Curbing systemic risk in the insurance sector: a mission impossible?

Paola Bongini and Laura Nieri[1]

August 2015

Abstract*: We address the issue of systemic risk in insurance and investigate how financial markets evaluate the regulatory measures designed to address the systemic risk posed by large and interconnected insurers and the publication of the list of global systemically important insurers (G-SIIs). By applying event study methodology to a sample of 44 of the world's largest insurers, we assess whether the stock prices reacted to the publication of the first list of 9 G-SIIs and the release of information regarding their new capital requirements and other policy measures. Overall, we determine that financial markets question the capability of the new rules to effectively disincentive insurers from engaging in non-traditional insurance activities that are the main source of systemic risk and to curb the moral hazard implications of a too-systemic-to-fail policy.*

Keywords*. systemic risk; insurance companies; event study; regulatory reforms; loss absorbency requirements*

JEL codes*. G01; G14; G22; G28*

[1] Paola Bongini, University of Milan-Bicocca; School of Economics and Statistics, Via Bicocca degli Arcimboldi 8, 20126 Milan, Italy, paola.bongini@unimib.it, tel. +39 02 6448.3012. Fax: +39 02 6448.3165
Laura Nieri (corresponding author)**,** Università di Genova; School of Social Sciences; Department of Economics, Via Vivaldi 5, 16126 Genova, Italy , laura.nieri@unige.it, tel. +39 010 209 5223. Fax: +39 010 209 5088

1. Motivation and background

The financial turmoil triggered in 2008 by the subprime mortgages crisis uncovered the importance of systemic risk in the financial sector. The occurrence of episodes such as the Lehman Brothers failure or the American International Group (AIG) federal bailout underlined the necessity to develop a clearer and more stringent regulatory and supervisory system to avoid that the distress of a systemically important institution might spread to rest of the financial system causing a serious damage to the real economy. At the same time, the new regulation has to curb the moral hazard implications associated with the expectation of a public intervention in favor of these large and interconnected institutions.

Since then, national and international regulatory authorities have been prompted to: *(i)* identify financial institutions that are to be considered *systemically important* and (ii) take measures to lessen the impact of the distress/failure of such institutions and discourage the piling up of systemic risk thus reducing the probability of a public sector intervention. In November 2010 the Financial Stability Board announced that new regulatory measures designed for systemically important financial institutions (SIFIs), similar to those devised for the banking sector, would have been applied also to the insurance industry. Accordingly, in May 2012 the International Association of Insurers Supervisors (IAIS) proposed a new regulatory framework concerning Global Systemically Important Insurers (G-SIIs) and on July 2013 the FSB and the IAIS released the first list of G-SIIs[2] and specified the policy measures, whose implementation time frame span from 2014 until 2019.

[2] In November 2014 the FSB in consultation with the IAIS released the second list of G-SIIs that confirmed the same companies designated in 2013.

The introduction of the specific regulation concerning G-SIIs has been mainly triggered by the willingness of regulators i) to incentivise insurers to become less systemically important, and give non-GSIIs strong disincentives from becoming G-SIIs; ii) to reduce the probability of failure of G-SIIs and the expected systemic impacts that such a failure may determine and iii) to limit the potential for regulatory arbitrage between different sectors of the financial system. In this perspective, as posed by the Public-Interest Theory of Regulation, the new regulatory measures are introduced to adjust market failures. Given the spillover effects associated to the failure of a systemic insurer and the ensuing expectations of a public bailout[3], systemic insurers have an incentive to engage in risky activities, that will ultimately increase their return without exposing them to a real risk of failure. Regulation tries to offset these incentives and to avoid that G-SIIs enjoy an implicit free public guaranty: those institutions deemed to be too systemic to fail are asked to bear the burden of a heavier regulation and comply with higher capital requirements. As a result, systemic insurers will have to pay for the implicit protection given by a too-systemic-to-fail regulation and systemic risk in the insurance sector will diminish and its overall stability increase, with a benefit for the the public at large.

In this paper, we set out to assess the markets' evaluation of the regulators' initiative to reduce the systemic relevance of a named group of G-SIIs and the subsequent expected public intervention in case of their distress. We examine equity market reactions following major regulatory steps by the FSB and IAIS that ultimately led to the disclosure of the first G-SII list

[3] Although for insurance companies there is not a central institution that has the power to rescue distressed institutions, such as the European Central Bank or the Federal Reserve Bank in the banking sector, we can expect that due to the negative externalities caused by the failure of a large and systemic insurance company, there is a high probability of a public intervention/bailout. As a matter of fact, AIG was bailed out by the US government – jointly by the Federal Reserve Bank and the Treasury – even if in the US there is not a federal protection scheme/entity for distresses insurance companies.

and test whether these reactions were consistent with Public-Interest Theory of Regulation (Demsetz, 1969).

In particular, using an event study methodology applied to a sample of 44 of the world's largest insurers, we assess whether the stock prices of G-SIIs reacted significantly and differently from those of other large insurers not designated by the IAIS as systemically important, after the methodology to identify G-SIIs was proposed (May 31, 2012) and after the disclosure of the first list of nine G-SIIs (July 18, 2013)[4]. The empirical expectation is that if markets perceived the new regulatory regime as effective in correcting market failures – i.e. bailout expectations for those intermediaries considered too–big or too–systemic–to–fail –, then negative abnormal returns would accrue to the group of insurance companies named in the list of G-SIIs.

Our research contributes to the ongoing debate on systemic risk in the financial sector and its regulation, by analyzing the case of systemically important insurers. In fact, the importance of the systemic risk in the insurance sector it is not univocally recognized by researchers. According to IAIS itself (2011) traditional insurance activities are not a concern from a systemic risk perspective. Insurers are not systemically risky because they lacked the "special character" of banks, primarily the vulnerability to bank runs due to the liquidity of bank deposits and the maturity mismatch of assets and liabilities (Swiss Re, 2003). Insurers fund their activity with upfront premiums, thus benefiting from large operating cash flow and, as far as their primary operating activity is concerned, they don't require wholesale financing; generally their outflows are not correlated to the business cycle and, being often associated with long-term contracts, occur over a longer time span. Finally, the large dimension of a company is a guarantee for an

[4] We didn't test the reaction to the disclosure of the second G-SIIs list since it did not convey new information to the market.

effective risk pooling, given that insurance is based on the law of large number. Hence, interconnectedness and systemic relevance of traditional insurers is usually deemed rather limited (The Geneva Association, 2010; 2011; Harrington, 2009; Grace, 2010; Cummins and Weiss, 2011; Focarelli, 2013).

During the international financial crisis started in 2008, insurance companies showed a much stronger resilience compared to banks and acted as a stabilizing factor of the financial system rather than a destabilizing one (Schich, 2009). In the insurance sector AIG was the only case of failure due to systemic reasons (Grace, 2010; Baranoff, 2012), but the main causes of its distress laid in the non-traditional non-insurance activities run by a non-regulated company that was part of the AIG financial conglomerate. Indeed, relevant studies by international and national regulators as well as by academic scholars point out that, despite there is no evidence of traditional insurance either generating or amplifying systemic risk, insurance companies may also engage in activities that exceed their typical core-business and that are a source of systemic risk (IAIS, 2009; 2011; Deutsche Bundesbank, 2013; Eling and Pankoke, 2014; Jobst, 2014). The business areas where system risk could arise are those where banking-like activities are run, such as derivatives trading, financial guarantees and securities lending, to name the most common ones (Cummins and Weiss, 2014). Non-traditional and non-insurance activities are relevant because, differently from typical insurance liabilities that can normally be managed over a longer timeframe, they may cause an immediate outflows and the risk of liquidity shortage, as it was the case of AIG (Baranoff, 2012). Most studies conclude that, given the specific origins of systemic risk in insurance, it is more appropriate for regulation to adopt an activity-based view, instead of evaluating the whole insurance company (Eling and Pankoke, 2012). This regulatory

approach could also limit potential arbitrage between different sectors of the financial system and ultimately reduce the scope for shadow banking.

