# PRACE NAUKOWE
Uniwersytetu Ekonomicznego we Wrocławiu

# RESEARCH PAPERS
of Wrocław University of Economics

Nr 342


## Ubezpieczenia wobec wyzwań XXI wieku


Redaktor naukowy
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Wydawnictwo Uniwersytetu Ekonomicznego we Wrocławiu
Wrocław 2014

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Projekt okładki: Beata Dębska

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Wrocław 2014

**ISSN 1899-3192**
**ISBN 978-83-7695-461-5**

Wersja pierwotna: publikacja drukowana

Druk i oprawa:
EXPOL, P. Rybiński, J. Dąbek, sp.j.
ul. Brzeska 4, 87-800 Włocławek

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RESEARCH PAPERS OF WROCŁAW UNIVERSITY OF ECONOMICS nr 342 • 2014

Ubezpieczenia wobec wyzwań XXI wieku ISSN 1899-3192

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# THE SYSTEMIC RELEVANCE OF THE REINSURANCE INDUSTRY

**Summary:** The paper aims to carry out the analysis of reinsurers' activity in the context of systemic risk. The main purpose of the work is the attempt to answer the question whether the failure of reinsurance companies may create financial instability and systemic risk, which could cause a spillover effect into the whole economy. This article contains the analysis of theoretical and empirical research of the papers and other reports. It also tries to prove that traditional reinsurance activity does not pose systematic risk. However, non-traditional activities of a reinsurance company, non-insurance activity of reinsurers, capital connectedness within insurance groups and financial conglomerates considerably increase the likelihood of posing systemic risk through these institutions.

**Keywords:** reinsurance, systemic risk, financial instability.

DOI: 10.15611/pn.2014.342.02

## 1. Introduction

Global financial crisis attracts attention of the scientific community and systemic risk in the financial services sector has been widely discussed. In this context most attention was focused on the banking sector, yet the research on systemic risk was intensified also in the insurance sector. The reinsurance market, which is an integral part of the insurance market, is often compared with the interbank market. Therefore, a question may be posed, whether the failure of reinsurance companies may create financial instability within the broader insurance sector, which could cause a spillover effect into the whole economy. The main purpose of this analysis is to provide the answer to the question whether reinsurers could cause systemic risk?

This paper is largely a descriptive analysis which presents the study of literature as well as the study of empirical results. There were also quoted the results of selected empirical analysis and conducted out simulations. This paper attempts to show that traditional activities of reinsurers do not pose systemic risk. A reinsurer engaged in de-

rivatives and non-insurance activities could make the insurer vulnerable and be a potential cause of systemic risk. One of the lessons which we have learned from the financial crisis is that the systemic relevance of insurance groups is correlated with the influence of activities outside of the traditional insurance business field.

## 2. The business model of reinsurance

Reinsurance is an integral part of the traditional insurance activity. Reinsurers offer the special type of insurance, dedicated to the primary insurer (or cedant) and it has the effect of redistribution of risks within the insurance sector. Reinsurance plays a particularly important role in the financial economy of primary insurers. Reinsurers absorb losses and protect primary insurers from financial consequences of disastrous damages and in this manner minimize the excessive variability of their financial results. Transferring a part of insurance risk onto reinsurers extends the insurance capacity of cedants. Reinsurance appears to be especially important for small and medium insurers − they get the chance to function on the increasingly competitive market. It is worth noting that reinsurance goes far beyond pure transfer of insurance risk: reinsurers often offer additional services, e.g. transfer of knowledge, assistance in managing the market, financial counseling.

The business model realized by reinsurers basically coincides with the business model of insurers. Reinsurers use a similar approach to managing the assets and liabilities, they apply similar insurance techniques and market analysis models, and run accountancy following similar principles. One key difference in the business model is that reinsurers provide services to professionals only. It is a business-to-business or wholesale relationship, which may impact the behaviour. The fact that primary insurance and reinsurance are businesses with a high degree of similarities means that supervision is also aligned. Whereas in the past it was often argued that the sophistication of the counterparties in reinsurance transactions exerted a certain degree of self-regulation which did not require supervision, today's approach treats the two businesses as essentially the same for regulatory and supervisory purposes [*Reinsurance*... 2012, p. 6].

