Discarding Risk Avoidance and Embracing Risk Optimization: Managing Reinsurance Credit Risk

Neil M. Bodoff, FCAS, MAAA

Abstract

Property-casualty insurance companies tend to focus on avoiding and controlling their exposure to reinsurance credit risk. This paper advocates switching from this risk avoidance and compliance mentality to a probabilistic and market based view in which one seeks to measure, hedge, exploit, and optimize risk.

Keywords. Reinsurance Credit Risk; Credit Default Swap; CDS.

1. INTRODUCTION

Many property-casualty insurance companies buy reinsurance protection to hedge their risk of sustaining unacceptably large losses. This act of hedging, however, gives rise to another type of risk: reinsurance credit risk. We define "reinsurance credit risk" as the risk that an insurance company's counterparty reinsurers will not fulfill their contractual obligations to indemnify the insurance company's losses. Reinsurance credit risk deservedly influences many aspects of how an insurance company chooses to buy its reinsurance protection.

How should an insurance company measure, monitor, and manage its exposure to reinsurance credit risk? We will describe the current state of affairs in this arena; describe some of the disadvantages of the current approach; propose an alternative approach; and describe the ways in which this alternative approach outperforms current methods and exploits risk for the benefit of the insurance company.

2. BACKGROUND

2.1 Current Practices for Managing Reinsurance Credit Risk

Current practice manifests a compliance and control approach to managing reinsurance credit risk. Typically an internal company committee decides, based upon various credit risk factors, which reinsurer counterparties are authorized (or "on the approved list") for transacting reinsurance business; other reinsurers don't make the cut and are thus labeled "not approved". Then internal compliance ensures that all reinsurance business transacts only with approved reinsurers. By prudently restricting the list of reinsurers with which it transacts business, the company attempts to contain reinsurance credit risk to an acceptably low level.

In addition to maintaining a gatekeeper function to keep out unapproved reinsurers, companies typically monitor the accumulated amount of credit risk exposure to any individual approved reinsurer. If a property-casualty insurance company accumulates, through various reinsurance agreements, a significant amount of exposure to a particular reinsurer, this exposure may encroach upon a previously defined risk limit set by the company. As a result, the company may choose to bar the reinsurer from further transacting business with it, even if the reinsurer has otherwise acceptable creditworthiness.

Finally, companies manage reinsurance credit risk by sometimes requiring counterparty reinsurers to "collateralize". The reinsurer can post collateral for the full amount of the reinsurance limit, but typically, rather than actually posting collateral, the reinsurer will pay for a letter of credit (LOC) from its bank, which serves as a guarantee that the reinsurer will pay its obligations. Primary companies typically require reinsurers to collateralize only when the reinsurer has a low rating or in some way appears to present a greater than average credit risk.

2.2 Drawbacks of Current Practices for Managing Reinsurance Credit Risk

There are several disadvantages of current practices for managing reinsurance credit risk. First, creating a binary distinction between one group of "approved reinsurers" and a second group of "unapproved reinsurers" is suboptimal. On the one hand, it lumps all approved reinsurers together and fails to differentiate between approved reinsurers of greater and lesser financial strength. Thus the company extinguishes any financial incentive for it to prefer a stronger approved reinsurer to a weaker approved reinsurer or, alternatively, to extract price concessions from the weaker approved reinsurer. Similarly, all unapproved reinsurers are considered equally unfit, even though some unapproved reinsurers might be only slightly less financially strong than some approved reinsurers. This discrepancy is problematic because it makes no allowance for price: essentially, the slightly worse creditworthiness of certain reinsurers is unacceptable at any price, and the slightly better creditworthiness of certain reinsurers is infinitely valuable, no matter how much more expensive. This practice is disadvantageous to the company because it fails to present a framework for evaluating the tradeoff between risk and reward. Thus the existing approach relies too much on risk avoidance and fails to provide a robust framework for risk optimization.

The exposure accumulation limits and their binary nature also appear to be suboptimal; currently, so long as the exposure is a few dollars less than the limit, this accumulation is wholly acceptable and apparently presents no risk to the company, whereas if the exposure exceeds the amount of the risk limit then the risk quickly becomes infinitely unacceptable. Problematically, the categories again are binary rather than continuous. The exposure limits fail to present a tradeoff between risk and reward: is it worth taking additional risk exposure on this particular reinsurer if doing so can generate a significant financial benefit for the company (e.g., if this reinsurer has the lowest price on the next reinsurance transaction)?

Another material disadvantage of relying on an approved list or "gatekeeper" approach occurs when the company buys reinsurance protection from an approved reinsurer, but then after the contract incepts the reinsurer's creditworthiness deteriorates. In the situation of long tail casualty lines of business, this is a realistic concern, because there is often a significant time lag between the inception of the reinsurance agreement, when the reinsurer is first vetted for approval, and when the company might need to rely upon its reinsurance for indemnification of losses. Although the current gatekeeper approach can evaluate the creditworthiness of a reinsurer at the time the reinsurance agreement is consummated, it provides the company with no protection from any future declines in the reinsurer's creditworthiness.

