Interconnectedness of European Insurers and Cat Shocks Contagion Effects

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- The **evolution of interconnectedness** of European insurers between themselves, as well as with other non-financial firms
- **Stock return movements** around the costliest catastrophic events (hurricanes)

02 Objectives

- To capture systemic relevance of European insurers
- To capture behavior of stock returns around important crisis periods, such as the global financial crisis, the European debt crisis, and Covid-19 pandemic
- To test the relevance of traditional insurance activities in instigating potential contagion shocks

03 Data and Methodology

- Daily stock return correlations of the largest 30 insurers and largest 30 non-financial firms headquartered in Europe (2000-2021)
- Event study

04 Analysis

- Correlations estimated on quarterly, yearly and other sub-period basis
- Analysis of cumulative abnormal returns (CARs) around the costliest hurricanes for the defined portfolios and event windows

05 Conclusions

- Trends in interconnectedness levels
- (De)stabilizing effects of catastrophic events on European insurers and non-financial firms

Introduction

- One of the underlying assumptions for the defined weights in the calculation of the GSII score is that **traditional insurance activities could not trigger** a systemic reaction due to risk diversification benefits related to the greater size

- Strong **regional clusters of return and volatility connectedness which primarily stems from US and European GSIBs and GSIIs**

What has been done

Is insurance industry interconnected?

- Highly interconnected between themselves within insurance network as well as with other financial institutions in the global financial sector
- The insurance sector is a major source of systemic risk driven by the non-traditional activities of insurers
- The insurance sector contributes less or none to the systemic risk, only limited to GSIIs

Is insurance industry interconnected with non-financial firms?

- Jourde (2022) provides extensive global analysis of long-term connectedness of insurance sector

Can catastrophic events destabilize insurance industry?

- The cat risk literature provides evidence of significant (systemic and non-systemic) negative market reactions within insurance industry to various catastrophic events

Current situation & problems

Insurance industry is interconnected

European insurers may act as hubs in transmitting systemic shocks

01

Within financial sector

02

Wide window of analysis

03

Cat shocks neglected

Problems

Study objectives

Interconnectedness levels

European insurers and non-financial firms

Crisis periods and interconnectedness

Behavior of stock returns around important crisis periods, such as the global financial crisis, the European debt crisis, and Covid-19 pandemic

Cat risk contagion effects

The relevance of traditional insurance activities in instigating potential contagion shocks

The narrative

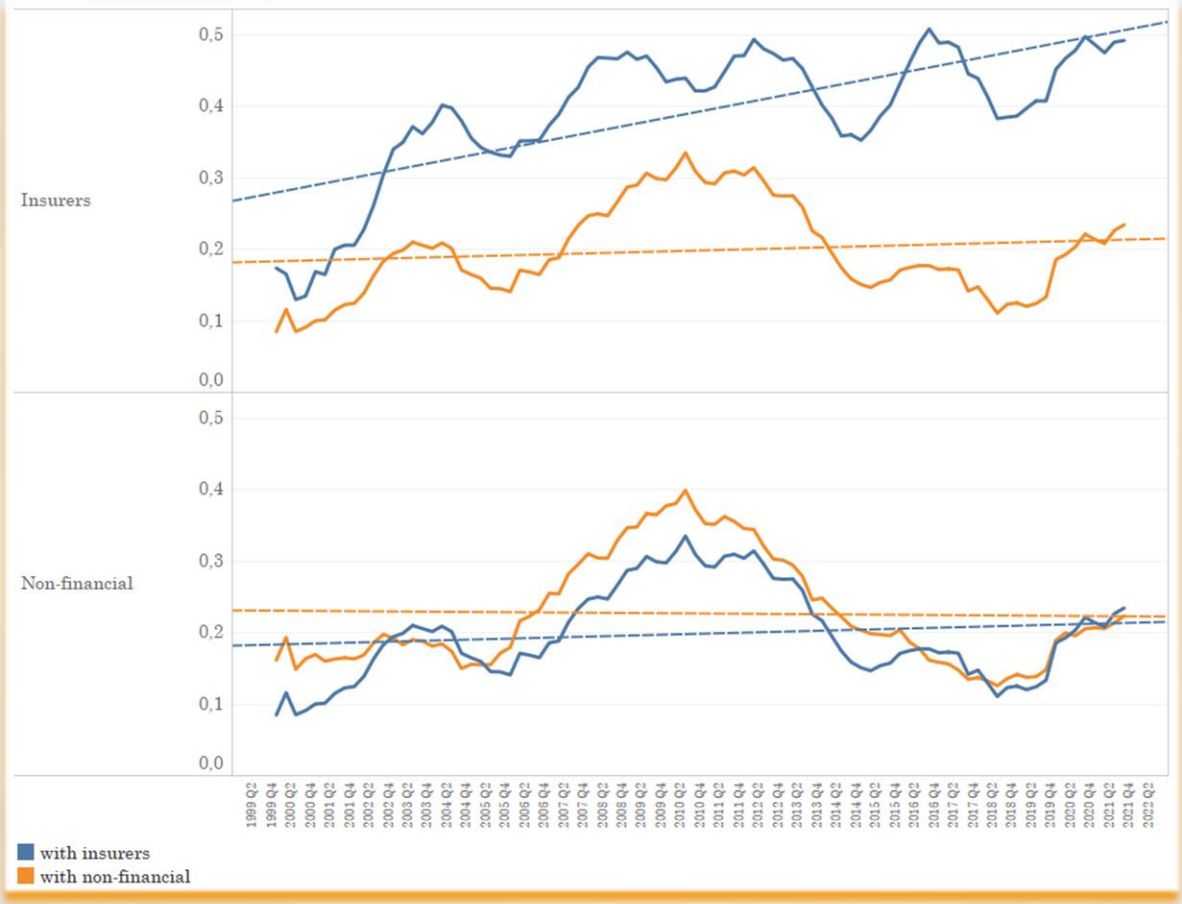
<table>
<tr><th colspan="2">Existing arguments</th><th>Our narrative</th></tr>
<tr><th>Interconnectedness - related arguments</th><th>Traditional insurance - arguments</th><td rowspan="5">If hurricanes pose threat to the stability of (re)insurers during times of increasing interconnectedness, then the cat risk contagion effects should be reflected as a systemic downward pressure on intensely interconnected insurers' and non-financial firms' stock prices.</td></tr>
<tr><td rowspan="4">Insurers become heavily interconnected with financial and non-financial institutions
Five of nine GSIIs are headquartered in Europe (potential hubs)</td><th>Reinsurance - argument</th></tr>
<tr><td>(re)insurers effectively share the risks through reinsurance and retrocession</td></tr>
<tr><th>Cat shocks - argument</th></tr>
<tr><td>significant (systemic and non-systemic) negative market reactions within insurance industry to various catastrophic events</td></tr>
</table>

