing mechanisms by offering contracts allowing their customers to replace larger risks by smaller ones (certainty, in the extreme) at a price. This is valuable to economic agents, either because they are (subjectively) risk-averse, or because there are (objective) follow up costs linked to the insured contingencies. Insurance thus is potentially valuable to consumers as well as to collective entities and enterprises. The demand for insurance is a fundamental component of human behaviour (Eisen und Zweifel 2000).

Trading of risks, and thus insurance, is made possible by differences in preferences and endowments (the usual precondition of mutually advantageous exchange) and, more importantly in the present context, by the potential for risk pooling over a large number of agents and events. Professional insurers owe their existence and role to this potential.

A characteristic element of our traditional understanding of insurance is that specific damages to specified agents are insured and give rise to reimbursement (Culp 2002: presence of an ‘insurable interest’ of the insured). As an important side effect, this leads to the potential for ‘behavioral’ risk, or moral hazard (particularly due to information asymmetries), and to features like co-insurance and deductibles as counter-measures. These and related difficulties may have different significance for different types of insurance contracts, e.g. retail versus commercial, casualty versus life, or direct versus reinsurance contracts (reinsurance referring to a redistribution of risks among the members of the insurance industry).

Clearly, the need for and benefits of an insurance-like redistribution would arise even in a centralized planner’s economy without any markets. In an idealized market economy without any information imperfections and other types of frictions, the insurance function could be handled by the capital market without help from specialized agents, through the exchange of contingent claims on different states of the world. In a ‘real’ world with frictions, this is not true anymore: specialized insurers arise. To guarantee survival and credibility, they must rely on accumulation of assets and capital reserves.

Banking

Banks provide portfolio management, risk sharing and monitoring services by collecting funds from savers or ‘surplus units’ and passing them along, in transformed form, to potential borrowers or ‘deficit units’ (investors or consumers). A second role for banks in the economy is the management of the payment system, that is to facilitate and keep track of transfers of wealth among economic agents. This is a book-keeping activity of banks realized by debiting and crediting accounts which involves banks in the operation of the economy-wide system of monetary exchange (Baltensperger and Dermine 1987a).

The traditional view of a bank loan is that of a more or less illiquid claim against specific and heterogeneous credit customers, not or not easily marketable as a consequence. One of the major functions of banks is to reduce the cost of screening and monitoring borrowers. Private information held by borrowers result in contracting problems, and the delegation of screening and monitoring to banks is an efficient solution mechanism for this (Diamond 1984).

The traditional picture of a bank liability is that of a deposit with a high degree of liquidity for its owner, withdrawable on demand in the prototypical case of demand deposits, offered to a heterogeneous group of deposit customers facing different and uncorrelated liquidity needs. By offering deposits, banks provide liquidity insurance to consumers. The payment system services of banks are linked to the issue of transferable/checkable deposit accounts. The involvement of banks in running the payment system introduces an externality into banking which is not present in insurance markets (Diamond and Dybvig 1983).

A crucial feature of the banking business is that the archetypical contract in banking – which the literature on banking and financial intermediation shows to emerge as an optimal type of arrangement under fairly broad circumstances – amounts to illiquid (‘long-term’) assets financed by highly liquid (‘short-term’) deposits. This feature of the banking business creates a potential for systemic risk and crises. Under certain circumstances, the liquidity ‘needs’ and withdrawal decisions of depositors may become correlated (e.g. due

to cyclical influences and resulting stress), and even highly correlated in the extreme case of a bank panic and run.

The capital market

The traditional picture of the capital market is that of a forum for the exchange of standardized, and therefore ‘marketable’, financial assets (claims, liabilities) by a large number of anonymous participants. By channelling the funds accumulated by savers/lenders to potential investors/borrowers, the capital market helps the economy to achieve a more efficient allocation of resources and an improved pattern of production and consumption over time. This is, in principle, the first function attributed to banks above. But banks perform this role in combination with a borrower screening and monitoring function.

Insurers and banks owe their existence (*raison d’être*) to the presence of information imperfections (particularly information asymmetries) and other forms of frictions characterizing exchange (transaction costs of all sorts). In a perfectly frictionless world, the capital market – together with a virtual accountant keeping track of payments and wealth transfers – could perform all these functions alone, through the exchange of contingent claims on various states of the world. There would be no need for intermediaries, neither in the form of banks nor in the form of professional insurers. But the real world, of course, is full of frictions and imperfections. Consequently, it relies very much on intermediaries of both types, and there is a division of labour between them and the capital market.

It may be instructive to think of the relative functions of insurance, banking and the capital market by assessing their respective roles in different ‘visions’ or (fictional) stages of development of an economy. A motive for insurance, as already mentioned, arises even under the hypothetical vision of a pure planner’s economy without any markets and money. An optimizing planner in such a world would smooth consumption across agents in view of individual risks by mimicking an efficient insurance mechanism. He would not need to accumulate any capital for that purpose. He would accumulate capital, however, in order to achieve optimal growth and consumption opportunities over time. In a frictionless market economy, both of these functions would be performed by the capital market – the former (insurance) through a segment where conditional claims on different states of nature are traded against each other. Given randomness of outcomes and perfect information and verification, such a market could function to the satisfaction of all. In a world with frictions, however, intermediaries will take their place: Insurers in the area of risk consolidation, taking account of the difficulties and costs tied to this task (particularly moral hazard), banks in the area of borrower screening and monitoring, liquidity insurance, and running the payment system.

Reaching out to the capital market

The pictures portrayed above are simplifications. Banks as well as insurers have for a long time reached out and developed more complex forms of their business, with clear forays into the capital market. This is especially true for banks. The activities commonly referred to as ‘investment banking’, as opposed to the ‘commercial banking’ portrayed above, in essence represent the capital market engagements of banks and have a long

history and standing. In the last decades, this process has developed further and has strongly influenced and changed the nature of both industries – banking first, insurance somewhat later, but recently also very strongly. Furthermore, this process is likely, or certain, to continue in the future. By bringing both industries closer to the capital market, this has created a trend of convergence between insurance and banking. This trend, and its implications for regulation, will be the subject of section 3. In spite of this trend, major differences remain, though, particularly the involvement of banking in the payment system and the vulnerability of banking to contagion and systemic risk.

‘Financial’ and ‘nonfinancial’ risks

Risks can be grouped into different types. One possibility is to distinguish between the risks of well-defined ‘real’ perils or hazards, such as fire, illness or flood damage – which may be referred to as nonfinancial risks – and the risks of adverse changes in market conditions and resulting changes in market prices – which may be referred to as financial or market risks. The former is typical of the insurance business, and the latter, obviously, is particularly representative of the risks facing participants in the capital market.

Losses from nonfinancial risks, in the sense of this definition, are usually characterized by a low degree of correlation, as different individuals are affected at different times and to different degrees (‘individual’, ‘idiosyncratic’, ‘nonsystematic’ risk). Nevertheless, this need not always be true, e.g. in the case of large scale disasters or epidemics.

Losses from financial or market risks, on the other hand, may often be correlated to a considerable degree, since changes in asset prices, interest rates, exchange rates and commodity prices are interrelated and subject to the common influence of fluctuations in the overall economy, in particular cyclical changes and the loom of financial instability and crisis. Financial risks, therefore, are partly ‘systematic’, reflecting ‘aggregate’ risk. Aggregate risk cannot be eliminated through diversification. But it can be traded in the financial market at prices determined by this market.

Given this distinction, it may seem tempting to identify banking with exposures to financial or market risk, and insurance to ‘real’, nonfinancial risk. However, this would not be entirely accurate. Traditional (commercial) banking is characterized as much by ‘real’, idiosyncratic risk as is insurance, both on its asset and on its liability side. The traditional ‘textbook’ bank collects deposits from a pool of deposit customers exposed to idiosyncratic random liquidity needs (or shocks), and the traditional perception of a bank credit loss is a loss resulting from individual credit customer problems. Any insurance firm, on the other hand, is subject to financial risk on its asset portfolio, as much as a bank.

What is true, however, is that banks are more concerned with interdependent and systemic risks than the insurance industry, because of their involvement in running the payment system, and also because their linkages to the capital market have a much longer history and, at least in the past, intensity.

Insurance is an arrangement providing individual protection against the risk of losses resulting from various perils through pooling of risks. Insurance is socially valuable. The demand for insurance is a fundamental component of human behaviour.

Banks provide portfolio management, risk sharing and monitoring services by collecting funds from savers and passing them along, in transformed form, to potential borrowers (investors/consumers). Because of their involvement in money creation and running the economy-wide payment system, banks are much more exposed to interdependent/systemic risks than are insurers.

Insurers, and even more importantly banks, have traditional links to the capital market. Over the last fifteen years, these links have become much more intense.

Reasons for regulatory intervention in financial markets

Information asymmetry, moral hazard, and adverse selection

The most fundamental causes of market failure, and consequently of potential intervention and regulation in financial markets referred to in the literature derive from information imperfections, notably the information asymmetries characterizing many financial market relationships. In both insurance and banking we can think of numerous instances where one market side has privileged or ‘private’ information not available, or available at a cost only, to the other market side. Examples are the information advantages of bank credit customers with regard to the quality of their own investment projects and repayment abilities, of insurance customers with respect to their honesty and their own efforts for damage avoidance, of depositors with regard to their liquidity needs and behaviour, or of banks in judging the quality of their own asset portfolios.

The resulting phenomena of moral hazard and adverse selection have long been known in the literature as potential sources of welfare losses and ‘market failure’, in the sense of deviations from market solutions which would be attainable in the absence of the underlying information imperfections (Akerlof 1970, Stiglitz and Weiss 1981). In the extreme, they can lead to a complete breakdown of markets. However, care must be taken in employing this terminology and in drawing regulatory conclusions. Comparison with an ideal state where the underlying information problems are assumed away is not helpful per se, and has been rightfully chastised by Demsetz as representing a ‘Nirvana approach’ (Demsetz 1969). In principle, these information imperfections impose a particular cost on the market, a cost which must be borne or dealt with by one or the other of the parties involved and which, consequently, affects market outcome. Introducing a regulation does not automatically do away with this cost or alleviate the underlying friction. What is needed to make a case for regulation is a comparison of the situation with and without the regulation, given the underlying information imperfection.

Moral hazard (hidden action) refers to the adverse incentive effects which the existence of a contract (insurance, credit) may exert on the behaviour of one of the parties involved (the insured, the credit customer). The insured may, e.g., have less incentive to act carefully or take preventive measures, as compared to the situation without insurance, influencing both the probability of damage and/or the extent of the loss if damage occurs. Moral hazard, unless too severe, does not lead to a complete breakdown of markets. Like

a negative externality, it raises the cost of insurance. Consequently, it affects the degree of insurance coverage characterizing market outcomes. Incentive schemes linking the price of insurance (or loan conditions) to observed (past) behaviour (bonus/malus systems etc) are known and widely used as devices to contain this problem.

Adverse selection (hidden information) refers to the inability of insurers or banks to accurately distinguish and separate different risk groups among their (insurance or credit) customers, forcing them to offer a pooling contract based on average risk of the entire customer population. Obviously, such a pooling contract is comparatively attractive to the 'bad' risks among the customers, but unattractive to the 'good' risks. It may force the latter out of insurance (in the extreme) and creates incentives for rival suppliers to offer alternative contracts attractive to the good customers only, implying a loss of good customers for the first supplier. As a final consequence, this may prevent the existence of a stable market equilibrium and the market may completely break down (Akerlof). A countermeasure would be an effort to acquire information aimed at the separation of risks.

In insurance, moral hazard and adverse selection, to the extent that they cannot be removed through corrective measures, have long been recognized as a particular cost of business which must be borne by one or the other party. In a competitive environment, they must eventually raise the price of insurance and result in lower insurance coverage than would otherwise be the case. However, there is no a priori case for seeing this as a market inefficiency. Given the presence of this cost and the underlying frictions, this may be seen as an efficient response of the market to these frictions.

Systemic risk

In banking, however, asymmetric information creates an additional problem reaching beyond that present in insurance, linked to the specific nature of banking and banking markets mentioned above. An argument of the following type has been emphasized here. Depositors are said to be unable to judge adequately the quality of bank assets and thus the default probability of individual banks. That is, depositors know that there are high and low quality banks, but they are unable to tell which is which, while the banks know themselves their own status. This may be reinforced by a low level of disclosure. This creates a problem because a large part of the banks' liabilities are withdrawable on demand or short notice at par (Diamond and Dybvig 1983). Depositors face the question whether an observed bank failure is due to bank-specific causes (a bad draw from a given distribution of returns) or whether it represents a shift in the risk of the banking system as a whole (an overall change in the state of the economy). As technological progress reduces substantially the cost of deposit transfers, the fear of a bank run becomes even more relevant. In this way, a form of externality arises: 'good' banks may be hurt by the existence of 'bad' banks. This can lead to (1) a misallocation of resources (a suboptimal level of risk taking) generally and (2) to the danger of bank runs: the failure of a 'bad' bank may cause a run on 'good' banks, and thus create a risk of the collapse and destruction of the banking system and the payment mechanism, with high social costs, due to the vital importance of the banking and monetary system for the smooth operation of an economy.

