Optimal Risk Transfer Decisions under Counterparty Risk

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Abstract

The business model of insurance companies critically relies on their ability to provide adequate protection in case of major loss events. Amongst others, climate change and the growing natural disaster risk impose pressure on insurers to secure appropriate risk financing capacity and have contributed to the increasing importance of alternative risk transfer, supplying 15% to the overall reinsurance capital by mid-2021 [1]. However, while most traditional reinsurance counterparties are strictly regulated to protect insurance policyholders and their claims, investors in the alternative risk transfer market are almost exclusively unrated [6]. This highlights the relevance for insurers to consider counterparty risk in order to adequately evaluate key performance indicators, to enhance managerial decision-making and to meet regulatory capital requirements. In addition, counterparties not fulfilling a minimum credit quality may be required to provide full collateral to eliminate their counterparty risk [2]. This risk management measure may yet limit the risk transfer capacity that can be offered in the alternative risk transfer market [5].

The aim of this paper is to extend previous work by studying the influence of counterparty risk (management) involved in risk transfer arrangements on a non-life insurer's optimal risk transfer in a shareholder value maximization setting with a target ruin probability and with policyholders sensitive to default risk, where the insurer can combine an industry loss warranty (ILW) with a reinsurance contract and decide about partial and full collateralization. The risk transfer instruments assessed include traditional reinsurance as well as alternative risk transfer instruments (collateralized reinsurance and ILWs), where the costliness of counterparty risk reduction measures, e.g. in the form of posted collateral, is reflected in the premium calculation.

For this purpose, we build on the strand of literature on insurers' optimal decision-making and maximize the insurer's shareholder value while ensuring a maximum ruin probability (see e.g. [3]). The insurer evaluates two decision variables related to the reinsurance contract and to the ILW, respectively: 1) the risk transfer instrument's fraction to be purchased and 2) its respective level of collateralization. We include policyholders' sensitivity to the insurer's default risk based on the premium reduction function derived by Klein and Schmeiser [4], which further incentivizes counterparty risk management.

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Our results emphasize that the neglection or underestimation of the counterparty risk involved in risk transfer instruments results in an increase of the insurer's actual ("true") ruin probability, which may no longer be in line with regulatory stipulations. Instead, the neglected counterparty risk is transferred to policyholders via a higher insurer default risk. Taking into account counterparty risk thus results in an increased demand for risk transfer (with resulting lower shareholder values) as compared to the case in which this risk is not considered. More risk transfer is required, e.g., when insurance demand is more sensitive to default risk. While collateralization seems unattractive for traditional reinsurance in the present setting, a partial collateralization of the ILW is beneficial already at low counterparty risk levels, despite associated costs. In case the insurer chooses a (full or partial) collateralization, the optimal contract fractions and thus the ceded loss amount can be reduced compared to the setting without collateral. The availability of collateral also slightly improves the maximum net shareholder value, mainly for higher counterparty risk levels and (default risk) correlations, and depending on costs. Overall, it is thus strongly advisable for insurers to take into account counterparty risk as well as the option to collateralize (along with costs) when aiming to make optimal (alternative) risk transfer decisions, especially given the interaction effects with policyholders that are sensitive to default risk, and to adequately meet regulatory solvency requirements.

Keywords: Index-linked catastrophic loss instruments, reinsurance, counterparty risk, collateral, shareholder value maximization.

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