

*Unnecessary Injury:*

**The Economic Costs of Imposing New Global Capital Requirements  
On Large U.S. Property and Casualty Insurers**

**Robert J. Shapiro and Aparna Mathur**

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**I. Introduction**

In the wake of the global financial crisis of 2008-2009, governments in every developed country applied new forms of financial regulation, and now their attention has shifted to international regulation. One of those trans-national efforts involves applying a new layer of global capital requirements to “Global Systemically Important Insurers (G-SIIs), whose failure could trigger a new financial crisis. In addition, talks are underway to also impose new global capital requirements on large insurance companies with significant foreign operations, but which do not present a systemic risk to their own economies or the global financial system. This study examines the rationale for this new regulatory approach and the costs associated with applying it to large U.S. property and casualty (P&C) insurers. We find, first, that such additional capital requirements are unnecessary: Even the largest U.S. P&C insurers pose no systemic risk to the U.S. or global financial systems, and current state-based capital requirements are sufficient to ensure that they can handle the claims arising from even the most extraordinary losses. Second, we find that imposing additional capital requirements on large U.S. P&C insurers with substantial foreign business, all other factors being equal, would likely force them to slow the growth of new P&C coverage, increase the cost of that coverage, and reduce their investments.

For nearly two centuries, American insurance companies have been regulated almost exclusively by U.S. state governments. Even today, as Congress and the Executive Branch claim expansive authority over most financial institutions, virtually all insurance regulation still takes place in the states. The persistence of this state-based approach reflects, as a legal matter, the McCarran-Ferguson Act enacted in 1945, which authorizes federal regulation of insurers only on matters which states fail to address and Congress specifically declares that the federal government will oversee. The generally hands-off approach of the federal government also reflects basic features of the insurance business, especially for property and casualty insurers. People insure their homes, automobiles, businesses and other property for losses arising from unpredictable events such as thefts, fires, hurricanes and earthquakes; and these events do not occur randomly across the country. Thefts and automobile accidents, for example, are more common in urban areas where populations and auto travel are more concentrated. Major natural disasters such as hurricanes, tornadoes and wild fires, which can produce tens of thousands of claims from a single event, are concentrated even more in certain states and regions. The state insurance commissions which license and oversee the operations of U.S. insurers are properly seen to be closer than a single federal agency to the local circumstances which require coverage and the ability of local populations to secure that coverage.

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At the same time, insurance regulators in every state face many of the same challenges, and the regulation of insurers across the 50 states and the District of Columbia has substantially converged through the broad adoption of model laws and regulations developed by the National Association of Insurance Commissioners (NAIC). State legislatures and insurance commissions can ignore the NAIC's recommendations; in practice, they almost always adopt or adapt NAIC model laws and regulations. One area of broad agreement involves the capital requirements or capital standards for insurers, matters widely seen as the heart of insurance regulation. These standards are intended to ensure that insurers can meet the claims of their customers under extraordinary as well as normal circumstances and continue to provide reliable coverage following disasters that produce many billions of dollars in claims.

Capital standards involve costs for insurers. Consequently, their levels and the rules that determine them affect both the price of coverage and the extent to which people and businesses can access that coverage. Since the mid-1990s, insurance regulators in every state have moved from fixed capital standards to risk-based capital (RBC) requirements. These RBC standards use a series of NAIC formulas to evaluate and assess a broad range of asset risks, insurance risks, affiliate risks and off-balance risks, in order to determine the capital reserves that each insurer needs to take account of those risks and remain financially sound. In recent years, the European Union (EU) also has adopted RBC standards. Unlike U.S. regulators, Europeans favor a more uniform RBC standard based on applying a series of financial models to insurers, including the subsidiaries of U.S. insurers doing business in their countries.

The convergence of the EU's ongoing process of adopting RBC standards with the recent financial crisis and the role played in that crisis by the insurer American International Group (AIG) produced calls for a new, global RBC standard for large insurers with substantial foreign business. For U.S. insurers, this global capital requirement would come on top of state-based regulation and likely would be based on an EU approach to those standards. If adopted on those terms, this initiative will substantially increase the capital requirements for those U.S. insurers.

As we will see, there is no evidence that higher capital requirements are needed to ensure the solvency and operations of large U.S. insurers. Higher requirements cannot be justified as "insurance" against a systemic financial crisis triggered or exacerbated by the failure of a major P&C insurer: Applying a range of measures and standards, researchers have consistently found that the P&C industry poses no systemic risk to the larger financial system or the overall economy. Furthermore, under current state-based RBC standards, the U.S. P&C industry has dealt with enormous claims arising from recent disasters without threatening their current or future coverage, much less their solvency -- from the Northridge earthquake, the 9-11 attacks and Super-storm Sandy, to the terrible 2005 hurricane season encompassing Katrina, Rita, Wilma and Dennis. By a series of measures, the P&C industry also weathered the financial and economic upheavals of 2008 and 2009 with little if any damage and no adverse effects for their policyholders.

We also have analyzed the P&C industry's capacity to deal with larger disasters -- events judged to be likely to occur once in a century, once every 250 years, and once every 500 years. We will show that the current resources set aside by the industry for great catastrophes would clearly cover a once-in-a-century event with claims more than twice those of the 2005 hurricane season, including Katrina. Assuming current reinsurance practices, the industry's present catastrophe resources also could handle disasters thought likely to occur once every 250 years

and even once every 500 years. In our judgment, a new, uniform and higher global capital requirement for large U.S. P&C companies with international business is unwarranted.

Higher capital requirements also would impose new costs on those insurers, particularly if companies maintain their existing capital margins (the excess of actual capital over required capital). Based on comparative analyses of European and U.S. capital requirements, we estimate that such a global capital standard would at least double the effective capital requirements for U.S. P&C insurers subject to the standard. In principle, the new requirements should raise the price of coverage and/or reduce its availability for millions of American households and businesses, all other factors being equal. In principle, much higher capital standards also would reduce future investments by P&C insurers and dampen the industry's efficiency and offerings by creating an uneven playing field for the affected companies. The extent of those consequences will depend on the level of the new capital requirements.

The impact on the cost of coverage, premium volumes and industry investment will depend on how many P&C insurers are affected and the market share they represent. In this regard, we assume that the new requirements would affect P&C companies with at least \$10 billion in annual gross written premiums or \$50 billion or more in assets, which operate in at least three countries, and derive at least 10 percent of gross premiums from foreign operations. By these criteria, drawn from the current U.S.-EU dialogue on new global capital standards for "Internationally Active Insurance Groups" or IAIGs, the new requirements would cover seven major U.S. insurers with 26.6 percent of the current U.S. P&C market: Liberty Mutual, American International Group, Travelers' Companies, Inc., Berkshire Hathaway, Inc., Chubb Group, ACE Group, and CNA Insurance Services. Using this scenario, we project the potential costs arising from higher, European-style capital standards.

Many researchers have examined and analyzed the economic costs and effects of higher capital requirements for commercial banks. For example, every ten percentage-point increase in bank capital requirements has resulted in an increase of 25-to-45 basis points on the interest rate charged on loans. On this basis, the contemplated increase in capital requirements for large U.S. P&C insurers would lead to increases in the annual premiums charged by the affected companies for automobile and homeowner's coverage of at least 37.5 basis-points and as much as 75 basis-points. Such a large increase would shock insurance and investment markets, so we assume the increase would be phased-in gradually: We limit our estimates to the short-run and project two increases in capital standards, of 15 percentage points and then to 30 percentage points.

To project how these increases would affect premiums for P&C insurance, we also analyzed the impact of a 15 percentage-point and 30 percentage-point increases in capital requirements on the mortgage market, and found that those increases would raise mortgage rates by 4.3 percent and 8.7 percent, respectively. To confirm the applicability, we also investigated the impact of the higher capital requirements on the historic return on equity (ROE) of the P&C industry, which is about 15 percent, and the premium rate increases necessary to maintain that ROE. We estimate that those increases would be about 4 percent and 7 percent, very close to the projected increases based on the mortgage market. Therefore, we adopt here estimates of premium rate increases of 4 percent following a 15 percentage-point increase in capital requirements for IAIGs and 8 percent following a 30 percentage point increase. On this basis, and assuming that all other factor are equal,

- We estimate that the annual premiums charged by those companies for homeowner's coverage would increase by \$45-to-\$55 if capital requirements rise by 15 percentage-points, and by \$90-to-\$109 if they rise 30 percentage-points. Similarly, the average annual cost of homeowner's insurance from an affected company could rise by about \$34 if capital standards increase 15 percentage-points and by \$68 if those standards increase 30 percentage-points.

Higher capital standards are also expected to affect the extent of coverage or volume of premiums. When premium rates increase, some policyholders will reduce their coverage. In addition, if competition and state regulation prevent IAIGs from raising their rates in some places, the affected companies could reduce their offerings or even withdraw their business. When Florida's state insurance commission blocked rate increases proposed by P&C insurers following the 2005 hurricane season, for example, some major insurers withdrew from that market. The volume response to higher capital standards can take a number of forms; but, in all cases, the result would be less competition and fewer choices for businesses and households.

- We estimate that if new global regulation of IAIGs increases their capital requirements by 15 percentage-points, and other factors remain unchanged, it could slow the growth of new premiums by an average of \$2.9 billion per-year. Similarly, a 30 percentage-point increase in those standards for those insurers would slow the growth of new premiums by an average of \$7.3 billion per-year.

Higher capital requirements are expected to modestly affect the level and composition of new investment by the affected insurers, since the slowdown in the growth of new premiums would reduce the resources available for new investments by the affected insurers.

- We estimate that, other factor remaining equal, a 15 percentage-point increase in capital requirements for IAIGs would reduce the growth of investments by those insurers by \$726 million over the next five years (2014-2018), and a 30 percentage-point increase would reduce the growth of their investment by \$1.8 billion over the same period.

In response to the higher capital requirements, some IAIGs will likely shift some resources from investments in relatively risky assets (such as equities and real estate) to relatively safer investments (such as Treasury bills and bonds). If all IAIGs respond in this way – the upper bound of such an effect – there would be a modest realignment of their investment portfolios.

- We estimate that a 15 percentage-point increase in capital requirements for IAIGs could result in their shifting about \$1.9 billion per-year in investment assets from equities and real estate to high-grade bonds or Treasury bills, for a total of \$9.4 billion over five years, other factors remaining equal. A 30 percentage-point increase in those capital standards would result in a generally comparable shift in their investment assets. These shifts in the IAIGs' investment portfolios also would reduce their investment income by between \$28.9 million and \$54.5 million over five years.

In addition to these costs, the IAIGs would face substantial transition costs associated with converting to the new system's valuation models for the new capital requirements, and the ongoing costs of maintain financial information for multiple accounting platforms. In addition, there are significant differences in the current U.S. system and the contemplated approach to the treatment of P&C insurers and legal entities versus groups, which would entail additional costs. While this analysis does not analyze those costs, they also could be very substantial.

We conclude that the current international discussions around establishing a new, global capital standard for U.S. P&C insurers with substantial foreign business, based on the ICS and European approach to capital requirements, are unwarranted and potentially costly to the United States. Given the recent global financial crisis, financial regulators have legitimate concerns about those aspects and operations of globally-systemic financial institutions that can adversely affect the economies of other nations. But all of the evidence demonstrates that U.S. P&C companies pose no systemic risk to the U.S. and global financial systems and economies. Furthermore, current RBC requirements for U.S. P&C insurers are more than adequate to ensure the solvency and continuing operations of the industry and its major companies under virtually any eventuality, including extraordinarily costly disasters. Finally, higher capital requirements based on the EU approach is projected to increase the cost of automobile and homeowners' coverage for many households and businesses, slow the growth and availability of P&C coverage by the affected companies, and reduce the investments and investment income of those insurers. But globalization does not demand global harmonization of financial regulation, any more than it depends upon uniform fiscal and monetary policies across nations.

## **II. The Terms for Regulating the Insurance Industry**

The regulation of insurers should reflect the character and importance of insurance itself. Insurance is not simply a product designed to satisfy consumer desires, such as a sports car or designer sneakers. Reliable insurance is essential for the efficient planning and functioning of millions of households and businesses, and therefore for the overall economy and society. Governments regulate insurance, along with most products and services, to protect households and businesses from fraud, misrepresentation and injury. But the regulation of insurance also should recognize its character as a private good that produces broad social and economic benefits. Insurance regulation, therefore, should promote the conditions for a strong and healthy insurance industry, so people and businesses can secure coverage under reasonable terms. Insurance regulators, in short, have an implicit duty to do no harm to the industry's larger purpose by not imposing burdens that could impair its capacity to provide broad coverage for the benefit of the consuming public.

