Insurance, evolution or revolution?

How the insurance industry can evolve past its current Darwinian challenges
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The insurance industry’s rapid evolution: embracing Darwinian forces to adapt, innovate and thrive

The insurance industry has long had a reputation for being rather placid. If only that were actually the case. Today, forces are buffeting the industry from all sides, generating a Darwinian compulsion to evolve. Only companies that meet these many challenges head-on with innovative solutions will adapt, survive and possibly thrive.

First is the macroeconomic environment. Sluggish growth and low interest rates have put pressure on earnings for years, forcing insurance companies to streamline operations to cut costs, but also adopt new, complex technologies for greater efficiencies, such as blockchain, and especially Robotic Process Automation (RPA) and Artificial Intelligence (AI). While insurance companies have been weaving new technologies into the day-to-day business for years, the magnitude and speed of today’s innovation is taking the industry into uncharted territory.

Another challenge for the industry is the continuous release of new rules and regulations that can be swayed by political winds. Those stemming from the financial crisis, such as Too Big to Fail (TBTF) and capital requirements such as the Solvency II Directive, continue to create complexity and pinch profits. And the rules just keep coming. The long-awaited IFRS standard for insurance contract accounting, IFRS 17, is anticipated in the first half 2017. It’s a complex standard that includes some fundamental differences to current accounting for liability measurement and profit recognition.

Further complicating this labyrinth of rules are the different regulatory approaches in different geographies. Although Europe is converging to risk-based capital requirements with Solvency II and getting closer to the U.S. standard, the fact that the U.S. regulates insurers on a state-by-state basis rather than at the federal level is a complication.

Let’s not forget the dramatic political developments of late. The U.S. election means that a major reworking, if not actual repeal, of the Affordable Care Act is certain. Meanwhile, Brexit is poised to change London’s relationship with the EU, which could force some companies to relocate operations and make other costly adjustments to conduct cross-border business. With elections in France and Germany in 2017, the EU political climate will remain unsettled for some time.

Given these dramatic and exciting developments in the industry, the current Journal of Financial Perspectives, which is devoted entirely to the insurance industry, is particularly timely. Please enjoy the following articles and the insights offered by some of our industry’s leading thinkers as we help witness and steer the industry evolution toward its future.

Shaun Crawford
EY Global Insurance Sector Leader
It is my great pleasure to welcome you all to Volume 4 of the Journal of Financial Perspectives, the academic publication of EY.

This issue is entirely devoted to the insurance industry. Based on available data and recent history, we assess the current state of the insurance industry and try to understand its future among risk, regulation, disruptive technologies, challenges and opportunities. Indeed, an underlying theme of the issue is the evolution the insurance industry is going through.

We open Volume 4 by tackling innovation head on with an article looking at the technological challenges the insurance industry is facing. In this article, co-authored by Chris Lamberton and Dave Hoy, we consider the impact of Robotic Process Automation (RPA) and Artificial Intelligence (AI) on business, and on insurance in particular. We analyze the main challenges to successful RPA implementation and the potential impact that more advanced AI methods could have on the evolution of the industry. We also briefly hint at the harder, philosophical and sociological issues related to AI, such as the problem of consciousness, whether human-level intelligence can be attained by purely computational methods, and the potential impact of AI on jobs loss and creation.

Volume 4 continues with two articles on the evolution of regulation and on the large/systemic insurers normative in particular. We attack this theme with a research paper analyzing the Too Big To Fail (TBTF) status in global insurance firms. Paolo Zangheri analyzes the impact of the evolution of the regulation dealing with systemically important insurance groups, using an event study methodology. Results show that after an initial positive reaction to being awarded the TBTF status, consistent with the expectation of an implicit subsidy, an opposite effect is observed. The disclosure on how the capital charges for systemic insurers would be calculated led to sizeable negative abnormal returns, the effect being more marked for leveraged entities. Continuing with the large/systemic insurers theme, Robert Shapiro and Aparna Mathur focus on capital requirements for large US property and casualty (P&C) insurers, arguing that additional capital requirements are unnecessary, as even the largest US P&C insurers pose no systemic risk to the US or global financial systems. The paper points out that current state-based capital requirements for US P&C insurers are sufficient to ensure coverage of claims arising from even the most extraordinary losses, and that imposing additional capital requirements would slow the growth of new P&C coverage and increase the cost of that coverage. This article further stresses important cultural differences in regulation between the US and the EU.
Moving to the United States, we have four papers dealing with different aspects of the US insurance market.

Cassandra Cole, Enya He and Kathleen McCullough examine financial strength ratings for insurance firms, based on a comprehensive analysis of several sources of data, including a proprietary dataset. Similar to bank ratings, the authors find that insurers’ unsolicited ratings tend to be lower than solicited ratings.

In the second contribution on the US insurance market, Jeffrey Thomas summarizes the US program for terrorism insurance and outlines its advantages as compared to similar programs in other developed countries. Based on an ex-post-recoupment mechanism rather than on premia, this approach requires less capital investment and makes “pricing” more accurate than a reinsurance approach. The paper further explains how the program creates market demand for the development of terrorism reinsurance in the private market.

A discussion on the impact of IRS and Treasury regulation on acquisition of US companies from non-US insurers and reinsurers follows. William Pauls argues that the particular treatment of foreign cash boxes, and more generally the disparate treatment afforded to foreign insurers and reinsurers, will continue to have an unwarranted chilling effect on acquisitions of domestic (insurance or other) corporations by foreign insurers and reinsurers.

Finally, the financial crisis is the subject of the paper by Greg Niehaus and Chia-Chun Chiang, who analyze the US life insurers’ responses to the financial crisis based on a review of the available research, and consider the lessons that have not been learned. It is found that most life insurers were not significantly affected by the crisis, although some suffered operating and investment losses. In analyzing responses, the paper distinguishes activities that increased economic and statutory capital, from activities that increased statutory capital alone.

I would like to conclude this introduction by thanking our readers for their attention and feedback.

**Damiano Brigo**
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Impact of Robotics, RPA and AI on the insurance industry: challenges and opportunities

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The RPA part of this article is based on the report EY 2016a and has been authored by Chris Lamberton. The introduction and the final section on insurance have been authored by Damiano Brigo. Dave Hoy helped improve the paper.
Impact of Robotics, RPA and AI on the insurance industry: challenges and opportunities

Abstract
We consider the current challenges and opportunities in applications of Robotics to financial services and to insurance in particular. Combinations of Robot Process Automation (RPA) with digitization have been considered by the industry, with important benefits in cost reduction and efficiency. We highlight the general benefits of RPA and the related implementation challenges in detail. We discuss more advanced Artificial Intelligence (AI) applications, arguing that such applications depend on the general advancements of AI, where human level interaction is not yet available. We discuss the great potential for AI applications in the near future and consider some initial examples. We also briefly discuss the hard problems of AI in relation to intelligence and consciousness in the introductory part, and briefly look at the implications AI and robots could have for human society and employment.
1. Introduction

The umbrella term “Robotics” brings about worry and excitement at the same time, leading to extreme reactions ranging from alarm to exaltation. From the very beginning part of the public feared that unemployment would be an obvious consequence of widespread use of Robotics, see Frey and Osborne (2013) for a recent study on computerization and unemployment, while others have been more optimistic and argued that only specific parts of jobs would be affected, see for example Chui et al (2015). Robots have also been seen as saving humanity from routine and menial tasks, giving humans the opportunity to focus on more pleasant jobs and activities, and on more rewarding intellectual activities, see Belfiore (2014).

At a more fundamental level, the related advances of Artificial Intelligence (AI) have caused a lively debate that continues over the years. One can easily witness extremes in this space too. Consider the bestseller books from Hofstadter (1979), a cult book by now, and especially Kurzweil (1999, 2006), supporting “strong AI” and predicting a machine singularity. In the ironic words of Lanier (2000), one of the pioneers of virtual reality, authors and friends he humorously calls “cybernetic totalists” espouse a number of beliefs that could be roughly described as follows. First, cybernetic patterns of information provide the ultimate and best way to understand reality. Second, people are cybernetic patterns. Third, subjective experience doesn’t exist and if it exists it is unimportant, being an ambient or peripheral effect. Fourth, one can extrapolate Darwin’s findings outside biology to obtain the singular, superior Darwinian description of all creativity and culture. Fifth, information systems will be accelerated qualitatively and quantitatively by Moore’s law. Finally, sixth and most dramatic, in Lanier’s words, “biology and physics will merge with computer science (becoming biotechnology and nanotechnology), resulting in life and the physical universe becoming mercurial; achieving the supposed nature of computer software. [...] Computers [...] will overwhelm all the other cybernetic processes, like people, and will fundamentally change the nature of what’s going on in the familiar neighborhood of Earth [...] maybe in about the year 2020. To be a human after that moment will be either impossible or something very different than we now can know” (Lanier 2000, 2010). A heated debate on whether a machine adopting computational algorithms can really reach human intelligence has developed over the years, jointly with the related question on whether machines can have subjective experiences and be conscious. Chalmers (1995) formulates the following related questions:

Q1: What does it take to simulate a human being’s physical action?
Q2: What does it take to evoke conscious awareness?
Q3: What does it take to explain conscious awareness?

For each of the three questions, one may answer that:

(C) Computation alone is enough,
(P) Physics is enough, but physical features beyond computation are required, or
(N) Not even physics is enough.

In terms of the three questions, Chalmers argues that Descartes would be Q1=N, whereas strong AI people would probably say Q1=C, Q2=C, Q3=C, while Penrose (1994) argues Q1=P, Q2=P, without saying much on Q3, and Chalmers himself declares he believes that Q1=C, Q2=C, Q3=N. In other words, Chalmers believes that while a human being’s intelligent behaviour can be simulated computationally and that conscious awareness can be evoked computationally, it cannot be explained computationally. Penrose instead argues that human intelligent behaviour cannot even be simulated computationally, nor can conscious awareness be evoked with a computational method. The latter is also the position of Searle’s (1980) with his famous Chinese Room experiment, where he sets up a thought experiment meaning to show that the Turing test cannot detect conscious awareness. More generally, as Cole (2014) explains, Searle means to reach the broader conclusion of refuting the theory that human minds are computer-like computational or information processing systems, a position related to computational theories of the mind and to “strong AI”. Searle suggests that minds must
result from biological processes; computers can at best simulate these processes. Searle’s arguments have been vigorously challenged by AI researchers and philosophers among others, see for example Dennett (1991). The debate has important implications for semantics, philosophy of language and mind, theories of consciousness, computer science and cognitive science.

Clearly, an in-depth discussion of such issues is beyond the scope of this paper. However, we decided to list such debates to help the reader appreciate the holistic nature of AI discussions and the enormous cultural stakes that are invested in this research, going well beyond specific industries. Having said that, and leaving eschatology aside, such fundamental questions and debates have not discouraged companies and practitioners: one need only think about computers’ supremacy in the game of chess, personal assistant vocal applications offered by mobile phone companies, computer systems beating human champions on the television game show Jeopardy (Cole 2014), and modern search engines, to name just a few developments. However, one should contrast this with the mostly exaggerated predictions AI experts have been suggesting over the years (Armstrong et al 2014), and with Hofstadter suggesting in Herkewitz (2014) that the actual advanced AI content in many such applications is very limited. It remains to be seen how much human intelligence is really present in the current AI achievements. In the meantime, optimism on the AI enterprise may be justified on more practical terms. Indeed, it may well be that technology and computing companies may reach AI as an emerging property progressively rather than through a mathematical breakthrough, and that formal properties of AI will be investigated more productively “after the fact”.

In this paper we will keep such fundamental questions in the background, and look at Software Robotics, Robotic Process Automation (RPA), Cognitive Robotics/Artificial Intelligence mostly from the practical point of view, briefly considering the potential disruption and opportunities these areas bring to the insurance industry in particular. In doing so, we will focus on implementation as a key feature of the process, highlighting its challenges. Finally, even though we consider the U.K. economy in some of the examples below, given that the U.K. economy is similar to other advanced economies with respect to the issues at stake we believe this article maintains a global appeal and may be of interest to the global community.

The paper is structured as follows: In Section 2 we introduce Software Robotics and RPA. In Section 3 we look at the opportunities and synergies that show up when software and Robotics are combined. In Section 4 we highlight the implementation challenges that an RPA and AI innovation process may involve for a company. In Section 5 we focus on insurance companies and briefly analyze the potential impact of Robotics on a number of fields of insurance businesses, including claim automation, bespoke insurance solutions design, customer contact, fraud detection and prevention, dangerous/catastrophe site inspection, recognition via drones and risk measuring sensors, among others. We include a brief description of a case study involving RPA implementation for a large insurer. We conclude assessing the overall challenges and opportunities that Robotics represents for the insurance industry in particular.

2. What is Software Robotics, and why does it matter?

Software Robotics has received a lot of attention in the last year. This includes both popular press speculation about the impact on jobs (FT, 2015) and the analyst press discussing the potential impact on offshoring and outsourcing (BBC, 2015). The promise of Software Robotics is to deliver a solution that can rapidly automate manual back-office and customer-facing processes, making them faster, significantly more cost-effective, and improving consistency and regulatory compliance, all with a return on investment typically in less than one year.

Many leading banks and insurers have successfully piloted Robotics solutions, but to date relatively few have succeeded in industrializing the benefits. However, the size of the prize on offer from doing so, in terms of both cost savings and service transformation, places accelerating and industrializing Software Robotics firmly on the agenda for the C-suite of most financial services groups.

But what is exactly RPA? Robotic Process Automation, also known as Software Robotics, is the use of a new class of software to automate business processes at a fraction of the cost of traditional solutions, without the need to change
current IT systems. RPA works by replicating the activities that people currently undertake, using existing core applications, accessing websites, and manipulating spreadsheets, documents and email to complete tasks. Using RPA software involves mapping out current or new processes, linking it to existing applications, and then scheduling them to run on one or more robots whenever required.

The individual elements of RPA software are not new. However, it’s the combination of all the features into a single, mature package that works with existing systems which, in many cases, creates a compelling alternative to core-platform integration or replacement. And not only can RPA reduce manual operations costs by 25-50% or more, it does this while improving service and compliance, and typically provides a return on investment in less than a year.

Because the software replicates human activity, it can be thought of as a set of software “robots”, forming a virtual workforce available 24 hours per day, with full audit and 100% accuracy. We briefly discussed the concerns about potential impact on unemployment in the introduction, highlighting also the potential positive effects. Overall, the concept of a “virtual workforce” has proven to be a useful perspective from which to approach Software Robotics, as it emphasizes business rather than IT control, and provides for rapid adoption through existing compliance and risk management frameworks.

In addition to “Standard Robotics”, there is also an increasing interest in “Intelligent Robotics” - the use of machine learning and AI approaches to allow automated processes to self-adjust and improve, and to tackle subjective decisions as well as following simple rules. This extension offers both improved, data-driven decision-making at speed, and increases the scope of manual work that can be automated. We see two different approaches to Intelligent Robotics. First, use-case specific solutions (such as intelligent document scanning for handling paper, or speech-recognition systems for call centers), and second, the combination of analytics platforms with RPA software. In the latter case, the analytics platform is the “brain”, with the RPA software providing the “body” of the robot, able to collect the information required and take the resulting action.

What about Cognitive Robotics/AI?
There is also a lot of focus at global tech conferences on the potential of Cognitive Robotics/AI, with leading companies developing driverless cars and self-navigating drones. While the progress being made in these projects is very impressive, the costs are significant and they expose some interesting challenges related to the general AI issues we discussed in the introduction.

Relating this back to financial services, the equivalent would be self-optimizing customer service, loan pricing, financial advice, or claims or complaint handling. Designing a good statistical or machine-learning optimization approach is challenging, but designing and monitoring one that aligns to legal, regulatory and ethical conduct requirements can be even more challenging. From an emotional perspective, there are currently no intelligent solutions that have yet reached human capability, as everyday experiences with voice solutions testify, see again Herkewitz (2014). Indeed, as we pointed out in the introduction, it is not even clear what human intelligence is, and whether it can be simulated or even evoked with a purely computational approach.

**RPA software distinguishing features:**

1. **Purpose**: Designed to carry out business processes, replacing manual activity
2. **Approach**: Visual, or “code-free” interface to define target processes and link to existing core platforms user interfaces and desktop applications. No (or limited) technical integration required
3. **Usability**: Suitable for IT-iterate business users and operations teams, rather than IT development or integration teams
4. **Scalability**: Runs in a data center, and can support high-volume, 24x7 operation, with scheduling, monitoring and reporting
5. **Compliance**: Full audit of both process definitions and individual tasks executed, and full security model supporting segregation of duties
Nonetheless, there are clearly areas where a degree of learning or “cognitive” technology offers a significant advantage, such as processing of paper documentation, understanding speech, detection of fraud, and so on. In these areas, there are three standard approaches:

1. Adoption of a niche product. This is common for highly specialized situations like voice processing and natural language interpretation, or for analysis of legal contracts.
2. Adoption of a targeted solution, such as a generic document scanning and intelligent character recognition solution for processing a variety of paper documents.
3. General cognitive robotic platform, combining an analytics or machine learning platform with the Robotics tool as described above.

One may argue that Cognitive Robotics carries a substantially higher cost than standard RPA, and therefore should be reserved for the highest value processes only. As a more general solution, it could also belong to a future wave of automation at a point when both financial services organizations are more mature in the deployment of advanced analytics techniques and associated model risk management, and the technologies are more mature and lower in cost.

3. Digital and Robotics: combination benefits
As outlined above the gains from automation can be considerable. But much more is possible when Robotics and digital are brought together. RPA needs to work with content that is available within a system. So for example, it can only automate a claims process once the initial information has been dealt with by one or more agents. That might involve a number of conversations and the manual input of information from supporting documentation. But if those preliminary stages are delivered via digital channels that maximize the extent of customer self-service, robots can get to work faster and across an entire end-to-end process. In other words, digital and robotic automation can deliver an overall solution that is far greater than the sum of its parts.

The return on investment that the combination can deliver will significantly outstrip those available from Robotics alone in fact by as much as two and a half times. As Robotics takes on greater responsibility for an end-to-end process and minimizes or even eliminates altogether the amount of human intervention required, potential ROI rises sharply.

Connecting digital with Robotics addresses some of the largest inefficiencies in current processes. And it can achieve this in a number of ways, working with any legacy system and, with a digital adapter sitting on top of the Robotics, can in fact digitize whole new areas of business process. And this is where one may see the next big wave of opportunity. Digitizing the entire estate is far too costly a prospect for most businesses to even contemplate. For example, insurers are likely to be able to digitize support for only in the region of just 25% of their current products and services. But the combination of Robotics with digital expands the scope across a far wider range - and therefore the available savings too. And even where it’s not possible to digitize certain elements of a process, using intelligent Optical Character Recognition (OCR) technology can achieve comparable results.

4. RPA implementation challenges and opportunities
As EY (2016a) points out, while combining digital and Robotics is an essentially simple concept, it requires care in realization to ensure that appropriate digital service levels, cyber controls and volumetric requirements are met, without compromising the agility of the core robotic capability being created within the business. EY (2016a) looks at some of the more practical challenges associated with using RPA. That includes identifying use cases, common problems encountered in implementing RPA and some pointers from EY’s experience of working on successful projects in financial services. We report some of the main findings here. EY (2016a) breaks the issues into two components: the common single issues across failed RPA projects and the multiplier effect from multiple issues. We will discuss these components in the following sections.
4.1 Top 10 common issues in failed RPA projects

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<th>Issue</th>
<th>Description</th>
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<td>1. Targeting RPA at the wrong processes</td>
<td>Targeting RPA at a highly complex process is a common mistake. This results in significant automation costs, when that effort could have been better spent automating multiple other processes. Often these processes are tackled only because they are very painful for agents, but may not offer huge savings.</td>
<td>Perform a proper opportunity assessment to find the optimum portfolio of processes. Low or medium complexity processes or sub-processes are the best initial target for RPA, with a minimum of 0.5 FTE saving, but preferably more. Only tackle complex processes once you are RPA-mature, and then perhaps look to automate the highest value/easiest parts first and increase the percentage of automation over time.</td>
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<td>2. Using the wrong delivery methodology</td>
<td>Quite often companies try to apply an over-engineered software delivery method to RPA, with no-value documentation and gates, leading to extended delivery times - often months where weeks should be the norm.</td>
<td>While IT governance is essential, most software delivery methods are over-engineered for RPA - especially as RPA rarely changes existing systems, and processes are documented in the tool. Look to challenge existing methods, and use an agile delivery approach to deliver at pace. Good RPA centers of excellence, with the right methods, can deliver new processes into production every 2-4 weeks.</td>
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<td>3. Thinking skills needed to create a PoC are good enough for final production automations and one can move immediately and trivially from prototypes to full production</td>
<td>One of the common traps of RPA is that with just a day or two of training, most business users can automate simple processes. But the skills needed to create scalable, resilient RPA processes are significantly greater, leading to lengthy testing and re-work cycles.</td>
<td>It is good to expect needing at least 2 weeks of classroom training, then 2-3 months of hands-on project delivery with supervision and coaching, before an analyst can deliver production-quality automations well. It's essential not to skimp on teams' training or skills transfer or support.</td>
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<td>4. Automating too much of a process or not optimizing for RPA</td>
<td>Often we see that companies try to totally eliminate human input in a process, which ends up in a very significant automation effort meaning additional cost or a delay to benefits. But we equally often see no effort in changing existing processes to allow RPA to work across as much of a process as possible, and hence reduced savings.</td>
<td>The best way to view RPA initially is as the ultimate &quot;helper&quot;, carrying out the basic work in a process and enabling humans to do more. Automating 70% of a process that is the lowest value, and leaving the high-value 30% to humans is a good initial target. It's always possible to back and optimize the process later. And while fully &quot;learning&quot; every process may take too long, look to see if simple tweaks mean that a robot can do more of a process.</td>
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<td>5. Forgetting about IT infrastructure</td>
<td>Most RPA tools work best on a virtualized desktop environment, with appropriate scaling and business continuity setup. It can be so quick to deliver RPA processes (typically weeks not months), that IT has not had the time to create a production infrastructure and hence get on the critical path to delivering benefit.</td>
<td>Take advice about exactly what IT infrastructure will be required from the RPA vendor or RPA SI. Knowing your company's lead times, ensure an appropriate &quot;tactical/physical PC-based infrastructure&quot; plan is in place, if a production environment is not feasible quickly.</td>
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<td>6. Thinking RPA is all that's needed to achieve a great ROI</td>
<td>While current RPA tools can automate large parts of a process, they often cannot do it all - frequently because the process starts with a call or on paper, or requires a number of customer interactions. Hence companies often end up automating many sub-processes, but miss the opportunities to augment RPA with digital or OCR and automate the whole process.</td>
<td>The cost arbitrage of RPA is significant. As an example, in the UK a robot can be 10-20% of the cost of an agent. But more often than not, a robot only works on sub-processes and hence leaves a lot of the process that a robot cannot handle, and therefore limit savings. Having invested heavily in digital and OCR technology that works well with RPA (and most don’t), we are seeing that benefits can be up to 2.5x that of RPA alone - can truly deliver near 100% straight-through processing even on old legacy systems, and are just as easy and cheap to deliver as RPA alone.</td>
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Table 1: Delivery/Technology Issues
4.2 The multiplier effect
More than one of the issues outlined above is often present, creating a significant multiplier effect. As our “top ten issues” list shows, it takes sufficient forethought or outside help to mitigate these issues. And, unfortunately, if more than one of these issues occurs – which is common – there’s a significant multiplier effect that can lead to loss of belief in RPA and projects stopping.

Let’s look at an example, creating a simple data-entry proof of concept (PoC) and taking into a user pilot on test data, where three of the simpler issues are encountered in a RPA program.

Table 2: Program issues

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<td>7. RPA being IT-owned, whereas it’s best being owned by the business</td>
<td>As RPA is software, some companies assume that RPA should be IT-controlled. However this approach can significantly limit its take-up within a business, and hence waste significant investment and potential.</td>
<td>Often companies think about the initial automation project, but forget that ultimately RPA will deliver a virtual workforce that allows the business to task robots across the entire business. IT would not be in charge of managing the current agent workforce, nor should they manage a virtual one. And as back-office agents can be trained to teach robots, having a business-owned RPA Center of Excellence (CoE) means having very little dependency on a constantly stretched IT dept. So business-led CoEs allow the business to prioritize which processes to automate and what the virtual workforce does, requiring only oversight from IT.</td>
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<td>8. Not thinking about scaling past PoCs or pilots, and not having an RPA business case</td>
<td>A common route for most organizations is to perform an initial proof of concept (PoC) or pilot, to see that RPA delivers on its promise. But often there is then an embarrassing gap between a successful PoC and large-scale production automation, as RPA programs cannot answer simple questions from the board about “Where are we going to target RPA?”, “How much will it cost?” and “What’s the return?”</td>
<td>There is a significant body of evidence to show that RPA can deliver tangible business benefits across all types of company, even those with the most archaic IT systems. We typically advise companies to carry out a rapid company-wide or unit-wide opportunity assessment alongside a PoC. Typical PoCs can automate sophisticated processes in weeks, which is all it takes to perform a solid opportunity assessment and create a detailed business case. This means quick stakeholder sign-off, and enhances the momentum of the RPA program.</td>
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<td>9. Not thinking about after processes have been automated</td>
<td>As described above there are a number of issues with just getting an RPA program mobilized, targeted and delivering at pace. But another common mistake is neglecting to consider how to get processes live and who runs the robot workforce - both issues that will delay go-live and timely delivery of benefits.</td>
<td>As described above, we believe a business-led RPA CoE is the best way to manage and enhance a virtual workforce - but it doesn’t just spring into existence. So the CoE processes need to be in place, IT governance agreed, and staff trained to operate robots and continue to enhance processes. While this seems daunting, a well-executed skills-building program can see a fully self-sufficient CoE established within 6-9 months - and usually quicker and less restrictive than negotiating an outsourced CoE arrangement.</td>
</tr>
<tr>
<td>10. Not treating RPA as a change program, with a focus on realizing benefits</td>
<td>RPA often involves automating sub-processes and hence people are still involved in the remainder of a process. So unless a structured re-organization and FTE-release or capacity happens, then agents “drift off” and start to perform other work – which is often providing a better service as they now have more time.</td>
<td>While providing better service is laudable, ultimately an RPA program must deliver its planned benefits in order to continue to roll out. Focusing on measuring and realizing benefits is therefore key. Note that in doing opportunity assessment, we usually recommend a portfolio of savings, service improvement and transformation processes is delivered – each of which needs to be measured and benefits delivered in order for ongoing investment to continue.</td>
</tr>
</tbody>
</table>
Impact of Robotics, RPA and AI on the insurance industry: challenges and opportunities

4.3 RPA vs platform upgrade
As we pointed out earlier, the core benefits from Software Robotics are the same as for any automation approach: reduced overall cost; improved speed and timeliness; improved accuracy; improved governance and control; and full audit history. In a sense, these benefits are the same as those typically associated with a core-platform upgrade. However, Robotics can, in many cases, deliver these benefits much faster and at lower cost than traditional IT integration projects.

That’s for three key reasons:

1. The use of existing user interfaces means there is no (or very limited) requirement to change existing legacy systems, something which is often expensive and time-consuming.

2. Integration testing costs are also significantly reduced, as there is no requirement to synchronize releases across all the platforms. Robotics works with the core platforms as they are at any given point in time, and contains many accelerators for accessing existing systems and desktop resources.

3. The visual nature of RPA tools, and the fact that they are building on existing core applications, allows process automation to be delivered incrementally using an agile approach – we typically see a two-week release cycle. This accelerates benefit realization, and improves transparency, reducing risk, and also allows for automation of processes which evolve over time.

4.4 Initial approach
One common challenge that organizations face when approaching the application of Robotics in their business, is simply knowing where to start. With candidate processes running into the thousands, identifying the opportunities that will yield the greatest and fastest returns can be an overwhelming prospect.

The simple answer is any team or process within your business which requires a significant manual team (for example greater than ten people) but limited personal customer contact. These are the processes which are most likely to yield realizable benefits that enhance customer experience. For a pure cost-reduction business case, we would also suggest selecting processes consuming at least 0.5 Full-Time Equivalent (FTE) resources each, with an initial target aggregate of 15-20 FTE minimum. In this way, it’s reasonable to expect the overall savings to cover the cost of establishing an RPA capability. But the human cost element isn’t the only benefit; that approach often underestimates the return on investment (ROI).

Let’s take customer onboarding as an example. Automating application processing, verification and account set-up processes across multiple legacy applications and teams can reduce cost and improve the customer experience by

<table>
<thead>
<tr>
<th>Issue</th>
<th>Typical time to deliver if issue avoided</th>
<th>Typical time to deliver if issue impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Using the wrong delivery methodology</td>
<td>With skilled resources and an agile, RPA-centric method employed, simple sub-processes are typically automated and ready for live in 2-4 weeks. And as one has agreed the governance with IT, and met the criteria, the CoE can promote into the test environment.</td>
<td>If a software delivery method is used, then excess documentation and governance gateways can quickly mean a process can take 6-8 weeks to deliver ready for live.</td>
</tr>
<tr>
<td>2. Assuming skills needed to create a PoC are good enough for production automations</td>
<td>If one knows a PoC is due to go live then the right development rigor is used and unit tested. Hence PoC may go from 1-2 weeks to 2-3 weeks with negligible overall impact.</td>
<td>If a PoC is delivered without the right design or quality for production, there can then be numerous cycles of testing and re-work before it is fit to go live - adding 2-3 weeks.</td>
</tr>
<tr>
<td>3. Automating too much of a process or not optimizing for RPA</td>
<td>Assuming we only look at the optimum 70% of a process, we should be able to automate in 2-4 weeks.</td>
<td>Continuing to automate the remaining 30% often involves convoluted exception handling or multiple diversions from the “happy-path”, so can double the time to deliver - adding 2-4 weeks.</td>
</tr>
<tr>
<td>TOTAL</td>
<td>2–4 weeks</td>
<td>10–15 weeks</td>
</tr>
</tbody>
</table>

Table 3: Data-entry PoC example
reducing the time taken from weeks to days or even hours. Insurers could automate claims processing for a large percentage of cases, reducing the timeline to hours or days, as opposed to weeks or months. In both of these cases, RPA provides a fast and cost-effective solution to transforming the customer experience with very limited impact or change to core platforms. In comparison, a traditional core platform integration or replacement program would impact many systems, and would be complex and expensive to implement.

Additional sources of benefit derive from areas of process improvement and standardization, for example:

- Processes where increased speed and timeliness would improve customer experience
- Processes with quality or consistency issues, or where there is a regulatory requirement for automation and control
- Changes and new features required for propositional enhancement that have been stuck on core platform development roadmaps for more than 12 months, or which are seen as prohibitively expensive to implement
- Processes which evolve on a monthly, quarterly or annual basis, and for a solution is required which can be adapted easily by business users

According to EY (2016a), to help companies target their investments, EY has developed an opportunity assessment framework taking all these factors into account. This helps organizations to assess operations across a given country or countries with analysis of the business case for robotic automation that each process offers. For insurers, the framework is “pre-loaded” with value chains illustrating the automation opportunities across life and pensions and general insurance. Using the framework enables companies to understand the targets for automation that will generate a given level of savings and shows the costs and ROI for every potential project.

4.5 How is Robotics deployed and what is the target operating model?
While Robotics is based on deployment of a software tool, it should not be treated as an IT integration. That approach generally leads to low adoption and reduced benefit. A far more effective approach is to imagine a virtual workforce, or a set of invisible robot hands, working from a task list and following documented processes. In a sense, this is comparable to the deployment of desktop tools: IT provides the platform, and business users make use of the software to add value. For Robotics, it should be business users (or staff very close to business departments) automating processes.

Within a large organization, the actual operating model will need to be scaled into a centralized, hybrid or distributed Robotics capability, but the principle of keeping ownership and control for process automation close to business users and departments is key to successful adoption, and for protection of business agility.

4.6 Robots and people
We now go back to the central theme we mentioned in the introduction. Robots are a highly flexible workforce that can seamlessly move from any defined task to any other to meet business needs, at the same time freeing people from routine tasks and allowing people to work on more intellectually and emotionally interesting tasks. What robots are not intrinsically able to do, however, is to exercise subjective judgement, to build empathy or support customers’ emotional needs. They are not able to handle situations that are new and different from the processes prescribed to them. In this sense, they are not a replacement for people.

The real benefits come from the combination of people, core platforms and robotics so that:

- Core platforms support core data records and automate highest value processes.
- Robotics runs all the repetitive, standardized processes across separated core platforms, and one-off high-volume processes or rapidly evolving processes which are costly to automate within core platforms.
- People focus on adding value through strategy, building deep customer relationships, managing exceptions, driving change and continuous improvement, and low-frequency activities that are not cost-effective to automate.

In a sense, this is “taking the robot out of the person”;

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stopping asking people to perform tasks that people are bad at (repetitive, high-volume activities), so they can focus on what they are good at, reducing cost, improving quality and improving productivity.

In many instances, we see this enabling a business to run a better service with a reduced headcount, but in many others it can simply free people to accelerate strategic change and to enhance service and productivity.

5. Robotics for insurance
We now briefly look at the potential benefits of RPA, AI and drones for the insurance industry. A similar analysis has been presented in Cranfield and White (2016). We may begin by looking at the potential benefits of RPA and AI, or cognitive computing, for insurance. A quick list, overlapping with our previous analysis above, would suggest reduced costs for operations, possibility to offer new services, bespoke products for individuals, fraud detection and prevention, and improved risk assessment accuracy. A few of these possibilities are still tentative right now and depend crucially on a rapid advancement of AI.

5.1 RPA in insurance
As far as RPA is concerned, we already discussed the general benefits and implementation issues for RPA above. RPA is already a reality for insurance, and most of the general discussion we had earlier extends straightforwardly to insurance. RPA benefits for insurance include the reduction of a claims documents processing team and of costs more generally. Cranfield and White (2016) explain how an insurance claims outsourcing and loss adjusting firm managed to implement RPA, leading to a team of just four people processing around 3,000 claims documents a day. Without RPA, running a similar service would involve a team up to 300% larger. An idea of the kind of benefits that can be obtained via these processes has also been given by Guttridge (2015), as reported in Cranfield and White (2016), where it is pointed out that in less than two years 10 automated processes within the insurance business had been introduced. This led to processing time reduction, including one process by over 90%, uninterrupted operations with multi-skilled robots working on processes 24 hours a day, seven days a week. Automation allowed to free resources who worked on customer focused tasks. Another important benefit has been the lack of human errors in processes.