## 3. Reinsurance activity and systemic risk

One of the most common definitions of systemic risk is the definition provided by Financial Stability Board (FSB) where systemic risk refers to the risk of disruption to financial services that is caused by an impairment of all or parts of the financial system and has the potential to have serious negative consequences for the real economy [*Guidance*... 2009, p. 10]. The notion that crisis or failures of financial intermediaries, markets, or infrastructure must have an impact on the real economy is crucial for this definition. Systemic risk is conceptually distinct. The classic risk categories − market risk, credit risk, and liquidity risk − do not, in themselves, con-

stitute systemic risk as long as they affect only one or a few companies. The situation changes, however, when these risks have an impact on most market participants or set off a chain reaction. In the case of contagion risk the disruption of the financial system is caused by the activities of a small group of market participants or submarkets and is spread via contagion throughout the whole economy. This can happen in the following ways: "decrease in asset prices caused by sales of a few institutions which forces other market participants to sell assets as well; bankruptcy of institutions, which triggers insolvencies of other companies due to unfulfilled commitments, investor uncertainty, due to the distress of one company combined with non-transparency as to whether other companies are experiencing the same problem, irrationality, and contracts based on credit rating" [Harrington 2009, p. 2].

Reinsurers are often believed to be contributing to systemic risk in insurance. The reinsurance market is often compared to the interbanking market. For the same reasons it may be viewed as the source of financial contagion [Monkiewicz 2012, p. 58]. To resolve the dispute whether the reinsurance sector poses systemic risk one may be helped by the analysis of reinsurers' activity run according to the traditional business activities, and non-traditional business activities [*Insurance*... 2011, p. 13]. The degree of innovation determines whether the activity belongs to the traditional or non-traditional insurance business. This classification is not always clear cut but, in general, we consider an activity to be traditional when its accompanying risks are mostly idiosyncratic, not correlated with each other, and not influenced by economic business cycles. These salient features set (re)insurers apart from other institutions in the financial sector [*Reinsurance*... 2012, p. 12].

Traditional activities include underwriting life, health, property, accident, liability, as well as the transfer of risk via reinsurance. A number of results of research and empirical analysis published in the theoretical and empirical research papers (about 30) prove that traditional activity of insurers does not pose systemic risk [see inter alia: Harrington 2009; Radice 2010; *Systemic*... 2010; *Position*... 2010; *Key Financial*... 2010; Cummins, Weiss 2011; Klein 2011; Grace 2011; *Insurance*... 2012; Chen et. al. 2012] or it is able to generate it at a very low level [*Regulating*... 2011]. Reinsurance does not pose systemic risk [Baur, Enz, Zanetti 2003; Lelyveld, Liedorp, Kampman 2009; Park, Xie 2011; *Reinsurance*... 2012].

Low capacity of insurers and reinsurers to generate systemic risk finds the following grounds. Firstly, the reinsurance sector is relatively a small one if compared with the insurance sector, especially with the banking sector. By assets in 2010, the ten largest reinsurers in the world (Munich Re, Swiss Re, Berkshire, Hannower Re, Lloyds, Scor, RGA, Partner Re, Transatlantic, Everest Re) are smaller than the one top primary insurer (Axa), and by market capitalization the whole reinsurance sector equals the two top primary insurers (Axa and Allianz) [*Insurance*... 2011, p. 21]. It has to be pointed out that in 2010 the average bank was as many as 3.9 times larger than an average insurer, while the assets of the biggest insurer equaled the assets of the bank which was ranked twenty -second among the twenty-eight biggest

banks from the list *Global-Systemically Important Banks* (G-SIBs) [*Cross Industry*... 2012, pp. 4-5]. Taking into consideration the criterion of size it should be concluded that reinsurers do not belong to the financial institutions "too big to fail", therefore, they should not generate a systemic risk.

Secondly, the relationship between cedants and reinsurers undoubtedly introduces a certain degree of interconnectedness to the insurance industry. Primary insurers may engage in reinsurance activities, just as a number of reinsurers maintain a primary insurance portfolio. Reinsurers purchase insurance from retrocessionnaires where at times the counterparties may be other reinsurers, or even primary insurers. However, the data testify to the fact that the degree of interconnectivity between reinsurers and retrocessionnaires is still comparatively small. Global premium volumes in reinsurance accounted for only 2% of premium from life insurance and 9% of premium from non-life insurance, while global premium volumes in retrocession was 8% and 14% respectively [*Reinsurance*... 2012, p. 9]. It proves that only a small part of insurance risk, is transferred to reinsurance and a much larger part puts a burden onto primary insurers.