Recent academic literature has concentrated its attention on the investigation of the interconnectedness between the banking and insurance industries during the financial crisis using systemic risk measures (Acharya, 2010; Billio, 2010; Chen et al, 2013), finding that these sectors have become highly interrelated over the past decade, with a likely increase in the level of systemic risk in the whole financial insurance industry, by means of complex and time-varying network of relationships. Interconnectedness, besides other features such as leverage and funding fragility, are among the determinants of systemic risk in the insurance sector which, however, is quite small in comparison to that of the banking sector (Weiβ et al., 2014).

To the best of our knowledge, the effects of the introduction of the G-SIIs regulation have been so far analyzed only by one study (Dewenter and Riddik, 2015) that find that market reacted positively to a series of events related to regulatory changes for systemically important insurers and conclude that from the investors perspective potential benefits of the alleged TBTF guaranty outweigh potential compliance costs for the designated firms. They also find that equity gains are not associated with a perceived fall in default probability, but are associated with an increase in implied asset risk, thus indicating that investors expect that protected firms will increase asset risk in response to the moral hazard created by the protection against default granted by the new regulation.

These findings are consistent with those of a few studies that are part of a wider literature concerning market reactions to the SIFIs regulation in the banking sector. Ueda and Di Mauro (2013) find evidence of a specific subsidy deriving from the government support and Abreu and Gulamhussen (2013) suggested that market participants still believe in the ‘too big to fail’

doctrine. On an opposite side stand the studies by Schäfer et al. (2013), Dewenter and Hesse (2013) and Bongini et al. (2014) that provide evidence of markets mixed reaction and conclude that financial markets doubt about the effectiveness of regulation in reducing systemic risk and, at the same time, curbing moral hazard.

The mixed evidence surrounding the new regulatory framework of systemic risk is probably due not only to the fact that the SIFI regulation is just a piece of the more complex regulation puzzle, but also to the possible inadequacy of a quite uniform methodology to effectively regulate such a diverse group of institutions as the G-SIIs and the G-SIBs are. Iwanicz-Drozdowska and Schab (2013) have reservations about the "one size fits all" solution followed by the BCBS/FSB approach and suggest possible corrections, by analyzing G-SIBs financial data collected from annual consolidated financial statements for 2006-2012.

Our research helps to shed new light on the literature on systemically important insurance and on the effectiveness of the new regulatory measures envisaged to reduce systemic risk in the insurance sector.

Our study is organized as follows. The next section describes our testable hypotheses; Section 3 reviews the main steps in the regulatory process that has led to the publication of the list of G-SIIs and the introduction of new regulatory rules; Section 4 analyzes the sample; Section 5 defines the methodology and presents our main results; and Section 6 presents the paper's conclusions.

2. The impact of a regulatory change on insurance companies' prices: our testable hypotheses

In this study we investigate how financial markets have reacted to the announcement that new regulatory measures would be applied to those insurers that have been designated as Global Systemically Important Insurers (G-SIIs).

Two broad traditions have emerged to explain regulatory policy or "economic regulation"[5]. The first holds that regulation exists to correct market failures and improve social welfare (Demsetz, 1969). Regulatory intervention occurs in the interest of the public at large (Public Interest Theory) and regulation is an instrument to: a) insure competition; b) impact (negative) externalities; c) stabilize the economy; d) introduce social objectives in economic policies. The alternative tradition - Private Interest Theory - posits that all economic agents (politicians and regulators as well) pursue their own interest, which may or may not include elements of public interest: under these assumptions there is no reason to conclude that regulation will promote the public interest. On the contrary, regulatory interventions are the results of (individual) powerful interest groups exerting pressure on politician and regulators to capture rents at the expense of more dispersed groups (Stigler, 1971; Posner, 1974; Peltzman, 1976, Becker, 1983). This theory holds that regulation is supplied in response to the demands of interested groups struggling among themselves to maximize the income of their members: regulators will try to satisfy the interests of those groups that will ensure them the highest reward (Posner, 1974, p.1).

Reading through the lens of the private interest theory of regulation, a G-SIIs regulatory intervention is not effective in reducing systemic risk and do not represent a real disincentive for insurers to operate in banking-like activities. It merely represents a legislative protection that

[5] den Hertog (2010) provides a detailed and updated discussion of the theories of regulation.

flows to those (influential) groups that derive the greatest value from it, i.e. financial institutions' shareholders. Indeed, shareholders of G-SIIs would obtain a reduction of the risks to which are exposed, without a parallel reduction in returns. In our case, insurers designated as G-SIIs are expected to be rescued by public intervention because of their relevance and therefore could obtain the following advantages: i) with almost no risk of bankruptcy, they will be incentivized to conduct riskier activities – i.e. incentives to embark on profitable shadow banking activities -; ii) G-SIIs will be able to borrow at lower funding costs thanks to the credit enhancement implicitly given by the government guarantees of their liabilities, with positive effects on their ability to grow and sustain programs of external growth[6]; iii) they could raise higher insurance premiums as long as customers would positively value the option of insuring with a "more stable" insurer.

In sum, a simple too-big-to-fail regulatory intervention could be a "nice present" for G-SIIs' shareholders who will repeal the benefits of such a regulation at the expense of overall societal welfare (potentially higher systemic risk and as a consequence increased probability of failures whose cost would be borne by tax payers). If regulation is deemed to benefit producers, then we would expect a positive market reaction for a G-SII to the release of the list. Large and interconnected insurers not designated G-SII would instead realize negative abnormal return due to a competitive disadvantage.

However, this time insurers' shareholders are delivered a poisoned pill given that being designated as G-SII brings benefits as described above, but also heavy and costly commitments to be subject to. As a matter of fact G-SIIs have to comply with *enhanced supervision*, *recovery and resolution plans (RRPs)* and an increase in capital requirements (*HLA capacity*) to the extent

[6] Insurers are less leveraged than banks (debt over total assets is around 5% for our sample of large insurers); long-term debt is typically used to finance growth (merger and acquisitions)

that they insist in conducting "non traditional/ non insurance business", i.e. those profitable and risky shadow banking activities that, after the AIG collapse, international regulators seek to curb. Such pieces of regulation can generate disadvantages against other insurers that carry a lighter regulatory burden. If the regulation is considered effective in correcting the externalities of a policy which gives some producers within the industry an implicit no-failure status, then negative abnormal returns would accrue to the group of G-SIIs. On the contrary, non G-SIIs may enjoy positive abnormal returns as long as the SIFIs regulation is truly leveling the playing field and removing any competitive advantage benefited by large and diversified insurers.

3. The identification of G-SIIs and the new regulatory process

As part of a global initiative, taken by the FSB, the central bankers and other standard setters, aimed at identifying global systemically important financial institutions (G-SIFIs), the IAIS[7] developed an assessment methodology in order to identify insurance-dominated financial conglomerates whose bankruptcy or disorderly failure would cause significant disruption to the financial system and the economy as a whole. These intermediaries would cause serious breakage to the system because of their size, complexity and interconnectedness. The assessment methodology was developed in two phases: collection of data and methodical assessment process.

[7] The International Association of Insurance Supervisors (IAIS) is a voluntary membership organization of insurance supervisors and regulators from more than 200 jurisdictions in nearly 140 countries. It is the international standard setting body responsible for developing and assisting in the implementation of principles, standards and other supporting material for the supervision of the insurance sector.

The first phase was very tricky since many of the data items were not publicly available at least on a consistent basis. Data[8] were requested and obtained through the respective national supervisors from 50 insurers, in 14 jurisdictions, selected according to the following criteria:

1) *Insurance groups whose total assets were USD 60 billion or more and whose ratio of premiums from jurisdictions outside the home jurisdiction to total premiums was 5% or more.*
2) *Insurance groups whose total assets were USD 200 billion or more and whose ratio of premiums from jurisdictions outside the home jurisdiction to total premiums was between 0% and 5%.*

Finally, a few insurers, such as financial guaranty insurers[9], were added to the scope by supervisory judgment.