5.2 AI/Cognitive computing
Insurance applications such as bespoke products for individual clients would require an intelligent virtual agent/broker and a high degree of cognitive computing, with the caveats we presented in the introduction. It is not really clear whether machines will attain human-level interaction capability in the next few years. Optimists say we already have the technology that is needed for this, but the reality is that human-level interaction is still quite limited. As we observed in the introduction, Douglas Hofstadter (Herkewitz 2014) argues that popular cutting-edge vocal applications and translation/game-playing programs that are routinely exalted by the press and commentators as proof that AI is advancing, do not contain any real AI. We will have to wait and see if the technology really attains credible human interaction capabilities. When this happens, we could indeed have personal bespoke virtual brokers for tailored life and car driving insurance policies, for example, with an enlargement of the insurers’ services to a much broader population and for a much broader range of risks. Another area where AI could be used, potentially, is on claims validation. While RPA can considerably simplify the operations around claims management, the approval of a claim still requires judgement and evaluations beyond the RPA grasp. In this sense a sufficiently advanced AI, having access to the claim-related data via drones, sensors or preferred news channels, could pre-validate or pre-approve claims by verifying the claimant information and data, potentially using drones if further investigation is needed. We will introduce drones and sensors below. Another application of AI to insurance could concern customer services and call centers: both could benefit from an AI approach once AI reaches a sufficiently advanced level. A hybrid approach could also be used: an AI system augmented with human intervention when needed. AI algorithms could also use social data to design fraud indicators that could predict to some extent the risk of a fraud from a given entity. Currently, machine learning algorithms are being used for fraud detection, see for example Guha et al (2015). As AI advances, these algorithms could attain higher predictive power and could become crucial in the management of fraud risk.
5.3 Drones/Sensors
Drones are vehicles that can move with a degree of autonomy. The typical drone is an unmanned aerial vehicle (UAV), namely an aircraft that does not have a human pilot aboard. It may be piloted at a distance by a human via remote control, or it may be fully/partly autonomous via an internal computer. Although drones originated for military applications, to deal with situations that may be too dangerous for humans, they are currently deployed also for civil usage, typically for data collection, aerial photography and agriculture. A possible use for insurers would be a dangerous site inspection for claim validation, as we hinted above. As regards sensors, they are devices that can be used to assess the behavior of insureds in relation to the risk being insured. Meek (2014) presents the important example of a sensor device that can be connected to a car port to measure and send signals on the car braking, turns, acceleration, and what time of day the insured is driving. The sensor device uploads the related data to the relevant company, which can use the data to rate drivers and offer a potential discount incentivizing safe drivers. The data on speed and location may not be collected, although they may be made available to the insureds. More generally, drones and sensors offer a number of opportunities and challenges (EY 2016b, Johnson 2014). We already considered the use of drones for claim validation above. Similarly, sensors would measure the insured person/property/vehicle risk-sensitive parameters, allowing the insurance company to tailor the insurance offer to the specific client risks, and verifying that the risk profile the client has in mind corresponds to the actual risks measured in reality. Sensors could also create a positive feedback effect on clients. A client who is aware that their car or property contains a number of sensors will be more careful in driving and managing the property, being aware that sensors will record a number of parameters. Speed excess with a car is less likely if the insured person knows a sensor is present in the car, and that their next insurance premium could increase in case of risky behaviour. The whole area of usage-based insurance is based on the possibility to maintain and improve a sensors-based approach to a much broader base, with potentially lower premia for clients and reduction in risk for insurers. Given current limitations of AI this is still tentative, but it is definitely an area where insurers are investing relevant resources (EY 2016b).

6. Conclusions
In this paper we highlighted the current challenges and opportunities in applications of Robotics to financial services and to insurance in particular. Combined RPA and software approaches have been already implemented with considerable benefits in cost reduction and efficiency, and we highlighted the general benefits of RPA and the related implementation challenges in detail. More advanced AI applications depend on the general advancements of AI, and human-level interaction agents are not there as yet. Nonetheless, we can foresee the great potential for these applications and have discussed some initial examples.
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The value and price of a "too-big-to-fail" guarantee: evidence from the insurance industry

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Abstract

This paper analyzes the impact of the evolution of the regulation dealing with systemically important insurance groups, using an event study methodology. The results show that investors were able to detect which companies were to be designated well ahead of the publication of the list. Most importantly, after an initial positive reaction, consistent with the expectation of a “too-big-to-fail” implicit subsidy, the disclosure on how the capital charges for systemic insurers would be calculated led to sizeable negative abnormal returns for the entities concerned. Leverage plays a key role in driving investors’ reaction; more leveraged entities experience higher abnormal returns when the expectation of a TBTF guarantee arises and lower ones when information on the size of the capital charges is revealed.
1. Introduction and motivation

In 2008, the biggest bailout in history prevented the failure of a large insurance company, AIG. This was coupled, in Europe, with substantial amounts of public money being used to rescue and recapitalize financial conglomerates with sizeable insurance activities. Despite AIG paying back bailout funds in the following years, concluding repayments in 2012, this has raised the question of whether insurance companies can become an important source of systemic risk and, if so, which entities should be regulated and how. Since 2012, international regulators have proposed a new framework aimed at identifying and regulating Global Systemically Important Insurers (G-SIIs). This framework foresees stricter oversight of accounts and practices, the requirement for the designated companies to prepare a plan allowing an orderly resolution of the entity in case of severe distress and, above all, envisages an additional capital requirement to which G-SIIs will be subjected, the Basic Capital Requirement (BCR).

This paper seeks to assess how financial markets have reacted to the introduction of this regulation between the end of 2011 and the end of 2015. In particular, I try to gauge to what extent insurance companies designed as systemically important, or those who may be so in the future, enjoy a “too-big-to-fail” (TBTF) premium and/or whether the imposition of additional capital requirements has been perceived as burden. In order to distinguish with precision which entities are liable to fall under the new measures I explore the different layers of regulation recently proposed for domestically and internationally active insurance groups. Following what is being done for other components of the financial industry (especially banks) I use a time-tested event study methodology.

The results show that this regulation does matter to investors, as the key steps of the regulation were accompanied by statistically significant abnormal returns for the equity of the entities affected. Investors were able to identify which companies would be designed as G-SIIs a year and a half before the official designation, and the positive reaction to the extension of the framework for systemically important banks to insurance companies can be thought as the perception of a valuable “too-big-to-fail” implicit guarantee, in line with what was found in similar studies on the banking sector. However, when details emerged, after the formal designation, on what arguably is the most important policy measure, the Basic Capital Requirement, G-SIIs experienced negative abnormal returns, which can be seen as a gauge of the price of the TBTF guarantee. This interpretation is corroborated by the fact that both the first-positive-effect and the second-negative-effect are stronger for more leveraged entities.

The overall impact of the regulation so far is not very large, slightly below what found for banks. Considering the group of G-SIIs, the cumulated abnormal return of the events, when they are statistically significant, is 0.58%. The -0.18% return differential with respect to a group of large multinational insurers which are not designated as systemic indicates that, so far, the price of the TBTF guarantee is perceived as slightly higher than its value. These findings, along with the results of the responsiveness of abnormal results to company characteristics, can hopefully inform the debate on the regulation and provide support for the next stages.

In Section 2 I briefly describe the cases of public bailouts of insurance companies during the 2007/8 financial crisis and sketch the new regulatory framework for global insurers that is being developed. Section 3 illustrates the differences between the banking and insurance business, the merits and limitations of capital-based regulation applied to insurance intermediaries and the evidence available so far on the TBTF premium in insurance. Section 4 summarises the methodology utilised. The results are shown in Section 5 and discussed in Section 6. Section 7 concludes.

2. The insurance sector, the financial crisis and the new regulation

The insurance sector was not spared by the global financial crisis and some groups had to be bailed out by governments or central banks. Towards the end of 2008, as a consequence of the rapidly escalating losses on its CDS portfolio, AIG, one of the largest insurers in the world, had to be bailed out by the US government. In September 2008 the Federal Reserve recapitalized AIG for USD 85 billion, in exchange for 79.9% of AIG equity; one year later, escalating uncertainty over the future of the company forced the Fed to pledge another USD 37.8 billion. This amounted to the largest bailout in history. On top of that, AIG was forced to
sell part of its insurance business. More specifically, the amount disbursed to support AIG reached USD 184.6 billion in April 2009. In return, AIG paid interest plus dividends on the received funding and US Treasury obtained a 92% ownership share in the company. As of December 14, 2012, the government assistance for AIG concluded. All Federal Reserve loans were repaid and the Treasury sold all of the common equity obtained through the support (Webel, 2013).

During the subprime crisis, other large US insurance companies, in addition to AIG, received public bailout funds through the TARP scheme, many others applied for it and others benefited from capital relief because of ad hoc regulatory changes. Many of them came under distress as the large losses in their investment portfolio, coupled with long-term guarantees to policyholders, quickly eroded their capital base. Others, writing financial guarantees to other firms, were unable to pay the claims related to the defaults of mortgage-backed securities. Finally, several life insurers qualified for public bailout because of their status as bank holding companies.1

In Europe, public support was given to the insurance subsidiaries of banks (such as RBS in the UK and Fortis in Belgium) and, to three large Dutch financial conglomerates: ING, Aegon and SNS Reaal. Within the framework of a Europe-wide financial plan, €30 billion were made available to prevent a liquidity shortfall; €14 billion were actually used.

Regulators have started responding to the problems that surfaced in 2007/8 within a wider framework for the regulation of insurance activity at the global level. The measures aim to target two issues: 1) how to regulate large and complex groups operating under different jurisdictions and 2) how to mitigate the contribution of the insurance sector to financial systemic risk. The focus of this paper is on the latter set of measures.

In order to respond to the growing complexity of the global insurance business1 the body in charge of coordinating insurance regulation internationally, the International Association of Insurance Supervisors (IAIS) has drafted a framework of globally accepted principles framing the supervisory activity, called Insurance Core Principles (ICPs). This is a set of principles and standards intended to help local supervisors design and implement a more effective supervision. These principles, which are not mandatory, are to be applied to any insurance company, on both a legal entity and group-wide level, in an attempt to cover all aspects of the regulatory activity, from the powers of the supervisor, to the set-up of the risk management framework and to the prevention of fraud and money laundering.2

The ICPs have then been extended to create the Common Framework for the Supervision of International Insurers (ComFrame), a set of requirements specifically focused on the group-wide supervision of internationally active insurance groups (IAIGs): an IAIG is an entity which writes premiums in at least three jurisdictions, with at least 10% of them outside the home market, and which has total assets of at least USD 50 billion or gross written premiums of at least USD 10 billion, based on a three-year average. No distinction is made either between primary insurers and reinsurers or among pure life or P&C insurers and composite entities. The IAIS has so far refrained from publishing a list of the IAIGs, the number of which should be around 50 worldwide, according to press estimates. A crucial feature of the ComFrame is the provision of an additional capital charge to be applied to large international insurance groups; the details on how this capital charge will operate are to be disclosed in late 2016.

In addition to the ComFrame, new regulation is being drafted in order to minimise the contribution of the insurance industry to systemic risk. The starting point is of course to assess which parts of the insurance business may be a source of systemic risk. A discussion of what in the insurance business constitutes a source of systemic risk is clearly beyond the scope of this paper, and in-depth analysis of the issue can be found in several recent overviews.3

In May 2011 the IAIS presented its thinking on the matter, and sketched the possible regulatory responses (IAIS, 2011). First of all, the IAIS states that traditional insurance activity is not a

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1 Schwarcz & Schwarcz (2014).
2 See Schoenmaker, Osterloo, & Winkels (2008) for a description on how the globalisation of the insurance industry is changing the structure of large multinational groups, leading to the centralisation of some activities. Cummins & Vanard (2007) provide some fitting examples of the tension between the existence of a global structure and the need to comply to strict national regulation and market practice.
3 See IAIS (2011) for a detailed list of the areas of application.
source of systemic risk, as it entails underwriting risks that are (i) idiosyncratic (ii) not correlated with each other (iii) not influenced by the business cycle.

However, as shown by the AIG case, insurance groups can contribute to systemic risk via non-traditional activities, which have rapidly increased in size and scope. In life insurance, the existence of financial guarantees on capital and, above all, minimum guaranteed returns attached to many products complicate the risk profile with respect to standard, pure risk, products. The collapse in asset prices or yields may leave some insurers unable to pay the guaranteed returns, leading potentially to insolvency; the exposure of life insurers to the same asset classes can lead rapidly to contagion. Other problems could come from non-insurance activities such as trade in derivatives, used to hedge assets returns. In non-life insurance, systemic risk is restricted to very specific lines of business, such as the supply of credit protection in the form of credit insurance, credit guarantees and derivatives (especially CDS).

The IAIS argues that, given the overall small size of non-traditional insurance, the potential contribution to systemic risk by the industry should be limited. However, other considerations, related to the size of the entities and their geographical reach must be taken into account. Insurers are large institutional investors, holding large positions in fixed income securities; therefore a main source of risk is linked to large drops in bond prices, not to mention defaults.

While systemic risk can arise due to the linkages between insurers and banks, the connections within the industry are much less a case for concern. As shown in Figure 1, there are profound differences in the way insurance companies and banks are interconnected. The banking networks allow for the possibility of distress in an entity to spread quickly to the rest of the industry, as shown by the freeze in the European interbank market in 2009 and 2011.

In insurance, on the other hand, the structure is normally highly hierarchical. There are almost no linkages among primary insurers; therefore, there is not a network comparable to the interbank market. Risks in the insurance sector are redistributed by reinsurance companies; they receive risks from insurers and may share part of it with other reinsurers via retrocessions.

The insurer-reinsurer relationship can have non-negligible implications for systemic risk, according to IAIS.5 The reinsurance market appears to be highly concentrated, and this leads to a strong interconnection between reinsurers and primary insurers ceding business to them. In principle the failure of a reinsurer

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5 For a completely opposite view see Kessler (2013).
may create problems as several contracts may be cancelled, leaving insurers without protection for tail risks, since contracts are very specific and difficult to be rewritten quickly.

Based on the considerations outlined above, IAIS has set up a framework to designate which insurance groups are systemically important (IAIS, 2011), and devised specific policy measures for them (IAIS, 2012a). The designation was based on a set of indicators related to:

- Size: the importance of an entity increases with the amount of services provided; however a large size is also a “prerequisite for effective risk pooling and diversification”.
- Global activity: the extent of international activity is a proxy of the negative externalities that distress may generate.
- Interconnectedness: interlinkages with other institutions may give rise to systemic risk.
- Non-traditional and non-insurance (NTNI) activities: activities such as investing substantially in the bond market or entering into derivative contracts are thought to be the biggest potential sources of systemic risk.
- Substitutability: the difficulty of replacing the services provided by an institution in distress increases its systemic importance.

This indicators-based methodology was complemented by soft information on specific features of the companies and their products, gathered through interviews with national supervisors.

On July 18, 2013 nine insurance groups were designed as systemically important (Global Systemically Important Insurers, G-SIIs). There are five European companies, Allianz (Germany), AXA (France), Assicurazioni Generali (Italy), Aviva and Prudential (UK), three from the US, AIG, MetLife and Prudential Financial, and a Chinese one, Ping An. In November 2014 the designation for these groups was confirmed, with no additions to the list. It changed in October 2015, with Generali being replaced by the Dutch insurer Aegon.

Together with the first list, a set of policy measures for G-SIIs was decided. It includes the following:6

- Systemically important insurers will be subjected to a more intensive and coordinated supervision, on top of the other requirements determined by national (and supranational, in case of EU insurers) authorities. Moreover, plans to restrict non-traditional and non-insurance businesses and separate them from the mainstream activities may be envisaged.
- Increased resolvability of groups or parts of them, in order to improve the supervisor’s ability to resolve an entity in distress, minimising the impact on the rest of the financial system and the taxpayer’s exposure to the risk of loss. G-SIIs are required to present a plan detailing how to handle the restructuring in case of failure.
- Higher Loss Absorbency (HLA): a higher level of capitalization will be required given the risk G-SIIs pose to the global financial system. The initial step is constituted by a Basic Capital Requirement (BCR). The BCR is to be calculated using a factor-based approach using risk weights related to different areas of activities, and applied on a group-wide basis.7 This will be replaced at some point by a global Insurance Capital Standard (ICS), which will be applied to all IAIGs.

The resolution plans were submitted to the regulator during summer 2014 and, after a discussion begun in October 2013, in November 2014 the model to calculate the BCR was presented. The details on the HLA were published in October 2015. From 2019, G-SIIs will be required to hold a level of capital no lower than the BCR. Figure 2 summarizes the different layers of regulations and the types of companies affected by each of them.

The new regulatory framework creates three groups of insurers:

1. Those that are too small or focused on just one market to be subjected to the ComFrame
2. The IAIGs that will have to adopt the ComFrame
3. A subset of the IAIGs, determined on an annual basis, deemed to be systemically important, to which the G-SII regulation will apply

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6 For a quick presentation of the measures see IAIS (2014b).
7 The details on how it is to be computed can be found in IAIS (2014a).
It follows that insurers belonging to group 1 will never be subjected to the G-SII regulation, whereas those in group 2 may be. In the empirical exercise I will exploit this fact to assess the impact of the evolution of the regulation on the equity prices of different groups of companies.

The process of identifying the systemically important insurers has so far spanned over four years. These are the most salient events, which will be considered in the empirical analysis.

1. November 15, 2011: The IAIS publishes a document on the relationship between insurance activity and systemic risk (IAIS, 2011) and sets a list of which activities undertaken by insurance groups can be a source of systemic risk. It contains also the first, tentative, list of policy measures to be taken in order to mitigate the contribution of the insurance industry to systemic risk.

2. January 10, 2012: The Financial Stability Board (FSB), the international body in charge of regulating the whole financial system, announces that the supervisory framework for systemically important financial institution will be extended to global systemically important insurance companies and other types of financial institutions. No details are provided on how or when this would be done and how to define systemically important insurers.


According to the Financial Times (Masters & Gray, 2012)

“Some 48 insurance groups in 13 countries are being targeted by global regulators for possible designation as "systemically important", a label that could lead to higher capital requirements and limits on business lines.”

4. July 18, 2013: The list of G-SIIs is published, together with the revised list of policy measures.

5. December 16, 2013: The IAIS publishes, for public consultation, the proposed methodology for the calculation of the Basic Capital Requirement to be applied to GSII.

6. October 5, 2015. The details of the Higher Loss Absorbency Requirement for Global Systemically Important Insurers are published. The IAIS paper stipulates how the extra capital requirement needed on top of the BCR is to be calculated.


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**Figure 2: The regulatory framework**

Source: Adapted from IAIS (2013a)

<table>
<thead>
<tr>
<th>Type of Entity:</th>
<th>Legal Entity</th>
<th>Group</th>
<th>IAIGs</th>
<th>G-SIIs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Tier: Insurance Core Principles</td>
<td>ICPs applied to legal entities only</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2nd Tier: ComFrame</td>
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<td></td>
<td></td>
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<tr>
<td>3rd Tier: G-SIIs Package</td>
<td></td>
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</tr>
</tbody>
</table>

Supervisory requirements and actions

- **1st Tier:** Insurance Core Principles
- **2nd Tier:** ComFrame
- **3rd Tier:** G-SIIs Package

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8 See http://www.financialstabilityboard.org/2012/01/meeting-of-the-financial-stability-board-in-basel-on-10-january/

9 See IAIS, 2015.
3. The role of capital and the "too-big-to-fail" premium

Investors’ assessment on the measure is likely to be driven to a large extent by the result of the trade-off between the expectation of a “too-big-to-fail” premium enjoyed by systemically important insurers and its cost, in terms of higher administrative charges and above all, higher and costlier capital requirements.

The G-SIIs’ regulation is based on a blueprint taken from banking prudential regulation, in which capital buffers clearly play a key role. However, this can be different, given the specificities of the two industries. While banks and (life) insurers share the role of channelling savers’ funds into investment and of large investors in financial markets, major differences emerge in several respects (Thimann, 2015). For the purpose of this analysis the most important ones are about the role of debt and capital, and therefore leverage.

Insurers, being pre-funded, do not need to issue much debt and, crucially, do not do that to finance core activities. Financial assets are acquired using the insurance premiums already earned, and not issuing additional liabilities. Therefore, while a higher capital charge will slow down asset accumulation and leverage in banking, the same will not happen in insurance, as the size of the asset size is mostly determined by the amount of premiums written.

As explained in Plantin & Rochet (2007), Chapter 4, in the traditional insurance business, capital serves as a buffer. If the proceeds from the sale of assets (which can take a long period and be conducted smoothly given the high liquidity of most assets) are not enough to cover all the claims, capital is used to pay the remaining claims, and only if it is depleted do the claimholders suffer losses. It works somehow in the same way as the deductible in a non-life insurance contract. Therefore, for insurers “raising capital [...] means that there are (even) more assets available to cover the liability stream [...]”, but such additional capital will be consumed, if at all, at the end of the process and has no crisis prevention or stabilisation function” (Thimann, 2015, page 376).

Additionally, bail-in is built in in most of the traditional life contracts as a participation to the gains (or losses) of the financial portfolios where their premiums are invested. This works as an additional buffer on top of capital. Unit-linked contracts with no guarantees on the amount invested would be, by definition, bailed in by policyholders.11

In non-life insurance, the policyholder’s claim to be compensated is guaranteed by the law regardless of the return from the investment of provisions. Policyholders are protected by the imposition of very prudent provisioning criteria, strong constraints on the asset classes in which provisions can be invested and/or by the requirement to hold extra capital over and above the technical provisions. As such, in these lines of business, a bail-in is ruled out.

Therefore, as far as the bulk of the business is concerned, the specificity of insurance may call into question the usefulness of capital surcharges as a systemic risk mitigating tool; as a consequence, it may be argued that any new regulation that increases surcharges may be perceived simply as an additional cost and investors may react negatively to news of their introduction.

Another crucial issue is whether insurers can be considered “too-big-too-fail”, thus raising the expectations of a public bailout in case of distress. As pointed out by Schwarz & Schwartz (2014), most of the US insurers that received government support as a consequence of the 2007/8 crisis were not “too-big-to-fail” in terms of size, but experienced distress due to the strong exposure to the mortgage-backed securities (both as liabilities for the companies writing credit insurance and as assets for life insurers) and the strong interconnections with other parts of the financial markets. The same applies for Europe, where it was mostly the banking and asset allocation arms of financial conglomerates that led to the distress which triggered the bailout.

Thus, it may be argued that the bailout was caused mostly by the activity undertaken by some insurers rather than by their size or core business. However, given the evidence on AIG and the large

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10 Normally debt is issued for M&A operations or to acquire fixed assets.

11 However, the existence of guarantees on the premiums invested and of minimum return of course changes the conclusion. In this case an adequate level of capital works as a buffer against adverse changes in the price and yields of financial assets. Recently, Berdin & Gründl (2015) developed a stylised model of a German life insurance company and showed that, in a scenario of prolonged low interest rate, quite a large number of companies with an insufficient level of capitalization would run the risk of going bust as the yield on investment remains below the guaranteed returns for a prolonged period.
Dutch conglomerates presented in Section 2, one could argue that, in case of other crises, large insurers could benefit from public bailout given:

- The role they play in providing long-term savings to a large number of people and the fact that the failure of a life insurer could lead to loss of confidence in the industry as a whole.
- The weight of their investment in some asset classes (for example, government and sovereign bonds); distress could trigger a fire sale of assets leading to potentially destabilising effects on prices. However, the extent of the sales may be limited by the ALM strategy aimed at reducing the maturity mismatch.
- The possibility that large losses in policyholder wealth due to the financial distress of an insurer and/or the plunge in its equity price may propagate to other parts of the financial markets, undermining the confidence in the whole system.

Figure 3 plots the dynamic correlation between the prices of CDS of ING and Aegon’s debt. The unfolding of the subprime crisis in the final months of 2007 led to a spike in the correlation between the perceived default risks.

According to the regulator, two main arguments supported the intervention (IAIS, 2011):

- Large losses in the investment portfolios of the insurance business led to a drop in solvency ratio; the ensuing chaos in financial markets exposed the banking arms to severe liquidity problems, preventing the access to market to restore the capital buffers of the insurance business.
- In a conglomerate, the loss of confidence in the banking or insurance sector may have propagated to the other sectors, and then to the rest of the financial system.

All this suggest that the existence and size of the TBTF premium is something that has ultimately to be assessed empirically.

The impact of the new regulation on systemically important financial institutions (SIFIs) on the banking sector is the subject of a few recent papers. Less has been written so far concerning insurance.

The consequences of the AIG crisis and subsequent bailout on stock prices are studied by Safa, Hassan, & Maroney (2013). They analyze the impact of the most important events related to the insurer’s near bankruptcy, assessing the extent of the contagion to other parts of the US financial industry. They find that the announcement of the first bailout had a positive effect on insurers’ equity price; in the day following the announcement average prices were 4% higher than what was projected by a factor model. However, immediately after the second bailout, stocks were 7% down with respect to the same benchmark. Equity prices of banks, brokers and savings and loans institutions show the same pattern. According to the authors, this indicates that, initially, the bailout was welcomed by the market, but the later realisation that the crisis was persisting and a new capital injection was needed depressed the valuations. Moreover, the authors try to test whether the Federal Reserve perceived AIG

12 For example, Bongini, Nieri, & Pelagatti (2015) study whether the release of information concerning the methodology to identify SFI, the list of designated banks and the new capital requirements had different impacts on the affected banks from that on non-designated banks. All in all, they find that the market reaction to the announcement was not very strong, slightly negative but very diverse according to the banks’ characteristics (level of capitalization, retail versus investment banks, etc.). Mixed but very weakly negative results are found by Kleinow et al. (2014): Interestingly, they find that the announcements of the banks designed as systemic leave their stock prices unchanged, and interpret this find as a sign that investors were able to predict the outcome of the designation process. Moenninghoff et al. (2015) find that, overall, the new regulation has a negative impact on the banks affected, which is however mitigated by the positive effect of the official designation. They also find that such a positive reaction may be linked to the expectation of a “too-big-to-fail” guarantee, which is exactly what the new regulation is meant to avoid. Schäfer, Schnabel, & Weder di Mauro, 2015 use event studies to analyze the impact of other reforms enacted after the subprime crisis in the US and Europe finding that overall, they reduce bailout expectations at the expense of lower equity returns.
as too big to fail. They estimate a factor model for financial intermediaries’ stock prices and introduce dummies for the period after the disclosure of large losses by AIG and before the first bailout (“crisis period”) and for that including the two bailouts (“post-crisis period”). If AIG was perceived as too big to fail, stock returns would have discounted an intervention by the Fed and the dummy for the crisis period would have been positive. Conversely, the dummy for the post-crisis period would be negative. The estimated coefficients, albeit having the expected sign, are not significant and this leads the authors to conclude against the “too-big-to-fail” hypothesis.

Dewenter & Riddick (2016) study the impact of several events on equity prices of eight of the nine insurers that have been named as systemic and a “control” sample of another 22 entities with similar characteristics. They consider the first AIG bailout and a few steps of the evolution of the G-SII regulation. They find that, adding the reactions to these events, designated firms enjoyed, on average, a “too-big-to-fail” premium of roughly 10% with respect to the other entities considered. Moreover, they find that in the G-SII sample, positive abnormal returns in several events are positively correlated with companies’ leverage and standard measures of systemic risk constructed using equity prices. This reinforces the authors’ view of the existence of a TBTF guarantee. Their analysis reaches three main conclusions:

“[...] first, [...] equity investors conclude that the potential benefits of the TBTF guaranty outweigh potential compliance costs for the designated firms, with stock prices rising an average 11.7% across the eight announcements, corresponding to an economically significant net increase in G-SII market value of $17.2 billion. The equity gains are not associated with a perceived fall in default probability, but are associated with an increase in implied asset risk of approximately 15%, and with a 2.5% abnormal loss to bondholders. These results are consistent with investor expectations that protected firms will increase asset risk in response to the moral hazard created by protection against default, and with investor expectations that bondholders will bear more risk and higher losses if the firm does fail, even with the G-SII protection. Second, we find that other large non-designated insurance firms do not, on average, enjoy any net benefits or costs from the new regulatory regime[...] consistent with the market recognizing that these firms fall outside of the TBTF umbrella. Third, we find that investors identified the likely candidates for G-SII designation very early in the process, with most of the net benefit embedded in stock prices a year before the final announcement of specific names”

(Dewenter and Riddick, 2016 p. 32).

Using a slightly different methodology in terms of estimation, choice of events, and considering both a much larger sample of securities and a different, regulation-based, criterion to select the “control” group, I reach somewhat different conclusions.

In the remainder of the paper I will seek to provide an empirical test of the following hypotheses:

1. The G-SII regulation is not considered important and therefore the new pieces of information have a neutral impact on stock returns.
2. The new regulation does have an impact, the sign of which derives from the balance of two effects:
   a. The new regulation, and especially the stricter capital requirements, may make insurers safer, reducing their cost of equity and propping up returns. At the same time, being designated as systemic implies the expectation of some sort of public guarantee: in this sense “systemic” can be read as “too-big-to-fail” and implies an indirect subsidy which boosts returns upon designation announcements.
   b. The higher costs and burden entailed by the new regulation offset the perceived TBTF benefits, leading to negative response of stock prices to any announcement.
4. Methodology

The methodology used for this event study closely follows the standard one described in Campbell, Lo, & MacKinlay (1997) and MacKinlay (1997) and surveyed more recently in Kothari & Warner (2007). For each company and announcement I estimate a simple market model using 88 observations ending three days before the event date; the sample length corresponds to four months of transactions and seeks to strike a balance between the need to have enough information to get sound parameter
estimates and to minimise the probability of the estimates being contaminated by other events, an issue that is particularly relevant given the large volatility stock markets experienced in 2011-2012.

As a regressor I use the national market index for the country where the company is listed, following the results of Campbell, Cowan, & Salotti (2010). While such a choice might be questionable in an analysis of the banking sector, given the weight credit institutions have on the stock markets in some countries, the issue is much less relevant for insurers, the capitalization of which is much smaller. My preferred measure of abnormal returns is computed over the event day (or first trading day after that if the event happens during the weekend or on a bank holiday) and the next, in order to account for differences in the time zones and lagged perception of the implications of the regulatory actions.

I use the daily returns of all the insurers' stocks included in the Datastream World Insurance index that were continuously traded between June 2011 and November 2015. I exclude brokers and analyze separately the impact on the six largest reinsurance companies in the world as a robustness check, as their prudential supervision related to systemic risk is not tackled by the measures under analysis. With this, I have a list with 121 securities, which can be found in Appendix A.

Then I consider different subsamples of insurers and test whether, on average, the event produced statistically significant abnormal returns and then if they were different across subgroups, using some parametric and non-parametric tests.

Since I consider the same set of events for all the securities, the assumption of absence of cross-section correlation (needed to aggregate abnormal returns) is not met. Therefore, in order to test whether the Cumulative Average Abnormal Returns (CAAR) of each subgroup is different from zero I employ the parametric test introduced by Boehmer, Musumeci & Poulsen (1991) and modified by Kolari & Pynnönen (2010), which adjusts the variance of the standardised CAAR taking into account both serial correlation and cross-section correlation across securities' abnormal returns; this latter issue can also be potentially a serious problem in case of concurrent events affecting a subset of insurers, such as, for example, a development in the Eurozone debt crisis.

I cross-check the results with those of a non-parametric test, the Generalised Sign Test explained in Cowan (1992). The whole procedure is explained in Appendix B. To test whether the difference between two groups is significantly different from zero I employ a simple t-test and a (non-parametric) Wilcoxon rank sum test.

Additionally, I check for the existence of other events that may have influenced insurers' stock prices on the dates analyzed, using event study papers related to the period under analysis and the Financial Times website. I do not find any significant event that can confound the results.

As a robustness check, I consider the results obtained from two alternative models. Firstly, I consider a larger window, covering two days before and after the event, to account for possible leaks and a slower reaction to the news. Then I re-estimate the market models using for each security a global stock market index (the Morgan Stanley Global Index), as done in other recent multi-country event studies.

In order to test the significance of the average stock price response to the regulatory announcements, I split the sample in two ways. First of all, I take the full sample of insurance companies and form a subset of entities which meet the IAIG criteria. Data on total assets are taken from Worldscope, and I look into company statements to determine the geographical scope of the activity. I was able to identify 38 entities meeting the IAIG criteria of size and geographical diversification: adding to them the six global reinsurers the final number is not too far away from the “around 50 insurers” affected by the regulation declared by IAIS. The remaining companies are grouped into the “Other” category. Then, within the IAIG sample, I consider the nine insurers designated as G-SII in 2013 and those not designated. For the latest event I modify the group in accordance with the

13 The decision on the list of global systemically important reinsurers and the policy measures was scheduled for July 2014 but has been delayed.


15 For example Schäfer, Schnabel, & Weder di Mauro (2015). Securities prices are converted into US dollars in order to avoid spurious volatility due to exchange rate fluctuations.
2015 revision of the list. As an alternative, I just focus on the IAIGs and group them according to the region where they are headquartered, creating three groups: EU-based, US-based and those located in the rest of the world.

Subsequently, I consider just the sample of IAIGs, and focus on the performance of the individual securities trying to assess which characteristics explain the size of the abnormal returns in selected events. Given the very small number (38) of data points I focus on just size, a proxy for the weight of non-insurance activity and a measure of leverage. As emphasized by Bongini, Nieri, & Pelagatti (2015) concerning banks, it is likely that less capitalized entities would benefit more from being perceived as “too-big-to-fail” and suffer more from the obligation to raise capital levels.

5. The results
Table 1 details the results of the tests on cumulative returns, comparing the IAIGs that were designated as systemically important, the other IAIGs, and the other companies. The CAAR is reported in the fourth column, followed by the values of respectively the Kolari and Pynnönen (KP) test and the Generalised Sign Test (GST).

The seventh column has the differences between the CAAR for the G-SIIs group and the others, and then the p-values of the t-test on the difference and that of the Wilcoxon rank sum test.

The disclosure of the activities that the IAIS thinks are sources of systemic risks (Event 1) in November 2011 followed the publication (in July 2011) of the criteria used to define an IAIG. Therefore, investors were, in principle, already able to identify the type of companies liable to be targeted by the new regulation. Large, international insurers show negative and statistically significant abnormal returns on average, while companies too small and local do not record any significant abnormal return. At this stage, investors do not seem to be able to pick which companies would have been identified: the average CAAR of the G-SII group is lower than that of the group of the non-designed ones, but the difference is not significantly different from zero.

A clear distinction between the subgroups also appears in the reaction to the following event, the FSB announcement of the extension to insurers of the regulation for systemically important institutions. Here, an explicit connection is made for the first time to the regulation coming into force for banks and that for insurance that begins to be planned. Investors appear now to be able to distinguish among IAIGs, and the group of G-SII enjoys a large and significant positive return (2.94%), which translates into a 1.08% extra-return over the other IAIGs and 2.62% over non-IAIGs.

The FSB statement lacks any detail on how the specific regulation for insurance was to be framed, and therefore the results can be rationalised as the expectation of some form of guarantee linked to the systemically important status or the possibility to be designated as such. In line with some evidence for the banking sector and the findings of Dewenter & Riddick (2016), this can be interpreted as the value of the implicit ‘too-big-to-fail’ guarantee, conditional on the information available on the event date.

The presentation of the methodology to be employed to identify a G-SII (Event 3) does not appear to be related to any significant difference in the average returns, even though the CAAR for the SIIs group is negative and statistically significant. This can be interpreted as investors having already guessed which companies would have been designated and adjusting their valuation accordingly. This view seems to be confirmed by the fact that the formal designation itself (Event 4) is not met by statistically significant abnormal returns.

On the contrary, when details emerge on the most important policy measure, the Basic Capital Requirement for G-SIIs (Event 5), a clear distinction shows up. The insurers that are subjected from the beginning to the new capital requirements experience a statistically significant -0.8% CAAR and the other insurers (non-IAIGs) have a statistically significant -0.6%, but the other IAIGs (non-G-SIIs) show no significant abnormal returns. The difference between designated and non-designated IAIGs amounted to a statistically significant -1.26%. These results, being related to an estimate of the capital burden designated insurers will incur, can be interpreted as the perceived cost of the “too-big-to-fail” guarantee.