It should be stressed that what is special to banking, according to this kind of argument, is the liquid nature of the liabilities of banks and the 'contagion' effect of bank failures; that is, the effect which an individual failure may have on the banking system and

the economy as a whole. This thought has always been, in one way or another, at the heart of the justification of bank regulation. Information problems and uncertainty as such create the possibility of bank failures and depositor losses. In principle, this fact alone does not much differentiate banking from other fields of business, including insurance. A creditor or shareholder of any firm may suffer losses of this kind. Whether this can justify regulatory intervention will be discussed next. But what is special to banking, and consequently gives rise to a regulatory concern which is specific to banking, is the potential effect of contagion and the resulting systemic risk.

Insolvency, customer protection, and incentives for undercapitalization

Beyond this, there is another consideration which is traditionally used when justifying regulation, both in insurance and banking, which is akin to arguments for consumer protection in other areas: Default of a company creates losses, first to shareholders of the companies involved, but in many cases also to the customers of these companies (bank creditors/depositors, insured parties). In insurance, this is particularly evident, as the insured may lose future benefits and insurance coverage, e.g. in life, old age, health or liability insurance, leaving them in a precarious economic situation in many cases and leading to calls for government and taxpayers to (at least partially) absorb these losses. Such calls are difficult to disregard, especially if the number of those affected is large, the potential losses severe, and if considerations of equity and justice are considered important (so that the problem is ‘too big to disregard’). This represents a moral hazard or externality which can lead to distorted behaviour (on the part of firms and their customers) and can form a potential basis of supervision and regulatory intervention aimed at improving incentives and protecting the taxpayer from having these losses shifted to him. In banking, this is known as the ‘too big to fail’ problem. In insurance, it forms the basis of the traditional motive for insurance customer protection. Many of the risks which are typically covered by ‘social’ insurance, such as unemployment risk, health risk, or old age income risk, are dealt with through public insurance schemes (rather than private ones) for precisely this reason.

In insurance, this is reinforced by governance problems resulting from two other characteristics of the industry. One is the ‘inversion of the production cycle’ in the insurance industry, i. e. the fact that insurance services are only produced and delivered **after** they are purchased and paid for by policyholders, in many cases years later only. This creates the difficult problem for policyholders to monitor the financial condition and solvency of their companies over extended periods of time in view of severe information asymmetries between the two parties (Plantin and Rochet 2007). The other is the lack of strong and tough claimholders, i.e. the dominance of a multitude of small policyholders and the resulting collective action or ‘free-rider’ problem emphasized by Dewatripont and Tirole (1994) in their ‘representation theory’ of prudential regulation, applied by them to banking, but equally applicable to insurance. Both of these features represent factors potentially leading to insufficient capitalization and suboptimal solvency levels, by giving insurers scope for hiding poor underwriting and underreserving from their policyholders over long periods of time. Plantin and Rochet provide examples of how these characteristics can induce insurance companies to enter into a Ponzi scheme by financing losses on the runoff of past underwriting years through underreserving for recent years, thus concealing losses or management mistakes for quite a long time (Plantin and Rochet 2007, ch. 2). These

features thus can provide motivation for monitoring by a government regulator and for interventions aimed at improving incentives and management discipline. A capital requirement can perform such a role.

Catastrophe risk and limited risk pooling potential

Finally, there is the problem of 'noninsurable' risks. Some risks are so large or unique that they lend themselves to risk pooling and insurability in a very limited sense only. In these cases, we can speak of market failure in a narrow sense. Examples are political catastrophes (war, NCBR risks) and, possibly, very large-scale natural disasters (e.g. climate change related risks). How to best deal with these types of risk has been much debated in recent years in connection with both Terrorism Risk and Natural Catastrophe Risk. At issue are both the extent to which this risk can and should be covered and the extent to which private insurers can or should play a role in this business.

In all this discussion of market failure, we must not forget that failure of market solutions to develop can also result from inappropriate regulatory interference strangling private market participation. In that case, it is appropriate to speak of policy or regulatory failure rather than market failure. Such situations are most likely to occur when considerations of distributional justice excessively dominate policy decisions at the expense of considerations of efficiency and effectiveness.

There are three instances of potential market failure which may justify intervention and regulation in the financial services area:

- Contagion and systemic risk, creating the need for protection against a breakdown of the payment system, financial crises and the resulting costs to the economy. This applies to the banking sector and essentially requires mechanisms for system-wide liquidity insurance. It has little or no bearing on the insurance industry.
- Risk of institutional default and resulting losses to insurance and bank customers, creating a moral hazard and a burden for the general taxpayer. This can be reinforced by the lack of strong claimholders and, in insurance, by the 'inversion of the production cycle', providing incentives for underreserving and undercapitalization. Imposing safeguards ensuring creditor and insurance customer protection and providing incentives for management discipline may follow from this. This applies to both insurance and banking.
- Catastrophe risk, calling for ways to deal with the individual and social implications of limited insurability in view of society's visions of distributional justice. This is a problem specific to insurance.

Asymmetric information and the resulting phenomena of moral hazard and adverse selection are questionable as motives for regulation as such, although they are often advanced so. It is not sufficient to establish a 'failure' of the market vis-à-vis some idealized state of the world, for example the state which could be reached if everybody had perfect information. A case must be made that regulation will improve on the unregulated market's solution, given the actual environment characterizing the economy. Without recourse to additional elements, such a case is much more difficult to make than is often thought at first sight.

Convergence of insurance and banking

The convergence process

Over the last few decades, the financial sector has experienced a major process of transformation which has brought insurers and banks, participants hitherto active in largely separate markets, much closer to the capital market and to each other. This convergence has taken place both at the level of products – e.g. asset insurance provided through either insurance guarantees or credit derivatives – and at the level of institutions – e.g. investment banks building up reinsurance capacity or insurance companies placing insurance linked securities in the capital market. While this convergence is still far from complete, the underlying process is very much alive and likely to go on. As Culp suggests, it must be seen in the context of related trends of convergence of ‘real’ and ‘financial’ perspectives on risk management, of organizational processes for managing an extraordinary variety of risks, and of risk management with the quest for an optimal capital structure (‘corporate finance’). At the center of this movement, according to Culp, are alternative risk transfer (ART) instruments, defined as ‘a large and growing collection of contracts, structures, and solutions provided by insurance and/or reinsurance companies that enable companies to transfer or finance some of the risks to which they are exposed in a nontraditional way, thereby functioning as synthetic debt or equity (or a hybrid) in a firm’s capital structure’. These instruments ‘represent the foray of the insurance industry into the corporate financing and capital formation processes that were once the near-exclusive domain of commercial and investment banks’ (Culp 2002b, p. 8).

Convergence thus refers to the fact that:

- Insurers have developed tools and products which are increasingly substitutes for capital market instruments;
- Banks and the capital market have developed tools and instruments which are substitutes for traditional insurance products;
- Customer companies increasingly go to both the capital market and banks and to insurers to buy risk management products, with an additional trend towards the search for integrated solutions (one-stop shopping from a single supplier).

Advances in risk management products

The product innovations of the last 15 years are characterized by several developments (Culp 2002a, b; Shiller 2003):

One is the trend towards **'equitized' risk transfer products**. Equity capital absorbs losses from any risks, while traditional risk transfer instruments are typically linked to one or two specific risks (e.g. interest rate or commodity price changes). The latter thus can be seen as providing options on paid-in capital, receivable only under specific conditions, such as a decline of a particular interest rate below a specified limit. 'Equitized' risk transfer products have characteristics which make them more similar to equity. One example is a **total return swap**, a credit derivative where a firm pays a fixed financing spread over LIBOR in exchange for receiving LIBOR plus all the income and the change in value on some underlying asset or asset portfolio. This can help firms manage the risk of either an actual default or a downgrade on the reference asset(s). The 'total return' nature of the swap makes the transaction economically similar to a sale of the asset: The swap removes all the risk and all the return on the asset in exchange for a fixed payment based on the expected income from the asset. In the sense that it leads to an inflow of funds in the event of a credit loss, it can be viewed as a 'synthetic' new equity issue.

Other examples of equitized risk management products are **multi-line integrated risk management policies** and **earnings per share insurance**. Integrated risk management products represent an alternative risk transfer instrument designed by insurance and reinsurance companies for corporate customers pursuing an enterprise-wide, integrated risk management approach. They provide combined coverage for all risks a customer wishes to bundle together under the same aggregate limits and deductible. Losses from any of the included risks can be used to satisfy the deductible and to make a claim. Multi-line policies can cover as few as two risks, but can also be comprehensive enough to effectively provide full earnings per share insurance.

Another development is the trend towards **risk finance**: the development of risk management products aimed at helping companies finance their retained risks on **pre-loss terms** rather than transferring the risks. The main traditional instruments used to pre-fund losses was through the use of internal reserves, earmarked funds, and other forms of self-insurance. More recent developments include **'finite risk' products** designed to help companies to pre-finance losses from retained risks, e.g. through use of a **'loss portfolio transfer'** used to deal with the timing risk of a known liability (the insurance analogue of an income swap).

A distinguishing feature of these new, alternative risk management products is that they often represent an underwriting of financial risks together with non-financial risks. Other characteristic traits are the extensive use of 'double triggers' and of 'experience participation'. **Double triggers** imply that payment is conditional on two separate developments: One is the occurrence of an economic loss by the insured. The other is provided by another control, linked to a specified index variable independent of the insured's performance and beyond his influence. This second trigger serves to lower the cost of insurance by limiting moral hazard and limiting the range of circumstances under which the policy pays off, often just to situations where the insured is expected to have significant need for funds. The insured thus makes a tradeoff: in exchange for a reduction in moral hazard and the resulting savings in insurance premiums, he accepts exposure to 'basic risk' from the second trigger. The more equity-like a risk transfer product is (e.g. earnings per share insurance), the greater becomes the potential for moral hazard and thus the greater the need for a second trigger. **'Experience participation'** refers to the use of

some sort of profit-sharing provision, implying a certain amount of risk-sharing between the insured and the insurer.

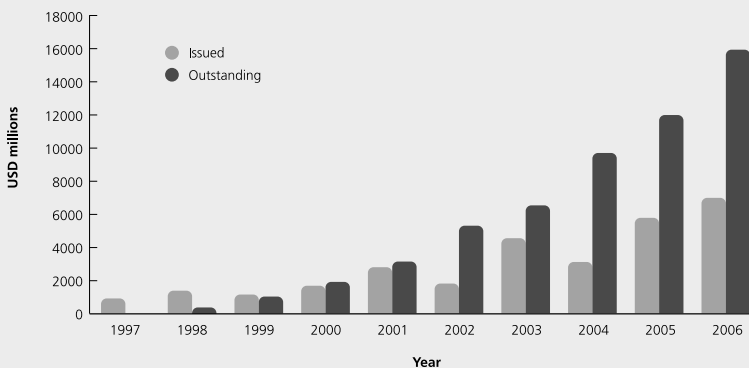
A further development is the trend towards the issue of **contingent capital**, giving companies the option to raise capital (equity or debt) when they expect to need it most, e.g. after occurrence of an insurable loss and a depletion of internal funds. Again, this is often linked to a second ‘trigger’, typically a risk or loss specific to the purchaser of the contract.

A final important trend is represented by the increased **securitization of insurance-related assets and liabilities**, such as life insurance policies or property losses resulting from natural catastrophes like hurricanes and earthquakes. Insurance-linked securities can also be based on a variety of other insurance risks, e.g. risks in air and sea transportation or investments in energy infrastructures. Securitization involves the isolation of a pool of assets and liabilities (the rights to a set of cash flows) and repackaging of these assets and cash flows into securities that are traded on the capital market. This unbundling and repackaging of risks allows market participants to invest and diversify into new classes of risk, previously not available for investment to them and potentially uncorrelated to other types of risk traditionally traded in the capital markets. It thus enhances the efficiency, adds to the liquidity, and strengthens the shock absorption capacity of financial markets. From the point of view of insurers, it allows them to spread risks through the use of the capital market much more widely than otherwise possible, thereby freeing capital for other uses. Securitization is not a trivial matter, however, when the underlying assets and liabilities are complex and heterogeneous.

Increasing use of the capital market by insurers and banks

Insurers have transferred an increasing amount of risk to the capital market. The following figure shows a dramatic growth in issuance and total amount of outstanding insurance-linked securities (ILS), including both P&C and life risks as well as catastrophe and non-cat risk, over the last few years (see figure).