Given the insurance industry's larger social and economic purposes, much of its regulation involves the regular review and analysis of the financial conditions of insurance companies, to ensure that they have the resources to pay the claims of those they insure. Their capital reserves should be adequate to meet those claims under a variety of conditions without impairing the industry's capacity to provide and maintain continuing coverage. Researchers have found that capital standards or requirements provide a cushion to help insurers survive their own inevitable mistakes and accidents. At the same time, capital requirements increase the cost

of coverage at the margin, making it harder for individuals and businesses to obtain coverage.<sup>2</sup> These higher costs also raise an insurer's "hurdle rate" for its investments, discouraging lower-return transactions and contracts.<sup>3</sup>

In theory, if regulators could correctly quantify all of these effects for each insurer, they could set capital requirements at an optimal level that makes payments of claims secure while minimizing increases in the cost of coverage. In practice, deriving optimal capital requirements has proven to be elusive.<sup>4</sup> In addition to the technical challenges involved in measuring all of the factors under normal conditions, the 2008-2009 financial crisis demonstrates that no one can anticipate every circumstance that could raise serious problems for insurers. The only recent instance of huge, unanticipated claims crippling a major insurer was AIG's crisis in 2008-2009, and that involved transactions in financial derivatives wholly unrelated to AIG's P&C business. In any case, transactions in financial derivatives by all institutions are now regulated under the 2010 Dodd-Frank financial system reforms, and derivatives today account for less than *one-tenth of one percent* of the assets of P&C insurers.

Nevertheless, some regulators, especially in Europe, see the recent financial crisis as sufficient reason to raise capital requirements for American as well as European P&C insurers—despite the fact that the U.S. P&C industry came through that crisis with no adverse effects. Raising those requirements could entail significant, additional costs for U.S. P&C insurers and their customers; and as the International Monetary Fund has noted, wider safety margins intended to provide greater security during extraordinary crises provide no benefits in the absence of such a crisis.<sup>5</sup> Researchers also have found that reforms that impose new costs on financial institutions can induce them to shift some operations to "shadow" arrangements that may be entirely unregulated.<sup>6</sup> In such cases, the ultimate result is less effective regulation and an uneven playing field which can "generate a variety of damaging unintended consequences."<sup>7</sup>

These challenges suggest that in setting capital standards, regulators should favor an experience-based, pragmatic approach in which the results of current requirements are reviewed regularly. When existing requirements are accompanied by expanding coverage and the prompt payments of claims by financially-sound insurers under both normal and extraordinary circumstances, proposals to raise or otherwise change those requirements should bear a very high burden of proof that they will produce better outcomes.

#### *Proposals for New Capital Requirements on Large U.S. Property and Casualty Insurers*

Despite these grounds for caution, American and foreign regulators are currently considering a proposal to apply new, quantitative global capital standards for major international insurers, under the aegis of the Financial Stability Board (FSB). The FSB was created by the G-

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<sup>2</sup> Baker and Wurgler (2013).

<sup>3</sup> Elliott (2014). Capital standards also create a reserve protected from the risks that some insurers may be tempted to assume in seeking higher returns. These effects should offset any moral hazard arising from state guaranty associations: These associations honor claims based on coverage by insurers that become insolvent, creating a government backstop that may induce some insurers to take greater risks than otherwise. Van den Heuvel (2007).

<sup>4</sup> See, for example, BIS assessment of the long-term economic impact of stronger capital and liquidity requirements; also, Kashyap, Stein and Hanson (May 2010).

<sup>5</sup> Elliot and Santos (Estimating the Costs of Financial Regulation)

<sup>6</sup> Hanson, Kashyap and Stein (2010).

<sup>7</sup> *Ibid.*

20 nations in April 2009, in the midst of the global financial crisis, to monitor the global economy and, when necessary, recommend measures to avert future financial disruptions and crises. The Board is comprised of representatives from the G-20 countries, the European Commission, and various international financial organizations and standard-setting bodies; and the U.S. delegation is led by senior representatives from the Board of Governors of the Federal Reserve System, the Treasury Department, and the Securities Exchange Commission (SEC).

Under its mandate, the FSB directed the International Association of Insurance Supervisors (IAIS) to develop a new “Basic Capital Requirement” (BCR) for “global systemically important insurers” (G-SIIs), as additional protection against the failure of an insurer which could trigger serious pressures and failures in other financial institutions. The IAIS issued its draft BCR for G-SIIs in October 2014.<sup>8</sup> Moreover, the FSB also directed the IAIS to develop “a comprehensive, group-wide supervisory and regulatory framework” for “Internationally Active Insurance Groups” (IAIGs), including a new, quantitative global Insurance Capital Standard (ICS). In contrast to G-SIIs, IAIGs are simply large insurance groups operating in at least three countries. Unless they are also G-SIIs, their own possible failures carry no perceived risk of triggering national or international systemic problems.

Finally, the IAIS has said that a simple, factor-based model will provide the basis for the Basic Capital Requirement for G-SIIs, and its approach to G-SIIs “will inform development of the ICS” for IAIGs. The contemplated ICS for IAIGs is expected to follow the European Union’s uniform, financial model-based approach to capital requirements for P&C insurers, rather than the American alternative of risk-based quantitative and qualitative assessments and risk management techniques attuned to the particular conditions applicable to each insurer.

#### *Capital Requirements in the European Union and the United States*

At a general level, capital regulation of insurers in the European Union follows a set of fixed principles which drive the application of a uniform set of financial models, in contrast to the application of multiple quantitative and qualitative rules in the United States. State regulators here begin by applying two types of capital requirements to insurers in their states. The first is a fixed, minimum requirement much like Europe’s, although lower than the EU standard. The second requirement is set by risk-based capital standards based on formulas developed by NAIC.<sup>9</sup> Insurers are required to meet the higher of the capital standards determined by the two requirements.<sup>10</sup> For P&C insurers, the risk-based capital requirements (RBC) cover an evaluation and assessment of a broad range of asset risks, insurance risks, affiliate risks, and off-balance sheet risks. Each insurer’s RBC amount is compared to the company’s actual, total risk-adjusted capital, and regulatory actions are indicated if the total adjusted capital falls below certain levels of its RBC.<sup>11</sup> The RBC formula is as follows:

$$RBC = 0.5 [investments\ in\ affiliates\ and\ off\ balance\ sheet\ liabilities,\ such\ as\ derivative\ instruments\ and\ contingent\ liabilities + (fixed\ income\ assets + equity\ assets + credit\ risk\ associated\ with\ reinsurance\ recoverables) + (loss\ reserves + premium\ or\ underwriting\ risks)]$$

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<sup>8</sup> IAIS (2014-A).

<sup>9</sup> Eling, Klein and Schmitt (2009).

<sup>10</sup> *Ibid.*

<sup>11</sup> For an excellent overview, see Klein (2012)



Since insurers often shift a substantial share of their risks to reinsurers, U.S. reinsurers are subject to comparable requirements; and, non-U.S.-based reinsurers are required to post collateral scaled to an insurer's financial strength rating before that insurer can claim accounting credit for risks transferred to those reinsurers. Beyond RBC standards, each state also monitors the financial condition of its insurers using detailed rules that govern their financial organization and transactions, through regular financial reporting requirements and audits.<sup>12</sup> The Financial Analysis Solvency Tools (FAST) system is one of the main mechanisms for these monitoring tasks, applying an array of solvency monitoring tools and a computerized analytical routine comprised of 20 financial ratios. In a series of studies, the FAST system predicted as much as 91 percent of P&C insolvencies and as few as 40 percent, depending on the data used.<sup>13</sup>

By contrast, the current EU system for capital requirements and regulation is built on two master agreements. The first, called Solvency I, focuses mainly on coordination issues across EU member states; but, it also sets solvency capital requirements based on an insurer's premiums and claims, rather than its risks. These requirements were widely criticized as rigid and unrealistic;<sup>14</sup> as a result, a second agreement, Solvency II, seeks to adapt the American risk-based approach to European principles and produce RBC standards for the EU. Its quantitative standards set a minimum capital requirement as well as a "target capital" standard, which is the economic capital an insurer is deemed to need, according to the system's financial models, to operate within a safe range given its underwriting risk, market risk, credit risk, and default risk.<sup>15</sup> The RBC for P&C insurers in the EU also takes account of operational risks and the prospect that an insurer's liabilities will increase based on the timing, frequency and severity of insured events and the associated claims settlements.

While the American and European approaches to RBC standards consider many of the same factors, important differences persist. The U.S. standard is organized around detailed rules, while the ICS and EU standard are organized around more general principles and financial models. The result is that EU capital regulation is more costly and inconsistent in its application across jurisdictions. In general, the ICS and EU approach also lead to much higher capital requirements, even though an EU study found that the main source of insurer insolvencies in EU nations was management errors, not under-capitalization.<sup>16</sup>

### **III. Assessing the Case for a New Global Capital Requirement for U.S. IAIGs**

There are two reasons why international regulators might consider applying an additional global capital requirement to large U.S. insurers with substantial business overseas. First, the regulators' lack confidence in the classifications which distinguish between IAIGs and G-SIIs, the "systemically important" insurers whose failure could produce serious financial stresses in other financial institutions and possibly cascading failures that could damage the economy and drive up unemployment. If this were so, increasing their capital requirements, as is now underway for G-SIIs, could make their failures less likely. The first issue, therefore, is whether

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<sup>12</sup>Eling *et al.*, *op. cit.*

<sup>13</sup>*Ibid.*

<sup>14</sup> For example, under Solvency I, an insurer could lower its capital requirements by reducing its premiums, even if doing so increased its risks.

<sup>15</sup> Eling *et al.*, *op. cit.*

<sup>16</sup> European Commission (2007).

there is any basis to believe that the failure of a large IAIG could produce systemic costs. The answer, as we will see, is no.

Alternatively, foreign regulators may have little confidence in current U.S. risk-based capital requirements and fear that the failure of an IAIG would require a government bailout and undermine public confidence in insurance. The second issue, therefore, is whether there is any significant likelihood that an IAIG facing huge claims from some catastrophe could fail with such adverse effects. Again, the answer, we will see, is clearly no.<sup>17</sup>

### *Systemic Risks Associated with the Failure of a Large U.S. Property and Casualty Insurer*

The issue of systemic risk mainly involves size and interconnectedness, and in some cases, non-traditional activities that involve unknown risk. The issue here is whether an event could produce such large losses by a major P&C insurer or group of insurers that the losses would impair other parts of the financial system and the overall economy. To begin, the Dodd-Frank financial reforms address these concerns. The Financial Stability Oversight Council (FSOC) created by that legislation is charged with identifying financial institutions that could present such risks to the financial system. Once identified as “systemically important financial institutions” (SIFIs), they are subject to special supervision by the Federal Reserve Board, enhanced capital requirements, higher liquidity requirements, and limits on their short-term debts.

Most experts in finance have concluded that compared to banks, insurers have neither the size nor the interconnectedness that drive the correlated losses that can pose systemic risks, especially when the country experiences severe economic and financial stresses. To begin, the insurance industry is much less concentrated than banking. The largest U.S. P&C insurer is the Berkshire Hathaway Group with assets of \$252.8 billion, as compared to the largest U.S. banking institution, J.P. Morgan Chase, with assets of \$2.3 trillion. The P&C industry is also less concentrated than banking: The top five P&C insurers account for less than 31 percent of all P&C assets, as compared to the top five banks with nearly 60 percent of all banking assets.<sup>18</sup> Accordingly, two scholars concluded recently that, “in terms of their core activities, insurers are not large enough to be systemically important,” and that P&C companies were the *least* likely segment of the industry to have that status.<sup>19</sup>

Insurers also are unlikely to be caught up in the cascading failures which can be triggered by the failure of large bank, and create a systemic crisis, because insurers are not very exposed to bank failures: Bank bonds represent 5.4 percent of P&C bond portfolios, and the bonds of all financial institutions represent 11.4 percent of P&C insurers’ equity.<sup>20</sup> In addition, the insurance industry is more highly capitalized than banking: Its capital-to-assets ratio of 39.6 percent (2011) is nearly four times the 11.4 percent ratio for banking.<sup>21</sup> As a result, it is generally recognized that the failure of another financial institution would not expose P&C insurers to losses

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<sup>17</sup> A third possibility is that European regulators seek to reduce the competitiveness of large U.S. insurers by imposing the higher capital requirements that European insurers already bear.

<sup>18</sup> Bank Market Share By Deposits and Assets, <http://www.cardhub.com/edu/bank-market-share-by-deposits/>; NAIC (2013-C).

<sup>19</sup> Cummins and Weiss (2009).