The negative performance of the insurers that do not meet the IAIG criteria may be rationalised as the realisation by investors...
that these entities would not be covered by the regulation mitigating systemic risk, but may still suffer from a systemic event for which they may not be ready. In other words, the results of Event 5 show that being outside the “club” of IAIGs has some costs, but being inside it and having to face systemic risk related charges is not a free lunch either and entails a significant stock market penalisation.

Finally, the addition of new, more detailed information on how the HLA is calculated (Event 6) does not seem to affect the three groups in a significant way.

Table 2 presents the results of the analysis for the IAIGs only, which are grouped according to the location of their headquarters: European Union (EU), United States (US) and rest of the world (ROW). This splitting is meant to capture the impact of the differences in the regulatory regimes with which the new framework will coexist. It must be noted, however, that the response of the ROW group is never significantly different from zero as long as the parametric tests are considered; the large heterogeneity in the regulatory frameworks is probably responsible for the large variability of the abnormal returns.

The methodology proposed by the IAIG to identify systemically important insurers (Event 3) is viewed by investors as more damaging for European concerns than for US ones, whereas the difference with those in the rest of the world is not significantly different from zero. When the single most important measure is tackled - the discussion of the details of the calculation of the BCR (Event 5) - it is the US group that records a negative differential with respect to the EU-based insurers.

The publication of the HLA calculation details has a negative impact on large US-based insurers, but the difference with respect to entities based elsewhere is not statistically significant.

In order to assess the robustness of the results, especially as far as the ability of investors to pick which companies would have been affected by the new measures is concerned, it may be useful to compare the behaviour of primary insurers versus that of reinsurers. To this end, I add to the sample the six reinsurers that match the IAIGs criteria. Table 3 presents the result of the split between IAIGs, other insurers and large reinsurers.

Concerning the first event, the absence of any statistically significant CAAR for the insurance group and the difference with respect to IAIGs’ abnormal returns confirm the view that the information provided by the IAIS paper was enough to enable investors to determine which companies were liable to be affected by the new regulation. The same applies for Event 2; moreover, the slightly negative CAAR for reinsurers is an indication that investors ruled out any form of TBTF premium benefitting reinsurers. The positive CAAR posted in Event 3 may be interpreted as an indication of investors reacting to the realisation that reinsurers were (temporarily) “off the hook” as far as systemic risk regulation was concerned.

The results of the robustness tests are reported in Appendix C. The results obtained using a single global index in the market model are in line with that of the baseline model as far as the size and significance of the events are concerned. On the other hand, moving from a two-day to a much larger five-day window gives more volatile results, as expected.

16 As an additional robustness check I split the small insurers sample according to HQ location, finding no significant differences.

17 They are QBE (Australia), Swiss Re (Switzerland), SCOR (France), Munich Re and Hannover Re (Germany). Berkshire Hathaway was excluded as, while listed as a reinsurer, it is in fact a large conglomerate.
## The value and price of a "too-big-to-fail" guarantee: evidence from the insurance industry

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
<th>Description</th>
<th>CARR</th>
<th>KP^0</th>
<th>GST^0</th>
<th>Diff. Vs. SII</th>
<th>p-val.</th>
<th>Wilcoxon^5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>November 15, 2011</td>
<td>The IAIS publishes a document on the relationship between insurance activity and systemic risk, and sets a list of which activities undertaken by insurance groups can be a source of Systemic Risk.</td>
<td>SII -1.31</td>
<td>0.02**</td>
<td>0.06**&lt;br&gt;Non-SII -1.08</td>
<td>0.08*</td>
<td>0.00***</td>
<td>-0.23</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Other</td>
<td>0.36</td>
<td>0.14</td>
<td>0.43</td>
<td>-1.67</td>
<td>0.01***</td>
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<tr>
<td>2.</td>
<td>January 10, 2012</td>
<td>The FSB announces that the supervisory framework for systemically important financial institutions will be extended to global systemically important insurance companies and other types of financial institutions.</td>
<td>SII 2.94</td>
<td>0.13</td>
<td>0.00***&lt;br&gt;Non-SII 1.86</td>
<td>0.28</td>
<td>0.00***</td>
<td>1.08</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Other</td>
<td>0.32</td>
<td>0.22</td>
<td>0.01***</td>
<td>2.62</td>
<td>0.00***</td>
</tr>
<tr>
<td>3.</td>
<td>May 31, 2012</td>
<td>IAIS releases its proposed assessment methodology for the identification of G-SIIs.</td>
<td>SII -0.23</td>
<td>0.03**</td>
<td>0.04**&lt;br&gt;Non-SII -0.24</td>
<td>0.36</td>
<td>0.45</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Other</td>
<td>0.05</td>
<td>0.01***</td>
<td>0.01***</td>
<td>-0.28</td>
<td>0.34</td>
</tr>
<tr>
<td>4.</td>
<td>July 18, 2013</td>
<td>The list of G-SIIs is published, together with the list of policy measures.</td>
<td>SII -0.2</td>
<td>0.26</td>
<td>0.3&lt;br&gt;Non-SII 0.19</td>
<td>0.24</td>
<td>0.11</td>
<td>-0.39</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Other</td>
<td>-0.15</td>
<td>0.45</td>
<td>0.39</td>
<td>-0.05</td>
<td>0.41</td>
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<td>5.</td>
<td>December 16, 2013</td>
<td>IAIS releases the public consultation document on the calculation of the basic capital requirements to be imposed on G-SIIs.</td>
<td>SII -0.82</td>
<td>0.00***</td>
<td>0.01***&lt;br&gt;Non-SII 0.44</td>
<td>0.2</td>
<td>0.31</td>
<td>-1.26</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<td>0.00***</td>
<td>0.00***</td>
<td>-0.21</td>
<td>0.21</td>
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<tr>
<td>6.</td>
<td>October 3, 2015</td>
<td>The details of the HLA are published.</td>
<td>SII -0.13</td>
<td>0.21</td>
<td>0.17&lt;br&gt;Non-SII 0.26</td>
<td>0.41</td>
<td>0.25</td>
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<td></td>
<td></td>
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<td>Other</td>
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<td>0.28</td>
<td>0.17</td>
<td>0.1</td>
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*p-values. Significant at ***1% **5% *10%

Table 1: Cumulative average abnormal returns, G-SIIs, other IAIGs and other insurers
<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
<th>Description</th>
<th>CARR</th>
<th>KP§</th>
<th>GST§</th>
<th>Diff. Vs. SII</th>
<th>p-val.</th>
<th>Wilcoxon§</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>November 15, 2011</td>
<td>The IAIS publishes a document on the relationship between insurance activity and systemic risk, and sets a list of which activities undertaken by insurance groups can be a source of Systemic Risk.</td>
<td>EU</td>
<td>-1.07</td>
<td>0.08</td>
<td>0.00***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>US</td>
<td>-1.33</td>
<td>0.03</td>
<td>0.02**</td>
<td>0.26</td>
<td>0.34</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ROW</td>
<td>-1.08</td>
<td>0.48</td>
<td>0.07*</td>
<td>0.01</td>
<td>0.5</td>
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<tr>
<td>2.</td>
<td>January 10, 2012</td>
<td>The FSB announces that the supervisory framework for systemically important financial institutions will be extended to global systemically important insurance companies and other types of financial institutions.</td>
<td>EU</td>
<td>2.2</td>
<td>0.09</td>
<td>0.44</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>US</td>
<td>2.49</td>
<td>0.37</td>
<td>0.15</td>
<td>-0.29</td>
<td>0.49</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>ROW</td>
<td>1.37</td>
<td>0.44</td>
<td>0.00***</td>
<td>0.83</td>
<td>0.15</td>
</tr>
<tr>
<td>3.</td>
<td>May 31, 2012</td>
<td>IAIS releases its proposed assessment methodology for the identification of G-SIIs.</td>
<td>EU</td>
<td>-1.57</td>
<td>0.16</td>
<td>0.00***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>US</td>
<td>0.86</td>
<td>0.23</td>
<td>0.19</td>
<td>-2.42</td>
<td>0.03***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ROW</td>
<td>0.14</td>
<td>0.38</td>
<td>0.36</td>
<td>-1.7</td>
<td>0.09*</td>
</tr>
<tr>
<td>4.</td>
<td>July 18, 2013</td>
<td>The list of G-SIIs is published, together with the list of policy measures.</td>
<td>EU</td>
<td>0.29</td>
<td>0.33</td>
<td>0.03**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>US</td>
<td>0.28</td>
<td>0.19</td>
<td>0.15</td>
<td>0.01</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ROW</td>
<td>-0.29</td>
<td>0.39</td>
<td>0.34</td>
<td>0.58</td>
<td>0.19</td>
</tr>
<tr>
<td>5.</td>
<td>December 16, 2013</td>
<td>IAIS releases the public consultation document on the calculation of the basic capital requirements to be imposed on G-SIIs.</td>
<td>EU</td>
<td>0.3</td>
<td>0.35</td>
<td>0.03**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>US</td>
<td>-0.62</td>
<td>0.11</td>
<td>0.01***</td>
<td>0.92</td>
<td>0.01***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ROW</td>
<td>0.43</td>
<td>0.46</td>
<td>0.5</td>
<td>0.5</td>
<td>0.34</td>
</tr>
<tr>
<td>6.</td>
<td>October 3, 2015</td>
<td>The details of the HLA are published.</td>
<td>EU</td>
<td>0.13</td>
<td>0.45</td>
<td>0.41</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>US</td>
<td>-0.16</td>
<td>0.05**</td>
<td>0.02**</td>
<td>0.29</td>
<td>0.46</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ROW</td>
<td>0.07</td>
<td>0.13</td>
<td>0.2</td>
<td>0.06</td>
<td>0.41</td>
</tr>
</tbody>
</table>

§p-values. Significant at ***1% **5% *10%

Table 2: Abnormal returns, IAIGs split by geography
The value and price of a "too-big-to-fail" guarantee: evidence from the insurance industry

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
<th>Description</th>
<th>IAIGs</th>
<th>KP</th>
<th>GST</th>
<th>Diff. Vs. Sil</th>
<th>p-val.</th>
<th>Wilcoxon</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>November 15, 2011</td>
<td>The IAIS publishes a document on the relationship between insurance activity and systemic risk, and sets a list of which activities undertaken by insurance groups can be a source of Systemic Risk.</td>
<td>-1.13</td>
<td>0.07*</td>
<td>0.00***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Other</td>
<td>0.36</td>
<td>0.14</td>
<td>0.43</td>
<td>-1.49</td>
<td>0.00***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Reins</td>
<td>0.76</td>
<td>0.24</td>
<td>0.10*</td>
<td>-1.89</td>
<td>0.05**</td>
</tr>
<tr>
<td>2.</td>
<td>January 10, 2012</td>
<td>The FSB announces that the supervisory framework for systemically important financial institutions will be extended to global systemically important insurance companies and other types of financial institutions.</td>
<td>2.11</td>
<td>0.27</td>
<td>0.00***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Other</td>
<td>0.32</td>
<td>0.22</td>
<td>0.01***</td>
<td>1.79</td>
<td>0.00***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Reins</td>
<td>-0.6</td>
<td>0.00***</td>
<td>0.08*</td>
<td>2.71</td>
<td>0.07*</td>
</tr>
<tr>
<td>3.</td>
<td>May 31, 2012</td>
<td>IAIS releases its proposed assessment methodology for the identification of G-SIIs.</td>
<td>-0.23</td>
<td>0.22</td>
<td>0.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Other</td>
<td>0.05</td>
<td>0.01***</td>
<td>0.01***</td>
<td>-0.28</td>
<td>0.26</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Reins</td>
<td>0.61</td>
<td>0.18</td>
<td>0.00***</td>
<td>-0.84</td>
<td>0.15</td>
</tr>
<tr>
<td>4.</td>
<td>July 18, 2013</td>
<td>The list of G-SIIs is published, together with the list of policy measures.</td>
<td>0.1</td>
<td>0.37</td>
<td>0.14</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Other</td>
<td>-0.15</td>
<td>0.45</td>
<td>0.39</td>
<td>0.25</td>
<td>0.25</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Reins</td>
<td>0.82</td>
<td>0.11</td>
<td>0.01***</td>
<td>-0.72</td>
<td>0.24</td>
</tr>
<tr>
<td>5.</td>
<td>December 16, 2013</td>
<td>IAIS releases the public consultation document on the calculation of the basic capital requirements to be imposed on G-SIIs.</td>
<td>0.15</td>
<td>0.47</td>
<td>0.19</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Other</td>
<td>-0.61</td>
<td>0.00***</td>
<td>0.00***</td>
<td>0.76</td>
<td>0.00***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Reins</td>
<td>-0.06</td>
<td>0.25</td>
<td>0.36</td>
<td>0.21</td>
<td>0.12</td>
</tr>
<tr>
<td>6.</td>
<td>October 3, 2015</td>
<td>The details of the BCR are published.</td>
<td>0.21</td>
<td>0.4</td>
<td>0.33</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Other</td>
<td>-0.23</td>
<td>0.28</td>
<td>0.17</td>
<td>0.44</td>
<td>0.13</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Reins</td>
<td>-0.53</td>
<td>0.14</td>
<td>0.33*</td>
<td>0.74</td>
<td>0.13</td>
</tr>
</tbody>
</table>

§p-values. Significant at ***1% **5% *10%  

Table 3: Abnormal returns, insurers and reinsurers
Summing up, some of the regulatory announcements had a non-negligible impact on insurers’ stock prices. The first official documents by the IAIS mentioning systemic risk depressed the valuation of IAIGs, but then, when the FSB suggested that insurance and banks could somehow be “lumped” together as far as systemic risk regulation was concerned, IAIGs experienced positive abnormal returns. Additionally, investors appear to be able to distinguish the insurers most likely to be designated, well ahead of the formal designation. The information provided by the IAIS in its methodological paper seems to have been enough to enable investors to pick those which would have been designated, despite the fact that investors have a much narrower information set than the regulators.

Finally, I utilise the information on the change in the SII list that occurred in November 2015 (Event 7) to get an overall assessment of how financial markets value the “systemic” status. Using a SUR model, I regress the returns of Generali and Aegon stocks on their home market index, the STOXX index for financial services (to control for industry specific shocks) and three time dummies for the day when the new list was announced, and the day before and after. I use a sample spanning 85 days before the event and three after it. It turns out that the only significant time dummy is the one for Generali on the event day: the coefficient is 1.07 with a t-statistic of 1.93, indicating a positive, but not very statistically significant positive effect of being removed from the SII list. The fact that the Aegon equity price does not seem to be affected by the event may indicate that firm characteristics matter for the assessment of the implications of the new regulation.

In order to investigate this issue I then consider the sample of the IAIGs, i.e., all the companies that at some point may be affected by the regulation and regress the CAAR for the most significant events (1, 2, and 5) on size, gearing and the importance of non-insurance activity. Moreover for Event 5, I also use a dummy for the entities headquartered in the US, in order to gauge how investors assess the compatibility with the global framework being developed and the existing national regulation. This is relevant in light of the expected developments in prudential regulation: the Solvency II regime, coming into force for all EU-based companies in 2016 foresees a risk-based capital weighting scheme, whereas US companies will stick to the risk weighting scheme.

Table 4: Determinants of abnormal returns in selected events

<table>
<thead>
<tr>
<th>Dep. Var: CAR</th>
<th>Event 1</th>
<th>Event 2</th>
<th>Event 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-10.42</td>
<td>-11.74</td>
<td>0.14</td>
</tr>
<tr>
<td></td>
<td>[-2.46]</td>
<td>[-2.46]</td>
<td>[0.04]</td>
</tr>
<tr>
<td>Total asset (log)</td>
<td>0.57</td>
<td>0.59</td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td>[2.11]</td>
<td>[2.19]</td>
<td>[0.51]</td>
</tr>
<tr>
<td>Debt/capital</td>
<td>-0.04</td>
<td>0.07</td>
<td>-0.03</td>
</tr>
<tr>
<td></td>
<td>[-1.38]</td>
<td>[2.52]</td>
<td>[-2.41]</td>
</tr>
<tr>
<td>Non policyholder liabilities</td>
<td>-1.06</td>
<td>1.59</td>
<td>-1.51</td>
</tr>
<tr>
<td></td>
<td>[-1.16]</td>
<td>[0.79]</td>
<td>[-1.44]</td>
</tr>
<tr>
<td>Headquartered in the US</td>
<td>-</td>
<td>-</td>
<td>-1.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[-2.98]**</td>
</tr>
<tr>
<td>Observations:</td>
<td>38</td>
<td>38</td>
<td>38</td>
</tr>
<tr>
<td>R-squared:</td>
<td>0.11</td>
<td>0.28</td>
<td>0.32</td>
</tr>
<tr>
<td>F-statistic:</td>
<td>1.47</td>
<td>4.37</td>
<td>3.93</td>
</tr>
<tr>
<td>Probf-stat):</td>
<td>0.24</td>
<td>0.01</td>
<td>0.01</td>
</tr>
</tbody>
</table>

Table 4: Determinants of abnormal returns in selected events

<table>
<thead>
<tr>
<th>Event 1</th>
<th>Event 2</th>
<th>Event 5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

18 The sample includes Event 6, so I dummy it out.
6. Discussion

Some of the steps in the development of the regulation did cause significant abnormal returns in insurers’ equity prices. In order to calculate the total impact I add across events the abnormal returns, considering just the case when they are statistically significant at least at the 10% level for both the Kolari-Pynnönen and the Generalised Sign Test. Considering the group of G-SIIs, I take Events 1, 2, 3 and 5: the cumulated abnormal return is 0.58%. The difference with respect to non-designated IAIGs is statistically significant only in Events 2 and 5: summing them I get -0.18%. Finally, the difference over non-IAIGs, considering Events 1 and 2, is 0.95%.

The first conclusion that can be drawn is that the perceived value of the TBTF guarantee related to being designated (or initially perceived by investors as) systemically important is relatively small, less than 0.6%. However, the difference with respect to IAIGs not having this status is slightly negative. This contrasts sharply with the nearly 12% (10.3% considering only the statistically significant responses) TBTF premium estimated by Dewenter & Riddick (2016), who consider a different set of events and put together the reaction to the first AIG bailout and only some of the steps of the G-SII regulation process. Some of the differences may be due to the choice of the events: in particular their analysis stops at the designation of the G-SIIs, while mine includes the publication of the details of the Basic Capital Requirement. More important, however, is the fact that their “control” group put together IAIGs which can be at some point designated as systemic with large, but just domestically focused entities which will never be designated.

It is, however, important to notice the quite large difference with respect to the group of smaller companies which do not meet the IAIG criteria, suggesting that, possibly, some form of implicit guarantee could come from the ComFrame regulation.

However, the process of regulating the sources of systemic risk in insurance is at a relatively early stage compared with that of the banking sector and therefore the sum of the impacts may not, at present, be very informative. What matters more is the effect of the additional information provided by the events.

Considering the G-SIIs group, only the rather vague statement by the FSB on the extension of the framework for G-SIFI to insurance was met by positive abnormal returns. The following steps, i.e. the releases of the details on how to identify SIIs (Event 3) and, crucially, how to calculate the BCR (Event 5), were accompanied by negative abnormal results. This is likely to indicate a pessimistic revision of the investors’ assessment of the impact of the new regulation on insurers’ profitability. However, the extra information provided by the details on the HLA calculation and the revision of the SII list was not considered relevant by financial market.

The revision in expectations also appears in the results of the regressions of the CAAR for Events 2 and 5 on companies’ size and, crucially, gearing. When the FSB declared that the systemic risk framework would also encompass insurers, the benefit in terms of extra returns was larger for bigger and more leveraged insurers, consistent with the TBTF premium hypothesis. However, once the details of the measures, and in particular the calculation of the BCR were known, size no longer mattered and more geared insurers experienced larger negative abnormal returns, consistent with the view that the new measures represented a higher cost for firms as they will have to recapitalize. Bongini, Nieri & Pelagatti (2015) find a similar result for banks.

7. Conclusion

This paper has sought to assess whether and to what extent the financial market priced the different phases of the evolution of the macroprudential framework for insurance companies. The new regulation matters to investors, as some of the key steps were accompanied by statistically significant abnormal returns and investors seem to have understood which entities would have been designated as systematically important well ahead of the publication of the list. The size of the abnormal returns and their evolution over time, suggest that investors’ opinions on the regulation have turned to moderately pessimistic once the details on the capital standards were enounced. Overall, the impact is not very strong, in line with what was found recently by similar studies on banks. Gearing is an important driver of the results. Its correlation with the cumulative results was positive upon the announcement of the extension of the SIFI status to insurers.

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19 This is consistent with the view that size is an imperfect indicator of systemic risk for banks and insurance, as shown by the low correlation between asset prices based measures of systemic risk and the size of the individual entities. See for example, Adrian & Brunnermeier, 2016.
before turning negative when investors were able to estimate the cost of being systemically important in terms of capital requirement. This is again consistent with an evolution of market perception from an initial expectation of a TBTF premium to a more pessimistic assessment of the costs and burdens related to the new regulation, especially for US-based entities.
## The value and price of a "too-big-to-fail" guarantee: evidence from the insurance industry

### Appendix A: Internationally Active Insurance Groups (IAIGs)

Note: China refers to mainland China jurisdiction

<table>
<thead>
<tr>
<th>Name</th>
<th>Jurisdiction</th>
<th>Assets 2010 YE (USD '000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVIVA</td>
<td>UNITED KINGDOM</td>
<td>591820229</td>
</tr>
<tr>
<td>ALLIANZ</td>
<td>GERMANY</td>
<td>881697289</td>
</tr>
<tr>
<td>AXA</td>
<td>FRANCE</td>
<td>1037518855</td>
</tr>
<tr>
<td>ASSICURAZIONI GENERALI</td>
<td>ITALY</td>
<td>597900960</td>
</tr>
<tr>
<td>PING AN INSURANCE</td>
<td>CHINA</td>
<td>169752469</td>
</tr>
<tr>
<td>PRUDENTIAL</td>
<td>UNITED KINGDOM</td>
<td>419755352</td>
</tr>
<tr>
<td>AMERICAN INERNATIONAL GROUP</td>
<td>UNITED STATES</td>
<td>683443000</td>
</tr>
<tr>
<td>METLIFE</td>
<td>UNITED STATES</td>
<td>730960000</td>
</tr>
<tr>
<td>PRUDENTIAL FINANCIAL</td>
<td>UNITED STATES</td>
<td>539854000</td>
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<tr>
<td>AVIVA UNITED KINGDOM</td>
<td>591820229</td>
<td></td>
</tr>
<tr>
<td>ALLIANZ GERMANY</td>
<td>881697289</td>
<td></td>
</tr>
<tr>
<td>AXA FRANCE</td>
<td>1037518855</td>
<td></td>
</tr>
<tr>
<td>ASSICURAZIONI GENERALI ITALY</td>
<td>597900960</td>
<td></td>
</tr>
<tr>
<td>PING AN INSURANCE CHINA</td>
<td>169752469</td>
<td></td>
</tr>
<tr>
<td>PRUDENTIAL UNITED KINGDOM</td>
<td>419755352</td>
<td></td>
</tr>
<tr>
<td>AMERICAN INERNATIONAL GROUP UNITED STATES</td>
<td>683443000</td>
<td></td>
</tr>
<tr>
<td>METLIFE UNITED STATES</td>
<td>730960000</td>
<td></td>
</tr>
<tr>
<td>PRUDENTIAL FINANCIAL UNITED STATES</td>
<td>539854000</td>
<td></td>
</tr>
<tr>
<td>AGEAS (EX-FORTIS) BELGIUM</td>
<td>142342814</td>
<td></td>
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<tr>
<td>MANULIFE FINANCIAL CANADA</td>
<td>406783811</td>
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<tr>
<td>POWER FINANCIAL CANADA</td>
<td>138358244</td>
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<td>SUN LIFE FINANCIAL CANADA</td>
<td>203583257</td>
<td></td>
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<tr>
<td>MAPFRE SPAIN</td>
<td>64569551</td>
<td></td>
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<tr>
<td>CNP ASSURANCES FRANCE</td>
<td>451545437</td>
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</tr>
<tr>
<td>AEGON (designated in 2015) NETHERLANDS</td>
<td>472167398</td>
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<tr>
<td>TOKIO MARINE HOLDINGS JAPAN</td>
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<tr>
<td>MS&amp;AD INSURANCE GP.HDG. JAPAN</td>
<td>82463115</td>
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<tr>
<td>SONY FINANCIAL HOLDINGS JAPAN</td>
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<tr>
<td>SAMSUNG FIRE &amp; MAR.IN. KOREA (SOUTH)</td>
<td>23830851</td>
<td></td>
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<tr>
<td>LEGAL &amp; GENERAL UNITED KINGDOM</td>
<td>524189226</td>
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<tr>
<td>STOREBRAND NORWAY</td>
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<tr>
<td>VIENNA INSURANCE GROUP AUSTRIA</td>
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<td>OLD MUTUAL UNITED KINGDOM</td>
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<td>RSA INSURANCE GROUP UNITED KINGDOM</td>
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<td>SWISS LIFE HOLDING SWITZERLAND</td>
<td>143526673</td>
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<td>ZURICH INSURANCE GROUP SWITZERLAND</td>
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<td>STANDARD LIFE UNITED KINGDOM</td>
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<tr>
<td>SHIN KONG FINL.HLDG. TAIWAN</td>
<td>64623125</td>
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<td>ACE SWITZERLAND</td>
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<td>AFLAC UNITED STATES</td>
<td>101039000</td>
<td></td>
</tr>
<tr>
<td>CHUBB UNITED STATES</td>
<td>50151000</td>
<td></td>
</tr>
<tr>
<td>GENWORTH FINANCIAL UNITED STATES</td>
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<td></td>
</tr>
<tr>
<td>TRAVELERS UNITED STATES</td>
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<tr>
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<td>XL GROUP BERMUDA</td>
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Note: China refers to mainland China jurisdiction.
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**Appendix A: Other Insurers**  
Note: China refers to mainland China jurisdiction.
The value and price of a “too-big-to-fail” guarantee: evidence from the insurance industry

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Appendix A: Other Insurers (continued)

Note: China refers to mainland China jurisdiction
### Appendix A: Other Insurers (continued)

Note: China refers to mainland China jurisdiction

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Appendix B: Methodology

First consider an 88-day estimation window \([T_0, T_1]\), ending three days before the event and estimate the following model

\[ r_{it} = \alpha + \beta r_{Mt} + u_{it} \quad \{A1\} \]

The abnormal returns are computed in the event window \((T_2, T_3)\) as

\[ ar_{it} = r_{it} - \hat{\alpha} + \hat{\beta} r_{Mt} \quad \{A2\} \]

Then they are cumulated over the event window of days ranging from \(T_2^1\) and \(T_2^2\), encompassing the event day, as

\[ CAR_i(T_2^1, T_3) = \sum_{t=T_2^1}^{T_3} ar_{it} \{A3\} \]

The BMP test considers first the cumulative returns standardized for an estimate of their standard deviation

\[ SCAR_i(T_2, T_3) = \frac{CAR_i(T_2, T_3)}{\sigma_{CAR_i(T_2, T_3)}} \{A4\} \]

Here the standard deviation is corrected for the serial dependence that arises in successive prediction errors based on the same parameter estimates as follows

\[ \sigma_{SCAR_i(T_2, T_3)} = \sqrt{\left( \frac{1}{n-2} \sum_{t=T_2^2}^{T_3} ar_{it}^2 \right) \left( \frac{1}{n-2} \sum_{t=T_2^2}^{T_3} CAR_i(T_2^2, T_3) \right)} \{A5\} \]

where \(\bar{r}_M\) is the mean of the market return over the estimation sample.

Then the statistic on the cross-section of the \(N\) companies belonging to a group is derived as

\[ Z = \frac{\sum_{i=1}^{N} SCAR_i(T_2, T_3)}{\sqrt{N \sigma_{SCAR}}} \{A6\} \]

However, the BMP test assumes that individual securities are uncorrelated in the cross-section, which may not be the case when the event date is the same for all companies. Kolari & Pynnönen (2010) devise a modification of the BMP statistics in order to account for cross-section correlation. The statistic they propose is the following

\[ Z_{BMP-KP} = Z_{BMP} \sqrt{\frac{1-\hat{p}}{1+(1+N)\hat{p}}} \{A8\} \]

where \(\hat{p}\) is the average cross-sectional correlation coefficient of the residuals of the estimated equation (i.e. the abnormal returns in the estimation period). This statistic is again asymptotically normally distributed under the null hypothesis of no effect.

In the generalised sign (GS) test the null hypothesis is that, within a group, the share of returns having a positive sign in the event window is equal to the fraction expected to have that sign, based on the estimation window. For example, considering positive returns

\[ \hat{p} = \frac{1}{N} \sum_{i=1}^{N} \frac{1}{(T_1-T_0)} \sum_{t=T_0}^{T_1} S_{nt} \cdot S_{nt} = \begin{cases} 1 & \text{if } u_{it} > 0 \\ 0 & \text{otherwise} \end{cases} \{A8\} \]

The test statistic is based on the normal approximation of a binomial distribution with parameter \(\hat{p}\) and reads

\[ Z = \frac{N_0 - N\hat{p}}{\sqrt{N\hat{p}(1-\hat{p})}} \{A9\} \]

where \(N_0\) is the number of securities in the group having on average positive residuals in the estimation windows.

In order to test for negative signs, substitute negative for positive in the definition of \(S_{nt}\) and \(N_0\).
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Significant at ***1% **5% *10%

Appendix C: Robustness checks
Table A1: Market model with common world index
## Appendix C: Robustness checks

### Table A1: Market model with common world index (continued)

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Significant at ***1% **5% *10%
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Significant at ***1% **5% *10%

Appendix C: Robustness checks

Table A2: [2, 2] Window
# The value and price of a “too-big-to-fail” guarantee: evidence from the insurance industry

## Table A2: [-2, 2] Window (continued)

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Significant at ***1% **5% *10%
Unnecessary injury: the economic rationale and costs of new global capital requirements for large U.S. property and casualty insurers

Robert J. Shapiro
Chairman of Sonecon, LLC, Senior Fellow of the Center on Business and Public Policy at the Georgetown University McDonough School of Business, and former U.S. Under Secretary of Commerce for Economic Affairs

Aparna Mathur
Resident Scholar at the American Enterprise Institute

1 This article was adapted from a study by Dr. Robert Shapiro and Dr. Aparna Mathur, available at http://www.sonecon.com/docs/studies/Report_on_Capital_Standards_for_PC_Insurers-Shapiro-Mathur-Sonecon-Final-November-15-2014.pdf
Abstract
In the wake of 2008-2009 global financial crisis (GFC), governments in most developed countries adopted new forms of financial regulation; more recently their attention has shifted to international regulation. One trans-national effort involves applying new global capital requirements to “Global Systemically Important Insurers” (G-SIIs), whose failure could trigger a new financial crisis. Talks are also underway regarding new global capital requirements for large insurance companies with significant foreign operations that do not present systemic risks to their own economies or the global financial system. We analyze the rationale for this new approach and the costs associated with applying it to large U.S. property and casualty (P&C) insurers. We find that additional capital requirements are unnecessary, because even the largest U.S. P&C insurers pose no systemic risk to the U.S. or global financial systems. We further find that current state-based capital requirements for U.S. P&C insurers are sufficient to ensure that they can handle the claims arising from even the most extraordinary losses. We also find that imposing additional capital requirements on large U.S. P&C insurers, all other factors being equal, would slow the growth of new P&C coverage and increase the cost of that coverage.
I. Introduction

For nearly two centuries, American insurance companies have been regulated almost exclusively by U.S. state governments. This hands-off approach by the U.S. federal government reflects certain features of the American P&C insurance business. People insure their homes, automobiles, businesses, and other property for losses arising from unpredictable events such as thefts, fires, hurricanes, and earthquakes, which do not occur randomly across such a large country. Thefts and auto accidents are more common in urban areas where populations and auto travel are concentrated. Major natural disasters such as hurricanes, tornadoes, and wildfires are concentrated in certain states and regions. The state insurance commissions which license and oversee the operations of U.S. insurers are 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.

At the same time, the regulation of insurers across the 50 states and the District of Columbia has substantially converged, mainly through the broad adoption of model laws and regulations developed by the National Association of Insurance Commissioners (NAIC). One area of overall agreement involves capital requirements for insurers, which are standards intended to ensure that insurers can meet the claims of their customers under extraordinary circumstances and continue to provide reliable coverage following disasters, which produce billions of dollars in claims.

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

The convergence of the EU's ongoing process of adopting RBC standards with the 2008-2009 global financial crisis (GFC) produced calls for a new, global RBC standard for large insurers with substantial foreign business. After the GFC, new forms of financial regulation were adopted by governments in most developed countries, combined with increased attention on international regulation. One trans-national effort involves applying new global capital requirements to “Global Systemically Important Insurers” (G-SIIs), whose failure could trigger a new financial crisis. However, there are also talks underway regarding new global capital requirements, such as the global RBC standards, for large insurance companies with significant foreign operations that do not present systemic risks to their own economies or the global financial system. For U.S. insurers, a global capital requirement would come on top of state-based regulation and likely would be based on the EU's approach to those standards. If adopted on those terms, this initiative would substantially increase capital requirements for those U.S. insurers.

We find, however, no evidence that higher capital requirements are needed to ensure the solvency and operations of large U.S. insurers. Applying a range of measures and standards, researchers Cummins and Weiss (2013); Harrington (2009); Park and Xie (2011) have consistently found that the U.S. P&C industry poses no systemic risk to the financial system or the economy. Under current RBC standards, the U.S. P&C industry already has dealt with extraordinarily large claims arising from recent disasters without threatening their coverage, much less their solvency - from the Northridge earthquake, the 9-11 attacks, and Superstorm Sandy, to the terrible 2005 hurricane season encompassing Katrina, Rita, Wilma, and Dennis. The U.S. P&C industry also weathered the financial and economic upheavals of 2008-2009 with no damage or adverse effects for their policyholders.

We also analyzed the P&C industry’s capacity to deal with even larger disasters - events thought to occur possibly once in a century, once every 250 years, and once every 500 years. We find that the current resources set aside for these great catastrophes by P&C companies would cover a once-in-a-century event with claims more than twice those of the 2005 U.S. hurricane season. Assuming current reinsurance practices,
the industry’s present catastrophe resources also could handle disasters likely to occur once every 250 years and once every 500 years.

Higher capital requirements also would impose new costs, 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. As a result, the new requirements would raise the price of coverage and/or reduce its availability for millions of U.S. households and businesses.

II. The Terms for Regulating the Insurance Industry

The regulation of insurers should reflect the character and importance of the insurance product. Insurance is not simply a good designed to satisfy fleeting consumer desires. Reliable insurance is essential for the efficient planning and functioning of most households and businesses, and therefore for the entire economy and society. Governments regulate insurance products and services in order 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 important social and economic benefits. Insurance regulation should promote the conditions for a strong, healthy insurance industry, so people and businesses can secure coverage under reasonable terms.

Given the insurance industry’s social and economic purposes, much of its regulation involves the regular review 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.

In theory, if regulators could correctly quantify all of these risks borne by each insurer, they could set capital requirements at an optimal level that would make payments of claims secure while minimizing increases in the cost of coverage. In practice, deriving optimal capital requirements has proven to be elusive. However, the only recent instance of huge, unanticipated claims crippling a major U.S. insurer was AIG’s crisis in 2008-2009, and that involved transactions in financial derivatives unrelated to AIG’s P&C business. Such transactions are now regulated under the 2010 Dodd-Frank financial reforms, and derivatives today account for less than one-tenth of 1 percent of the assets of U.S. P&C insurers.