The methodical assessment process consisted of an initial indicator–based assessment followed by the supervisory judgment incorporation and the final a validation process. Consistently with the BCBS approach for G-SIBs, the indicator-based approach considers those features that are regarded as a potential source of systemic risk, that is an insurer's Size, Global activity, Interconnectedness, Non-Traditional and Non-Insurance (NTNI) activities and Substitutability (see table 1).

- Table 1 -

The specific nature of the insurance sector has influenced the selection, grouping and weights assigned to each indicator. For instance, size is proxied not only by the straightforward indicator

[8] Data are of year-end 2011.

[9] *Insurers and reinsurers of municipal bonds and asset-backed securities. A bond or other security insured by a financial guaranty insurer has the unconditional and irrevocable guarantee that interest and principal will be paid on time and in full in the event of a default*. Cfr. The Association of Financial Guaranty Insurers (AFGI), http://www.afgi.org/

"total asset", but also by "total revenues" since looking only at asset size may underestimate activities of non-life insurers.

The two most important categories of indicators for assessing the systemic importance of insurers are the Interconnectedness category and the NTNI category, which receive higher weights in the construction of the indicator. Interconnectedness accounts for the inter-linkages between the insurance sector, the banking sector and the financial markets; due to these interconnections the distress of an insurance company may spread to rest of the financial system causing spillover effects. NTNI can be described as those activities that are conducted by an insurance group and that are not directly connected with the traditional insurance business. Generally speaking, the activities of an insurer can be grouped into two categories:

A) *Insurance* which includes the traditional activities that can be mixed also with non-traditional features providing the so called *Non-Traditional insurance business*.

B) *Non insurance* which includes all activities with no connection with the insurance business but that are conducted by the insurer.

Typical activities belonging to the former category are *Financial guarantee insurance* and reinsurance contacts with no risk transfers. Examples of activities concerning the latter category are *Mortgage guarantee insurance* and annuities with additional guarantees.

The difference between the two categories is not so marked; some jurisdictions may consider a specific activity as a non-traditional one and other national supervisors can allocate the very

same activity to the Non-Insurance category. More generally, the difference between *Traditional* and *Non Traditional* or *Insurance* and *Non Insurance* activities is very thin.[10]

Table 2 helps understand what activities are considered NTNI and how they are grouped. Even if there is not a unique definition of such activities, it is certain that some non-insurance activities are of systemic relevance. The emblematic case of AIG, whose subsidiaries underwrote a large volume of *Credit Default Swaps CDS* combined with high leverage, teaches that this type of investment can have severe effects on global economy and financial markets.

- Table 2 -

The results of the indicator-based assessment provide a first indication of the level of systemic risk borne by insurers and were used by supervisors in their validation process, that ultimately ended with the designation of the nine G-SIIs. It is important to recall that to identify systemically important insurers supervisors integrate the results of the indicator-based assessment with an additional qualitative and quantitative assessment, the latter being represented by the Insurance and Financial Stability (IFS) score.

According to the view that systemic risk arises mainly in those activities that are non-traditional or non-insurance-based, the whole business of an insurance company is divided into different segments and different risk weights are associated to each one of them (see table 3). The sum of the weighted assets gives the IFS score, which increases as the value of non insurance financial assets increases.

- Table 3 -

[10] For example, a number of jurisdictions would classify variable annuities closer to traditional life insurance, while others, in light of the dominant investment component in these products, would see them closer to non-traditional insurance activities.

The designated G-SIIs will be subject to a specific new regulatory regime developed by the IAIS in line with the FSB framework for G-SIFIs. In particular, IAIS' policy measures can be grouped into four different categories: *Enhanced supervision, Effective resolution, Loss Absorbency Capacity* (LA) and *Higher Loss Absorption (HLA) capacity*[11].

Enhanced supervision applies immediately to all G- SIIs to ensure that they rapidly achieve the higher standards of risk management their G-SII status demands. Special emphasis is placed on group-wide supervision and liquidity planning primarily for the NTNI business. The group-wide supervisors should also analyze activities that cause systemic importance of G-SIIs and take necessary measures to reduce that systemic importance. This includes overseeing the development and implementation of a Systemic Risk Management Plan (SRMP)[12] which could include measures such as separation of NTNI activities from traditional insurance business and/or restriction or prohibition of systemically important NTNI activities.

As regards effective resolution, all G-SIIs will be required to produce Recovery and Resolution Plans (RRPs) in cooperation with their group-wide supervisor. Moreover, for G-SIIs, effective resolution will take account of the specificities of insurance, including: a) plans and completed steps needed for the separation of NTNI activities from traditional insurance activities; b) the possible use of portfolio transfers and run-off arrangements as part of the resolution of entities conducting traditional insurance activities; c) the existence of policyholder protection and guarantee schemes (or similar arrangements).

With respect to Loss Absorbency (LA) capacity, G-SIIs will be required to hold regulatory capital for all group activities. The development of backstop (or basic) capital requirements will be completed by the end of 2014 and the requirements will apply shortly thereafter.

[11] IAIS (2013.a)

[12] The SRMP should be completed within 12 months after the designation for the first group of G-SIIs

Finally, in addition to LA capacity, G-SIIs will be subject to an increased loss absorption capacity requirement (HLA) based on the NTNI activities that those G-SIIs undertake. The calculation and location of the additional capital requirement may depend upon whether the G-SII has demonstrated effective separation of NTNI activities from traditional insurance activities. The IAIS also proposes that, when possible, HLA should be targeted as follows at the entities where the systemically important actives are located: a) where the G-SII has demonstrated effective separation of NTNI activities from traditional insurance activities, targeted HLA may be calculated based on the NTNI activities and applied to the separated entities conducting them; b) where NTNI activities are not effectively separated, HLA may be calculated based on the NTNI activities in the consolidated insurance group (including the parent company) taking account of the insurance group's interconnectedness score (yielding an HLA uplift greater than if the activities had been separated). The proposed HLA measures will be subject to further consultation before they are finalized in 2015 in advance of the proposed implementation date of January 2019.

4. Sample and descriptive statistics

4.1 Sample

In its document of July 18, 2013, the IAIS states that the nine G-SIIs were identified among a sample of 50 insurance-dominated financial conglomerates from all over the world. The sample of 50 insurers was not disclosed, but was the methodology used to identify the sample. We followed the sample selection process used by IAIS and described in Section 2 and run a "screening" search on the Bloomberg database, looking for those firms:

A) having an active state of trade;

B) being *Parent* of the group;

C) included in the insurance sector of the *Industry Classification Benchmark* (ICB), [13]

D) whose total assets as of year-end 2011 were greater than or equal to USD 60 billion.

From the 61 insurers provided by such screening search, we excluded those who did not respect the criteria about the ratio of premiums from foreign jurisdictions over total premiums[14], as prescribed in the IAIS' assessment methodology. The final list of insurance companies respecting all the aforementioned criteria consists of forty-four insurers including the nine insurance companies designated as G-SIIs. The list is shown in Table 4.

- Table 4 -

4.2 Descriptive statistics

Table 5 provides summary statistics for our sample of G-SIIs and their peers. We consider several measures of performance namely size, capitalization, leverage, profitability, liquidity, operational efficiency and complexity (non-traditional and non-insurance business). Data are as of year-end 2011 following IAIS' assessment methodology and are collected from Factset and Bloomberg. Column five of Table 5 (panel B) reports the p-value of a t-test for differences in means between the two group of insurers, G-SIIs and other large insurers. G-SIIs appear to be larger than their peers and differentiate mainly for their stronger ability to reward equity and higher leverage. The larger weight of debts among liabilities is due to short-term funding which is considered by IAIS a potential feature of financial institutions involved in maturity

[13] A company-classification system for stocks developed by Dow Jones and FTSE. The Industry Classification Benchmark (ICB) is a system that classifies both domestic and international stocks. Every company has a place in the ICB, which has a four-tier, hierarchical industry-classification structure. The ICB uses a system of 10 industries, partitioned into 18 supersectors, which are further divided into 39 sectors, which in turn contain 104 subsectors. Cfr. Bloomberg.