Thirdly, in general, the insurance market does not contain the feedback mechanisms that would make it fully interconnected and therefore prone to potentially systemic events akin to the systemic events observed in the interbank market and recently seen between banks and shadow banks. "The dominant connections between reinsurers and primary insurers are vertical. The few existing horizontal connections between reinsurers are weak and most likely immaterial. In general, there are no horizontal connections between primary insurers. Structure of the insurance market is essentially hierarchical and that the potential for systemic events to develop within such a structure is limited. The absence of feedback loops implies that the likelihood of potentially non-linear systemic reactions is small. This is another proof that the (re)insurance market has built-in circuit breakers. To be sure, the failure of one reinsurer would adversely impact its cedants. But the failure of one reinsurer does not necessarily cascade through the market and cause the failure of other reinsurers or retrocessionaires" [*Reinsurance*... 2012, p. 9-10].

Moreover, insurance companies and their products can be substituted by other market participants, for example, by catastrophe bonds due to low market entry barriers. Also, insurance coverage can be created within a certain industry in the form of self-insurance cooperatives between companies. Thus, the possibility of the temporary absence of insurance companies and/or their products cannot be a cause of systemic risk [Eling, Pankoke 2012, p. 13-14]. Previous studies argue that "reinsurers pose a low systemic risk because of the very low default probability of major reinsurance companies. For example, Swiss Re (2003) identifies 24 reinsurer bankruptcies during the 1980-2002 period, and none of them involved major reinsurance companies. Due to the limited number of bankruptcies and the relatively small size of bankrupt reinsurers, counterparty credit risks regarding reinsurance companies were considered to be insignificant" [Park, Xie 2011, p. 7]. Finally, reinsurers' bankruptcies

were rarely factors of disturbances in the insurance sector. As it is proved by chronological events, the main reasons for insurers' bankruptcies were rather due to faulty managing of insurance risk and finances (the lack of appropriate technical and insurance reserves) than due to reinsurers' bankruptcies. "In the US non-life insurance industry over a 40-year period, only 3.7% of impairments in primary non-life insurers were caused by reinsurance failures" [*Reinsurance...* 2012, p. 11].

The conclusion that reinsurers do not pose systematic risk may also be drawn on the base of the results of empirical analyses [e.g. Lelyveld, Liedorp, Kampman 2009]. They assessed the impact of direct contagion that is the loss of (part of) reinsurance claims on the stability of the insurance market. They did not find evidence that the reinsurance contributes to the spread of systemic risk directly. "Even when the complete reinsurance sector collapses just a limited number of insurance companies fail, representing a negligible part of the insurance sector. In addition, no contagion effects occur as only primary insurers with direct linkages to the failed reinsurance company fail. The insurance sector as a whole seems resilient to reinsurance failures" [Lelyveld, Liedorp, Kampman 2009, p. 27].

Other empirical study analyzes the interconnectedness between reinsurers and US property-casualty insurers [Park, Xie 2011]. This paper presents the first detailed examination on the likely impact of major global reinsurer insolvency on the US property-casualty insurance industry in order to illustrate the potential systemic risk caused by the interconnectedness of the insurance sector through reinsurance. "They find that the likelihood of a primary insurer's downgrade increases with its reinsurance default risk exposure from downgraded reinsurers. Counterparty primary insurers' stocks also react negatively to their reinsurers' downgrades. The negative effects also spill over to insurers that are not directly exposed to the credit risk of downgraded reinsurers. Despite the close interconnectedness, worst case scenario analyses show that the likelihood of systemic risk caused by reinsurance transactions is relatively small for the US property-casualty insurance industry" [Park, Xie 2011, p.1]. The outcome of a one scenario in which there were assumed bankruptcies of the biggest world reinsurers is shown in Table 1.