Nevertheless, some regulators, especially in Europe, see the GFC as sufficient reason to raise capital requirements for American as well as European insurers. Yet, raising those requirements could entail significant, additional costs for U.S. insurers and their customers; and as the International Monetary Fund (IMF) has noted, wider safety margins intended to provide greater security during extraordinary crises provide no benefits in the absence of a crisis.

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

Despite grounds for caution, American and foreign regulators are considering a proposal to apply new global capital standards for major international insurers under the aegis of the Financial Stability Board (FSB). The FSB was created by the G20 nations in April 2009 to monitor the global economy and recommend measures to avert financial disruptions and crises. 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. The FSB also directed the IAIS to develop “a comprehensive, group-wide supervisory and regulatory framework” for “International Association of Insurance Groups” (IAIGs), including a new 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 failures should carry no risk of triggering national or international systemic problems.
Finally, the IAIS has said that its approach to G-SIs “will inform development of the ICS“ for IAIGs. The contemplated ICS is expected to follow the EU’s uniform, financial model-based approach to capital requirements for P&C insurers, rather than the U.S. alternative of risk-based quantitative and qualitative assessments and risk management techniques attuned to the conditions applicable to each insurer.

Capital Requirements in the EU and the U.S.

At a general level, capital regulation of insurers in the EU follows a set of fixed principles that drive the application of a uniform set of financial models, in contrast to the application of multiple quantitative and qualitative rules in the U.S. State regulators begin by applying two types of capital requirements. 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. Insurers are required to meet the higher capital standards as determined by the two requirements. For P&C insurers, risk-based capital requirements (RBC) cover the evaluation and assessment of a 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.

The RBC formula is as follows:

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

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.

In contrast, the 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.

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 to operate within a safe range given its underwriting risk, market risk, credit risk, and default risk. 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 associated claims settlements.

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. Firstly, the regulators lack confidence in the classifications that distinguish between IAIGs and G-SIs, the “systemically important” insurers whose failure could produce serious financial stresses in other financial institutions and possibly damage the economy. The first issue is whether 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.

Secondly, 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 could fail, with such adverse effects. Again, the answer, we will see, is no.

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7 IAIS (2014b).
8 Eling, Klein and Schmit (2009).
9 Eling, Klein and Schmit (2009).
10 For an excellent overview, see Klein (2012).
12 For example, under Solvency I, an insurer could lower its capital requirements by reducing its premiums, even if doing so increased its risks.
14 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.
Systemic Risks Associated with the Failure of a Large U.S. Property and Casualty Insurer

The issue of systemic risk involves size, interconnectedness, leverage, and in some cases, non-traditional activities that involve unknown risk. The issue 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. 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. 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.

It is generally understood that compared to banks, insurers have neither the size nor the interconnectedness that drive the correlated losses, which can pose systemic risks. 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, compared to the largest U.S. banking institution, J.P. Morgan Chase, with assets of $2.3 trillion. Furthermore, the top five P&C insurers account for less than 31 percent of all P&C assets, compared to the top five banks with nearly 60 percent of all banking assets. Accordingly, Cummins and Weiss concluded 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.

Insurers also are unlikely to be caught up in the cascading failures, which can be triggered by the failure of a large bank, because insurers are not highly 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. The insurance industry also 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. As a result, the failure of another financial institution would not expose P&C insurers to losses sufficiently large enough to threaten their solvency. With the exception of AIG, insurers did not suffer greatly in the 2008-2009 GFC, and AIG’s problems did not arise from normal insurance-related transactions.

A recent analysis tested the impact on the insurance sector of an economic crisis in which the broad market gradually fell by 40 percent: Harrington found that P&C insurers were negatively related to systemic risk under those conditions, and concluded that “writing property-casualty lines may act as a stabilizing factor during systemic crises.” Another study modeled the impact of a more sudden collapse in stock prices and found again that the insurance industry would not be a source of systemic risk. These findings were confirmed in the recent Great Recession, when the value of the S&P 500 fell 54.9 percent over 15 months. The U.S. P&C industry continued to operate normally. 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.

Some observers have questioned the exposure of large P&C insurers to 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 1 percent of P&C insurers, insufficient to trigger or sustain a systemic crisis. A similar analysis conducted in 2006 by the Group of 30 found that if 20 percent of the global reinsurance market failed – if several major reinsurers failed at once – it still would not produce widespread insolvencies among insurers sufficient to affect the real economy.

Other Risks to the Solvency of Large Property and Casualty Insurers

If the failure of a U.S.-based IAIG could not trigger systemic costs for the financial system and economy, the question becomes: is there any prospect that IAIGs facing huge claims

16 Cummins and Weiss (2013).
17 Ibid.
18 Ibid.
19 Harrington (2009).
20 Ibid.
21 Grace (2010).
23 Park and Xie (2011).
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from a major disaster will require public bailouts, which would undermine confidence in the insurance industry? The capacity of P&C insurers to cover huge, unpredicted losses 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.25 The profitability of these insurers is based on those premiums, plus their investment income, underwriting gains or losses, and overall operating performance.26

The 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 a ratio of less than three-to-one. The surplus refers to an insurer’s excess capital after meeting all of the payable claims of its policyholders, or the “policyholders’ surplus.”27 The data show that these surpluses have increased every year since 2009. The industry’s premium-to-surplus 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 2013.28

As noted already, the central feature of the regulators’ strategy is RBC requirements.29 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,30 and state regulators are authorized to take certain actions based on an insurer’s RBC-level of impairment. If the ratio of insurer’s Total Adjusted Capital (TAC) to its Authorized Control Level (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 2012.31 Using these and earlier data, we calculated the aggregate, industry-wide RBC ratio for the years 2008 to 2012 (Table 1). Under the RBC system, regulatory action is required when an insurer’s TAC is less than twice its ACL RBC. Our results show that the TAC for all P&C insurers, taken together, has been five-to-six times the ACL from 2008 through 2012.

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

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

Table 1: RBC Ratio for All Property and Casualty Insurers, NAIC, 2008-2012 ($ 000). Modified by Shapiro and Mathur 2014.

26 Kearney (2010).
27 Beckman and Tremelling (1972).
28 Property Casualty Insurers Association of America (2014).
29 NAIC (2014b).
30 Ibid.
31 NAIC (2014a).
some regulatory response based on their TAC-to-ACL ratios. 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.

The portfolios of P&C insurers manifest none of the risky behavior that can lead to serious problems. The Treasury Department’s most recent report on the industry found that in 2012, 65.3 percent of the financial assets of P&C insurers – $909.9 billion from a total of $1,382.9 billion – were invested in high-quality investment-grade bonds. Of the remaining one-third of 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, $592 million or 0.04 percent were held in derivatives. The remaining $115.8 billion were classified as “other investments.”

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

The next question is: are the current standards sufficient for truly terrible natural or man-made catastrophes? Natural or man-made disasters produce “correlated losses” - tens of thousands of substantial claims of a similar sort at one time – on top of the industry’s regular claims from unrelated events. P&C insurers prepare for catastrophes by building up their surpluses – loss reserves – over years, and by spreading their risks across many thousands of policyholders in hundreds of places and shifting some potential liabilities to reinsurers.

In 2012, P&C insurers maintained reserves of $596.2 billion for 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, the industry’s catastrophe surplus totaled $117.4 billion - as compared, for example, to insured losses from superstorm Sandy of $25.85 billion, of which private insurers were responsible for $18.8 billion. The 2005 hurricane season 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.

The Congressional Research Service (CRS) recently modeled the capacity of the insurance industry to deal with even more 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 which may occur once every 500 years with claims of $217.0 billion (all estimates in 2012 $).

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 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. The CRS model, again, projects total insured claims of $164.5 billion from a once-every-250-years catastrophe. If U.S. P&C insurers transfer 40 percent of the projected claims from such a 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 projected claims of $217 billion from a once-every-500-years catastrophe – still a smaller percentage than were transferred for Katrina – the 2012 catastrophe surplus of P&C insurers also could handle the remaining claims of $108.5 billion.

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

The preceding analysis established that under current RBC capital standards and industry practices, U.S. P&C insurers could

34. Shapiro and Mathur (2008).
36. Ibid.
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handle the claims from any currently-conceivable circumstances. Nevertheless, the IAIS is working to develop a new, global group insurance capital standard (ICS) that would apply much higher capital standards to large U.S. 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. 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.

These developments should be matters of concern for the insurance industry and the overall U.S. 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. 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, there is no evidence that those companies warrant additional capital requirements.

The Basic Capital Requirement for G-SIIs
To appreciate how a new ICS for IAIGs would work, we begin with the IAIS’s description of the factor-based approach adopted in the BCR for G-SIIs. 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. 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.

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

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 issues will arise. Rather than seek equivalence, the U.S. is working through the EU-U.S. 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.

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. Sharara et al. 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. 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.

37 Linklaters (2013).
38 IAIS (2014b).
39 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.
40 IAIS (2014b).
41 IAIS (2013).
42 IAIS (2014c).
44 Sharara et al. (2010).
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.-EU dialogue produces higher capital requirements for large U.S. P&C insurers. 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 their business conducted in foreign markets. On this basis, a minimum of seven major U.S. P&C insurers would qualify, accounting for 26.6 percent of the U.S. P&C market based on direct premiums written in 2012.45

Higher capital requirements for IAIGs 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 premiums and premium rates. 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 the ICS for IAIGs could affect premium rates and volume for affected insurers.

A review of the economic literature shows a range of effects when capital requirements rise for financial institutions. One study (Kashyap, Stein and Hanson (2010)) found that banking institutions respond to higher capital requirements by slowing the growth of their assets, which leads to a slowdown or contraction in their lending. Economists also have found that financial institutions pass along higher costs of capital to their customers through higher borrowing costs: studies (Kashyap, Stein and Hanson (2010)) confirm that when the minimum capital ratio for banks increases by 10 percentage points, the interest rates charged for loans rise by 25-to-45 basis points.46

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 (i.e., when the ratio of its total adjusted capital to its required capital, given its risks, is 70 percent or less). As noted earlier, Sharara et al. 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.47 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 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. Our analysis assumes that insurers will seek to maintain their existing capital margins - 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 focus on homeowner and auto

<table>
<thead>
<tr>
<th>Year</th>
<th>Average Homeowner Premiums</th>
<th>Average Auto Premiums</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>$1,076</td>
<td>$850</td>
</tr>
<tr>
<td>2014</td>
<td>$1,128</td>
<td>$852</td>
</tr>
<tr>
<td>2015</td>
<td>$1,183</td>
<td>$854</td>
</tr>
<tr>
<td>2016</td>
<td>$1,241</td>
<td>$856</td>
</tr>
<tr>
<td>2017</td>
<td>$1,302</td>
<td>$858</td>
</tr>
<tr>
<td>2018</td>
<td>$1,365</td>
<td>$860</td>
</tr>
<tr>
<td>Average</td>
<td>$1,244</td>
<td>$856</td>
</tr>
</tbody>
</table>

Table 2: Estimated Average Premiums for Homeowners' and Auto Coverage With No Change in Capital Standards, 2013-2018 (modified from Shapiro and Mathur 2014, p. 20, Tables 5 and 6).

46 Ibid.
47 Sharara et al. (2010).
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insurance, because the NAIC has published the average premium rates for homeowner and auto coverage for the years 2003-to-2011.\textsuperscript{48} 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).\textsuperscript{49} These data show that premiums increased at average rates of 5 percent per-year for homeowners’ coverage and 0.2 percent per-year for automobile coverage. We use these calculations to estimate the average premium rates for homeowners’ coverage and auto coverage for the 2013 baseline year and then over the following five years (2014-to-2018), assuming that capital standards for P&C insurers remain unchanged (Table 2).

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 1 percentage-point increase in capital costs leads to an increase in the interest rates charged for loans of at least 2.5 basis points.\textsuperscript{50} If this finding were applied directly to insurers, each 1 percentage-point increase in insurers’ capital requirements would produce an increase of at least 2.5 basis points in premium rates. In banking, these costs can be 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? We start with another banking analogy, the impact of higher capital requirements on bank mortgage rates. Over the decade 2005-2013, the average rate for 30-year fixed mortgages under Freddie Mac was about 5 percent.\textsuperscript{51} Applying this to an average loan of $200,000, a typical monthly payment would be $1,074.\textsuperscript{52} If capital requirements increased 30 percentage-points, so the mortgage rate rose to 5.75 percent, the monthly payment would increase to $1,167, or an annual increase in premium prices of 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.\textsuperscript{53}

To assess if these increases are in line with how P&C insurers would likely respond to an increase in capital requirements in their industry, we obtained data from SNL Financials on balance sheet items such as reserves and equity, revenues from premiums

\begin{table}
\centering
\begin{tabular}{|c|c|c|c|c|}
\hline
\multicolumn{2}{|c|}{15 Percentage-Point Increase in Capital Requirements} & \multicolumn{2}{c|}{30 Percentage-Point Increase in Capital Requirements} \\
\hline
Year & Average Premium & Premium Increase & Average Premium & Premium Increase \\
\hline
2014 & $1,173 & $45 & $1,219 & $90 \\
2015 & $1,231 & $47 & $1,278 & $95 \\
2016 & $1,291 & $50 & $1,340 & $99 \\
2017 & $1,354 & $52 & $1,406 & $104 \\
2018 & $1,420 & $55 & $1,474 & $109 \\
\hline
Average & $1,294 & $50 & $1,343 & $100 \\
\hline
\end{tabular}
\end{table}

\textsuperscript{48} Insurance Information Institute (2014). \textsuperscript{49} NAIC (2013). \textsuperscript{50} Kashyap, Stein and Hanson (2010). \textsuperscript{51} Freddie Mac (2014). \textsuperscript{52} Panchuk (2012). \textsuperscript{53} For shorter-term mortgages, the corresponding monthly change will be lower.
A 2005 study found that P&C insurers typically target a return on equity (ROE) of approximately 15 percent, although the value may differ based on the business line. Therefore, an increase in capital requirements that depresses the return on equity will be followed by an adjustment in pricing to maintain a ROE of 15 percent. Applying this analysis at the industry level, we estimate that a 30 percentage-point increase in capital requirements would cause insurers to increase 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 adding 37.5 basis points and 75 basis points to average mortgage rates. In the analysis which follows, we 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 3.

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 affecting 26.6 percent of the U.S. market (the IAIGs’ market share). If an 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 3). 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.

If the FSB process leads to these large increases in capital requirements for IAIGs, the average price for automobile coverage issued by them also would rise significantly. Under a 15 percentage-point increase in capital requirements for IAIGs, the cost of 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 4). 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.

<table>
<thead>
<tr>
<th>Year</th>
<th>15 Percentage-Point Increase in Capital Requirements</th>
<th>30 Percentage-Point Increase in Capital Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average Premium</td>
<td>Premium Increase</td>
</tr>
<tr>
<td>2014</td>
<td>$886</td>
<td>$34</td>
</tr>
<tr>
<td>2015</td>
<td>$888</td>
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<tr>
<td>2016</td>
<td>$890</td>
<td>$34</td>
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<tr>
<td>2017</td>
<td>$892</td>
<td>$34</td>
</tr>
<tr>
<td>2018</td>
<td>$895</td>
<td>$34</td>
</tr>
<tr>
<td>Average</td>
<td>$890</td>
<td>$34</td>
</tr>
</tbody>
</table>


References:

54 SNL (2014).
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 homeowners are required to carry at least minimum insurance, and they may be subject to additional costs for leaving their current insurers, such as the loss of “safe driver discounts” or the need to have their homes reappraised. The largest study of auto owners’ sensitivity to price increases for auto coverage found an elasticity of -0.57: a 1 percent increase in the price of coverage is expected to lead to a 0.57 percent decrease in demand for the coverage, which can translate to continuing coverage but at lower levels.\textsuperscript{56} For homeowners’ coverage, one study suggests that a 1 percent increase in price leads to a 1 percent decrease in demand, yet the elasticity of demand for homeowners’ coverage is often thought to be less than for auto coverage, especially for homeowner coverage tied to a mortgage.\textsuperscript{57} For this analysis, we will also apply the estimate for auto insurance premium elasticity to increases in homeowners’ premium rates.

To model these effects, we begin with NAIC data on direct written premiums by P&C insurers from 2003 to 2012.\textsuperscript{58} 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. 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. This provides the baseline for our projections for 2014 to 2018 (Table 5).

From the preceding analysis, we found that the contemplated increase in capital standards for insurers should drive up premium rates by about 4 percent or 8 percent per year, depending on how much those standards increase. We find 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 estimated at about 2 percent. Similarly, a 30-percentage point increase in capital requirements would reduce the premium volumes of the affected insurers by about 5 percent.

\begin{table}[h]
\centering
\begin{tabular}{|c|c|}
\hline
Year & Direct Written Premiums \\
\hline
2013 & $522.7 \\
2014 & $530.4 \\
2015 & $538.3 \\
2016 & $546.2 \\
2017 & $554.3 \\
2018 & $562.5 \\
\hline
Total & $2,731.7 \\
\hline
\end{tabular}
\end{table}

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|}
\hline
Year & Premium Volume Affected (26.6% of Projected Baseline) & 2% Reduction in Affected, Direct Premiums & 5% Reduction in Affected, Direct Premiums \\
\hline
2013 & $141.1 & $2.8 & $7.1 \\
2014 & $143.2 & $2.9 & $7.2 \\
2015 & $145.3 & $2.9 & $7.3 \\
2016 & $147.4 & $2.9 & $7.4 \\
2017 & $149.6 & $3.0 & $7.5 \\
\hline
Average & $145.3 & $2.9 & $7.3 \\
Total & $726.6 & $14.5 & $36.3 \\
\hline
\end{tabular}
\end{table}

\textsuperscript{56} Jaffe and Russell (1998).
\textsuperscript{57} DeFusco and Paciorek (2014).
\textsuperscript{58} NAIC (2013).
Again, we assume that the higher capital requirements will affect the seven U.S. P&C insurers that currently meet the tentative criteria for IAIG status, with 26.6 percent of the U.S. P&C insurance market. We also assume that those insurers would maintain their existing capital margins (ratio of actual capital to required capital). Table 6 presents the estimated effects on premium volumes from 15-percentage point and 30 percentage point increases in capital requirements: we estimate that they would reduce premium volumes, on average, by 2 percent and 5 percent, respectively.

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.

VI. Conclusions
Globalization presents many important challenges for the regulation of businesses that operate across borders. Regulators of 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 necessary and even urgent interest in those 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 uniform fiscal and monetary policies across nations.

In this spirit, the current effort to 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. The new requirements being considered in the U.S.-EU dialogue would impose substantial additional costs on large U.S. P&C insurers with substantial foreign business, and those additional costs would raise the price and slow the growth of their coverage for American households and businesses.
A comprehensive examination of insurer financial strength ratings

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Abstract
While unsolicited financial strength ratings have been studied in the banking literature, these sometimes controversial ratings have not been studied in insurance. Utilizing data from multiple sources, including a proprietary dataset, we provide the most comprehensive examination of insurer financial strength ratings to date and the first analysis of unsolicited ratings for U.S. property-liability insurers. Similar to bank ratings, we find that insurers’ unsolicited ratings tend to be lower than solicited ratings. We also find some consistency in the importance of organizational and key financial characteristics when comparing the results for unsolicited and solicited ratings across the agencies.

Keywords: Financial Strength Ratings, Selection Bias, Unsolicited Ratings, Demotech, A. M. Best
1. Introduction

Insurance companies have several options with respect to financial strength ratings. Existing ratings research has focused on a wide variety of topics including the determinants of ratings, differences across rating agencies, reasons to obtain ratings, and the impact of ratings on firms. One particular area of investigation has been unsolicited ratings. Unsolicited ratings are based solely on public information, while most financial strength ratings are based on publicly available information as well as proprietary information provided by the firms being rated. In banking, research has shown that unsolicited ratings, sometimes called shadow ratings, are lower than solicited ratings [Poon (2003), Poon and Firth (2005), and Poon et al. (2009)]. Differences in solicited and unsolicited ratings may be partially due to the fact that banks with unsolicited ratings are typically smaller and have weaker financial profiles than banks with solicited ratings [Poon and Firth (2005)].

Given the important information that financial strength ratings provide to consumers, regulators, investors and other insurers, ratings have been the subject of extensive academic, regulatory and industry analysis. In the current study, we add to existing literature in financial strength ratings by utilizing data from multiple sources, including a proprietary dataset from Demotech, to provide a comprehensive study of both unsolicited and solicited ratings from multiple rating agencies. More specifically, our sample includes solicited ratings from five rating agencies (A. M. Best, S&P, Moody’s, Fitch and Demotech) as well as unsolicited ratings from three agencies (S&P, Fitch and Demotech) over a nine-year period for property-liability insurers in the U.S.. Our sample of unsolicited ratings includes Demotech provisional ratings, which are quite similar to the unsolicited ratings of the other rating agencies in the sense that these ratings are based on publicly available information only and initiated by the rating agency. However, unlike traditional unsolicited ratings, Demotech’s provisional ratings are generally assigned to all insurers with available data in a given year. Thus, we are able to track a large sample of insurers rated with a process similar to traditional unsolicited ratings. Given that all insurers with available data are generally assigned a provisional rating by Demotech, this also helps to reduce the problems associated with sample selection bias that can be present in other studies of unsolicited ratings, where only a small subset of firms have an unsolicited rating. Moreover, Demotech does not release the provisional ratings to the public. This provides an interesting contrast to the rating practices of S&P and Fitch, both of which do make public their unsolicited ratings without consent of insurers. To our knowledge, this type of comparison has not been possible in prior ratings studies due to the data constraints. Finally, the study carefully controls for potential selection bias due to the fact that not all firms receive unsolicited and solicited ratings from all of the agencies in a manner similar to prior literature [Cantor and Packer (1997) and Pottier and Sommer (1999)].

In summary, our study accomplishes several goals. First, based on the structure of the data and analysis, we are able to examine the distribution of ratings across the various rating agencies. Second, we contrast the types of firms with published ratings from the various agencies (solicited and unsolicited) as well as the firm characteristics that have the most influence on financial strength ratings. Our initial presentation of summary statistics allows the reader to better understand which insurers possess various types of unsolicited and solicited ratings as well as the differences in the distribution of these financial strength ratings. Third, we provide an analysis of the characteristics impacting the ratings as well as the relative importance of these characteristics across ratings agencies. This builds on the prior studies in the area of insurance that have considered both the determinants of financial strength ratings as well as differences in the rating methodologies of these agencies [Harmelink (1974), Pottier and Sommer (1999), and Gaver and Pottier (2005)].

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1 Poon (2003), Poon and Firth (2005), and Poon et al. (2009) study solicited and unsolicited bank ratings across different countries.
2 The importance of ratings is highlighted in the case of AIG before the government bailout. As reported in Wall Street Journal (September 16, 2008), AIG had to “post $14.5 billion in collateral to bolster its credit rating” as well as “additional collateral to investment banks and others it trades with” after its credit downgrades.
3 To our knowledge this is the first time the provisional ratings have been studied in the ratings literature.
4 The provisional ratings are proprietary and made available for this study by Demotech. Demotech generally creates a provisional rating based on publicly available data for all insurers each year and provides that information to the firm. If the insurer elects to finalize this rating, then a fee is paid and the rating is made public. While the insurer is given the opportunity to provide additional information, the finalized rating is still based largely on publicly available information. These ratings were made available to the authors for this sample period. The authors are unable to extend the data beyond the current sample due to availability of data.
5 Other studies have examined a number of related areas including the decision to be rated, the similarities and differences of financial ratings across different firms, and industries and competition among rating agencies (Cantor and Packer (1997), Van Roy (2006), Poon et al. (2009), Gonis et al. (2012), and Doherty et al. (2012)).
Finally, the inclusion of Demotech provisional ratings allows for a comprehensive study of unsolicited insurer financial strength ratings for the very first time and provides some insight into whether differences are observed between unsolicited ratings that are made available to the public and those that are not. A better understanding of these issues for property-liability insurers not only helps to better perceive different types of ratings but also has key public policy implications for the regulators, consumers, and investors relying on these ratings as well as the insurers rated by the agencies.

The remainder of the paper is organized as follows. In Section 2, we examine background information related to the financial ratings literature. This is followed in Sections 3 and 4 by a discussion of the data and methodology, respectively. Finally, a discussion of the results as well as conclusions and public policy implications is presented.

2. Background information

A variety of studies have examined the determinants of insurer financial strength ratings from various rating agencies. Similar to prior studies examining bank financial ratings (Poon (2003) and Poon and Firth (2005)), studies related to insurers generally find that financial characteristics including capitalization, liquidity, profitability, and firm size are important in determining insurer ratings (Harmelink (1974), Pottier and Sommer (1999), and Gaver and Pottier (2005)). We draw on the variables considered in prior literature to identify the factors important in determining financial strength ratings.

While the studies generally find that financial and operational traits are important determinants of ratings, they also find that there are differences across rating agencies [Cantor and Packer (1997), Pottier and Sommer (1999), Van Roy (2006), and Poon et al. (2009)]. For example, in a study of property-liability insurers, Pottier and Sommer (1999) indicate that rating agencies exhibit systematic differences in the relative importance given to the different factors they consider. Authors have tested whether these are real differences or merely the artifacts of selection bias, given that different agencies rate different insurers. Given the mixed results of prior literature, we control for potential selection bias in the current study.7

Research examining unsolicited ratings is limited to the banking literature (examples include: Poon (2003), Poon and Firth (2005), and Poon et al. (2009)). The general conclusion from these studies is that banks’ unsolicited ratings tend to be lower than solicited ratings, even after controlling for self-selection bias. One limitation of these studies is that each analyzes the unsolicited ratings from one particular rating agency only (i.e., S&P, Fitch, and S&P, respectively) and there has been no research examining the unsolicited ratings across multiple rating agencies. And, to the best of our knowledge, no prior studies in the insurance literature have investigated unsolicited insurer ratings. It is our hope that by taking advantage of unsolicited ratings from multiple agencies as well as a proprietary dataset from Demotech, our study will help fill both voids in the literature.

While issues related to the determinants of ratings as well as the potential impact from selection bias and unsolicited ratings are important from an academic standpoint, research has found that the existence of ratings significantly impacts a variety of stakeholders. As stated by Pottier and Sommer (1999), “insurer financial strength ratings are heavily relied upon by insurance agents, brokers and consumers, are used by insurers in their advertising, provide a tool for regulators to assess insurer risk and are often used in academic research as measurers of insolvency risk” (p. 622). Evidence of this impact is found in Doherty and Phillips (2002), who document an increase in rating stringency and conclude that the dramatic capital build-up in the insurance industry can be explained by the pressure experienced by insurers to maintain existing ratings.9

6 More specifically, Gaver and Pottier (2005) find that all of these variables are important determinants of insurer ratings while Pottier and Sommer (1999) find that firm size and investment in junk bonds are significant determinants for all three of the rating agencies examined.

7 Cantor and Packer (1997) find that sample selection bias does not explain the average rating differences and that observed differences in average ratings rather reflect differences in rating models. While Pottier and Sommer (1999) find some evidence of selection bias in the rating determinants model for A. M. Best, none of their rating differences models shows evidence of sample selection (Pottier and Sommer (1999, p. 639)).

8 Ratings have also been used in insolvency prediction [Ambrose and Seward (1988), Singh and Power (1992), Ambrose and Carroll (1994) and Pottier (1998)].

9 In addition, Epermanis and Harrington (2006) find that an insurer’s A. M. Best rating decline is followed by significant premium declines both in the same year and in the following year.
Data
The dataset comprises data from several sources for the period of 2000 to 2008. Insurers’ demographic and financial information is from the National Association of Insurance Commissioners’ (“NAIC”) Database. Insurers without required financial information are deleted. Demotech ratings (both provisional and finalized) are obtained from Demotech, Inc., and A. M. Best’s ratings are obtained from A. M. Best Company. Finally, Fitch, Moody’s and S&P ratings are obtained from the SNL Database. Similar to Pottier and Sommer (1999), we condense the ratings into five categories using the descriptions provided by the agencies to facilitate comparison across the rating agencies.11

We consider both unsolicited and solicited ratings in our analysis. Due to data limitations, the unsolicited ratings analysis is restricted to the ratings of Demotech, S&P and Fitch.12

As noted earlier, Demotech unsolicited ratings are different from the unsolicited ratings of both S&P and Fitch in two important ways: (1) the ratings are generally assigned to all insurers every year rather than a limited group and (2) the ratings are not made available to the public unless the insurer pays for the rating to be finalized and released.13 However, like traditional unsolicited ratings, Demotech provisional ratings are still initiated by the rating agency. To distinguish Demotech provisional ratings from the more traditional unsolicited ratings provided by S&P and Fitch, we refer to these as provisional ratings throughout the remainder of the paper.14

In the analysis of solicited ratings, or those initiated by the insurers, we consider the ratings of the four traditional rating agencies (A. M. Best, S&P, Moody’s and Fitch) as well as Demotech. The inclusion of Demotech ratings provides an interesting contrast to traditional solicited ratings given the difference in the rating processes. Unlike traditional agencies, Demotech provides insurers with their provisional ratings and insurers decide whether to make the ratings public. If an insurer elects to finalize the rating, some additional information may be requested that could impact the final rating released to the

<table>
<thead>
<tr>
<th>Year</th>
<th>Demotech (Provisional)</th>
<th>S&amp;P</th>
<th>Fitch</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>1829</td>
<td>218</td>
<td>N/A</td>
</tr>
<tr>
<td>2001</td>
<td>1712</td>
<td>258</td>
<td>N/A</td>
</tr>
<tr>
<td>2002</td>
<td>1591</td>
<td>247</td>
<td>N/A</td>
</tr>
<tr>
<td>2003</td>
<td>1731</td>
<td>355</td>
<td>N/A</td>
</tr>
<tr>
<td>2004</td>
<td>806</td>
<td>119</td>
<td>N/A</td>
</tr>
<tr>
<td>2005</td>
<td>1452</td>
<td>72</td>
<td>3</td>
</tr>
<tr>
<td>2006</td>
<td>1604</td>
<td>36</td>
<td>426</td>
</tr>
<tr>
<td>2007</td>
<td>1575</td>
<td>26</td>
<td>446</td>
</tr>
<tr>
<td>2008</td>
<td>1605</td>
<td>N/A</td>
<td>500</td>
</tr>
<tr>
<td>Total</td>
<td>13905</td>
<td>1331</td>
<td>1375</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Demotech (Provisional)</th>
<th>A.M. Best</th>
<th>S&amp;P</th>
<th>Moody’s</th>
<th>Fitch</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>195</td>
<td>200</td>
<td>351</td>
<td>146</td>
<td>73</td>
</tr>
<tr>
<td>2001</td>
<td>181</td>
<td>548</td>
<td>366</td>
<td>177</td>
<td>196</td>
</tr>
<tr>
<td>2002</td>
<td>185</td>
<td>515</td>
<td>363</td>
<td>174</td>
<td>186</td>
</tr>
<tr>
<td>2003</td>
<td>177</td>
<td>518</td>
<td>379</td>
<td>214</td>
<td>212</td>
</tr>
<tr>
<td>2004</td>
<td>175</td>
<td>516</td>
<td>350</td>
<td>211</td>
<td>248</td>
</tr>
<tr>
<td>2005</td>
<td>190</td>
<td>493</td>
<td>365</td>
<td>211</td>
<td>264</td>
</tr>
<tr>
<td>2006</td>
<td>207</td>
<td>496</td>
<td>367</td>
<td>198</td>
<td>279</td>
</tr>
<tr>
<td>2007</td>
<td>221</td>
<td>498</td>
<td>324</td>
<td>200</td>
<td>307</td>
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<tr>
<td>2008</td>
<td>235</td>
<td>490</td>
<td>279</td>
<td>144</td>
<td>317</td>
</tr>
<tr>
<td>Total</td>
<td>1766</td>
<td>4274</td>
<td>3144</td>
<td>1675</td>
<td>2082</td>
</tr>
</tbody>
</table>

Table 1: Number of ratings in sample by year

3. Data
The dataset comprises data from several sources for the period of 2000 to 2008. Insurers’ demographic and financial information is from the National Association of Insurance Commissioners’ (“NAIC”) Database.10 Insurers without required financial information are deleted. Demotech ratings (both provisional and finalized) are obtained from Demotech, Inc., and A. M. Best’s ratings are obtained from A. M. Best Company. Finally, Fitch, Moody’s and S&P ratings are obtained from the SNL Database. Similar to Pottier and Sommer (1999), we condense the ratings into five categories using the descriptions provided by the agencies to facilitate comparison across the rating agencies.11

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10 All continuous variables are winsorized at 1 percent level to minimize the impact of outliers.
11 It should be noted that while we condense the ratings into five categories, there are no finalized Demotech ratings in the lowest category and very few observations in this category for the other rating agencies.
12 Table 1 provides information related to unsolicited ratings. Data related to unsolicited financial strength ratings of insurers is somewhat limited. The agencies have generally discontinued this practice or limited the types of insurers to which they assign these ratings. For example, in a press release in early 2009, Fitch announced that it will no longer issue unsolicited ratings, called “q” ratings, though it noted it may issue “q” scores (similar to “q” ratings in the sense that it utilizes historical financial information) in the future if demanded by the market [Business Wire (2009)]. Additionally, recently an A. M. Best document indicates that it only assigns solicited ratings, called “pd” or public data ratings, to “Canadian property/casualty insurers and HMOs and health insurers (United States)” for which the company does not currently provide traditional solicited ratings (A. M. Best (2009)). Other than Demotech, only S&P and Fitch offered unsolicited ratings for some part of the sample period. For S&P, a majority of these ratings were only available through 2003 when there was a significant decline in the unsolicited ratings issued. For Fitch, the unsolicited ratings were only available since 2006.
13 More information on the process of finalizing a rating is provided below.
14 Provisional rating is the term used by Demotech.
public; however, for the reduced sample of insurers that elect to finalize their ratings, the provisional rating provided to the insurer is typically the same as the final rating released to the public. To distinguish these ratings from the more traditional solicited ratings, we refer to these as finalized ratings.

Table 1 provides a summary of the number of insurers rated by each of the rating agencies for the years of our sample. Given that Demotech generally provides its provisional ratings to all insurers with the needed publicly available financial information, it is not surprising that Demotech has the highest number of provisional (unsolicited) ratings. S&P and Fitch have provided approximately the same number of unsolicited ratings; however, the time periods over which these ratings have been provided differ. As shown in the table, while S&P provided a number of unsolicited ratings through 2003, this number dropped significantly in subsequent years. In addition, we do not have any Fitch unsolicited ratings prior to 2006. In terms of solicited ratings, the major two rating agencies in the sample are A. M. Best and S&P with 4,274 and 3,144 firm-year observations respectively. This is followed by Fitch, Demotech and Moody's.

