

Chapter 31

Insurance Market Regulation: Catastrophe Risk, Competition, and Systemic Risk

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Abstract Insurance regulation has long been a subject of considerable interest to academics, policymakers, and other stakeholders in the insurance industry. Among the areas explored by academics over the years, there are three topics of particular importance that have significant implications for the regulation of insurance companies and markets: (1) catastrophe risk, (2) competition, and (3) systemic risk. This chapter provides an overview of insurance regulation and discusses key issues that it faces and how it has responded to these issues including the role of competition, increasing catastrophe risk, and the reemergence of systemic risk in financial markets and its implications for insurance regulation.

31.1 Introduction

Insurance regulation has long been a subject of prominent interest to academics, policymakers, and other stakeholders in the insurance industry. The recent financial crisis and its cascading effects on the global economy have drawn increased attention to the regulation of financial institutions including insurance companies. Other issues, such as the rising number and cost of natural and man-made catastrophes, have significant regulatory implications. In general, as the nature and types of risks that households and businesses face have changed, the insurance industry has evolved to meet the need for efficient risk management solutions. This evolution has been marked by intense competition, the globalization of insurance markets, convergence in the financial services industry, new products and methods for financing and managing risk, changing technology, broader access to information and other important developments that have affected the role, and provision of insurance. As the insurance industry has evolved, so has its regulation. Regulators have been compelled to respond to the transformation of the insurance industry and the shifting environment in which it resides.

Three topics are particularly significant in terms of their implications for insurance regulation: (1) catastrophe risk, (2) competition, and (3) systemic risk. Concerns about catastrophe risk have greatly increased over the last two decades with the rising frequency and severity of natural disasters in the USA and worldwide as well as the heightened threat of terrorist events marked by the 9/11 attacks and other incidents. Governments and the insurance industry have been challenged in responding to this increase in catastrophe risk. Insurance companies have sought to enhance their

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assessment, pricing, and financing of catastrophe risk as well as adjust their contract provisions and exposures. In turn, insurance regulators have been confronted with the measures taken by insurers and compelled to react in terms of what changes they will allow and where they may seek to constrain insurers' actions, conscious of the need to maintain an adequate supply of catastrophe risk coverage. Governments also have explored and created mechanisms to fill in gaps and/or lower the cost of private catastrophe coverage.

Competition in the insurance industry has been a long-standing area of attention. Insurance markets that are relatively mature and that have low entry/exit barriers are generally populated by a large number of suppliers that compete aggressively to sell their products and services to various buyers. Insurance markets that are relatively immature may be subject to too much or too little competition depending upon the sophistication of their sellers and buyers. In such markets, regulators may be compelled to intervene to establish a reasonable level of stability or counter suppliers' market power depending upon the structure and performance of these markets. Even in mature insurance markets that are structurally competitive, public mistrust of insurance companies and political pressure may induce insurance regulators to impose constraints on insurers' prices and products. Hence, issues concerning competition and how insurance markets should be regulated are prominent in many countries.

Systemic risk and its implications for the regulation of insurance companies have been the subjects of considerable discussion in light of the financial crisis and the problems experienced by the investment subsidiaries of the American International Group (AIG) and monoline insurers. There also have been concerns about the potential effects of systemic risk in financial markets on the financial condition of insurance companies. There has been a vigorous debate over whether insurance companies are significant contributors to systemic risk in the financial sector, with most insurance experts concluding this is not the case. Nonetheless, governments are exploring or have adopted new regulations that could increase the regulatory oversight of insurance institutions that are deemed to be systemically significant. Further, insurance regulators are enhancing their monitoring of insurance companies that belong to corporate groups which could be exposed to financial risks arising from the activities of noninsurance entities within their group structures.

In this context, this chapter provides an overview of insurance regulation and discusses key issues that it faces and how it has responded to these issues including the role of competition, increasing catastrophe risk, and the reemergence of systemic risk in financial markets and its implications for insurance. Most of the discussion in this chapter is focused on the USA with some references to regulatory policies in the European Union (EU) for comparative purposes. The chapter is organized as follows. Section 31.2 articulates a set of principles for government intervention in insurance markets and discusses the types of regulatory remedies that might be used to address market failures in insurance. Section 31.3 reviews the basic framework for insurance regulation and the objectives, policies, and practices employed in the principal areas of insurance regulation. Section 31.4 assesses the competitiveness of insurance markets based on their structure and performance. Section 31.5 tackles the issue of catastrophe risk and how regulation affects its financing and management. Section 31.6 examines the topic of systemic risk in insurance and its regulatory implications. Section 31.7 offers concluding remarks.

31.2 Principles for Insurance Regulation

A survey of insurance regulation naturally begins with a review of basic principles of insurance regulation. It is important to articulate a rationale for why insurance markets and companies are regulated to lay a foundation for the review of the regulation of the particular areas covered in this chapter. This section begins by applying the concepts of workable competition and market failures to

insurance which form the basis for arguments for beneficial regulatory intervention. This is followed by a discussion of the types of regulatory remedies for insurance market failures that may enhance social welfare if properly designed. The section ends with a review of other possible motivations for regulatory intervention in insurance markets which may lead to certain regulatory policies that do not conform to the economic principles articulated here.

31.2.1 Market Failures and Regulatory Intervention

The economic rationale for regulatory intervention in markets is based on the concept of market failures (see, e.g., [Spulber 1989](#); [Viscusi et al. 2000](#)). Market failures arise when one or more of the conditions for perfect competition are violated. A market is considered to be perfectly competitive when there are numerous buyers and sellers of a homogeneous product, there are no barriers to entry and exit, and both buyers and sellers have perfect information. When these conditions are satisfied, the joint surplus or gains from trade of firms and consumers are maximized. However, in reality, few if any markets satisfy these conditions. A more reasonable standard for judging the need for regulation is the standard of “workable competition.” A market is considered to be workably competitive when it reasonably approximates the conditions for perfect competition to the extent that government intervention cannot improve social welfare ([Scherer and Ross 1990](#)).

The kinds of market failures that are most commonly found in insurance markets are severe asymmetric information problems and principal-agent conflicts. These market failures could prompt some insurance companies to incur excessive financial risk and/or employ market practices that harm consumers ([Klein 2009](#)). Insurance buyers, particularly households and small businesses, are severely challenged in terms of being able to assess the financial risk of insurance companies and understand the terms of insurance contracts. Principal-agent conflicts also work to the detriment of insurance buyers if insurance companies can increase their financial risk after their policyholders have paid premiums to these companies. Additionally, it is possible that insurers could acquire sufficient market power under certain conditions to constrain competition and manipulate the supply and price of insurance in order to earn excess profits.

Government intervention may be justified when market failures occur if intervention can remedy these failures and increase the efficiency of a market. For example, an insurance company may incur excessive financial risk because its owners could avoid paying the full costs of its insolvency due to the limited liability of corporations. The fiduciary role played by financial institutions such as banks and insurance companies coupled with their complexity present special problems for their creditors.¹ One could argue that if it is difficult and costly for consumers to properly assess the financial condition of insurance companies and protect their interests after they have paid premiums then it may be more efficient for the government to monitor insurers’ financial risk and take other measures to protect consumers’ interests.

An optimal regulatory scheme would be based on a set of principles under which regulators would seek to recreate the conditions for workable competition or implement remedies to compensate for market failures and maximize social welfare. This implies that regulators would strive to remedy true market failures and not try to artificially alter “undesirable” market outcomes that are not caused by market failures per se. There is also the presumption that regulators possess all the information they need and can implement appropriate remedies which may not always be the case. Not all market

¹[Saunders and Cornett \(2003\)](#) discuss the rationale for the regulation of financial institutions. While their principal argument is based on externalities (discussed below), other arguments also contribute to the case for government oversight.

failures can necessarily be corrected by regulation and the efficiency of any particular regulatory intervention must be judged in terms of regulators' ability to remedy a particular market failure and any deadweight costs associated with regulatory intervention that may exceed the benefits from intervention. It is also presumed that regulators will employ "best practices" and the most efficient measures to address market failures.

31.2.1.1 Solvency Regulation

The economic rationale for regulating insurer solvency is based on the problems created by costly information and principal-agent problems (Munch and Smallwood 1981). Insurance companies' incentives to maintain a high level of safety are compromised to the extent that the personal assets of their owners are not at risk for unfunded obligations to policyholders that would arise from bankruptcy. As noted above, it is costly for consumers to correctly determine an insurer's financial risk in relation to its prices and quality of service.² Insurance companies also can alter their risk after they have received funds from their policyholders. This could be characterized as a "principal-agent" problem that may be very hard for policyholders to monitor and control. These conditions could hamper consumers' ability to differentiate between insurers with varying risk levels and expose them to excessive financial risk.

There are other reasons why regulators may seek to curb excessive insolvency risk. There is the potential problem of "contagion" whereby a spike in insurer insolvencies could induce a "crisis of confidence" that may have adverse effects on other insurers. Additionally, negative externalities could arise from excessive insurer insolvency risk if the costs of unpaid claims are shifted beyond policyholders to their creditors. Consequently, the regulation of financial institutions is often coupled with insolvency guaranty mechanisms (e.g., deposit insurance, insurance guaranty associations) that assume at least some part of the obligations of bankrupt firms to those that entrusted their funds with these firms. However, the existence of insolvency guarantees could lead to moral hazard and undermine market discipline. Insurance buyers have diminished incentives to buy insurance from financially strong insurers if they know or believe that their claims will be covered if their insurer becomes bankrupt (Cummins 1988). Hence, the existence of insolvency guarantees further increases the need for good financial regulation to compensate for any diminution of market discipline due to these guarantees.

It would not make economic sense for regulators to attempt to eliminate all insolvencies because this would likely be too costly relative to any benefits that would be obtained from such a policy. A more reasonable objective would be to reduce the social costs of insurer insolvencies within limits that would be socially acceptable. It should be noted that the social cost of an insurer insolvency exceeds the lost equity of the insurer because it includes the costs imposed on policyholders and other creditors of the insurer. Regulators can reduce insolvency risk by compelling insurers to meet certain financial standards and intervening if an insurer assumes too much risk or gets into financial difficulty (Cummins et al. 1995).

²The costs of determining financial soundness are much lower today than they were in the past as anyone with knowledge and access to the Internet can check an insurer's claims paying ability provided by rating agencies. However, rating agencies cannot engage in enforcement actions (although they may pressure insurers to correct problems) and most countries do not accept the notion that they are an adequate substitute for government regulation.

31.2.1.2 Price Regulation

Different arguments have been offered for the regulation of insurance prices. One view is that insurers have an incentive to underprice the coverage they offer in an attempt to obtain more business and increase their profits, effectively betting on the possibility that their claims will be lower than expected (Joskow 1973; Hanson et al. 1974). If they “win” the bet, then they will collect the winnings in terms of additional profits. If they “lose” the bet, their losses are confined to the equity they hold and any further losses are passed on to policyholders and other creditors. This could induce other insurers to cut their prices in order to retain their business which would lead to a further weakening of the financial condition of the industry.³ The regulatory answer to this kind of problem has been the enforcement of uniform prices or price floors to prevent insurers from charging inadequate prices.

Alternatively, consumers and some regulators may believe that insurers will seek to overprice insurance in the absence of regulation. According to this view, it is necessary for regulators to impose price ceilings to prevent insurers from charging prices that exceed the cost of providing coverage. To rationalize such a policy, one might argue that consumer search costs impede competition resulting in excessive prices and profits.⁴ Another argument might be that insurers already entrenched in a market have an informational advantage over potential entrants that would effectively create an entry barrier that would diminish competition.

Many insurance economists question the need for price regulation of insurance products. If one looks at the empirical evidence on competition and the effects of insurance price regulation, most researchers conclude that price regulation is unnecessary and potentially harmful (Cummins 2002; Harrington 2002). Studies of insurance markets in the USA conclude that they are structurally competitive and their performance is consistent with what one would expect in a competitive market (Cummins and Weiss 1991; Klein 2005; Grace and Klein 2007). Entry and exit barriers tend to be low and concentration levels rarely approach a point that would raise concerns about insurers’ market power. Hence, under these conditions, one would expect insurance markets to be efficient and that prices will not exceed competitive levels.

31.2.1.3 Market Conduct Regulation

There appears to be greater justification for some level of regulation of insurers’ products and market practices, e.g., marketing and claim adjustment. Because of consumers’ difficulty in understanding the terms of insurance contracts and disparities in their bargaining power relative to insurers, they are potentially vulnerable to unfair marketing and claim practices.⁵ One example of this was the misrepresentation of life insurance products in the USA in the late 1980s and early 1990s (Klein 2012). Although several prominent insurers were involved in these practices, one would normally expect that most insurers would try to avoid abusive trade practices in order to maintain a good reputation for their treatment of their customers. There is a greater problem with insurance companies and intermediaries that lack sufficient incentives to maintain a good reputation or seek to prey on vulnerable consumers and that value the gains from such behavior more than any costs they would incur from obtaining

³This view likely stems from the periodic price wars (and subsequent insurer failures) that afflicted property-casualty insurance markets in the USA during the 1800s and early 1900s.