<sup>20</sup> *Ibid.*

<sup>21</sup> *Ibid.*

sufficiently large to threaten their solvency, as Lehman Brothers' failure did for other major banking institutions in 2008. With the exception of AIG, insurers did not suffer greatly in the 2008-2009 crisis -- and AIG's problems did not arise from normal insurance-related transactions. As one long-time analyst of the industry has observed, "[a]part from AIG, the insurance sector as a whole was largely on the periphery of the crisis. The AIG crisis was heavily influenced by its CDS portfolio, sold by a non-insurance entity, AIG Financial Products (AIGFP), which was not subject to insurance regulation."<sup>22</sup>

More generally, a recent analysis tested the impact on the insurance sector of a serious economic crisis in which the broad market gradually fell by 40 percent: The authors found that P&C insurers were *negatively* related to systemic risk under those conditions, concluding that "writing property-casualty lines may act as a stabilizing factor during systemic crises."<sup>23</sup> Another study also modeled the impact of a collapse in stock prices and found that even under those conditions, the insurance industry would not be a source of systemic risk.<sup>24</sup> These findings were confirmed in the recent Great Recession, when the value of the S&P 500 fell from 1,515.96 on December 10, 2007 to 683.38 on March 6, 2009, or 54.9 percent over 15 months. The U.S. P&C industry continued to both operate normally and expand. The "Annual Report on the Insurance Industry" issued by the Federal Insurance Office of the U.S. Department of the Treasury provides extensive evidence of the industry's resilience in this period.<sup>25</sup> From 2007 to 2009, direct premiums written for personal P&C coverage remained stable, and direct premiums for commercial P&C coverage fell less than 10 percent. Similarly, the net investment income of the P&C industry declined just 12.5 percent, from \$56.5 billion in 2007 to \$48.4 billion in 2009. Moreover, the industry's net yield on its invested assets of 4.2 percent in 2008 and 3.93 percent in 2009 was greater than the net yield recorded for any year since 2009, and fewer P&C companies became insolvent in 2008 and 2009 than in any year since 2009.

Some observers have questioned the exposure of large P&C insurers to serious problems in the reinsurance market, but those concerns also have little foundation. A 2011 analysis found that the failure of one of the three top reinsurers (Swiss Re, Munich Re, or Berkshire Hathaway) would threaten just one percent of P&C insurers, insufficient to trigger or sustain a systemic crisis.<sup>26</sup> A similar analysis was conducted in 2006 by the Group of 30, an international organization comprised of senior personnel from the private and public sectors and academia.<sup>27</sup> The report from the Group of 30 found that if 20 percent of the global reinsurance market failed – that is, if several major reinsurers failed at once – it still would not produce widespread insolvencies among insurers sufficient to affect the real economy.<sup>28</sup>

A series of other academic analyses also have concluded that insurance companies do not pose systemic risks. One recent study found that core insurance activities pose no systemic risk, because no insurer is sufficiently large or interconnected; and a 2010 study by the Geneva

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<sup>22</sup> Harrington (2009).

<sup>23</sup> Harrington (2009).

<sup>24</sup> Grace (2010).

<sup>25</sup> U.S. Department of the Treasury (2013).

<sup>26</sup> Park and Xie (2011).

<sup>27</sup> The Group of 30 was then chaired by JP Morgan Chase chairman Jacob Frankel and Jean Claude Trichet, former head of the European Central Bank

<sup>28</sup> Group of 30 (2006).

Association, an international think tank for insurance issues, concurred.<sup>29</sup> Another recent analysis found that problems with insurers do not lead to serious problems for banks and other financial institutions,<sup>30</sup> while other researchers applied a number of alternative measures of systemic risk to the range of financial institutions and found that “insurance firms are overall the least systemically risky” in the financial system.<sup>31</sup> And Daniel Tarullo, a Governor of the Federal Reserve Board, confirmed recently that the Fed, the institution with primary responsibility for the stability of the U.S. financial system and the overall U.S. economy, does not see the P&C industry as a source of systemic risk. In testimony before the Senate Committee on Banking, Housing and Urban Affairs in October 2014, Tarullo said, “[m]y pretty strong presumption is that there isn’t any systemic risk in traditional insurance activities.”<sup>32</sup>

#### *Other Risks to the Solvency of Large Property and Casualty Insurers*

If the failure of a U.S.-based IAIG could not and would not trigger systemic costs for the financial system and economy, the question for those who would impose higher capital requirements on IAIGs becomes this: Is there any prospect that IAIGs facing huge claims from a major disaster will require public bailouts that would undermine confidence in the insurance industry? The capacity of P&C insurers to cover huge, unpredicted losses from super-storms, earthquakes, major terrorist events or other causes depends on their profits and reserves or, stated differently, their premiums, expenses, investment income and surplus. The Treasury Department reports that the 2,700 P&C insurers active in 2012 collected \$460 billion in net premiums, with the ten largest insurance groups accounting for nearly half of that total premium volume.<sup>33</sup> The profitability of these insurers is based on those premiums, plus their investment income, underwriting gains or losses, and overall operating performance.<sup>34</sup>

One traditional way for state regulators to measure a P&C insurer’s capacity to meet its obligations is the ratio of its premiums to its surplus, using as a threshold for adequate resources represented by a ratio of less than three-to-one. The surplus here refers to an insurer’s excess capital after meeting all of the payable claims of its policyholders, or the “policyholders’ surplus.”<sup>35</sup> The data show that these surpluses have increased every year since 2009, thereby driving down the industry’s premium-to-surplus ratio. The ratio in 2013 hit a record-low of 0.73 or one-quarter of the threshold and half the average 1.45 ratio for the 55 years from 1959 to 2013.<sup>36</sup>

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<sup>29</sup> Bell and Keller (2009).

<sup>30</sup> Chen *et al.* (2012)

<sup>31</sup> Acharya *et al.* (2010).

<sup>32</sup> LifeHealthpro (2014).

<sup>33</sup> U.S. Department of the Treasury (2013). By 2012, net commercial written premiums exceeded pre-crisis levels.

<sup>34</sup> Kearney (2010).

<sup>35</sup> Beckman and Tremelling (1972).

<sup>36</sup> Property Casualty Insurers Association of America (2014). Another rough and less reliable way of evaluating an insurer’s profitability is “combined ratio,” or an insurer’s losses, loss adjustment expenses (costs associated with investigating, administering, defending or paying claims) and underwriting expenses, as a percentage of its premiums. A combined ratio of more than 100 is said to signal that an insurer’s premiums may not be sufficient to cover its losses and expenses over a given period. By this measure, the aggregate, combined ratio for all P&C insurers has exceeded 100 since 2008, while declining from 108 in 2011 to 103 in 2012. However, the combined ratio is not considered to be very accurate, because it does not include an insurer’s investment income. As of December 2012, P&C insurers held about \$1.4 trillion in invested assets and earned more than \$50 billion of net

As noted at length already, the central feature of the regulators' strategy to ensure that P&C insurers remain solvent even under the stress of huge unexpected claims, is their risk-based capital (RBC) requirements.<sup>37</sup> Under this strategy, a complex set of formulas establish a minimum level of capital that can be compared to an insurer's actual capital level,<sup>38</sup> and state regulators are authorized to take certain actions based on an insurer's RBC-level of impairment.<sup>39</sup> In this way, the RBC system alerts regulators to undercapitalized insurers while they have time to intervene and prevent or reduce the costs of an insurer's insolvency. The RBC formula for P&C insurers starts with asset risks and underwriting risks.<sup>40</sup> Asset risks include the risk of default of policies held by the affiliates of a parent insurance company, as well as the risk of default on the principal and interest on an insurer's fixed income assets, or declining value for other short-term and long-term invested assets. The RBC formula for P&C insurers also includes underwriting risks for its reserves and premiums, which include pricing and reserving errors.

The Society of Actuaries (2010) describes the RBC calculation as follows:  
*Total RBC after Covariance =  $R0 + \text{sqrt}(R1^2 + R2^2 + R3^2 + R4^2 + R5^2)$* , where  
*R0: Asset Risk-Subsidiary Insurance Companies; R1: Asset Risk-Fixed Income;*  
*R2: Asset Risk-Equity; R3: Asset/Credit Risk- (Recoverables, Reinsurance); R4:*  
*Underwriting Risk-Reserves; and R5: Underwriting Risk-Net Written Premium.*  
*Authorized Control Level RBC (ACL RBC) = 0.5 x Total RBC after Covariance.*

If the ratio of insurer's Total Adjusted Capital (TAC) to its ACL RBC falls below one of five defined levels, an action level is triggered. Some 2,601 P&C insurers filed RBC assessments with the NAIC for 2012.<sup>41</sup> Using these and earlier data, we have calculated the aggregate, industry-wide RBC ratio for the years 2008 to 2012. (Table 1, below.) Under the RBC system, regulatory action is required when an insurer's Total Adjusted Capital (TAC) is less than twice its Authorized Control Level (ACL) RBC. Our results show that the TAC for all P&C insurers, taken together, has been *five-to-six times* the ACL. From 2009 through 2012, the industry's RBC ratio has averaged more than 600 percent.

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regular investment income, plus another \$8.6 billion in realized capital gains. Including investment income, the industry's adjusted combined ratio falls below 100.

<sup>37</sup> NAIC (2014-B). RBC replaced fixed capital standards as the primary means of monitoring the prospective financial solvency of insurers. Under fixed capital standards, insurers were required to hold the same amount of capital -- ranging from \$500,000 to \$6 million depending on the state and an insurer's lines of business, and regardless of an insurer's financial conditions.

<sup>38</sup> NAIC (2014-B).

<sup>39</sup> Each of the four types of action -- called company action, regulatory action, authorized control, and mandatory control -- requires particular responses from the insurer as well as the regulator.

<sup>40</sup> NAIC (2009).

<sup>41</sup> NAIC (2014-A).

**Table 1: RBC Ratio for All Property and Casualty Insurers, NAIC, 2008-2012 (\$ 000)**

	2008	2009	2010	2011	2012
<b>Number of Companies</b>	2,650	2,568	2,606	2,600	2,601
<b>R0 - Asset Risk – Affiliates</b>	41,956,539	44,229,308	45,408,726	45,083,425	48,201,346
<b>R1 - Asset Risk - Fixed Income Assets</b>	6,019,789	6,745,280	6,666,137	7,941,632	7,934,578
<b>R2 - Asset Risk – Equities</b>	52,456,701	57,209,628	69,488,335	74,325,097	80,684,906
<b>R3 - Asset Risk – Credit</b>	17,247,418	16,184,833	14,903,885	15,514,367	13,709,545
<b>R4 -Underwriting Risk – Reserves</b>	99,937,576	100,654,969	101,631,899	102,176,645	103,245,652
<b>R5 - Underwriting Risk - Written Premiums</b>	56,154,339	55,234,918	53,997,075	55,754,469	60,138,046
<b>Total RBC</b>	273,772,362	280,258,936	292,096,057	300,795,635	313,914,073
<b>Total RBC After Covariance</b>	193,386,033	199,654,405	211,980,682	216,938,031	226,376,198
<b>Authorized Control Level (ACL) RBC</b>	96,693,017	99,827,203	105,990,341	108,469,016	113,188,099
<b>Total Adjusted Capital (TAC)</b>	578,401,613	643,578,743	692,557,389	690,336,975	732,657,366
<b>RBC Ratio</b>	<b>598%</b>	<b>645%</b>	<b>653%</b>	<b>636%</b>	<b>647%</b>

By contrast, the threshold for a regulatory response is 200 percent or less:

- (1) No Action, if an insurer’s TAC is at least twice its ACL;
- (2) Company Action Level, if its TAC is 1.5-to-2.0 times its ACL;
- (3) Regulatory Action Level, if its TAC is 1.0-to-1.5 times its ACL;
- (4) Authorized Control Level, if its TAC is 1.0-to-0.7 times its ACL; and,
- (5) Mandatory Control Level, if its TAC is less than 0.7 times its ACL

Turning to individual companies, we found that from 2008 to 2012, 2.3 percent to 3.2 percent of P&C insurers were subject to some regulatory response based on their TAC-to-ACL ratios. (Table 2, below.) Even under the extraordinary financial and economic stresses of 2008-2009, almost 97 percent of P&C insurers had the resources to withstand all of the risks measured by the RBC standard without danger of financial difficulty.

**Table 2: Number of P&C Insurers Triggering Regulatory Action Level Events, 2008-2012**

Action Levels	2008	2009	2010	2011	2012
<b>No Action</b>	2,566	2,571	2545	2538	2532
<b>Company Action</b>	29	19	13	14	16
<b>Regulatory Action</b>	16	10	17	13	14
<b>Authorized Control</b>	10	10	5	9	8
<b>Mandatory Control</b>	29	29	26	26	31
<b>Total</b>	2,650	2,639	2,606	2,600	2,601
<b>No Action Percentage</b>	<b>96.8%</b>	<b>97.4%</b>	<b>97.7%</b>	<b>97.6%</b>	<b>97.4%</b>

There is considerable variation in RBC ratios, however, based on the assets of P&C insurers. (Table 3, below.) In general, the RBC ratio is lower among larger insurers, because competition forces them to operate with lower capital margins. Nevertheless, the median RBC ratio for the largest P&C companies, those with assets of \$10 billion or more, ranged from 474 percent to 556 percent from 2008 to 2012, or well more than twice the level triggering even the mildest regulatory response.<sup>42</sup>

<sup>42</sup> *Ibid.*

**Table 3: Median RBC Ratios for P&C Insurers, by Asset Size, 2008-2012**

	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>
<b>Less than \$10 million</b>	1,605%	1,866%	1,729%	1,904%	1,934%
<b>\$10 million-\$25 million</b>	1,595%	1,610%	1,587%	1,522%	1,507%
<b>\$25 million-\$100 million</b>	1,039%	1,145%	1,108%	1,148%	1,150%
<b>\$100 million-\$250 million</b>	870%	920%	889%	907%	902%
<b>\$250 million-\$500 million</b>	861%	907%	908%	863%	894%
<b>\$500 million-\$1 billion</b>	773%	832%	784%	769%	803%
<b>\$1 billion-\$10 billion</b>	667%	720%	725%	689%	701%
<b>More than \$10 billion</b>	<b>474%</b>	<b>528%</b>	<b>556%</b>	<b>503%</b>	<b>502%</b>
<b>All Companies (unweighted)</b>	<b>992%</b>	<b>1,047%</b>	<b>1,037%</b>	<b>1,039%</b>	<b>1,034%</b>

Moreover, the portfolios of P&C insurers appear to be very sound. The Treasury Department’s most recent report on the industry found that the investments of P&C insurers are very conservative, manifesting none of the risky behavior that can lead to serious problems. In 2012, 65.3 percent of the financial assets of P&C insurers – \$909.9 billion from a total of \$1,382.9 billion in assets – were invested in high-quality investment-grade bonds.<sup>43</sup> Of the remaining one-third of their assets, \$81.6 billion or 5.9 percent were held in cash and short-term cash-equivalents; and \$215.9 billion or 19.2 percent were held in preferred or common stocks. Finally, \$16.1 billion or 1.2 percent of all P&C assets were held in mortgage loans and real estate, and \$592 million or 0.04 percent were held in derivatives. The remaining \$115.8 billion were classified by the Treasury as “other investments.”