Next, for the agencies for which we have both unsolicited (or provisional) and solicited (or finalized) ratings, we compare the percentage of ratings in each of the categories. This information is summarized in Table 2. First, we contrast the Demotech provisional and finalized ratings. It appears that there is approximately the same percentage of insurers with ratings in the top two categories. However, we find that there is a much larger percentage of insurers with ratings in the good/strong finalized category than the good/strong provisional category (50 percent compared to 32 percent). We also find that while no insurer with a finalized rating receives a rating less than fair/adequate rating, 11 percent of provisional ratings fall in this category. More extreme differences are observed when comparing the unsolicited and solicited ratings of S&P and Fitch. With S&P, for insurers soliciting ratings, 46 percent receive ratings in the top two categories. However, for unsolicited ratings, only 12 percent of insurers receive ratings in these categories. Also, while only 1 percent of insurers soliciting ratings receive a less than fair/adequate rating, 24 percent of insurers fall into this category when considering unsolicited ratings. Finally, for Fitch, we find that only 5 percent of insurers seeking ratings receive a rating in the bottom two categories, and 60 percent of insurers receive unsolicited ratings in these categories. To determine if the differences in the distributions are econometrically significant, we conduct a Wilcoxon rank-sum test for the ratings of each of

<table>
<thead>
<tr>
<th></th>
<th>Provisional</th>
<th>Finalized</th>
<th>Unsolicited</th>
<th>Solicited</th>
<th>Unsolicited</th>
<th>Solicited</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superior/extremely strong/exceptional</td>
<td>2956</td>
<td>21%</td>
<td>348</td>
<td>20%</td>
<td>10</td>
<td>1%</td>
</tr>
<tr>
<td>Excellent/very strong</td>
<td>4052</td>
<td>29%</td>
<td>518</td>
<td>29%</td>
<td>140</td>
<td>11%</td>
</tr>
<tr>
<td>Good/strong</td>
<td>4486</td>
<td>32%</td>
<td>889</td>
<td>50%</td>
<td>273</td>
<td>21%</td>
</tr>
<tr>
<td>Fair/adequate</td>
<td>934</td>
<td>7%</td>
<td>11</td>
<td>1%</td>
<td>585</td>
<td>44%</td>
</tr>
<tr>
<td>Less than fair/adequate</td>
<td>1477</td>
<td>11%</td>
<td>0</td>
<td>0%</td>
<td>323</td>
<td>24%</td>
</tr>
</tbody>
</table>

Table 2: Unsolicited and solicited ratings comparison

Note that the number of observations is low for A. M. Best in 2000 and Demotech in 2004. This is due to data limitations. To ensure this is not influencing the results obtained, these two models are repeated excluding these data years from the sample. The unreported results are generally consistent with those presented in the following section.

Note the total across the rating agencies exceeds the total number of insurer-year observations indicated earlier since insurers are rated by multiple agencies in a given year.

For more information on the Wilcoxon ranked sum test see: https://en.wikipedia.org/wiki/Wilcoxon_signed-rank_test
the three agencies. Using the full distribution of ratings provided by the agencies, we reject the null hypothesis that the provisional (unsolicited) and finalized (solicited) ratings have identical distributions. This result is similar to the findings in the banking literature, which suggest unsolicited ratings tend to be lower [Poon (2003)].

For finalized and solicited ratings, we examine the number of insurers with multiple ratings. As shown in Table 3, the majority of insurers elect to only be rated by a single agency. This is not surprising given that the rating process can be costly for insurers. However, we do find that more than 30 percent of insurers seek multiple ratings. Given the volume of insurers with multiple ratings, we control for the existence of another rating in our model. This is discussed in more detail in the following section.

Finally, for insurers with multiple ratings, we compare those with secure ratings across the agencies. As shown in Table 4, there appears to be strong consistency in the evaluation of the insurers by the agencies. More specifically, for all comparisons except Demotech and A. M. Best, we find in excess of 90 percent agreement (insurers receiving secure ratings by both agencies). For Demotech and A. M. Best, the percentage of agreement is smaller (i.e., 81 percent). This finding of such consistency in the evaluation of insurers makes it even more important to control for the existence of other rating(s) in the modeling.

4. Methodology and variable descriptions
4.1 Methodology
Next we turn to our consideration of the characteristics that influence the different types of ratings. We examine both the factors that impact the ratings as well as whether these factors vary across agencies. We first consider Demotech provisional ratings and the unsolicited ratings of S&P and Fitch. Then, we consider Demotech finalized ratings and the solicited ratings of the other four agencies.

For the Demotech provisional ratings, we use ordered probit modeling. Given that Demotech generally provides provisional ratings for the population of insurers, this modeling approach is most appropriate. However, for all other models (the unsolicited S&P and Fitch ratings, the finalized Demotech ratings, and the solicited ratings of the other four agencies), we use an estimation procedure that controls for potential selection bias. This is necessary given that only some insurers are selected to receive unsolicited ratings by S&P and Fitch and only some insurers elect to be rated by each of the agencies. More specifically, we use

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18 These statistics are calculated on an insurer-year observation basis.
19 An insurer is considered to have a secure rating if it has a rating in one of the top two categories.

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Table 3: Ratings summary

<table>
<thead>
<tr>
<th>Year</th>
<th>1 Rating</th>
<th>2 Ratings</th>
<th>3 Ratings</th>
<th>4 Ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>518</td>
<td>144</td>
<td>53</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>717</td>
<td>206</td>
<td>93</td>
<td>15</td>
</tr>
<tr>
<td>2002</td>
<td>690</td>
<td>210</td>
<td>103</td>
<td>1</td>
</tr>
<tr>
<td>2003</td>
<td>700</td>
<td>217</td>
<td>118</td>
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<tr>
<td>2004</td>
<td>702</td>
<td>209</td>
<td>124</td>
<td>2</td>
</tr>
<tr>
<td>2005</td>
<td>662</td>
<td>213</td>
<td>141</td>
<td>3</td>
</tr>
<tr>
<td>2006</td>
<td>698</td>
<td>209</td>
<td>141</td>
<td>2</td>
</tr>
<tr>
<td>2007</td>
<td>732</td>
<td>228</td>
<td>118</td>
<td>2</td>
</tr>
<tr>
<td>2008</td>
<td>760</td>
<td>209</td>
<td>93</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>6179</td>
<td>1845</td>
<td>984</td>
<td>30</td>
</tr>
</tbody>
</table>

Table 4: Comparison of secure ratings among the rating agencies

<table>
<thead>
<tr>
<th>Comparison groups</th>
<th>Secure rating by both</th>
<th>Total rated by both</th>
<th>% secure by both</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demotech and A. M. Best</td>
<td>387</td>
<td>479</td>
<td>81%</td>
</tr>
<tr>
<td>Demotech and S&amp;P</td>
<td>102</td>
<td>102</td>
<td>100%</td>
</tr>
<tr>
<td>Demotech and Moody’s</td>
<td>46</td>
<td>46</td>
<td>100%</td>
</tr>
<tr>
<td>Demotech and Fitch</td>
<td>32</td>
<td>32</td>
<td>100%</td>
</tr>
<tr>
<td>A. M. Best and S&amp;P</td>
<td>184</td>
<td>188</td>
<td>98%</td>
</tr>
<tr>
<td>A. M. Best and Moody’s</td>
<td>30</td>
<td>30</td>
<td>100%</td>
</tr>
<tr>
<td>A. M. Best and Fitch</td>
<td>58</td>
<td>62</td>
<td>94%</td>
</tr>
<tr>
<td>S&amp;P and Moody’s</td>
<td>1328</td>
<td>1344</td>
<td>99%</td>
</tr>
<tr>
<td>S&amp;P and Fitch</td>
<td>1487</td>
<td>1503</td>
<td>99%</td>
</tr>
<tr>
<td>Moody’s and Fitch</td>
<td>1175</td>
<td>1191</td>
<td>99%</td>
</tr>
</tbody>
</table>

---

20 For more information on ordered probit modeling, please see: https://en.wikipedia.org/wiki/Ordered_probit
21 It should be noted that for both the S&P and Fitch models, the sample period is limited to the period for which data is available as shown in Table 1.
a joint approach that models both the insurer’s rating and the decision to rate insurer (or the decision by insurer i to be rated).\textsuperscript{22} Given that the variable of interest (i.e., insurer rating) is only observed if a selection condition is met, the following system of equations is used:

\[
\begin{align*}
1. & \quad y_i^* = x_i \beta + \lambda \epsilon_i + \tau_i \\
2. & \quad S_i^* = z_i \gamma + \epsilon_i + \zeta_i
\end{align*}
\]

Equation 1 is fitted using an ordinal probit regression model\textsuperscript{23} where \( y \) takes on a value of 1 through 5 based on the rating assigned to the insurer. Equation 2 is the endogenous decision model. This approach produces consistent estimators of \( \beta \).\textsuperscript{24}

For comparison purposes, we consider the same set of firm characteristics as potential determinants of financial ratings for each ratings series (i.e., provisional Demotech ratings, unsolicited ratings, Demotech finalized ratings, and solicited ratings models).\textsuperscript{25} These characteristics are divided into four categories: organizational characteristics, business mix, business risk and financial strength and flexibility.

4.2 Variable descriptions

With respect to the determinants of financial strength ratings models, we use a set of variables in four categories similar to those used in prior insurance and banking literature [Pottier and Sommer (1999), Poon (2003)].

Organizational characteristics: previous literature has shown that different organizational forms are associated with systematically different levels of risk in terms of business written and investments [Lamm-Tennant and Starks (1993), Downs and Sommer (1999), and Cole et al. (2009)]. Our size measure is “direct premiums written.”\textsuperscript{26} We also include proxies to capture differences in organizational forms (“mutual indicator” and “other organization type indicator” with stock being the omitted category), group membership (“group indicator”) and insurer age (“established age”).

Business mix: first, we include the “line-of-business Herfindahl” and the “number of states licensed” as measures of concentration. The measures are relatively standard measures of concentration and business mix in the insurance literature. To the extent that diversification reduces firm risk, more diversified firms are expected to have higher ratings. However, if diversification leads to a lack of efficiency in operations that adversely impact profitability, the opposite result may exist. We also include two variables to measure specific business focus as this may impact various aspects of the firm and therefore insurers’ ratings: the “percentage in long-tail lines” and the “percentage in personal lines.”\textsuperscript{27}

Business risk: we include “stock to cash and invested assets” as a measure of investment risk as varying levels of stock investment will correlate with varying levels of firm risk. We also include “2-year loss development” as it is an important part of the assessment of an insurer’s risk. According to A. M. Best, more than two thirds of an insurer’s gross capital requirement is usually generated from its loss reserve and net premiums written components [A. M. Best (2003)]. This measure allows us to determine whether the insurer has been understating or overstating loss reserve estimates in recent periods. “Catastrophe exposure” is proxied by the percentage of the insurer’s premiums written in property insurance in states along the Gulf Coast and the Atlantic Seaboard. An insurer’s exposure to catastrophic events creates greater uncertainty and thus is likely to be associated with lower financial strength ratings. Finally, two measures related to reinsurance are included: “reinsurance ceded” and “recoverables to surplus.” The extent of reinsurance use has a potentially conflicting impact on an insurer’s business uncertainty [Borch (1974) and Berger et al. (1992)]. Given that reinsurance transfers part of the risk to a reinsurer, greater use

\textsuperscript{22} The modeling technique used is ssm in STATA. The summary of the modeling description was obtained from Miranda and Rabe-Hesketh (2006). See this article for additional details.

\textsuperscript{23} See fn 20.

\textsuperscript{24} We control for heteroskedasticity. There is no evidence of multicollinearity or autocorrelation.

\textsuperscript{25} There is some variation in the variables included in the decision model. The discussion related to these variables and the results of these models are available from the authors upon request.

\textsuperscript{26} It should be noted that since larger firms are typically expected to have lower levels of insolvency risk [Cummins and Danzon (1997) and Cummins and Sommer (1996)], the size measure can also be considered a business risk measure.

\textsuperscript{27} In general, long-tailed lines of business relate to liability, environmental, and bodily injury claims. With these types of claims, it typically takes a longer period from the time of the occurrence of the injury to final settlement of the loss. This can lead to more error in loss reserving as well as more volatility of losses in general. Typically, due to their standardized nature, personal lines coverages are considered less volatile than commercial coverages. It should be noted that both of these measures may also capture varying levels of business risk.
of reinsurance may be associated with reduced uncertainty of the primary insurer’s business. Alternatively, greater use of reinsurance can have several adverse effects for the primary insurer: it may make it “more susceptible to short-term dislocations in the overall market,” it ties its financial stability to that of the reinsurer and it exposes it to potential uncertainty in payments if a claim dispute occurs [Doherty and Phillips (2002, p. 62)]. In this respect, the use of reinsurance may complicate the assessment of the insurer’s risk, which increases the information asymmetry and uncertainty regarding the company. The “recoverables to surplus” is another measure related to reinsurance. Higher levels of recoverables are likely related to a greater probability of insolvency. As discussed in prior research, we would expect this variable to be negatively related to the insurer’s rating [i.e., Gaver and Pottier (2005)].

Financial strength and flexibility: previous studies have established that insurers that are more profitable and well capitalized are associated with higher ratings [Kahane et al. (1986), MacMinn and Witt (1987), Cummins (1988), Doherty (1989), Pottier and Sommer (1999), Doherty and Phillips (2002) and Gaver and Pottier (2005)]. “Capital to assets” serves as a proxy for an insurer’s capitalization while “net income to assets” measures an insurer’s profitability. We also include “cash to invested assets” given that prior studies have found that the insurer’s levels of liquidity are also likely to impact ratings [Kahane et al. (1986) and Pottier and Sommer (1999)]. An insurer with higher levels of investment in cash is expected to be associated with relatively lower uncertainty and likely higher ratings because cash is much easier to value and less risky than bonds and stocks. Finally, previous research has indicated that growth is important in determining insurer insolvency risk [Harrington and Danzon (1994) and Pottier and Sommer (1999)]. We proxy growth with “change in NPW.” The impact of growth on firm’s uncertainty and potential impact on ratings is ambiguous as strong premium growth may indicate that policyholders have confidence in the financial health of the insurer and thus indicate lower uncertainty. On the other hand, it may be a result of a property-liability insurer’s lowering underwriting standards or underpricing [Harrington and Danzon (1994)].

### Table 5: Summary statistics

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Unsolicited</th>
<th>Solicited</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organizational characteristics</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct premiums written</td>
<td>10.1733</td>
<td>10.3186</td>
<td>10.6565</td>
</tr>
<tr>
<td>Mutual indicator</td>
<td>0.2021</td>
<td>0.2087</td>
<td>0.1847</td>
</tr>
<tr>
<td>Other organization type indicator</td>
<td>0.1001</td>
<td>0.0664</td>
<td>0.0590</td>
</tr>
<tr>
<td>Group affiliation</td>
<td>0.6521</td>
<td>0.6904</td>
<td>0.6617</td>
</tr>
<tr>
<td>Established age</td>
<td>42.7033</td>
<td>44.8859</td>
<td>45.1690</td>
</tr>
<tr>
<td><strong>Business mix</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line-of-business Herfindahl</td>
<td>0.5173</td>
<td>0.4909</td>
<td>0.4702</td>
</tr>
<tr>
<td>Percentage in long-tail lines</td>
<td>0.6980</td>
<td>0.6904</td>
<td>0.6963</td>
</tr>
<tr>
<td>Percentage in personal lines</td>
<td>0.3739</td>
<td>0.4009</td>
<td>0.3930</td>
</tr>
<tr>
<td>Number of states licensed</td>
<td>16.0049</td>
<td>16.5506</td>
<td>19.5425</td>
</tr>
<tr>
<td><strong>Business risk</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stock to cash and invested assets</td>
<td>0.1143</td>
<td>0.1178</td>
<td>0.1122</td>
</tr>
<tr>
<td>2-year loss development</td>
<td>-0.8428</td>
<td>-1.1127</td>
<td>-0.3846</td>
</tr>
<tr>
<td>Catastrophe exposure</td>
<td>6.6966</td>
<td>6.6989</td>
<td>7.1536</td>
</tr>
<tr>
<td>Reinsurance ceded</td>
<td>0.5319</td>
<td>0.5458</td>
<td>0.5519</td>
</tr>
<tr>
<td>Recoverables to surplus</td>
<td>49.5773</td>
<td>48.3800</td>
<td>49.2293</td>
</tr>
<tr>
<td><strong>Financial strength and flexibility</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital to assets</td>
<td>0.4272</td>
<td>0.4306</td>
<td>0.4144</td>
</tr>
<tr>
<td>Net income to assets</td>
<td>0.0232</td>
<td>0.0231</td>
<td>0.0262</td>
</tr>
<tr>
<td>Cash to invested assets</td>
<td>0.1958</td>
<td>0.1679</td>
<td>0.1575</td>
</tr>
<tr>
<td>Change in NPW</td>
<td>19.9881</td>
<td>17.1664</td>
<td>17.0099</td>
</tr>
</tbody>
</table>

5. Results

5.1 Summary statistics

Table 5 provides summary statistics for the entire sample and separately for insurers with unsolicited and solicited ratings. It appears that insurers that solicit ratings tend to be larger and more diverse in terms of business mix and geographic operation. In addition, these insurers have smaller loss development factors.

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28 Prior research has considered whether the financial profiles are statistically different between solicited and unsolicited samples using t-tests. Given the uniqueness of our sample (data from multiple rating agencies), there are some firms that appear in both the unsolicited and solicited subsamples, which makes a complete comparison of these two subsamples difficult. However, t-tests conducted including the insurers that appear in only one subset show significant differences for all but one of the variables at the 5 percent level. For that variable (“catastrophe exposure”), the t-test shows significant differences at the 10 percent level. It should be noted that the Demotech provisional ratings are included in the unsolicited group and Demotech finalized ratings are included in the solicited group.
Table 6: Determinants of provisional and unsolicited financial ratings

<table>
<thead>
<tr>
<th></th>
<th>Demotech (provisional)</th>
<th>S&amp;P</th>
<th>Fitch</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organizational characteristics</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct premiums written</td>
<td>0.116&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.348&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.444&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Mutual indicator</td>
<td>0.074&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-0.0059</td>
<td>0.206</td>
</tr>
<tr>
<td>Other organization type indicator</td>
<td>-0.0407&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-0.0146</td>
<td>0.154</td>
</tr>
<tr>
<td>Group affiliation</td>
<td>0.172&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.591&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.544&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Established age</td>
<td>0.000131&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-0.000455</td>
<td>0.000980</td>
</tr>
<tr>
<td><strong>Business mix</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line-of-business Herfindahl</td>
<td>-0.480&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-0.646&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-1.472&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Percentage in long-tail lines</td>
<td>0.322&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.145</td>
<td>0.768&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Percentage in personal lines</td>
<td>-0.318&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.126</td>
<td>-1.424&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Number of states licensed</td>
<td>0.00129&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.00128</td>
<td>-0.00282</td>
</tr>
<tr>
<td><strong>Business risk</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stock to cash and invested assets</td>
<td>-0.140&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-1.540&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-1.369&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>2-year loss development</td>
<td>-0.0112&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-0.00593</td>
<td>-0.0101&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Catastrophe exposure</td>
<td>-5.51e-05&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.00312&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.000322&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Reinsurance ceded</td>
<td>-0.0712&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.623&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.686&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Recoverables to surplus</td>
<td>-0.00181&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-0.00307&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-0.00649&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Financial strength and flexibility</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital to assets</td>
<td>1.757&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.529&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.447&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Net income to assets</td>
<td>3.120&lt;sup&gt;a&lt;/sup&gt;</td>
<td>3.124&lt;sup&gt;a&lt;/sup&gt;</td>
<td>6.897&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Cash to invested assets</td>
<td>-0.641&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-1.823&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-0.996&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Change in NPW</td>
<td>0.000430&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.00159&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-0.00899&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Observations</td>
<td>13905</td>
<td>1331</td>
<td>1375</td>
</tr>
</tbody>
</table>

5.1.1 Provisional and unsolicited ratings

We now turn to an analysis of whether the determinants of unsolicited financial ratings are consistent across the agencies. This includes an analysis of the Demotech provisional ratings as well as the S&P and Fitch unsolicited ratings. As shown in Table 6, it appears that organizational characteristics have less of an impact on the ratings assigned to insurers in comparison to the other categories. More specifically, four (stock to cash and invested assets, 2-year loss development and both reinsurance variables) of the five business risk measures are significant for all three agencies while this is only the case for two (direct premiums written and group affiliation) of the five organizational characteristics. The mutual variable is also significant in the Demotech model. Additionally, all of the financial strength measures are significant for S&P and Demotech and three of the four for Fitch. Finally, as it relates to business mix, while only one of the variables, line-of-business Herfindahl, is significant for S&P, all of these variables are significant for Demotech and three of the four for Fitch.

An examination of the sign and size of the coefficients provides some information as to the magnitude of the impact of the firm characteristics across the various agencies. Examining first the organizational characteristics, we find that size and group affiliation are associated with greater probabilities of being assigned a higher rating for S&P and Fitch in comparison to Demotech.

In terms of business mix, we find that firms that are more concentrated in terms of business are over two times more likely to receive a lower rating from Fitch and three times more likely to receive a lower rating from S&P than from Demotech. In addition, while larger percentages of business in long-tail lines are associated with greater probabilities of being assigned higher ratings for Demotech and Fitch, larger percentages of business in personal lines are associated with greater probabilities of being assigned lower ratings by these agencies.

The results for the business risk measures generally support the hypotheses that greater uncertainty is associated with the probability of being assigned a lower rating.

<sup>29</sup> It should be noted that for the second-stage models, the likelihood ratio test for ρ = 0 rejects the null hypothesis at a significance level of .05 or better for S&P, but not for Fitch.
<table>
<thead>
<tr>
<th>Organizational characteristics</th>
<th>A.M. Best</th>
<th>S&amp;P</th>
<th>Moody's</th>
<th>Fitch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct premiums written</td>
<td>0.354(^a) (0.0202)</td>
<td>0.0703(^a) (0.0204)</td>
<td>0.0311(^c) (0.0185)</td>
<td>0.109(^a) (0.0195)</td>
</tr>
<tr>
<td>Mutual indicator</td>
<td>0.334(^a) (0.0555)</td>
<td>-0.349(^a) (0.103)</td>
<td>0.264(^a) (0.102)</td>
<td>-0.399(^a) (0.120)</td>
</tr>
<tr>
<td>Other organization type indicator</td>
<td>-0.324(^b) (0.143)</td>
<td>0.160 (0.111)</td>
<td>-0.0344 (0.358)</td>
<td>0.309 (0.202)</td>
</tr>
<tr>
<td>Group affiliation</td>
<td>0.189(^a) (0.0730)</td>
<td>0.427(^a) (0.201)</td>
<td>-0.771(^a) (0.295)</td>
<td>-0.330 (0.372)</td>
</tr>
<tr>
<td>Established age</td>
<td>0.00201(^a) (0.000803)</td>
<td>-0.00257(^a) (0.000611)</td>
<td>-0.00182(^a) (0.000109)</td>
<td>-0.00187(^a) (0.000807)</td>
</tr>
<tr>
<td>Business mix</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line-of-business Herfindahl</td>
<td>-0.455(^a) (0.0793)</td>
<td>0.571(^a) (0.119)</td>
<td>-0.0888 (0.110)</td>
<td>0.681(^a) (0.150)</td>
</tr>
<tr>
<td>Percentage in long-tail lines</td>
<td>0.441(^a) (0.0670)</td>
<td>-0.640(^a) (0.102)</td>
<td>-1.011(^a) (0.150)</td>
<td>-0.697(^a) (0.157)</td>
</tr>
<tr>
<td>Percentage in personal lines</td>
<td>-0.838(^a) (0.0582)</td>
<td>0.320(^a) (0.0732)</td>
<td>0.0425 (0.132)</td>
<td>0.183(^a) (0.0796)</td>
</tr>
<tr>
<td>Number of states licensed</td>
<td>0.0201(^a) (0.00151)</td>
<td>0.000157 (0.00110)</td>
<td>-0.00174 (0.00118)</td>
<td>-0.00653(^a) (0.00144)</td>
</tr>
<tr>
<td>Business risk</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stock to cash and invested assets</td>
<td>0.418(^a) (0.144)</td>
<td>1.020(^a) (0.163)</td>
<td>-0.506 (0.655)</td>
<td>1.589(^a) (0.238)</td>
</tr>
<tr>
<td>2-year loss development</td>
<td>-0.00685(^a) (0.00109)</td>
<td>-0.000737 (0.00135)</td>
<td>-0.00262 (0.00182)</td>
<td>-0.000358 (0.00182)</td>
</tr>
<tr>
<td>Catastrophe exposure</td>
<td>0.00093(^a) (0.00162)</td>
<td>0.0117(^a) (0.00185)</td>
<td>0.0140(^a) (0.00213)</td>
<td>0.0140(^a) (0.00213)</td>
</tr>
<tr>
<td>Reinsurance ceded</td>
<td>0.097 (0.0842)</td>
<td>0.140(^a) (0.0378)</td>
<td>0.0581 (0.143)</td>
<td>0.287(^b) (0.0472)</td>
</tr>
<tr>
<td>Recoverables to surplus</td>
<td>-0.00356(^a) (0.000317)</td>
<td>-0.00163(^a) (0.000246)</td>
<td>-0.000899(^a) (0.000428)</td>
<td>-0.00303(^a) (0.000417)</td>
</tr>
<tr>
<td>Financial strength and flexibility</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital to assets</td>
<td>1.319(^a) (0.321)</td>
<td>3.139(^a) (0.170)</td>
<td>0.531(^a) (0.136)</td>
<td>0.552(^b) (0.379)</td>
</tr>
<tr>
<td>Net income to assets</td>
<td>1.653(^a) (0.374)</td>
<td>2.782(^a) (0.612)</td>
<td>2.087(^b) (0.867)</td>
<td>2.936(^b) (0.842)</td>
</tr>
<tr>
<td>Cash to invested assets</td>
<td>-0.564(^a) (0.120)</td>
<td>-0.149 (0.0988)</td>
<td>0.750(^a) (0.158)</td>
<td>0.0492 (0.268)</td>
</tr>
<tr>
<td>Change in NPW</td>
<td>0.00097(^a) (0.000370)</td>
<td>0.00156(^a) (0.000381)</td>
<td>0.00121(^a) (0.000664)</td>
<td>0.00125(^a) (0.000619)</td>
</tr>
<tr>
<td>Observations</td>
<td>16859</td>
<td>16859</td>
<td>16859</td>
<td>16859</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year indicator variables included in all models; standard errors in parentheses</th>
</tr>
</thead>
<tbody>
<tr>
<td>a = p&lt;0.01  b = p&lt;0.05  c = p&lt;0.1</td>
</tr>
</tbody>
</table>

Table 7: Determinants of solicited financial ratings
The only exception is the “reinsurance ceded” variable, which is positive for both S&P and Fitch. This suggests that these agencies may consider that insurers that cede more business are reducing their risk.

While both capitalization and profitability are associated with the probability of being assigned a higher rating, the importance of these factors appears greater for Fitch. Interestingly, the measure of liquidity is associated with probability of receiving a lower rating. The impact of this variable is twice as high for S&P than the other two agencies. Finally, growth is associated with being assigned a higher rating for both Demotech and S&P with the impact being much greater for S&P.

5.1.2 Solicited ratings
The results for solicited ratings are presented in Table 7. The results of the solicited models show some differences when compared to the results for the unsolicited models. First, more of the organizational characteristics are significant though the impact varies across the agencies. For example, the size measure is uniformly associated with the probability of being assigned a higher rating. However, mutual form is associated with the probability of receiving a higher rating for Demotech, A. M. Best, and Moody’s but lower ratings for S&P and Fitch. In addition, age is associated with the probability of being assigned a higher rating for Demotech but a lower rating for S&P, Moody’s, and Fitch. Second, while many of the same variables in the other categories that were found to significantly impact unsolicited ratings are also found to impact solicited ratings, the magnitude of the impact varies. In comparing the significance and signs of rating determinants for the three agencies providing both provisional (unsolicited) and finalized (solicited) ratings, there are fewer differences between the models for Demotech ratings in comparison to S&P and Fitch. The result for Demotech is not surprising given the consistency in the provisional and finalized ratings noted earlier. Additionally, these differences observed for S&P and Fitch may be due, in part, to the incorporation of proprietary information into the rating process.

It should be noted that certain organizational characteristics and key business risk and financial strength and flexibility measures are consistent in their impact on ratings.

6. Conclusions
In this paper, we examined the differences between unsolicited and solicited ratings of insurers as well as the differences in ratings across rating agencies. In doing so, we provide one of the most comprehensive examinations of ratings within the financial strength ratings literature. Utilizing a proprietary dataset from Demotech that includes a large sample of provisional ratings combined with a limited sample of unsolicited S&P and Fitch ratings, we are able to perform a fairly thorough examination of insurer financial strength ratings. Moreover, the inclusion of both traditional solicited and unsolicited ratings combined with the provisional and finalized Demotech ratings provide us the opportunity to extend both the general ratings literature as well as the insurance literature.

Consistent with the banking literature, our examination of the distributions of provisional (unsolicited) and finalized (solicited) ratings provides some evidence that ratings initiated by rating agencies tend to be lower than ratings initiated by insurers. We also find that there are statistically significant differences between the characteristics of insurers with provisional (solicited) and those with finalized (unsolicited) ratings. In addition, examining the subset of insurers that are rated by multiple agencies, we find that the insurers rated as “secure” by one rating agency generally are considered secure by the other agencies.

We also find that after controlling for sample selection bias, there is some variation in the factors influencing the determinants of ratings across agencies. However, when comparing the results for unsolicited (provisional) and solicited (finalized) ratings, we find there is a certain degree of consistency in the importance of certain organizational and key financial characteristics. Also, within the subsample of insurers where data for ratings initiated by agencies and insurers are both available, we find the greatest consistency in the results for Demotech in comparison to S&P and Fitch. Recall that the biggest difference between Demotech’s unsolicited ratings and those of S&P and Fitch is that the former does not disclose unsolicited (provisional) ratings.

30 It should be noted that for the second-stage models, the likelihood ratio test for \( p = 0 \) rejects the null hypothesis at a significance level of .05 or better for all of the ratings models except A. M. Best, generally indicating the presence of selection bias with the decision to be rated. This supports the use of a two-stage framework in modeling ratings.
to the public, while the latter two agencies do. While such a
difference in disclosure policy offers one possible explanation for
the difference in ratings consistency, future research is warranted
to explore the consistency/inconsistency between solicited and
unsolicited ratings.

Our findings are of particular importance given that serious
concerns have been raised regarding the accuracy of unsolicited
ratings by both policymakers [U. S. Department of Justice
(1998)] and researchers [Baker and Mansi (2002)]. For example,
the Department of Justice argues that unsolicited ratings may
not be as accurate as solicited ratings because unsolicited ratings
are not based on the same type of information as solicited
ratings. Baker and Mansi (2002) express similar concerns that
unsolicited ratings are less accurate than solicited ratings because
the agencies do not have access to important private information
obtained in the solicited ratings process. Our findings provide
some evidence that although the distributions of unsolicited
and solicited ratings differ, unsolicited insurer ratings may be as
accurate as solicited ratings.
A comprehensive examination of insurer financial strength ratings

References


Benefits of the U.S. program for terrorism insurance from a comparative perspective

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Abstract
This article summarizes the U.S. program for terrorism insurance and outlines its advantages as compared to similar programs in other developed countries. The program, while similar to reinsurance, does not require participants to pay premiums but instead uses an ex post recoupment mechanism. Consequently, it is generally referred to as a Federal “backstop.” This approach requires less capital investment and makes “pricing” more accurate than a reinsurance approach. The program also requires insurers to maintain significant amounts of exposure through insurer deductibles and copayments, which creates market demand for the development of terrorism reinsurance in the private market. The current program extends until 2020, though it may be extended further in the future.
I. Introduction
The September 11 terrorist attacks in the United States triggered a crisis in the market for terrorism insurance. Although reinsurers paid out billions of dollars to cover terrorism losses, they withdrew future coverage for terrorism from the market, which caused primary insurers to exclude terrorism losses from their coverage. Because of a perceived drag on the U.S. economy from the unavailability terrorism coverage, the U.S. adopted the Terrorism Risk Insurance Act (TRIA) in 2002. TRIA created a unique government-industry partnership to support the development of the terrorism insurance market. This program functions somewhat like reinsurance in that it will reimburse participating insurers for a portion of terrorism loss, but it does not charge ex ante premiums or maintain reserves like a reinsurer would. The program has been labeled a Federal “backstop” for terrorism insurance.

This article briefly describes the U.S. program for terrorism insurance, and explains the basis for U.S. government involvement in the market for terrorism insurance. It then contrasts the approach taken by the U.S. to that taken in other countries in the developed world. The U.S. approach makes greater use of market forces and uses an ex post mechanism to avoid challenges of ex ante underwriting. This approach has been successful in developing the market for terrorism insurance in the U.S. and has the advantage of low cost, greater accuracy in pricing, and avoiding unnecessarily creating reserves for terrorism risk.

II. Summary Description of the Terrorism Risk Insurance Program
A. Legislative History
TRIA was adopted in 2002 after insurers and reinsurers began excluding terrorism risk from insurance coverage in the wake of the September 11, 2001 terrorist attacks. The exclusion of terrorism risk created a drag on the U.S. economy because banks were unwilling to lend on major construction projects without terrorism insurance. In 2005, TRIA was extended. In 2007, the Act was modified to include domestic terrorism and extended until 2014. In 2015, the Act was extended to 2020 and revised in several relatively minor ways.

B. Coverage Under the Terrorism Risk Insurance Program
Under current law, the terrorism insurance program requires that commercial property and casualty insurers offer terrorism coverage in the policies they are selling. The program does not set the price of the insurance (though state regulation may apply), and does not require that insureds purchase terrorism coverage.

For a terrorism loss to be covered by the program, the event giving rise to the loss must be certified as an act of terrorism by the Secretary of the Treasury in consultation with the Secretary of Homeland Security, and property and casualty insurance losses from the event must exceed $5 million. For an insurer to receive any benefits under the program, insurance industry losses from the terrorism event must exceed $100 million in 2015. The required industry losses to trigger benefits under the program increase by $20 million per year until the requirement is $200 million in insurance industry losses in 2020. For an individual insurer to receive benefits under the program, it must meet its own deductible equal to 20% of its annual direct earned premiums from the previous year. Once the deductible has been met, insurers are reimbursed for 85% of insured terrorism losses that occur in 2015, with the reimbursement amount decreasing by 1% point per year until it reaches 80% in 2020.

2 See ABA TIPS Taskforce on Federal Involvement in Insurance Modernization, white paper on Renewal of TRIA at 1 (March 15, 2006) [hereinafter white paper].
3 Id. at 1-2.
6 Terrorism Risk Insurance Program Reauthorization Act of 2015, Pub. L. 114-1 129 Stat. 12. The revisions reduce the share of Federal payments, increase the industry aggregate retentions for the trigger and recoupment, and add consultation with the Secretary of Homeland Security to certify an event as an act of terrorism. See id. §§ 102-105. The Act also requires several studies and some administrative changes. See id. §§ 107-112.
8 See id. § 102(1).
9 See id. § 103(a)(1)(B)(ii).
10 See id. § 103(b)(2)(B)(i)+(v).
11 See id. § 103(b)(2)(B)(ii) and § 102(7).
12 See id. § 103(a)(1)(A).
The program has an annual cap of $100 billion (more than twice the losses from the September 11 attacks). If total insured losses exceed $100 billion in a calendar year, the program will not make additional payments, and insurers that have met their deductible are relieved of any liability that exceeds the cap.

C. Recoupment of Federal Payouts Under the Program

The terrorism insurance program also includes provisions to recoup Federal payments from the insurance industry after a loss. If aggregate losses retained by insurers (due to the deductibles and insurer copayments) do not exceed $27.5 billion, the Secretary of the Treasury is required to impose surcharges on property and casualty insurance policies to recoup 140% of the difference between the industry retention and $27.5 billion. The threshold used for mandatory recoupment will increase by $2 billion per year until it is $37.5 billion in 2020, with a formula and regulations to determine the amount thereafter.