⁴Harrington (1992) explains but does not advocate this view. Further, the cost of shopping for insurance has dropped dramatically for personal lines of coverage (see Brown and Goolsbee 2002).

⁵It is true that consumers subject to unfair treatment might seek remedies through the courts and sometimes do so. However, legal remedies may not be feasible for consumers with limited resources and bills to pay. Also, it may be difficult to secure financial damages from some fraudulent insurers.

a bad reputation. Regulators need to pay particular attention to these kinds of firms who are not otherwise motivated to treat consumers fairly. Appropriate regulatory remedies could take the form of approving insurance products purchased by individuals and small businesses, monitoring insurers' market practices and consumer complaints, encouraging self-compliance measures by insurers, and sanctioning insurers who mistreat consumers.

31.2.2 *Other Motivations for Regulatory Intervention*

In contrast to market failures, there are situations where market conditions could lead to market outcomes that consumers and regulators may view as problematic (Klein 2009). These outcomes are not the result of market failures but rather are caused by factors affecting the cost of and/or the insurability of certain risks. For example, in some markets insurance may be expensive because claim costs are high. There may be other situations where insurers may be reluctant to supply insurance voluntarily because of severe adverse selection or moral hazard problems or correlated risk exposures, e.g., natural and man-made catastrophes. Although these kinds of outcomes can create consternation among consumers, they can be the natural result of properly functioning market forces and not something that can be remedied by regulation per se.

Nonetheless, consumer concerns and societal preferences may prompt governments to impose artificial regulatory constraints on insurance prices and other regulations intended to increase the availability of insurance or “engineer” the coverages provided in insurance contracts. One example of this (which is discussed in greater detail in Sect. 31.5) is Florida’s resistance to sharp hikes in the price of residential property insurance after the 2004/2005 hurricane seasons. Regulators may argue that such restrictions are needed to prevent large swings in the cost of insurance.⁶ There are other aspects of the political environment for certain insurance markets and their regulation that can lead to policies that are not in the best interest of consumers despite what they may believe. The political economy of regulation could be described as a setting in which different interest groups seek to influence regulators and legislators to adopt policies that are most beneficial to them.⁷ There may be some groups that have few members but have relatively substantial and concentrated economic interests. These groups are more likely to succeed on issues that are not transparent and/or important to most consumers (Meier 1988). There are other issues, such as the price and availability of auto and homeowners insurance, that may be highly salient to many consumers, and this could result in substantial political pressure on regulators to compel insurers to lower the cost and/or increase the supply of insurance. Hence, a number of factors can affect regulatory policies and who benefits from such policies.⁸

These types of policies may be applauded by voters and interest groups who seek special treatment, but they can also result in significant market distortions that can ultimately worsen the problems that regulators are seeking to fix. For example, severe constraints on insurance prices can amplify moral hazard by decreasing insureds’ incentives to control their risk which can further escalate claim

⁶If regulators believe that rate increases are warranted, they tend to prefer to see these increases phased in gradually over time rather than implemented in 1 year.

⁷Insights from Becker (1983) and related literature are helpful in understanding how interest group politics may play in government policies regarding insurance. Stigler (1971) and Peltzman (1976) also laid the foundation for an economic theory of regulatory behavior that considers the potential influence of the concentrated economic interests of regulated firms and other groups. Political scientists such as Meier (1988) have broadened this framework to include other factors that might influence regulatory behavior, such as ideology, bureaucracy, the role of political elites, and the complexity and saliency of regulatory issues.

⁸See Meier (1988) and Klein (1995) for discussions of theories of regulatory behavior and how they apply to insurance.

costs and prevent insurers from earning a fair profit. Regulators may also impose mandatory service requirements which require insurers to accept all applicants or impose other constraints on their underwriting practices. These kinds of policies can prompt insurers to exit the market and severely reduce the supply of insurance.

31.3 Competition in the Insurance Industry

To develop a good understanding of insurance regulatory policies and assess their relative merits, it is helpful to review the evidence on the competitiveness of insurance markets. This section examines the empirical evidence on the structure and performance of key insurance sectors and markets. This examination utilizes the structure-conduct-performance framework (SCP) for analyzing the competitiveness and efficiency of insurance markets.⁹ According to this framework, a competitive market structure which elicits independent and competitive behavior by firms leads to efficient market outcomes such as fair profits and prices no higher than necessary to produce goods and services that meet consumer demands.

31.3.1 Market Structure

Economists typically look at several aspects of a market's structure in determining how it might be expected to affect firm conduct and market performance. These aspects include seller and buyer concentration, product differentiation, barriers to entry and exit, cost structures, vertical integration, and diversification. One could argue that the cost and quality of information available to buyers and sellers also can affect competition.¹⁰ Of these characteristics, seller concentration and barriers to entry and exit are particularly significant. In a highly concentrated market, there is the potential for firms to acquire substantial market power (individually and/or collectively) that they can use to control output and ultimately prices. At the same time, the cost of entry and exit can influence not only seller concentration but the ability of incumbent firms to exercise market power. According to the theory of "contestable markets," even in a highly concentrated market with low entry/exit barriers, if incumbent firms attempt to raise their prices above a competitive level, this will attract new entrants to the market who will drive prices back down to competitive levels (Baumol et al. 1982). Hence, the threat of entry by new firms can have a disciplinary effect on the behavior of incumbent firms.

Most of the existing literature on the structure and performance of insurance markets are specific to particular markets, and the analysis performed is often tied to other issues such as the effect of regulation on market outcomes.¹¹ There are also several studies that have conducted a more comprehensive assessment of the structure and performance of major industry sectors in various countries.¹² These studies have generally found that the principal industry sectors and markets are

⁹See Scherer and Ross (1990) for a more detailed explanation of this framework and its application to various industries.

¹⁰Scherer and Ross (1990) list a set of basic conditions that determine market structure in their explanation of the SCP framework. One of the conditions they list is technology. One could reinterpret "technology" to include information pertinent to the production and sale of a good or service. Arguably, information is an especially valuable resource to buyers and seller of insurance and plays an important role in the functioning and regulation of insurance markets.

¹¹See, for example, Carroll (1993), Bajtelsmit and Bouzouita (1998), Helms (2001), and Grace and Klein (2009a).

¹²Cummins and Weiss (1991) analyze the structure and performance of the property-liability insurance industry in the USA, and Grace and Klein (2007) examine the structure and performance of the US life insurance industry. Several studies of the structure and performance of the insurance industries in other countries are provided in Cummins and Venard (2007).

Table 31.1 Property-casualty insurance market structure: 2010

Line	Number of insurers	Pct. of sector DPW (%)	CR10 (%)	HHI	Since 2001	
					Entries (%)	Exits (%)
Personal auto	915	35.0	38.2	370	15.1	31.8
Commercial auto	927	4.9	17.6	66	22.2	30.0
Homeowners	865	14.8	36.7	342	23.1	31.2
Fire and allied	995	4.8	35.8	231	24.1	28.4
Commercial MP	743	7.0	22.4	94	26.4	30.9
General liability	1,283	9.6	28.6	130	31.2	25.6
Medical malpractice	315	2.2	35.6	200	94.7	42.5
Workers' compensation	653	7.7	21.4	85	21.4	33.8
Other	1,337	14.0	23.1	99	20.6	26.5
All lines combined	2,488	100.0	20.2	86	18.1	27.9

Source: National Association of Insurance Commissioners (NAIC) and author's calculations

structurally competitive and profits do not exceed what would be considered a fair rate of return when these sectors and markets are relatively mature in terms of their development. However, some of these studies have also found high levels of technical and cost inefficiency in key insurance sectors. Further, developing markets may be plagued by high entry barriers and levels of market concentration which can have an adverse effect on competition.

Rather than reviewing the findings of each of these studies in detail which vary in terms of their focus and when they were conducted, I examine recent data on the basic structure and performance of the major industry sectors and markets supplemented by references to certain studies which provide additional insights. To make this exercise manageable, my data are confined to the USA. Figures reflecting the structure of property-casualty insurance lines on a countrywide basis are shown in Table 31.1. There were 2,488 insurance companies that sold property-casualty insurance in 2010, with several hundred companies competing in each major line. The principal measures of market concentration, the 10-firm concentration ratio (CR10)—the market share of the top ten insurers—and the Herfindahl-Hirschman Index (HHI)—the sum of the squared market shares of all insurers—also indicate competitive market structures in these lines. The top ten insurers accounted for no more than 38% of the premiums in any given line and 20–35% in many lines. Similarly, HHI values ranged from 66 to 370, with most lines falling between 100 and 200. These levels of concentration are considerably below levels that most economists consider necessary for firms to begin acquiring market power.¹³

Entry and exit barriers also appear to be low. Regulatory capital requirements are relatively modest compared to the standards set by rating agencies and the amount of capital insurers actually hold (Klein 2012). Information and the cost of establishing distribution systems likely have a greater impact on entry and exit, but these factors do not appear to impose significant barriers to many insurers.¹⁴ The ease of entry and exit is revealed by the high percentage of entries and exits in and out of these lines since 2001. These figures do reflect some industry and market restructuring as exits have exceeded entries in all lines shown except general liability and medical malpractice. This is consistent with the general consolidation of the industry and insurers' increased focus on markets where they believe they can be most successful. It also should be noted that these figures only reflect licensed insurers

¹³The Department of Justice (DOJ) has established merger guidelines, which consider markets with HHIs in excess of 2,000 to be highly concentrated. Mergers in such markets are subject to closer scrutiny by the DOJ.

¹⁴Information and expertise are arguably the most important resource to insurance companies as discussed above. To be successful in penetrating any market, insurers must have a good understanding of the risks they will underwrite and price.

Table 31.2 Life-health insurance market structure (2010)

Line	Pct. of sector reserves (%)	Number of insurers	CR10	HHI	Since 2001	
					Entries (%)	Exits (%)
Life						
Industrial	0.2	48	91.3%	2,315	19.1	61.9
Ordinary	20.5	559	44.8%	306	9.8	35.3
Credit	1.6	103	73.2%	1,014	7.4	56.9
Group	5.9	333	62.9%	765	9.6	38.5
Annuities						
Individual	39.1	365	50.1%	335	9.7	35.8
Group	27.5	144	58.4%	501	13.3	44.5
Supp contracts	0.3	1	100.0%	10,000	33.3	100.0
Accident and health						
Group	2.3	349	68.9%	1,128	14.1	43.6
Credit	2.5	82	80.6%	2,023	5.9	57.6
Individual	0.1	355	69.3%	895	13.9	37.6
Other	0.0	1	100.0	10,000	100.0	100.0
All lines combined	100.0	720	34.6%	198	6.8	39.9

Source: NAIC data and author's calculations

domiciled in the USA and do not include international insurers, captives, and surplus lines companies which provide additional competition to licensed domestic insurers in some lines.

Table 31.2 presents 2010 data on the structure of different segments of the life and annuity sectors. As in the property-casualty sector, there are numerous insurers selling various life and annuity products. A total of 720 life-health companies reported data in 2010, and 100–560 insurers offer products in each of the major lines.¹⁵ In general, market concentration is relatively low in these broad lines and entry and exit activity is relatively high. Exits have exceeded entries, consistent with industry consolidation and the decline in the number of life-health insurance companies.¹⁶ Life insurers in the USA are also subject to competition from international companies and other financial institutions that offer products that compete with life insurance and annuity contracts with an investment component.

31.3.2 Market Conduct and Performance

Market conduct can encompass a number of different aspects of firm behavior including pricing, advertising, research and innovation, mergers, capital investments, and legal tactics. Particularly important questions are whether firms act independently in making their pricing and product decisions, continue to innovate in terms of developing new products to meet consumers' needs, and strive to maximize their efficiency in conducting their operations. Unfortunately, it is difficult to come up with good quantitative measures of firm conduct in insurance markets that one can compare with standard benchmarks for other industries. Hence, for the purposes of this chapter, it is more feasible to offer some qualitative observations on industry practices and then move on to a discussion of market performance.

¹⁵The number of insurance companies selling industrial life and health credit insurance is smaller, but these are small and declining markets.

¹⁶Many exits may represent mergers and acquisitions of life insurers into large holding companies.