#### *P&C Insurers Would Remain Financially Sound After a Terrible Catastrophe*

By industry standards, P&C insurers in compliance with current RBC capital standards should be sound under virtually any financial and economic conditions. The final question is, are those standards sufficient in the face of terrible natural or manmade catastrophes? Natural or manmade disasters produce what economists call correlated losses – tens of thousands of substantial claims at one time – on top of the industry’s regular stream of claims from uncorrelated events. P&C insurers prepare for genuine catastrophes not only by building up their surpluses – loss reserves – over years, but also by spreading their risks across tens of thousands of policyholders in hundreds of places and shifting some of their potential liabilities to reinsurers.<sup>44</sup> In addition, insurers and reinsurers can further hedge their potential liabilities by issuing insurance-linked securities, called catastrophe bonds and catastrophe derivatives.

In 2012, P&C insurers maintained reserves of \$596.2 billion for their incurred losses and for the losses and loss adjustment expenses for past events that remain unpaid. A standard industry rule designates 20 percent of policyholder reserves for catastrophic events (the “catastrophe surplus”) with the other 80 percent to be held for normal risks. In 2012, therefore, the industry’s catastrophe surplus totaled \$119.2 billion – as compared, for example, to insured losses from super-storm Sandy of \$25.85 billion, of which private insurers were responsible for \$18.8 billion. (Table 4, below.) The privately-ensured losses from Sandy, then, accounted for less than 16 percent of the industry’s total 2012 catastrophe surplus. The 2005 hurricane season

<sup>43</sup> U.S. Department of the Treasury (2013).

<sup>44</sup> King (2009).

included the worst natural disaster in U.S. history (Katrina) plus three other major storms (Hurricanes Rita, Wilma and Dennis). The insured claims from these disasters totaled \$57 billion, or less than half of the industry's most recent catastrophe surplus.<sup>45</sup>

**Table 4: Financial Operating Results for U.S. Property and Casualty Insurers, 2008-2012 (billions)<sup>46</sup>**

	2008	2009	2010	2011	2012
<b>Net Earned Premiums</b>	\$438.1	\$419.0	\$420.5	\$433.9	\$449.4
<b>Incurred Losses &amp; Loss Adjust Expenses</b>	\$339.2	\$306.7	\$309.1	\$344.5	\$335.0
<b>Expenses</b>	\$118.1	\$113.4	\$119.5	\$124.0	\$129.0
<b>Policyholder Dividends</b>	\$2.0	\$2.0	\$2.3	\$1.9	\$2.1
<b>Investment Income</b>	\$51.2	\$47.0	\$47.2	\$49.0	\$47.7
<b>Other Items</b>	(\$0.1)	\$0.8	\$1.0	\$1.2	\$2.3
<b>Pre-tax Operating Gain</b>	\$29.9	\$44.7	\$37.8	\$14.8	\$3.3
<b>Realized Capital Gains (Losses)</b>	(\$19.8)	(\$8.0)	\$5.7	\$7.2	\$6.2
<b>Pre-Tax Income</b>	\$10.1	\$36.7	\$43.5	\$22.0	\$39.5
<b>Taxes</b>	\$7.7	\$8.4	\$8.9	\$2.9	\$6.0
<b>Net After-Tax Income</b>	\$2.4	\$28.3	\$34.7	(\$19.2)	\$33.5
<b>Policyholder Surplus</b>	<b>\$455.6</b>	<b>\$511.5</b>	<b>\$556.9</b>	<b>\$550.3</b>	<b>\$586.9</b>
<b>Catastrophe Surplus (20 Percent)</b>	<b>\$91.1</b>	<b>\$102.3</b>	<b>\$111.4</b>	<b>\$110.1</b>	<b>\$117.4</b>

As suggested by these calculations, a sound measure of the effectiveness of the current RBC standard is the industry's capacity to satisfy the claims from terrible natural catastrophes. The Congressional Research Service (CRS) recently modeled this capacity in the face of three truly extraordinary catastrophes: A once-in-a-century event with claims of \$108 billion, events which theoretically should occur once every 250 years with claims of \$164.5 billion; and events what may occur once every 500 years with claims of \$217.0 billion (all estimates in 2012 \$).<sup>47</sup> Table 4, above, provides the financial operating results for U.S. P&C insurers for the period 2008 to 2012. This financial analysis is one of the best measures available to gauge the industry's capacity to handle claims from truly extraordinary events.

The industry's catastrophe surplus of \$117.4 billion in 2012 could clearly manage a once-in-a-century catastrophe with \$108 billion in claims, but not the projected claims for even more rare and terrible events. However, these calculations do not take account of the normal industry practice of hedging such catastrophic costs through reinsurance. For example, reinsurers based mainly in Germany, Great Britain, Switzerland and Bermuda absorbed 60 percent of the costs of the claims from Hurricane Katrina, the most expensive catastrophe for U.S. insurers on record.<sup>48</sup> The CRS model, again, projects total insured claims of \$164.5 billion from a once-every-250-years catastrophe – nearly three times the combined claims of Hurricane Katrina, plus Rita, Wilma and Dennis. If U.S. P&C insurers transfer 40 percent of the projected claims from such a once-every-250-years catastrophe to the balance sheets of foreign reinsurers – 20 percentage-points less than were transferred for Katrina – the 2012 catastrophe surplus could handle the resulting claims on U.S. insurers of \$98.4 billion. If reinsurers absorbed 50 percent of the

<sup>45</sup> Shapiro and Mathur (2008). In addition, the worldwide capacity of the reinsurers grew by 7 percent in 2012.

<sup>46</sup> Insurance Information Institute (2014).

<sup>47</sup> King (2013).

<sup>48</sup> *Ibid.*



projected claims of \$217 billion from a once-every-500-years catastrophe – still a substantially smaller percentage than were transferred for Katrina – the 2012 catastrophe surplus of P&C insurers also could handle the resulting, remaining claims of \$108.5 billion.

The CRS study notes that its estimates of the costs of its hypothetical catastrophes rely on current valuations for real estate and other property, and such cost estimates increase with time as real estate valuations rise and development expands. The study’s author cautions, therefore, that problems could arise in the future if catastrophe liabilities increase faster than catastrophe surpluses. However, such esoteric risks could also be managed through increased foreign reinsurance and the use of catastrophe bonds and exchange-traded options and swaps that shift part of such extraordinary risks to investors. Catastrophe bonds work as follows. Investors purchase bonds covering very low probability events and place the funds in a trust account; and, until the specified event occurs, investors receive interest payments from the trust account and part of the premiums from the underlying policies. If a catastrophe as defined by the terms of the bond happens, the insurer that issued the bond claims the funds in the trust account.<sup>49</sup> If such an event does not occur in the bond’s lifetime, investors reclaim the principal. In 2012, investors held \$14.8 billion in catastrophe bonds, including \$5.85 billion issued in 2012.<sup>50</sup> Finally, concerns that large and unexpected losses could trigger defaults in catastrophe bonds, which in turn could trigger larger financial problems, also are unwarranted. At present, the catastrophe bond market is too small to raise systemic issues. Nor are there grounds for concern if the market in the bonds grows larger, since they are fully collateralized through the funds held in the trust accounts for catastrophe payouts.

#### **IV. The Structure of Higher Capital Standards for Property and Casualty IAIGs**

The preceding analysis has established that under current RBC capital standards and industry practices, U.S. P&C insurers can handle the claims from any currently-conceivable circumstances. Nevertheless, the International Association of Insurance Supervisors (IAIS) is working to develop a new, global group insurance capital standard (ICS) that would apply much higher capital standards to large insurance groups with substantial foreign business (IAIGs), defined for now as groups with assets of at least \$50 billion, gross written premiums of at least \$10 billion, operating in at least three countries with at least 10 percent of its gross premiums written in foreign markets.<sup>51</sup> As also noted earlier, this effort is related to the IAIS program to develop a new, global basic capital requirement (BCR) for those companies deemed to be global systemically-important insurance companies (G-SIIs). In this effort, the IAIS is developing a “Common Framework for the Supervision of Internationally Active Insurance Groups” (ComFrame), including new supervisory standards covering corporate governance, enterprise risk management and capital adequacy. The IAIS represents insurance regulators and supervisors from 200 jurisdictions in 140 countries; and, the U.S. Financial Stability Board recognizes the IAIS as the international standard-setting body for the insurance industry,

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<sup>49</sup> This market also includes catastrophe equity puts, in which an insurer purchases the put and receives an option to issue preferred stock at an agreed-upon price to the investors if a defined catastrophe occurs. Similarly, under a catastrophe risk swap, an insurer pays investors fixed payments in exchange for their obligation to pay the insurer “floating” payments if an insured catastrophe occurs.

<sup>50</sup> King (2013), *op. cit.*

<sup>51</sup> Linklaters (2013).

equivalent to the Basel Committee on Banking Supervision and the International Organization of Securities Commissions.

These developments should be matters of genuine concern for both the insurance industry and the overall economy. Thus far, the IAIS discussions of the BCR for G-SIIs reflect a preference for a European approach to insurance regulation, which relies on prescribed financial models applied uniformly across the industry, as compared to the U.S. approach based on qualitative and quantitative analysis of each insurer's business.<sup>52</sup> Moreover, the IAIS has acknowledged that the BCR for G-SIIs "will inform" the development of the ICS for IAIGs, raising concerns that the IAIS is prepared to impose additional, EU-style, factor-based global capital standards on many large U.S. P&C insurers through the ICS. Yet, as this analysis has demonstrated, there is no evidence that those companies warrant any additional capital requirements. The NAIC has expressed its concerns about the direction of ComFrame, noting that any final recommendations should not impose new burdens on insurers simply because they are large and operate internationally.<sup>53</sup>

### *The Basic Capital Requirement for G-SIIs*

To appreciate how a new ICS for IAIGs would likely work, we begin with the IAIS's description of the factor-based approach adopted in the BCR for G-SIIs.<sup>54</sup> An insurer's BCR "Adequacy Ratio" is defined as its "Total Qualifying Capital Resources" divided by its "Required Capital," and its BCR is satisfied if its qualifying capital resources exceed its required capital. The measure covers all holding companies, insurance entities, banking entities and any other companies in the group designated as a G-SII. As with the RBC, "required capital" here is "calculated on a consolidated group-wide basis for all financial and material non-financial activities ... using a 'factor based' approach with 15 factors ... [and] a Market Adjusted Valuation Approach" based on the major categories of risk from both traditional and non-traditional insurance activities (NTNI), assets and non-insurance activities.<sup>55</sup>

$$\begin{aligned} \text{Required Capital} = & \text{Sum of (Liability factors multiplied by Liability measures)} + \\ & \text{(Sum of Asset Factors multiplied by Asset measures)} + \text{(Sum of NTNI factors} \\ & \text{multiplied by NTNI measures)} + \text{Sum of Other Factors multiplied by other measures)} \end{aligned}$$

A G-SII's BCR capital adequacy ratio covers several areas of risk also included in RBC ratios, but the results depend on the weight assigned to each factor. Whether the BCR model properly weights the factors will be very consequential. The EU Solvency II Framework states that the European Commission will determine whether non-EU regulatory regimes provide a level of protection for policyholders comparable to the Solvency II regime and therefore "equivalent" to Solvency II; and only insurers in "equivalent" jurisdictions will be allowed to operate in EU markets. If the EU does not accept U.S. "equivalence," difficult competitive

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<sup>52</sup> For example, the factor-based, quantitative basic capital requirements developed by the IAIS for G-SIIs lack the flexibility to account for much of the variation and complexity in risks and capital needs within and among insurance groups. As a result, this approach can mask some companies' risks behind their factor-based scores and indicate that other, sound companies face serious problems.