Data and Methodology

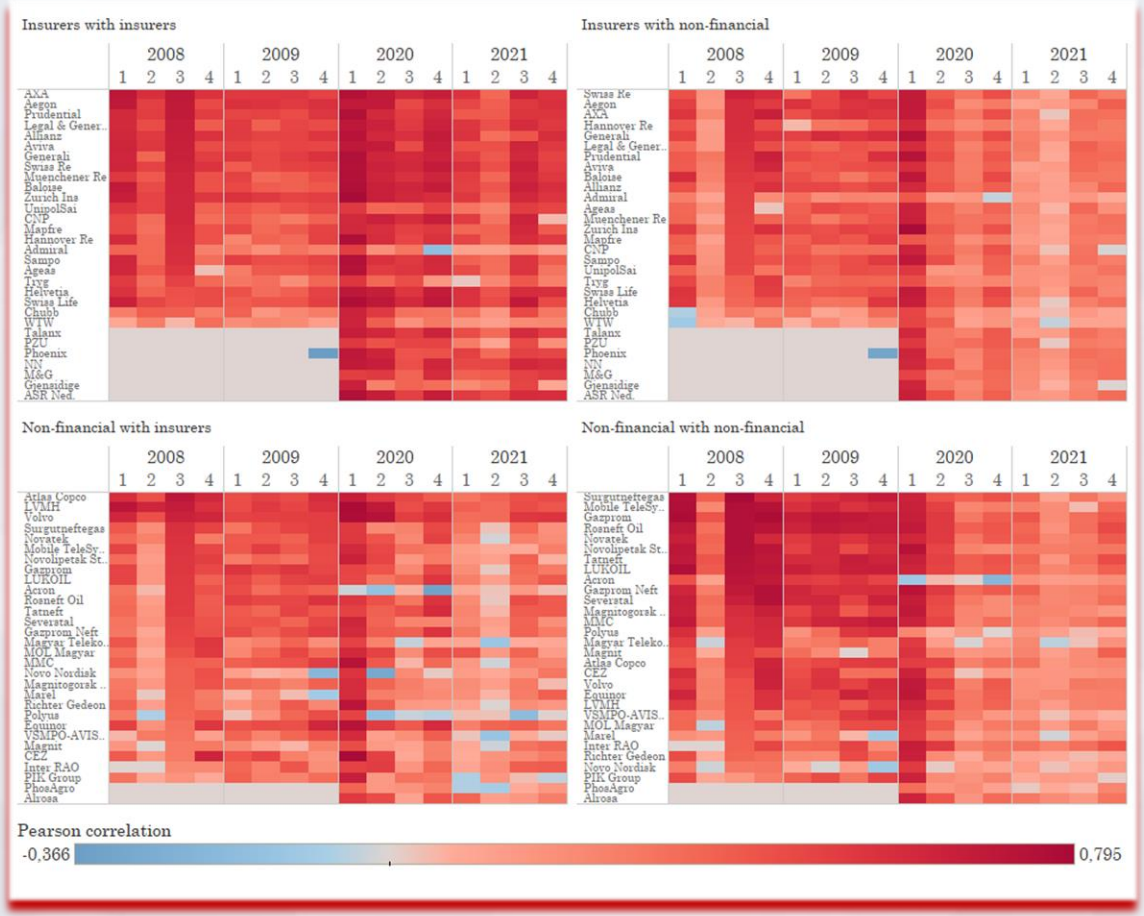
Data sample	Key var	Calculation
30 European insurers 30 European non-financial firms 2000-2021	Daily stock returns	the first natural logarithmic difference of the underlying (closing) stock price
Methods	**Analysis/Portfolios**	**Calculation**
Correlations: Pearson Kendall Spearman	**Sub-periods** (2000-2003, 2003-2007, 2008-2009, 2010-2011, 2012-2015, 2016-2019, and 2020-2021) **Yearly** **Quarterly**	1) Pair-wise correlations for each insurer with other insurers and with all non-financial firms, and for each non-financial firm with other non-financial firms and with all insurers. 2) The mean and median of these pair-wise correlations firm by firm and across firms to observe the dynamics for each group
Event study: Market model (*Euro Stoxx 50 Index*) Estimation window: 190 trading days starting 50 days Event window: [-5,5], [-2,2], and [0,1] US hurricanes	1) a portfolio consisted of 30 stocks of insurers, 2) a portfolio consisted of 30 stocks of non-financial firms, 3) a portfolio composed of the five GSIIs in the sample, and 4) a portfolio of the top 5 most correlated non-financial firms with the insurance industry in the given year	$AR_{i,t} = R_{i,t} - (\alpha_i + \beta_i R_{m,t})$ $CAR_i(t_1, t_2) = \sum_{t=t_1}^{t_2} AR_{i,t}$ Event date: Date of landfall