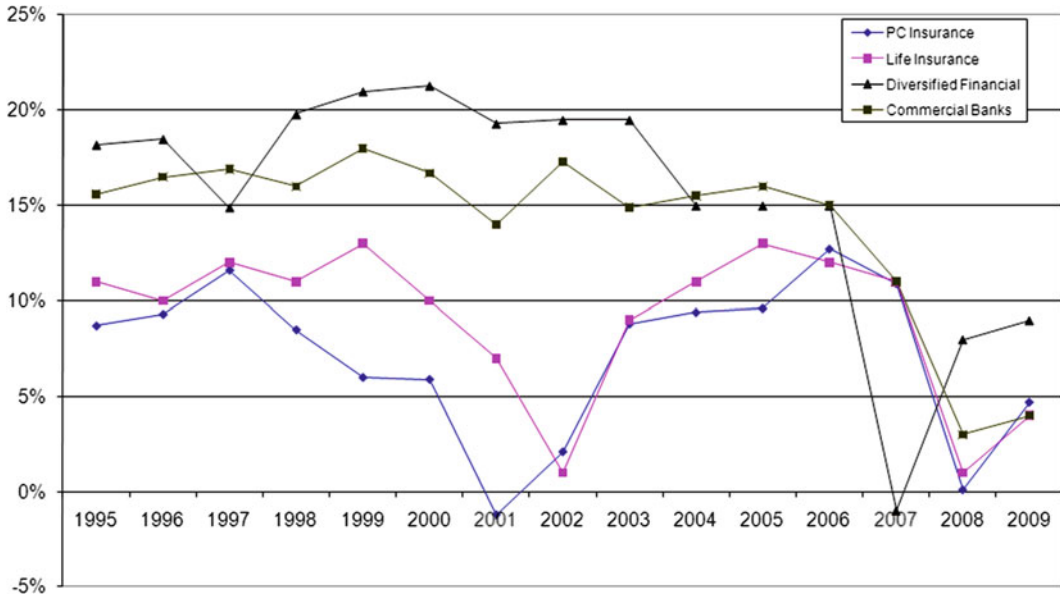


Fig. 31.1 Annual rate of return net income as % of equity: 1995–2009 (Source: Insurance Information Institute)

Since the 1950s, property-casualty insurers in the USA have taken a number of steps to increase the independence of their pricing decisions. With the passage of the McCarran-Ferguson Act in 1945, the industry formed rate cartels to stabilize their pricing subject to state regulatory oversight. However, over time, the institutions that promulgated uniform industry rates transformed themselves into “advisory organizations” that file only advisory loss costs with regulators. Insurers must develop their own loadings for expenses and profits and choose to adopt the advisory loss costs or modify them for their own purposes. Insurers may also file their own full rates without any reference to the loss costs filed by advisory organizations. With one exception, there is no evidence or studies that indicate that property-casualty insurers engage in explicit or tacit collusion to fix prices.¹⁷

There are no advisory organizations for life, annuity, and health insurance markets although companies selling products in these markets may use published mortality and morbidity tables as a starting point in their pricing. As in the property-casualty sector, I cannot find any evidence or studies that would indicate that life and health insurers collude to fix prices. A study by [Brown and Goolsbee \(2002\)](#) did find that the price of term life insurance fell dramatically over the period 1990–1997. Their analysis attributes much of this decline to the increasing use of the Internet by consumers shopping for term life insurance. This suggests that as consumers are able to obtain more information at a lower cost, it can spur even greater price competition among insurance companies, especially for products with more common features among different companies for which price comparisons are more feasible.

When economists assess the performance of insurance markets they focus their greatest attention on profitability and cost efficiency. There are various measures of profitability, but one commonly used is the rate of return on net worth or equity. Figure 31.1 compares the annual rates of return for the property-casualty and life insurance sectors in the USA against the rates of return for diversified

¹⁷In 2004, New York Attorney General Eliot Spitzer filed a suit against the insurance broker Marsh-McLennan for steering its commercial clients to insurers which with which it had contingent commission arrangements. Several prominent insurers also were implicated in the suit.

financial firms and commercial banks over the period 1995–2009. As can be seen from this chart, profits in both insurance sectors have been much lower than the profits earned in the other industries. The rate of return earned by property-casualty insurers in the USA based on these figures also falls below estimates of their cost of capital developed by [Cummins and Phillips \(2005\)](#). Hence, these data indicate that insurance companies in the USA are not earning excessive profits.

Measuring the efficiency of insurance companies is a more difficult task than measuring their profitability. Prior to the 1990s, industry analysts relied primarily on expense ratios as a measure of efficiency. However, there are problems with using expense ratios to gauge insurers' efficiency. A high expense ratio could indicate low efficiency, but it could also reflect greater expenditures on services to policyholders. Consequently, over the last two decades, economists have increasingly used frontier efficiency and productivity methods to analyze firm performance in insurance and other industries (see Chap. 25). These methods measure the performance of each firm against "best practice" cost, revenue, or profit frontiers derived from the dominant firms in the industry. A number of studies of the insurance industries in the USA and other countries using these methods have found evidence of the presence of scale economies and that smaller insurers have not achieved an efficient scale of operation (see, e.g., [Cummins and Weiss 2000](#); [Eling and Luhnen 2010](#)).

This begs the question of how inefficient insurers could remain viable in a competitive market. A thorough response to this question is beyond the scope of this chapter, but it is possible to offer several observations. One is that there may be a certain amount of inertia among buyers that cause some to stay with less efficient insurers. This inertia may be eroding over time as new buyers enter insurance markets and existing buyers shop more intensively for "better deals." Indeed, there has been significant consolidation in the insurance industry as smaller insurers have been acquired by larger firms and some companies have narrowed their focus to product lines in which they are more competitive. A more realistic expectation for a competitive market might be a strong trend towards increasing efficiency. If one accepts such a proposition, then pertinent issues for both researchers and policymakers are whether the efficiency of an insurance market is progressing at a "reasonable" pace and if there are impediments to efficiency gains that need to be addressed.

31.4 Principal Areas of Insurance Regulation

In the USA, insurance is regulated principally at the state level, although the Congress can supersede state regulation where it chooses to do so. Each state (as well as the District of Columbia and the five US territories) has a chief regulatory official who is responsible for supervising insurance companies and markets within the state. In most states, the position of insurance commissioner is an appointed position, but in 12 states/territories insurance commissioners are elected officials. As discussed further below, the financial regulation of insurance companies is relatively uniform among the states, but the regulation of insurance prices, products, and market conduct is much less uniform. The state-based system of regulation in the USA contrasts with other countries which in most cases are regulated at a national level and in a few cases regulatory responsibilities are shared by state and national governments.

31.4.1 Financial Regulation

A primary objective of insurance regulation is to protect policyholders and others from excessive insurer insolvency risk. Regulators can seek to accomplish this objective by establishing and enforcing financial standards and acting against insurers who take on too much risk. Insurance regulators

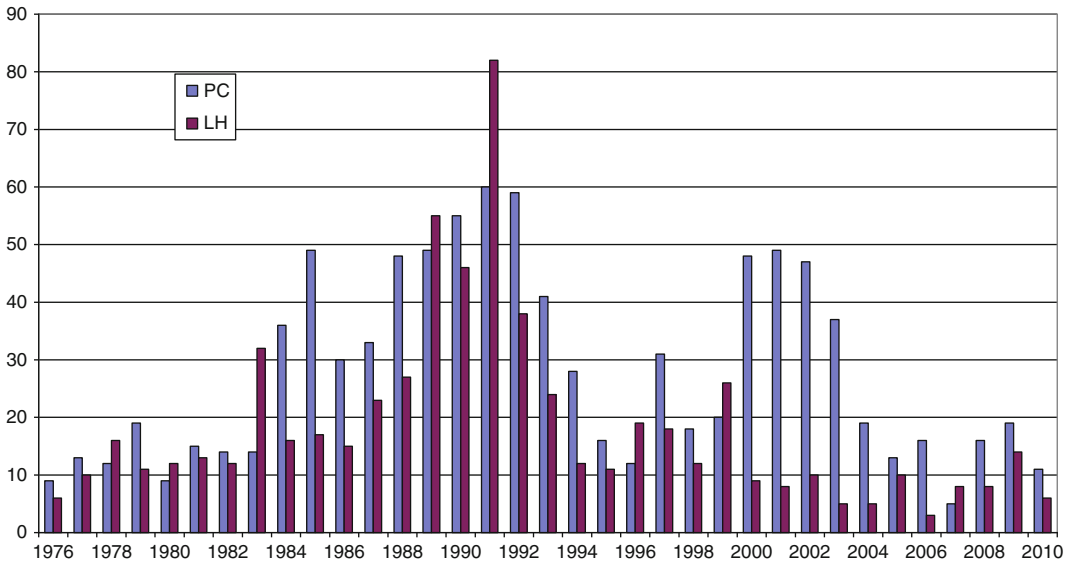


Fig. 31.2 Insurance company impairments property-casualty and life-health insurers (Source: A.M. Best)

can impose financial requirements due to their authority over insurance companies’ ability to incorporate and/or conduct business in their jurisdictions. Financial regulation includes a number of aspects of insurers’ operations, including (1) capitalization, (2) pricing and products, (3) investments, (4) reinsurance, (5) reserves, (6) asset-liability matching, (7) transactions with affiliates, and (8) management. Regulators also have the authority to step in and take remedial actions when insurers encounter financial distress or fail to comply with financial regulations, administer insurer receiverships (bankruptcies), and utilize insolvency guaranty mechanisms that cover a portion of the claims of insolvent insurers.

Figure 31.2 shows the number of property-casualty and life-health insurer insolvencies for the period 1976–2010. The frequency of life-health insolvencies is principally affected by asset problems and policy lapses and terminations due to an increase in interest rates. The number of property-casualty insolvencies is largely driven by the underwriting cycle and particularly significant events such as Hurricane Andrew in 1992. Some readers might wonder why the 2004/2005 storms seasons in the Southeast did not result in a large number of insolvencies. The most compelling explanation for this is that many insurance companies by that time had significantly improved their assessment and diversification of catastrophe risk as well as reduced their exposures in hurricane-prone areas to levels they could reasonably manage.¹⁸ More generally, it is possible that regulatory changes implemented in the late 1980s and early 1990s have led to fewer insolvencies, but it is difficult to disentangle the effect of improved regulation from the effects of tighter rating agency standards and better financial risk management by insurance companies.

A detailed review of each of these aspects of financial regulation is beyond the scope of this chapter, but capital requirements warrant some discussion. Capital requirements have long been a critical element of financial regulation of insurance companies, but they have received special attention in

¹⁸There were five insurance company insolvencies in Florida that could be attributed to the 2004/2005 storm seasons (three of these companies belonged to the Poe Group). The companies that became insolvent were “small” single-state companies that Florida regulators had allowed to take on too many exposures relative to their capacity to absorb the associated losses that would occur if severe hurricanes struck the state (Grace and Klein 2009b).

recent year in light of the Basel II accords and associated developments in the USA, the EU, and other countries.¹⁹ Prior to the 1990s, fixed capital requirements were common. Over the past 15 years, most of the major developed economies have moved towards some form of risk-based approach to determining insurers' capital requirements (ChandraShekar and Warriar 2007; Eling et al. 2009). Under a risk-based approach, regulatory capital requirements may be calculated by using simple or complex formulas or standard or internal capital models.

In the USA, regulators employ both fixed capital requirements determined by each state and uniform risk-based capital (RBC) standards based on complex formulas developed by the NAIC that have been adopted by every state.²⁰ Different formulas apply to property-casualty, health and life insurance companies. In these formulas, selected factors are multiplied times various accounting values (e.g., assets, liabilities, or premiums) to produce RBC charges or amounts for each item. These charges are aggregated into several "baskets" and then a covariance adjustment is applied to reflect the assumed independence of certain risks. An insurer's calculated RBC amount is matched against its actual total adjusted capital (TAC) to assess the adequacy of its capital from a regulatory perspective. If a company's TAC falls below its RBC requirement, certain company and regulatory actions are required that depend on the severity of the company's capital deficiency.

When the US system was first adopted in the early 1990s, it was considered to be more sophisticated than the regulatory capital requirements used in other countries and a significant advancement over fixed capital requirements. However, over time, its reliance on static formulas to determine how much capital an insurer should hold has come under increasing criticism by economists in light of the developments that have occurred in dynamic financial analysis (DFA) and the use of models to assess and manage insurers' financial risk (Cummins and Phillips 2009; Holzmuller 2009). Also, the US RBC formulas omit some significant areas such as operational risk and catastrophe risk. US regulators have indicated a willingness to address these omissions and consider greater use of modeling to determine risk charges in certain areas but appear to strongly resist moving to a more comprehensive model-based approach such as that being developed in the EU (Vaughn 2009).