**Growth of the Insurance-Linked Securitization (ILS) market:
Total ILS issued and outstanding**

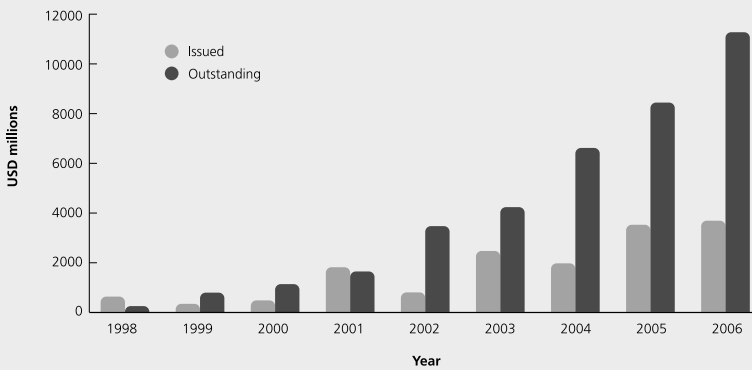


Source: Swiss Re Capital Markets, as of August 2006.

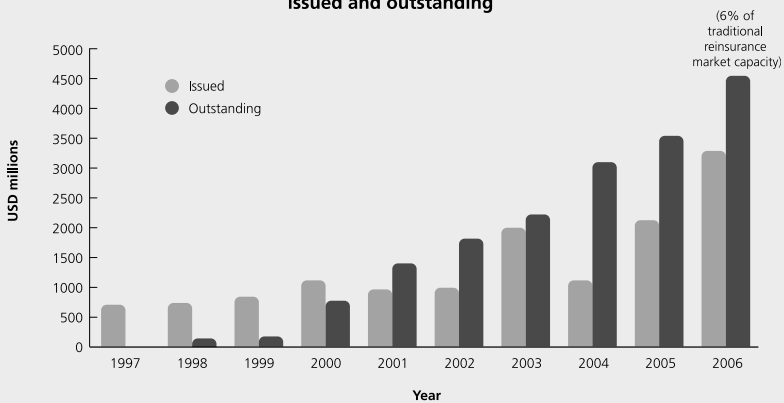
About 70 percent of outstanding ILS at the end of 2006 consists of life risk, while 30 percent are Cat bonds (see following figures). Even if outstanding ILS still represent a small share of the overall risk insured – outstanding Cat bonds amount to 6 percent of traditional reinsurance market capacity at the end of 2006 – the importance of ILS as an alternative to reinsurance is growing rapidly.

The growth in ILS is heavily influenced by the legal and regulatory environment. For example, the use of ILS has increased substantially since 2001, when Regulation XXX became effective in many US states. Regulation XXX imposes conservative reserve requirements for certain term life insurance policies. As a consequence, insurers have made increasing use of ILS to free up regulatory capital.

Growth of the Life Securitization market



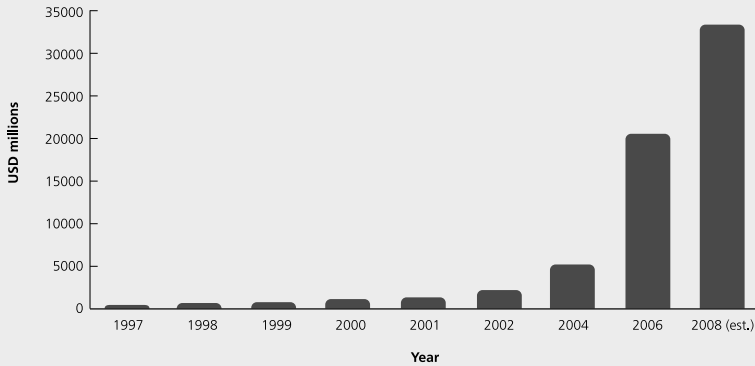
**Growth of the P&C Cat Bond market:
issued and outstanding**



The growth of credit derivatives, issued by banks and investment banks, is similarly impressive as the following figure shows. Because an important share of these credit derivatives has been bought by insurance companies and

pension funds, financial linkages between insurance and banking have considerably increased over the last years.

Growth of the Global Credit Derivatives Market



Source: British Bankers Association, 'Credit Derivatives Report,' 2006.

Regulatory implications of convergence

What does this process of convergence imply for the regulation of insurance and banking? In one way, the growing similarity of the two industries strengthens the case for an integrated regulation, both at the level of regulatory substance and at the level of organizational structures. However, we should not forget that an important difference remains. At the core of received bank regulation has always been the traditional deposit and credit business of banks and the concern for contagion and systemic risk associated with it, and not the capital market activities of banks as such. The problem of contagion still resides largely with banks, and not with insurers. Hence, regulation which derives from this concern must remain specific to banking.

An integrated view of insurance and bank supervision makes sense with regard to their capital market activities. Here, the growing similarity of products, tools and risk management methods does suggest similar substantive approaches to regulation. In our view, this clearly strengthens the case for moving away from regulating individual products and risks, in both insurance and banking, towards a generalized solvency supervision based on a comprehensive, enterprise-wide view of a firm's risks (to be discussed in Solvency regulation section page 19). The same development can also provide arguments for an organizational integration of regulation under the roof of a common financial market supervisory authority (to be discussed in the Organizational structure of regulation section page 34).

Over the last few decades, the financial sector has experienced a process of convergence which has brought insurers and banks much closer to the capital market, and consequently closer to each other. At the center of this movement are alternative risk transfer (ART) instruments (Culp).

This process of convergence strengthens the case for an integrated financial market supervision. However, an integrated regulation of insurance and banking makes sense only with respect to their capital market activities. Regulation which derives from the concern for contagion must remain specific to banking.

Approaches to financial market regulation

Systems of financial market regulation include a broad array of instruments and approaches. At a general level, we can identify certain features which can be used to distinguish between different approaches to regulation (Baltensperger and Dermine 1987b).

Prudential (preventive) versus protective measures

A first distinction is between prudential, or preventive, regulation on the one hand and protective measures on the other hand. **Prudential, or preventive, measures** are those aimed at controlling the levels of risk assumed by financial institutions, thus affecting the probability of institutional default (bank, insurance company failure). Prudential measures can include capital adequacy and solvency requirements, liquidity requirements, price regulations, asset diversification rules, restrictions on permissible business activities, restrictions on market entry, and general financial market supervision and inspection. **Protective measures**, on the other hand, offer protection to bank or insurance customers, or to the financial institutions themselves, in the case of actual or impending default. Indirectly, they also concern the capacity of the system to prevent or contain contagion and systemic risk. Protective measures include various forms of (mandatory) insurance, mutual assistance and public guarantees, such as deposit insurance, common emergency funds and lending of last resort.

It must be seen, however, that this separation is not clearcut. The two types of measures are interrelated in several ways. First, a basic idea of protective regulation, such as deposit insurance or lending of last resort facilities, is the creation of confidence in the financial system, with beneficial effects on the probability of contagion and systemic risk. That is, they also have a preventive component. Protective measures may in turn promote overly risky behavior on the part of financial institutions. Therefore, protective measures often call for supplementary preventive regulations.

Protective regulatory measures, such as liquidity insurance through systems of compulsory deposit insurance or lending of last resort, are widely employed in banking. Overwhelmingly, the motivation behind these regulations in banking is linked to considerations of contagion risk and system stability. We have established above that contagion and systemic risk, while possibly of crucial importance for banking, play no comparable role in insurance. Insurance customers usually have no right to withdraw

already paid premiums or to cancel contracts on short notice. Their premiums are payable in advance, ensuring a steady flow of liquidity to the insurer. True, the system of reinsurance introduces a certain element of interdependence, but this is not comparable to banking. Furthermore, reinsurance contributes itself endogenously to containing probabilities of institutional default in the insurance industry. Consequently, there is no need for public liquidity insurance or similar regulatory schemes in insurance.

Discretionary (principles-based) versus institutionalized (rigid) interventions

Another important distinction is that between a discretionary approach to protecting the safety of customers and the financial system and an institutionalized or contractual approach to achieve this end. In a similar vein, we could distinguish between a ‘principles-based’ and a strictly ‘rules-based’ approach. **Discretionary interventions** are all those that are at the discretion of the responsible authority (usually the government), such as lending of last resort, public guarantees and subsidies of all sorts, or nationalization. The main characteristic of a discretionary intervention is that it is not granted ‘for sure’, so that some amount of private risk remains. This uncertainty creates obvious incentives for customers to monitor their financial institutions. On the other hand, discretion may lower credibility, as there is scope for time-inconsistent behavior on the part of authorities. In a discretionary intervention system the cost of intervention (e.g. the costs of bailing out insolvent firms) is shared in some way by the general taxpayer and the shareholders and customers of the private companies involved. **Institutionalized interventions**, on the other hand, are represented, e.g., by the formalized deposit insurance systems known in the United States and many other countries. Since in this case help is granted automatically and at explicitly specified conditions, these institutions, while creating confidence in the safety of the system, are also prone to generate problems of moral hazard, as is well known from US deposit insurance experience.

In the case of institutionalized intervention, the specific forms of the rescue schemes employed becomes important, including the degree of coverage, the provisions and principles of funding the system (e.g. risk-related versus ‘flat’ fees for participants, cost participation), or the degree of compulsion enforced on the system. In the case of discretionary intervention, an important issue evidently concerns the circumstances under which help is granted. As mentioned above, it is a characteristic of a discretionary approach that these conditions are not known with exact certainty. Nevertheless, over time certain traditions and practices can evolve, and authorities can be more or less generous in determining the thresholds beyond which help is supplied and more or less precise in spelling out the conditions under which it will act.

Costs and potential abuse of regulation

Two further considerations of a general nature must be kept in mind:

Costs of Regulation: We should always remember that regulations invariably entail costs, not only in the form of **direct, administrative costs**, but also in terms of **additional, secondary distortions** introduced into the system (**opportunity costs of regulatory**

intervention). Thus, even if a regulation is judged to have beneficial effects, it is important to also assess its costs and weigh them against the associated benefits.

Regulatory Capture: Furthermore, we should always keep in mind the **potential abuse of regulation as an instrument of protection** and restricted market entry for new competitors. A system with highly sector-specific regulators may be particularly prone to this.

Discussions of regulation and decisions concerning the imposition or abolition of regulatory interventions always must take account of these aspects, too.

Systems of financial market regulation include a broad array of instruments and approaches. To be distinguished are prudential (preventive) versus protective measures and discretionary (principles-based) versus institutionalized (rigid) interventions. Insurance market interventions are mostly of the prudential type and may either rely on rigid institutional schemes or on general principles to be applied with discretion.

The costs and the potential misuse of regulation must always be taken into account in decisions concerning the imposition or abolition of regulatory interventions.

Solvency regulation

We have found the protection of insurance customers from the consequences of institutional default and the problem of catastrophe risk to be potentially valid motivations for intervention in insurance markets. Instruments of solvency protection are mainly measures of prevention of various kinds. Such measures are well known both in insurance and banking. A major issue here is the choice between specific regulation of individual products or of investment behaviour on the one hand and a generalized solvency regulation on the other hand.

Instruments of solvency regulation

One possibility to protect economic agents from the consequences of institutional default would be to make sure in one way or another that such defaults never happen. This would be a very dangerous course to follow, however. Solvency risk protection should not have the aim of completely preventing insolvencies, as institutional default is the ultimate penalty of the market for inefficient firms not fit for survival, and it must remain so. Keeping such firms alive artificially can prove very costly in the long run and may not be feasible except at exorbitant expense. Thus, solvency protection measures should be more aimed at providing incentives for firms to follow sound policies in their own interest and to internalize the external cost of default.

Instruments of solvency regulation can include a variety of measures, such as:

- product and price regulation,
- portfolio investment restrictions,
- mandatory (re)insurance,
- emergency insurance funds (company specific or industry-wide),
- capital and reserve regulation,
- market entry control,
- general supervision and inspection.

Product regulation refers to establishing regulatory rules governing the admissibility or non-admissibility of specific contracts, including material product specification and price. Regulations of this type have played an important role in the past, in Europe as well as the US. Such regulations can be highly restrictive, stifle product development and innovation and reduce competitive pressures in the market. In effect, they amount to a cartel-type market arrangement and can impose high costs on the market and consumers.

Similarly, specific portfolio investment restrictions can have adverse effects. The exclusion or the mandatory inclusion of particular forms of assets, for instance, reduces available diversification possibilities and may even have the effect of increasing insolvency risk, rather than lowering it (Eisen, Müller and Zweifel 1992).