[14] This second step of the analysis was quite tricky since no automatic filters exist in order to search for premiums ratio. Therefore we checked each company's balance sheet, computed the aforementioned ratio to exclude not only companies whose ratio was below the 5% but also those companies whose data were not publicly available.

transformation. Revenues and total assets from Asset Management, Banking and Specialty Finance, as compiled by Bloomberg, are used as proxy for non-traditional and non-insurance activities. Interestingly, NTNI activities are equally present in both groups or not significantly different between the two.

- Table 5 –

5. Methodology and empirical results

5.1 Methodology

To isolate the effect of the IAIS announcement, we use classical event study approach. The case for using event studies to evaluate the impact of a regulatory change was made by Schwert in 1981, and since then, numerous studies have been published, including some in domains other than banking regulation (see MacKinlay, 1997; Lamdin, 2001).

An event study examines returns during an "event window" to determine whether these returns were abnormally positive or negative[15]. The event window represents the entire length of time over which the analyst may look for a price reaction to what investors may consider "new information" (news). In the case of a regulatory change, the event window is a less concise period of time and less specific concept. A regulatory change was, at some point, first proposed. The proposed change was then debated, and ultimately it was determined when the change would be enacted. The event window encompassed this entire time frame (Lamdin, 2001). As previously explained, the G-SII regulation comprises a time span that begins in 2012 and ends in

[15] The impact on financial markets is addressed considering stock market data only. In fact CDS prices are available for a limited number of insurers; although the impact on CDS prices might be more interesting as it captures tail-risk events, the thinness of the sample refrained us from the use of these data.

2013. Along this timeline, we believe that two dates are of particular interest for assessing the market reaction to the SIIs regulation:

a) May 31, 2012, when for the first time the IAIS published the methodology defining the characteristics of a G-SIIs and gave a general picture of the potential policy measures to be applied to global insurers.

b) July 18, 2013, when the first list of G-SIIs was announced using 2011 year-end data and policy measures envisioned to address the risks posed by systemic insurers were published.

As in classical event studies, the time series under study are divided into two subsamples: the estimation window, with n_0 time points, and the event window, with n_1 time points. If R_{it} is the return of security i at time t and R_{mt} is a market index, then the abnormal returns are defined as $AR_{it} = R_{it} - \hat{\beta}_0 - \hat{\beta}_1 R_{mt}$, where the beta-coefficients are least-square estimates of the regression of R_{it} on a constant and R_{mt}. The estimates are based on the estimation window, whereas the abnormal returns are computed for the entire sample. The standardized abnormal returns are then computed as

$$SAR_{it} = \frac{AR_{it}}{S\sqrt{1 + c_{it}}},$$

where S^2 is the unbiased estimate of the regression error variance $c_{it} = -\boldsymbol{x}_{it}^{\prime}\left(\boldsymbol{X}_0^{\prime}\,\boldsymbol{X}_0\right)^{-1}\boldsymbol{x}_{it}$ for t in the estimation window, and $c_{it} = \boldsymbol{x}_{it}^{\prime}\left(\boldsymbol{X}_0^{\prime}\,\boldsymbol{X}_0\right)^{-1}\boldsymbol{x}_{it}$ for t in the event window. Additionally, $\boldsymbol{x}_{it}^{\prime} = [1\ R_{mt}]$ is the vector of regressors, and $\boldsymbol{X}_0$ is the matrix of the estimation window regressors stacked in one $n_0 \times 2$ data matrix. For the typical values of n_0 used in event studies (> 100), the term c_{it} is generally close to zero and can be neglected.

Due to the characteristics of our sample – same event over the same event window occurring to firms belonging to the same industry – cross-sectional independence of the residuals returns cannot be assumed and assured (Kolari and Pynnönen, 2010). To deal with the issue of event date clustering, we adopt two quite standard parametric tests that address cross-correlation of returns (Brown and Warner, 1985; Ahern, 2009). We also use a non-parametric approach based on ranks following Bongini et al. (2014), which is both robust to fat-tailed distributions and works in presence of cross-sectional dependence. Notice that since the nonparametric test is distribution-free, it can be applied also to the absolute value of the abnormal returns. This property is extremely relevant to detect cross-sectional variation in abnormal returns. The average CARs, in fact, could be zero because some firms enjoy positive abnormal returns that are cancelled by negative abnormal returns for other institutions. In this case, when the nonparametric test applied to the cumulative abnormal returns does not reject the null of *no mean shift*, and the same test on absolute returns rejects its null, then it means that the mean abnormal return is zero – i.e. on average the market did not react –, and the dispersion of the returns across stocks has increased – i.e. the market discriminated among different firms - .

In our study, we regress daily stock returns for firm *i* on the daily stock returns of a national market index over the estimation window. This is a common practice in multi-country event studies where the use of a national market index and local currency returns is observed as the most appropriate choice (Campbell et al, 2010). Data on national stock market indices and individual stock prices were downloaded from Bloomberg. The regression parameters are estimated separately for each institution via ordinary least squares using daily data for days -241 to -41 relative to each event date T^* (5/31/2012 or 07/18/2013), thus forming a 200-day estimation window, which is consistent with previous research. The estimation window is far

enough ahead of the event not to be contaminated by it to still be representative of the changing correlations in extremely volatile markets since the onset of the financial crisis in 2007.

We start with an aggregate analysis in which we compare abnormal stock returns for (average) portfolios of our sample insurers. The first comparison is between the nine insurers that were designated as systemically important – the G-SIIs – and the thirty-five large insurers that were ultimately deemed not to be systemically important – the non-G-SIIs. We distinguish between these two sets across all events even though the list of G-SIIs was not actually revealed until July 18, 2013, i.e., the second event date. Thus, when looking at the first event (May 31, 2012), we would expect differences between G-SIIs and non-G-SIIs only to the extent that the market has anticipated which insurers would be included in the final list. The second comparison considers the geographical distribution of the sample; more specifically, our sample insurers are divided into three sub-samples (Europe, North America, and Asia) according to where their headquarters are located because the stock markets of these areas were exhibiting different patterns and were facing quite dissimilar cycle phases at the time of the investigation.

5.2 Abnormal returns

Table 6 reports the abnormal returns estimates at the two event dates (Panel A for G-SIIs and panel B for the non G-SIIs). No unique pattern of response is present in both groups; however, on average negative abnormal returns predominate for G-SIIs and positive abnormal returns for non G-SIIs at the first event date, consistently with the expectation of the Public Interest Theory of regulation. Average abnormal returns are positive for both groups at the second event date (July, 18 2013); a result that seems to imply that markets no longer believe that the regulation

will be able to contain the systemic risk of global insurers and that the benefits of the G-SII designation outweigh the costs. No statistical significance is however evident in either events.

- Table 6 -

Table 7 reports the mean abnormal returns around the relevant event-windows and the p-values of the test statistics used to test the statistical significance with respect to both the full sample and each sub-set of insurers. The second, third, fourth and fifth columns of Table 7 present the Brown and Warner (1985) statistic, the Ahern (2009) statistic, the p-value of the rank-based statistic and the rank test on absolute returns, respectively[16].

- Table 7 -

5.2.1 The pre-release event

The pre-release event, that is, when the methodology to identify the future G-SIIs was presented and the policy measures were broached, led to a negative reaction to the future regulatory change by the market for the overall sample and our pre-defined partitions: both non G-SIIs and G-SIIs, or North American, European or Asian insurers on average witnessed negative abnormal returns, over the larger event window[17]. Such a reaction appears to be consistent with the Public Interest Theory of regulation: markets judge the new regulatory framework proposed by the IAIS, on line with the FSB requirements for G-SIFIs, as harming producers (insurers) while benefiting consumers/taxpayers. Interestingly, the only significant response can be found with respect to non G-SIIs: as mentioned above, the methodology to

[16] Recall that if the rank test is applied to the absolute values of the standardized abnormal returns, one can infer whether the return volatility among stocks has increased.

