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Questioning Equity Return Based Systemic Risk Measures for the Insurance Industry

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Extended Research Proposal and Preliminary Results

Abstract

This paper questions the effectiveness of equity based systemic risk measures for the insurance industry. We apply three measures, i.e. linear Granger causality, Conditional Value at Risk and Marginal Expected Shortfall, on three control groups, namely banks, insurers and non-financial companies listed in Europe over the last 14 years. Our evidence suggests that the three measures display inconsistencies over time and thereby does not allow us to fully endorse or reject the ability of these measures to capture systemic risk spillovers in the insurance industry. Further analyses highlight how these measures tend to mainly capture the exposure of insurance companies towards life and investments activities, i.e. an underwriting portfolio with heavy financial components.

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Introduction & Relevant Literature

After the 2008 financial crisis and 2012 European sovereign debt crisis the concept of systemic risk has become more and more relevant. The existing literature provides several measures to detect and assess systemic risk in the financial sector.[1] Most widely used measures are based on equity prices and therefore neglect industry specific characteristics. For instance Adrian and Brunnermeier (2008), Acharya et al. (2010), Huang et al. (2011), Gray and Jobst (2010) and Billio et al. (2012), propose systemic risk measures irrespective of the type of financial institution under consideration. Among other findings, they suggest that also non-banking financial institutions play a prominent role in causing systemic risk. In particular some authors find that the insurance industry has become a major source of systemic risk (e.g. Billio et al.(2012)). This is partially in contrast with other authors who propose both qualitative and quantitative analyses on the insurance industry.[2] For instance Harrington and Scott (2009), Bell et al. (2009), Geneva Association (2010) and Cummins and Weiss (2011) based on their qualitative analyses of different business lines (i.e. life and non-life business) and activities (i.e. traditional and non-traditional insurance activities), do not find evidence of systemic relevance for the industry as a whole. Quantitative analyses are proposed by Baluch et al.(2011) who argue that the systemic relevance of the insurance industry has been growing due to the increasing in non-tradition (banking related) activities. Cummins et al. (2013) use a systemic risk measure that takes into consideration insurance industry characteristics and find that the insurance sector only plays a marginal role in causing systemic risk.

The current literature lacks both theoretical and empirical analyses on the effectiveness of equity based measures in capturing the presence of systemic risk in the insurance industry. Thus our contribution aims at testing if different equity based systemic risk measures are able to i) provide consistent outcomes, ii) distinguish across industries and business activities, iii) properly capture the systemic relevance risk of the insurance industry.

[1] A comprehensive review of the models applied to Systemic Risk is provided by Bisias et al. (2012).

[2] A comprehensive review of the systemic risk researches in the insurance sector is provided by Eling and Pankoke (2012).

Methodology & Data

We test three equity return based measures of systemic risk: i) the indexes based on linear Granger causality proposed by Billio et al. (2012), ii) the Conditional Value at Risk proposed by Adrian and Brunnermeier (2011) and iii) the Dynamic Marginal Expected Shortfall proposed by Brownlees and Engel(2012), on 3 control groups: insurance companies, banks and non-financial companies.

We test the systemic relevance of each institution with respect to its industry, with respect to other industries and more in general the relevance of each industry as a whole $vis-\grave{a}-vis$ other industries.

Specifically, in the Granger causality test, we measure the systemic importance of an institution in terms of the total number of statistically significant causing and receiving connections within the belonging group and among groups. This approach allows us to detect the mutual causality within and among industries, nonetheless to investigate the behavior of banks, insurers and non-financial companies over both crises and non-crises periods.

Regarding the CoVaR model we estimate the average marginal contribution of the single institutions towards its own industry and towards other industries. Moreover we measure the average contribution of one industry towards the others.

Moreover, we estimate the average DMES for each institutions taking into account time varying volatility and correlation as well as a non linear tail dependence.

Fianlly we analyze the relation between insurance activities and systemic risk measures relying on stock data rather than on flow data.

We use the total equity returns of European institutions [3] for each control group we select the 20 most capitalized institutions included in the STOXX® Europe 600, STOXX® Euro 600 Banks and STOXX® Euro 600 Insurance for non-financial institutions, banks and insurers respectively. We analyze a time window of 14 years, from January 1999 to December 2013. The CoVar and SES are estimated on a daily frequency basis whereas the Granger causaliy test on a monthly frequency basis. Moreover, in line with Adrian and Brunnermeier (2011), we include a set of state variables in the COVaR estimation.[4]

[3] We include in the sample companies listed in the large Eurozone's stock exchanges, namely EU, UK and CH.

[4] We select the following state variables: 1) Market volatility (VIX), 2) a liquidity Spread (3M REPO - 3M BUBILL), 3) change in short interest rates (3M BUBILL), 4) the Slope of the yield curve (10Y BUND - 3M BUBILL), 5) the credit Spread (BAA 5-7Y Corporate - EURO Sovereign 5-7Y), 6) the total equity return (STOXX EURO 600

Preliminary Results

From our preliminary evidences we observe inconsistency among the three measures. In particular, results display contradicting behaviors, associating predominance to different industries in posing systemic risk at the same point in time.

Moreover, the measures cannot provide a clear cut evidence of the role of the insurance industry. For example, in Granger causality test's outcome, if banks and non-financial institutions clearly behave as *causer* or *receiver* over time, insurers show a more ambiguous role.

Finally, due to the mixed results concerning insurers, the three measures do not provide clear information about the systemic relevance of neither insurance companies nor of the insurance industry as a whole. As the applied measures seem individually to associate a clearer role to banks and non-financial institutions, the same seems not to apply to insurers: our preliminary finding is that equity based measures could properly capture the systemic risk posed by the non-traditional activities but not the systemic relevance of the traditional insurance activities and therefore the systemic importance of the industry as a whole.

Ongoing analyses aim at shedding lights on the role of traditional and non-traditional insurance activities, bridging the gap between general equity based measures and industry specific approaches.

All share).

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