For this reason, a trend has evolved in insurance regulation towards a more general, less intrusive type of solvency control based on a comprehensive view of all risks of a firm, permitting more freedom to companies and allowing them to remain efficient and competitive while attempting to ensure a high solvency probability through other means. Numerous national legislators have abandoned the individual insurance product as the object of regulation. Instead, the focus of regulation has shifted to ensuring institutional solvency in general, that is to ensure that insurance companies are able to honour their payment obligations in a continuous way with a high probability, the most important instrument being that of a generalized capital and reserve regulation, possibly supplemented by additional supervisory rules, such as investment restrictions and provisions of regular inspection by supervisory authorities. In Europe, this trend is reflected in the EU's Solvency II initiative. In Switzerland, the corresponding development has resulted in the Swiss Solvency Test SST adopted with the revised Insurance Supervision Act which entered into force on January 1, 2006.¹ The US, on the other hand, appears to be lagging behind Europe in this process of regulatory adjustment.

Occasionally, the stability of the entire system of insurance and its reputation are mentioned as a supplementary objective of regulation. This remains a secondary consideration throughout, though, and should rightfully stay in the background.

In banking, a corresponding development has led to the capital adequacy requirement provisions of the Basel I and (soon to come into effect) Basel II accords. In fact, insurance regulation in this area has drawn strongly on the regulatory approach of the Basel committee on capital regulation in banking.

Inspiration from ongoing bank regulation discussion

Capital adequacy requirements have a long tradition in banking. Bank solvency regulation relies to a large extent on this instrument. The maintenance of some capital– or solvency-ratio is typically enforced, that is, a minimum ratio between capital and an overall balance sheet magnitude, such as total assets or some weighted measure of risk assets. A main objective of the Basel committee has been to achieve some degree of international cooperation and minimal harmonization in this area. It is easy to see that a single, unified requirement based on total assets of a bank alone is highly problematic, as it creates

¹In Switzerland, the backbone of established solvency regulation in insurance has long been represented by the **system of 'technical reserves', to be covered by 'tied assets'** ('Sondervermögen', Sicherheitsfond, gebundenes Vermögen), supplemented by a **'solvency margin'** (Solvabilitätsspanne), **to be covered by equity capital**. Minimum standards for admission to the market plus a minimum starting capital gave a formal kind of entry control. When in operation, the capital requirement of the solvency margin replaced this initial capital requirement. The solvency margin reflected the riskiness of the insurer's premia flows and payment obligations. The technical reserves of an insurer formed part of its business plan to be approved by supervising authorities. The coverage of technical reserves by tied assets is economically very similar to a capital reserve requirement. The investment strategy for the assets covering the technical reserves had to exhibit an appropriate balance of safety, return and liquidity.

incentives to reallocate asset portfolios from low risk to high risk (high return) investments, with the possible outcome that the risk of institutional default could even increase, rather than decline.

To mitigate against this deficiency, the idea of risk-dependent capital adequacy requirements was developed and introduced under the Basel Capital Accord of 1988 (Basel I). The idea to take overall bank risk as the basis for required capital, and thus making capital requirements depend on asset structure and risk profile of a bank, is fundamentally sound. Nevertheless, the system introduced in 1988 was deficient in several ways. In particular, the differentiation of risks was soon considered to be inadequate, as only a very limited number of risk classes were distinguished, with risk characteristics of individual credit items within each risk group remaining very heterogeneous. Furthermore, covariances of return between different risk groups were not taken into account, risks of different asset classes being treated additively. Questionable was, furthermore, the complete concentration on banks' asset side, with liability side risk remaining neglected. An early critique of Basel I was that noninsurable 'market risk', in particular interest rate risk and business cycle risk, was not taken into account. This led to the 'market risk amendment' of 1996. A certain danger of capital requirements which is difficult to avoid completely is their potential misuse as an instrument of credit allocation via politically determined (economically inappropriate) risk weights.

These problems have led to the development of a revised approach to capital adequacy regulation, the new framework which has become known as Basel II (but is not yet in effect). The main thrust of this reform project is to develop a more refined approach to capturing total portfolio risk as a basis of the capital requirement, whilst improving incentives for banks to use and implement modern and efficient tools of risk management on their own. In addition, so-called 'operational risks' (e.g. breakdown of payment system, external influences) shall be taken into account as source of an extra requirement.

The concept of Basel II distinguishes three thrusts or 'pillars': in addition to the refinement of the capital requirement (first pillar), Basel II aims at strengthening the role of bank supervision (second pillar) and strengthening market discipline through increased transparency and disclosure requirements (third pillar). These three thrusts are meant to mutually reinforce each other. In this way, a more encompassing and subtle definition of the regulatory environment is aimed at.

In the context of the first pillar, a major innovation of Basel II is that banks are given a 'menu choice' in selecting the methods for evaluating and measuring their risks: they can choose between a relatively simple 'standard approach' and (different forms of) an 'Internal Ratings Based (IRB) approach'. The standard approach is based on supervisory-determined criteria and risk weights. It represents a relatively straightforward refinement of Basel I and will be relevant for the large majority of banks. The IRB approach, on the other hand, requires banks to develop, implement and continuously review a complex, tailor-made internal system of risk management and measurement. This must be done with the approval and in cooperation with the supervisory authority and represents a heavy investment for the bank. Naturally, this option will be mostly relevant for the big multinational banks with their complex and highly specific business activities. A major improvement under both the standard and the IRB approach is that banks shall be given incentives, in the form of compensations in the calculation of their capital requirements, for developing risk reducing measures and strategies.

All in all, the Basel II framework represents a clear improvement over the current regulatory regime. The more refined differentiation between different risk profiles and the increased reliance on incentives for internal risk management efforts, along with the availability of a menu-choice in risk evaluation models is clearly superior to Basel I. Also, the new emphasis on transparency (pillar 3) and on the role and sophistication of the supervisor (pillar 2) are positive contributions. Nevertheless, Basel II still involves certain dangers, notably the following ones (Baltensperger 2006): high implementation costs (regulatory perfection cannot be the objective); separate and additive treatment of certain risks; risk of imbalance between the three pillars; potential procyclical effects; potential misuse through politically determined risk weights.

Generalized solvency regulation: Solvency II and SST

Recent developments in insurance solvency regulation have been considerably inspired by the debate about Basel II in banking. This applies, in particular, to the Solvency II proposal in Europe and the development of the Swiss Solvency Test SST in Switzerland. This makes sense, as problems and objectives are similar to some extent. At the same time, however, insurance regulation must strive to avoid the dangers of remaining in the shadow of banking regulation.

In view of increased international competition and the ongoing internationalization of insurance and capital markets, the focus of insurance supervision has recently shifted, in the spirit of the general trend referred to above, towards a more comprehensive risk-based supervision and away from a regulation of individual insurance products. In Switzerland, this has led to a new system of supervision under the revised Insurance Supervision Act of January 1, 2006. As a core element, this new approach includes the adoption of the newly developed SST as a novel instrument for monitoring the ability of insurers to handle their risks adequately. Preventive product monitoring is replaced with a strict solvency monitoring.² At the EU level, this is mirrored by Solvency II, a project which is well advanced, but still under discussion. The US lags behind Europe in this development, a potential competitive disadvantage for the US insurance industry unless redressed. The SST is discussed in the following as an example of a generalized solvency regulation scheme already in existence.

The SST determines a target capital deemed necessary for the insurance company to survive the risks it has assumed with adequate security (high probability). This target capital is compared to the actually available 'risk bearing' capital. The SST assumes an explicitly economic point of view in this, i.e. portfolios and risks are evaluated at market values, rather than according to statutory accounting.

The target capital serves as an indicator, or warning signal: If available risk bearing capital falls short of the target capital, this does not yet imply insolvency. But it indicates the necessity of corrective measures; either additional capital has to be built up or risks have to be reduced, so that insolvency can be avoided.

The SST aims at promoting risk awareness and appropriate risk management by the

²In some socially sensitive areas, such as supplemental health insurance or occupational pensions, however, the 'preventive approach' is retained.

insurers themselves. The definition of the necessary target capital is a responsibility of the company itself. In the spirit of Basel II, SST allows for a ‘menu choice’ available to the supervised companies in determining their target capital: On the one hand, a ‘standard model’ for the evaluation of risks and the calculation of target capital is provided by the supervisor. On the other hand, the development of company-specific, ‘internal models’ of risk evaluation is allowed and actively encouraged. In this way, the SST does not provide a fixed model, but rather a set of fundamental principles. The model for risk evaluation and calculation of target capital is part of the company’s business plan which must be approved by the supervisor.

With its emphasis on an increased focus of supervision on the qualitative review of the various risks in insurance and on strengthening incentives for self-supervision and self-assessment, the SST can be said to be ‘deliberately embedded in an overall concept of comprehensive assessment of the general risk of management of the companies’ (Federal Office of Private Insurance 2006). The revised legislation also strengthens transparency requirements, makes insurance intermediaries subject to supervision, creates an explicit legal foundation for specific supervision of conglomerates, makes reinsurers subject to the same solvency supervision as direct insurers, and expands supervisory responsibilities in the area of corporate governance.³

Target capital under SST is made up of two components, expected shortfall and minimum capital. Expected shortfall is the average loss (change of risk bearing capital) over a year exceeding the 99 percentile (average of the 1 percent worst outcomes), used as an estimate of the capital which is necessary for the company to survive with high probability the fluctuations in capital resulting from its insurance, market and credit risks over the subsequent year. Market and insurance risks are quantified analytically and with help of scenarios, credit risk is included additively as a ‘capital charge’ (Basel II approach). Minimum capital is computed such that in case of a ‘bad’ outcome (‘run-off situation’) another insurer can take over the insurance portfolio (assets and liabilities) while being compensated for the costs of providing the necessary regulatory capital during the liquidation period of the portfolio. The target capital thus is specified such that, even in the unlikely event of a loss equal to the expected shortfall, risk bearing capital at least equal to the minimum capital is available.

We believe that the SST has successfully adopted the strengths of the Basel II blueprint. The shift from preventive product control to a comprehensive assessment of risks and solvency, the emphasis on incentives for self-supervision and self-assessment, and the provision of a menu choice with regard to the models employed in evaluating risks and determining target capital all represent clear advantages of the new legislation. In our view, this represents a big step forward in insurance supervision and regulation. It must clearly be seen, however, that a flexible, principles-based supervision of this kind puts high demands on the skills and professional competence of supervisors.

Are there remaining dangers comparable to those alluded to in connection with Basel II above? The following issues have to be considered, we believe:

- Implementation costs are as relevant in insurance as in banking. Regulatory perfection cannot be the objective.
- We have the impression that there is more awareness in insurance of the interdependence of the various risk categories. Still, accounting appropriately

³ On the SST, see also Schmeiser et al. 2006.

for the relevant covariances is a challenge in practice. It is not yet quite clear to us what to think of the additive inclusion of a credit risk charge. Nevertheless, the correlation between specific insurance risks and general market risk (interest rate, business cycle risk) should be less of a problem than that between banks' credit risks and general market risk.

- Procyclicality can present a problem in insurance (as well as in banking) and requires careful attention of the supervisor. A cyclical downturn can cause a decline in portfolio quality and erosion of risk bearing capital, forcing companies to raise additional capital or to lower their risks through portfolio adjustments in critical times. If followed blindly and without judgment, SST procedures could introduce a fateful procyclical pattern into the insurance market and the economy. The problem of distinguishing between 'normal' cyclical effects and (more serious) structural shifts in business environment and quality of company management must be addressed. To some extent, this is a question of working with an appropriate time horizon.

Risk-based capital in the European Union: Solvency II

Background

The rationale for EU insurance legislation is to facilitate the development of a Single Market in insurance services, whilst at the same time securing an adequate level of consumer protection. The development of the necessary legislative framework began in the 1970s with the first generation Insurance Directives*, but was only completed in the early 1990's with the third generation Insurance Directives. The third generation Insurance Directives established an 'EU passport system' (single licence) for insurers based on the concept of minimum harmonisation and mutual recognition. The Directives required the Commission to conduct a review of the solvency requirements. It became clear that Solvency I had major weaknesses, such as the lack of risk sensitivity, restrictions on the proper functioning of the Single Market, sub-optimal arrangements for the supervision of groups and lack of international and cross-sectoral convergence.

Solvency II: a new regulatory framework

Addressing these flaws, Solvency II will move away from the simplistic regulatory capital requirements currently in force across most of Europe. In their place will come a more qualitative and quantitative approach, in which capital levels are geared to the risks being run within each business and the effectiveness of the measurement, monitoring and control functions in operation to manage them. By aligning solvency capital to each insurer's particular risk profile, Solvency II will provide a valuable incentive for improving risk management. The requirement for more detailed risk information systems should also help to enhance the basis for decision-making.

