

# **Bank and sovereign risk spillovers to the insurance sector: evidence from Europe**

## **ABSTRACT**

*This paper empirically investigates credit risk spillovers to the insurance sector, focusing on the European sovereign debt crisis and analyzing CDS spreads variations. Due to the mixed evidence of existing literature, we aim at verifying how sovereign spillovers propagate and evolve due to the banking transmission channel and how insurers' business models explain their vulnerability.*

*We expect to find that the debt crisis increased the credit risk of insurers through their asset holdings and that this effect was amplified by spillovers from the banking sector. We aim at explaining the impact of contagion by a set of bank- and insurance-specific strategic and business characteristics, namely capital ratios, product risks, sources of income and diversification. Finally, in contrast with some recent contributions, we expect contagion to be more relevant for also systemically important insurers, due to their greater interconnectedness with the banking sector.*

*JEL Classification:* G01, G15, G21, G22, G32

*Keywords:* contagion, sovereign risk, bank spillovers, insurance spillovers, systemic risk

## **EXECUTIVE SUMMARY**

### **1. Purpose of Research and Summary Literature Review**

The main aim of this paper is to investigate credit risk spillover effects from banks and sovereign risk to the insurance sector. Therefore, we closely relate to three strands of literature: empirical studies on sovereign risk spillovers between banks and countries, contributions on systemic risk and contagion across financial sectors, and studies on the impact of insurers' business models on their risk profile.

Regarding the first strand of literature, the European sovereign debt crisis stimulated several papers to investigate risk spillovers across sovereign countries and banks, and their transmission channels, identified primarily in asset holdings, collateral, rating and guarantee channels (BIS, 2011).

De Bruyckere et al. (2013) and Acharya and Steffen (2015), find that the sovereign exposures of banks headquartered in most Eurozone countries react positively to increases in yields, especially in periphery countries, consistently with the carry-trade hypothesis. Authors also find that large banks, those with short-term debt and with lower capital are more exposed to sovereign risk. Battistini et al. (2014) investigate the relationship between the dynamics of sovereign yields and the domestic banks' sovereign debt exposure in Eurozone countries: most banks responded to greater systemic risk by increasing the home-bias in their sovereign portfolios. Demirgüç-Kunt and Huizinga (2013) provide evidence that systemically large banks suffer a reduction in their market value in countries with large fiscal deficits, as these became too-big-to-save. Furthermore, Acharya et al. (2014) provide empirical evidence of a two-way feedback loop between financial and sovereign credit risk during the recent financial crisis driven to the exposure of financial firms to government debt through their bond portfolio and the value of explicit government guarantees, which drastically reduces in countries with large fiscal deficits. By investigating the interdependences between sovereign and bank CDS spreads in the period 2007-2010, Alter and Schürle (2012) find that before bank bailouts contagion transferred from bank CDS spreads to sovereign CDS spreads. However, with bank bailout programs, sovereign CDS spreads had a leading role in explaining price changes in bank CDS spreads. Moreover, by expanding the period of analysis from 2004 to 2013, Avino and Cotter (2014) provide empirical evidence that in most countries with strained fiscal public finances sovereign CDS spreads have a leading role in explaining banks CDS spreads during both the sub-prime and the European sovereign debt crisis, while in developed countries the relationship seems to be inverted. In the insurance sector, only one study has tried to address the issue of the exposure of sovereign risk (Düll et al., 2015), finding that the insurance sector is more affected by sovereign risk than the non-financial one and that variations in risk transmission are primary driven by insurers' investment portfolio.

Our purpose, with reference to this stream of literature, is to verify how sovereign spillovers propagate in the case of insurers, in particular due to their higher share of sovereign bond holdings and the weaker role played by the rating channel (with funding relying mainly on policyholders' anticipated premiums), the guarantee channel (with insurance runs being limited by the conditional nature of technical provisions) and the collateral channel (with the role played by the indemnity principle).

Secondly, this paper is linked to the literature on systemic risk in financial institutions, with banking being investigated largely and few contributions focusing on the insurance sector. The FSB (2009) defines systemic risk with reference to size, interconnectedness and substitutability of an institution, with the IAIS (2009) adding timing of outflows as an essential specialty of the insurance sector. The GA (2010), with reference to insurers, underlines that the insurance business model provides stability rather than systemic issues (as in and Vaughan, 2012) and the sector was impacted only through quasi-banking activities (trading in derivatives and mis-management of short-term funding). Contributions in this field are relatively recent, suggest different methodological approaches and provide mixed evidence: the existence of systemic risk issues in insurance is reported by Billio et al. (2012), Weiß and Mühlhnickel (2014) and, to a lower extent than in banks, by Chen et al. (2014a), Acharya et al. (2010) and Bierth et al. (2015); instead, no evidence of it is found, f.i., by (Harrington, 2009; Bell and Keller, 2009). Finally, Hammoudeh et al. (2013), suggest that banks lead the issue of systemic risk, in particular in transmitting credit risk shocks, while the latter nonetheless impacts greatly on insurers' CDS spread variation.