[17] The reader should notice that in this specific date (May 31 2012) the event window was shortened and restricted to a [-2, +1] interval in order to consider the exact calendar holidays and trading days. In fact, the 31rst of May was Thursday; therefore June 1rst figure was available; however, for many companies trading prices were not available on the 4th of June (Bank holiday) therefore only a limited number of markets would have included such news in their pricing and others would not. For conservative reasons, we restricted our analysis to consider a 4-days window.

identify systemically important insurers is not straightforward and contains a great deal of discretion. It also poses a great weight to features such as the relevance of NTNI activities and the level of interconnectedness that cannot be easily gauged by simply analyzing financial reports and publicly available information. As a matter of fact, our descriptive statistics show that the differences between G-SIIs and non G-SIIs are rather thin in terms of main financial indicators. Markets could not easily discriminate among large and internationally active insurers and predict which of them would have been named G-SIIs by the FSB.

5.2.2 The release event

The release of the G-SII list and the publication of the policy measures (second event) caused a mixed market reaction. For half of our sample, abnormal returns were negative, if we consider an event window of five days around the event date. Results change if we consider a three-day event window starting with the event day: with the exception of Asian insurers, the whole sample enjoyed positive cumulative abnormal returns. Starting from the event date (t=0), the market mood changes radically and markets seem to believe that the new regulation will benefit producers (insurers): the G-SII designation could turn into a certainty the expectation of a public intervention in case of distress of systemically important insurers, with no counterpoint effectively harming the sources of systemic risk in the insurance industry.

Nonetheless, no significant response can be found at the full sample level, with respect to the disaggregation between G-SIIs and non G-SIIs or with respect to our sample's geographical distribution. Moreover, the rank test to the absolute values of the abnormal returns did not reveal any increase in the return volatility among the stocks, i.e. no diverse and significant market response was occurring. This no clear-cut reaction could imply that markets are changing their

idea regarding the balance between benefits and costs of a G-SII designation, but, at the same time, they are not completely confident that too-systemic-to-fail insurers will be bailed out 100% of times, because the very few public guarantee schemes so far existing for insurance companies are not deemed to be large enough to rescue a large distressed company.

In sum, the release of the G-SIIs list and publication of the policy measures are to be considered, in the event-study terminology, a non-event, e.g. markets evaluate the new regulation as weak and not sufficiently credible in curbing systemic risk. Differently from what happens in the banking industry, the real burden and contours of the G-SIIs regulation, especially in terms of additional capital requirements, are less clear for three main reasons. First, IAIS does not specify *how much* additional capital (HLA) is eventually needed. The additional burden for G-SIIs is not yet clearly defined, even though one year has elapsed after the release of the identification methodology (first event). Second, such increased loss absorption capacity requirement will crucially depend on organizational aspects that are not predictable at the moment: it will depend upon whether a G-SII will fail to demonstrate effective separation of NTNI activities from traditional insurance activities. Finally, a common regulatory standard for capital adequacy is still to be agreed upon by different national regulators worldwide. Lacking such a level playing field, it might be difficult to believe that an add-on to an esoteric measure of capital adequacy could be considered credible

5.3 Market reactions and insurers' characteristics

In order to assess the significance of insurer characteristics in explaining the few (individual) market reactions to the IAIS announcement, we perform a regression analysis considering both the abnormal returns for the event date and the cumulative abnormal returns as dependent

variables. As independent variables we focus on variables capturing different firm characteristics, such as size (log of total assets), profitability (ROA and ROE), capitalization (solvency ratio) and business diversification as captured by the ratio of NTNI revenues over total revenues (see Table 8).

Since the question concerns which specific insurer suffered or benefited the most from being designated as systemically important financial institutions, we would expect that the riskiest insurers or those who have a larger share of NTNI activities would have the most to loose if markets would consider the regulatory policy proposed by the FSB and the IAIS as truly capable to make them "pay", to as great a degree as possible, for their systemic nature. In other words, if markets would expect that the specific additional supervisory measures were binding and biting, then it is likely that the insurers with the lowest solvency ratios and the largest NTNI activities will have the most to lose from the introduction of the new regulation. To test this hypothesis, we regress the abnormal returns registered by our sample around the first and second event date on their solvency ratio and the ratio of NTNI activities' revenues to total revenue (Table 8). We also include size and profitability measures as control variables.

For each dependent variable, we perform an analysis first considering only the dummy G-SIIs as explanatory variable and then considering all the variables proxy for insurers' financial characteristics.

The most relevant result to our study is that the dummy G-SIIs is never significant in any of the periods under consideration: this result reinforces our previous findings that the new regulation of too-systemic-to-fail insurers is not considered effective in reducing market failures associated with any TBTF policy.

Moreover, neither the insurer characteristics are significant in explaining the reaction to the FSB announcement, although these variables generally show the expected sign.

In sum, our results show that financial markets did not believe in the capability of regulators of imposing specific, additional and binding supervisory rules to large systemically relevant insurers. The heavier regulatory burden for G-SIIs is considered not fully credible or not yet effective.

- Table 8 -

6. Conclusions

In this paper, we investigate the wealth effects of the new G-SII regulation announced in May 2012 and finalized on July 18, 2013. We measure the market reaction to this set of regulations using an event study of stock prices for the largest 44 insurers in the world.

Overall, we find that financial markets did not react to the new regulation regarding G-SIIs and that market reactions were not even linked to the insurers' financial characteristics (business models, capital adequacy) as opposed to what was seen in the banking sector where at least on a national level (Schaefer et al., 2013) or at the very beginning of the introduction of a G-SIB regulation (Bongini et al., 2014) markets seemed to grasp the supervisory implications of the SIFI regulation. The new rules set for G-SIIs are either not being considered as capable to contain the systemic risk of global insurers nor markets believe that they will be treated differently in case of distress, according to their belonging or not to a G-SII list.

Our work is a preliminary and seminal study considering the issue of systemic risk and the insurance industry. Although it is now quite accepted by regulators and the industry that also

insurers could be considered systemically risky even though they lack the "special character" of banks, i.e. the susceptibility to runs due to the liquidity nature of bank deposits, research will have the task to consider and include in its models the very fact that insurance failures do not occur overnight. The nature of the insurance business is such that when analyzing systemic risk, it would likely be necessary to evaluate, on the one side, each business activity instead of whole companies and, on the other side, to take into consideration that economic losses for stakeholders are usually diluted over a much longer time-span than in the banking industry.

References

Abreu J. F. and Gulamhussen M. A. (2013). The stock market reaction to the public announcement of a supranational list of too-big-to-fail banks during the financial crisis, *Journal of International Financial Markets, Institutions & Money*, vol. 25, 49-72

Acharya, V.V., L.H. Pedersen, T. Philippon, and M. Richardson, (2010) Measuring Systemic Risk," working paper, New York University, Stern School of Business, New York, NY. Available at http://ssrn.com/abstract=1573171.

Ahern, K., (2009) Sample selection and event study estimation", *Journal of Empirical Finance* 16 (3), 466–482.

Baranoff, E. (2012), An Analysis of the AIG Case: Understanding Systemic Risk and Its Relation to Insurance, *Journal of Insurance Regulation*, Vol. 31, 243-270

Becker, G.S. (1983), A theory of competition among pressure groups for political influence, *The Quaterly Journal of Economics*, 98, 371-400

Billio, M., M. Getmansky, A.W. Lo, and L. Pelizzon (2010) Econometric Measures of Systemic Risk in the Finance and Insurance Sectors," NBER working paper 16233, Cambridge, MA.