The three pillar approach

The foundation of the new regime will be three pillars, which are conceptually comparable to Basel II (see figure).

The first regulatory threshold is a best estimate of liabilities, which then is augmented by a risk margin to reflect any uncertainty in the future cash flows. In the absence of a liquid market in insurance liabilities, the risk margin is to be based on a proxy 'cost-of-capital'. This reflects the return on the capital a

* Directive 79/267/EEC; Directive 73/239/EEC; and Directive 73/240/EEC.



whole sector. Introducing risk-based regulatory requirements will ensure that a fair balance is struck between strong policyholder protection and reasonable costs for insurers. In particular, capital requirements will reflect the specific risk-profile of each insurance company. Insurers that manage their risks well – because they have rigorous policies, use appropriate risk-mitigation techniques, or diversify their activities – will be rewarded and allowed to hold less capital. On the other hand, poorly managed insurers, or insurers with a larger risk appetite, will be asked to hold more capital in order to ensure that policyholder claims will be met when they fall due. Solvency II will result in much greater emphasis being placed on sound risk management and robust internal controls. The responsibility for an insurers' financial soundness will be pushed back firmly to its management, where it belongs. Insurers will be given more freedom – i.e. they will be required to meet sound principles rather than arbitrary rules. Regulatory requirements and industry practice will be aligned and insurers will be rewarded for introducing risk and capital management systems that best fit their needs and overall risk profile. In return, they will be subject to strengthened supervisory review.

Insurance solvency regulation and the 'pre-commitment' approach

Goodhart (1996), in the context of the discussion of bank capital regulation going on at that time, argued that the regulation of banks should shift towards less formal, rigorous and complex regulatory solutions and more reliance on internal control mechanisms and on disclosure requirements. In a comment on his contribution, Baltensperger 1996 agreed with the thrust of this argument, noting that financial institutions and industries have a great self-interest in setting sound standards and avoiding problems of instability and disruption and that this should be exploited to the greatest possible degree by public regulation. At all cost, public regulation should avoid solutions which effectively weaken this self-interest, rather than strengthening it, such as, e.g., public safety nets with too great a degree of comfort.

Pre-commitment, as proposed by Kupiec and O'Brien (1995) to deal with banks' exposure to market risk, is an approach which goes in this direction. The pre-commitment approach foresees that a bank must specify an amount of capital deemed adequate to cover its planned level of risk exposure over a given planning horizon and make a commitment to manage its portfolio such that its cumulative losses at any time during this period are kept below this capital reserve. A system of corrective measures or 'penalties' imposed and enforced by a regulator in case of a failure of the commitment is supposed to provide the incentive to the bank for putting up an adequate amount of capital (given its portfolio risks and its capacity to manage those risks). Required public disclosure of pre-commitment and cases of their violation are thought to provide additional incentives for appropriate behaviour. The scheme represents an approach which attempts to set conditions such as to induce banks to willingly hold sufficient capital reserves.

However, the pre-commitment approach, attractive as it may appear, faces certain difficulties when applied to banking (Baltensperger 1998). In fact, we are going to suggest here that it may be better suited for insurance and that in a way the idea of the SST comes quite close to it. An obvious problem is to define sensible consequences ('penalties') in

case of violation. Discussed and proposed in the banking context were, e.g., supplementary capital requirements or restrictions on risk exposure for subsequent periods, monetary fines, as well as mandatory public disclosure of commitment and violations of commitments. Mandatory disclosure was proposed by Kupiec and O'Brien as an (at least partial) substitute for direct regulatory consequences. Is this enough? It would amount, in essence, to a market solution with enforced transparency. Indeed this could go quite a way. The market also imposes penalties in case of capital deficiencies, in the form of enforced portfolio adjustments and the necessity to rebuild capital in a situation of stress and, therefore, very likely at extra cost. Also, confidence and trust is at the heart of banks' business. Because of this, banks have good reason to protect themselves against the consequences of bad events.

Nevertheless, if we believe in the externalities and distortions stressed by the traditional arguments for bank regulation, this might not be enough by itself, but should be backed up by additional measures. It must be emphasized, though, that the power and incentive effects of market penalties and, consequently, the strength of the externalities and distortions present in the market, depend to a considerable degree (maybe decisively) on expectations about government intervention and public support in situations of stress. Removing these expectations could go a long way towards removing the distortions of market solutions.

The major problem here is that banking authorities are facing a dilemma with regard to situations of financial stress, especially if large institutions, or many institutions, or even the stability and safety of the banking system as a whole, are involved. The inclination to interfere in order to limit system-wide damage becomes politically extremely powerful in such situations, and awareness of this among market participants creates a severe credibility problem. On the one hand, in order to insure market discipline and minimization of distortions, the authorities should commit themselves to let banks in difficulty be penalized (by the market and/or by the regulatory rules in force). On the other hand, the authorities must ensure the stability of the financial system in face of the possibility of large shocks and 'systemic' disruption, which may be the result of exogenous shocks not attributable to 'bad behaviour' of banks themselves. To balance its responses on both these accounts in a sensible, and credible, way is an extremely difficult task for the authorities. The distinction between 'small' or 'normal' disturbances and 'large' shocks with 'system-wide' implications must be essential to finding this balance. In case of systemic crises (large disruptions of the financial system), it may not be sensible to expect banks to pay penalties and raise extra capital (and they may not be able to do so and yet survive). This can justify, or make necessary, regulatory measures beyond a mere pre-commitment solution. It is doubtful that the latter could effectively deal with large financial shocks and system-wide disruption.

In insurance, however, as we have stressed before, the concern about system-wide risk, system stability, and the resulting credibility problem is not present to the same extent as in banking. Therefore, a pre-commitment approach may fit the insurance case better than that of banks.

Risk-based capital in the US: the RBC model

In 1993, the National Association of Insurance Commissioners (NAIC) instituted formal regulatory risk-based capital requirements that placed a floor on the amount of capital that an insurance company could hold without triggering regulatory action.

Separate risk-based capital models apply to life companies, property and casualty companies and health maintenance organizations. These different formulas seek to reflect the differences in the economic environments facing these different companies. The common risks identified in the NAIC models include Asset Risk-Affiliates, Asset Risk-Other, Credit Risk, Underwriting Risk, and Business Risk.

The U.S. risk-based capital system has two main components: 1) the risk-based capital formula, that establishes a hypothetical minimum capital level that is compared to a company's actual capital level, and 2) a risk-based capital model law that grants automatic authority to the state insurance regulator to take specific actions based on the level of impairment. Nearly all the states have adopted laws, regulations or bulletins that are considered to be substantially similar to the NAIC's risk-based capital for Insurers Model Act.

Components of the life risk-based capital formula include asset risk, insurance risk, interest rate risk, health provider credit risk, business risk guaranty fund assessment risk, and business risk health administration expense risk. The property/casualty and health formulas take a slightly different approach to each of these components to reflect the differences in risks associated with the different insurance types.

The asset risk includes the risk of default of assets for affiliated investments. This represents the risk-based capital requirement of the downstream insurance subsidiaries owned by the insurer and applies factors to other subsidiaries. The parent is required to hold an equivalent amount of risk-based capital to protect against financial downturns of affiliates. For life companies, off-balance sheet items are included in this risk component and these include non-controlled assets, derivative instruments, guarantees for affiliates and contingent liabilities. The asset risk also represents the risk of default for debt assets and loss in market value for equity assets. Fixed income assets include bonds, mortgages, short-term investments, etc. Equity assets include common and preferred stock, real estate, long term assets, etc. All insurance companies are subject to an asset concentration factor that reflects the additional risk of high concentrations in single exposures.

Insurance risk is the equivalent of underwriting risk. The life insurance risk-based capital factors calculate the surplus needed to provide for excess claims, both from random fluctuations and from inaccurate pricing for future level of claims (experience fluctuation risk). Property/casualty companies calculate an underwriting risk for reserves and an underwriting risk for premiums. These calculations reflect the risk of pricing and reserving errors. Because reserves for various types of business possess different frequency and severity characteristics, the formula applies separate factors to each major line of business. These factors are then adjusted for company experience and for investment potential. The capital to support the risk that current premiums charged are not sufficient to pay future losses is calculated in much the same manner as the reserve risk. Property/casualty insurers also calculate risk based capital for excessive growth. This calculation recognizes that companies that grow rapidly may have greater reserve deficiencies.

The interest rate risk is the risk of losses due to changes in interest rate levels. The factors in this calculation represent the surplus necessary to provide for a lack of synchronization of asset and liability cash flows. This risk category does not apply to property/casualty or health companies.

Business risk guaranty fund assessment risk and business risk health administration expense risk represent the wide range of general business risks faced by life insurers. The characteristics of these risks are difficult to quantify in a general way for all companies. Each formula contains a similar category of risk. Health insurers are subject to business risk calculations that deal with risks such as the variability of operating expenses, collectibility of payments for administering third party programs, and excessive growth. These sub-components recognize that instability can result from poor controls on administrative expenses as well as from instability in medical expenses.

Each formula recognizes the correlation between various types of risk. The formulas apply a covariance calculation to determine the appropriate risk-based capital. The levels of regulatory action are determined from the risk-based capital after covariance. This adjustment reflects the fact that the cumulative risk of several independent, not correlated, items is less than the sum of the individual risks. The covariance adjustment reduces the importance of the smaller items and the dominance of the biggest items affected by the adjustment.

Under this regulatory scheme there are five action levels, which are determined by comparing a company's Total Adjusted Capital to its Authorized Control Level Risk-Based Capital as computed by the risk-based capital formula. Total Adjusted Capital is compared to Authorized Control Level Risk-Based Capital because the Authorized Control Level Risk-Based Capital is the level at which an insurance commissioner can first take control of an insurance company – that is, control of the insurance company may be seized.

The level of required risk-based capital is calculated and reported annually. Depending upon the level of the reported risk-based capital, a number of remedial actions, if necessary, are available.

The ratio of Total Adjusted Capital to Authorized Control Level Risk-Based Capital results in the following action levels:

1. A company reporting total adjusted capital of 200% or more of minimum risk-based capital is a 'no action' level company.
2. Total Adjusted Capital of 150% to 200% of minimum risk-based capital institutes a Company Action Level under which the insurer must prepare and submit to the insurance regulator, a comprehensive financial plan that identifies the conditions that contributed to the company's financial condition and must contain proposals to correct the company's financial problems. If a company fails to file this comprehensive financial plan, this failure to respond triggers the next lower action level.
3. Total Adjusted Capital of 100% to 150% of minimum risk-based capital triggers a Regulatory Action Level initiative. At this level, an insurance company is also required to file an action plan, and the state insurance commissioner is required to perform any examinations or analyses to the insurer's business and operations that he or she deems necessary. The state insurance commissioner also issues appropriate corrective orders to address the company's financial problems.
4. Total Adjusted Capital of 70% to 100% of the minimum risk-based capital triggers an Authorized Control Level. This is the first point that the law

authorizes the regulator to take control of the insurer. This authorization is in addition to the remedies available at the higher action levels. It is important to recognize that the law grants the insurance commissioner this power automatically. This action level occurs at a point where the insurer may still be technically solvent according to traditional standards – that is, the company's assets may still be greater than its liabilities.

5. Total Adjusted Capital of less than 70% triggers a Mandatory Control Level that requires the regulator to take steps to place the insurer under supervisory control.

The life formula also includes a trend test. For companies whose total adjusted capital is between 2.0 and 2.5 times their Authorized Control Level Risk-Based Capital are subject to a trend test. The trend test calculates the greater of the decrease in the margin between the current year and prior year and the average of the past three years. The assumption is that the decrease could occur again in the coming year. Any company that trends below 1.9 times their Authorized Control Level Risk- Based Capital would trigger the company action level.

The definition of different action levels within the risk-based capital framework comes close to the 'double trigger approach proposed by Plantin and Rochet 2007.

Capital reserves as an incentive device

When discussing capital adequacy and capital requirements we must never forget that capital reserves do not only serve as a protection against (extraordinary) losses and the associated risk of insolvency, but that they serve also as an incentive encouraging sound corporate behaviour and managerial discipline. By increasing stockholders' loss potential, capital reserves raise stockholder interest in company soundness and management discipline and enhance stockholder incentives to closely monitor company management and company solvency.

To the extent that the adverse incentives potentially leading to undercapitalization and underreserving discussed in chapter 2 are present, a capital requirement can serve as an appropriate corrective measure and disciplining tool. However, in view of the preceding discussion of solvency regulation and precommitment, great care should be taken to avoid overly rigid restrictions and rely as much as possible on solutions aligning regulatory objectives with the self-interest of companies in avoiding financial distress and maintaining financial soundness.