Correlations by sub-periods

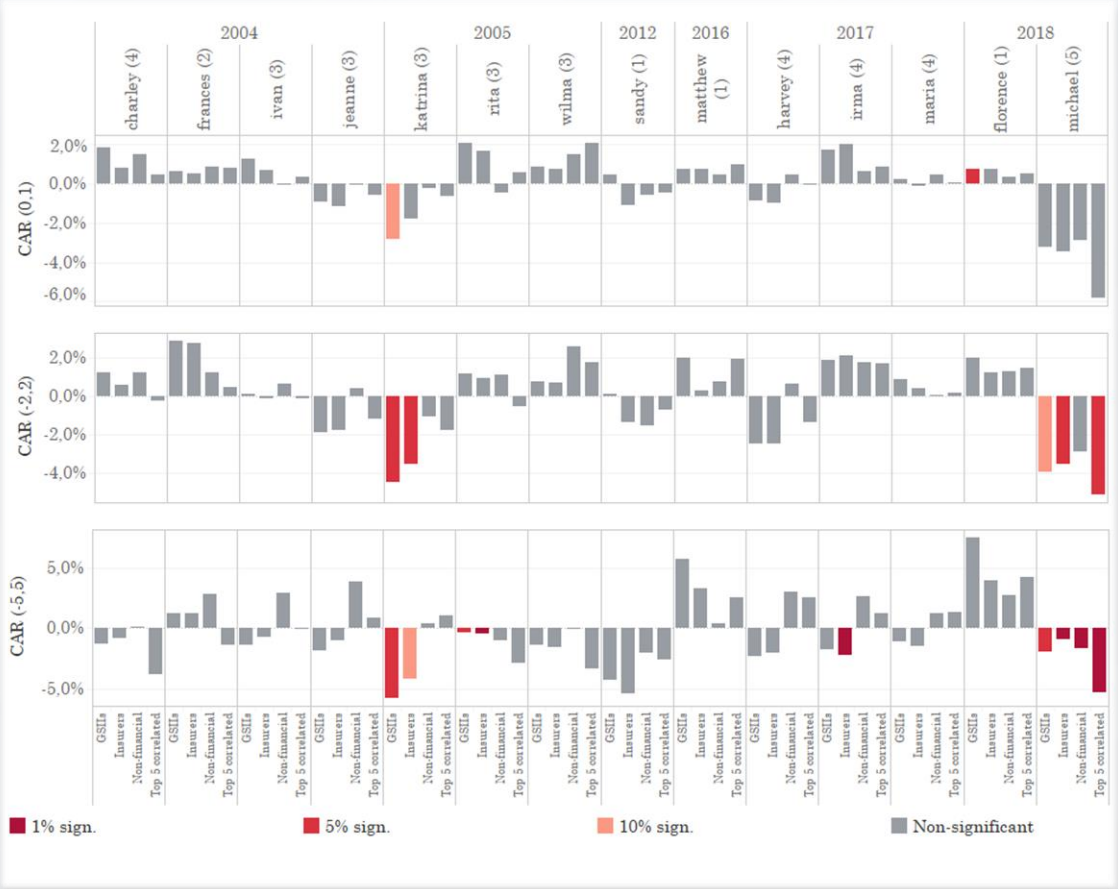
Quarterly correlations



2008 vs. 2020


Insurers with insurers
Insurers with non-financial
Non-financial with insurers
Non-financial with non-financial
2008
2009
2020
2021
1 2 3 4
AXA
Aegon
Prudential
Legal & Gener..
Allianz
Aviva
Generali
Swiss Re
Muenchener Re
Baloise
Zurich Ins
UnipolSai
CNP
Mapfre
Hannover Re
Admiral
Sampo
Ageas
Tryg
Helvetia
Swiss Life
Chubb
WTW
Talanx
PZU
Phoenix
NN
M&G
Generadige
ASR Ned.
Atlas Copco
LVMH
Volvo
Surgutneftegas
Novatek
Mobile TeleSy..
Novolipetsk St..
Gazprom
LUKOIL
Acron
Rosneft Oil
Tatneft
Severstal
Gazprom Neft
Magyar Teleko..
MOL Magyar
MMC
Novo Nordisk
Magnitogorsk ..
Marel
Richter Gedeon
Polyus
Equinor
VSMPO-AVIS..
Magnit
CEZ
Inter RAO
PIK Group
PhosAgro
Alrosa
Pearson correlation
-0,366
0,795

CARs around US hurricanes



Top correlated NFFs suffer the most!

VARIABLES	(1) DVAR CAR (0,1)	(2) DVAR CAR (-2,2)	(3) DVAR CAR (-5,5)	(4) DVAR CAR (0,1)	(5) DVAR CAR (-2,2)	(6) DVAR CAR (-5,5)
MPCorr	-0.076***	-0.072*	-0.174***	-0.075***	-0.068	-0.133**
	(-3.291)	(-1.945)	(-2.811)	(-3.014)	(-1.703)	(-2.199)
Insurers CAR (0,1)	0.760***			0.584***		
	(4.285)			(3.457)		
Insurers CAR (-2,2)		1.061***			0.955**	
		(3.096)			(2.435)	
Insurers CAR (-5,5)			-0.111			-0.204
			(-0.265)			(-0.409)
Low category (dummy)	0.004	-0.015	-0.012	0.001	-0.024**	-0.029
	(0.664)	(-1.604)	(-0.539)	(0.133)	(-2.600)	(-1.338)
High category (dummy)	-0.006**	-0.003	-0.005	-0.006**	-0.007	-0.008
	(-2.599)	(-0.524)	(-0.731)	(-2.163)	(-1.239)	(-0.926)
Damage (in bn)	0.000	0.000*	0.000	0.000	0.000*	0.000
