



Systemic risk of insurers around the globe [☆]

Christopher Bierth ¹, Felix Irresberger ¹, Gregor N.F. Weiß ^{*}

Technische Universität Dortmund, Otto-Hahn-Str. 6, D-44227 Dortmund, Germany



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ABSTRACT

We study the exposure and contribution of 253 international life and non-life insurers to systemic risk between 2000 and 2012. For our full sample period, we find systemic risk in the international insurance sector to be small. In contrast, the contribution of insurers to the fragility of the financial system peaked during the recent financial crisis. In our panel regressions, we find the interconnectedness of large insurers with the insurance sector to be a significant driver of the insurers' exposure to systemic risk. In contrast, the contribution of insurers to systemic risk appears to be primarily driven by the insurers' leverage.

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"SIFIs are financial institutions whose distress or disorderly failure, because of their size, complexity and systemic interconnectedness, would cause significant disruption to the wider financial system and economic activity."

[Financial Stability Board, 11/04/2011]

1. Introduction

At the climax of the financial crisis of 2007–2009, American International Group (AIG) became the first example of an insurance company that required (and received) a bailout due to it being regarded as systemically important. Not only did AIG's near-collapse come to the surprise of most economists who considered systemic risk to be confined to the banking sector, but it also spurred a realignment of insurance regulation towards a macroprudential supervision of so-called Global Systemically Important Insurers

(G-SIIs). As a consequence, the Financial Stability Board (FSB) together with the International Association of Insurance Supervisors (IAIS) recently published a list of nine G-SIIs which will ultimately face higher capital and loss absorbency requirements. In their methodology, insurers are deemed to be of systemic relevance to the global financial sector, if they are of such size and global interconnectedness that their default would cause severe disruptions in the financial sector and subsequently the real economy.

However, the (heavily criticized)² methodology proposed by the IAIS has only undergone limited empirical scrutiny so far. Most importantly, the relation between the interconnectedness and systemic risk of insurers has not been analyzed before. In this paper, we intend to fill this gap in the literature by investigating whether the interconnectedness of insurers with the global financial sector in addition to their size increased the insurers' individual contribution to systemic risk. As the main result of our analysis of a panel of global insurers from 2000 to 2012, we find that interconnectedness only increases the systemic vulnerability of large life and non-life insurers. In contrast, the impact of an insurer's interconnectedness on its contribution to systemic risk is much less clear.

Economists have long neglected the potential of the insurance sector to destabilize the whole financial system. In contrast to

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^{*} Corresponding author. Tel.: +49 231 755 4608.

E-mail addresses: christopher.bierth@tu-dortmund.de (C. Bierth), felix.irresberger@tu-dortmund.de (F. Irresberger), gregor.weiss@tu-dortmund.de (G.N.F. Weiß).

¹ Tel.: +49 231 755 8212.

² For example, the Secretary General of the Geneva Association, John Fitzpatrick, criticized the IAIS indicators for penalizing risk diversification.

banks, insurers are not subject to depositor runs and thus do not face the risk of a sudden liquidity drain,³ hold more capital (see Harrington, 2009) and are less interconnected horizontally with the rest of the financial sector. However, the case of American International Group (AIG) showed that insurers can become systemically important nonetheless if they engage too heavily in business activities outside the traditional insurance sector. As a consequence, the Financial Stability Board urged the IAIS to identify G-SIIs that could potentially destabilize the global financial sector and to implement new regulation for these insurers. Building on the experiences made during the AIG case, the IAIS (2012) recently published a proposal for a methodology for identifying G-SIIs that cites non-core and non-insurance activities, insurer size and interconnectedness as the major drivers of systemic risk in the insurance industry.

Both the question whether insurers can actually become systemically important and the question whether the IAIS's proposed methodology is suitable for identifying G-SIIs remain relatively unanswered in the literature. Early treatments of the topic of systemic risk in insurance include the works by Acharya et al. (2009), Harrington (2009) and Cummins and Weiss (2014).⁴ In the latter, it is hypothesized that non-core activities and high degrees of interconnectedness are the primary causes of insurers' systemic relevance. The interconnectedness of insurers is also empirically analyzed by Billio et al. (2012) who argue that illiquid assets of insurers could create systemic risks in times of financial crisis. In a related study, Baluch et al. (2011) conclude that systemic risks exist in the insurance sector even though they are smaller than in banking. More importantly, systemic risk in insurance appears to have grown partly as a consequence to the increasing interconnectedness of insurers and their activities outside the traditional insurance business. Chen et al. (2014) put a special emphasis on the insurance sector but find in their analysis of credit default swap and intraday stock price data that the insurance sector is exposed but does not contribute to systemic risks in the banking sector. While the former two studies are only concerned with the interconnectedness of banks and insurers, Weiss and Mühlhnickel (2014) also study the impact of size, leverage and other idiosyncratic characteristics included in the IAIS methodology on the systemic risk exposure and contribution of U.S. insurers during the financial crisis.⁵ Most importantly, they find that insurer size seems to have been a major driver of the systemic risk exposure and contribution of U.S. insurers. Several of the IAIS indicators (like, e.g., geographical diversification), however, do not appear to be significantly related to the systemic risk of insurers. Finally, Weiss and Mühlhnickel (2015) support the too-big-to-fail conjecture for insurers by showing that insurer mergers tend to increase the systemic risk of the acquiring insurers.