Bongini Paola, Nieri Laura and Pelagatti Matteo (2015) The Importance Of Being Systemically Important Institutions, *Journal of Banking and Finance* Vol 50, 562-5774

Brown, S., Warner, J., (1985) Using daily stock returns: the case of event studies, *Journal of Financial Economics* 14 (1), 3–31.

Chen H., Cummins J. David, Viswanathan K.S And Weiss M. A. (2013), Systemic Risk And The Inter-Connectedness Between Banks And Insurers: An Econometric Analysis, *Journal Of Risk And Insurance*, Vol 18 (3), 623-652

Cummins, J.D. and Weiss, M.A. (2011), Systemic Risk in the U.S. Insurance Sector, *The Journal of Risk and Insurance*, vol.81, n. 3, 489-527.

Demsetz, H. (1969) Information and efficiency another viewpoint, *Journal of Law and Economics*, 12, 1-22

den Hertog, J. (2010) Review of economic theory of regulation, Tjalling C. Koopmans Research Institute, discussion paper series n. 10-18

Deutsche Bundesbank (2013) Financial Stability Review 2013, *Bundesbank Publications*, Issn 1861-8995.

Dewenter, K.L. and Hess, A.C. (2013) The Financial Stability Board and Global Systemically Important Banks: Unintended consequences?, (October 1, 2013). Available at SSRN: http://ssrn.com/abstract=2338665

Dewenter, K.L. and Riddick, L.A., (2015), What's the value of a TBTF guaranty? Evidence from the G-SIFI designation for insurance company, (July 8, 2014 (July 10, 2015). Available at SSRN: http://ssrn.com/abstract=2547723

Eling, M. and Pankoke, D. (2014), Systemic Risk in the Insurance Sector-What Do We Know?, Working Papers on Risk Management and Insurance, no. 124, University of St.Gallen,

http://www.ivw.unisg.ch/~/media/internet/content/dateien/instituteundcenters/ivw/wps/wp124.pdf

Financial Stability Board (July 2013) Global Systemically Important Insurers (G-Siis) and The Policy Measures That Will Apply To Them", *Fsb Publications*, *Http://Www.Financialstabilityboard.Org/Publications/R_130718.Pdf*

Focarelli D., (November 2013), Insurance And Systemic Risk", *Ppt Presentation*, http://www.ania.it/export/sites/default/it/pubblicazioni/monografie-e-interventi/Solvency/Insurance-and-systemic-risk-Intervento-Dario-Focarelli.pdf

Grace, M.F. (2010), The Insurance Industry and Systemic Risk: Evidence and Discussion, Policy Brief, Networks of Financial Institute at Indiana State Institution, April, PB-02, http://www2.indstate.edu/business/nfi/leadership/briefs/2010-PB-02_Grace.pdf

Harrington Scott E. (2009), The Financial Crisis, Systemic Risk, and the Future of Insurance Regulation, *Public Policy Paper Of The National Association Of Mutual Insurance Companies*.

International Association Of Insurance Supervisors (October 2009) Systemic Risk And The Insurance Sector, *Iais Supervisory Material*, Http://Iaisweb.Org/__Temp/Note_On_Systemic_Risk_And_The_Insurance_Sector.Pdf

International Association Of Insurance Supervisors (November 2011), Insurance And Financial Stability, *Iais Supervisory Material*, Http://Www.Iaisweb.Org/Supervisory-Material/Other-Supervisory-Papers-And-Reports-764.

International Association Of Insurance Supervisors (May 2012), Global Systemically Important Insurers: Proposed Assessment Methodology (Public Consultation Document)", *Iais Supervisory Material*, Http://Www.Iaisweb.Org/G-Siis-988.

International Association Of Insurance Supervisors (July 2013.a), Global Systemically Important Insurers: Policy Measures", *Iais Supervisory Material*, Http://Www.Iaisweb.Org/G-Siis-988.

International Association Of Insurance Supervisors (July 2013.b), Global Systemically Important Insurers: Initial Assessment Methodology**,** *Iais Supervisory Material*, Http://Www.Iaisweb.Org/G-Siis-988.

Iwanicz-Drozdowska M. and Schab I. (2013) Regulation of G-SIBs. Does one size fit all?, Available at http://www.researchgate.net/publication/274704664_Regulation_of_GSIBs._Does_one_size_fit_all

Jobst, A. (2014), Systemic Risk in the Insurance Sector – A Review of the Current Assessment Approaches, The Geneva Papers on Risk and Insurance - Issues and Practice (Forthcoming), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2022062Mackinley A. C. (1997) Event Studies In Economics And Finance" *Journal Of Economic Literature* 35, Pp. 13-39.

Peltzman, S. (1976) Toward a more general theory of regulation, *Journal of Law and Economics*, 19, 211-241

Posner, R. A. (1974), Theories of economic regulation, NBER working paper series N.41

Schich, S. (2009), Insurance Companies and the Financial crisis, Financial markets Trends, OECD, n. 2, 31Schwert G.W. (1981) Using Financial Data To Measure Effects Of Regulation, *Journal of Law and Economics* 24, No. 1, 121-158.

Schwarcz D. and Schwarcz S.L. (2014), Regulating Systemic Risk in Insurance, *University of Chicago Law Review*, n°4, 1569-1640

Stigler, G.G. (1971) The theory of economic regulation, *Bell Journal of Economics and Management Sciences*, 2, 3-21

Swiss Re, 2003, Reinsurance – A Systemic Risk, *Sigma*, n. 5/2003 (Zurich, Switzerland).

The Geneva Association (March 2010), Systemic Risk In Insurance. An Analysis Of Insurance And Financial Stability, *Research Report.*

The Geneva Association (April 2011), Considerations For Identifying Systemically Important Institutions In Insurance, *Research Report*.

Ueda K. and Weder Di Mauro B. (2012) Quantifying Structural Subsidy Values For Systemically Important Financial Institutions", *Journal of Banking and Finance*, Vol. 37, 3830-3842.

Weiβ, G.N.F., Bierth, C., Irresberger, F. (2014), Systemic Risk of Insurers Around the Globe, April, Available at SSRN: http://ssrn.com/abstract=2419508

Table 1 Indicator-based measurement approach proposed by the IAIS

Category	*Category weighting*	*Individual indicator*	*Indicator weighting [for 2011 data]*
Size	5%	Total assets	2.50%
		Total revenues	2.50%
Global activity	5%	Revenues derived outside home country	2.50%
		Number of countries	2.50%
Interconnectedness	40%	Intra-financial assets	5.70%
		Intra-financial liabilities	5.70%
		Reinsurance	5.70%
		Derivatives	5.70%
		Large exposure	5.70%
		Turnover	5.70%
		Level 3 assets	5.70%
Non-Traditional insurance and Non-insurance activities	45%	Non-policy holder liabilities and non-insurance revenues	6.40%
		Derivatives trading	6.40%
		Short term funding	6.40%
		Financial guarantees	6.40%
		Minimum guarantee on variable insurance products	6.40%
		Intra-group commitments	6.40%
		Liability liquidity	6.40%
Substitutability	5%	Premiums for specific business lines	5%

Source: International association of Insurance Supervisors, 2013

Table 2. Illustrative allocation of activities conducted by insurance-focused groups.
The table shows the activities conducted by a potential insurance-focused group divided into two categories, *insurance* and *non-insurance*. Within the former category they are classified from the most traditional (left side of the table) to the most non-traditional (right side of the table). In the middle are shown those activities that can be considered traditional but that are still combined with non-traditional features.