The development of new capital standards in the EU is being guided by its Solvency II initiative. Solvency II consists of three pillars: (1) quantitative requirements, (2) qualitative requirements and supervision, and (3) supervisory reporting and public disclosure. A primary goal of the EU's Solvency II initiative is to develop and implement harmonized RBC standards across the EU based on standard or internal company models. The intent is to take an enterprise risk management (ERM) approach towards capital standards that will provide an integrated solvency framework that covers all significant risk categories and their interdependencies.

Based on the Solvency II directives that have been adopted to date, there will be two levels of regulatory capital requirements. The first level is the minimum capital requirement (MCR) which is the minimum amount of capital that an insurer would be required to hold below which policyholders would be subject to an "unacceptable" level of risk (in the view of regulators). An insurer that fails to meet its MCR would be subject to immediate regulatory intervention. The second level is the solvency capital requirement (SCR), also known as "target capital," that is intended to represent the economic capital an insurer needs to hold that will allow it meet its claim obligations within a prescribed safety level. The economic capital for a given insurer will be derived by using a Value-at-Risk (VaR) calibration at a 99.5% confidence level over a 1-year time horizon.²¹ The SCR will encompass all

¹⁹Basel II is the second of the Basel accords which are recommendations on banking laws and regulations issued by the Basel Committee on Banking Supervision. Basel II has been extended and superseded by Basel III which sets global regulatory standards on bank capital adequacy, stress testing, and market liquidity risk developed in response to perceived deficiencies in financial regulation revealed by the 2007–2009 financial crisis.

²⁰An insurer is required to have capital that meets or exceeds the higher of the two standards.

²¹This is essentially equivalent to limiting an insurer's probability of default to 0.5%.

risk categories that are viewed as significant by regulators, including insurance, market, credit, and operational risk as well as risk mitigation techniques employed by insurers (e.g., reinsurance and securitization). An insurer that falls between its MCR and SCR *may be* subject to regulatory action based on regulators' determination of whether corrective steps are warranted. The MCR would be calculated using a simplified modular approach calibrated at an 85% (VaR) confidence level subject to a corridor of 25–45% of an insurer's SCR and a monetary minimum floor.

Regulators in the EU are looking at both the use of both standard and internal models to calculate the MCR and SCR. A standard model has the advantage of being more uniform among insurers (companies would be allowed to make certain adjustment to customize a standard model to fit with their particular circumstances) and the companies that use them presumably would not want to expend the additional resources needed to develop an internal model. An insurer may prefer to use an internal model to better correspond to its particular circumstances and needs subject to certain standards established by regulators. Insurers with more resources or that are already performing internal capital modeling will probably be more likely to opt for an internal model, while small- and medium-sized insurers may be more likely to adopt a standard model because of resource considerations. An insurance company will need to obtain regulatory approval to be allowed to use an internal model to determine its capital requirements.

31.4.2 Market Regulation

Insurers' prices, products, and conduct are the principal areas of focus in market regulation. In the USA, the extent and stringency of price regulation vary significantly by line and by state. The lines subject to the greatest rate regulation are personal auto, homeowners, workers' compensation, and health insurance. The reality is that in most states and markets, at a given point in time, regulators do not attempt to impose severe price constraints. However, as discussed above, the problem arises when strong cost pressures compel insurers to raise their prices and regulators resist market forces in an ill-fated attempt to ease the impact on consumers.²² Inevitably, severe market distortions occur. Ultimately, insurance markets can be sucked into a "downward spiral" as the supply of private insurance evaporates and state mechanisms are forced to cover the gap.

Insurance pricing was essentially deregulated in the EU in 1994 with the introduction of the Third Generation Insurance Directive. However, certain factors used in insurance pricing are still subject to regulation in some member countries. One example of this is the automobile insurance bonus-malus system in France (Dionne 2001). Although auto insurance rate levels are not subject to explicit constraints, the premiums are adjusted by a bonus-malus coefficient (set by law) that considers a driver's past experience. Also, in March 2011, the European Court of Justice banned gender-based pricing insurance. Hence, while insurance pricing in the EU has largely been deregulated, some constraints still exist which affect insurers' ability to implement full risk-based rates.

Insurance products are effectively regulated in the USA through requirements that policy forms must receive prior approval before they are implemented. Regulators focus primarily on insurance policies purchased by individuals (e.g., auto, home, life, and health) and small businesses. The intent expressed by regulators is to ensure that there are no major gaps in the coverages that one would normally expect to find in a given insurance product or policy provisions that would be highly detrimental to consumers. Their concern is that unsophisticated insurance buyers do not have the capacity to identify such gaps or provisions. Regulators typically refer to standardized policy forms

²²Regulators may seek to suppress overall rate levels and/or compress rate differentials between low- and high-risk insureds.

developed by industry advisory organizations, such as the Insurance Services Office (ISO), to evaluate the specific policies filed by insurers. However, in some instances, states may require insurance policies to conform to idiosyncratic regulatory preferences that go beyond generally accepted industry standards. Further, some policy provisions can be contentious such as the use of special wind deductibles in homeowners insurance policies or the exclusion of coverage for certain perils such as sinkholes or mold contamination.

Market conduct regulation takes various forms in the USA. Regulators stated objective is to deter and sanction abusive trade practices that take undue advantages of consumers, such as the failure to pay legitimate claims or misleading sales practices. Historically, US regulators have relied on market conduct exams and the monitoring of consumer complaints to uncover compliance violations or “unfair” treatment of consumers. More recently, US regulators have required insurers to file “market conduct statements” to assist their monitoring activities. The industry has expressed concerns about the efficiency of the methods used to regulate market conduct. Market conduct exams have been criticized for being too extensive, duplicative, and costly and placing more emphasis on minor errors than major patterns of abuse. The evidence also suggests that regulators fail to recognize and encourage insurer self-compliance efforts which could enable a more efficient allocation of regulatory resources (Klein and Schacht 2001).

31.5 Catastrophe Risk

The risk of “natural” and “man-made” disasters has increased dramatically in many parts of the world due to a combination of factors, including population growth and economic development, climatic changes and weather cycles, geologic activity, and political unrest. The rising cost of catastrophes is evident in Fig. 31.3 which plots annual insured losses from catastrophes in the USA from 1985 to 2011 and Fig. 31.4 which plots annual insured losses from catastrophes worldwide for the period 1970–2011.²³ Insurance regulation and other government policies play a key role in the management and financing of catastrophe risk. Various stakeholders bear the risk and costs of catastrophes in different ways through the interaction of the public and private sectors that affect their incentives and the efficiency of catastrophe risk management. This section examines several key aspects of regulatory and other government policies associated with catastrophe risk including regulatory requirements for insurers’ management of their catastrophe risk, catastrophe risk financing, price and market conduct regulation, and government financing of catastrophe risk.

31.5.1 Regulatory Requirements for Catastrophe Risk Management

The management of catastrophe risk in an insurance company would be expected to encompass several elements including risk assessment, underwriting, pricing, policy design, and financing. Risk assessment involves the use of catastrophe models to evaluate an insurer’s potential losses from a given catastrophic peril based on the nature and location of its exposures. An insurer’s underwriting policies and decisions determine its exposure to catastrophe losses and where and how much risk it will assume. Its pricing determines the amount of premiums it will collect to finance potential losses as well as the incentives of insureds to take steps to mitigate their vulnerability to catastrophe losses.

²³It should be noted that these figures omit uninsured losses and that total economics losses from a catastrophic event can be much higher than insured losses.

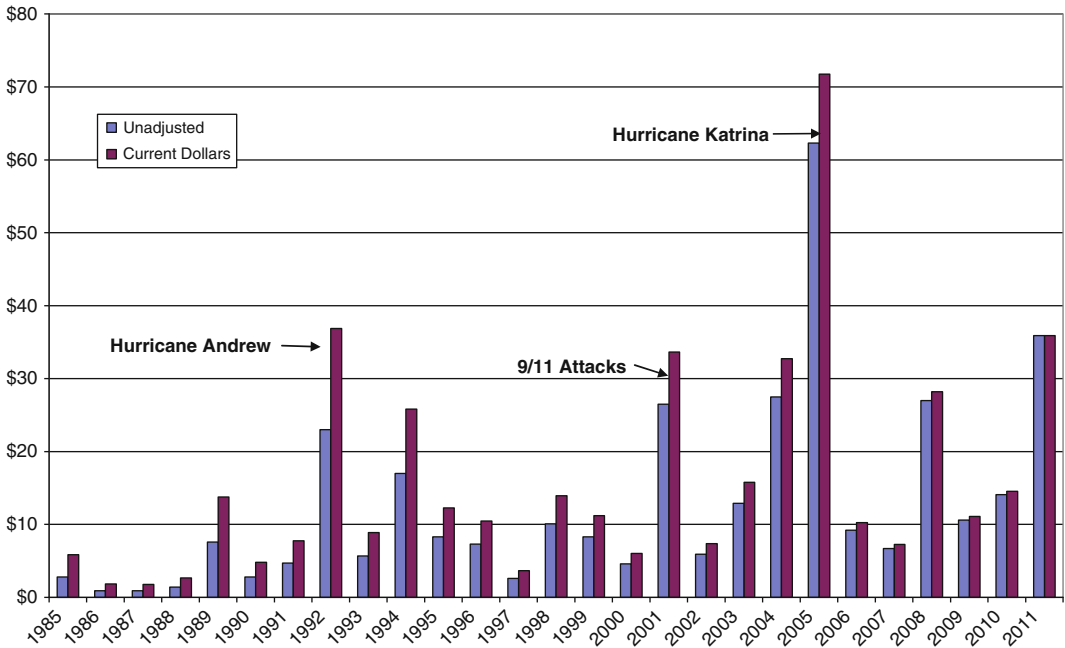


Fig. 31.3 Insured losses for US catastrophes (\$B) 1985–2011 (Source: Insurance Information Institute)

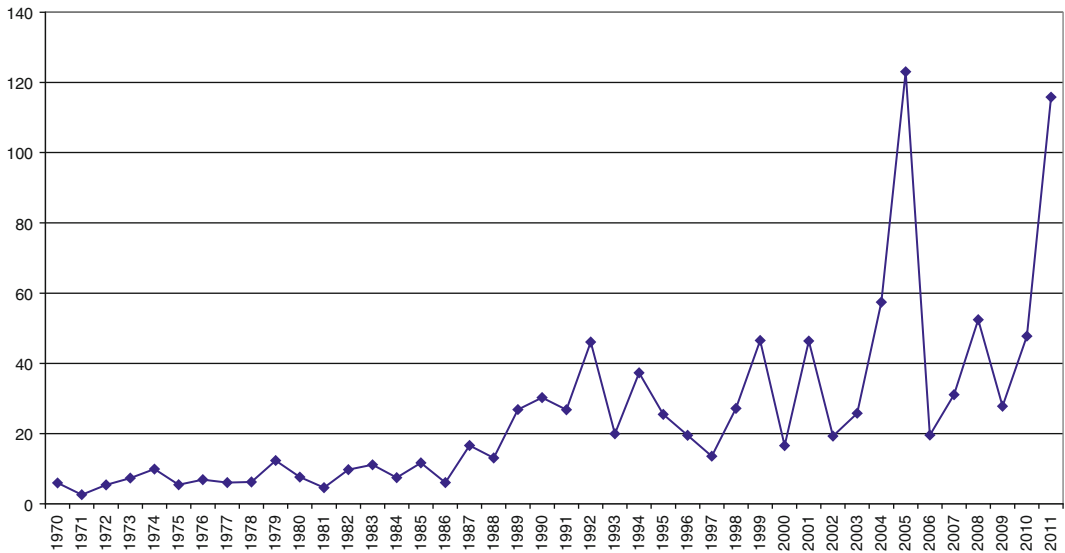


Fig. 31.4 Worldwide insured catastrophe losses (\$B) 1970–2011 (adjusted to \$2011) (Source: Swiss Re, sigma. No. 1/2011)

Policy design can also affect an insurer’s potential losses from catastrophic events in terms of the perils that are covered and cost sharing with insureds. Finally, an insurer must determine how it will fund its catastrophe losses utilizing its revenues, surplus, reinsurance, and potentially other catastrophe financing mechanisms including derivative instruments such as cat bonds and options. Ultimately, a principal objective of an insurer’s catastrophe risk management program should be to ensure that it

will be able to absorb the losses from major catastrophic events and remain solvent and viable (Klein and Wang 2009).²⁴

Regulators “supervise” insurers’ catastrophe risk management programs through two principal ways: (1) reviewing and approving insurers’ cat risk management programs and (2) capital requirements. In the USA, financial examiners are instructed to review insurance companies’ catastrophe risk management with some guidelines on how such a review should be performed.²⁵ Beyond the guidelines provided, the scope and sophistications of these reviews likely vary among states. States such as Florida, where hurricane risk is a significant concern, appear to have developed special questionnaires and reports that are used by financial analysts and examiners to assess how well an insurer is managing its catastrophe risk. In states where catastrophe risk is less of a concern, regulatory reviews of insurers’ catastrophe risk management may be less prescribed and examiners may exercise greater judgment in how they conduct these reviews. In theory, the objectives of these reviews should be to ensure that an insurer understands its catastrophe exposure and has adequate surplus and reinsurance in place to maintain its catastrophe risk within acceptable parameters.