Plantin and Rochet's 'double trigger' approach

Because of the complexity of the Solvency II / SST approach and the high demands on supervisory skills which it implies, Plantin and Rochet have suggested a simple 'double trigger' approach as an alternative. They argue that, just as banks screen and monitor their debtors, the prudential authority should screen and monitor insurance firms, without intervening in their ongoing operations as long as simple and easily verifiable financial ratios are met. It should be committed, however, to making prompt and tough decisions as

soon as a company no longer complies with certain prudential rules. When this happens, the only aim of the regulator must be the recovery of current policyholders' outstanding claims, even if this hurts future business opportunities or is detrimental to the workforce and shareholders (Plantin and Rochet 2007, p.64).

Based on this view, Plantin and Rochet suggest that prudential ratios should be defined simply and derived from public accounts, because these accounts are easily verifiable. They propose a 'double trigger' regulation with two levels of capital requirements. If an insurance company satisfies the first (and higher) capital requirement, the scope of regulatory intervention would be limited to making sure that the firm's reports are correct and based upon sincere information. If this first threshold is violated, the prudential authority must carry out further investigations and establish with the firm a plan to restore its prudential situation. Finally, if the situation deteriorates further or if these investigations reveal additional losses, so that the second (lower) threshold is hit, the prudential authority must transfer the case to a guarantee fund run by the industry. In this case, the regulator and the guarantee fund jointly take over responsibility and control rights (Plantin and Rochet 2007, p.66).

The role of the first threshold is to protect shareholders and management against a regulatory bias toward excessive interventionism. Excessive regulatory intervention in well-functioning and well-capitalized firms is seen as counterproductive. Shareholders are the best decision makers in this case and the threat of regulatory interference reduces managerial incentives toward innovation and operational efficiency. Regulation in this situation is limited to verification, particularly verification of capital reserves and the use of sound reserving policies. The role of the second threshold, whose violation assigns rights as well as duties to the regulatory authority, is to provide the regulator with a strong incentive to intervene effectively and promptly and to create an unambiguous reference for posterior sanctions. The role and design of the guarantee fund which comes into play under this plan when the lower threshold is hit requires careful attention, of course.

Traditionally, the regulation of individual products (admissibility, product specification, price) has played a large role in insurance supervision. Such regulations can be highly restrictive and stifle product development, innovation, and competition. For this reason, a trend has evolved towards a more general, less intrusive type of solvency control with focus on ensuring institutional solvency in general. In Europe, this trend is reflected in the EU's Solvency II initiative and the (already adopted) Swiss Solvency Test SST in Switzerland.

In banking, a corresponding development has led to the capital adequacy requirement provisions of the Basel I and (soon to come into effect) Basel II accords. Insurance regulation in this area has been considerably inspired by the debate about Basel II. In Switzerland, the SST provides a successful application of the 'pre-commitment' approach originally suggested for banking, a flexible, principles-based type of supervision which, however, puts high demands on the skills and professional competence of supervisors.

Great care must be taken to avoid overly rigid restrictions and rely as much as possible on solutions aligning regulatory objectives with the self-interest of firms in avoiding financial distress and maintaining financial soundness. A simple and interesting regulatory view is provided by the 'double trigger' approach suggested by Plantin and Rochet 2007.

Private versus public insurance: Catastrophe risk and limited insurability

Limited insurability

Which risks can and should be dealt with through private insurance markets and which not? Certain risks apparently are less suitable for private insurance than others. Public or ‘social’ insurance has played a major role in most societies for a long time, particularly in the areas of health insurance and medical cost coverage, unemployment insurance, invalidity insurance, and longevity risk (old age income insurance).

In some of these cases, it is not necessarily a fundamental inability of private markets to provide workable solutions, but rather the desire of society to combine insurance with considerations of equity and redistribution of income or wealth. This necessarily leads to government interference, or even a complete takeover by government in the form of publicly run insurance schemes.

Some risks can be intrinsically difficult or impossible to insure through private markets, however, particularly certain risks related to man-made or natural catastrophes, such as the risks of war, of terrorist attacks, of NCBR (Nuclear-Chemical-Biological-Radiological) events, or of large scale natural disasters such as earthquakes, hurricanes or flooding. For obvious reasons, these risks have been much discussed in recent years.

Over the last 25 years, worldwide insured losses from catastrophes, particularly weather-related catastrophes, have increased sharply (with a concentration of insured losses in the US). Main reasons for this development are increased urbanization, increases in property values and insurance coverage, and very possibly climate change. This trend is likely to continue in the future (Kunreuther and Michel-Kerjan 2007).

In the US, concerns after the attacks of 9/11 that the limited availability of terrorism insurance could be detrimental to the health of the economy led Congress to enact the Terrorism Risk Insurance Act (TRIA) of 2002, a law creating a temporary program that effectively functions as public reinsurance for the property/casualty and worker’s compensation industries. It was expected that this program would give the insurance industry time to develop instruments and strategies to cover terrorism risk. This law was extended in 2005 and 2007, but deep disagreement persists as to the appropriate relative roles of private insurance and government in this field.

Fundamentally, we see the following reasons which may limit or even prevent private insurability:

- **Insufficient scope for risk pooling** (correlated/aggregate risk): Either all or too large a share of the entire population are affected in the same way at the same time, or the damage resulting from an event is so big that it threatens the survival of the insurer. In the extreme, an event reducing every person's income or 'endowment' in a society by the same amount at the same time obviously is not insurable within that society. In the case of events which cause simultaneous damage to many (although not all) members of a society at the same time, insurability may still exist, but it can be limited and become very costly. If the probability of such events is low and the expectation high that society will provide emergency help in such a situation anyway, a moral hazard problem preventing a private solution and paving the way to public insurance can be present.
- **Informational ambiguity**: Uncertainty, or even ignorance, in assessing the nature and extent of risks and their cost consequences can make insurance too costly to allow active markets to develop. Large-scale disasters are infrequent events with highly uncertain consequences, implying limited ability to identify and quantify probabilities of the event occurring and of the extent of the damages likely to follow from it. This makes it necessary to work with wide confidence limits and 'reserve margins' in setting premiums. As a consequence, insurability through private markets may not be given anymore.
- **Moral hazard and adverse selection** can make insurance (too) costly and, in the extreme, lead to a breakdown of markets (Akerlof). This is the major concern in connection with many of the traditional fields of social insurance.⁴

Big risks occurring only infrequently can cause substantial fluctuations in an insurer's net worth over time. In order to survive, the insurer must hold an adequate buffer of capital reserves and incur corresponding capital costs.

Risk averse individuals are always willing to buy insurance at an 'actuarially fair' price, that is, replace an uncertain prospect by a certain prospect with the same expected value. However, the price at which a (private) insurer can offer insurance will also have to cover his costs of running the insurance business itself including, besides all the administrative costs (such as the costs of information collection, legal advice, accounting procedures etc.) the costs caused by limited risk pooling, informational ambiguity, and moral hazard. If these costs are high enough, this may raise the price of insurance to a

⁴In a recent study of terrorism insurance, the United States Government Accountability Office (GAO, September 2006) counts four 'commonly accepted principles of insurability' similar to the conditions named above. They relate partly to moral hazard, partly to informational ambiguity, and partly to limited risk pooling potential:

- 'The law of large numbers must apply. There must be a sufficiently large number of homogeneous units exposed to random losses, both historically and prospectively, to make the future losses reasonably predictable. This principle works best when there are large numbers of losses with similar characteristics spread across a large group.'
- 'The loss must be definite and measurable. The insurer must be capable of determining whether a loss has taken place, and setting a dollar value on the amount of the loss.'
- 'The loss must be fortuitous or accidental. That is, the loss must result from chance and not be something that is certain to happen. To the extent that a future loss approaches certainty, an insurer would have to charge the full value of the loss plus an additional amount for the expenses incurred.'
- 'The loss must not be catastrophic. That is, the losses should not affect a very large percentage of an insurance company's policyholders at the same time, for example, in a limited geographic area. Alternatively, a catastrophic loss is one that is extraordinarily large relative to the amount of exposure in an insurance pool.'

level at which insurance becomes unattractive to the insured, so that a market cannot develop.

Catastrophe risk and the role of private versus public insurance

It is not possible to generalize about the private insurability of catastrophe risk. Some events are sufficiently close to meeting these conditions for insurability, and coverage is effectively offered at prices affordable to many insurance consumers, so that a market can develop and work. Other events do not meet the above conditions across the board, or do not meet one or the other of these conditions by such a wide margin that private insurance remains virtually impossible.

Examples of the former kind are numerous types of natural catastrophes, possibly also some forms of terrorism risk. Coverage for damages resulting from natural catastrophes, such as earthquakes, hurricanes and flooding, has long been available through private insurers. Still, the rise in insured losses referred to above, along with new hazards facing insurers, such as liability from climate change, present new challenges to the insurance industry reaching beyond past experiences. An equally difficult development can be observed in terrorism risk insurance. A recent US report of the President's Working Group on Financial Markets (PWG 2006) on terrorism risk insurance made available in September 2006 comes to the conclusion that the availability and affordability of such insurance in the US has substantially improved since 2002: Insurers have made great progress in measuring and managing terrorism risk through the use of sophisticated models and of better diversification and risk control methods. They have made a significant effort at modelling the potential frequency and severity of terrorism attacks and in assessing the potential losses resulting from them based on an analysis of terrorist behaviour. Although further improvements along these lines seem possible, very substantial uncertainty about many of the relevant parameters remains, however, and is likely to remain. Still, the quantity of terrorism risk insurance capacity has increased substantially; more capital has been allocated to the area, and reduced prices for insurance coverage have resulted in higher demand and an increase in the percentage of companies buying terrorism coverage from 27% in 2003 to 58% in 2005.

It must be clearly noted, though, that all this has happened in the presence of a subsidized Federal reinsurance program through TRIA (which reimburses insurers for 90% of their losses – in property/casualty and worker's compensation insurance – up to a specified level and after subtraction of a fixed deductible).

A traditional example of the second kind of event – noninsurable risks – is risk related to war and civil unrest. Another example, which is very much under discussion currently, is NCBR risk. The PWG report mentioned before, as well as the study by GAO already referred to above, both come to the conclusion that this represents an entirely new type of risk to insurers and that there is little scope and potential for the future development of a private market in this area. To find appropriate instruments for modelling probabilities and risk exposure for these kinds of events is even more complex and challenging than is true for 'conventional' types of terrorism attacks. According to PWG, this has more to do with the nature, scale and uncertainty of damage and losses from NCBR events – however caused – than with terrorism specifically. Historically, such coverage has not been available

widely, unless mandated by law. What coverage exists today is mostly linked to state mandates, particularly in connection with worker's compensation insurance and coverage for reactor operators. Prices, when insurance is offered, seem to be too high for most insurance consumers. NCBR reinsurance is virtually unavailable.

Furthermore, in the case of NCBR risk, expectations by policyholders of the likelihood that post-disaster government help would come forth seem to be particularly high, even higher than in the case of comparatively smaller scale 'conventional' terrorism attacks or natural disasters. Alternatively, consumers may perceive this kind of risk to be similar to other risks not generally covered, in particular war risk.

In both cases, it remains an open issue as to what extent the government should enter the field. In 'conventional' terrorism risk insurance, a continuation of government subsidization can help increase the extent to which the population is covered by such insurance. One possible position would be to say that this is a political decision to take by society. However, the certainty of continued government intervention could also contribute to slowing down or even preventing private efforts at developing these markets. An effort must be made at finding an appropriate balance of these considerations.⁵

In the NCBR risk case, it will be exceedingly difficult, if possible at all, to get to a private market solution. The real issue here will probably be whether this should be dealt with through an explicit 'contractual' government scheme or, rather, through a 'discretionary' approach to ex post government support (which might provide more incentives for private prevention, where such prevention is possible at all).

Finding the appropriate demarcation line between private and public insurance remains one of the central open issues in insurance market regulation. Guiding principles should be the following ones: Private insurers can and should only be expected to deal with those risks which sufficiently meet the above mentioned conditions for insurability. Mandatory requirements to go beyond this can only lead to disillusion and, eventually, market withdrawal. On the other hand, government should abstain from interfering in those markets where private insurance is feasible and functional. Desires to combine insurance with redistribution should be resisted and redistribution, if politically desired, pursued through other mechanisms.

Certain risks apparently are less suitable for private insurance than others. Public or 'social' insurance has played a major role in most societies for a long time. In some of these cases, it is not necessarily a fundamental inability of private markets to provide workable solutions, but rather the desire of society to combine insurance with considerations of equity and redistribution, which leads to government interference.

Some risks can be intrinsically difficult or impossible to insure through private markets, however, particularly certain risks related to man-made or natural catastrophes. Fundamental reasons which may limit or even prevent private insurability are: insufficient scope for risk pooling (correlated/aggregate risk), informational ambiguity, and (excessive degrees of) moral hazard/adverse selection.