		Traditional →		←Non traditional
INSURANCE	Underwriting	• Most life and non-life (re)insurance business lines	• Life insurance and variable annuities with additional guarantee • Mortgage guarantee insurance • Trade credit insurance	• Alternative risk transfer (ART), incl.Insurance-linked securities (ILS) • Financial guarantee insurance • Finite reinsurance
	Investments and funding	• Proprietary investment function (ALM) • Hedging for ALM purposes • Funding through equity and debt issues; also securities lending	• Property and derivatives trading (non ALM) • Property management (related to investment portfolio)	• Purely synthetic investment portfolios • Cascades of repos and securities lending • Scope and scale activities beyond insurance remit
NON-INSURANCE	• CDS/CDO underwriting • Capital market business • Banking, incl. investment banking and hedge fund activities • Third-party asset management • Industrial activities			

Source: IAIS (November 2011), "Insurance and Financial Stability".

Table 3. Risk weights for the computation of the Insurance and Financial Stability (IFS) score

	Traditional	Semi-traditional	Non-traditional
INSURANCE Underwriting and supporting investment / treasury functions	2.5%/20%	12.5%/50%	22.5%/75%
NON-INSURANCE Financial activities	100%		
NON-INSURANCE Industrial activities	0%		

Source: IAIS (July 2013), Global Systemically Important Insurers: Initial Assessment Methodology.

Table 4. Sample of insurers

This list includes insurers selected according to the following criteria: a) with total assets exceeding $60 billions and whose ratio of premiums from jurisdictions outside the home jurisdiction to total premiums was 5% or more; b) with total assets greater than $200 billion; c) for which daily stock price data were publicly available and that actively traded during our estimation period. SIIs are in bold.

Insurance name	country code	Total Assets (bil. USD) as of Dec 2011
Allianz Se-Reg	*DE*	*831.348*
Axa Sa	*FR*	*946.19*
Assicurazioni Generali	*IT*	*548.282*
Aviva Plc	*UK*	*484.464*
Prudential Plc	*UK*	*423*
Ping An Insurance Group Co-H	*CN*	*362.783*
American International Group	*US*	*553.054*
Metlife Inc	*US*	*796.226*
Prudential Financial Inc	*US*	*620.244*
Amp Ltd	*AU*	*113.102*
Ageas	*BE*	*117.42*
Baloise Holding Ag - Reg	*CH*	*73.576*
Swiss Life Holding Ag-Reg	*CH*	*161.793*
Swiss Re Ag	*CH*	*225.899*
Zurich Insurance Group Ag	*CH*	*386.971*
Hannover Rueck Se	*DE*	*64.628*
Muenchener Rueckver Ag-Reg	*DE*	*320.864*
Cnp Assurances	*FR*	*416.03*
Mapfre Sa	*ES*	*71.093*
Aegon Nv	*NL*	*447.868*
Delta Lloyd Nv	*NL*	*97.022*
Ing Groep Nv-Cva	*NL*	*1.657.879*
Storebrand Asa	*NO*	*67.178*
Legal & General Group Plc	*UK*	*506.367*
Old Mutual Plc	*UK*	*251.843*
Resolution Ltd	*UK*	*194.492*
Standard Life Plc	*UK*	*248.335*
Aflac Inc	*US*	*116.237*
Ace Ltd	*US*	*87.321*
Berkshire Hathaway Inc-Cl A	*US*	*392.647*

Hartford Financial Svcs Grp	*US*	*302.609*
Lincoln National Corp	*US*	*201.491*
Unum group	*US*	*60.179*
Great-West Lifeco Inc	*CA*	*234.869*
Manulife Financial Corp	*CA*	*454.433*
Power Corp Of Canada	*CA*	*251.324*
Power Financial Corp	*CA*	*248.552*
Sun Life Financial Inc	*CA*	*214.69*
Aia Group Ltd	*CN*	*114.461*
China Life Insurance Co-H	*CN*	*251.426*
New China Life Insurance C-A	*CN*	*61.395*
Dai-Ichi Life Insurance	*JP*	*389.93*
Ms&Ad Insurance Group Holding	*JP*	*138.175*
Tokio Marine Holdings Inc	*JP*	*199.549*

Source: Bloomberg database

Table 5. Sample characteristics

This table reports summary statistics for 9 insurers selected as Global systemically important insurers by the FSB on July 2013 and for 35 publicly traded other large and internationally active insurers. Year end 2011 financial statement data are from Factset and Bloomberg. Mean test for equality is a t-test. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively

panel A: regional distribution			
	SIIs (number)	non-SIIs (number)	Total
North America	3	11	14
Europe	5	19	24
Asia	1	5	6
	9	35	44

panel B: performance measures				
	SIIs (mean)	non-SIIs (mean)	difference	t-test
size (log total assets)	11.79	11.42	0.37	*
Leverage (%)				
Total Debt/Total Capital	48.29	34.30	13.99	**
LT Debt/Total Capital	27.72	27.46	0.26	
solvency ratio	200.60	301.59	-100.99	
Business diversification				
NTNI revenues (log)	9.59	9.51	0.08	
NTNI assets (log)	10.72	11.22	-0.49	
NTNI revenues/total revenues	5.39	6.91	-1.52	
NTNI assets/total assets	12.61	24.28	-11.67	
Profitability (%)				
Loss Ratio	80.16	80.31	-0.15	
Loss & Expense Combined Ratio	94.96	115.37	-20.41	
Return on Assets	0.79	0.57	0.22	
Return on Equity	10.72	6.07	4.65	*
Valuation (x)				
Price/Earnings	14.69	44.43	-29.74	
Dividend Yield (%)	3.72	4.20	-0.48	

Table 6. Abnormal return estimates

This table reports the abnormal returns estimates at the event dates (May 31 2012; July 18 2013). ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively

		May 31 2012			July 18 2013		
Panel A G-SII							
Insurer	**Country code**	**AR(0)**	**t-stat**		**AR(0)**	**t-stat**	
Allianz Se-Reg	DE	0.0038	0.3167		-0.0072	-0.9143	
American International Group	US	0.0113	0.7861		-0.0066	-0.4936	
Assicurazioni Generali	IT	-0.0067	-0.5756		-0.0026	-0.2785	
Aviva Plc	UK	-0.0159	-1.0707		0.0037	0.2329	
Axa Sa	FR	-0.0047	-0.2800		0.0188	2.2346	**
Metlife Inc	US	-0.0114	-0.7819		0.0095	0.8517	
Ping An Insurance Group Co-H	CN	-0.0034	-0.1731		-0.0052	-0.5647	
Prudential Financial Inc	US	-0.0029	-0.2435		0.0079	0.7528	
Prudential Plc	UK	-0.0001	-0.0053		-0.0005	-0.0372	
AVERAGE		**-0.0033**	**0.6104**		**0.0020**	**0.6622**	
Panel B non G-SII							
Ace Ltd	US	0.0058	0.5309		0.0051	0.8268	
Aegon Nv	NL	-0.0078	-0.4542		0.0199	1.6081	*
Aflac Inc	US	0.0121	1.0006		-0.0029	-0.3055	
Ageas	BE	-0.0282	-1.1718		0.0102	0.9325	
Aia Group Ltd	CN	0.0081	0.4990		-0.0053	-0.5171	
Amp Ltd	AU	0.0081	0.8502		0.0116	1.1355	
Baloise Holding Ag - Reg	CH	-0.0032	-0.2465		0.0215	2.7846	***
Berkshire Hathaway Inc-Cl A	US	0.0061	0.7185		0.0013	0.2237	
China Life Insurance Co-H	CN	0.0028	0.1630		-0.0099	-0.9145	
Cnp Assurances	FR	-0.0289	-1.5277		0.0228	1.7235	*
Dai-Ichi Life Insurance	JP	0.0033	0.2242		-0.0239	-1.2799	
Delta Lloyd Nv	NL	-0.0085	-0.4768		0.0061	0.4592	
Great-West Lifeco Inc	CA	0.0036	0.3353		0.0110	1.6305	*
Hannover Rueck Se	DE	0.0046	0.3450		0.0226	2.0038	**
Hartford Financial Svcs Grp	US	-0.0036	-0.1863		-0.0044	-0.4100	
Ing Groep Nv-Cva	NL	0.0029	0.1489		0.0159	1.1625	
Legal & General Group Plc	UK	-0.0032	-0.2390		0.0040	0.5147	
Lincoln National Corp	US	0.0370	1.9441	**	0.0261	2.1693	**
Manulife Financial Corp	CA	0.0098	0.6032		0.0065	0.5627	
Mapfre Sa	ES	-0.0346	-1.9122	*	-0.0024	-0.1332	
Ms&Ad Insurance Group Holding	JP	-0.0009	-0.0711		-0.0482	-2.9088	***
Muenchener Rueckver Ag-Reg	DE	-0.0001	-0.0146		0.0108	1.2133	
New China Life Insurance C-A	CN	na	na		-0.0330	-1.1926	