<sup>53</sup> NAIC (2013-A).

<sup>54</sup> IAIS (2013).

<sup>55</sup> IAIS (2014-B)

issues will arise. Rather than seek such equivalence, the United States currently is working through the EU-US dialogue process towards the ICS. The results may be substantially the same, since the NAIC has concluded that the regulatory capital required under the EU solvency framework will be much greater than the capital required under the U.S. RBC approach.<sup>56</sup>

This view is supported by a recent study comparing the European Solvency II standard for minimum statutory capital requirements with U.S. and Canadian accounting standards for P&C insurers.<sup>57</sup> Its authors concluded that capital requirements for EU insurers based on Solvency II factors could be *nearly four times* greater than the capital standards for U.S. insurers under NAIC RBC formulas. To be sure, this calculation is based on assumptions about the levels and types of assets and liabilities held by hypothetical firms. Nevertheless, the analysis shows that applying European solvency and capital standards to U.S. insurers would significantly increase their capital requirements, particularly those operating in the E.U.

## **V. The Economic Effects of Higher Capital Requirements on U.S. Insurers**

Next, we examine the potential impact on U.S. insurance premiums and coverage if the current U.S.-E.U. dialogue produces higher capital requirements for large U.S. P&C insurers. These estimates necessarily are tentative, because we cannot yet know how many firms would be affected, and the IAIS has no plans to release a list of companies to be designated as IAIGs.<sup>58</sup> For this analysis, we apply the three criteria which the IAIS has acknowledged have informed its deliberations about IAIGs – P&C insurers with assets of \$50 billion or more, or direct gross written premiums of \$10 billion or more, operating in at least three countries and at least 10 percent of its business conducted in foreign markets. On this basis, a minimum of seven major U.S. P&C insurers would qualify,<sup>59</sup> accounting for 26.6 percent of the U.S. P&C market based on direct premiums written in 2012.<sup>60</sup>

Higher capital requirements for IAIGs, therefore, would produce a very uneven playing field between those seven companies and non-IAIGs, including U.S. subsidiaries of foreign-based insurers that do not qualify as IAIGs in their own countries. Based on models developed for banking, higher capital requirements for more than one-quarter of the U.S. market for P&C coverage will have significant effects on premium rates and industry investment. Capital ratios in banking do not translate directly to the RBC ratios. Nevertheless, applying the models used to analyze how capital requirements affect lending and investment behavior in banks can help inform our understanding of how changes to the RBC ratio, in the guise of the ICS for IAIGs, will affect premium rates, volume and investments by affected insurers.

A review of the economic literature shows a range of effects which occur when capital requirements rise for financial institutions. One study found that banking institutions respond to higher capital requirements by slowing the growth of their assets, which leads to a slowdown or

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<sup>56</sup> EU-US Dialogue Project Technical Committee (2012).

<sup>57</sup> Sharara, Hardy and Saunders (2010). The study focuses on P&C coverage, because it represents approximately 80 percent of the industry's aggregate solvency-risk capital requirements.

<sup>58</sup> American Council of Life Insurers (2013).

<sup>59</sup> Liberty Mutual, American International Group, Travelers' Companies, Berkshire Hathaway, Chubb Group, ACE Group, and CNA Insurance Services.

<sup>60</sup> U.S. Treasury (2013).

contraction in their lending.<sup>61</sup> These effects can be substantial, although they also can be moderated by phasing-in the additional capital requirements so firms can finance part of the additional capital from their retained earnings. To be conservative, we assume here that the higher capital requirements for large insurers would be phased-in gradually. Economists also have found that financial institutions pass along higher costs of capital to their customers through higher borrowing costs: Studies confirm that when the minimum capital ratio for banks increases by 10 percentage points, the interest rates charged for loans rises by 25-to-45 basis points.<sup>62</sup> Finally, studies have found that higher capital requirements induce many banks to shift part of their lending to the unregulated, “shadow-banking” sector.

We begin by estimating the likely extent of the contemplated increase in capital requirements for IAIGs. Under current rules, an insurer with an RBC ratio of less than 0.7 faces regulatory intervention (that is, when the ratio of its total adjusted capital to its required capital, given its risks, is 70 percent or less). As noted earlier, a recent study found that a shift to a Solvency II-type regulatory regime would result in capital requirements nearly four times greater than under current RBC standards.<sup>63</sup> Applying this study and the current 0.7 threshold as an absolute minimum capital requirement, we project that the minimum RBC ratio under a Solvency-II type regime would be 1.4 to 2.8 or two-to-four times the current minimum level. This would represent an increase in the minimum capital ratio for P&C insurers of 70 percentage points (under a minimum ratio of 1.4) or 210 percentage points (under a minimum ratio of 2.8). Such a large increase at once would shock insurance and investment markets, so we also assume that the increase is phased-in gradually. Therefore, we limit our estimates to the short run and project two changes in the minimum capital ratio: An initial increase from 0.7 to 0.85 and a second increase from 0.85 to 1.0, so capital standards rise 15 and 30 percentage points. We note that this analysis and the analyses which follow assume that insurers will seek to maintain their existing capital margin – the excess of actual capital over required capital.

To estimate the impact of the higher capital requirements for IAIGs on their cost of coverage, we will focus on homeowner and auto insurance, because the NAIC has published the average premium rates for homeowner and auto coverage for the years 2003-to-2011.<sup>64</sup> These categories of coverage accounted for 54 percent of all direct premiums written in 2011 and 2012 (39 percent for auto coverage and 15 percent for homeowner coverage).<sup>65</sup> First, we analyze those rates to calculate the annual increases when capital requirements are stable. (Table 5, below.)

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<sup>61</sup> Hanson, Kashyap and Stein (2010).

<sup>62</sup> *Ibid.*

<sup>63</sup> Sharara, Hardy and Saunders (2010).

<sup>64</sup> Insurance Information Institute (2014).

<sup>65</sup> NAIC (2013-C).

**Table 5: Average Premiums Paid By Homeowners and Automobile Owners, 2003-2011**

Year	Average Homeowner Premiums	Average Auto Premiums
2003	\$668	\$830
2004	\$729	\$842
2005	\$764	\$832
2006	\$804	\$817
2007	\$822	\$797
2008	\$830	\$789
2009	\$880	\$787
2010	\$909	\$791
2011	\$978	\$820

These data show that premiums increased at average rates of 5.0 percent per-year for homeowners' coverage and 0.2 percent per-year for automobile coverage. We next use these calculations to estimate the average premium rates for homeowners' coverage and auto coverage first for the 2013 baseline year – \$1,076 for homeowners coverage and \$850 for automobile coverage – and then over the following five years (2014-to-2018), assuming that the capital standards for P&C insurers remain unchanged. (Table 6, below.)

**Table 6: Estimated Average Premiums for Homeowners' and Auto Coverage With No Change in Capital Standards, 2013-2018**

Year	Average Homeowner Premiums	Average Auto Premiums
2014	\$1,128	\$852
2015	\$1,183	\$854
2016	\$1,241	\$856
2017	\$1,302	\$858
2018	\$1,365	\$860
<b>Average</b>	<b>\$1,244</b>	<b>\$856</b>

Next, we estimate the increase in those rates for insurers affected by increases in their capital standards of 15 percentage-points and 30 percentage-points. We recall that research from the banking sector found that each one percentage-point increase in capital costs leads to an increase in the interest rates charged for loans of at least 2.5 basis points.<sup>66</sup> If this finding were applied directly to insurers, each one percentage-point increase in their capital requirements would produce an increase of at least 2.5 basis points in premium rates. In banking, these costs can be completely passed on to consumers. If the same held true for insurance, a 15 percentage-point increase in capital requirements would lead to annual increases in premium rates of 37.5 basis points or 0.375 percent per-year, and a 30 percentage-point increase in capital requirements would lead to an annual increase in premium rates of 75 basis points or 0.75 percent per-year.

How would these increases affect premiums in the mortgage and auto insurance industry? To examine this issue, we collected information on average mortgage rates for 30-year fixed mortgages under Freddie Mac over the last decade, 2004-2013.<sup>67</sup> The average mortgage rate was

<sup>66</sup> Hanson, Kashyap and Stein (2010).

<sup>67</sup> Freddie Mac (2014).

approximately 5 percent. Applying this to an average loan of \$200,000, a typical monthly payment would be \$1,074.<sup>68</sup> If capital requirements increased by 30 percentage-points, and the mortgage rate rose to 5.75 percent, the monthly mortgage payment would increase to \$1,167. Under this scenario, the annual increase in premium prices would be about 8.7 percent. For a 15 percentage-point increase in capital requirements, mortgage rates would rise to 5.375 percent, and the annual premium would increase by 4.3 percent.<sup>69</sup>

To assess if these increases are in line with how property and casualty insurers would likely respond to an increase in capital requirements, we obtained data from SNL Financials on balance sheet items such as reserves and equity, revenues from premiums and investment income, and costs.<sup>70</sup> A study by Cummins and Phillips (2005) found that P&C insurers typically target a return on equity (ROE) of approximately 15 percent, although the actual value may differ based on the line of business.<sup>71</sup> Therefore, an increase in capital requirements that causes the return on equity to go down will likely be followed by an adjustment in premium pricing in order to maintain a ROE of 15 percent. Applying this analysis at the industry level and using typical values for the variables, we estimate that a 30 percentage-point increase in capital requirements would cause insurers to increase their premium prices by 7 percent, and a 15 percentage-point increase in capital requirements would cause premium prices to rise by about 4 percent. These increases are within the bounds produced by applying the 37.5 basis points or the 75 basis points increase to average mortgage rates following a 15 percentage-point and a 30 percentage-point increase in capital requirements, respectively. In the analysis which follows, we will model the changes in premium prices when a 15 percentage-point increase in capital requirements causes premium prices to increase by 4 percent, and a 30 percentage-point change causes premium prices to rise by 8 percent. The results for homeowners' coverage are presented in Table 7. Considering the actuarial pricing mechanism for homeowners' and auto coverage, we assume throughout this analysis that all other factors remain equal.

**Table 7: Estimated Premium Increases for Homeowners' Coverage under Higher Capital Standards, 2014-2018**

Year	15 Percentage-Point Increase in Capital Requirements		30 Percentage-Point Increase In Capital Requirements	
	<i>Average Premium</i>	<i>Premium Increase</i>	<i>Average Premium</i>	<i>Premium Increase</i>
<b>2014</b>	\$1,173	\$45	\$1,219	\$90
<b>2015</b>	\$1,231	\$47	\$1,278	\$95
<b>2016</b>	\$1,291	\$50	\$1,340	\$99
<b>2017</b>	\$1,354	\$52	\$1,406	\$104
<b>2018</b>	\$1,420	\$55	\$1,474	\$109
<b>Average</b>	<b>\$1,294</b>	<b>\$50</b>	<b>\$1,343</b>	<b>\$100</b>

This analysis suggests that increasing capital requirements for IAIGs on the scale contemplated in the ICS would lead to significant increases in premiums for homeowners' insurance coverage affecting 26.6 percent of the U.S. market (the IAIGs' market share). If an

<sup>68</sup> Panchuk (2012)

<sup>69</sup> For shorter-term mortgages, the corresponding monthly change will be lower.

<sup>70</sup> SNL (2014).

<sup>71</sup> Cummins and Phillips (2005).

agreement includes a 15 percentage-point increase in capital requirements, the cost of homeowners' coverage from an IAIG would average \$1,294 per-year over the years 2014 to 2018, compared to \$1,244 per-year without that increase. (Table 7, above.) The increase in the annual cost of homeowners' coverage from IAIGs, therefore, would average \$50 over those years. Similarly, if the capital requirements for IAIGs increase by 30 percentage-points, the cost of their homeowners' coverage would average \$1,343 per-year over the 2014-2018 period, compared to \$1,244 per-year without higher capital requirements. The increase would average \$100 per-year.

Similarly, if the FSB process leads to the large increases in capital requirements for IAIGs currently contemplated, the average price for automobile coverage issued by them will likely rise significantly. If an agreement includes a 15 percentage-point increase in capital requirements for IAIGs, the cost of their auto coverage is projected to average \$890 per-year over the period 2014-to-2018, compared to an average of \$856 per-year without a change in capital standards. (Table 8, below.) The cost of auto coverage from an IAIG, therefore, is projected to increase by an estimated \$34 per-year. Similarly, if the capital requirements for IAIGs increase by 30 percentage-points, the cost of their auto coverage would average \$925 per-year over the 2014-2018 period, compared to \$856 per-year without higher capital requirements. In this case, the increase could average as much as \$68 per-year.