Catastrophe risk also can be incorporated into regulatory capital requirements which would be expected to increase insurers’ incentives to properly manage their catastrophe risk. Capital charges for catastrophe risk can be derived using standard formulas or modeled scenarios. Of the two approaches, the latter is more sophisticated and potentially more desirable (from a regulatory perspective) for insurers with significant catastrophe exposures. Currently, neither US RBC requirements nor EU capital requirements explicitly consider an insurer’s catastrophe risk, but this omission is being rectified in both jurisdictions in the development of revised capital standards.²⁶ For several years, the NAIC has been working on adding a catastrophe risk component to its RBC formula for property-casualty insurers. Based on the latest draft proposal, the RBC charge for catastrophe risk will be based on modeled property catastrophe losses (see NAIC 2010). Separate risk charges would be determined for the hurricane peril and the earthquake peril and would not be subject to a covariance adjustment based on the premise that the risks from these perils are independent of each other and other risks included in the RBC formula. Each charge would be calculated on gross of reinsurance basis and a negative charge or credit would be determined based on a company’s modeled anticipated ceded reinsurance. The actual charge applied would be on a net basis and calculated by subtracting the reinsurance credit from the gross of reinsurance charge.

In the EU, the capital requirements being developed under Solvency II will also have a catastrophe risk sub-module (EIOPA 2011).²⁷ Under the current proposal and technical provisions being tested, the cat risk charge could be calculated using two alternative approaches. If no regional scenarios are provided by a regulator, a standard formula would be used to calculate the capital charge for nonlife catastrophe risk. The formula would apply different factors to an insurer’s net written premiums broken down by lines of business. The charges for each line of business would be subject to a covariance adjustment based on assumptions about the independence of cat risk associated with each line of business. The second approach would utilize modeled scenarios to determine the nonlife cat

²⁴Insurers calculate various risk metrics of their potential losses from different catastrophic perils based on their exposures, reinsurance, and other financing arrangements. One of these metrics is an insurer’s Probable Maximum Loss (PML) which is similar in concept to Value-at-Risk (VaR) measurements. Typically, an insurer will structure its cat risk management program to ensure that it can meet specified PML targets and remain solvent.

²⁵The NAIC publishes the Financial Condition Examiners Handbook as a basic reference tool to guide regulators in how to conduct financial examinations.

²⁶When the US RBC system was first developed, regulators considered adding a capital charge for catastrophe risk but decided it would be too complicated and controversial at that time. As for the EU, the current approach for determining insurers’ capital standards is very simple and does not explicitly create capital charges for a number of specific risks so the inclusion of capital charge for catastrophe risk would not be consistent with this simplified approach.

²⁷Under current projections, Solvency II is scheduled for full implementation beginning in 2014.

risk charge for an insurance company. A regulator could provide regional scenarios that could be used by insurers to determine their cat risk charge or a company could be given the option of using its own customized catastrophe scenarios based on the classes of business that it writes and their geographic concentration.

31.5.2 Regulation of Catastrophe Risk Financing

Regulators can affect the use of catastrophe risk financing mechanisms in several ways (Klein and Wang 2009). One way they do this is by imposing constraints on or barring insurers from using certain instruments or creating other impediments. Second, regulation can either facilitate or inhibit catastrophe risk financing in terms of the rules governing accounting for and financial reporting of catastrophe risk transactions. Thirdly, there is the issue of whether an insurer's use of catastrophe risk financing is considered in regulatory assessments of its capital adequacy and financial risk which could affect insurers' motivation to use efficient risk financing devices. Finally, other regulatory and government policies, such as the regulation of insurers' rates and market practices, the creation of government insurers/reinsurers, and tax rules, also influence the economic viability of catastrophe financing instruments.

31.5.2.1 Surplus and Catastrophe Reserves

Retaining additional surplus to absorb catastrophe losses has been used as a conventional catastrophe risk financing mechanism and serves as an insurer's first layer of protection. Any catastrophe losses it retains are funded by its surplus and designated catastrophe reserves if allowed. In the USA, regulatory and tax policies do not discourage this "self-funding" of catastrophe losses by insurers but make it more costly than it needs to be. First, insurers are generally required to keep catastrophe funds in their general surplus accounts which makes these funds vulnerable to being drawn down for other uses. Another problem is regulators may view higher amounts of surplus held to fund catastrophes as a justification for imposing tighter constraints on an insurer's rates. A third problem is that additions to surplus are taxed as income and the investment earnings on this surplus are also taxed which slows its accumulation.²⁸ US regulatory and GAAP accounting rules do not permit insurers to establish catastrophe reserves, i.e., reserves for losses arising from events that have not yet occurred.

Insurers and US regulators support the idea of allowing insurers to set up tax-favored catastrophe reserves, but the necessary accounting and tax provisions to facilitate such reserves have not been enacted (Davidson 1996; Harrington and Niehaus 2001). In concept, an insurer would be allowed to contribute up to a certain amount of its income every year to a reserve intended to fund future catastrophe losses and the reserve would be reported as a liability in an insurer's financial statement. Contributions to the reserve and investment earnings associated with the reserve would not be taxed. However, the federal government (Congress and the Internal Revenue Service) have not been enthusiastic about providing favorable tax treatment for catastrophe reserves because of the concern that they would be manipulated to reduce insurers' taxes. This contrasts with tax policies in EU countries which typically allow insurers to deduct contributions to and investment earnings on catastrophe reserves from their income in determining their tax liability (US General Accountability Office 2005).

²⁸Harrington and Niehaus (2003) estimated that the tax cost of holding additional capital to cover catastrophe losses could exceed 100% of the "expected cost of claims" at higher layers of an insurer's catastrophe risk exposure.

31.5.2.2 Reinsurance

Reinsurance continues to be the primary mechanism used by insurers to diversify their catastrophe risk. Approximately 40–50% of catastrophe losses in the USA are covered by reinsurance. The primary issue in the USA has been the different treatment of reinsurance transactions with domestic versus foreign reinsurers. Under the current rules in most states, insurers are allowed “full credit” for contracts placed with reinsurers domiciled and regulated in the USA and some “approved” foreign insurers who deposit funds in US financial institutions according to regulatory collateral requirements.²⁹ These rules require foreign reinsurers to provide collateral equal to their gross liabilities plus \$20 million to ceding US insurers. This is a significant issue as foreign reinsurers had a 59.9% share of “unaffiliated” premiums ceded by US insurers in 2010, according to the Reinsurance Association of America (RAA), up from 57.8% in 2009.³⁰ The different treatments of domestic and foreign reinsurers affect US insurers in several ways. First, insurers are not allowed to subtract premiums ceded to unauthorized insurers in calculating their net premiums which is used as a proxy measure of their potential future liabilities and risk. Second, insurers are not allowed to count recoverables from unauthorized reinsurers as an asset except to the extent that ceding insurers hold or have access to collateral deposited by the reinsurers. Ultimately, collateral requirements effectively increase the cost of foreign reinsurance and penalize US insurers that buy reinsurance from foreign reinsurers that do not meet regulatory collateral requirements. *Cummins (2007)* observes that the US requirements are inconsistent with global insurance/reinsurance markets and are directly opposed to the EU Reinsurance Directive that effectively abolishes collateralization.³¹

This approach to the differential treatment of reinsurance transactions has been strongly criticized by US insurers and foreign reinsurers as being inefficient and unfair. In response to this criticism, the NAIC has adopted changes to its model law and regulation that govern credit for reinsurance. Under the new provisions, domestic and foreign reinsurers can elect either to be subject to the same collateral requirements imposed in the prior model law or qualify as an “eligible insurer” that would be subject to reduced collateral requirements if they comply with number of criteria. The collateral requirements for certified reinsurers that meet these criteria would be scaled according to the ratings assigned to them by regulators. The ratings assigned by regulators are based on the ratings of reinsurers assigned by major rating agencies. Under this system, reinsurers with the highest ratings are not required to post any collateral. Reinsurers with lower ratings are required to post collateral based on a scale developed by the NAIC that progressively requires more collateral to be posted the lower a reinsurer’s rating is.³² Regulators in several states including Florida, Indiana, New Jersey, and New York have already changed their laws to reduce collateral requirements for foreign reinsurers (consistent with

²⁹The discrimination against foreign reinsurers stems from US regulators’ concerns about their ability to access funds from a foreign reinsurer outside their regulatory jurisdiction. The laws in most states generally conform with the NAIC’s Credit for Reinsurance Model Law. Most recently, several states have modified their laws to provide more favorable treatment for reinsurance ceded to foreign reinsurers consistent with a reform proposal that was adopted but not implemented by the NAIC, as discussed further below.

³⁰The term “unaffiliated” refers to the relationship between the primary insurer (i.e., ceding insurer) and the reinsurer (i.e., assuming insurer). A primary insurer may cede business to a reinsurer with which it is affiliated (i.e., they are owned by the same parent company) and/or reinsurers with which they are not affiliated.

³¹See *Evans (2007)*.

³²For example, a reinsurer that has an A rating from A.M. Best (and/or equivalent ratings from other rating agencies) would be required to post collateral equal to 20% of its obligations to US insurers. A reinsurer with an A rating from A.M. Best would be required to post collateral equal to 50% of its obligation to US insurers. Under the NAIC regulations, regulators are required to use the lowest financial strength rating received from an approved rating agency in determining the highest possible rating of a certified reinsurer.

the NAIC's proposed rating scale) to help lower the cost of catastrophe reinsurance for insurers based in their jurisdictions.

It should be noted that reinsurers are not subject to price regulation in contrast with primary insurers. Hence, when the cost of reinsurance increases, this can create a problem for primary insurers if regulators do not allow them to raise their rates to compensate for the higher cost of reinsurance. This is not a problem that regulators can directly control as they have no authority to force reinsurers to lower their prices. This has led regulators to explore other measures such as the creation of a state catastrophe reinsurance funds (discussed further below) or lowering collateral requirements for foreign reinsurers as discussed above.

31.5.2.3 Derivative Instruments

As discussed in [Klein and Wang \(2009\)](#), attempts to establish markets for catastrophe put options for natural disasters have not proved to be successful in the past, but there are recent efforts to reestablish viable options markets. The New York Mercantile Exchange (NYMEX) and the Chicago Mercantile Exchange (CME) have created mechanisms for the trading of cat futures and options. US regulators allow insurers to use options for risk hedging purposes, but there are no provisions for valuing such transactions in financial reporting prior to their triggering. Presumably, if a catastrophe option was triggered, an insurer could report its expected payoff as an asset pending the receipt of a cash payment. To date, the volume of trades in cat options and futures has been relatively small, so they have not yet become a significant source of risk transfer for US insurers. Regulators also have allowed insurers to engage in catastrophe swaps, albeit without associated financial accounting provisions or recognition of its favorable impact on their financial risk. There is no publicly available data on the level of swap activity in insurance markets, but there are anecdotal reports that they play a significant role for international reinsurers. More favorable regulatory treatment in the USA would increase US insurers' incentives to use cat options, futures, and swaps when their underlying attributes would make them economically desirable.

Catastrophe bonds have been the most popular derivative instrument used by US insurers to diversify their catastrophe risk. In 1999 and 2001, the NAIC adopted model acts to make "onshore" issuances of cat bonds more feasible, but almost all cat bonds issued by US insurers have been done "offshore."³³ There are several reasons for this as discussed by [Klein and Wang \(2009\)](#). Many US insurers issuing cat bonds through offshore Special Purpose Reinsurance Vehicles (SPRVs) have the trust funds associated with these instruments hold their deposits in US-certified institutions. This effectively provides the collateral required for the "reinsurer" (i.e., the SPRV) to be treated as authorized under US regulations without the SPRV actually being located and regulated in the USA. Consequently, regulatory accounting rules have not been an issue for US insurers that have issued cat bonds through offshore vehicles.