⁵Take note of a RAND study attempting to use 'robust decision making tools' for evaluating alternative extents of government involvement in terrorism insurance markets. The objective in this is to identify policies that perform reasonably well across a wide range of outcomes/states of the world (RAND 2006).

Finding the appropriate demarcation line between private and public insurance remains one of the central open issues in insurance market regulation. Guiding principles should be the following ones: Private insurers can and should only be expected to deal with those risks which sufficiently meet the conditions for insurability. Mandatory requirements to go beyond this can only lead to disillusion and, eventually, market withdrawal. On the other hand, government should abstain from interfering in those markets where private insurance is feasible and functional. Desires to combine insurance with redistribution should be resisted and redistribution, if politically desired, pursued through other mechanisms.

Credit scoring

Risk-based insurance premiums

A well-known principle of insurance requires that equal risks must be treated equally, while unequal risks must be treated differently. That is, the premiums charged should be risk-based, actuarially sound. Adequately identifying and differentiating between different risks or risk groups is a central difficulty of the entire insurance business; the well-known problem of adverse selection results precisely from this. It has long been recognized and accepted that overcoming this difficulty greatly contributes to the feasibility and efficiency of insurance markets.

Against that, two issues arise. First, insurers must find reliable and cost-effective indicators of various risks. This is not an easy task, as imperfect information is a pervasive feature characterizing the real world and information acquisition technologies aiming at perfection would be very costly. Second, depending on the particular indicators employed, there is a danger that differentiated premiums may be seen by society and politics as unjust and discriminatory. The choice of such indicators then may become a politically sensitive issue encumbered by legal restrictions, and even bans of certain procedures.

Credit scoring

One procedure which can be employed by insurers and has proven useful in property/casualty insurance in many instances is credit scoring. 'Credit scoring', also named 'credit-based insurance scoring' or 'insurance scoring', uses customers' credit history information to develop models predicting how often a customer is likely to file a claim and how expensive these claims will be. Credit scores provide a numerical ranking allowing insurers to charge lower premiums to customers who are lower risks. In numerous studies, a high correlation between credit-based insurance scores and future loss experience has been demonstrated. According to some studies, the predictive value of credit scores exceeds that of other traditional rating factors, such as age, gender, location, or vehicle type and driving record. Credit scoring can be used by insurers to complement, and in many cases dampen, the influence of other rating instruments.

Insurance companies use credit scores in different ways and degrees. By offering customers different options, this can also contribute to strengthening competition in insurance markets.

Credit scores as such do not factor in other characteristics such as income, race, marital status, age, location or nationality. There exists a certain political concern, however, that credit scoring might have unequal impacts on specific population groups. This has led to legislative developments in some US states restricting their use, e.g. through prohibition of the use of credit scores as the sole criterion for premium determination, through requests for filing a model with the supervisor, through prohibition of penalizing customers with no credit history (they must be treated as ‘average’ risks), through restrictions on the use of some information (e.g. debt from hospital expenses), or through the imposition of disclosure rules (applicants must be informed of the use of credit scores).

One study recently conducted for a population in the State of Washington found a strong correlation between age and credit scores, a minor one between income and credit scores, but no significant relationship between credit scores and marital status, gender, geographical location or ethnicity.

Age – which is related to the criterion ‘length of driving experience’ – is a standard and long-accepted rating variable in driver’s insurance, because of its proven relationship to risk and loss experience. The use of individual credit scores may dampen its influence, however. The relation between income and credit scores may be marred by the more frequent lack of a credit history at the low income end. The absence of a relationship between credit scores and the remaining variables would support the view that the use of credit scoring does not fall unevenly on particular population groups.

Prohibiting, or excessively restricting, the use of credit scoring not only prevents insurers from efficiently pricing insurance risks but, by reducing available alternatives in the use of such ratings, also limits customer choice and competition in insurance markets. It is clear that, in final consequence, this will prove harmful for the market and the consumer. The same is true, of course, for restrictions on other types of economically justifiable, actuarially sound risk identification criteria.

A well-known principle of insurance requires that equal risks must be treated equally, while unequal risks must be treated differently. One procedure which can be employed by insurers and has proven useful in many instances is credit scoring. This amounts to using consumers’ credit history to predict future loss experience. Credit scoring can be used to complement other rating instruments and, in many instances, absorb some of their influence. Prohibiting, or excessively restricting, the use of credit scoring not only prevents insurers from efficiently pricing insurance risks but, by reducing available alternatives in the use of such rating, also limits customer choice and competition in insurance markets.

Regulatory arbitrage and regulatory competition

Regulatory arbitrage

‘Avoiding regulatory arbitrage’ and ‘creating a level playing field’ are concerns frequently raised in financial market regulation debates today. In a similar vein, the principle of ‘same business, same risks, same rules’ is often proposed as a guide towards an equitable and fair regulatory system. These principles are typically evoked when the treatment of different sectors or groups of firms offering similar lines of products and services under different regulatory regimes is at issue, for example banks versus insurance companies, or foreign versus domestic suppliers.

Behind these calls is a concern about a competitive disadvantage resulting from a less advantageous, more restrictive regulatory environment, as compared to the conditions under which competitive firms are allowed to operate. They typically result in proposals for some sort of harmonization of regulatory conditions applicable to all.

This is to some extent understandable, particularly when identical products are offered by firms operating under differing legal and regulatory frameworks. However, we must also clearly see that the call for a level playing field can quickly lead us into slippery territory. In fact, it can easily amount to a call for a cartelized system, comparable to the efforts of high tax governments to achieve an international harmonization of taxes (at their level). Especially when such endeavours originate from or are taken up by regulatory authorities themselves, they are likely to represent an attempt towards the formation of a kind of a regulatory cartel arrangement. As Kane (1991) has reminded us, one possible way of looking at a system relying excessively on cooperation and harmonization is to interpret it as an attempt at the formation of an international cartel among regulators, with the purpose of protecting them from the unpleasant effects of international mobility of financial firms and their customers. The difficulty of arranging durable patterns of international regulatory cooperation then may reflect, above all, the usual difficulties inherent in forming and maintaining a worldwide cartel in any product.

Regulatory competition

Clearly, allowing for some degree of regulatory competition has major advantages, too. It cannot be a sensible objective to suppress regulatory competition, therefore. In a world of mobile customers and firms, by making regulatory regimes contestable, regulatory

competition forces legislators/regulators to abandon inefficient, suboptimal solutions introduced in the past (for whatever reason, be it lack of better insight or regulatory self-interest). Given the questionable nature and effectiveness of a good part of received, 'traditional' financial market regulation, the potential benefit of such contestability should not be underestimated.

In our view, the major reason for this is that optimal regulatory solutions cannot easily and unambiguously be established even in theory and, consequently, must be searched for in a trial and error process. Coordination of regulation obviously is beneficial only if regulation is optimal. An illuminating illustration of the difficulty of establishing optimal regulatory solutions is provided by the long and painful debate about capital adequacy requirements in banking. Furthermore, even if all the necessary ingredients of an optimal regulatory solution were known, it is not clear that the type and level of regulation actually chosen by self-interested governments and legislators in the absence of regulatory competition would always reflect this optimal form. Thus uncertainty about the theoretically correct form of regulation, along with considerations of public choice theory, creates vast potentials for divergences between actual regulation and socially optimal regulation. This, we believe, is a sound reason for making regulatory regimes contestable by allowing a certain regulatory competition. This is reinforced by the fact that a particular regulation, even if it is optimal at one time, may cease to remain optimal over time in a dynamic industry like the financial one. Also, if countries are heterogenous in terms of consumer preferences and technological and institutional development, optimal regulatory solutions for them can diverge.

A race to the bottom?

The most important argument usually brought up against allowing regulatory or 'system competition' is that it would lead to a 'race to the bottom': a solution of the lowest common denominator, where everyone adapts his rules to the least regulated place in response to a loss of market share, implying a suboptimally low level of regulation as the outcome of the process. Occasionally, references are made to 'beggar-thy-neighbour deregulation'.

We find this argument unconvincing. It is based on a view which essentially sees regulation just as a factor of cost and comparative disadvantage, with no redeeming value. Such examples of (obviously ill-advised) regulation may exist. They are not the rule, however. When regulations have not only costs but also benefits for firms, markets, and customers – and only in these cases can regulations be socially justified – it is not clear that market shares will be maximized by minimizing regulation. Relaxing or abolishing regulation then will not necessarily result in a comparative advantage; instead, it might create a disadvantage. In these cases, regulation can be viewed as a kind of 'public input' that affects the quality (or, what is equally important, the customers' perception of the quality) of the financial services offered. Hence, it can indirectly affect the demand for these services. For example, by lowering or abolishing capital adequacy standards, the perceived safety of bank or insurance products could be so much impaired that demand is reduced drastically. In a 'deregulation race' it is not necessarily true that the winner will be the country with the most relaxed standards (Baltensperger and Behrends 1994).⁶

⁶Sinn (2003) claims that system competition cannot work. He argues – in the context of bank capital regulation – that markets and bank customers are unable to adequately differentiate between different national regulatory

Balancing regulatory competition and the concern for a level playing field: Mutual recognition

Is it justifiable to attempt to create comparative advantage through regulatory differences? Is this a form of protectionism which should be avoided? Or can it be viewed as a competitive process in the service of the search for the optimal regulatory system under uncertainty?

In our opinion, the latter view should prevail, if it is properly understood and pursued. The following is, we believe, an intellectually honest and defensible position: Try to define a regulatory system which looks reasonable and efficient, to the best of our knowledge. Examples from other countries and industries can serve as a guideline in this (difficult) effort, along with historical experience and *ex ante*, theoretical considerations. If the resulting blueprint is different (be it less or more stringent) than the currently existing system, it is appropriate to attempt to change the existing system through intellectual debate and political action.

However, we should not try to force onto others regulations we are currently subject to, but feel are inappropriate. If others are subject to (what we think are) suboptimal regulations, even if these appear less stringent than ours, they will suffer in the long run (if our evaluation is correct and markets are open and contestable).

To be avoided are blatantly preferential treatments or subsidies for certain groups or firms, e.g. through public guarantees, say, for particular public pension schemes.⁷ They must be clearly distinguished from trial and error in a process of evaluating alternative forms of and approaches to regulation.

A great step towards balancing regulatory competition and the concern for a level playing field would be achieved by a system based on mutual recognition and acceptance of regulatory and supervisory standards, possibly subject to harmonization of some minimal standards.

regimes. Hence, information asymmetries comparable to those that serve as the motivation for regulatory intervention in the banking industry in the first place will also prevent competition among regulatory authorities from working properly, according to him. In our view, this argument rests on a questionable and unconvincing analogy (Baltensperger 2003). Monitoring activity structures and risk profiles of individual banks is very difficult, indeed, given today's importance of off-balance-sheet activities and availability of market instruments allowing bank portfolio adjustments at a moment's notice. (Still, the benefits of enhanced transparency and disclosure rules should not be totally discounted.) Differences in national standards in banking regulation, on the other hand, are an entirely different matter. They are difficult to hide and can fairly easily be revealed to bank lenders by financial specialists, rating agencies, and the financial press. Public laws and regulations cannot be hidden, nor do they change very frequently in an unforeseeable way. Their degree of enforcement can be monitored by interested specialists. Admittedly, attempts to exploit legal formulations and corresponding evasion and circumvention activities may occur and develop over time. But resulting patterns can be observed and do not change overnight. There can be little doubt that reputations for tough, or weak, regulatory standards can be credibly established over time. Succumbing to the temptation to exploit the advantage resulting from a low regulatory standard may have high long-run costs in terms of reputation. This should be very clear for observers of the Swiss financial system and its regulatory standards.

⁷The frequently advanced argument that such guarantees 'do not cost the taxpayer anything' is fundamentally wrong: The probability that guarantees will actually be used at one time or another is always greater than zero – otherwise they would not be necessary in the first place; furthermore, guarantees create adverse incentives and cause moral hazard costs.

An example of how suboptimal regulation can weaken the regulated industry in the long run and lead to pressure for reform under contestable markets, even if this regulation was thought to benefit insurance customers and the health of their companies for quite some time, is provided by the developments in the wake of hurricane Katrina, the most devastating insurance event ever in the US. Given the fragmented regulatory system of the US, claims resulting from this disaster did not only fall on a few big insurers hit by big claims, but also on smaller insurers with rates capped by state regulation and with insufficient financial reserves to survive this event without problems. Furthermore, development of adequate reinsurance capacity was restricted by an implicit form of protectionism requiring foreign reinsurers writing cross-border business into America to put up more collateral than American insurers must provide (or fulfill some other conditions). Arguably, all this has helped to limit insurance capacity and drive up primary insurance rates in damage-prone places like Florida, to the detriment of the American insurance consumer (The Economist 2006). This, in turn, has led to discussions calling for reforms which would judge foreign and domestic reinsurers on more equal terms for setting collateral, such as financial strength and reliability of regulatory oversight in home countries (The Economist 2006). In the long run, such reforms would benefit the American insurance consumer. The same developments have also contributed to the debate about creating an alternative federal chartering authority for insurance in the US (The Economist 2006).