**Table 8: Estimated Premium Increases for Automobile Coverage under Higher Capital Standards, 2014-2018**

Year	15 Percentage-Point Increase in Capital Requirements		30 Percentage-Point Increase In Capital Requirements	
	<i>Average Premium</i>	<i>Premium Increase</i>	<i>Average Premium</i>	<i>Premium Increase</i>
<b>2014</b>	\$886	\$34	\$920	\$68
<b>2015</b>	\$888	\$34	\$922	\$68
<b>2016</b>	\$890	\$34	\$925	\$68
<b>2017</b>	\$892	\$34	\$927	\$69
<b>2018</b>	\$895	\$34	\$929	\$69
<b>Average</b>	<b>\$890</b>	<b>\$34</b>	<b>\$925</b>	<b>\$68</b>

This analysis demonstrates the extent to which higher capital requirements for IAIGs could create a dramatically uneven playing field, as the expected premium increases associated with the higher capital requirements would leave IAIGs at a severe competitive disadvantage in the U.S. market for homeowners and auto coverage. We should expect that many IAIGs would absorb an even greater share of the costs associated with the new capital standards, which in turn would reduce their resources for other uses, including investment.

*The Impact of Higher Capital Requirements for IAIGs on the Volume of their Premiums*

Next, we turn to the impact of higher capital standards on the volume of insurance issued by the IAIGs, based on the estimated increases in premium rates or prices. In the preceding section, we found that while financial institutions face large additional costs when their capital standards increase, we should expect that state insurance regulators would allow IAIGs to pass along one-fifth to two-fifths of the additional costs in higher premiums. In this section, we will assess the impact of such increases in premium prices on the volume of insurance.

The nature of the insurance market suggests that the elasticity or sensitivity of demand for auto or homeowners’ insurance to price is limited. In most places, auto and home owners are required to carry at least minimum insurance; in addition, they may be subject to additional costs for leaving their current insurer, such as the loss of “safe driver discounts” or the need to have their homes reappraised. Nevertheless, the largest study of auto owners’ sensitivity to price increases for their auto coverage found an elasticity of - 0.57: A one percent increase in the price of coverage is expected to lead to a 0.57 percent decrease in demand for the coverage, which usually translates into continuing coverage but at lower levels than previously.<sup>72</sup> Researchers also have found that this elasticity varied relatively little across states and types of automobile. With regard to homeowners’ coverage, one study suggests that a one percent increase in the price leads to a one percent decrease in demand; yet the elasticity of demand for homeowners’ coverage is often thought to be less than for auto coverage, especially for coverage tied to a mortgage, because homeowners have more ways to reduce the cost.<sup>73</sup> For this analysis, we will apply the estimate for auto insurance premium elasticity to increases in both auto and homeowners’ premium rates. While we apply the conservative value for the elasticity in this case, since only the IAIGs would raise prices as they adjust to the new capital requirements, the result would directly affect their competitiveness. Consequently, they could face much larger declines in demand than suggested here, and the elasticity could be significantly higher. From a policy perspective, it is important to appreciate that the higher capital requirements will produce a substantive competitive disadvantage for IAIGs relative to other insurers in the market.

To model these effects, we begin with NAIC data on the direct written premiums of P&C insurers for the period from 2003 to 2012.<sup>74</sup> (Table 9-A, below.) These data, drawn from the annual statements filed by insurers with the NAIC, show that premium volume grew at an annual rate of 1.5 percent over this period, when there were no major changes in capital standards.

**Table 9-A: Premium Volumes of P&C Insurers, 2003-2012 (\$ billion)**

<b>Year</b>	<b>Direct Written Premiums</b>
<b>2003</b>	\$451.3
<b>2004</b>	\$474.2
<b>2005</b>	\$484.3
<b>2006</b>	\$496.3
<b>2007</b>	\$502.3
<b>2008</b>	\$490.6
<b>2009</b>	\$475.4
<b>2010</b>	\$475.1
<b>2011</b>	\$492.4
<b>2012</b>	\$515.1

Next, we use that underlying growth rate in written premiums to estimate the path of premium volumes over the next five years, again in the absence of changes in capital requirements. We start by applying that growth rate to the data on direct premiums in 2012 in

<sup>72</sup> Jaffe and Russell (1998).

<sup>73</sup> DeFusco and Paciorek (2014).

<sup>74</sup> NAIC 2013-C).



order to estimate direct written premiums in 2013; and that value, \$522,688,572,950, provides the baseline for our projections for the next five years, 2014-2018. (Table 9-B, below.)

**Table 9-B: Estimated Premium Volumes of P&C Insurers, Current Capital Standards, 2013-2018 (\$ billion)**

Year	Direct Written Premiums
2014	\$530.4
2015	\$538.3
2016	\$546.2
2017	\$554.3
2018	\$562.5
<b>Total</b>	<b>\$2,731.7</b>

From the preceding analysis, we found that based on studies in banking, the contemplated increase in capital standards for insurers, in principle, could drive up premium rates by about 4 percent or 8 percent per year, depending on the extent of the increase in those standards (15 percentage-points or 30 percentage-points). Therefore, we estimate that a 15 percentage-point increase in capital standards for P&C insurers would result in a reduction in written premiums by insurers affected by the new standards of approximately 2 percent. Similarly, a 30-percentage point increase in capital requirements would reduce the premium volumes of the affected insurers by about 5 percent.

Once again, we assume here that the higher capital requirements will affect the seven U.S. P&C insurers that currently meet the tentative criteria for IAIG status and which accounted for 26.6 percent of the U.S. P&C insurance market in 2012. We also assume that those insurers would maintain their existing capital margins, that is, the margin of actual capital over required capital. Table 10, below, presents the estimated range of effects on premium volumes from 15-percentage point and 30 percentage point increases in capital requirements: We estimate that they could produce reductions in premium volumes of 2.0 percent and 5 percent, respectively.<sup>75</sup>

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<sup>75</sup> Note, we model the change in premium volume as a reduction in total written premiums due to a data constraint. To estimate the impact on consumers, we would want to estimate the reduced demand for insurance as a result of higher prices. However, the available data cover only the total value of written premiums, not the total number of policies written. Therefore, we use the reduction in total premiums as a proxy for the reduction in quantity of insurance demanded when prices rise. This assumption may not hold if the price elasticity of demand is significantly less than 1.0, so that the percentage increase in price is much higher than the percentage reduction in quantity. However, this is not a major concern for our model since even though we use the conservative value of the auto elasticity, the elasticity for home mortgages is at least 1.0, and the elasticity for auto insurers could be higher. More important, we model here a situation in which only a small fraction of insurers are subject to the higher capital requirements and therefore, are forced to raise prices when other insurers are not. This should make demand for their products even more elastic than we assume here.

**Table 10: Estimated Effects on Premium Volumes from Higher Capital Requirements, Potential IAIGs and 26.6 Percent of Premiums Affected, 2014-2018 (\$ billion)**

<b>Year</b>	<b>Premium Volume Affected (26.6 % of Projected Baseline)</b>	<b>2.0% Reduction in Affected, Direct Premiums</b>	<b>5% Reduction in Affected, Direct Premiums</b>
<b>2014</b>	\$141.1	\$2.8	\$7.1
<b>2015</b>	\$143.2	\$2.9	\$7.2
<b>2016</b>	\$145.3	\$2.9	\$7.3
<b>2017</b>	\$147.4	\$2.9	\$7.4
<b>2018</b>	\$149.6	\$3.0	\$7.5
<b>Average</b>	<b>\$145.3</b>	<b>\$2.9</b>	<b>\$7.3</b>
<b>Total</b>	<b>\$726.6</b>	<b>\$14.5</b>	<b>\$36.3</b>

This analysis suggests that a 15 percentage-point increase in capital standards affecting insurers that account for 26.6 percent of the market will slow the growth of new premiums by \$14.5 billion over the five-year period, 2014 to 2018, or by an average of between \$2.9 billion per-year. Similarly, a 30 percentage-point increase in those standards for those insurers would slow the growth of new premiums by between \$36.3 billion over the five years, for an average annual reduction of \$7.3 billion.

*Impact of Higher Capital Requirements for IAIGs on their Investment*

The increased capital requirements for IAIGs will likely result in less investments and less productive investment with adverse effects for growth. The direct effects follow from our previous analysis: When premium rates go up and the growth of premium volumes slows as a result of new capital standards, the revenues and incomes of the affected insurers grow more slowly, which in turn leads to less investment. In addition, higher capital requirements in the context of RBC ratios would likely force at least some of the affected insurers to revise the composition of their investment portfolios, away from the relative risk of stocks and real estate, and towards less-risky investments such as bonds and Treasury bills. This response also ultimately leads to lower levels of investment, since the returns from less-risky assets are lower. In this section, we explore these responses and effects.

In the preceding analysis, we found that a 15 percentage-point increase in the capital standards of insurers which account for 26.6 percent of the market could slow the growth of their new premiums by an average of \$2.9 billion per-year for the period, 2014 to 2018. Similarly, a 30 percentage-point increase in those standards for IAIGs could slow the growth of their new premiums by an average of \$7.3 billion per-year over that period. Such slowdowns in the growth of new premiums would likely mean less investment by those insurers, since their investments directly depend on their incomes and profits. Most premium revenues are used to cover claims and operating and other expenses, with the remainder invested.<sup>76</sup> Earlier, we presented data on the financial operating results of P&C insurers for the five years, 2008-2012. (Table 4, above) Using these data, we estimate that an average of 5.0 percent of annual net earned premiums was

<sup>76</sup> American Insurance Association (2014).

available for additional investment in those years.<sup>77</sup> On this basis, we can estimate that a 15 percentage-point increase in the capital requirements for IAIGs would reduce investment by those insurers by \$0.7 billion over the five year period, 2014-2018. Similarly, a 30 percentage-point increase in their capital standards would reduce their investments over those five years by an estimated \$1.8 billion.

The second effect on the composition of their investment portfolios is more difficult to assess, because there is little systematic research on the investment decisions of insurers since RBC requirements have been in place, starting in 1994. In principle, an increase in capital standards could produce an increase in capital and/or a reduction in the average riskiness of the insurer's investments. In fact, researchers found that before 1994, the relationship between capital levels and the riskiness of investments was generally positive: Average risk increased with capital levels.<sup>78</sup> But once RBC requirements were in place, insurers could have changed or modified that behavior.

There is one recent study of the effect of higher RBC requirements on P&C insurers. The authors examined the relationship between an insurer's capital requirements and its asset risks and underwriting risks, comparing the period of 1994 to 2007, to 1992.<sup>79</sup> They found that those risks could account for roughly 87 percent of all risk-based capital, with risky assets defined as investments in equities and real estate. Further, they posited that the relationship between capital and risk has remained positive for many insurers. The authors also believe that some insurers see capital and risk as substitutable; and if that is true, among such insurers the constraints applied by RBC standards could induce those with high levels of capital to assume more risk. The researchers posit that a positive correlation between risk and capital may occur when an increase in risk leads an insurer to increase its capital levels as an additional buffer against solvency problems.

This reasoning suggests that P&C insurers with more than sufficient capital to accommodate higher RBC standards may respond to those higher requirements by investing more in relatively risky assets, while insurers with less adequate capital for the higher standards may try to build an appropriate buffer by raising additional capital or try to lower the average risk of their assets. The study classified P&C insurers as undercapitalized if their RBC ratio was less than 2, as marginally capitalized if their RBC ratio was equal to or greater than 2 but less than 3, and as well-capitalized if their RBC ratio was 3 or greater.<sup>80</sup> On average, over the entire period from 1994 to 2007, the relationship between capital and both types of risk, asset and underwriting, was positive for well-capitalized insurers. Among the undercapitalized and marginally capitalized insurers, the application of RBC requirements was accompanied by a reduction in investments in relatively more risky assets.

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<sup>77</sup> This calculation is based on the following approximation: (Net earned premiums + investment income + realized capital gains) – (Incurred losses and loss adjustment expenses + expenses + policyholder dividends + taxes) = resources available for new investment.

<sup>78</sup> Cummins and Somer (1996).

<sup>79</sup> Cheng and Weiss (2012).

<sup>80</sup> *Ibid.*

We can use these results to project how a large increase in capital requirements affecting insurers with 26.6 percent of the P&C market would impact their investments. At the end of 2012, as noted earlier, the P&C industry held 65.3 percent of its investments in high-grade bonds, 19.2 percent in stocks, 1.2 percent in real estate and mortgages, and most of the remainder in cash or cash-equivalent instruments, and “other investments.” Further, the Federal Reserve has issued its estimates of the total financial assets of P&C insurers for the years, 2003-2013:

**Table 11-A: Investments in Financial Assets by P&C Insurers, 2003-2012 (\$ billions)<sup>81</sup>**

Year	Total Financial Assets
2003	\$1,059.3
2004	\$1,159.1
2005	\$1,246.3
2006	\$1,335.8
2007	\$1,385.8
2008	\$1,305.5
2009	\$1,380.2
2010	\$1,360.5
2011	\$1,376.6
2012	\$1,438.9
2013	\$1,530.7

Based on these data, we calculate that the value of these investments increased at an average annual rate of 4.1 percent over the 10-year period. On this basis, we project the total financial investments of P&C insurers over the next five years, 2014 to 2018, in the absence of higher capital standards. (Table 11-B, below)

**Table 11-B: Estimated Investments in Financial Assets by P&C Insurers, 2014-2018 (\$ billions)**

Year	Total Financial Assets
2014	\$1,595
2015	\$1,661
2016	\$1,731
2017	\$1,803
2018	\$1,878

The higher capital requirements would affect the presumed IAIGs with 26.6 percent of the P&C market, and we assume here that they also hold 26.6 percent of the industry’s total financial assets. Under current capital requirements, about 20.4 percent of these investments are held in stocks and real estate. If these insurers are well-capitalized, the higher capital standards could produce an increase in their investments in stocks and real estate. If they are marginally capitalized or undercapitalized relative to the higher capital standards, they would be expected to shift some of their relatively risky assets to safer investments in response to the new RBC standards. Data released by the NAIC covering P&C insurers, 2009-2012, show that about 12 percent of the insurers were marginally capitalized or undercapitalized, by the standards of the

<sup>81</sup> Board of Governors of the Federal Reserve System (2014).

recent study.<sup>82</sup> As noted earlier, however, large insurers with assets of \$10 billion or more have lower median RBC ratios than smaller insurers (See Table 3, above), and therefore they are more likely to be marginally capitalized or undercapitalized relative to the new capital standards. This suggests that IAIGs are more likely to respond to the much higher capital standards contemplated by the ICS by shifting some their assets from relatively riskier equities and real estate to relatively safer bonds.