Consequently, the principal obstacles to onshore SPRVs appear to be their tax and regulatory treatment.³⁴ These factors may help to explain why no onshore securitizations have occurred. Currently, profits earned by offshore reinsurer affiliates of US insurers are not taxed in the calculation of the consolidated profits of US insurers. However, premiums paid to an offshore reinsurer (affiliated or not) are subject to an excise tax based on the gross premiums paid "regardless of the eventual

³³"Onshore" securitization refers to transactions that would be accomplished through a US-regulated entity or mechanism. "Offshore" securitizations refer to transactions that are conducted using non-US entities or mechanisms.

³⁴[Klein and Wang \(2009\)](#) provide an illustration of the tax advantages of an offshore securitization over an onshore securitization. [Cummins \(2008\)](#) observes that the NAIC model act still imposes a number of regulatory hurdles in forming and using onshore SPRVs.

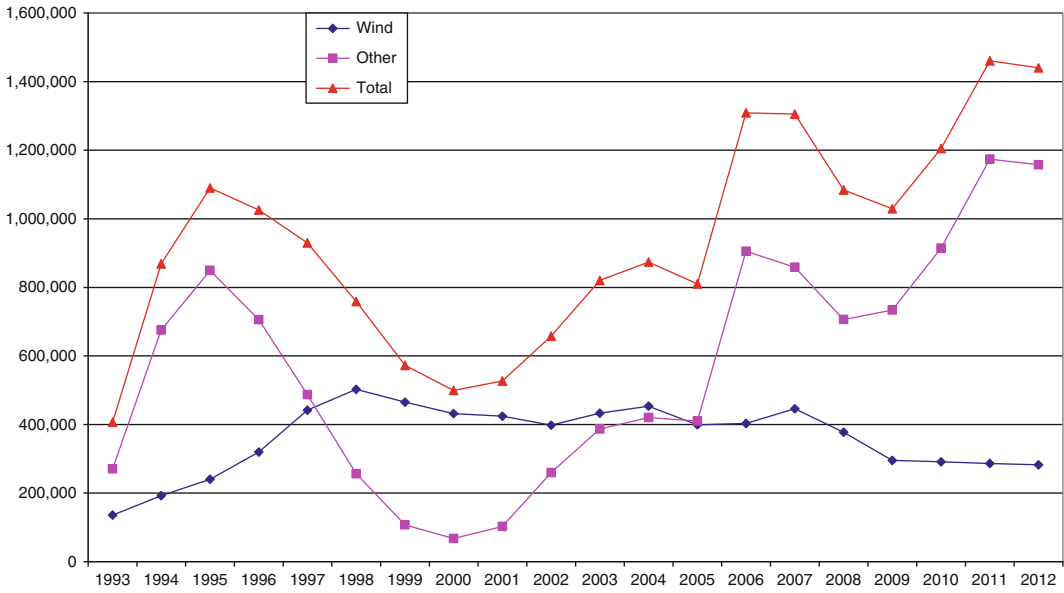


Fig. 31.5 Florida property insurance residual market number of policies: 1993–2012 (Source: Citizens Property Insurance Corporation)

outcome of the coverage.” Offshore SPRVs also have much lighter regulatory burdens and the transactions can be completed more quickly. The boom of SPRV facilities in Bermuda and the Cayman Islands has promoted the establishment of specialized law firms and professional services for such facilities.

31.5.3 Price and Market Conduct Regulation

The price of private insurance that covers catastrophe perils has risen substantially in some geographic areas where catastrophe risk is especially high. For example, homeowners insurance in coastal areas subject to hurricane risk have seen their premiums escalate over the last 2 decades (Klein 2008). This has created tension between insurers and regulators over the price of homeowners insurance in the areas that have experienced the greatest rate increases. Some states, such as Florida, have attempted to place tight constraints on homeowners’ insurance rates in coastal areas. These constraints have contributed to the retrenchment of major insurers from these areas. This, in turn, has driven a large number of homeowners into Florida’s residual market mechanism, the Citizens Property Insurance Corporation (FCPIC). The dramatic growth in the number of policies insured by the FCPIC is evident in Fig. 31.5. As of March 31, 2012, Citizens had 1.4 million policies in force and over \$502 trillion in insured exposures.³⁵

This illustrates the kinds of problems than occur when regulators seek to constrain the price of insurance coverages that cover catastrophic perils. Suppression of overall rate levels or compression

³⁵Of the total policies in force, 96.6% were for personal residential properties. Personal residential properties accounted for 75.3% of the total exposures in force. Commercial residential and nonresidential properties accounted for the other policies and exposures in force.

of geographical rate structures can compel insurers to tighten the supply of insurance which decreases the availability of coverage. Also, these policies can reduce insureds' incentives to optimally manage their risk from natural disasters. However, regulators cannot force market long-term outcomes at odds with economic realities, e.g., low rates and widely available coverage in the face of very high risk, without the government replacing private insurers as the principal source of insurance coverage.

Regulators can constrain many other aspects of insurers' market activities beyond pricing, which can have further effects on the sustainability of their operations (Klein 2008). For example, regulation of underwriting and the policy terms that insurers can use have a significant impact on hurricane-prone insurance markets. The regulation of underwriting—e.g., the rules insurers use to select or reject applicants, insurer decisions to reduce the number of policies they renew or new policies they write—can be somewhat difficult to specify because of the complexity and opaque nature of this aspect of regulation. Some aspects of the regulation of policy terms, e.g., the maximum wind/hurricane deductibles that insurers are allowed to offer, are more readily discernable, but other aspects may be obscured in the policy form approval process. Generally, it appears that insurers have been allowed to substantially increase the maximum wind/hurricane deductibles they are allowed to offer, but there has been greater regulatory interference with their underwriting decisions.³⁶

As noted above, other aspects of insurers' activities are regulated such as marketing and distribution, the servicing of policies, and claim adjustment. The regulation of claim adjustment can be especially relevant in the context of catastrophe risk. Following a disaster, regulators may pressure insurers to make more generous claim payments and pay claims more quickly.³⁷ Disputes over “wind versus water” damages were particularly contentious following Hurricane Katrina in 2005 leading to a number of lawsuits (Kunreuther and Michel-Kerjan 2009). The potential for regulators to pressure insurers on claim payments and litigation increases the uncertainty that insurers face in assessing and pricing catastrophe risk. This greater uncertainty can prompt insurers to further boost their rates or reduce the supply of insurance which can have negative repercussions for many insureds.

31.5.4 Government Financing of Catastrophe Risk

Government financing of catastrophe risk can occur through various ways using different mechanisms. Countries vary in terms of their reliance on private versus government financing of different catastrophic perils. One approach is the direct provision of insurance through a government program

³⁶Klein (2008) discusses and documents the nature of this interference in greater detail. For example, some states limit or prohibit the use of certain underwriting criteria, such as the age of a home and/or its market value, a history of prior claims, and the insured's credit score. Also, some states issued moratoriums on policy cancellations/nonrenewals following major hurricanes. Further, some states have increased prior notice requirements for insurers electing to nonrenew policies in a specified area due to concerns about hurricane risk. Also, some states may limit the size of the wind deductible that an insurer can require as a condition for writing a new policy or renewing an existing policy.

³⁷For example, Florida requires insurers to report data on their handling of hurricane claims and subjects insurers to claim audits. While these measures may not explicitly require insurers to pay claims more quickly or offer higher settlements, they can be used to apply implicit pressure. These requirements are specified in Rule 69O-142.015 Standardized Requirements Applicable to Insurers After Hurricanes or Natural Disasters issued on June 12, 2007. The Florida Office of Insurance Regulation (FLOIR) also performs targeted market conduct examinations of insurers' handling of hurricane claims which can result in sanctions if regulators determine that an insurer has failed to adjust and settle claims in an appropriate manner. For example, the FLOIR accused Nationwide for underpaying 2004 hurricane claims and forced the company to review how it handled these claims. See “Nationwide Agrees to Review Hurricane Claims in Florida,” *Columbus Dispatch*, October 15, 2005. The Florida Governor also set deadlines for insurers' settlements of 2004 hurricane claims. See “Deadline is Set for Insurers to Settle Storm Claims,” *Palm Beach Post*, October 27, 2004.

or state-sponsored insurer. A good example of this is National Flood Insurance Program (NFIP) which was established in 1968 and is administered by the Federal Emergency Management Agency (FEMA).³⁸ The NFIP provides flood insurance to homeowners and businesses subject to specified maximum limits. As of January 2012, the NFIP had 5.6 million policies and approximately \$1.3 trillion in coverage in force, most of which were for residential properties.³⁹ The NFIP has suffered severe fiscal problems due to legal constraints on its ability to charge adequate premiums, claim payments for properties that have suffered repetitive losses, and large payouts following major disaster such as Hurricane Katrina. Federal law has prevented the NFIP from charging risk-based rates for certain properties which has been a significant contributor to its fiscal problems. In 2011, both the US Senate and the US House passed bills that would reform the NFIP which included provisions that would phase in risk-based premiums, but they failed to come to agreement on final legislation that could be enacted.⁴⁰

The California Earthquake Authority (CEA) is a good example of a state-sponsored insurer.⁴¹ It was established in 1996 to head off an impending crisis in the supply of homeowners insurance in the state of California following the Northridge earthquake in 1994. Under California law, insurers that write homeowners insurance must also offer earthquake coverage to consumers who purchase a homeowners insurance policy (the purchase of earthquake coverage is optional to the consumer). Because of this mandate and their concern about the increasing risk of earthquakes, insurers were threatening to withdraw from the homeowners' insurance market. This led to the creation of the CEA which provides earthquake insurance policies on residential properties which insurers can issue to homeowners in lieu of issuing their own earthquake policy or endorsement. The hope was that the CEA would bolster the supply of earthquake insurance and increase the number of homeowners that would purchase it. Unfortunately, the opposite has happened and the percentage of homeowners with earthquake coverage has steadily dropped from approximately 31% in 1996 to 14% by 2004 (Zanjani 2008). Many California homeowners believe that the cost of earthquake insurance is excessive relative to the amount of coverage provided. Hence, there is a concern about the large number of homeowners who lack earthquake insurance coverage which could result in a substantial amount of uninsured losses if a severe earthquake were to strike one of the major population centers in California.

There are also government mechanisms to provide reinsurance for certain catastrophic perils. One example of this is the federal government's Terrorism Risk Insurance Program (TRIP) which provides a backstop for insurance claims stemming from acts of terrorism.⁴² The program was initially established in 2002 through the enactment of the Terrorism Risk Insurance Act (TRIA) following the wake of 9/11 attacks. Prior to 9/11, most commercial insurance policies included terrorism coverage. However, after 9/11 reinsurers essentially vacated the terrorism reinsurance market and insurers were reluctant to continue to offer terrorism coverage without federal assistance which motivated Congress to enact TRIA. The program effectively allows eligible insurers to recoup a portion of their losses from a terrorist act from the Department of the Treasury for commercial lines only subject to industry and insurer triggers and retention levels. The total cap on federal coverage is \$100 billion. To be eligible for federal payments, an insurer is required to offer terrorism coverage to their commercial

³⁸For more information on the NFIP, see Michel-Kerjan (2010).

³⁹Obtained from FEMA's website on April 29, 2012 at <http://www.fema.gov/business/nfip/statistics/stats.shtm>

⁴⁰For further discussion of proposals to reform the NFIP see Michel-Kerjan and Kunreuther (2011).

⁴¹See Zanjani (2008) for an analysis of the private and public provision of earthquake insurance in California.

⁴²See Kunreuther and Michel-Kerjan (2004) for a discussion of the issues involved with terrorism risk insurance in the USA.

policyholders. Eligible insurers are not required to pay any upfront premiums to the government.⁴³ Instead, any losses paid by the Treasury would be recouped through an ex-post surcharge of up to 3% annually on premiums paid by policyholders. The program was initially set to expire at the end of 2005 but has been extended by subsequent legislation through the end of 2014. The Obama administration has stated that it does not believe that the program should be extended beyond 2014, but this position has been strongly opposed by insurers who argue that TRIP serves an important and useful role and should be continued.

Another example of a government catastrophe reinsurance program is the Florida Hurricane Catastrophe Fund (FHCF). Florida is the only state that has established such a facility. The FHCF provides catastrophe reinsurance to primary insurers underwriting property coverage in the state and was established following Hurricane Andrew. The establishment and growth of the FHCF has been a matter of some controversy. Proponents of the FHCF contend that it helps to fill a gap in private reinsurance capacity and also provides reinsurance at a lower cost. It should be noted that the FHCF can accumulate tax-favored reserves (an option not currently available to US insurers and reinsurers) and can also access credit supported by local bonding authority. Opponents of the FHCF question the need to augment private reinsurance, raise concerns about crowding out private reinsurance, and cite the potential for financial shortfalls that can lead to assessments on insurers/consumers in the state.