We add to this literature by assessing the evolution of risk spillovers between banking and insurance sectors and by explaining the differences through country- and entity-specific variables.

Thirdly, this work relates to the literature on the impact of insurers business models on their risk profile and with reference to systemic risk spillover effects, where evidence is still mixed in the lack of a comprehensive definition and methodological approach in measuring systemic risk. After their extensive review of extant literature, Eling and Pankoke (2012) conclude that traditional insurance activities (underwriting, funding and investing) do not pose systemic risk threats, whereas other authors (Baluch et al., 2011; Cummins and Weiss, 2014; on the regulatory perspective, Schwarcz and Schwarcz, 2014) underline the role potentially played by non-traditional quasi-banking operations in both life and non-life insurers (f.i. financial guarantees, CDS, lending of securities), as well as the inner differences within and between these two major business lines (Bierth et al., 2015). Even trading activities, however, are questioned in their ability to expose insurers to systemic risks (f.i. Chiang and Niehaus, 2015). Also in the case of reinsurance evidence is mixed: no event of significant exposure of these entities is documented, despite some authors argue that reinsurance crisis have a potentially non-negligible effect (f.i. Cummins and Weiss, 2014), in particular due in extreme scenarios (Chen et al., 2014b), while others exclude these to produce significant consequences (f.i. Park and Xie, 2014).

We contribute to this strand of literature by analyzing the impact of insurance business models on their vulnerability to contagion. Finally, by focusing on Europe, we aim at extending the existing literature outside the US market and testing a different event triggering market turmoil.

## **2. Data, Methodology and Expected Results**

Our research questions are addressed by analysing monthly CDS spread variations for a sample of European insurance companies (9), banks (21) and countries (15) over the years 2006-2014. Our sample is restricted in order to control for liquidity risk: we decided to select only European CDS spread changes listed in the ITRAXX financial index. Within alternative methodological approaches, we rely on the widely used definition of Bakaert et al. (2005), which defines contagion as: "excess correlation, that is correlation over and above what one would expect from economic fundamentals" and the contagion measures proposed by Anderson (2011) and De Bruyckere et al. (2013).

Our approach consists of three steps. Firstly we analyse the effects of bank and country variables on insurance credit spreads, decomposing fundamental and excess correlations in CDS spread changes. Then we measure contagion as the excess correlation between insurers-banks and insurers-countries.

Lastly, we investigate the impact of insurers' business models on their risk profile. We control for time variation by splitting the time sample and running our model for every year.

In our models, we identify four common market-wide risk factors: credit risk, risk aversion, business expectations and country term-spread. Moreover, we include a number of insurance (sovereign exposure, dependency of profitability on financial returns, weight of life policies, share of innovative products, capital), bank (capital ratios, weight of traditional business, weight of banking portfolio, share of deposit funding) and sovereign-specific control variables (debt to GDP, interest expenses to GDP, GDP growth).

Our expected findings, so far confirmed by preliminary results, can be summarized as follows.

We expect a substantial increase in credit risk of insurers through the transmission channel of holdings of government bonds during the European sovereign debt crisis. Additionally, this effect should be amplified significantly by spillover effects from the banking sector.

We anticipate that the strength of contagion channels should be largely explainable by a selection of strategic choices and business features at the bank and insurance company level: capital ratios, product risks and income sources and diversification should represent the main drivers of systemic risk.

Finally, and partially in contrast with some recent contributions, we expect contagion to be more significant for systemic institutions, including insurers, due to their greater interconnectedness with the banking sector.

### **3. Importance of the research**

We believe that our contribution in the field of spillovers between banking, insurance and sovereign risks is important for the following reasons.

Firstly, the need to strengthen the understanding of systemic risk in financial institutions and to provide additional empirical evidence in a field characterized so far by contrasting evidence.

Secondly, we aim at joining three streams of research that so far were mostly investigated separately: transmission channels in the context of the European sovereign debt crisis; contagion across sectors of financial markets; and drivers of insurers' exposure to systemic risk arising from their business models.

Thirdly, our focus on the European market extends the existing literature both geographically and beyond the events of the 2007-2009 financial crisis.

Lastly, our contribution should evidence if, as expected, insurers present issues of systemic nature despite their role of risk absorbers and due mainly to their holdings of sovereign assets and the presence of less traditional operations.

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