The following analysis assumes that the contemplated increase in capital requirements for IAIGs would have the above-described effect on U.S. IAIGs. As it is likely that only some of those IAIGs would respond in this way, the results provide an upper bound of the impact of the higher capital standards on the investment portfolios of P&C insurers. To estimate the extent of this effect from a 15 percentage-point increase in capital requirements, we adjusted the baseline of financial investments (Table 11-B, above) for the projected 2 percent slowdown in the growth of new premiums in response to a 15 percentage point increase in capital requirements. This adjustment reduces overall investment levels for IAIGs by about \$145 million per-year or \$726 million over the period 2014-2018. The results (presented in Table 12-A, below) suggest that IAIGs would respond to a 15 percentage-point increase in their capital requirements by shifting an average of \$1.9 billion per-year in investment assets from equities and real estate to high-grade bonds, or \$9.4 billion over five years.

**Table 12-A: Impact on Investment of a 15 Percentage-Point Increase in Capital Standards Affecting Large Insurers with 26.6 Percent of the U.S. Market, 2014-2018 (\$ billion)**

Year	Baseline: All P&Cs' Financial Investments	IAIGs' Investments (26.6%)	IAIGs' Baseline Adjusted for Reduced Premiums	Share Invested in Equities and Real Estate (20.4%)	Two Percent Reduction in Those Investments
2014	\$1,595	\$424.3	\$424.2	\$86.5	\$1.73
2015	\$1,661	\$441.8	\$441.7	\$90.1	\$1.80
2016	\$1,731	\$460.5	\$460.4	\$93.9	\$1.88
2017	\$1,803	\$479.6	\$479.5	\$97.8	\$1.96
2018	\$1,878	\$499.6	\$499.5	\$101.9	\$2.04
<b>Average</b>	<b>\$1,739</b>	<b>\$461.1</b>	<b>\$461.0</b>	<b>\$94.0</b>	<b>\$1.9</b>
<b>Total</b>	<b>\$8,667</b>	<b>\$2,305.7</b>	<b>\$2,305.1</b>	<b>\$470.2</b>	<b>\$9.4</b>

The investment impact of a 30 percentage-point increase in the capital requirements for IAIGs is similar to the impact of a 15 percentage-point increase. (Table 12-B, below.) The higher capital standard leads to a reduction in the growth of their investments of \$1.9 billion over 2014 to 2018 or an average of \$363 million per-year – as expected, twice the effect of a 15 percentage-point reduction. The impact on the IAIGs' investment portfolio in reduced investments in equities and real estate is virtually the same – \$1.9 billion per-year and \$9.4 billion over five years – since the reduction is only 2.0 percent of the 20.4 percent share of the IAIGs' portfolios invested in equities and real estate.

<sup>82</sup> NAIC (2014-D).

**Table 12-B: Impact on Investment of a 30 Percentage-Point Increase in Capital Standards Affecting Large Insurers with 26.6 Percent of the U.S. Market, 2014-2018 (\$ billion)**

Year	Baseline: All P&C Financial Investments	Investments Affected (26.6%)	IAIGs' Baseline Adjusted for Reduced Premiums	Share Invested in Equities and Real Estate (20.4%)	Two Percent Reduction in Those Investments
2014	\$1,595	\$424.3	\$423.9	\$86.5	\$1.7
2015	\$1,661	\$441.8	\$441.4	\$90.1	\$1.8
2016	\$1,731	\$460.5	\$460.1	\$93.9	\$1.9
2017	\$1,803	\$479.6	\$479.2	\$97.8	\$2.0
2018	\$1,878	\$499.6	\$499.2	\$101.8	\$2.0
<b>Average</b>	<b>\$1,739</b>	<b>\$461.1</b>	<b>\$460.8</b>	<b>\$94.0</b>	<b>\$1.9</b>
<b>Total</b>	<b>\$8,667</b>	<b>\$2,305.7</b>	<b>\$2,304.0</b>	<b>\$470.0</b>	<b>\$9.4</b>

These modest shifts in the portfolio assets of IAIGs would entail some small, additional costs, because as the IAIGs shift investments in relatively riskier assets to the less risky assets, investment income would be reduced as well.<sup>83</sup> Over the ten-year period, 2004-to-2013, the average return on equities was 7.34 percent, the average return on Treasury bills was 1.54 percent, and the average return on Treasury bonds was 4.27 percent. Shifting approximately \$9.4 billion out of equities and into Treasury bills, or about four-tenths of one percent of their combined portfolios, would reduce their combined investment incomes by \$54.5 million over five years; and shifting those assets from equities to Treasury bonds would reduce investment income by \$28.9 million over that period. These reductions in investment income, in turn, would result in slightly lower investment in future years.

#### *Additional Costs of a New Global Capital Requirement*

The new capital standards for IAIGs currently under consideration could entail yet additional costs. The IAIS has pressed the case that the ICS be calculated using International Financial Reporting Standards (IFRS) and mark-to-market valuations. American insurers are subject to U.S. Generally Accepted Accounting Principles (GAAP) and Generally Accepted Auditing Standards (GAAS); and therefore U.S. IAIGs would have to absorb additional accounting costs associated with the IFRS. In addition, adopting mark-to-market valuations for purposes of the ICS would introduce additional volatility in the capital calculations of the IAIGs, based on market fluctuations. As this volatility increased, their risks of appearing to be impaired would rise. As a result, the IAIGs might have to increase their capital margins, especially to avoid raising additional capital when tight markets or serious economic problems drive up the costs of capital. This volatility would further raise the effective levels of the new capital requirements, potentially increasing the effects projected above on premiums, premium rates and investment – all despite the fact, as our analysis has established, that the current state-based capital requirements for U.S. IAIGs are fully adequate to address the projected claims arising from virtually any conceivable catastrophe and the financial stresses arising from severe economic disruptions.

<sup>83</sup> Stern School of Business (2014).

## **VI. Conclusions**

Globalization presents many genuine and important challenges for the regulation of businesses which operate across borders. Regulators of the same or similar businesses in North America, Europe, Latin America, Asia and Africa will approach many of the same issues in a variety of ways. Those differences are inevitable and often appropriate, since they may reflect legitimate differences in values, policy priorities and technical approaches. Financial regulators have a legitimate and even urgent interest in those aspects and operations of globally-systemic financial institutions that could adversely affect the economies of other nations. But globalization does not require the harmonization of financial regulation, any more than it demands or depends upon uniform fiscal and monetary policies across nations.

In this spirit, the current effort to develop and apply uniform capital standards for all large, multinational property and casualty insurance companies is misguided. P&C companies pose no systemic risks to other financial institutions or the economy, which could justify new standards. Moreover, there is no evidence that under current capital requirements, U.S. P&C insurers are ill-prepared for virtually any eventuality which could produce very large claims on their reserves. The new requirements currently being considered in the U.S.-E.U dialogue would impose substantial additional costs on large U.S. P&C insurers with substantial foreign business; and (based on our analysis of prior years and related projections) those additional costs would raise the price and slow the growth of their coverage for American households and businesses, and reduce new investments by those insurers. The United States should reconsider its current role in this effort.

## References

- Acharya, Viral V. and Pedersen, Lasse Heje and Philippon, Thomas and Richardson, Matthew P. (2010). “Measuring Systemic Risk.” Federal Reserve Bank of Cleveland Working Paper No. 10-02. April 23, 2010. <http://ssrn.com/abstract=1595075>.
- American Council of Life Insurers (2013). “ComFrame-A Common Framework for Supervision.” <http://www.ncoil.org/InternationalTaskForce/ACLIAttachment2.pdf>.
- American Insurance Association (2014). “How Property/Casualty Insurance Companies Invest Premium Dollars.” 2014. <http://www.aiadc.org/AIAdotNET/docHandler.aspx?DocID=313776>.
- Arnold, Liana. “Bank Market Share by Deposits and Assets.” Card Hub. <http://www.cardhub.com/edu/bank-market-share-by-deposits/>
- Baker, Malcolm P. and Wurgler, Jeffrey (2013). “Would Stricter Capital Requirements Raise the Cost of Capital? Bank Capital Regulation and the Low Risk Anomaly” (March 15, 2013). <http://dx.doi.org/10.2139/ssrn.2233906>
- Beckman, Raymond, W. and Robert N. Tremelling II (1972). “The Relationship Between Net Premium Written and Policyholders’ Surplus.” Paper presented at November 1972 Meeting. *Proceedings of the Casualty Actuarial Society, Volume LIX*. 1972. <https://www.casact.org/pubs/proceed/proceed72/72203.pdf>.
- Bell, Marian and Benno Keller (2009). “Insurance and Stability: The Reform of Insurance Regulation.” Zurich Financial Services Group. 2009.
- Berrosipide, Jose M., and Rochelle M. Edge (2009). “Linkages Between the Financial and Real Sectors: Bank Credit and Capital over the Crisis.” Paper for 2009 FMA Annual Meeting. FMA. 16 October 2009. <http://www.fma.org/Reno/Papers/berrosipide.edge.essay.pdf>
- Berrosipide, Jose M. and Edge, Rochelle M. (2010). The Effects of Bank Capital on Lending: What Do We Know, and What Does it Mean?” Board of Governors of the Federal Reserve System. FEDS Working Paper No. 2010-44. August 17, 2010. <http://dx.doi.org/10.2139/ssrn.1895532>
- Board of Governors of the Federal Reserve System (2014)., *Financial Accounts of the United States, Flow of Funds, Balance Sheets and Integrated Macroeconomic Accounts, Historical Annual Tables, 2005-2013*, Table L. 111, p. 74, <http://www.federalreserve.gov/releases/z1/current/annuals/a2005-2013.pdf>.
- Caballero, R.H., E.M.R.A. Engel, and J.C. Haltiwanger (1995). “Plant-level adjustment and aggregate investment dynamics.” *Brookings Papers on Economic Activity* No. 2, pp. 1–54. 1995.



- Chen, Hua, J. David Cummins, Krupa S. Viswanathan, and Mary Weiss (2012). “Systemic Risk and the Interconnectedness between Banks and Insurers: An Econometric Analysis.” *Journal of Risk and Insurance*. (forthcoming)
- Cheng, Jiang and Mary A. Weiss (2012). “The Impact of RBC Requirements in Property-Liability Insurance.” Paper prepared for the 2012 China International Conference on Insurance and Risk Management. February 1, 2012.  
<http://www.ccirm.org/conference/2012/uploadfiles/A/I-A/1-CHENG%20JIANG-The%20Impact%20of%20RBC%20Requirements%20in%20Property-Liability%20Insurance.pdf>
- Cummins, J.G., K.A. Hassett and R.G. Hubbard, R.G. (1994). “A reconsideration of investment behavior using tax reforms as natural experiments.” *Brookings Papers on Economic Activity*, No. 2, pp. 1–60. 1994.
- Cummins, J.G., K. A. Hassett, and R. G. Hubbard (1996). “Tax reforms and investment: a cross-country comparison.” *Journal of Public Economics*, No. 62, pp. 237–273. 1996.
- Cummins, J. David and Richard D. Phillips (2005). “Estimating The Cost of Equity Capital for Property-Liability Insurers.” Wharton Financial Institutions Center. No 03-31.  
<http://fic.wharton.upenn.edu/fic/papers/03/0331.pdf> .
- Cummins, J. David, and D.W. Sommer (1996). ‘Capital and risk in property-liability insurance markets’, *Journal of Banking and Finance* 20: 1069-1092.
- Cummins, J. David and Weiss, Mary A. (2013) “Systemic Risk and the U.S. Insurance Sector.” *Journal of Risk and Insurance* (forthcoming). December 2, 2013.
- Cummins, J. David and Weiss, Mary A. (2013). “Systemic Risk and Regulation of the U.S. Insurance Industry”. Networks Financial Institute, Indiana State University. Policy Brief 2013-PB-02. March 9, 2013.
- DeFusco, Anthony A. and Andrew Paciorek (2014). “The Interest Rate Elasticity of Mortgage Demand: Evidence from Bunching at the Conforming Loan Limit.” Federal Reserve Board, Finance and Economic Discussion Series, Division of Research & Statistics and Monetary Affairs. No. 2014-11.
- Eling, Martin and Schmeiser, Hato and Schmit, Joan (2009). “The Solvency II Process: Overview and Critical Analysis.” *Risk Management and Insurance Review*, Vol. 10, No. 1, pp. 69-85. November 2009. <http://ssrn.com/abstract=869267>.
- Elliott, Douglas J. (2014). “Systemic Risk and the Asset Management Industry.” *Economic Studies*, Brookings Institution. May 2014.
- Elliott, Douglas and Andre Oliveira Santos (2011). “Estimating the Costs of Financial Regulation.” International Monetary Fund. IMF Staff Discussion Note. December 2011.