Residual markets mechanisms also could be viewed as a quasi-governmental form of government financing of catastrophe risk. The administration and regulation of residual market facilities can have significant effects on property insurance markets and vice versa. These mechanisms include Fair Access to Insurance Requirements (FAIR) plans, wind/beach pools, and special corporations that write both full and wind-only coverage.⁴⁴ The important aspects of residual market administration include rates, eligibility requirements, available coverages, and coverage provisions. Suppressing or compressing residual market rate structures, lenient eligibility requirements, and generous coverage terms can cause significant problems.⁴⁵ In turn, suppressing or compressing insurers' rates can tighten the supply of insurance in the voluntary market and force more properties into the residual market.

Finally, there is the provision of federal disaster assistance. As discussed by [Michel-Kerjan and Volkman-Wise \(2011\)](#) and [Michel-Kerjan and Kunreuther \(2011\)](#), there has been a substantial increase in the number of the presidential disaster declarations over time. There were 597 disaster declarations for the years 2001–2010 compared to 191 disaster declarations for the years 1961–1970. There were 98 disaster declarations in 2011 which exceeded the previous record of 87 declarations in 2010. A number of factors affect the number of disaster declarations and the amount of aid provided including the number and severity of disasters, the amount of uninsured losses, media coverage, public sympathy, and politics ([Michel-Kerjan and Kunreuther 2011](#)). Unfortunately, it is difficult to obtain comprehensive data on the total amount of assistance provided and the associated cost to taxpayers, but the number of declarations and the studies conducted on federal disaster assistance indicate that cost of assistance has also escalated over time.⁴⁶

The provision of federal disaster assistance raises two important issues in the context of catastrophe risk management. One issue is the failure of many homeowners to purchase insurance for certain

⁴³[Michel-Kerjan and Raschky \(2011\)](#) found that this approach to funding the program (no upfront premiums, post-event recoupment charges) had a negative impact on insurers' diversification when contrasted with wind and earthquake commercial insurance lines.

⁴⁴FAIR plans exist in 32 states and supply full property coverage to insureds who cannot obtain coverage in the voluntary market. Wind/Beach plans provide wind only coverage for properties in designated coastal areas in the states of Alabama, Mississippi, North Carolina, South Carolina, and Texas. There are two state-run insurance corporations—the Florida Citizens Property Insurance Corporation and the Louisiana Citizens Property Insurance Corporation.

⁴⁵This was demonstrated in the state case studies for auto insurance in [Cummins \(2002\)](#).

⁴⁶[Cummins et al. \(2010\)](#) provide a comprehensive analysis of the federal government's exposure to catastrophic risk.

catastrophic perils such floods and earthquakes. A second issue is how disaster assistance influences property owners' incentives to mitigate their exposure to catastrophe risks. What many people may not realize is the bulk of federal disaster assistance is provided to local governments to rebuild infrastructure; the assistance received by individuals consists mainly of small grants to cover immediate expenses and subsidized loans to help them rebuild or repair their homes. Nonetheless many property owners may operate under the misperception that the government will bail them out if they suffer significant uninsured losses from a catastrophe. This misperception could reduce property owners' motivation to mitigate their exposure to catastrophe perils and/or fail to purchase adequate insurance (Michel-Kerjan and Volkman-Wise 2011).

31.6 Systemic Risk

The problem of systemic risk has garnered significant attention since the financial crisis of 2007–2010. As noted by Cummins and Weiss (2010), because the crisis began in the financial sector and there was a federal bailout of the AIG, questions have been raised about whether the insurance industry is a major contributor to systemic risk (see also Schwarz 2008; Geneva Association 2010). As discussed further below, the empirical evidence indicates that the insurance is not a significant contributor to systemic risk in the economy. This raises the question of whether there is a need for increased regulation of insurance companies as systemically risky institutions. A second, and perhaps the most important, issue concerns insurance companies' exposure to systemic risk and how regulation should address this exposure.

31.6.1 Regulation of Systemic Risk

Several studies have examined the question of whether the US insurance industry poses significant systemic risk to the economy. There appears to some consensus that the core activities of insurance companies do not pose systemic risk to the economy. Grace (2010) concludes that insurance does not create significant systemic risk to the economy. Harrington (2011) also concludes that insurance companies have a much lower potential for systemic risk than other financial institutions. It should be noted that problems experienced by AIG and its role in the financial crisis is a special case. The AIG received prominent attention because of its losses on credit default swaps due to the activities of its investment subsidiaries and not its insurance operations. AIG also engaged in securities lending which added to its liquidity problems.

In 2007, AIG was the fifth largest global insurance companies based on total revenues. In 2008, it fell out of the top ten but then rebounded to become the sixth largest global insurance company by 2010. As noted above, AIG's problems stemmed primarily from the activities of its investment subsidiary AIG Financial Products Corporation (AIGFP), headquartered in Fairfield, Connecticut, with major operations in London. In the Spring of 2008, AIGFP suffered substantial losses on credit default swaps that it had issued and traded. When AIGFP had issued these instruments, it expected to pay few if any claims. However, as the real estate market began to implode in 2007 and the financial crisis worsened in 2008, many firms began to default on their debt forcing AIGFP to assume losses far greater than what was ever anticipated and what it was prepared to handle. AIGFP's losses prompted the credit rating agencies to downgrade the credit rating of the AIG group in September 2008. This forced the Federal Reserve Bank to issue an \$85 billion line of credit to AIG to avert a crisis that could have brought down other financial institutions (which had purchased credit default swaps from AIGFP) and the collapse of financial markets. Since then, AIG has been winding down its financial

products division and refocusing its attention on its insurance operations. In a similar manner, Swiss Re lost its number one position to Munich Re due to the losses it suffered on its asset management activities during the financial crisis.

Cummins and Weiss (2010) also analyze the potential for the insurance industry to cause systemic events that spillover to other segments of the financial sector and the general economy. Their primary conclusion is that the core activities of US insurance companies do not create systemic risk. However, they did find that the noncore activities of insurers do constitute a source of systemic risk. The noncore activities of insurance company holding groups include trading in derivatives (e.g., credit default swaps), asset lending, asset management, and providing financial guarantees. They note that although information on the noncore activities of insurance companies is difficult to obtain, their analysis indicates that the leading global insurance organizations have significant exposure to credit default swaps.

Despite the strong evidence that insurance companies are not major contributors to systemic risk, the Congress has included insurance in the enactment of new regulations aimed at identifying, monitoring, and controlling the activities of financial institutions deemed to be systemically important. Most importantly, in the context of this discussion, Title I of the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 established the Financial Stability Oversight Council (FSOC) which has broad authority to constrain what it deems to be “excessive risk” in the financial system. The FSOC has 10 voting members and 5 nonvoting members. One of the voting members is a presidential appointee with insurance expertise. The nonvoting members include the Director of the Federal Insurance Office and a state insurance commissioner designated by the NAIC.

The FSOC is charged with three primary responsibilities:

1. To identify risks to the financial stability of the USA that could arise from the material financial distress, failure, or ongoing activities of large, interconnected bank holding companies or nonbank financial companies or that could arise outside the financial services marketplace
2. To promote market discipline by eliminating expectations on the part of shareholders, creditors, and counterparties of such companies that the government will protect them from losses if they fail
3. To respond to emerging threats to the stability of the US financial system

As discussed by Harrington (2011), Section 113 of the Dodd-Frank Act authorizes the FSOC to designate a nonbank financial company, including an insurance company, as systemically important that should be subject to enhanced regulation and supervision by the Federal Reserve. Section 113 further specifies the factors the FSOC should consider in making such a determination. These factors include:

1. The extent of its leverage
2. The extent and nature of its off-balance sheet exposures
3. The extent and nature of its transactions and relationships with other significant bank and nonbank holding companies
4. Its importance as a source of credit for households, businesses, state, and local governments and as a source of liquidity for the US financial system
5. Its importance as a source of credit for low-income, minority, or underserved communities and the impact of its failure on the availability of credit in these communities
6. The extent to which its assets are managed rather than owned by the company and the extent to which ownership of assets under management is diffuse
7. The nature, scope, size, scale, concentration, interconnectedness, and mix of its activities
8. The degree to which it is regulated by one or more primary financial regulatory agencies
9. The amount and nature of its assets and liabilities
10. Any other risk-related factors that the FSOC deems to be pertinent

After receiving comments on earlier proposed rules, on April 3, 2012, the FSOC issued a final rule and interpretive guidance on how it will implement its authority to require supervision and regulation of nonbank financial companies under Section 113. The rule outlines a framework for determining whether a nonbank financial company is a “systemically important financial institution” (SIFI). The framework is structured around six broad categories:

1. Size
2. Lack of substitutes for the financial services and products the company provides
3. Interconnectedness with other financial firms
4. Leverage
5. Liquidity risk and maturity mismatch
6. Existing regulatory scrutiny

Consistent with the views expressed by industry representatives and the conclusion of the studies cited above, [Harrington \(2011\)](#) argues that the core activities of property-casualty insurers do not pose systemic risk and that a reasonable application of the FSOC’s authority should not result in a determination that any property-casualty insurers are systemically important. He also expresses the opinion that although some large life insurers may pose greater systemic risk than property-casualty insurers, few if any life insurers should be deemed as systemically important. However, there is also the issue of the noncore activities of major insurance organizations. [Cummins and Weiss \(2010\)](#) observe that these noncore activities are beyond the traditional purview of insurance regulators and have not been rigorously supervised by bank regulators. Insurance regulators’ failure to look closely at the noncore activities of insurance organizations likely stemmed from their belief that this was the responsibility of other regulators of these organizations.⁴⁷ Consequently, they argue that regulators need to significantly improve their capabilities in group supervision on a worldwide scale. It will be interesting to see how the FSOC applies its final rule, interpretive guidance, and judgment in determining which, if any, insurance organizations are systemically important.

31.6.1.1 Regulation of Insurers’ Exposure to Systemic Risk

The second issue that warrants discussion is the insurance industry’s exposure to systemic risk and its implications for the financial regulation of insurance companies. [Cummins and Weiss \(2010\)](#) examined the primary indicators that determine whether financial institutions are systemically risky as well as contributing factors that would increase their vulnerability to systemic events. As noted above, they concluded that core activities of insurance companies do not pose systemic risk to the economy. However, they also found that life insurers are subject to intra-sector crises because of their leverage and liquidity risk and that both life and property-casualty insurers are vulnerable to “reinsurance crises” arising from counterparty credit exposure.

[Wang et al. \(2009\)](#) also conducted a study of the financial crisis and its impact on the life insurance industry. They note that a number of life insurers were stressed by the crisis, initially due to losses on their credit-backed securities, followed by a subsequent decline in the value of other assets they held as the crisis spread through the financial sector and the general economy. As a consequence, several large insurers sought financial assistance from within their holding companies and/or the federal government. There were also a number of rating downgrades of life insurers as a result of their asset

⁴⁷Historically, insurance regulators have viewed their role to supervise the insurance companies within holding company organizations, trusting other financial regulators to supervise the noninsurance activities of these groups. This is changing somewhat as insurance regulators are increasing their emphasis on group-wide supervision in which they will communicate with other financial regulators on the activities of noninsurance entities within a group.

problems. In contrast, property-casualty insurers were much less affected by the crisis (Grace 2010; Cummins and Weiss 2010). Further, no major insurer insolvencies can be directly attributed to the financial crisis.

The experience of insurance companies during the crisis is consistent with assessments of their vulnerability to systemic events and turmoil in financial markets and economic recessions. Life insurers are more vulnerable to systemic risks generated in other parts of the financial sector than property-casualty insurers for several reasons. As discussed by Cummins and Weiss (2010), life insurance companies are more highly leveraged than property-casualty insurers and are exposed to severe liquidity risk due to their holdings of mortgage-backed securities and privately placed bonds. Life insurers also sell products with embedded options such as minimum interest guarantees.

This assessment of insurance companies' exposure to systemic risk has several implications for their regulation. First, a robust and properly focused regulatory system should encourage and compel insurers to properly manage all of the significant risks that they face, including the potential adverse effects of problems in the financial sector and the general economy. Second, regulators can increase their attention to insurers' exposure to systemic events in their financial monitoring and assessment of companies' risk management programs. Third, regulators can place limits on certain activities or practices that increase insurers' exposure to problems in the financial sector. Examples of this approach include statutory limitations on investments in mortgage-backed securities and actions aimed at curbing securities lending. However, this approach requires an appropriate balance of risk and cost, i.e., regulators need to consider how limitations on insurers' investment practices might affect their ability to offer appropriate products at a reasonable price. Ensuring that insurance companies are properly managing their financial risk is preferable to regulatory micromanagement of their operations.