An optional federal charter for insurance companies in the US?

In the United States, insurance supervision up to now has maintained a complex system dating back to the 19th century where insurance companies are regulated solely at the state level and must obtain approval from fifty-one state regulators if they want to offer a product or service nationally. In an increasingly global insurance market, where insurance companies are competing with banks and securities firms in offering products to the consumers of financial services in a nationwide and even international market, this state-based system of regulation is coming under increasing pressure for reform. Insurance companies find that banks and securities firms can obtain much faster approval of new products and services than they can themselves under this complicated system of state-based control. Such delay in obtaining approvals is increasingly seen as a competitive disadvantage in the fast-developing financial services industry.

For this reason, a process has been started towards the creation of a federal chartering authority that would provide a federal alternative to state regulations and would permit insurance companies to gain approval for new services from one single authority. Bills have been introduced in both houses of Congress recently which would create such a federal chartering authority and give insurance companies the choice of being federally regulated or state regulated.

This call for an optional federal charter in insurance appears as an effort entirely in line with the preceding discussion of the virtues of regulatory competition plus mutual recognition. Nor should the idea be unfamiliar to the American lawmaker and politician: The US banking system has operated under a 'dual' system of regulation by both federal and state authorities throughout much of its history, and the checks and balances provided

by this system have always been viewed as healthy and beneficial for the industry and the consumer.

'Creating a level playing field' and 'avoiding regulatory arbitrage' are concerns frequently raised in financial market regulation debates. In a similar vein, the principle 'same business, same risks, same rules' is often proposed as a guide towards an equitable and fair regulatory system. However, we must clearly see that this can lead us into slippery territory. It can easily amount to a call for a cartelized system, comparable to the efforts of high tax governments to achieve an international harmonization of taxes (at their level).

Allowing for some degree of regulatory competition has major advantages too, given that optimal regulatory solutions cannot easily and unambiguously be established, even in theory, but must be searched for in a trial and error process. In a world of mobile customers and firms, by making regulatory regimes contestable, regulatory competition forces legislators/regulators to abandon inefficient, outdated solutions. The presumption that this would lead to a regulatory 'race to the bottom' is unjustified.

A great step towards balancing regulatory competition and the concern for a level playing field would be achieved by a system based on mutual recognition and acceptance of regulatory and supervisory standards, possibly subject to harmonization of some minimal standards.

The call for an optional federal charter for insurance in the US is entirely in line with such a view. Nor should this idea be unfamiliar to the American lawmaker and politician. The US banking system has for a long time operated under a 'dual' system of regulation by both federal and state authorities, and the 'checks and balances' provided by this system have traditionally been viewed as healthy and beneficial to the industry and the consumer.

The organisational structure of regulation

Integration of financial market supervision?

In recent years, a trend towards an integrated financial market supervision with a single prudential supervisor has developed internationally. By the year 2005, 39 countries worldwide had adopted an integrated supervisory authority. In the UK, previously independent regulatory bodies were combined to create the Financial Services Authority FSA, an integrated regulator of all providers of financial services, in 1997. In Germany, the Bundesamt für Finanzdienstleistungsaufsicht BaFin was formed in 2002 as an integrated supervision authority. Other examples include Japan, Canada, the Netherlands, Sweden, Austria and Liechtenstein. In Switzerland, the creation of the Integrated Financial Market Supervisory Authority (FINMA) aims at a comparable development.

In the 1990s, this trend was influenced by the then fashionable ‘bancassurance’ (‘Allfinanz’) model for the financial services industry: the trend towards the creation of financial conglomerates combining insurance and banking under one roof. In the meantime, this business model has lost much of its lustre. In Switzerland, most banks and insurers have either never taken it up or abandoned it again in more recent times. However, this does not mean that the single prudential supervisor idea is dead and done. On the contrary, the trend of convergence between insurance, banking and the capital market described in the ‘Convergence of insurance and banking’ section page 10 has given it new life and importance under a new and different perspective.

To the extent that insurers and banks operate in the same markets and compete for the same customers with closely related products, an integrated regulation is certainly not a far-fetched idea, but may appear rather logical. Still, the pros and cons of such an institution require careful discussion. Also, the differences between insurance and banking discussed in the ‘Convergence of insurance and banking’ section page 10 must be kept in mind. In particular, contagion and systemic risk are characteristic of banking, not insurance, and all regulations which have to do with these issues, while potentially important for banking, should not be applied to insurance.

Advantages of an integrated supervision

- The strongest case for an integrated supervisory agency rests on the growing convergence between insurance and banking. This ongoing process creates

similarities between the two industries and is leading to a growing similarity in the regulatory approaches to both, notably in the area of solvency supervision and ensurance. This can be seen as strengthening the case for a common supervisor responsible for both. An integrated supervisor may promote cross-sectional knowledge transfer in areas where a potential overlap exists, can facilitate optimal staff deployment and offer better career prospects. He may exhibit lower transaction costs of handling conflicting objectives and responsibilities by resolving conflicts internally and avoiding potentially damaging disputes between separate authorities. He may benefit from economies of scale and scope that lead to reduced administrative costs, e.g. in the recruitment of qualified staff, through better allocation of staff to different tasks and supervised firms, and through centralized support services. Risk-based capital requirements and quantitative methods for risk management critically raise the required expertise and organizational sophistication for supervisors. This represents a major challenge for the new, principles-based approaches to regulation increasingly favoured today. Effectiveness and efficiency are key to deal with this challenge.

- An integrated supervisory authority may enhance the national and international visibility and reputation of supervision. This is important from the perspective of a country and its financial sector. It is in the interest of the financial sector to be represented by an internationally recognized and accepted authority. International recognition of a national supervisor may gain further importance in avoiding interference of foreign regulators and competitive distortions. Institutional independence from political influence, together with transparency, accountability and integrity, are also crucial elements for enhancing credibility and acceptance of the regulatory authority.
- Regulatory capture may be particularly likely with highly sector-specific authorities. An integrated regulation might mitigate against this.
- Finally, to the extent that financial conglomerates exist, an integrated supervisor may be better equipped for dealing with them.

Dangers of an integrated supervision

- There is a risk that an integrated supervision results in the absorption of insurance regulation by banking regulation, based on an exaggerated view of the similarities of insurance and banking. ‘Avoiding regulatory arbitrage’ (between banking and insurance) has often been advanced as an argument in favor of an integrated supervision. However, this is slippery territory again. The principle ‘same business, same risks, same rules’ does not necessarily apply. Instead, the danger of ‘equal treatment of unequal problems and risks’ may exist. Both industries offer financial services, it is true. But the nature of these services, the risks involved, and the derived need for public regulation differ considerably. Consequently, different approaches are justified. Under an integrated supervision, this may require separate regulatory ‘divisions’ for insurance and for banking, allowing for separate approaches where necessary.

- A ‘dual’ system of regulation with ‘checks and balances’ and a certain degree of competition between different regulatory bodies has long been seen, and not completely without justification, to provide certain advantages, too. It can be argued that it is better equipped to deal with the fact that optimal forms of regulation are not easily and unambiguously identifiable, but must be found through trial and error.
- Finally, potential problems of transition deserve consideration, too. The merger of different regulatory authorities with their different cultures and styles is a demanding managerial task. There is a risk that the transition leads to frictions that could reduce the effectiveness and quality of supervision. The process of transition deserves careful attention, consequently.

Experiences with an integrated supervision

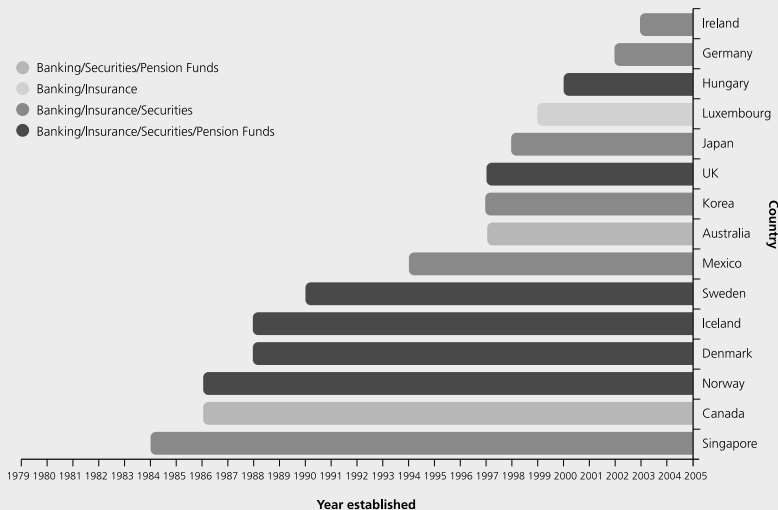
Several countries have accumulated valuable experience with an integrated approach to financial regulation and supervision over recent years, notably Great Britain with its FSA and Germany with BaFin. It is probably fair to conclude that this experience has been favourable in an overall sense, so far.

Experience with integrated financial market supervision

In recent years, a growing number of countries have adopted a system of integrated supervision of different financial market activities. The approaches followed thereby vary widely in terms of breadth (insurance, banking, securities, and pension funds) and depth (supervisory functions and responsibilities). The following figure provides an overview of integrated supervisory agencies and their degree of integration.

Integrated Supervisory Agencies

- Banking/Securities/Pension Funds
- Banking/Insurance
- Banking/Insurance/Securities
- Banking/Insurance/Securities/Pension Funds



Even if it is too early to finally assess experience with integrated financial market supervision, a few important conclusions emerge.

First, due to fundamental differences between banking and insurance, the scope of harmonization of supervisory rules is limited. Therefore, most countries maintained separate laws governing supervision of the two sectors, and examples of countries who harmonized supervisory rules are rare. The British Financial Service Authority (FSA), who initially followed a model of harmonized supervision, has recently adopted organizational measures to strengthen sector-specific supervisory knowledge.

Second, in many cases integrated supervision has increased national and international visibility of the supervisory authority. In Northern Europe (Denmark, Norway, Sweden), for example, where integrated financial market supervision was introduced in the mid 80s, the integration of supervision has significantly improved the standing of financial market regulation. In the Northern experience, the creation of a single, quasi-autonomous regulatory body has delivered a higher status for regulation within the governmental machinery than separate specialist agencies could have achieved. Moreover, the creation of a high profile agency of sufficient size to offer a degree of career progression for its staff appears to have contributed to overcoming problems of staff recruitment and retention (Taylor and Fleming 1999).

Third, there are indications that integrated supervision is associated with a higher overall quality of supervision, measured using the degree of compliance with internationally accepted standards such as the Basel Core Principles for Effective Banking Regulation and the Insurance Core Principles of the IAIS (Cihák and Podpiera 2006).

Finally, the costs of supervision and supervisory staff have not necessarily declined as a consequence of integration. This, however, does not imply that economies of scale and scope, which have been an important argument in favor of integrated supervision particularly in small countries, do not exist. Instead, it seems that more resources have been invested in quality improvements of the regulatory process.

All in all, it appears that the positive aspects mentioned above deserve more weight than the negative ones. Nevertheless, the risks involved in the latter must be duly taken into account in order for the result to be beneficial.

In recent years, a trend towards an integrated financial market supervision with a single prudential supervisor has developed internationally. The strongest argument for an integrated supervisor results from the growing convergence between insurance and banking. An integrated supervision can raise the effectiveness of supervision in those areas where a potential overlap exists, notably by benefiting from economies of scale and scope, e.g. in the recruitment of qualified staff or in the efficient allocation of staff to different tasks, or through an improved cross-sectional knowledge transfer. The new, 'principles-based' approaches to regulation favoured today call for new levels of expertise and sophistication on the part of supervisors. Effectiveness and efficiency are key to deal with this challenge.

An integrated supervisory agency may also enhance the national and international visibility and reputation of supervision. It is in the interest of the financial sector to be represented by an internationally recognized and

accepted authority. Institutional independence from political influence, together with transparency, accountability and integrity are also crucial for establishing credibility and acceptance.

Some dangers of an integrated supervision must be considered, nevertheless. There is a risk that an integrated supervision results in the absorption of insurance regulation by banking regulation, based on an exaggerated view of the similarities of both industries. An integrated supervision may require separate regulatory 'divisions', allowing for separate approaches where necessary. Also, the advantages of a 'dual' system of regulation with its checks and balances may be lost.

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