We complement the existing empirical literature on systemic risk in insurance by performing the first panel regression analysis of the systemic risk exposure and contribution of international insurers. In particular, we test hypotheses that size and interconnectedness could drive the systemic importance of international insurers. To measure an insurer's exposure and contribution to the fragility of the financial sector, we follow Anginer et al. (2014b), Anginer et al. (2014a) and Weiss and Mühlhnickel (2015), Weiss and Mühlhnickel (2014) and employ the Marginal Expected

Shortfall (MES) of Acharya et al. (2010) and ΔCoVaR methodology of Adrian and Brunnermeier (2014), respectively. We then estimate these measures for a sample of 253 international life and non-life insurers for the period from 2000 to 2012 and perform panel regressions of the quarterly MES and ΔCoVaR estimates. As independent variables, we use insurer-specific and macroeconomic variables that have been discussed in the literature as potential drivers of systemic risk. Most importantly, we employ the measure of interconnectedness proposed by Billio et al. (2012) which is based on a principal component analysis of the stock returns of financial institutions.⁶

Based on a sample of 253 life and non-life insurers, we find systemic risk in the international insurance sector to be small in comparison to previous findings in the literature for banks. However, confirming the results of Baluch et al. (2011), we find a strong upward trend in both the exposure and contribution of insurers to the fragility of the global financial system during the financial crisis. In our panel regressions, we find the interconnectedness of large insurers with the financial sector to be a significant driver of the insurers' exposure to systemic risk. In contrast, the contribution of insurers to systemic risk appears to be primarily driven by the insurers' size and leverage.

The remainder of this article is structured as follows. Section 2 introduces the data and the methodology used in our empirical study. Section 3 presents the results of our investigation into the determinants of systemic risk in the insurance industry. Concluding remarks are given in Section 4.

2. Data

This section describes the construction of our sample and presents the choice of our main independent variables as well as descriptive statistics of our data.

2.1. Sample construction

We construct our data sample by first selecting all publicly listed international insurers from the dead and active firm lists in *Thomson Reuters Financial Datastream*. For reasons of relevance, we concentrate on insurance firms with total assets in excess of \$ 1 billion at the end of 2000. We then omit all firms for which stock price data are unavailable in *Datastream*. Next, we exclude all secondary listings and nonprimary issues from our sample. Further, we exclude Berkshire Hathaway which is listed as an insurance company in *Datastream* due to its unusually high stock price. Balance-sheet and income statement data are retrieved from the *Thomson Worldscope* database and all stock market and accounting data are collected in U.S. dollars to minimize a possible bias in our results stemming from currency risk.

Finally, we split our data sample into life and non-life insurers. The definition of life and non-life insurance companies in the company lists of *Datastream* is somewhat fuzzy.⁷ Therefore, the industry classification of *Datastream* is cross-checked with the firms' SIC code (Worldscope data item WC07021, SIC codes 6311, 6321, 6331) and the Industry Classification Benchmark (ICB) code (Worldscope data item WC07040, ICB supersector 8500) to exclude firms which cannot be clearly classified as life or non-life insurance companies.⁸ Additionally, all company names are manually screened for words suggesting a non-insurance nature of the companies' business and

³ Although one could possibly think of an "insurer run" on life insurance policies, this possibility appears to be highly unlikely as insurance customers are often protected by guarantees and as canceling a long-term life insurance policy often implies the realization of severe losses. Consequently, there exists no example of a default of an insurer in the past that caused significant contagion effects (see, e.g., Eling and Pankoke, 2012).

⁴ Other analyses of systemic risk in insurance include the works of Eling and Schmeiser (2010), Lehmann and Hofmann (2010) and van Lelyveld et al. (2011).

⁵ In a related study, Cummins and Weiss (2013) analyze the characteristics of U.S. insurers that are systemically important based on the insurers' SRISK (see Acharya et al., 2012).

⁶ Other potential measures of the interconnectedness of financial institutions include the measures proposed by Billio et al. (2012) and Chen et al. (2014) which are both based on Granger causality tests.

⁷ For example, several medical service plans and medical wholesale companies are listed as life insurance companies in *Datastream's* company lists.

⁸ Consequently, HMO, managed care and title insurance companies are not included in the final sample.

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