31.7 Concluding Remarks

There is no doubt that regulation plays a prominent role in insurance and perhaps little disagreement with the proposition that it should. However, there can be significant differences of opinion over what aspects of insurance should be regulated and specific regulatory policies in many areas. A strong case can be made that because of the inefficiencies created by high information costs and principal-agent conflicts, there should be some form of solvency regulation of insurance companies. A similar argument can be made for regulating certain aspects of insurers' market conduct. At the same time, there appears to be little economic justification for regulating insurance prices in well-developed insurance markets where competition should ensure risk-based rates that are no higher than necessary to provide insurers with a fair rate of return.

But even in the areas of solvency and market conduct, there can be a wide divergence of opinion with respect to specific regulatory policies and practices. As countries seek to modernize their systems for solvency regulation, there are strong debates over what policies are necessary and appropriate as well as the methods employed by regulators to ensure that insurers do not assume excessive financial risk. Insurers (and some academics) are concerned that some of the measures being considered are excessive and overly intrusive and will impose unnecessary costs on insurance companies. Some of the methods used to regulate market conduct, at least in the USA, also have been criticized for being excess and inefficient. Additionally, there are concerns regarding other aspects of market regulation such as prohibitions on certain underwriting criteria, mandatory offer requirements, and mandated benefits.

Tensions between insurers and regulators can be especially high in lines of insurance subject to high-risk and escalating claim costs. The pricing, financing, and management of catastrophe risk have been very contentious in the USA. In some states, regulators have sought to constrain the

price of homeowners insurance in coastal areas and resist insurers' efforts to reduce their exposure to catastrophe losses. Government financing of catastrophe risk raises concerns with respect to cross-subsidies and negative effects on property owners' incentives to buy adequate insurance and take steps to mitigate their exposure to catastrophe losses.

The issue of systemic risk has garnered considerable attention due the recent financial crisis and the problems encountered by AIG. While there is a general consensus among academics that the core activities of insurance companies are not a significant contributor to systemic risk, the federal government has adopted regulations that could potentially deem certain insurance companies to systemically important and make them subject to increased regulation by the Federal Reserve. Industry representatives remained concerned about how these regulations will be implemented and the potential for some insurance companies to be deemed systemically significant. There is less disagreement over whether insurance companies have some exposure to systemic risk generated in other parts of the financial sector and reasons to be concerned that certain noncore activities of insurance holding companies contribute to systemic risk. These issues have attracted regulators' attention and the measures that they propose to address these issues will likely generate a healthy debate.

References

- Bajtelsmit VL, Bouzouita R (1998) Market structure and performance in private passenger automobile insurance. *J Risk Insur* 65(3):503–514
- Baumol WJ, Panzar JC, Willig RD (1982) Contestable markets and the theory of industry structure. Harcourt Brace Jovanovich, San Diego
- Becker GS (1983) A theory of competition among pressure groups for political influence. *Q J Econ* 98:371–400
- Brown JR, Goolsbee A (2002) Does the internet make markets more competitive? Evidence from the life insurance industry. *J Polit Econ* 110(3):481–507
- Caroll A (1993) Structure and performance of the private workers' compensation market. *J Risk Insur* 60(2):185–207
- ChandraShekar P, Warriar SR (2007) Risk-based capital management: a "principles based approach" to insurer solvency management, Paper presented at the Asian-Pacific Risk and Insurance Association, Annual Conference, Taiwan, July 2007
- Cummins JD (1988) Risk based premiums for insurance guaranty funds. *J Finance* 43:823–839
- Cummins JD (ed) (2002) Deregulating property-liability insurance: restoring competition and increasing market efficiency. AEI-Brookings Joint Center for Regulatory Studies, Washington, DC
- Cummins JD (2007) Reinsurance for natural and man-made catastrophes in the United States: current state of the market and regulatory reforms. *Risk Manag Insur Rev* 10:179–220
- Cummins JD (2008) Cat bonds and other risk-linked securities: current state of the market and regulatory reforms. *Risk Manag Insur Rev* 11:23–47
- Cummins JD, Phillips RD (2005) Estimating the cost of capital for property-liability insurers. *J Risk Insur* 72:441–478
- Cummins JD, Phillips RD (2009) Capital adequacy and insurance risk based capital systems. *J Insur Regul* 28(1):25–72
- Cummins JD, Venard B (eds) (2007) Handbook of international insurance: between global dynamics and local contingencies. Springer, Berlin
- Cummins JD, Weiss MA (1991) The structure, conduct, and regulation of the property-liability insurance industry. The Financial Condition and Regulation of Insurance Companies R.E. Randfall and R.W. Kopcke, editors, Conference Series 35, Federal Reserve Bank of Boston, Boston, June 1991, pp. 117–164
- Cummins JD, Weiss MA (2000) Analyzing firm performance in the insurance industry using frontier efficiency and productivity methods. In: Dionne G (ed) Handbook of insurance. Kluwer, Dordrecht
- Cummins JD, Weiss MA (2010) Systemic risk and the insurance sector, Working paper, Temple University, September 14. <http://ssrn.com/abstract=1725512>
- Cummins JD, Harrington SE, Klein RW (1995) Insolvency experience, risk-based capital, and prompt corrective action in property-liability insurance. *J Bank Finance* 19(3–4):511–527
- Cummins JD, Suher M, Zanjani G (2010) Federal financial exposure to natural catastrophe risk. In: Lucas D (ed) Measuring and managing federal financial risk. University of Chicago Press, Chicago
- Davidson RJ Jr (1996) Tax-deductible, pre-event catastrophe reserves. *J Insur Regul* 15(2):175–190
- Dionne G (2001) Commitment and automobile insurance regulation in France, Quebec and Japan, Working Paper, HEC Montreal

- Eling M, Luhnen M (2010) Efficiency in the international insurance industry: a cross-country comparison. *J Bank Finance* 34:1497–1509
- Eling M, Klein R, Schmit JT (2009) Insurance regulation in the United States and the European union: a comparison, policy report. The Independent Institute, Oakland
- European Insurance and Occupational Pensions Authority (2011) EIOPA report on the fifth quantitative impact study (QIS5) for solvency II, EIOPA-TFQISS-11/001, March 2011. https://eiopa.europa.eu/fileadmin/tx_dam/files/publications/reports/QIS5_Report_Final.pdf
- Evans AM (2007) The EU reinsurance directive. *The Geneva Papers on Risk and Insurance – Issues and Practice* 32:95–104
- Geneva Association (2010) Systemic risk in insurance – an analysis of insurance and financial stability. Special Report of the Geneva Association Systemic Risk Working Group, March. http://www.genevaassociation.org/PDF/BookandMonographs/Geneva_Association_Systemic_Risk_in_Insurance_Report_March2010.pdf
- Grace MF (2010) The insurance industry and systemic risk: evidence and discussion. *Networks Financial Institute Policy Brief 2010-PB-02*, April
- Grace MF, Klein RW (2007) The effects of an optional federal charter on competition in the life insurance industry. Report to the American Council of Life Insurance, Washington, DC
- Grace MF, Klein RW (eds) (2009a) *The future of insurance regulation in the United States*. Brookings Institution Press, Washington, DC
- Grace MF, Klein RW (2009b) A perfect storm: hurricanes, insurance markets and regulation. *Risk Manag Insur Rev* 12(1):81–124
- Hanson JS, Dineen RE, Johnson MB (1974) Monitoring competition: a means of regulating the property and liability insurance business. NAIC, Milwaukee
- Harrington SE (1992) Rate suppression. *J Risk Insur* 59:185–202
- Harrington SE (2002) Effects of prior approval rate regulation of auto insurance. In: Cummins JD (ed) *Deregulating property-liability insurance: restoring competition and increasing market efficiency*. AEI-Brookings Joint Center for Regulatory Studies, Washington, DC
- Harrington SE (2011) Insurance regulation and the Dodd-Frank act. *Networks Financial Institute Policy Brief 2011-PB-01*, March
- Harrington SE, Niehaus G (2001) Government insurance, tax policy, and the affordability and availability of catastrophe insurance. *J Insur Regul* 19(4):591–612
- Harrington SE, Niehaus G (2003) Capital, corporate income taxes, and catastrophe insurance. *J Financial Intermediation* 12:365–389
- Helms RE (2001) The changing United States health care system: the effect of competition on structure and performance. Independent Institute Working Paper No. 29, April
- Holzmueller I (2009) The United States RBC standards, solvency II and the Swiss solvency test: a comparative assessment. *Geneva Papers on Risk and Insurance - Issues and Practice* 34:56–77
- Joskow PL (1973) Cartels, competition and regulation in the property-liability insurance industry. *Bell J Econ Manag Sci* 4(2):375–427
- Klein RW (1995) Insurance regulation in transition. *J Risk Insur* 62:263–404
- Klein RW (2005) *A regulator's introduction to the insurance industry*, 2nd edn. National Association of Insurance Commissioners, Kansas City
- Klein RW (2008) Catastrophe risk and the regulation of property insurance markets. Presented at the American risk and insurance meeting, Portland, OR, 4 August
- Klein RW (2009) An overview of the insurance industry and its regulation. In: Grace MF, Klein RW (eds) *The future of insurance regulation in the United States*. Brookings Institution Press, Washington, DC
- Klein RW (2012) The modernization of insurance company solvency regulation in the U.S.: issues and implications. Paper presented at the networks financial institute 8th annual insurance reform summit, Washington, DC, 21 March
- Klein RW, Schacht J (2001) An assessment of insurance market conduct surveillance. *J Insur Regul* 20:51–93
- Klein RW, Wang S (2009) Catastrophe risk financing in the United States and the European union: a comparison of alternative regulatory approaches. *J Risk Insur* 76(3):607–637
- Kunreuther HC, Michel-Kerjan EO (2004) Policy watch: challenges for terrorism risk insurance in the United States. *J Econ Perspect* 18(4):201–214
- Kunreuther HC, Michel-Kerjan EO (2009) *At war with the weather: managing large-scale risks in a new era of catastrophes*. MIT, Cambridge
- Meier KJ (1988) *The political economy of regulation: the case of insurance*. SUNY Press, Albany
- Michel-Kerjan E (2010) Catastrophe economics: the national flood insurance program. *J Econ Perspect* 24(4):165–186
- Michel-Kerjan E, Kunreuther HC (2011) Redesigning flood insurance. *Science* 333:408–409
- Michel-Kerjan E, Volkman-Wise J (2011) The risk of ever-growing disaster relief expectations. Paper presented at the annual NBER insurance group conference, Cambridge, MA, September. <http://nber.org/confer/2011/INSf11/Michel-Kerjan-Volkman-Wise.pdf>

- Michelkerjan EO, Raschky PA (2011) The effects of government intervention on the market for corporate terrorism insurance. *Eur J Polit Econ* 27:S122–S132
- Munch P, Smallwood DE (1981) Theory of solvency regulation in the property and casualty insurance industry. In: Fromm G (ed) *Studies in public regulation*. MIT, Cambridge
- National Association of Insurance Commissioners (2010) Proposal for a risk-based capital charge for property catastrophe risk based on the results of catastrophe modeling, June. http://www.naic.org/documents/committees_ex_isftf_100623_capital_req.pdf
- Peltzman S (1976) Toward a more general theory of regulation. *J Law Econ* 19:211–240
- Saunders A, Cornett MM (2003) *Financial institutions management: a risk management approach*. McGraw-Hill, New York
- Scherer FM, Ross DS (1990) *Industrial market structure and economic performance*. Houghton-Mifflin, Boston
- Schwarz SL (2008) Systemic risk, duke law school, Research Paper No. 163, March. <http://ssrn.com/abstract=1008326>
- Spulber DF (1989) *Regulation and markets*. MIT, Cambridge
- Stigler GJ (1971) The theory of economic regulation. *Bell J Econ Manag Sci* 2:3–21
- US Government Accountability Office (2005) Catastrophe risk: U.S. and European approaches to insure natural catastrophe and terrorism risks. GAO-15-199, February, Washington, DC
- Vaughan TM (2009) The implications of solvency II for U.S. insurance regulation. Networks Financial Institute Policy Brief PB-2009–03, February
- Viscusi WK, Harrington JE, Vernon JM (2000) *Economics of regulation and antitrust*, 3rd edn. MIT, Cambridge
- Wang S, Klein RW, Ma G, Ulm ER, Wei X, Zanjani G (2009) The financial crisis and lessons for insurers. Report to the Society of Actuaries, September
- Zanjani G (2008) Public versus private underwriting of catastrophic risk: lessons from the California earthquake authority. In: Quigley JM, Rosenthal LA (eds) *Risking house and home: disasters, cities, public policy*. Berkeley Public Policy Press, Berkeley