The program includes a timetable for recoupment surcharges. For acts of terrorism that occur prior to December 31, 2017, recoupment premiums are to be collected by September 30, 2019. For acts of terrorism that occur between January 1 and December 31, 2018, 35% of the recoupment is to be collected by September 30, 2019, with the remainder collected by September 30, 2024. For acts of terrorism after January 1, 2019, the recoupment surcharges are to be collected by September 30, 2024.

Although there is no mandatory recoupment if the losses retained by insurers exceed the mandatory recoupment threshold ($27.5 billion in 2015, increasing to $37.5 billion in 2020), the Secretary has discretion to impose surcharges for recoupment in light of the ultimate costs to the taxpayers, the economic conditions in the insurance marketplace, the affordability of commercial insurance.
for small and medium-sized businesses, and other facts the Secretary considers appropriate.21

D. Backstop, not Reinsurance

The term “backstop” is used to describe this program because the Federal government stands behind the program, and facilitates it, but much of the risk, especially in the first instance, is borne by the insurance industry. Because of the deductibles, insurers bear the risk of terrorism losses up to 20% of their direct earned premium. The precise amount of this deductible will vary depending on the conditions in the marketplace and the sales of individual insurance companies, but it could be as much as $36 billion.22

Furthermore, the recoupment provisions provide that much or all of the government payments under the program would be recovered from insureds through premium surcharges. When insured losses are $27.5 billion or less (and that threshold figure will increase to $37.5 billion over time), the government will recoup 140% of its payout.23 If, for example, a terrorism event caused insured losses of $20 billion, assuming the insurance industry paid a deductible of $6 billion, the Federal share of the losses would be $11.9 billion (20 billion - 6 billion x .85), so the recoupment surcharges would be for $16.66 billion (11.9 billion x 1.40).24 Where the losses exceed $27.5 billion, the mandatory recoupment is limited to the difference between $27.5 billion and the total amount of the insurers’ share of the losses (deductible plus copayments).25

Thus, if we assume a terrorism event with $50 billion in insured losses, and that the industry deductible is $15 billion, the remaining insured losses would be $35 billion. Of that amount, the insurers would be responsible for a copayment of $5.25 billion (50 billion - 15 billion x .15). The government’s share would be $29.75 billion. Mandatory recoupment under this scenario would be $10.15 billion (27.5 - 15 - 5.25 = 7.25 x 1.40 = 10.15).26 Although this recoupment would leave the government responsible for more than $29 billion of the losses, the Secretary of Treasury also has authority to impose additional discretionary surcharges for all or part of this $29 billion not covered by mandatory recoupment.

These recoupment provisions make the program much different to traditional reinsurance, which is the transfer of risk from primary insurers to reinsurers in exchange for a premium payment. Here, while there is a transfer of sorts in the sense that the government pledges to reimburse some of the losses, the Federal government doesn’t bear the risk in the same way as a reinsurer. The Federal government explicitly has the right to recover the payments through both mandatory and discretionary premium surcharges. In addition, the program does not charge any premiums. Instead of trying to predict the risks and potential costs in advance, this program pools the risk and then distributes the costs of a loss after the terrorism incident.

E. Use of Market Mechanisms

While the Federal backstop reduces terrorism risk exposure for insurers to a level that encourages insurers to underwrite terrorism risk, insurers maintain enough exposure under the program to create incentives for the operation of a terrorism insurance market. Insurers must bear 20% of their direct earned premiums as a deductible and another 15% of any losses as a copayment (which will increase to 20% by 2020). Using 2012 data, the National Association of Insurance Commissioners determined that the insurers could face as much as $36 billion in exposure from the deductible provision.27 In addition, insurers face additional billions in exposure from the copayment provision.28 Thus, insurers easily face tens of billions in exposure,

21 See id. § 103(e)(7)(C).
22 This figure was obtained by using aggregate direct earned premium figures from the NAIC for 2012 for the commercial property-casualty insurance sector, see Webel, supra note 5, at 5, but to reach this figure, direct earned premiums would have to be evenly distributed among all insurers and all insurers would have to bear the same proportion of terrorism losses. These are very artificial assumptions, but they give some sense of maximum scope of the insurer deductibles.
23 The statute says that the mandatory surcharge applies to the difference between the lesser of the aggregate amount of the insured losses or $27.5 billion, see 15 U.S.C. § 6701, Terrorism Insurance Program § 103(e)(6), and the amount of the insured losses retained by the insurers under the deductible and copayment provisions, see id. § 103(e)(7)(A)(i). Where the total losses are under $27.5 billion, this amount will always be the amount paid out by the government. See Webel, supra note 5, at Appendix, Table A-1, at 16.
24 For a similar example using the pre-2015 multiplier of 133%, see Webel, supra note 5, at Appendix, Table A-1, at 16.
25 The insurance marketplace aggregate retention amount is the lesser of $27.5 billion (in 2015, increasing by $2 billion per year to $37.5 billion in 2020) and the aggregate amount of all insured losses for terrorism during a calendar year. See 15 U.S.C. § 6701, Terrorism Insurance Program § 103(e)(6). The mandatory recoupment amount is the difference between the insurance marketplace aggregate retention amount under subsection (6) and the aggregate amount of insured losses not compensated by the program because they are within the deductible or copay. See id. § 103(e)(7)(A).
26 See Webel, supra note 5, at Appendix, Table A-1, at 16.
27 See Webel, supra note 5, at 5.
28 The program has a hard cap of $100 billion. See 15 U.S.C. § 6701, Terrorism Insurance Program § 103(e)(7)(A). Insurers are reimbursed for 85% of losses (so retain 15% of the losses as a copayment). See id. § 103(e)(7)(A). Thus, maximum copayments are $15 billion ($100 billion x .15). To reach this figure, insurers would have to have no deductible at all, which would not happen.
which is similar to the $23.9 billion in losses from the September 11 attack. This exposure, which exists underneath the Federal backstop, is the space where the terrorism reinsurance market operates.

III. Government Involvement in the Market for Terrorism Insurance is Warranted

When the terrorism program in the U.S. was first adopted in 2002, and each time it has been up for renewal, it generated significant debate about whether government involvement in the market for terrorism insurance was warranted. Critics of the program, and of government involvement generally, argued that with time the private market for terrorism insurance would develop. The need for terrorism insurance generates market demand, and with additional research, models for terrorism risk can be developed to facilitate underwriting terrorism risk. While this is true, the unpredictable nature of terrorism risk makes it impossible to price at a level that will promote widespread purchasing of terrorism insurance.

A. Terrorism is Unpredictable

Although there is a functioning market for terrorism insurance and reinsurance in the U.S., the Federal backstop is necessary to keep the market functioning. Fundamentally, even though there has been a great deal of research since 2001, terrorism risk is still highly unpredictable. Acts of terrorism are deliberate, not accidental, undertaken with the intention of generating fear. Terrorists may act in ways that are unexpected in order to generate greater fear, and have shown an increased willingness to attack “soft” targets. Terrorists’ willingness to carry out suicide attacks makes it more difficult to predict their behavior. There is a relatively small amount of historical data on terrorism, and those data are limited by the broad range of cultural, operational, and ideological differences in terrorist groups. Furthermore, what data there are may be unavailable to insurance underwriters because of national security and law enforcement concerns. While progress has been made in modeling terrorism risk (in particular, the scope of damages from various terrorism scenarios), a 2014 review of current modeling efforts by the RAND Corporation, an independent research institute, concluded that “fundamental assumptions limit the validity of these [terrorism] models for predicting the future expected losses from the full range of terrorist events accurately enough to support an actuarial assessment of terrorism risk.”

B. Unpredictability Affects Prices and Availability

Because terrorism is so unpredictable and could lead to catastrophic losses, insurers have difficulty in determining an appropriate price for the coverage and the amount of capital reserves that should be maintained for the risk. The Federal backstop limits insurers’ risk to the individual insurers’ (currently 15% which will move in time to 20%), which makes insurers more willing to underwrite terrorism insurance and to charge lower prices.

31 See RAND II, supra note 29, at 8; see also Michel E. Boardman, Known Unknowns: The Illusion of Terrorism Insurance, 93 Geo. L. J. 783, 812-824 (2005).
32 See Whitepaper at 3; see also WHARTON RISK MANAGEMENT AND DECISION PROCESS CENTER, TRIA AND BEYOND, at 13 (2005) (hereinafter WHARTON).
33 See Whitepaper at 3. This has been called the dynamic uncertainty problem. See WHARTON, supra note 32, at 52-53.
34 See Whitepaper at 3; see also Peter Chalk, Bruce Hoffman, Robert Reville, Anna-Britt Kasupski, Trends in Terrorism: Threats to the United States and the Future of the Terrorism Risk Insurance Act at 15-16 (2005) (hereinafter RAND I).
35 See Whitepaper at 2; see also WHARTON, supra note 32, at 55-56.
37 See Whitepaper, supra note 2, at 3; WHARTON, supra note 32, at 58.
38 See Whitepaper, supra note 2, at 3; WHARTON, supra note 32, at 53-54.
39 RAND II, supra note 29, at 11.
40 RAND II, supra note 29, at 12. The fundamental assumptions that limit validity of the models are that there are a finite set of attack scenarios and that the intentions and capabilities of terrorism groups can be predicted. In fact, the possible range of scenarios is limitless and it is impossible to predict the intentions and capabilities of all individuals and groups that might undertake a terrorist act. Id. Another important limitation of the modeling pointed out by RAND is that validity and reliability of the models are completely untested. Id. This problem led the U.S. National Academic of Sciences to conclude, “after reviewing a wide range of terrorism risk models at the Department of Homeland Security . . . that it ‘did not find any Department of Homeland Security (terrorism) risk analysis capability and methods that are yet adequate for supporting decisionmaking.’” Id. at 11-12 (citing National Research Council, Department of Homeland Security Bioterrorism Risk Assessment (National Academy Press, 2008)).
41 See Whitepaper, supra note 2, at 4; see also WHARTON, supra note 32, Chapter 3.2. For additional analysis of the impact of the unpredictable nature of terrorism on availability of terrorism insurance in the U.S. market, see Thomas Russell & Jeffrey E. Thomas, Government Support for Terrorism Insurance, 15 CONN. INS. L.J. 183 (2008).
42 See Whitepaper, supra note 2, at 4; see also Hartwig, supra note 36, at 11. The historical experience when TRIA was adopted supports this analysis. Insurers re-entered the market, prices dropped, and take-up rates went up. See RAND I, supra note 34, at 7.
This benefit of TRIA is particularly acute for risks with the highest level of damages because those are the most unpredictable. An insured loss of $100 billion would be one of historic proportions. It would be more than double the most significant insured loss in U.S. history, Hurricane Katrina, which caused $47.4 billion in insured property damage (2012 dollars). Insurers faced with such risks may seek to exclude terrorism from coverage as uninsurable, or, if they continue to insure for terrorism risk, they will likely charge much higher prices. This is precisely what happened after the September 11 attacks. Because the scope of the risk turned out to be much greater than had previously been expected, reinsurers withdrew from the market and primary insurers sought, and obtained, approval from state regulators to exclude terrorism from coverage. With the Federal backstop, however, prices have dropped to a level that most insureds are willing to pay. The “take-up” rate for terrorism insurance is relatively stable at about 60%.

C. Without the Federal Backstop, Prices for Terrorism Insurance Would Increase and Availability Would Decline

Both the current unpredictability and the historical experience with terrorism insurance coverage suggest that without the government backstop, the cost for terrorism insurance will go up and the availability (or “take-up” rates) will go down. When the program was up for renewal at the end of 2014, some insurers started excluding terrorism losses on renewal policies with terms that extend beyond the program’s expiration at the end of the year. They are also including terrorism exclusions in policies at renewal and that capacity in some areas could be so limited that only 10% of the current Federally-backed terrorism insurance would be available in the stand-alone market. This is precisely what happened after the September 11 attacks. Because the scope of the risk turned out to be much greater than had previously been expected, reinsurers withdrew from the market and primary insurers sought, and obtained, approval from state regulators to exclude terrorism from coverage. This benefit of TRIA is particularly acute for risks with the highest level of damages because those are the most unpredictable. An insured loss of $100 billion would be one of historic proportions. It would be more than double the most significant insured loss in U.S. history, Hurricane Katrina, which caused $47.4 billion in insured property damage (2012 dollars). Insurers faced with such risks may seek to exclude terrorism from coverage as uninsurable, or, if they continue to insure for terrorism risk, they will likely charge much higher prices. This is precisely what happened after the September 11 attacks. Because the scope of the risk turned out to be much greater than had previously been expected, reinsurers withdrew from the market and primary insurers sought, and obtained, approval from state regulators to exclude terrorism from coverage. With the Federal backstop, however, prices have dropped to a level that most insureds are willing to pay. The “take-up” rate for terrorism insurance is relatively stable at about 60%.

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43 See Rand II, supra note 29, at 1, Table 1 (citing Property Claim Services, http://www.iii.org/facts_stats/catastrophes-us.html).


45 See Whitepaper at 1 & nn. 4-5; see also Rand II, supra note 29, at 18 (“In the aftermath of the attacks, private reinsurers who had underwritten the largest portion of insured losses at the World Trade Center ceased to reinsure terrorism risk in the United States, and by February 2002 commercial exclusions for terrorism were approved for use in 45 states.”); Michel-Kerjan, supra note 45, at 4.

46 See RAND II, supra note 29, at 18; Weibel, supra note 5, at 11 (citing Marsh, Inc., 2013) Terrorism Risk Insurance Report at 12 (May 2013); Michel-Kerjan, supra note 45, at 5. It is worth noting, however, that a take-up rate of 60% means that 40% of insureds are not purchasing terrorism insurance so that in the event of a terrorism loss, those insureds will not have coverage. See id. Virtually 100% of the losses from the September 11 attacks were covered by insurance because terrorism was not excluded. Id.

47 See RAND II, supra note 29, at 18-19 (noting that “industry experts project significant contraction of the amount of terrorism insurance offered if TRIA were not to be renewed”); Harwig, supra note 36, at 11 (noting that “Anon estimates that 70% to 80% of the market would encounter terrorism exclusions if the program were discontinued”); Rodd Zolits, Risk Managers Fear Insurance Gaps if TRIA is Allowed to Lapse: Survey, Business Insurance (Oct. 29, 2013) (44.9% of risk professionals reported that allowing the Federal backstop to expire would decrease their terrorism coverage limits and 23.8% report that they think terrorism coverage would not be available without the Federal backstop); Marsh Risk Management Research, Market Update, 2013 Terrorism Risk Insurance Report at 19 (May 2013) (projecting that because of finite capacity of the stand-alone terrorism market, the cost of terrorism insurance could be five to ten times higher than under the Federally-backed terrorism program, and that capacity in some areas could be so limited that only 10% of the current Federally-backed terrorism insurance would be available in the stand-alone market) (available at http://www.insureagainstterrorism.org/MMC2OTRIARiskProfile%20Report%2004-2013.pdf (last visited March 24, 2014). (http://www.businessinsurance.com/article/20131029/NEWS06/13102901 (8601?tags=159f03623386762339f133401028388) (last visited March 13, 2014). For a more general argument that continued Federal involvement is essential, see Laura M. Reiter, The Need for a Long-Term Federal Backstop in the Terrorism Insurance Market, 2 BROOK. J. CORP. FIN. & COM. L. 243 (2007).

48 See, e.g., Arthur D. Postal, Market is Already Reacting to Possible Inaction on TRIA, Industry Rep Says, PropertyCassuytly 360 (February 25, 2014) (http://www.propertycasuity360.com/2014/02/25/market-isalready-reacting-to-possible-inaction-ontriA-UdOBaZouXn4, email) (last visited March 13, 2014); Brian J. Green, The Future of TRIA, Risk Management Magazine (February 20, 2014) (“Insurers have issued, and are continuing to issue, policies that extend beyond the program's expiration at the end of the year. They are also including conditional language for the post-Dec. 31 period in which TRIA may not exist, or may not exist on its current terms. But some insurers are not offering post-Dec. 31 terrorism coverage at all.”) (available at http://www.rmmagazine.com/2014/02/20/the-future-of-tria/ (last visited March 25, 2014); Unease Over Terror Insurance Rattles Market, Commercial Mortgage Alert (November 1, 2013) (“Zurich North America told insurance brokers and consultants this week that starting in January, policyholders will be notified that their terrorism coverage could be altered, or premiums increased, if the government program lapses. A recent memo from Liberty Mutual was more direct, saying if the program isn’t renewed, it will end coverage for certain terrorist acts.”) (available at http://www.cmalert.com/headlines.php?id=182897) (last visited March 25, 2014); Prepared Remarks of Ethan Sonnichsen, National Association of Insurance Commissioners, Financial Services Panel Series: “The Reauthorization of the Terrorism Risk Insurance Act: A Panel Discussion”, National Association of Insurance Commissioners & The Center for Insurance Policy and Research (“Indeed, insurance regulators around the country are already being asked to review policy exclusions for 2014 contracts that dramatically reduce coverage if TRIA is not reauthorized.”) (http://www.naic.org/documents/government_relations_tria_reauth_panel_discussion.pdf).


50 See Michel-Kerjan, supra note 45, at 9; see also Weibel, supra note 5, at 8.
war and terrorism-related losses, and the program in Spain started in 1954 to cover a variety of extraordinary risks, including terrorism. Although terms and conditions vary considerably, nearly all of these programs operate as reinsurance with some form of government involvement, often with the government acting as a guarantor of the fund.

B. The U.S. Approach is the Most Market-oriented of the Major Government Programs

The U.S. approach to terrorism insurance makes greater use of market mechanisms than the approaches taken by other developed countries facing substantial terrorism risk. As explained above, the relatively high insurer retentions (20% of directed earned premiums as a deductible and a copayment of 15% that will increase over time to 20%) create an incentive for the development of private terrorism reinsurance. Because the programs in other countries are meant to provide reinsurance rather than to create a backstop with a space underneath for a private reinsurance market, the insurer retentions are much lower. In the U.K., for example, the industry retention is UK£ 100 million (approximately US$ 166 million) per event, UK£ 200 million (US$ 332 million) per year, with an individual insurer bearing a portion of that industry retention according to its level of participation in the pool. In France, the industry retention is € 400 million (US$ 363 million) shared between 105 members of the pool in proportion to the amount of ceded business. While this is a little higher than the retention in the U.K., on an average the retention is only about € 4 million (US$ 4.4 million) per insurer. In Australia, the industry retention is only AD$ 10 million (US$ 7.31 million), with each insurer retaining the lesser of AD$1 million (US$ 731,000) or 4% of their gross property revenue. With such low industry retentions (and in the case of France, with mandatory terrorism coverage), there is no space in the market for private reinsurers to operate.

In some countries, the terrorism program is even more intrusive on the private market. In Israel, which has had a program since 1961, the program is a government compensation system that operates like primary insurance. Although not a government program per se, in Germany the government founded a private insurance company, Extremus AG, which provided € 450 billion of terrorism coverage to more than 1000 firms. This company is completely reinsured, with the first € 2 billion layer provided by private companies and the next € 8 billion reinsured by the German government. Spain also offers what amounts to primary insurance that covers terrorism risk, but does so through a government-managed fund, which is sold by insurance producers as an add-on to property insurance. The Spanish program was developed initially to provide compensation to victims of the Spanish Civil War (1936-1939). It provides coverage for a number of extraordinary risks that the private market will not cover. Because these programs operate at the primary insurance level and have government backing, they displace private insurance at both the primary and reinsurance level.

C. Other Countries’ Experience with Terrorism Risk Shows Government Involvement is Necessary

Amongst developed countries, Austria is the only country in which a terrorism pool has developed without government sponsorship and backing, but this pool provides such limited coverage that it shows that the private market is not a meaningful alternative to a government-sponsored program. The amount of coverage available through the Austrian pool is only € 5 million (US$ 5.51 million) per policy per location with a maximum of

53 See Michel-Kerjan, supra note 45, at 8.
54 See id.; see also Weibel, supra note 5, at 8.
55 For a comparison of the terms and conditions of various governmental programs, see generally airmic Technical, supra note 50.
56 See Michel-Kerjan, supra note 45, at 8.
57 The government is involved in nine out of ten of the most significant programs. See id. at Appendix A, 17-36. The one exception is Austria, but it should be noted that the limits of the Austrian pool are € 100 million, which is nearly 1/1000th of the coverage afforded by TRIA and represents an amount that in the U.S. is borne by the insurance industry, not the government, because for TRIA to apply, losses must exceed $100 million, see 15 U.S.C. § 6701, Terrorism Insurance Program § 1030(a)(1)(B)(ii).
58 See Weibel, supra note 5, at 8-9 (Spain’s program is a government-owned reinsurer; U.K. and Germany have a private reinsurers established by the government with government backing); see generally airmic Technical, supra note 50, Appendix A, at 17-36 (providing details on ten countries’ approach to terrorism risk).
59 See Michel-Kerjan, supra note 45, at 10.
60 Id. at 9.
61 See Airmic Technical, supra note 50, at 18.
62 See Michel-Kerjan, supra note 45, at 8.
63 See id. at 10.
64 Id.
65 See Airmic Technical, supra note 50, at 31.
66 See Michel-Kerjan, supra note 45, at 8.
67 See Airmic Technical, supra note 50, at 31.
68 See Michel-Kerjan, supra note 45, at 8; airmic Technical, supra note 41, at 31.
69 See Airmic Technical, supra note 50, at 19-20.
€200 million (US$ 220 million). This shows the unwillingness of insurers, even in a large pool, to take on terrorism risk at catastrophic levels. The amount of coverage available in Austria is less than 1% of the estimated amount of the insurance industry retention under the U.S. terrorism program, and is barely more than 1% of insured property losses from the September 11 attacks. This coverage is much more limited than that provided by other government programs for terrorism insurance, and shows that government involvement in the terrorism insurance market is necessary for broad coverage.

### V. Advantages to the U.S. Approach to Terrorism Insurance

#### A. The Program has Promoted Terrorism Insurance

In the U.S. a market for terrorism has developed underneath the Federal backstop. The industry retention and insurer deductibles created an incentive for the market to develop, but without the backstop insurers would not have been willing to take on high levels of terrorism risk. Thus, the backstop, as a government-supported pool to cover the most catastrophic losses, facilitated the development of the market for terrorism insurance. If the program is not extended, the insurance industry will be unwilling to continue to cover terrorism risk at current levels. Insurers left the market in 2001 after the September 11 attacks, in 2006 when there was a possibility of non-renewal, and were in the process of leaving the market just before the program was renewed in 2015.

The necessity of government involvement is also demonstrated by the experience of other countries facing terrorism risk. Only those countries with significant government involvement have robust terrorism coverage. In Austria, the only country with an industry-sponsored program without government involvement, coverage is limited to € 200 million, only about 1% of the covered property losses from the September 11 attacks.

#### B. The Cost of the Program is Modest and Reasonable

Some critics have suggested that the U.S. terrorism insurance program is too costly. Although the Congressional Budget Office estimated that extending the terrorism insurance program would “increase direct spending by $3.1 billion over the 2008-2012 period and by $6.6 billion over the 2008-2017 period [with an . . . additional $1.1 billion] to be spent after 2017,” these figures assumed that the program would pay out on average about $2.3 billion annually. In fact, there have been no payments made under the Federal terrorism insurance program since its inception in 2002. Thus, the actual costs under the program have been negligible.

At the other end of the spectrum, some have criticized the program on the ground that the Federal backstop is provided “for free.” Those covered by the program receive the benefit of the backstop without paying for it, and therefore some characterize this as a kind of government subsidy. The CBO estimated that the value of this benefit, using insurance principles, would be approximately $1.1 billion per year. Although one might suggest that there should be some kind of “premium” for participation in the U.S. program, which would be consistent with the approach taken in other countries, this would divert capital from the market for a risk that is highly unpredictable. By comparison, in the U.K. insurers pay the pool 0.03% or 0.006% of their property premiums depending on the location of the property, resulting in current reserves of approximately £4.7 billion (US$7.34 billion).

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70 See id.
71 Using NAIC data on insurance industry direct earned premiums, the Congressional Research Service estimated that, in the aggregate, the 20% directed earned premium insurer retention under the terrorism insurance program was equivalent to about $36 billion. See Wedel, supra note 5, at 5. If 278 million (Austrian pool’s maximum) is divided by 36 billion, it comes to 0.00772, or 0.772%.
72 The RAND II study notes that the insured property losses from the September 11 attacks were $23.9 billion, see RAND II, supra note 29, at 1 (this does not include non-property losses, which pushed the total to more than $32 billion). If 278 million (Austrian pool’s maximum) is divided by 23.9 billion, it comes to 0.01163, or 1.163%.
74 See supra § I.E.
75 An economic analysis conducted by Paul Raschky and Erwann O. Michel-Kerjan from the Wharton School Center for Risk Management and Decision Processes showed that under the current program insurers are much less diversified for terrorism risk than other kinds of coverage, which shows that insurers have provided much more capacity to the terrorism market than they would have without the Federal backstop. See Michel-Kerjan, supra note 45, at 6.
76 See Whitepaper, supra note 2, at 2-3 nn. 13-14 (citing survey data).
77 See Whitepaper, supra note 2, at 2-3. nn. 13-14 (citing survey data).
78 See supra note 40.
On the one hand, while it might be considered prudent to create reserves for a terrorist incident, those reserves would take capital away from other potentially more productive uses. Moreover, the basis for setting a reserve of any particular amount is, at best, speculative. If the U.S. were to collect premiums and maintain reserves for its program, this would be an even greater market intrusion than the Federal backstop. It would require underwriting decisions about the price of the benefits provided by the program, which would be extremely difficult to do accurately because of the unpredictability of terrorism risk.

Instead of setting the price for participation in the program ex ante, the Federal backstop uses the recoupment mechanism to set the “price” for benefits of the pooling mechanism after a terrorist event. This makes the ultimate cost of the program much more accurate than an ex ante approach. Depending on the circumstances, the Secretary of Treasury may be required to impose up to a 3% premium surcharge on property and casualty insurance, or may have discretionary authority to determine the particulars of the surcharge. For those years where there are no certified terrorist incidents (that is, for nearly 15 years of the program, from 2001 until the present), the cost of the program has been minimal. For those years in which there is a terrorism incident, the government may recover some or all of its costs, or in some scenarios, recover even more than it spends. For example, the Congressional Research Service estimated that a terrorism incident with covered losses of $27.5 billion would require the Federal government to pay $16.4 billion, but would generate $21.8 billion in recoupment, for an excess of $5.4 billion.

Of course, not all scenarios would generate a surplus for the government. In the event of a terrorism incident that causes $100 billion in insured losses, the Congressional Research Service estimates that the Federal government’s share of the losses would be $59.5 billion, none of which would be subject to mandatory recoupment. The amount would be subject to discretionary recoupment, which would be determined by the Secretary of the Treasury (discussed in Section II). This could leave a substantial burden on taxpayers, but a terrorism event of this size would be unprecedented. Consequently, even if the terrorism insurance program was not in operation, it is likely that the Federal government would step in and provide disaster assistance. If one assumes that the government would step in, the terrorism program has the benefit of encouraging insurers to participate at some level thereby reducing the Federal government’s costs by some $40 billion in a worst-case scenario. In addition, the industry retention in the terrorism insurance program promotes market mechanisms to encourage pre-event planning, and provides some administrative capacity for claims processing.

C. The Program is not “Corporate Welfare” for Insurance Companies

Because of the low cost of the program to insurers, some have suggested that the U.S. terrorism insurance program is a kind of “corporate welfare.” That phrase is used as a kind of ad hominem attack on programs that are seen as providing a government benefit for large companies. The pejorative notion of “welfare” is the use of government power for a kind of wealth-transfer from taxpayers to corporations. In this case, there is not a wealth transfer from taxpayers to insurers because insurers, in a free market, would be free to exclude terrorism coverage from their policies. While it is true that the Federal backstop provides a pooling mechanism for high levels of terrorism risk, which provides sufficient protection for insurers to undertake some insurance of terrorism risk, and which enables the insurers to receive the benefit of premiums for insurance they sell, the recoupment mechanism in the program puts the cost of the program back on insurers. Those covered by insurance receive a more direct benefit from the U.S. terrorism insurance program than do insurers (who otherwise would just exclude terrorism risk), but insureds also would pay the premium taxes used to recoup the cost of Federal payments after a terrorist attack.

87 See supra §D.
88 See id.
89 See supra note 21.
The U.S. program, while using the market mechanism to some extent, retains some risk for the U.S. government. This is appropriate from an actuarial standpoint because the government is in the best position to combat terrorism through the use of its intelligence services, law enforcement, and military power. All taxpayers provide financial support for these efforts and benefit from them. The Federal backstop for terrorism insurance is a reasonable extension of these efforts, especially when the private sector cannot get access to intelligence and law enforcement information about terrorism that might be used for modeling purposes.\(^9\) Because the government has better access to the information about terrorism risk, and is in a better position than those in the private sector to reduce that risk, it is reasonable that the government should bear some of the consequences of terrorism risk.

VI. Conclusion
The U.S. terrorism insurance program has been successful. The Federal backstop has provided a risk pooling mechanism to address the catastrophic risks associated with some terrorist activities, while at the same time leaving insurers with enough “skin in the game” to create an incentive for a private market to develop underneath the backstop. Although the U.S. has been fortunate that it has not been subject to any major terrorist events since the September 11th attacks, the nature of terrorism risk is still highly unpredictable and potentially catastrophic. While insurers have become more willing to put up some of their capital to cover terrorism risk, the market would likely collapse or at least severely constrict without the U.S. program. The catastrophic levels of risk for terrorism, combined with its unpredictability, would cause insurers to limit the amount of terrorism risk that they are willing to underwrite, which will reduce coverage and increase prices. While some assert that without the Federal backstop the market will provide sufficient terrorism insurance, these assertions appear to be based on ideological “faith” in market principles rather than any empirical evidence. The historical evidence, current actions of insurers, and the evidence from other countries shows that the market operating without any government support will provide low levels of terrorism insurance coverage, if any, at much higher cost. By extending the program, the U.S. will maintain significant levels of insurance protection for terrorism.

\(^9\) See Whitepaper, supra note 2, at 3-4.
Benefits of the U.S. program for terrorism insurance from a comparative perspective

References


Unintended consequences? The impact of IRS notice 2014-52 on acquisitions of U.S. companies by non U.S. insurers and reinsurers

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Abstract

In Notice 2014-52, the U.S. Internal Revenue Service (“IRS”) described several additions that will be made to the Treasury regulations under section 7874 to curb transactions that are commonly called “inversions.” According to Notice 2014-52, one of those additions will target the use of foreign “cash boxes” to complete inversions that otherwise fall outside the purview of section 7874 and, in so doing, will equate foreign insurers and reinsurers with cash boxes by offering only a limited exclusion from the cash box analysis for the assets that such companies hold in the ordinary conduct of their insurance and reinsurance businesses. Conversely, Notice 2014-52 offers foreign banks and finance companies much broader exclusions from the cash box analysis for the assets that such companies hold in the ordinary conduct of their banking and financing businesses. Unfortunately, the policy justification underpinning the disparate treatment afforded foreign insurers and reinsurers is not apparent on the face of Notice 2014-52, and, in the absence of further clarification from the U.S. Treasury Department (“Treasury”) and the IRS, that treatment has had, and likely will continue to have, an unwarranted chilling effect on acquisitions of domestic corporations (whether insurance companies or otherwise) by foreign insurers and reinsurers.
I. Background on Inversions and the General Operation of Section 7874

An inversion typically involves a transaction in which (i) a foreign corporation directly or indirectly acquires the assets held by a domestic corporation and (ii) the shareholders of the domestic corporation exchange some or all of their stock for stock of the foreign corporation. As relevant to the analysis of the U.S. federal tax consequences associated with an inversion, section 7874 provides the following general rules:

- If the foreign corporation acquires substantially all of the properties held by the domestic corporation, and the shareholders of the domestic corporation receive at least 80 percent of the vote or value of the foreign corporation's stock in the acquisition transaction by reason of holding stock in the domestic corporation, the foreign corporation will be treated as a domestic corporation for U.S. federal tax purposes. This conclusion assumes that, after the acquisition, the “expanded affiliated group” that includes the foreign acquiring corporation does not have substantial business activities in the foreign country in which, or under the laws of which, the foreign acquiring corporation is organized when compared to the total business activities of such expanded affiliated group.

- Alternatively, if the foreign corporation acquires substantially all of the properties held by the domestic corporation, and the shareholders of the domestic corporation receive at least 60 percent, but less than 80 percent, of the vote or value of the foreign corporation's stock in the acquisition transaction by reason of holding stock in the domestic corporation, then, among other consequences, the use of certain of the domestic corporation's U.S. federal income tax attributes will be limited for a 10-year period. In this type of inversion, the foreign acquiring corporation constitutes a “surrogate foreign corporation,” and the domestic acquired corporation constitutes an “expatriated entity,” under the parlance of section 7874.

For purposes of the foregoing rules, the percentage of the foreign acquiring corporation's stock held by the former shareholders of the domestic acquired corporation after the acquisition is determined under the ownership fraction described in section 7874(a)(2)(B)(ii) (the “Ownership Fraction”). The Ownership Fraction takes into account the shares of the foreign acquiring corporation held by the former shareholders of the domestic acquired corporation in the numerator and the total outstanding shares of the foreign acquiring corporation in the denominator. Thus, in the absence of a rule to the contrary, the Ownership Fraction could be reduced through a contribution of cash or other liquid assets to the foreign acquiring corporation in exchange for new stock in connection with the inversion transaction.

II. The Public Offering Rule of Section 7874(c)(2)(B)

Under the “public offering rule” of section 7874(c)(2)(B), stock sold in a “related” public offering is not taken into account in calculating the Ownership Fraction. In effect, section 7874(c)(2)(B) works to prevent a public offering of stock completed by a foreign acquiring corporation in connection with an inversion from reducing the percentage ownership of the former shareholders of the domestic acquired corporation in the foreign acquiring corporation.

In January 2014, the Treasury and the IRS published temporary regulations that expand the reach of the public offering rule of section 7874(c)(2)(B) to cover private placements and similar transactions involving the stock of a foreign acquiring corporation that participates in an inversion (the “January 2014 Temporary Regulations”). In brief, under the January 2014 Temporary Regulations, where a foreign acquiring corporation exchanges its stock for “nonqualified property,” i.e., cash and certain other liquid assets, that stock generally is treated as investable capital.

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4 Although not a focus of this article, an inversion also can involve a foreign corporation's direct or indirect acquisition of the trade or business assets of a domestic partnership.

5 The foreign corporation's acquisition of the properties held by the domestic corporation can be accomplished directly or indirectly (e.g., via an acquisition of the domestic corporation's stock). See § 7874(a)(2)(B)(i); Treas. Reg. § 1.7874-2(b); (d)(1), (d)(2), (e)(3). As noted above, this conclusion assumes that the substantial business activities exception of section 7874 is not satisfied.


7 See § 7874(a)(2)(B)(ii). As noted above, this conclusion assumes that the substantial business activities exception of section 7874 is not satisfied.

8 See § 7874(a)(2)(B); see also § 7874(a)(1), (a)(2)(A), (d)(1), (d)(2), (e)(3). As noted above, this conclusion assumes that the substantial business activities exception of section 7874 is not satisfied.