Old Mutual Plc	UK	-0.0030	-0.2338		-0.0116	-1.3866	
Power Corp Of Canada	CA	-0.0027	-0.2658		0.0212	3.0491	***
Power Financial Corp	CA	-0.0103	-1.0085		0.0168	2.4856	**
Resolution Ltd	UK	-0.0225	-1.4742		0.0079	0.6012	
Standard Life Plc	UK	0.0055	0.4462		0.0054	0.4608	
Storebrand Asa	NO	0.0131	0.5299		0.0226	1.4136	
Sun Life Financial Inc	CA	0.0271	1.6345	*	0.0061	0.5389	
Swiss Life Holding Ag-Reg	CH	0.0035	0.2108		0.0132	1.0412	
Swiss Re Ag	CH	0.0299	2.4704	***	0.0210	1.9434	**
Tokio Marine Holdings Inc	JP	-0.0022	-0.1765		-0.0402	-2.6907	***
Unum Group	US	0.0065	0.5786		0.0086	1.1134	
Zurich Insurance Group Ag	CH	0.0051	0.5000		0.0057	0.6941	
AVERAGE		**0.0010**	**0.8460**		**0.0041**	**0.2086**	

Table 7. Market reaction around the two events

This table reports the mean absolute abnormal returns over the event windows and their statistical significance using the rank test and the BW (1985) and Ahern (2009) tests and considering the whole sample of insurers and different sets of insurers for each of the two events. The G-SIIs are those insurers that were ultimately designated as systemically important. Non G-SIIs are the remaining large insurers that were ultimately deemed not to be systemically important. Europe, North America, and Asia insurers are intermediaries with headquarters in Europe, the US, or ASIA, respectively. For all events, the abnormal returns are calculated around a five-day window (-2, 0, +2) or a three-day window (0, +2), where 0 is the event day.

Pre- release date (May 31 2012)		Mean AR (%)		Brown and Warner test (p-value)		Ahern test (p-value)		Rank test (p-value)		Rank test on abs. val. (p-value)	
	n. obs	[-2, +1]	[0, +1]	[-2, +1]	[0, +1]	[-2, +1]	[0, +1]	[-2, +1]	[0, +1]	[-2, +1]	[0, +1]
Full sample	43	-1.44	-0.43	0.5935	0.9940	0.1558	0.6133	0.1358	0.6312	0.2992	0.3100
G-SIIs	09	-0.89	-0.37	0.4956	0.6928	0.4663	0.7882	0.4998	0.8318	0.4836	0.4849
Non G-SIIs	34	-1.56	-0.44	0.1446	0.5576	0.0630	0.5889	0.0925	0.5890	0.2158	0.2366
Europe	22	-1.82	-0.38	0.2487	0.7330	0.2725	0.8812	0.2725	0.8901	0.2729	0.3641
North America	14	-1.34	-0.96	0.3021	0.2948	0.2719	0.2428	0.3947	0.4236	0.3357	0.0671
Asia*	7	-0.32	0.50	0.7948	0.5702	0.5386	0.5220	0.5012	0.4643	0.4795	0.1658

Release date July 18 2013)		Mean AR (%)		Brown and Warner test (p-value)		Ahern test (p-value)		Rank test (p-value)		Rank test on abs. val. (p-value)	
	n. obs	[-2, +2]	[0, +2]	[-2, +2]	[0, +2]	[-2, +2]	[0, +2]	[-2, +2]	[0, +2]	[-2, +2]	[0, +2]
Full sample	44	-0.38	0.18	0.584	0.7436	0.7590	0.5538	0.7836	0.5503	0.2826	0.4959
G-SIIs	09	-0.33	0.07	0.7425	0.9265	0.6771	0.8933	0.6855	0.8853	0.1530	0.2068
Non G-SIIs	35	-0.39	0.20	0.5929	0.7176	0.4144	0.4996	0.8178	0.5148	0.4155	0.3626
Europe	22	0.06	0.82	0.9506	0.3078	0.9016	0.3005	0.9755	0.3437	0.2136	0.2164
North America	14	-0.34	0.20	0.7322	0.7924	0.7879	0.7381	0.6892	0.7996	0.2985	0.1841
Asia	8	-1.65	-1.64	0.2936	0.1771	0.3928	0.2097	0.4224	0.2125	0.4739	0.1138

* in 2012 one Asian insurer is missing since it was not yet listed

Table 8. Regression results

This table presents the results from an OLS regression where the abnormal and cumulative returns registered by our sample insurers around the two event dates are the dependent variables while solvency ratio, the ratio of NTNI revenues over total revenues are the dependent variables pulis size and profitability ratios

a) May 31 2012

	AR(0)				CAR [-2, +1]				CAR [0, +1]			
Regressor	[1]		[2]		[1]		[2]		[1]		[2]	
	coefficient	p-value	coefficient	p-value	coefficient	p-value	coefficient	p-value	coefficient	p-value	coefficient	p-value
intercept	0.0010366	0.665	0.138043	0.489	-0.0155673	0.000	-0.0489556	0.801	-0.0044245	0.204	-0.0586282	0.796
G-SIIs	-0.0043692	0.406	-0.0005504	0.934	0.0066522	0.46	0.0100207	0.449	0.0007701	0.919	0.0114453	0.459
NTNI activities			0.0000956	0.66			0.0006184	0.163			0.0004136	0.41
Solvency ratio			-5.08E-06	0.804			-2.24E-06	0.955			2.97E-05	0.53
Roe			0.0000806	0.902			-0.0013173	0.313			-0.0017215	0.262
Roa			0.0072148	0.375			0.0310428	0.067			0.0075356	0.681
Log of size			-0.0031672	0.418			0.0010013	0.894			0.0019663	0.824
N	43		18		43		18		43		18	
R-squared	0.0169		0.2335		0.0134		0.4768		0.0003		0.1986	
F-test	0.71		0.56		0.56		1.67		0.9185		0.45	

a) July 18 2013

	AR(0)				CAR [-2, +2]				CAR [0, +2]			
Regressor	[1]		[2]		[1]		[2]		[1]		[2]	
	coefficient	p-value	coefficient	p-value	coefficient	p-value	coefficient	p-value	coefficient	p-value	coefficient	p-value
intercept	0.0040604	0.153	0.0162177	0.907	-0.0038605	0.214	0.0124188	0.07	0.0020229	0.495	-0.0052719	0.982
G-SIIs	-0.0020756	0.738	-0.0124788	0.199	0.0005231	0.939	-0.0047713	0.716	-0.0012965	0.843	-0.0131482	0.402
NTNI activities			-0.0003233	0.298			-0.0000339	0.936			-0.0002285	0.649
Solvency ratio			-7.40E-05	0.023			7.99E-07	0.984			-5.54E-05	0.257
Roe			0.0004972	0.588			0.0002161	0.866			0.0002408	0.873
Roa			-0.0065988	0.929			0.0008503	0.957			0.0008586	0.963
Log of size			0.0004803	0.929			-0.0004598	0.952			0.0010588	0.905
N	44		18		43		18		43		18	
R-squared	0.0027		0.4912		0.0001		0.0243		0.0009		0.1484	
F-test	0.11		1.77		0.01		0.05		0.04		0.32	