Insuring such events presents the possibility of loss transmission, if only because the same event is often covered by several insurers, and often reinsured. However, to be systemically relevant, the losses must be high in relation to the financial resources of the insurance industry. Carried out stress tests also show that reinsurance sector does not pose systemic risk as reinsurance companies hold enough equity able to cover financial consequences of even the biggest catastrophes, without any significant long-term downgrading of their solvency. At the end of 2010, the capital of global reinsurers accounted for about USD 440 bn, equivalent to a solvency ratio of more than 250%. According to the simulation, for the solvency ratio to drop to 100%, it would require an aggregate reinsurance industry loss of more than USD 260 bn, equivalent to economic losses of USD 2,000 bn. For

comparison, the economic losses from Hurricane Katrina were about USD 125 bn and that all great world-wide natural catastrophes that have occurred in the 60 years between 1950 and 2010 amounted to USD 2,100 bn (in 2010 dollars) [*Insurance...* 2011, p. 28]. Assessing systemic relevance of insurers, it should be noted that although catastrophic events can sometimes entail extremely large losses, they are typically small in comparison to the failure of the major bank. Even the losses of USD 73 bn associated with Hurricane Katrina − that were spread over several insurers and reinsurers − were less than Lehman Brothers' outstanding debt (USD 155 bn) when it filed for bankruptcy [*Systemic Risk...* 2010, p. 42]. It is worth noting that in 2008 due to the shock coming from the financial system the assets of the ten biggest reinsurers fell almost by 20%. It was a bigger challenge for the reinsurance sector than the losses connected with reinsurance of the even biggest natural catastrophes.

**Table 1.** Scenario analysis: number of hypothetically insolvent insurers

| | 100% Loss | | 50% Loss | | 30% Loss | | 10% Loss | |
|---|---|---|---|---|---|---|---|---|
| | * | ** | * | ** | * | ** | * | ** |
| Munich Re | 17 | 20 | 8 | 8 | 5 | 5 | 2 | 2 |
| Swiss Re | 25 | 28 | 17 | 19 | 6 | 7 | 1 | 1 |
| Berkshire Hathaway | 17 | 22 | 7 | 8 | 5 | 6 | 2 | 3 |
| All three | 57 | 98 | 29 | 31 | 18 | 19 | 6 | 7 |
| All-unaffiliated | 290 | 451 | 170 | 205 | 101 | 115 | 33 | 34 |

* Direct Effect
** Chain Effect; Total number of insurers is 2,492.

Source: [Park, Xie 2011]

The analyses and modeling which lead to the conclusion that systemic risk is posed by bankruptcies of the biggest reinsurers, is relatively small and should not trigger any serious disturbances in the functioning of the insurance market, were conducted on the assumption of the lack of reinsurance spiral. Cummins and Weiss were among the first to point at the risk of spiral as the potential source of systemic risk [Cummins, Weiss 2011]. What is important, since 1980 the supervision over the reinsurance market has newly introduced more transparent rules of disclosing information, which should effectively diminish the reinsurance spiral risk in the future [*Reinsurance...* 2012, p. 18].

On the other hand, non-traditional activity of insurers and reinsurers considerably changes the profile of their risk. The convergence of financial market segments (banking, insurance and capital) and the demand for insurance of catastrophe risk (hurricanes, typhoons, earthquakes) as well as terroristic risk give rise to the development of methods of alternative risk transfer (Alternative Risk Transfer – ART). Among them there are products of insurance-linked securities − (ILS), e.g. cat bonds or contracts Industry Loss Warranties − ILW). They constitute the alternative for retrocession and traditional reinsurance, as through them reinsurers and primary

insurers are able to make transfer of insurance risk onto the capital market. It is noteworthy that the insurance securitization market, although developing, is still extremely small. In the years 2008-2011 the value of newly issued catastrophe bonds fluctuated about USD 4 bn which accounted for about 1% of total securitization transactions. One may believe that this marginal ILS market should not trigger any systemic failures. And as it is also expected to develop, it should be carefully monitored by financial supervision bodies not to create systemic problems in the future.

Reinsurers more often than insurers tend to exceed the borders of traditional reinsurance activity. One such an example and a possible source of posing systemic risk by insurers and reinsurers is their activity in the area of derivatives transactions, including Credit Default Swaps − (CDS). According to the IAIS classification these operations are viewed as non-insurance and they bear a high risk of liquidity, credit risk and market risk (the risk of interest rate and the risk of stock market). It should be indicated, however, that the involvement of reinsurers into the derivatives trade is relatively small. Banks and hedging funds are far more active on the CDS market than insurance and reinsurance companies. Over the last seven years, reinsurers have continuously reduced the notional amount of CDS protection sold from a high of USD 20,3 bn in 2003 to a low of USD 4 bn in 2010. At the same time they increased the amount of protection bought from a low of USD 1,2 bn in 2006 to USD 4 bn in 2010 [*Reinsurance*... 2012, p. 30]. Because of credit risk the issue of affiliated insurance requires strict monitoring by supervision bodies.