9 See Treas. Reg. § 1.7874-1(b); Temp. Treas. Reg. § 1.7874-4T(i)(9); Notice 2014-52, supra note 1, at § 2.01(a).


“disqualified stock” and is excluded from the calculation of the Ownership Fraction.12 Thus, if a foreign acquiring corporation is capitalized with cash in connection with an inversion, the January 2014 Temporary Regulations generally direct that the stock of the foreign acquiring corporation issued in exchange for that cash be excluded from the Ownership Fraction.13

III. The Cash Box Rule of Notice 2014-52

Although the January 2014 Temporary Regulations address situations in which nonqualified property is transferred to a foreign acquiring corporation in exchange for such corporation’s stock in a transaction related to the inversion, those regulations do not address the consequences of the foreign acquiring corporation’s holding nonqualified property, which was not transferred to such corporation in a transaction related to the inversion. As a result, stock of the foreign acquiring corporation may be included in the denominator of the Ownership Fraction, thereby decreasing that fraction, even though a substantial portion of the value of that stock is attributable to cash or other liquid assets.

As described in Notice 2014-52, the Treasury and the IRS are aware that a domestic corporation may be acquired by a foreign acquiring corporation “that has substantial cash and other liquid assets” in an inversion that is not subject to section 7874.14 In an effort to limit the availability of this acquisition method, Notice 2014-52 announced that the Treasury and the IRS intend to issue regulations under section 7874(c)(6) providing that a portion of the stock of the foreign acquiring corporation will be excluded from the denominator of the Ownership Fraction if more than 50 percent of the gross value of all “foreign group property” constitutes “foreign group nonqualified property” (the “Cash Box Rule”).15 With respect to the operation of the Cash Box Rule, Notice 2014-52 provides as follows:

13 See, e.g., Temp. Treas. Reg. § 1.7874-4T(b), (d)(1) providing exceptions to the disqualified stock rules.
14 See Notice 2014-52, supra note 1, at § 2.01(b).
15 Under section 7874(c)(6)(B), Treasury has been delegated authority to “prescribe such regulations as may be appropriate to determine whether a corporation is a surrogate foreign corporation, including regulations . . . to treat stock as not stock.”
16 See Notice 2014-52, supra note 1, at § 2.01(b).
17 The 50-percent test will be applied after the inversion and all transactions related to the inversion, if any, are completed.17
18 Foreign group property means any property held by the “expanded affiliated group” (the “EAG”) after the inversion and all transactions related to the inversion, if any, are completed, other than the following property: (i) Property that is acquired in the inversion and that, at the time of the inversion, was held (directly or indirectly) by the domestic acquired corporation; and (ii) to avoid double counting, stock in a member of the EAG and an obligation of a member of the EAG.19 For purposes of section 7874 and Notice 2014-52, an EAG includes foreign holding companies, foreign insurance and reinsurance companies, and other foreign corporations, so long as ownership of more than 50 percent of the vote and value in respect of the stock of the relevant corporation (except the common parent of the EAG) is owned by one or more members of the EAG.20 Thus, foreign group property generally includes the assets held by the foreign acquiring corporation and its pre-inversion foreign and domestic subsidiaries that are members of the EAG.
19 See id.
20 Specifically, the term “expanded affiliated group” means an affiliated group as defined in section 1504(a) and as determined as of the end of the day on which the inversion is completed, except that section 1504(a) is applied by substituting “more than 50 percent” for “at least 80 percent” each place it appears and without regard to section 1504(a)(3). See § 7874(c)(1); Temp. Treas. Reg. § 1.7874-4T(i)(3); Notice 2014-52, supra note 1, at § 2.01(b).
21 See Notice 2014-52, supra note 1, at § 2.01(b). Notice 2014-52 also provides that foreign group property that otherwise would not be foreign group nonqualified property nevertheless will be treated as foreign group nonqualified property in a transaction “related to” the inversion, “substitute” property is acquired in exchange for “transferred” property that would be foreign group nonqualified property had such transferred property not been exchanged for the substitute property. See id. The parameters of this anti-substitution rule are not well defined in the notice.
22 See id. at § 4.
When triggered, the Cash Box Rule will skew the Ownership Fraction in the direction of the former shareholders of the domestic acquired corporation. In this regard, Notice 2014-52 directs that the portion of the stock of the foreign acquiring corporation that will be excluded from the denominator of the Ownership Fraction will be equal to the product of:

(i) the value of the stock of the foreign acquiring corporation other than (a) stock described in section 7874(a)(2)(B)(ii) (that is, stock of the foreign acquiring corporation held by the former shareholders of the domestic acquired corporation by reason of their holding stock in the domestic acquired corporation), and (b) stock excluded from the denominator of the Ownership Fraction under either Treas. Reg. § 1.7874-1(b) (because it is held by a member of the EAG) or Temp. Treas. Reg. § 1.7874-4T(b) (because it is disqualified stock); and

(ii) the “foreign group nonqualified property fraction,” which Notice 2014-52 describes as the gross value of all foreign group nonqualified property, divided by the gross value of all foreign group property.23

Facts

- FA, a country X corporation, is publicly traded and has 100x shares outstanding.
- FA has a single subsidiary, FO, also a country X corporation.
- FO has 200x of foreign group property of which 160x is foreign group nonqualified property.
- FA acquires UST, a domestic corporation, in a reverse subsidiary merger in which the shareholders of UST receive 100x shares of FA stock, so that, after the transaction, FA has 200x shares outstanding.
- After the acquisition, the FA EAG does not have substantial business activities in country X.

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Example 1 illustrates the potential application of the Cash Box Rule.

FGP = foreign group property, FGNQP = foreign group nonqualified property, FA = foreign acquirer, FO = single subsidiary of FA, UST = domestic corporation

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23 See id. at § 2.01(b). Notice 2014-52 also provides that (i) property received by the foreign acquiring corporation that gives rise to disqualified stock that is excluded from the denominator of the Ownership Fraction pursuant to Temp. Treas. Reg. § 1.7874-4T(b) will be excluded from both the numerator and the denominator of the foreign group nonqualified property fraction, and (ii) a coordination rule similar to Temp. Treas. Reg. § 1.7874-4T(h) (regarding the interaction of the EAG rules with the rule that excludes disqualified stock from the denominator of the Ownership Fraction) will be included in the regulations under development by Treasury and the IRS. See id.
Analysis

- After the acquisition, 80% (160x / 200x) of the gross value of the FA EAG's assets consists of foreign group nonqualified property.
- Because the 50% threshold of the Cash Box Rule is satisfied, a portion of the FA stock is excluded from the denominator of the Ownership Fraction. The number of FA shares excluded is equal to the product of:

\[
\frac{100x \text{ shares}}{\text{equal to the 200x shares of FA stock outstanding after the transaction minus the 100x "by reason of" FA shares issued to the UST shareholders}} \times 80\% \text{ (equal to the gross value of all of the FA EAG's foreign group nonqualified property (160x) divided by the gross value of all of the FA EAG's foreign group property (200x))} = 80 \text{ shares}
\]

- Thus, the Ownership Fraction is equal to:

\[
\frac{100x \text{ (the number of FA shares received by the UST shareholders)}}{120x \text{ (the 200x FA shares outstanding after the transaction minus the 80x of excluded FA shares)}} = 83.3\%
\]

- Result: FA is treated as a domestic corporation for U.S. federal tax purposes under section 7874(b).

IV. The Exclusions from Foreign Group Nonqualified Property

Recognizing that many foreign financial institutions, including insurers and reinsurers, are required to hold substantial amounts of property that is described in Temp. Treas. Reg. § 1.7874-4T(i) (7) - generally cash, cash equivalents, and marketable securities (“Liquid Assets”) - for regulatory reasons and other bona fide business purposes, Notice 2014-52 excludes from the definition of foreign group nonqualified property certain assets associated with the ordinary conduct of a banking or financing business and the ordinary conduct of an insurance or reinsurance business. Specifically, Notice 2014-52 excludes from the definition of foreign group nonqualified property “property that gives rise to income described in section 1297(b)(2)(A) or section 954(h) or [section 954(i)] (determined by substituting the term ‘foreign corporation’ for the term ‘controlled foreign corporation’).” 24

In view of the imprecise language used in Notice 2014-52 to describe these exclusions from foreign group nonqualified property, there remains a fair amount of uncertainty as to the manner in which they will operate in the regulations under development by the Treasury and the IRS. With that point in mind, a discussion of the possible mechanics of each of the exclusions follows below.

A. Property That Gives Rise to Income Described in Section 1297(b)(2)(A)

The first exclusion from foreign group nonqualified property provided in Notice 2014-52 is for property that gives rise to income described in section 1297(b)(2)(A) (the “Section 1297(b)(2)(A) Exclusion”). Section 1297(b)(2)(A) applies for the purposes of determining whether a foreign corporation constitutes a “passive foreign investment company” (a “PFIC”) and speaks to the “passive income” aspect of that analysis. 25 Specifically, that provision excludes from passive income any income “derived in the active conduct of a banking business by an institution licensed to do business as a bank in the United States (or, to the extent provided in regulations, by any other corporation).” 26

For purposes of applying section 1297(b)(2)(A), Notice 89-8127 provides that a foreign corporation that is not licensed to do business as a bank in the U.S. may qualify for the passive income exception if it constitutes an “active foreign bank.” 28 Under Notice 89-81, a foreign corporation qualifies as an active foreign bank for a taxable year if it satisfies a three-prong test:

1. The foreign corporation is licensed in the country in which it conducts its principal banking operations, and those activities are subject to the banking regulators of that country;
2. The foreign corporation conducts an active banking business

24 Id.
25 See § 1297(a), (b)(1).
27 See Notice 89-81, supra note 26, at § II.
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by accepting deposits and making loans regularly; and
5. The foreign corporation derives at least 60 percent of its gross income for the taxable year from bona fide banking activities.28

Notice 89-81 states that it is an “administrative pronouncement” that may be relied on by taxpayers “until regulations are published,” and that any modification of the rules in Notice 89-81 would be prospective.29 Treasury and the IRS published proposed Treasury regulations concerning the application of section 1297(b)(2)(A) in 1995, but those regulations have yet to be finalized.30 Given the uncertain status of the guidance under section 1297(b)(2)(A), the test provided by Notice 89-81 appears to be the test contemplated to be used for purposes of the Section 1297(b)(2)(A) Exclusion,31 but that conclusion is subject to confirmation from the Treasury and the IRS.

In view of the preceding discussion, the liquid assets held by a foreign corporation ought to be excluded from foreign group nonqualified property under the Section 1297(b)(2)(A) Exclusion if the following requirements are satisfied:

1. The foreign corporation is licensed and regulated as a bank in its country of principal operation;
2. The foreign corporation is engaged in the active conduct of a banking business;
3. The foreign corporation derives at least 60 percent of its gross income from bona fide banking activities; and
4. The foreign corporation uses the assets in the active conduct of its banking business.32

B. Property That Gives Rise to Income Described in Section 954(h)

The second exclusion from foreign group nonqualified property offered in Notice 2014-52 is for property that gives rise to income described in section 954(h) (the “Section 954(h) Exclusion”). Section 954(h) provides the active financing exception to the foreign personal holding company income rules of Subpart F (concerning “controlled foreign corporations” (each, a “CFC”)) and excludes from foreign personal holding company income the “qualified banking or financing income” of an “eligible controlled foreign corporation.”33 Thus, for purposes of the Section 954(h) Exclusion, it seemingly will be necessary to determine whether the relevant property (i) is held by an eligible foreign corporation (determined by substituting the term “foreign corporation” for the term “controlled foreign corporation”) and (ii) gives rise to qualified banking or financing income.

A foreign corporation apparently will constitute an eligible foreign corporation for purposes of the Section 954(h) Exclusion if it (i) is predominantly engaged in the active conduct of a banking, financing, or similar business and (ii) conducts substantial activity with respect to that business.34 In general, a foreign corporation is predominantly engaged in the active conduct of a banking, financing, or similar business if more than 70 percent of its gross income is derived directly from the active and regular conduct of a “lending or financing business” with customers that are not related persons.35 For this purpose, a corporation may engage in a lending or financing business by making loans, purchasing receivables, engaging in leasing, issuing letters of credit or guarantees, or providing charge card or credit card services.36

28 See id. at § II.(A).
29 Id. at “Effective Date.”
31 Cf. Chief Couns. Adv. 200134004 (Apr. 18, 2001) (“Although no final regulations have been promulgated, Notice 89-81, 1989-2 C.B. 399, describes the circumstances under which income derived in the banking business by a foreign corporation not licensed to do business as a bank in the United States is treated as active income for purposes of the PFIC passive asset and passive income tests. . . . Based on the cross-reference[s] . . . to section 1297 . . . , we conclude that . . . [t]he taxpayers were entitled to . . . rely on Notice 89-81 throughout the years here in issue to determine whether, and to what extent, income derived by a foreign corporation not licensed to do business as a bank in the United States but engaged in the banking business should be treated as active income . . . .), available on Westlaw at 2001 WL 961299.
32 Cf. Notice 89-81, supra note 26, at §§ II.(B)(X)(ii) (“Income earned by an active foreign bank from other activities, such as activities as a dealer in stock and securities, data processing, and management consulting, will not be characterized as nonpassive income pursuant to the exception provided in section 1296(b)(2)(X) of the Code.”), II.(C) (“An asset that generates both income that is treated as nonpassive income under section 1296(g)(2)(A) and income that is passive income under section 1296(d) will be treated as a nonpassive asset and a passive asset in proportion to the amounts of each type of income generated by the asset during the taxable year.”).
33 As of the time of this article's drafting, section 954(h) applies to taxable years of foreign corporations beginning before 2015 (and taxable years of U.S. shareholders with or within which any such taxable year of such foreign corporation ends). See § 954(h)(9). The implication of Notice 2014-52 is that the sunset of section 954(h) may not be critical for purposes of determining the operation of this exclusion from foreign group nonqualified property. Alternatively, Notice 2014-52 may portend the extension of that provision.
34 See § 954(h)(2)(A).
35 See § 954(h)(2)(B)(ii)-(iii); see also §§ 954(h)(3)(A) (defining the term “customer”), 954(h)(5) (E) (defining the term “related person”). A foreign corporation also may qualify as an eligible foreign corporation on account of being a licensed bank or a registered broker or dealer. See § 954(h)(2)(B)(ii)-(iii).
36 See § 954(h)(4).
In order for income to constitute qualified banking or financing income for purposes of the Section 954(h) Exclusion, it seemingly will be necessary for that income to be:

1. Derived in the active conduct of a banking, financing, or similar business by the eligible foreign corporation;
2. Derived from one or more transactions (i) with customers located in a country other than the U.S. and (ii) substantially all of the activities in connection with which are conducted, or deemed conducted, directly by the eligible foreign corporation in its home country, i.e., the country under the laws of which the corporation is organized; and
3. Treated as earned in the eligible foreign corporation's home country for purposes of that country's tax laws.37

For purposes of the qualified banking or financing income analysis, two more special rules apply:

1. As noted above, a corporation can qualify as an eligible foreign corporation without being a licensed bank or a registered broker or dealer. However, in such an instance, none of the foreign corporation's income will constitute qualified banking or financing income unless more than 30 percent of its gross income is derived directly from the active and regular conduct of a lending or financing business with customers that are not related persons and that are located within the foreign corporation's home country.38
2. Qualified banking or financing income will not include income derived from transactions with customers located in a country other than the home country of the foreign corporation unless that corporation conducts substantial activity with respect to a banking, financing, or similar business in its home country.39

In view of the preceding discussion, the liquid assets held by a foreign corporation apparently will be excluded from foreign group nonqualified property under the Section 954(h) Exclusion if the following requirements are satisfied:

1. The foreign corporation derives more than 70 percent of its gross income directly from the active and regular conduct of a lending or financing business with unrelated customers;
2. The foreign corporation derives more than 30 percent of its gross income directly from the active and regular conduct of its lending or financing business with unrelated customers that are located within the foreign corporation's home country;
3. The foreign corporation conducts substantial activity with respect to its lending or financing business both generally and in the foreign corporation's home country;
4. The foreign corporation uses the assets in the active conduct of its lending or financing business in the foreign corporation's home country; and
5. The assets give rise to income that is treated as earned in the foreign corporation's home country.

C. Property That Gives Rise to Income Described in Section 954(i)

The last exclusion from foreign group nonqualified property provided in Notice 2014-52 is for property that gives rise to income described in section 954(i) (the “Section 954(i) Exclusion”). Section 954(i) provides the active insurance exception to the foreign personal holding company income rules of Subpart F (as noted above, concerning CFCs) and excludes from foreign personal holding company income the “qualified insurance income” of a “qualifying insurance company.”40 Thus, for purposes of the Section 954(i) Exclusion, it seemingly will be necessary to determine whether the relevant property (i) is held by a qualifying insurance company (determined by substituting the term “foreign corporation” for the term “controlled foreign corporation”) and (ii) gives rise to qualified insurance income.

A foreign corporation apparently will constitute a qualifying insurance company for purposes of the Section 954(i) Exclusion only if it satisfies the following requirements:

1. It is subject to regulation as an insurance (or reinsurance) company by its home country (i.e., the country in which such corporation is created or organized);
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- It is authorized by the insurance regulatory body for its home country to sell insurance, reinsurance, or annuity contracts to unrelated persons in that country;
- It is engaged in the insurance business;
- It would be subject to tax under Subchapter L of the Code, i.e., the insurance company provisions set forth in sections 801-848, if it were a domestic corporation; and
- It derives more than 50 percent of its net written premiums from the issuance or reinsurance of contracts covering “applicable home country risks” and with respect to which no policyholder, insured, annuitant, or beneficiary is a related person.\(^{41}\)

Importantly, for purposes of the last requirement, (i) the net written premiums of any “qualifying insurance company branch” of the foreign corporation must be aggregated with those of the corporation,\(^ {42} \) and (ii) the term “applicable home country risks” generally means risks in connection with property in, liability arising out of activity in, or the lives or health of residents of the home country of the foreign corporation or qualifying insurance company branch, as the case may be, issuing or reinsuring the contract covering the risks.\(^ {43} \)

In order for income to constitute qualified insurance income for purposes of the Section 954(i) Exclusion, it seemingly will be necessary for that income to be received from an unrelated person and be derived from the investments made by a qualifying insurance company (or its qualifying insurance company branch) of:

- Its reserves allocable to “exempt contracts” or of 80 percent of its unearned premiums from exempt contracts; or
- An amount of its assets allocable to exempt contracts equal to one-third of its premiums earned on property, casualty, or health insurance contracts during the taxable year and 10 percent of its reserves for life insurance or annuity contracts.\(^ {44} \)

For purposes of the qualified insurance income analysis, the term “exempt contract” generally means an insurance or annuity contract issued or reinsured by a qualifying insurance company or qualifying insurance company branch in connection with property in, liability arising out of activity in, or the lives or health of residents of a country other than the U.S.\(^ {45} \) Moreover, two other special limits apply:

1. No contract of a qualifying insurance company or qualifying insurance company branch is an exempt contract unless the company or branch derives more than 30 percent of its net written premiums from exempt contracts (determined without regard to this rule) that cover applicable home country risks and with respect to which no policyholder, insured, annuitant, or beneficiary is a related person.\(^ {46} \)

2. A contract issued by a qualifying insurance company or qualifying insurance company branch that covers risks other than applicable home country risks is not an exempt contract unless the company or branch, as the case may be, conducts substantial activity with respect to an insurance business in its home country and performs in its home country substantially all of the activities necessary to give rise to the income generated by such contract.\(^ {47} \)

As such, the liquid assets held by a foreign corporation and its insurance branches apparently will be excluded from foreign group nonqualified property under the Section 954(i) Exclusion only if all of the following requirements are satisfied:

1. The foreign corporation is regulated as an insurance (or reinsurance) company in its home country;
2. The foreign corporation and each of its insurance branches are authorized to sell insurance, reinsurance, or annuity contracts to unrelated persons in their respective home countries;

\(^{41}\) See § 953(e)(3); see also §§ 953(e)(6) (defining the term “home country”), 954(i)(6) (providing that, for purposes of section 954(i), the definitions provided in section 953(e) apply).

\(^{42}\) See § 953(e)(3)(B); see also § 953(e)(4) (defining the term “qualifying insurance company branch” to mean a qualified business unit of a foreign corporation if such unit is licensed, authorized, or regulated by the applicable insurance regulatory body for its home country to sell insurance, reinsurance, or annuity contracts to persons other than related persons in such home country, and such foreign corporation is a qualifying insurance company, determined under section 953(e)(3) as if such unit were a qualifying insurance company branch). The premiums of a qualifying insurance company branch will be taken into account to the extent that they are treated as earned by such branch in its home country for purposes of that country’s tax laws. See § 953(e)(3)(B) (flush language).

\(^{43}\) See § 953(e)(2)(B)(ii).

\(^{44}\) See § 954(i)(2); see also §§ 953(e)(5) (providing rules for determining whether a contract issued by a foreign corporation is a life insurance or annuity contract), 954(i)(4)-(5) (providing methods for determining unearned premiums and reserves).

\(^{45}\) See § 953(e)(2)(A); see also § 954(i)(6) (providing that, for purposes of section 954(i), the definitions provided in section 953(e) apply).

\(^{46}\) See § 953(e)(2)(A); see also § 954(i)(6) (providing that, for purposes of section 954(i), the definitions provided in section 953(e) apply).

\(^{47}\) See § 953(e)(2)(A).
3. The foreign corporation is engaged in an insurance business;
4. The foreign corporation and each of its insurance branches conduct in their respective home countries substantial activity with respect to that business;
5. The foreign corporation and each of its insurance branches perform in their respective home countries substantially all of the activities necessary to give rise to the income generated by a contract issued by such corporation or such branch;
6. The foreign corporation would be subject to tax as an insurance company if it were a domestic corporation, i.e., more than half of the business of the foreign corporation during the taxable year is the issuing of insurance or annuity contracts or the reinsuring of risks underwritten by insurance companies;
7. The foreign corporation and its insurance branches derive more than 50 percent of their aggregate net written premiums from the issuance or reinsurance of contracts covering applicable home country risks and with respect to which no policyholder, insured, annuitant, or beneficiary is a related person;
8. The foreign corporation and each of its insurance branches derive more than 30 percent of their net written premiums (as separately determined for each) from the issuance or reinsurance of contracts covering applicable home country risks and with respect to which no policyholder, insured, annuitant, or beneficiary is a related person;
9. The assets give rise to income from unrelated persons; and
10. The assets are held as investments by the foreign corporation or the insurance branches in support of their exempt contracts or their required surplus with respect to exempt contracts.

D. Observations on the Exclusions from Foreign Group Nonqualified Property

A review of the exclusions from foreign group nonqualified property included in Notice 2014-52 reveals a rather stark difference in the treatment afforded foreign banks and finance companies versus that afforded foreign insurers and reinsurers. Specifically, the incorporation of the more lenient rules of section 1297(b)(2)(A) and section 954(h) for the former group versus the much more restrictive rule of section 954(i) for the latter group suggests that a strategic decision was made on the part of the Treasury and the IRS to impose stricter limits on the ability of foreign insurers and reinsurers to acquire domestic corporations. Unfortunately, the policy justification underpinning that decision is not apparent on the face of Notice 2014-52. If, and to the extent that, this decision reflects a concern on the part of the Treasury and the IRS regarding “overcapitalized” insurance companies, a review of the considerations outlined below reveals that any such concern would be more appropriately addressed outside the scope of section 7874 and the exclusions from foreign group nonqualified property.

- Although a significant portion of the assets held by an insurer or a reinsurer in the ordinary conduct of its insurance business may be liquid in character, those assets are not “passive” from the perspective of the company’s business. Rather, those assets are held by such companies in order to ensure that they will have adequate funds on hand to pay claims when losses arise and to meet the requirements and expectations of insurance regulators, ratings agencies, and the insurance market. Thus, those assets simply are not held to facilitate the types of transactions that the Cash Box Rule aims to curb.
- When determining how much capital to hold, insurers and reinsurers generally have to manage competing priorities: the capital demands of insurance regulators, the high cost of capital, and the return demands of investors (returns are maximized if capital is minimized). From a regulatory perspective, the forms of capital across an insurance or reinsurance group are strictly regulated, as regulators look to ensure that obligations to policyholders come first.
- Acquisitions made by insurers and reinsurers often include equity consideration on account of regulatory, ratings agency, and other business concerns associated with all-cash acquisitions. Thus, while the impact of the Cash Box Rule and, more generally, section 7874 can be mitigated through a foreign corporation’s using only cash consideration to acquire a

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48 See §§ 816(a), 831(c).
51 See Fact Sheet: Treasury Actions to Rein in Corporate Tax Inversions (Sept. 22, 2014) (explaining that the purpose of the Cash Box Rule is to “[l]imit the ability of companies to count passive assets that are not part of the entity’s daily business functions in order to inflate the new foreign parent’s size and therefore evade the 80 percent rule” (emphasis added)), available at http://www.treasury.gov/press-center/press-releases/Pages/jl2645.aspx.
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**Example 2**

Example 2 illustrates why this outcome likely has carried the day.

- Foreign reinsurers typically reinsure risks arising around the globe, thus making it extremely difficult for those companies to reach the more-than-50-percent threshold of net written premiums from reinsurance contracts covering risks in their home countries for purposes of the Section 954(i) Exclusion. Thus, even a small amount of equity consideration issued by a foreign reinsurer in an acquisition of a domestic target could cause the foreign reinsurer to become a domestic corporation for U.S. federal tax purposes on account of the workings of the Cash Box Rule and section 7874(b).

In the absence of further clarification from the Treasury and the IRS, the disparate treatment afforded foreign insurers and reinsurers in Notice 2014-52 has had, and likely will continue to have, an unwarranted chilling effect on business combinations involving foreign insurers and reinsurers and domestic corporations (whether insurance companies or otherwise).

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52 See Alison Bennett & Laura Davison, Caught in Crosshairs: Insurers Waiting for Inversion Guidance Fear M&A Slowdown, 80 DTR GG-1 (Apr. 27, 2015); see also Sonali Basak, Tax-Dodge Scrutiny in U.S. Repels Bidders from Bermuda Takeovers, 97 DTR GG-1 (May 20, 2015); cf. Adam Cancryn & Muhammad Umer Shahid, Insurance M&A Scoreboard, Q3’14, SNL Financial (Oct. 28, 2014) (“When an insurer does do a headline-grabbing deal, it wants to be absolutely sure every one of those headlines will be positive. . . . At least for now, shareholders and regulators are watching too closely for companies to roll the dice on risky acquisitions.”), available at https://www.snl.com/interactivex/article.aspx?id=29604736&KPLT=6
Facts

- The facts are the same as those in Example 1, with the exceptions noted below.
- FA has two subsidiaries:
  - FO, a country X reinsurance company that reinsures risk located outside of country X; and
  - USSub, a domestic non-life insurance company that insures risks located in the U.S.
- FO has 150x of total assets (and thus foreign group property), 140x of which FO holds in the form of cash or marketable securities as reserves for use in its reinsurance business, but which do not give rise to income described in section 954(i) because the reinsured risks are located outside of country X.
- USSub has 50x of total assets (and thus foreign group property), 40x of which USSub holds in the form of cash or marketable securities as reserves for use in its insurance business, but which do not give rise to income described in section 954(i) because USSub is a domestic corporation and the insured risks are located in the U.S.

Analysis

- After the acquisition, 90% (180x / 200x) of the gross value of the FA EAG's assets consist of foreign group nonqualified property, because none of the cash or marketable securities held by FO and USSub qualify for the Section 954(i) Exclusion, even though all of those assets are used in the active conduct of the FA EAG's insurance business.
- Because the 50% threshold of the Cash Box Rule is satisfied, 90x shares of FA stock are excluded from the denominator of the Ownership Fraction, with the result that the Ownership Fraction is:

\[
\frac{100x}{120x} = 90.9\%
\]

- Result: FA is treated as a domestic corporation for U.S. federal tax purposes under section 7874(b).

V. Recommendations for Future Guidance Under the Cash Box Rule

Considering all of the issues discussed above, it is apparent that the Cash Box Rule is too broad in its approach with respect to foreign insurers and reinsurers. One potential solution to this problem would be the addition of an exclusion from foreign group nonqualified property for property that gives rise to income described in section 1297(b)(2)(X).\(^53\)

Similar to section 1297(b)(2)(A), section 1297(b)(2)(X) excludes from passive income any income “derived in the active conduct of an insurance business by a corporation which is predominantly engaged in an insurance business and which would be subject to tax under subchapter L if it were a domestic corporation.” Although the scope of section 1297(b)(2)(X), like that of section 1297(b)(2)(A), continues to be refined, an exclusion incorporating section 1297(b)(2)(X) would focus on the status of the foreign corporation as an insurance company for U.S. federal tax purposes engaged in the active conduct of an insurance business. Such an exclusion from foreign group nonqualified property would offer a far more practical alternative than the Section 954(i) Exclusion and would be on par with the Section 1297(b)(2)(A) Exclusion. Moreover, as more guidance is developed under section 1297(b)(2)(X), one would expect that such guidance would have a corresponding impact on the scope of property excluded from foreign group nonqualified property.

With respect to the last point of the preceding paragraph, the Treasury and the IRS published proposed Treasury regulations under section 1297(b)(2)(X) on April 24, 2015 (the “Section 1297(b)(2)(X) Proposed Regulations”). The release of the Section 1297(b)(2)(X) Proposed Regulations\(^54\) did not come as a surprise given the recent media attention that has been focused on the application of section 1297(b)(2)(X) to foreign insurers and reinsurers,\(^55\) and, as expected, the proposed regulations offer

\(^53\) See William R. Pauls, Inversion Notice Boxes Out Foreign Insurers and Reinsurers, 145 TAX NOTES 1259, 1266 (2014); see also Alison Bennett, Inversions Notice Should Expand Exception on “Cash Boxes” for Insurers, Critics Tell IRS, 244 DTR G-5 (Dec. 18, 2014); Andrew Velarde, Treasury May Consider PFIC Insurance Exception in Inversion Reqs, 2014 TNT 219-3 (Nov. 13, 2014).


a few points that demand further consideration, particularly with respect to the “active conduct” and “insurance business” aspects of the exception. Although a complete analysis of the Section 1297(b)(2)(B) Proposed Regulations is beyond the scope of this article, it will suffice to say that the initial reactions to those proposed regulations have been roundly negative.56 Those reactions reflect the fact that the Section 1297(b)(2)(B) Proposed Regulations do not cite, and otherwise are not grounded in, the legislative history of section 1297(b)(2)(B),57 which foreign insurers and reinsurers have had to rely on for nearly 30 years for purposes of determining whether they satisfy the exception offered under section 1297(b)(2)(B).58

One final point of consideration concerns the fact that the exclusions from foreign group nonqualified property only apply to the liquid assets held by the foreign acquiring corporation and its pre-inversion foreign subsidiaries that are members of the EAG.59 Foreign-controlled groups often include domestic subsidiaries, and it seems inconsistent with the policy goals of the Cash Box Rule to preclude the property of those domestic subsidiaries from potentially being eligible for the exclusions from foreign group nonqualified property. To the extent that this result was intended by the Treasury and the IRS in Notice 2014-52, it should be explicated in the Treasury regulations implementing the Cash Box Rule. Otherwise, those Treasury regulations should clarify that the exclusions from foreign group nonqualified property potentially apply to the property held by the foreign acquiring corporation and its pre-inversion foreign and domestic subsidiaries that are members of the EAG.

VI. Parting Thoughts

The elephant in the room with respect to the Cash Box Rule (and, for that matter, the Section 1297(b)(2)(B) Proposed Regulations) is the inability of the Treasury and the IRS to define what they believe constitutes a “hedge fund reinsurer,” which, by many press accounts, apparently is the most evil thing imaginable. Lost in the drama and rhetoric of all this puffery is the reality that the vast majority of foreign insurers and reinsurers do not come close to falling within the small category of companies described by the IRS in Notice 2003-34,60 i.e., the authority upon which the “hedge fund reinsurer” notion appears to be based.61 In this regard, Notice 2003-34 provides as follows:

- The typical arrangement involves a Stakeholder, subject to U.S. income taxation, investing (directly or indirectly) in the equity of an enterprise (“FC”), usually a corporation organized outside the United States. FC is organized as an insurance company and complies with the applicable local laws regulating insurance companies.
- FC issues “insurance or annuity contracts” or contracts to “reinsure” risks underwritten by insurance companies. Some of the contracts do not cover insurance risks. Other contracts significantly limit the risks assumed by FC through the use of retrospective rating arrangements, unrealistically low policy


57 Section 1297(b)(2)(B) (then section 1296(b)(2)(B)) was enacted in 1986 as part of the Tax Reform Act of 1986 (TRA 1986), Pub. L. No. 99-514, and subsequently was amended in 1988 by the Technical and Miscellaneous Revenue Act of 1988 (TAMRA), Pub. L. No. 100-647. The Conference Report for TRA 1986 provides that an “exception to the definition of passive income is provided for income derived by bona fide banks and insurance companies, subject to regulatory exceptions…. A bona fide insurance company is any foreign insurance company that would be subject to taxation under subchapter L if the company were a domestic insurance company.” H.R. REP. NO. 99-841, at II-644 (1986) (Conf. Rep.) (emphasis added). TAMRA added the “predominantly engaged in an insurance business” requirement to section 1297(b)(2)(B) (then section 1296(b)(2)(B)). Both the House and Senate Reports accompanying TAMRA describe the addition of this language as “clarifying” the exception from passive income “for income received by bona fide insurance companies.” H.R. REP. NO. 100-795, at 273 (1988) (emphasis added); see also S. REP. NO. 100-445, at 286 (1988). The House and Senate Reports further provide that:
- This exception from passive income extends only to income derived by insurance companies that are predominantly engaged in the active conduct of an insurance business and that would be taxed under the special rules applicable to domestic insurance companies if they were domestic corporations. Thus, income derived by entities engaged in the business of providing insurance will be passive income to the extent the entities maintain financial reserves in excess of the reasonable needs of their insurance business.
- H.R. REP. NO. 100-795, at 273 (1988); see also S. REP. NO. 100-445, at 286 (1988). Thus, as directed by this legislative history, section 1297(b)(2)(B) provides an exception for income received by a “bona fide insurance company” with “reasonable” financial reserves.

58 As a general matter, proposed Treasury regulations do not carry the weight of temporary or final Treasury regulations, although, in certain instances, proposed Treasury regulations may “constitute a body of informed judgment on which courts (and, correspondingly, taxpayers) may draw for guidance.” Stokely USA, Inc. v. Commissioner, 103 T.C. 439, 459 (1993). Specifically, proposed Treasury regulations “can be useful as guidelines where they closely follow the legislative history of the [underlying] act.” Van Wyck v. Commissioner, 113 T.C. 440, 444 (1999). As noted above, the Section 1297(b)(2)(B) Proposed Regulations do not seem to fall under this category of guidance.

59 See William R. Pauls, Inversion Notice Boxes Out Foreign Insurers and Reinsurers, supra note 53, at 1262, 1263, 1265, and 1266. By their terms, each of sections 954(h), 954(i), 1297(b)(2)(A), and 1297(b)(2)(B) only apply to foreign corporations.

60 Supra note 49.

61 Although this reality has been conveniently dismissed by those beating the drum of discontent, it nevertheless is borne out in a recent analysis performed by the Joint Committee on Taxation. See Staff of the Joint Committee on Taxation, Background and Data with Respect to Hedge Fund Reinsurance Arrangements, at 12-15 (July 30, 2014), available at https://www.jct.gov/publications.html?func=startdown&id=4745
limits, finite risk transactions, or other similar devices.

