Cat Bond Pricing: Reinsurance and Insurance-Linked Securities in Comparison

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Executive Summary

Problem Description

After more than a decade of cat bond presence, capital market solutions have enhanced their prestige. Record cat bond market activity in the last two years reveal the progress of valuable perception and indicate many sponsors' strategic behavior in using cat bonds as an important supplement to traditional reinsurance to managing their risks. Whilst sponsors are eager to eliminate inefficiencies of the traditional catastrophe market, investors thoroughly appreciate the benefits of the uncorrelated asset class that has successfully been tested by the massive credit market collapse starting in July of last year.

Obviously, the approval of cat bonds, as a stabilizing factor in sponsor as well as investor portfolios, confirms a growing convergence between the traditional reinsurance and the capital market. In accordance with eroding market barriers, one would expect that pricing movements strongly correlate. Therefore, the main objective of this thesis is dedicated to the relevance of converging prices. Due to the fact that not a standard, single pricing methodology for both markets has been established yet, influential pricing factors are analyzed, investigated and explained. The factor identification and comparison of both approaches presents parallels and significant deviations of pricing natural catastrophe risk within the two different markets.

Procedure

The introduction highlights the recent market developments in the reinsurance sector handling of natural catastrophe risks. After briefly characterizing these risks and disclosing motives of securitization, potential inefficiencies of the traditional market are to be pointed out. The role of innovative financial vehicles (in this thesis focused on cat bonds) to transfer risks directly to capital markets will be explained thoroughly.

The main section of the thesis is concerned with the different pricing approaches of the two markets. Depending on whether one assesses prices from the capital market perspective (ILS fund) or the traditional reinsurance view ((re)insurers), two different approaches are used. Therefore, as a first step, theoretical fundamentals in the pricing of both markets, the traditional catastrophe reinsurance market compared to the ILS market, are identified. The purpose of the study is to reveal existing pricing techniques for natural catastrophe risk. Thus, the focus is to present, analyze and compare how influencing factors are taken into account in both market systems.

In the empirical part of the thesis, the aim is to shed light on a concrete practical example of pricing in natural catastrophe risk. The goal is to uncover how risks were assessed in practice and what prices were paid. The result accentuates similarities as well as differences in the pricing of both markets. Furthermore, reactions and future behavior of the market participants are deviated, registered, and predicted where possible. The necessary data for the empirical part was gathered from meetings on the traditional insurance side from employees of a representative reinsurance company, and on the ILS side from a colleague working as a portfolio manager at Horizon21. Possible similarities and differences are clarified with a precise and structured questionnaire filled out by the market participants. The aim is to reveal future strategies and optimal capital allocation.

Results

The pricing methodology used is fairly similar. Both approaches apply hard and soft factors in combination. Expected loss as the hard factor hardly differs in the two markets. In general, both parties obtain their relevant information from professional, sophisticated third-party modeling firms. Soft factors form the risk load, or in capital market language the expected excess return. Evidently, the similarity in methodology of both approaches is substantial.

One issue that clearly stands out between the two markets is assigned costs. Beside the mentioned capital costs that constrain reinsurers' capacity supply, leverage costs, management fees, and production costs develop completely different. Whereas ILS funds profit from the flexible and huge capital market volume, reinsurers are privileged to use high leverage. Additionally, fixed up-front costs are much lower for the traditional reinsurance business than accrued issuing costs of a cat bond. Shelf-offering programs mitigate such high expenses of issued cat bonds, which represents growing efficiency in the future.

The analysis of the traditional reinsurance market reveals that applied capital costs determine a great part of the resulting rate on line (ROL). Depending on the assigned return on equity (ROE), the charged amount could take on an enormous value. Evidence for the great impact of an aspired ROE is proven by the concrete example of LongpointRe. The results of the traditional catastrophe reinsurance pricing clearly show that the effective capital costs in a prosperous market environment, with a yielding ROE of 40%, adds up to a ROL of 7.86%, whereas in normal market conditions, with a ROE of 13%, the ROL is almost halved to

3.74%. Thus, market conditions are one of the main market drivers in the traditional catastrophe business, due to their significant effect on pricing.

From the pricing perspective of an ILS fund, the required target return is determined on the fund's investment character and other attractive, future opportunities that concurrently appear in the market. Portfolio managers are granted the beneficial effect of access to a secondary market that delivers clear indication on prices. Through the developing secondary market, the liquidity premium has vanished so far. Appetizers for novelty has also disappeared in the course of time, due to improved investor sophistication and the approval of a functioning, maturing cat bond market during the last decade. LongpointRe, priced in May 2007 in a booming market environment, was effectively issued at LIBOR plus 5.25%.

Therefore, if the market environment had not been so prosperous, the traditional catastrophe solution would have been cheaper as the ILS.

The empirical example of this thesis highlights how crucial the valuation procedure and the impact of soft factors is. Beside ROE and the target return, both interviewed market participants confirmed to duly examine competing opportunities that appear simultaneously on the market. The decision to go into a deal is finally made by balancing reasons for and against the transaction. In contrast to the profoundly calculated hard factor of expected loss, soft factors do not easily lend themselves to measure. Their assessment happens informally in both markets, rather than being properly calculated with an assigned pricing formula.

Observing both markets, a definitely strong correlation between the spreads and the ROLs has to be noted. The ROL in the traditional business takes the same course as the spread of cat bonds does, although they have never run in a one-to-one ratio. Whereas the cat bond market cycle is limited to upper and lower bounds, the traditional catastrophe reinsurance market cycle does not disclose such constraints. As a consequence the latter is much more volatile and implies stronger amplitudes. Taking into consideration the particular market conditions, cat bond spreads proceed relatively in comparison to the traditional ROLs. However, the distinct approximation of spreads is obvious and increasingly prevents companies from developing the ability to capitalize on arbitrage opportunities. Any absence of such a dependency would definitively allow some degree of arbitrage. Therefore, the convergence in spreads is probably a logical consequence of a growing liquid and efficient financial market.[1]

[1] **See Questionnaire 23 June 2008, 24 June 2008.**

Even though the capital market promises great potential, insurance-linked securities do neither replace nor substitute traditional reinsurance products. However, it complements the industry and offers attractive alternatives by making capital available for high-severity/low-frequency risks. The temporary callable capital bears many advantages. It could reduce the volatility of insurance cycles and keep the pricing more stable. Derivative, structured and tailor-made solutions waiting in the pipeline could also accelerate a smooth diffusion of both markets and ease tight market constraints. Therefore, the more efficient provided capital market instruments develop, the more capable they are in competing with the traditional industry.