	(0.955)	(1.817)	(0.384)	(1.426)	(1.898)	(0.332)
Constant	0.017***	0.023**	0.031**	0.012**	0.024**	0.029*
	(3.030)	(2.660)	(2.120)	(2.263)	(2.645)	(1.929)
Observations	146	130	232	128	112	199
R-squared	0.388	0.254	0.100	0.370	0.309	0.103
Number of firms	30	30	30	27	27	27
F-statistic	12.82	8.390	4.562	11.41	15.47	3.966
F-test (p-value)	1.27e-06	5.30e-05	0.00343	6.72e-06	4.38e-07	0.00832

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Discussion

1

Growing interconnectedness of the largest European insurers

- the largest insurers have, historically, similar or decreasing levels of interconnectedness with non-financial firms despite the growing interconnectedness between themselves around Solvency II implementation
- no significant changes in the trend of interconnectedness between the largest European insurers and the largest European non-financial firms

2

Amplified correlations around crises

- some of the non-GSIIs become heavily correlated with insurers and non-financial firms during the onset of the Covid-19 crisis
- some of the low-correlated non-financial firms become more heavily correlated with insurers during the onset of the Covid-19 crisis

3

Weak evidence of destabilizing effects of catastrophic events on European insurers and non-financial firms, however the potential for cat risk contagion effects exists

Conclusions

Interconnectedness levels

↑ among insurers
– with non-financial firms

Crisis periods and interconnectedness

↑ non-GSIIs
↑ low-correlated non-financial firms

Cat risk contagion effects

Reinsurance crises - highly unlikely

THANK YOU!