Systemic problems may also arise from capital connections within insurance groups operating at an international scale. In 2009 thirty-seven insurers were included into the 500 biggest world corporations in terms of revenues, including the three biggest reinsurers Munich Re, Swiss Re and Berkshire Hathaway. It turned out that all the classified insurance companies are capital groups where the insurance activity is prevailing [Gołąb 2012, pp. 104-106]. In large capital groups systemic risk is particularly essential as the failure of one entity in the group may bring about the knock-off effect, which in the case of big international groups increases the instability of the financial system.

Therefore, International Association of Insurance Supervisors (IAIS) which is participating in a global initiative, under the purview of the FSB and G20, based on international cooperation and exchange of information between the regulators of the financial market, was obliged to identify global systemically important insurance institution (G-SIIs). The methodology of IAIS takes into account key differences in the nature of banking activity and evaluates separately a traditional business model of insurance and reinsurance as well as the model of quasi-banking activity run by insurers within groups and financial conglomerates. In the IAIS method in the context of generating systemic risk special emphasis was put on non-traditional and non-insurance activity within insurance groups, which was attributed the biggest weights of risk from 40% to 50% likewise mutual connectedness within the financial system − from 30% to 40% [*Global Systemically*... 2012, p. 19].

## 4. Conclusions

On the one hand, reinsurance is an integral part of the insurance market. The reinsurance market is characterized by the hierarchical structure. The dominant connections between reinsurers and primary insurers are vertical, the few existing horizontal connections are weak. No horizontal connections between reinsurers and primary insurers make that the potential for systemic events to develop within such a structure is limited. Several studies show that the reinsurance does not pose systemic risk. The reinsurance sector is not able to generate systemic shock which could be strong enough to have significantly adverse impact on the whole financial system as well as on the real economy.

On the other hand, one of the lessons of the financial crisis suggests that insurance and reinsurance groups as well as financial conglomerates are deeply involved in non-insurance activity (quasi-banking), and they may pose systemic risk. Therefore, the regulators and insurance supervision should monitor in a much better way both the pace of financial innovation and the changes in the business models of insurers and reinsurers. They are also expected to extend regulations referred to especially non-insurance activities which are much more hazardous in terms of financial stability than traditional insurance and reinsurance activity.

It should be noted that FSB admitted insurers into G-SIFIs, mainly because of their capital interconnectedness and involvement in related operations. Also according to IAIS the biggest predispositions to create or increase systemic risk lie in non-traditional insurance and non-insurance activities, conducted within the insurance groups as well as the range and depth of interconnectedness with other elements of the financial system. These are the areas, which create strong reliance between insurance (reinsurance) sector, banks and capital markets.

The results of this paper should contribute to better understanding of systemic risk in the (re)insurance sector and also encourage more research in this field. Of course the considerations presented in this work do not analyzed the problem in full, thus, further analytical study seems to be essential.

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## SYSTEMOWE ZNACZENIE SEKTORA REASEKURACYJNEGO

**Streszczenie:** Opracowanie dotyczy analizy działalności reasekuratorów w kontekście ryzyka systemowego. Na podstawie studiów dostępnej literatury przedmiotu, głównie raportów i innych opracowań naukowych, a także wyników wybranych analiz empirycznych i symulacji starano się odpowiedzieć na pytania: czy rynek reasekuracyjny, podobnie jak rynek międzybankowy, może być znaczącym źródłem niestabilności systemowej. Czy wstrząsy wywołane kłopotami finansowymi lub upadłością reasekuratorów mogą przenosić się na rynek ubezpieczeń i wywoływać negatywne skutki finansowe w całym systemie finansowym, a potem i w sferze realnej gospodarki? W opracowaniu starano się wykazać, że tradycyjna działalność reasekuracyjna nie ma potencjału do kreowania ryzyka systemowego, gdyż dominująca hierarchiczna struktura powiązań wzajemnych tłumi potencjalny efekt przenoszenia szoków i wstrząsów systemowych w sektorze ubezpieczeniowym i reasekuracyjnym.

**Słowa kluczowe:** reasekuracja, ryzyko systemowe, niestabilność finansowa.