- European Commission (2007). “Insurance guarantee schemes in the EU: Comparative analysis of existing schemes, analysis of problems and evaluation of options.” Final report. November 2007.
- EU-U.S. Dialogue Project Technical Committee. “Comparing Certain Aspects of the Insurance Supervisory and Regulatory Regimes in the European Union and the United States.” EU-U.S. Dialogue Project. December 2012.  
[http://www.naic.org/documents/eu\\_us\\_dialogue\\_report\\_121220.pdf](http://www.naic.org/documents/eu_us_dialogue_report_121220.pdf)
- Financial Stability Board (2013). “FSB identifies global systemically important insurers (G-SIIs) and the policy measures that will apply to them.” July 18, 2013.
- Francis, William and Osborne, Matthew, (2009). “On the Behavior and Determinants of Risk-Based Capital Ratios: Revisiting the Evidence from UK Banking Institutions” UK Financial Services Authority. FSA Occasional Paper No. 31. March 1, 2009.  
<http://dx.doi.org/10.2139/ssrn.1393376>.
- Freddie Mac (2014). “30-Year Fixed Rate Mortgages Since 1971.”  
<http://www.freddiemac.com/pmms/pmms30.htm>.
- Gilchrist, Simon, and Egon Zakrajsek. “Investment and the Cost of Capital: New Evidence from the Corporate Bond Market.” National Bureau of Economic Research. Cambridge, MA: June 2007. <http://www.nber.org/papers/w13174.pdf>
- Grace, Martin (2010). “The Insurance Industry and Systemic Risk: Evidence and Discussion.” Working Paper, Georgia State University. 2010.
- Group of 30 (2006). *Reinsurance and International Financial Markets*. 2006.
- Guiné, Carlos. “Global Systemically Important Insurers.” *Financial Stability Report*. European Insurance and Occupational Pensions Authority. May 2014.  
[https://eiopa.europa.eu/fileadmin/tx\\_dam/files/publications/fin-stability/Reports/may\\_2014/Global\\_Systemically\\_Important\\_Insurers.pdf](https://eiopa.europa.eu/fileadmin/tx_dam/files/publications/fin-stability/Reports/may_2014/Global_Systemically_Important_Insurers.pdf)
- Hancock, Diana and Wilcox, James A., (1994). “Bank Capital and the Credit Crunch: The Roles of Risk-based and Leverage-based Capital Regulations.” *Journal of the American Real Estate and Urban Economics Association*. Vol 22, No 1, Winter 1994.  
<http://ssrn.com/abstract=5436>.
- Hanson, Samuel Gregory and Kashyap, Anil, and Stein, Jeremy C. (2010). “A Macroprudential Approach to Financial Regulation.” Chicago Booth Research Paper No. 10-29. November 12, 2010. <http://dx.doi.org/10.2139/ssrn.1708173>.
- Harrington, Scott E. (2009). “The Financial Crisis, Systemic Risk, and the Future of Insurance Regulation.” Issue Analysis. NAMIC. 2009.  
<http://www.namic.org/pdf/090908SystemicRiskAndTheFuture.pdf>.

- Insurance Information Institute (2014). "Homeowners and Renters Insurance."  
<http://www.iii.org/fact-statistic/homeowners-and-renters-insurance>.
- International Association of Insurance Supervisors (2013). "Basic Capital Requirements for Global Systemically Important Insurers (G-SIIs): Proposal." 16 December 2013.
- \_\_\_\_\_ (2014-A). "IAIS Develops Basic Capital Requirements for Global Systemically Important Insurers." 23 October 2014.
- \_\_\_\_\_ (2014-B). "Fact Sheet: Basic Capital requirements (BCR) for Global Systemically Important Insurers (G-SIIs)." 23 October 2014.
- Jaffe, Dwight and Thomas Russell (1998). "The Causes and Consequences of Rate Regulation in the Auto Insurance Industry." In *The Economic of Property-Casualty Insurance*. David Bradford, ed. University of Chicago Press (January 1998).  
<http://fic.wharton.upenn.edu/fic/papers/03/0331.pdf>
- Kearney, Susan (2010). "Measuring Insurer Profitability." American Institute for Chartered Property Casualty Underwriters ,2010.  
[http://www.theinstitutes.org/MediaCenter/docs/articles/Measuring\\_Insurer\\_Profitability10-10.pdf](http://www.theinstitutes.org/MediaCenter/docs/articles/Measuring_Insurer_Profitability10-10.pdf)
- King, Michael R., (2009). "The Cost of Equity for Global Banks: A CAPM Perspective from 1990 to 2009" *BIS Quarterly Review*, September 1, 2009.  
<http://ssrn.com/abstract=1472988>.
- King, Rawle (2013). "Financing Natural Catastrophe Exposure: Issues and Options for Improving Risk Transfer Markets." Congressional Research Service. Report No. 7-5700
- Klein, Robert W. (2012). "Insurance Regulation and the Challenge of Solvency II: Modernizing the System of U.S. Solvency Regulation." NAMIC (2012).  
<http://www.namic.org/pdf/publicpolicy/insRegSolvII.pdf>
- Lehman Brothers Holdings, Inc. (2008). "[Lehman Brothers Holdings Inc. Announces It Intends to File Chapter 11 Bankruptcy Petition](#)". September 15, 2008.
- LifeHealthPRO, "Fed to Go Easy on Insurance Companies, September 9, 2014.  
<http://www.lifehealthpro.com/2014/09/09/fed-to-go-easy-on-insurance-companies>.
- Linklaters (2013). "IAIS to Develop Global Risk-Based Capital Standard." 14 October 2013.  
<http://www.linklaters.com/Publications/Publication1386Newsletter/Insurance-Update-October-2013/Pages/IAIS-develop-global-risk-based-capital-standard.aspx>
- Matson, Patricia and Ronald Sleiman. "Solvency II and U.S. Equivalence." *The Financial Reporter*. Issue 85. June 2011.

- National Association of Insurance Commissioners. (2014-A) “Aggregate P/C RBC Results by Year.” 22 May 2014. [http://www.naic.org/documents/research\\_stats\\_rbc\\_results\\_pc.pdf](http://www.naic.org/documents/research_stats_rbc_results_pc.pdf).
- National Association of Insurance Commissioners (2014-B). “Risk-Based Capital.” 14 May 2014. [http://www.naic.org/cipr\\_topics/topic\\_risk\\_based\\_capital.htm](http://www.naic.org/cipr_topics/topic_risk_based_capital.htm).
- National Association of Insurance Commissioners (2014-C). “Global Systemically Important Insurers (G-SIIs).” 11 April 2014. [http://www.naic.org/cipr\\_topics/topic\\_global\\_sys\\_insurers.htm](http://www.naic.org/cipr_topics/topic_global_sys_insurers.htm)
- National Association of Insurance Commissioners (2014-D). “Summary: Aggregate P/C RBC Results By Year.” 2014. [http://www.naic.org/documents/research\\_stats\\_rbc\\_results\\_pc.pdf](http://www.naic.org/documents/research_stats_rbc_results_pc.pdf).
- National Association of Insurance Commissioners (2013-A). “International Insurance Issues.” [http://www.naic.org/documents/government\\_relations\\_2013\\_flyin\\_ib\\_international.pdf](http://www.naic.org/documents/government_relations_2013_flyin_ib_international.pdf)
- National Association of Insurance Commissioners (2013-B). “Property and Casualty Insurance Industry: 2012 Top 25 Groups and Companies by Countrywide Premium.” 1 April 2013. [http://www.naic.org/documents/research\\_top\\_25\\_market\\_share\\_pc.pdf](http://www.naic.org/documents/research_top_25_market_share_pc.pdf)
- National Association of Insurance Commissioners (2013-C). “United States Insurance Market Report Card.” 20 August 2013. [http://www.naic.org/state\\_report\\_cards/report\\_card\\_us.pdf](http://www.naic.org/state_report_cards/report_card_us.pdf)
- National Association of Insurance Commissioners (2009). “Risk-Based Capital General Overview.” 15 July 2009. [http://www.naic.org/documents/committees\\_e\\_capad\\_RBCoverview.pdf](http://www.naic.org/documents/committees_e_capad_RBCoverview.pdf)
- Nelson, Ben. “NAIC CEO Reacts to AIG Designation as Systemic.” Statement, National Association of Insurance Commissioners. 11 July 2013. [http://www.naic.org/fsoc\\_statment\\_nelson\\_aig\\_designation\\_130711.htm](http://www.naic.org/fsoc_statment_nelson_aig_designation_130711.htm).
- Panchuk, Kerri Ann (2012). “Average Mortgage Amount Increases by \$20,000.” Housing Wire. April 11, 2012. <http://www.housingwire.com/articles/average-mortgage-amount-increases-20000>.
- Park, Sojung C. and Xiaoying Xie (2011). “Reinsurance and Systemic Risk: The Impact of Reinsurer Downgrading on Property-Casualty Insurers,” Working Paper, California State University. 2011.
- Property Casualty Insurers Association of America (2014). Release, April 21, 2014, <http://www.pciaa.net/LegTrack/web/NAIIPublications.nsf/lookupwebcontent/98C290281B43EC2386257CC10057836?opendocument>.

- Santos, Joao A. C. (2001). "Bank capital regulation in contemporary banking theory: A review of the literature." *Financial Markets, Institutions & Instruments*. Vol. 10(2), pp. 41-84. 2001.
- Shapiro, Robert and Aparna Mathur (2008). "The Economic Effects of Proposals for Federal Natural Catastrophe Reinsurance and New Loan Programs: Who Pays and Who Benefits?" Sonecon.  
[http://www.sonecon.com/docs/studies/Report\\_on\\_the\\_Effects\\_of\\_Proposed\\_Hurricane\\_Legislation-Shapiro-Mathur-August\\_2008.pdf](http://www.sonecon.com/docs/studies/Report_on_the_Effects_of_Proposed_Hurricane_Legislation-Shapiro-Mathur-August_2008.pdf).
- Sharara, Ishmael, Hardy, Mary and David Saunders (2010). "Regulatory Capital Standards for Property and Casualty Insurers under the U.S., Canadian and Proposed Solvency II (Standard) Formulas." Society of Actuaries. University of Waterloo. November 2010.  
<https://www.soa.org/research/research-projects/risk-management/research-study-intl-regimes.aspx>
- SNL (2014). "Insurance Group Analysis." <http://www.snl.com/Sectors/Fig/Insurance.aspx>.
- Society of Actuaries (2010). "A Study of International Solvency Regimes."  
<http://www.soa.org/research/research-projects/risk-management/research-study-intl-regimes.aspx>
- Stern School of Business (2014). "Annual Returns on Stock, T. Bonds and T. Bills: 1928 – Current." New York University.  
[http://pages.stern.nyu.edu/~adamodar/New\\_Home\\_Page/datafile/histretSP.html](http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/histretSP.html)
- Tarullo, Daniel (2014). "Statement before the Committee on Banking, Housing and Urban Affairs, September 9, 2014.  
[www.banking.senate.gov/public/index.cfm?FuseAction=Files.View&FileStore\\_id=63ddb2d9-fdc0-4afc-8df7-b829f962ca03](http://www.banking.senate.gov/public/index.cfm?FuseAction=Files.View&FileStore_id=63ddb2d9-fdc0-4afc-8df7-b829f962ca03).
- U.S. Department of the Treasury. Federal Insurance Office. *Annual Report on the Insurance Industry*. June 2013. <http://www.treasury.gov/initiatives/fio/reports-and-notices/Documents/FIO%20Annual%20Report%202013.pdf>
- Van den Heuvel, Skander, (2007). "The Welfare Cost of Bank Capital Requirements" Wharton Financial Institutions Center Working Paper No. 07-19. August 2007.  
<http://dx.doi.org/10.2139/ssrn.1008597>
- Walker, Oliver, and Simon Dietz. "Ambiguity and Insurance: Robust Capital Requirements and Premiums." Centre for Climate Change Economics and Policy. November 2012.  
<http://www.cccep.ac.uk/Publications/Working-papers/Papers/110-119/WP115-ambiguity-insurance-capital-premiums.pdf>.

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