• FC’s actual insurance activities, if any, are relatively small compared to its investment activities. FC invests its capital and the amounts it receives as consideration for its “insurance” contracts in, among other things, hedge funds or investments in which hedge funds typically invest. As a result, FC’s portfolio generates investment returns that substantially exceed the needs of FC’s “insurance” business. FC generally does not currently distribute these earnings to Stakeholder.

• Stakeholder takes the position that FC is an insurance company engaged in the active conduct of an insurance business and is not a passive foreign investment company. Therefore, when Stakeholder disposes of its interest in FC, it will recognize gain as a capital gain, rather than as ordinary income.\(^\text{62}\)

Whether the Treasury and the IRS will heed the recommendations offered here and by other commentators is unknown. Nevertheless, now is the time to be forthright about the effects of these new rules on foreign insurers and reinsurers, unless those companies wish to become subject to a new U.S. tax paradigm.

\(^{62}\) Notice 2003-34, supra note 49, at § II.
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Abstract
Understanding how institutions were impacted by the financial crisis and how they responded is important for developing risk management plans that are capable of dealing with potential future crises. This paper therefore examines the impact of the financial crisis on U.S. life insurers and reviews the research on how life insurers responded to the crisis. Most life insurers were not significantly affected by the crisis, but some suffered large operating and investment losses. Regarding responses, the paper distinguishes activities that increased economic capital as well as statutory capital (e.g., cutting dividends and obtaining capital infusions) from activities that increased statutory capital without having a direct positive impact on economic capital (e.g., selling policies at a discount relative to fair value and selling securities at fire sale prices).
1. Introduction

The financial crisis is clearly a defining period for financial institutions. The impact was widespread, influencing the management and regulation of commercial banks, investment banks, derivative markets, and insurance companies. The focus of this paper is on the impact of the financial crisis on life insurers in the U.S. The objective is to review, using the results of academic and government research, and with the benefit of hindsight, how life insurers in the U.S. responded to the financial crisis and some of the side effects of these responses.

When thinking about how to manage the risk of a potential loss, it can be useful to distinguish actions that are taken prior to the resolution of the uncertainty regarding the potential loss – ex ante decisions, from those that are taken if a loss materializes – ex post decisions. Ideally, risk managers would evaluate alternative ex ante actions as well as contingent ex post actions, and develop an action plan based on the relative costs and benefits. Of course, sometimes unexpected events occur for which there was no planning and therefore no ex post contingency plans to draw upon. In these situations, organizations need to respond in the best way possible. Our purpose is to summarize how life insurers responded to the large negative economic capital shocks that they experienced during the financial crisis, i.e., their ex post risk management actions. We cannot determine whether these responses were planned or not; nevertheless, an understanding of the actions taken by these institutions and the repercussions of those actions can help risk managers, regulators, and policy makers assess the benefits of alternative risk management plans for the future, whether they be at the institution level or the public policy level.

The analysis begins by assessing the impact of the financial crisis on U.S. life insurers’ operating income and asset portfolios (unrealized capital gains). This analysis indicates that while some insurance groups and companies needed to take significant actions to counteract the impact of the financial crisis, the majority of companies did not need to respond in meaningful ways. The main focus of the paper is on the response of the insurers that were significantly impacted.

Even though most of these companies were in little danger of violating regulatory capital standards, the insurers that suffered large operating and investment losses in 2008 took significant actions to replenish capital. The responses included lowering external and internal dividends [Berry-Stolzle et al. (2014) and Niehaus (2015)], raising external capital [Berry-Stolzle et al. (2014)], shifting internal capital from other entities in the group [Niehaus (2015)], and in a few cases, obtaining capital infusions from the federal government [GAO (2013) and Massad (2012)]. There is also some evidence that insurers reduced their asset risk during the financial crisis, relative to the prior period, by “reaching for yield” less [Becker and Iyashina (2015)]. All of these responses affect the level and risk of economic capital and statutory capital similarly, and are consistent with a desire to protect franchise value and maintain product demand varying with the level and variability of capital.1

Research has also uncovered evidence of insurers taking actions to increase statutory capital even though these actions did not directly increase economic capital. Responses of this nature include lowering prices below actuarial value during a period when the statutory liability that insurers recorded from selling policies was significantly below the economic value of the liability [Koijen and Yogo (2015)], lobbying state regulatory authorities to obtain statutory capital relief [GAO (2013)], selling bonds with embedded capital gains that allowed insurers to report higher assets than if they had continued to hold these bonds [Ellul et al. (2014)], and selling bonds that had been downgraded at fire sale prices to increase risk-based capital ratios [Merrill et al. (2014)]. While the focus on statutory capital (in some cases, at the expense of economic capital) can be explained by customers, investors, financial advisors, and rating agencies using statutory capital to assess insurer financial strength, further research and commentary by practitioners on this topic can help identify other explanations for, and effects of, this behavior.

1 Of course, most consumers do not monitor insurer capital. Instead, information is provided by rating agencies. In the absence of the insurers’ responses, rating agencies would have likely downgraded insurers’ financial strength ratings (see Society of Actuaries (2004) and Koijen and Yogo (2015)).
2. Impact of the financial crisis on U.S. life insurers

2.1 Conceptual framework

The major impacts of the financial crisis on life insurers can be traced to several key economic indicators: lower stock prices, higher credit spreads on corporate and mortgage bonds, lower U.S. Treasury bond rates, and increased market volatility in general. In this section, we outline from a conceptual perspective the impact that these economic variables had on insurers’ economic capital and statutory capital. By economic capital, we mean the value of capital based on the market values of assets and measuring liabilities as the present value of expected claim payments on policies already written discounted using market risk-free interest rates.

Chapter 1, page 3: Definition of economic capital. See, for example, Society of Actuaries (2004) and Ward et al. (2013). Statutory capital is the measure of capital found when using U.S. statutory accounting principles.

Because they are important for understanding the impact on and/or response of insurers to the financial crisis, we also analyze risk-based capital measures. Risk-based capital can be thought of as a measure of capital that an entity (e.g., the National Association of Insurance Commissioners (NAIC) or a rating agency) deems to be appropriate for an insurer given its risk profile. As the riskiness of the insurer’s activities increase, risk-based capital increases. The ratio of actual capital to risk-based capital, therefore, provides a measure of whether the actual amount of capital is sufficient given the risk of the insurer’s activities.

Risk-based capital ratios are utilized by regulators and rating agencies to assess the likelihood that insurers will be able to fulfill the promises that they have made to policyholders. In the U.S., the NAIC risk-based capital measure is scaled in such a way that the actual amount of capital held by insurers is usually many times greater than the NAIC risk-based capital measure, implying that the NAIC risk-based capital ratio (actual capital to risk-based capital) is many times greater than one. If the ratio falls below two, regulatory intervention is required in the U.S.

To provide a sense of the values of typical NAIC risk-based capital ratios and how they changed during the financial crisis, Figure 1 illustrates the median NAIC RBC ratio for all life insurance companies from 2005 to 2011 and the percentage of companies with an NAIC risk-based capital ratio below three. The median value reaches a minimum of 9.2 in 2008 and the percentage of companies with NAIC RBC ratios below three reaches a maximum.
of 7.0 percent in 2008. While these metrics suggest that life insurer capital dropped in 2008, both metrics quickly rebounded. As we discuss below, the rebound in capital can be attributed in large part to the response of life insurers and government during the crisis.

Rating agencies also use risk-based capital ratios, along with other information, when assigning life insurer ratings. For example, A. M. Best calculates what they call the Best's Capital Adequacy Ratio (BCAR), which is the ratio of the capital held by an insurer to the amount of capital that A.M. Best deems to be required given the insurer’s risk (A. M. Best 2014). The BCAR ratings are scaled in such a way that insurers with ratios greater than one are deemed to be “secure” and those with ratios less than one are deemed to be “vulnerable.” More importantly, A.M. Best publishes the guidelines that they use to relate BCAR ratios to their ratings of an insurer’s “balance sheet strength.” Table 1 replicates the guidelines reported in 2014.

The important point to highlight is that insurers may be far from violating the NAIC minimum risk-based capital standard of two, but still be concerned that their capital has fallen or their risk has increased. This is because (1) more insurers are concerned about protecting franchise value and (2) consumer demand is sensitive to the financial strength of the insurer. Rating agencies (such as A. M. Best) play a prominent role in the communication of insurers’ financial strength to consumers (see e.g., Eling (2012) and Epermanis and Harrington (2006)). In addition, insurers, especially publicly traded stock insurers, are concerned with investor perceptions.

2.2 Economic factors impacting life insurers during the financial crisis

There were a number of factors that impacted life insurers during the financial crisis, which are outlined below.

- **Lower stock prices:** the decline in equity values during the financial crisis had minimal impact on most life insurers’ assets simply because they held relatively few equity securities on their general account. However, prior to the financial crisis some insurers had sold variable annuities that promised purchasers that they would receive a guaranteed amount even if the separate account value fell below the guaranteed amount. Since most separate account assets are invested in stock market securities, when equity values fell, the values of separate accounts fell as well. Thus, the expected payments on the guarantees increased, which increased the economic value of insurer’s liabilities and therefore decreased economic capital, all else equal. Statutory capital is similarly impacted by lower stock prices.3

- **Higher credit spreads:** the increased credit spreads and corresponding downgrades of fixed income securities reduced the market value of bonds and mortgage-backed securities and thereby reduced the economic value of insurers’ capital. Provided the bonds were still rated in NAIC category 1-54, life insurers did not have to recognize the lost value for statutory accounting purposes and instead could continue to report the value of bonds at amortized cost. In this case, statutory capital would not have declined as result of increased credit spreads. For bonds with an NAIC rating of 6, however, the bonds would have to be valued at the lower of amortized cost and fair value. In this case, the decline in the value of bonds held by life insurers lowered statutory capital. Regardless of whether downgrades of securities impacts statutory capital, downgrades will increase risk-based capital (the denominator in the risk-based capital ratio) if the downgrade places the security in a higher risk classification. This in turn will decrease the risk-based capital ratio.5

- **Higher volatility:** increased uncertainty and market volatility increases the value of options embedded in life insurance and thereby reduced the economic value of insurers’ capital. The effect of higher market volatility also increased statutory reserves (liabilities) for variable annuities starting in 2009, but this effect would not have been incorporated into reserves prior to 2009.

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3 In the U.S., variable annuities with guaranteed benefits are subject to reserve requirements known as Actuarial Guideline (AG) 34, and 39 before 2009 and subject to AG 43 afterwards. While earlier requirements specified predetermined asset return scenarios, the latter requirement allows insurers to use stochastic reserve calculations based on real world expectations to some extent. Either way, on the valuation date if the account value drops compared to previous account value, then the reserve for variable annuities increases because the gaps between account value and guaranteed value increases, causing statutory capital to fall after a stock price drop.

4 The NAIC rating categories range from 1 to 6 with 1 being the highest credit quality.

5 Insurers holding mortgage-backed securities (MBS) received some relief from this effect in 2009 (for residential MBS) and 2010 (for commercial MBS) when the NAIC changed how they calculated NAIC risk-based capital for MBS. See Becker and Opp (2014) and Hanley and Nikolova (2013) for analyses of how insurers changed their investment decisions following the NAIC rule change. In particular, Becker and Opp (2014) show that insurers purchased more lower-rated MBS, and Hanley and Nikolova (2014) show that insurers were more likely to hold on to downgraded MBS after the rule change.
Lower Treasury rates: in response to the economic crisis, interest rates on U.S. government bonds fell during the financial crisis. The impact of falling Treasury rates on the economic value of life insurers depends on the extent to which their assets and liabilities had similar sensitivities (durations) to interest rate changes. If the interest rate sensitivity of liabilities was greater (less) than that of assets, then the drop in interest rates would have increased the economic value of liabilities more (less) than the value of assets, and economic capital would have declined (increased).

The marginal impact of lower Treasury rates on statutory capital is more complicated because the value of statutory assets and liabilities do not necessarily change as interest rates change. Given that statutory measures of liabilities are based on the interest rate prevailing at the time business is written, statutory liabilities would not have increased as much as the economic value of liabilities as a result of lower interest rates. Similarly, for bonds in NAIC rating categories 1-5, the marginal impact of lower Treasury rates would not have increased their statutory value because that is reported using amortized cost. However, for bonds in NAIC category 6, their statutory value is reported using the lower of amortized cost and fair value. The marginal impact of lower Treasury rates on these bonds would have offset to some extent the impact of increased credit spreads that these bonds experienced during the same time period.

To summarize, there were changes to several economic variables during the financial crisis that had potentially negative implications for the economic capital of life insurers. The extent to which these changes also had a negative impact on statutory capital varies because statutory capital does not always change with changes in economic values. In the next section, we illustrate that the operating income and investment performance of the majority of U.S. life insurers were not significantly affected by these factors. However, some U.S. life insurers were significantly adversely affected and they tended to be the larger companies.

2.3 What was the impact of the financial crisis on U.S. life insurers?
We use two metrics to describe the impact of the financial crisis on life insurers:

- Operating income divided by prior year capital (OpInc/Capital): This is a measure of the return on equity from insurance operations. Note, this metric excludes income from realized capital gains.

- Unrealized capital gains divided by prior year capital (Ung/Capital): This is a measure of the change in the market value of investments from the beginning to end of a year.
The change in unrealized capital gains divided by prior year capital (UnRCapGains/Capital): This is a measure of the annual return on equity from investment operations. This metric does not give the complete investment performance as it excludes the annual performance of securities that were sold during the year.

We calculate these ratios for each U.S. life insurance company from 2005 to 2011.7

Figure 2 illustrates how the median, 10th percentile value, and 5th percentile value for the distribution of OpInc/Capital varies around the financial crisis. All three characteristics drop in 2008, but the median value remains positive. Also, the drop in the median value is only 1.7 percent (from 5.6 percent in 2007 to 3.9 percent in 2008). The 10th and 5th percentile values have larger drops in 2008 than the median value. The 10th percentile value drops by 4.2 percent (from -9.7 percent to -13.9 percent) and the 5th percentile value drops by 11.1 percent (from -23.2 percent to -34.3 percent). These data suggest that the financial crisis had large negative effects on the operating income of some life insurers, but the operating income of the majority of life insurers was minimally affected.

7 Prior year capital is reported as capital and surplus plus the interest maintenance reserve and the asset valuation reserve.

Figure 4 illustrates how the median, 10th percentile value, and 5th percentile value for the distribution of UnRCapGains/Capital varies around the financial crisis. All three characteristics drop in 2008, but the median value remains positive. The 10th percentile value drops from -3.3% to -13.1% and the 5th percentile value drops from -7.8% to -21.2% in 2008. These data indicate that the financial crisis had a large impact on the unrealized capital gains of life insurers.

Table 2: Public equity issues by life insurers in 2008 and 2009

<table>
<thead>
<tr>
<th>Issue date</th>
<th>Issuer</th>
<th>Proceeds (U.S. $m)</th>
<th>Type</th>
<th>Curr.</th>
</tr>
</thead>
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<tr>
<td>12/02/08</td>
<td>Manulife Financial Corp</td>
<td>1,707</td>
<td>Common Shs.</td>
<td>CAN</td>
</tr>
<tr>
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<td>Manulife Financial Corp</td>
<td>2,371</td>
<td>Common Shs.</td>
<td>CAN</td>
</tr>
<tr>
<td>09/08/09</td>
<td>Fairfax Financial Holdings Ltd.</td>
<td>1,000</td>
<td>Sub Voting Shs.</td>
<td>U.S.</td>
</tr>
<tr>
<td>02/03/09</td>
<td>ING Canada Inc.</td>
<td>1,629</td>
<td>Common Shs.</td>
<td>CAN</td>
</tr>
<tr>
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<td>American Equity Inv.</td>
<td>50</td>
<td>Common Shs.</td>
<td>U.S.</td>
</tr>
<tr>
<td>12/22/09</td>
<td>American Equity Inv.</td>
<td>52</td>
<td>Cont Conv Con.</td>
<td>U.S.</td>
</tr>
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<td>Common Shs.</td>
<td>U.S.</td>
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<td>Delphi Financial Group Inc.</td>
<td>63</td>
<td>Class A Ord Shs.</td>
<td>U.S.</td>
</tr>
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<td>Genworth Financial Inc.</td>
<td>564</td>
<td>Class A Ord Shs.</td>
<td>U.S.</td>
</tr>
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<td>Common Shs.</td>
<td>U.S.</td>
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<td>Protective Life Corp</td>
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<td>Common Shs.</td>
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<td>1,250</td>
<td>Common Shs.</td>
<td>U.S.</td>
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<td>Class A Ord Shs.</td>
<td>U.S.</td>
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<td>177</td>
<td>Cvt Senior Nts.</td>
<td>U.S.</td>
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<td>78</td>
<td>Common Shs.</td>
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<td>Common Shs.</td>
<td>U.S.</td>
</tr>
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<td>6,500</td>
<td>Common Shs.</td>
<td>U.S.</td>
</tr>
<tr>
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<tr>
<td>Total</td>
<td></td>
<td>24,517</td>
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</table>
negative effect on the investment portfolios of some life insurers, but the effect on most insurers' portfolios was relatively modest.

A potential concern with the metrics that we just examined is that the large changes as a percentage of prior year capital in 2008 (e.g., the firms in the lowest decile) could be due to small companies with low capital. If so, while the percentage changes for some insurers are large, the overall impact on the industry could be relatively small. To address this issue, we divide the sample into quartiles based on the value of total general account assets and calculate the mean value of OpInc/Capital and UnRCapGains/Capital for each quartile. The results are depicted in Figure 4. Each quartile has a negative average UnRCapGains/Capital ratio and the value varies little across the quartiles.\(^8\)

### 3. Response of U.S. life insurers to the financial crisis

We now summarize the research regarding life insurers’ responses to the financial crisis. We would expect insurers that have experienced a negative capital shock to replenish capital in the least expensive way possible.\(^9\) Most likely, the least costly response to a negative capital shock is to reduce the dividend payments to equity holders. We expect the next lowest cost method would be to obtain capital from other entities in the group if possible. After exhausting those avenues, we would expect insurers to seek capital in the capital markets by issuing debt or equity. As a last resort, we would expect firms to seek funding from the government.

#### 3.1 Cutting dividends

Berry-Stolzle et al. (2014) show that life insurers responded to the financial crisis by cutting shareholder dividends. For example, the percentage of annuity providers that decreased dividends relative to the prior year, conditional on the insurer paying positive dividends in the prior year, increased from about 43 percent in 2007 to 50 percent in 2008 to over 80 percent in 2009. Our calculations indicate that for all insurers filing the life annual statement in the U.S. aggregate shareholder dividends dropped by about U.S.$3.7 billion in 2008 and by close to U.S.$15 billion in 2009 (not tabulated). Moreover, the large drop in shareholder dividends in 2009 remains after deleting AIG companies from the analysis.

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\(^8\) Another potential concern with the metrics presented in this section is that they are heavily influenced by the life insurers in the AIG group. Therefore, we remove AIG’s subsidiaries from the data and recalculate the metrics in Figure 4. There are minimal changes to the graphs when AIG is removed.

\(^9\) The idea that insurers would follow a “pecking order” of lowest to highest cost methods of raising capital during the financial crisis was explicitly made by Motohiro Yogo in conference discussion at the 2014 Western Economic Association meetings in Denver, Colorado.
Niehaus (2015) examines internal shareholder dividends versus total shareholder dividends for a sample of life insurers. Consistent with the aggregate data, it was found that both total shareholder dividends and internal shareholder dividends drop in 2009. Moreover, internal dividends as a percentage of total dividends drop in 2008 and 2009 compared to other years, suggesting that life insurers are less reluctant to decrease internal dividends than external dividends.

Of all of the responses to the financial crisis that we examine, dividend cutting appears to have the most breadth in terms of the number of insurers. The widespread use of dividend cutting to bolster capital is not surprising given that dividend cuts are associated with relatively low costs when many companies in the industry are doing the same. In addition, cutting internal shareholder dividends is cheaper than cutting external shareholder dividends.

3.2 Obtaining new capital
A central issue in the academic corporate finance literature is to what degree frictions in capital markets limit the extent to which corporations can access new capital. If there are periods in which access to capital markets is restricted, then real economic activity can be hindered. In the context of the life insurance industry, capital is an important input that is needed to credibly write insurance policies. Consequently, if there are periods, such as the 2008 and 2009 financial crisis, in which insurers' access to capital markets is restricted, then insurers' capacity for writing insurance can be impaired, especially those insurers that suffered very poor operating or investment performance.

Insurance companies obtaining new capital
Berry-Stolzle et al. (2014) show that life insurance companies, especially those with relatively low earnings, substantially increased their paid-in capital and surplus during the financial crisis, suggesting that these companies were able to raise external capital.10 In Figure 5, we present the change in aggregate statutory paid-in capital and surplus for life insurers from 2005 to 2011. Consistent with the findings of Berry-Stolzle et al. (2014, p529), there is a large increase in paid-in capital and surplus in 2008 of U.S.$75 billion for the industry, with about U.S.$50 billion of this amount attributable to AIG's life subsidiaries. As is well known (and described in more detail below), most of the funds raised by AIG came from the U.S. federal government. Still, even ignoring AIG, life companies substantially increased their paid-in capital and surplus in 2008 and to a slightly lesser extent in 2009. This is why Berry-Stolzle et al. conclude that they “do not find any evidence that insurers had difficulty generating new capital” during the financial crisis.

To address the potential concern that part of the increase in capital and surplus came from other insurers within the same group as opposed to sources external to the group, Berry-Stolzle et al. (2014, p530) consolidate the paid-in capital and surplus of all life insurers in each group and show that consolidated paid-in capital and surplus also increased substantially during the financial crisis. Moreover, using regression analysis, they demonstrate that the relationships between the amount of capital raised by insurers and insurers' characteristics did not change during the financial crisis compared to other time periods. They conclude that life insurers’ “ability to tap external capital markets appears to have remained constant” during 2008 and 2009 relative to earlier periods and that their “measures of external capital issuance are not confounded by internal capital transfers within groups.”

This conclusion, however, needs to be interpreted carefully, because their measure of external capital issuance does not equal the amount of capital that was obtained from investors external to the group. Instead, their measure of external capital issuance equals the amount of capital that was obtained from entities external to the life insurance industry. Thus, these entities could be entities within the group that are not life insurers or investors external to the group (i.e., outside investors). In other words, “external capital” means “external to the life industry,” not external to the firm.

Niehaus (2015) analyzes internal capital transfers among entities within groups that contain life insurers and shows that during the financial crisis there was a substantial amount of internal capital transfers from non-insurance entities (most likely the holding companies) to life insurers in the same group. In his sample, 75 percent of the total paid-in capital and surplus received by life insurers in 2008 was from entities internal to the group, suggesting that much of the “external” capital documented by Berry-Stolzle et al. (2014) was from entities internal to the group but external to the life insurance industry. The internal

10 Their measure of external capital includes surplus notes.
capital transfers documented by Niehaus (2015) also have to be interpreted carefully, as some of the internal capital that was transferred to life insurers could have previously been raised externally (from outside investors) by the holding company and then transferred internally to the life insurance subsidiaries.

While the existing research does not completely sort out the exact source of new capital, the research clearly indicates that life insurers that suffered declines in performance during 2008 took steps to raise capital from sources internal and external to their groups.

Public equity issues
To identify the extent to which publicly-held life insurance companies and groups raised capital by issuing equity securities to the public during 2008 and 2009, we extracted all equity issues by life insurers in the U.S. and Canada from the Security Data Corporation (SDC) file of security issues. Table 2 reports some basic information on the 13 companies that issued equity, including securities convertible to equity. In total, about U.S.$24.5 billion of equity was raised in 2008 and 2009, indicating that some insurance groups (companies) were able to access the public equity markets during the financial crisis. It is important to highlight that almost half of the equity capital that is listed in Table 2 comes from AIG in May 2008, which is prior to their revelation of a U.S.$25 billion loss on their credit default swap book in August of 2008 and their downgrade of three levels in September 2008.

Surplus notes
Another way that insurers raised external capital was by issuing surplus notes. Table 3 reports the number and percentage of life insurers that issued surplus notes each year from 2005 to 2011. The percentage of insurers that issued surplus notes reached its peak in 2008 at 4.3 percent. Table 3 also reports that the aggregate amount of surplus notes issued in 2008 and 2009 totaled almost U.S.$10 billion. These results indicate that some life insurers were able to access the debt markets during the financial crisis.

Berry-Stolzle et al. (2014) estimate a model for the likelihood that a life insurer would issue surplus notes conditional on it increasing its paid-in capital and surplus. In other words, they examine variables that explain the choice of surplus notes versus other methods of increasing paid-in capital and surplus (issuing external equity or obtaining capital from other entities in the group). They find that during the financial crisis, insurers with poorer performance and that specialized in annuities were more likely to raise capital by issuing surplus notes.
Federal government programs for providing capital

Part of the paid-in capital and surplus discussed above was provided by the federal government through various programs to provide capital and liquidity to financial institutions. Table 4\textsuperscript{11} summarizes the amount of funds and the recipients of those funds. Ignoring AIG for a moment, most of the funds provided to insurers were through short-term credit facilities. With respect to equity stakes, the federal government injected U.S.$3.4 billion into The Hartford, U.S.$0.95 billion into Lincoln National and U.S.$69.8 billion into AIG in exchange for various combinations of preferred stock, warrants, and common stock.

Given that taking assistance (capital) from the federal government results in increased federal regulation and is likely to be a negative signal to consumers and investors, Koijen and Yogo (2015) argue that it is unlikely that insurers would seek assistance unless they were financially constrained and found it costly to raise funds in the capital market. Thus, the evidence on insurers taking government assistance can be interpreted as indicating that at least some insurance groups faced significant frictions in the capital markets.

3.3 Efforts to increase statutory capital

The previous sections identify insurer responses to the financial crisis that increased economic capital. Those actions also increased statutory capital. In this section, we discuss efforts by insurers to increase statutory capital even though the direct impact on economic capital could have been neutral or in some cases negative. Indirectly, these efforts could benefit the entity to the extent that consumers, investors and or rating agencies use statutory capital as a signal about the financial soundness of the insurer.

State statutory accounting capital relief

In response to lobbying efforts by some life insurers, a number of states provided statutory capital relief to insurers by allowing them to account for certain items differently than previously allowed. “Prescribed” practices provide all insurers domiciled in a state the option to use accounting practices that differ from NAIC statutory accounting practices \cite{GAO2013}.\textsuperscript{12} Prescribed and permitted practices allowed insurers to report higher statutory capital than they otherwise would have been able to do, but these practices did nothing directly to shore-up economic capital.\textsuperscript{13}

The U.S. General Accounting Office \cite{GAO2013} provides additional analysis and discussion of prescribed and permitted practices and their impact on insurer capital. Table 5, which summarizes the impact of these accounting practices on life insurers’ net income and statutory capital from 2006 to 2011, is taken from the GAO report. In 2008, these practices increased life insurers’ statutory capital by over U.S.$8.9 billion. In contrast, in the two years immediately prior to the financial crisis, prescribed and permitted practices either decreased statutory capital or increased it by less than U.S.$0.5 billion.

Selling policies at prices below actuarial value

Koijen and Yogo (2015) provide an interesting analysis of life insurers’ pricing of policies during the latter months of 2008 and early part of 2009. Recall, interest rates dropped rather dramatically in the latter part of 2008. For example, the ten-year Treasury rate dropped from 5.26 percent in June 2007 to 2.2 percent at the end of 2008 (St. Louis Federal Reserve Economic Data). Financial economics implies that as interest rates drop, the price of long-term life insurance and annuity products should increase in price. Koijen and Yogo (2015) provide evidence that prices of these products moved in the opposite direction.

Their explanation contains two main components. First, statutory accounting for life insurers and annuity providers requires that insurers value the liability created from writing new contracts using a discount rate that is a function of the 12-month moving average of Moody’s composite yields on seasoned corporate bonds.\textsuperscript{14} As a consequence, the discount rate for valuation purposes only slowly adjusts to recent movements in interest rates, and importantly, during a period of declining interest rates, the discount rate used to value the liability for statutory accounting purposes is higher.

11 In addition, the Federal Home Loan Bank System provided advances to insurers involved in housing finance during the crisis, just as it had done prior to the crisis. In 2008, it provided $54.9 billion in advances to 74 insurers, compared to $28.7 billion for 52 companies in 2007.

12 Insurers who use prescribed and permitted practices are required to disclose the impact of the practices in the annual statement.

13 This does not imply that the prescribed and permitted practices were inappropriate. It can be argued that these practices made statutory capital better reflect the assets that were available to pay unexpected costs.

14 For example, let α equal the average of the previous 12-month Moody’s composite yields on seasoned corporate bonds. Then for immediate annuities the discount rate for valuation purposes equals 0.03 + 0.8(α-0.03).
than market rates. This in turn implies that the value of the statutory liability is less than the economic value of the liability.

To illustrate, suppose that the economic liability from selling a policy is $100, i.e., the present value of expected claims is $100 using market interest rates. However, because of the statutory accounting rules, insurers record a liability for this policy of only $90. If the insurer sells the policy for $96 net of expenses, then the insurer records an asset of $96 and therefore augments statutory capital by $6. In this example, the increase of $6 of statutory capital comes at the cost of paying on the policy for $4 less than the insurer expects to pay on the policy. In this hypothetical example, the insurer has paid $0.66 ($4/$6) for each dollar of additional statutory capital.

The second component to the explanation is that some insurers were financially constrained and could not obtain capital from other sources. Koijen and Yogo (2015) argue that these insurers had an incentive to lower their price on the policies below actuarial value to increase the number of policies sold and correspondingly increase the amount of statutory capital that they could report. Competition among insurers may have led some other insurers that were not financially constrained to decrease their prices as well. On average, insurers in their sample sold 30-year term annuities at prices that were below actuarial value by 16 percent and sold universal life insurance policies at prices that were below actuarial value by 57 percent at the end of 2008 and beginning of 2009. Prices of these products during normal times are 6 to 10 percent above actuarial value.

The behavior documented by Koijen and Yogo (2015) suggests that some insurers were so constrained for capital that they were willing to pay substantially more than a dollar (sell policies at a loss) to obtain a dollar of capital. Their estimates indicate that insurers were willing to reduce profits by $0.96 on average to increase statutory capital by $1.00. This implies that some insurers were extraordinarily concerned with the amount of statutory capital that they would have to report during the financial crisis.

3.4 Asset decisions

There is also evidence that some insurers responded to their depleted capital during the financial crisis by changing how they invested their assets. Ellul et al. (2014) examine decisions regarding downgraded asset-backed securities (ABS). Downgrades would increase the denominator of risk-based capital ratios if insurers continued to hold these securities. As a consequence, one might expect insurers to sell these securities and put the proceeds into investment-grade securities. There is, however, an additional consideration arising because of the accounting for these securities.

Whereas property and casualty (P/C) insurers are required to report securities with NAIC designations 3, 4, 5, or 6 at lower of amortized cost and fair value, life insurers are only required to report securities with an NAIC designation of 6 at lower of amortized cost and fair value. Consequently, following a downgrade that pushes an ABS into a lower NAIC designation (other than category 2 and 6), life insurers face a tradeoff: if they hold the ABS, then the denominator of NAIC risk-based capital ratio increases, but the reported value of their assets and, thus the numerator of the NAIC risk-based capital ratio remains constant. On the other hand, if they sell the ABS at a loss and reinvest the proceeds in AAA-rated securities, then the denominator of the NAIC risk-based capital ratio declines, but the life insurer will report lower assets and, thus the numerator of the NAIC risk-based capital ratio also declines. Thus, if life insurers are concerned about reporting a low NAIC risk-based capital ratio, they would be more inclined to hold downgraded securities compared to P/C insurers.

Ellul et al. (2014) examine the trading of life insurers compared to P/C insurers during the financial crisis and show that life insurers with relatively low capital ratios tended to hold the downgraded ABS compared to P/C insurers, which tended to sell these securities. Instead, life insurers were more likely to sell corporate bonds with capital gains, which bolstered their capital ratios because these bonds were previously reported at historical cost or amortized value. This evidence suggests that insurers’ asset decisions during the financial crisis were influenced by the impact of their decisions on statutory capital.15

Merrill et al. (2014) also provide evidence that some insurers’ investment decisions during the financial crisis were motivated

15 Interestingly, this evidence indicates that some life insurers were willing to sell bonds that had appreciated even though the interest maintenance reserve requires them to amortize the gains over time.
to influence statutory capital (and therefore their risk-based capital ratios) and that these decisions were costly in that they resulted in selling securities at fire sale prices. Similar to Ellul et al. (2014), they argue that P/C insurers had an incentive to sell residential mortgage-backed securities (RMBS) if they were capital constrained because of mark-to-market accounting. In addition, they argue that life insurers had a similar incentive to sell RMBS during the first three quarters of 2009.16 Merrill et al.’s (2014) results indicate that transactions of RMBS by P/C and life insurers during the first three quarters of 2009 were at fire sale prices. This evidence indicates that insurers sold securities at prices lower than their true value in an effort to increase their statutory capital and thus their risk-based capital ratios.

It also worth noting that the distortion in life insurers’ investment decisions documented by Ellul et al. (2014), i.e., selling bonds with capital gains and holding downgraded ABS, is likely to have increased asset risk relative to the opposite strategy. On the other hand, there is also evidence that indicates that life insurers’ investment decisions during the financial crisis were toward less risky assets. Becker and Iavshina (2015) show that prior to the financial crisis, life insurers with relatively low capital “reached for yield,” i.e., were more inclined to purchase riskier securities with higher yields. However, they did not find this behavior during the financial crisis.

4. Summary and conclusion

Good risk management practice implies that organizations should undertake cost-effective loss prevention strategies to mitigate the likelihood of large losses occurring. However, in some cases, unexpected events occur. In these situations, organizations should be able to respond to unexpected events that cause large losses to mitigate the impact of those losses. This paper examines how the U.S. life insurance industry responded to the events of the financial crisis.

Overall, most life insurers’ operating income and unrealized capital gains were not significantly affected by the drop in stock prices, increased credits spreads and lower Treasury rates that occurred during the financial crisis. However, some insurers experienced large drops in operating income and unrealized capital losses on their investment portfolios. The insurers that were significantly negatively affected tended to be relatively large insurers that wrote a large amount of annuity business in the years prior to the crisis (of course, AIG had other issues).

In response, life insurers cut shareholder dividends, more so to other internal entities in their group than to external investors. They replenished capital by obtaining internal capital transfers from other entities in their group, and some accessed capital markets by issuing debt (surplus notes) and/or equity securities. All of these actions increased economic capital and statutory similarly.

The more interesting responses involve activities that replenished statutory capital but did not have a direct positive impact on economic capital. These activities included lobbying state regulators to allow prescribed and permitted exceptions to standard statutory accounting rules, selling life insurance and annuities at below cost, selling securities that had appreciated in value, and selling securities at fire sale prices to increase statutory capital. Insurers’ focus on statutory capital (even at the expense of economic capital) can be explained by the use of reported statutory capital by consumers, investors, and rating agencies to assess insurers’ financial strength, which in turn can potentially have real consequences in terms of customer demand for policies and investor demand for securities. Additional research on this issue and whether there are other explanations is warranted.

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16 During 2009, the NAIC was evaluating whether to force life insurers to also mark RMBS to market. Merrill et al. (2014) argue that life insurers likely anticipated that the NAIC would adopt this policy by the end of 2009. As it turned out, at the end of 2009 the NAIC made other changes to the calculation of risk-based capital for RMBS that offset the mark-to-market effect. Consequently, the incentive for life insurers to sell RMBS was removed at the end of 2009.
References


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