3. A PROPOSED ALTERNATIVE APPROACH TO MANAGING REINSURANCE CREDIT RISK

In order to address the problems noted previously, one needs to shift away from a risk avoidance, binary, compliance framework in which reinsurers are judged to be approved or not approved. Instead, one ought to embrace a risk hedging, continuous, probabilistic, market based, optimization framework for reinsurance credit risk. Under this paradigm, one embraces the probabilistic perspective that all reinsurers, no matter how creditworthy they are, manifest some amount of credit risk; this observation leads one to a continuous framework in which the distinction among reinsurers is simply the likelihood of default, which is either larger or smaller depending upon the particular reinsurer. Or, similarly, one can say that the difference among reinsurers is simply the varying cost of hedging their credit default risk. Fortunately, Credit Default Swaps (CDS) can provide market based pricing information about the cost of hedging the credit risk of various (though not all) reinsurers. By harnessing this information, one can establish a common basis for evaluating reinsurers' price quotes on an "apples-to apples" basis. As a result, one can evaluate the tradeoff between the higher prices charged by reinsurers of higher credit quality and the lower prices of reinsurers of lesser credit quality.

In order to deploy this proposed framework, one needs to establish a common metric for comparing the cost of various reinsurers' price quotes. Thus we define:

$$\text{Credit risk adjusted reinsurance price} = \text{reinsurance price} + \text{cost of credit default protection} \quad (3.1)$$

In order to more fully describe the proposed approach, we show an example using a simplified case study.

3.1 Simplified Case Study 1: Evaluating Reinsurance Quotes by Using CDS Price Information

In this case study we deal with an insurance company seeking to buy property catastrophe reinsurance. The company solicits price quotes from reinsurers with varying degrees of creditworthiness.

Exhibit 1 shows CDS price data for selected reinsurers via the Thomson Reuters "TRX P&C Reinsurance Index" as of September 28, 2009.

Exhibit 1

Company Name	1Y CDS Spread bps (as of 28-Sep-2009)
Munich Re	13.25
Swiss Reinsurance Company Ltd	73.50
Berkshire Hathaway Inc	102.37
Hannover Rueckversicherung AG	15.00
Society of Lloyd's	273.24
SCOR SE	26.00
Everest Reinsurance Holdings Inc	65.24
XL Capital Ltd	131.22
RenaissanceRe Holdings Ltd	95.03
Ace Ltd	49.30

source: Thomson Reuters

First we will examine a simplified case in which only 2 reinsurers of varying creditworthiness offer price quotes. Let's assume, for illustrative purposes, that Munich Re quotes a price of 6.0% Rate on Line (RoL), where Rate on Line equals price divided by limit; XL Capital quotes a price of 5.5% RoL. Let's assume that each reinsurer is an "approved reinsurer" for the buyer and each reinsurer is willing to write 100% of the reinsurance cover. Now initially it appears that the XL

Capital quote is lower and thus a better choice for the buyer. Incorporating the cost of credit risk, however, illuminates that Munich Re's quote is actually the lower price, as shown in Exhibit 2:

Exhibit 2

	1	2	3 = 1 * 2	4	5	6 = 4 / 10k * 5	7 = 3 + 6	8 = 7 / 1
Reinsurer	Reinsurance Occurrence Limit	Quoted Reinsurance Rate on Line (RoL)	Quoted Reinsurance Price	Price of CDS (in basis points)	Notional amount of CDS protection	Price of one year CDS protection	Credit risk adjusted reinsurance price	Credit risk adjusted reinsurance RoL
Munich Re	100,000,000	6.00%	6,000,000	13.250	100,000,000	132,500	6,132,500	6.13%
XL Capital Ltd	100,000,000	5.50%	5,500,000	131.220	100,000,000	1,312,200	6,812,200	6.81%

Exhibit 2 shows an example in which a higher quote from a more creditworthy reinsurer turns out to be the lower cost choice. It also shows how this type of measurement framework provides an incentive for reinsurers to enhance their financial strength. Moreover, this approach could provide a primary company with powerful information to show to a reinsurer of lesser credit quality (as judged by the CDS market) in order to extract a lower price. In this case, the buyer of reinsurance can say to XL that its price quote needs to be reduced by $0.7 million, because otherwise it would effectively be the higher priced option.

3.2 Simplified Case Study 2: Transcending the "Approved" List

In this case study, we will examine a situation which shows how using CDS information can help a company optimize its purchase by transcending the limitations of a restrictive "approved reinsurers list". Exhibit 3 shows a list of reinsurers and, simply for the illustrative purposes of this case study, their status as "approved" or "not approved".

Exhibit 3

Reinsurer	CDS spread	Status
Hannover Rueckversicherung AG	15.00	Approved
RenaissanceRe Holdings Ltd	95.03	Approved
XL Capital Ltd	131.22	Not Approved

Exhibit 4 shows a hypothetical case in which each of the reinsurers quotes a price for the cover and is willing to accept 50% of the exposure of the cover.

Exhibit 4

		1	2	3 = 1 * 2	4	5	6 = 4 / 10k * 5	7 = 3 + 6	8 = 7 / 1	9
Reinsurer	Status	Reinsurance Occurrence Limit	Quoted Reinsurance Rate on Line (RoL)	Quoted Reinsurance Price	Price of CDS (in basis points)	Notional amount of CDS protection	Price of one year CDS protection	Credit risk adjusted reinsurance price	Credit risk adjusted reinsurance RoL	Share authorized by reinsurer
Hannover	Approved	100,000,000	8.50%	8,500,000	15.000	100,000,000	150,000	8,650,000	8.65%	50.00%
Renaissance Re	Approved	100,000,000	7.00%	7,000,000	95.030	100,000,000	950,300	7,950,300	7.95%	50.00%
XL	Not Approved	100,000,000	6.50%	6,500,000	131.220	100,000,000	1,312,200	7,812,200	7.81%	50.00%

If the primary company buying the reinsurance cover uses restrictive categories such as "approved" and "not approved", then in this case the company will unnecessarily pay more for its reinsurance cover. This result occurs because the low price from XL Capital, which is not an approved reinsurer, is nugatory; the market clearing price to place 100% of the cover is therefore 8.5%. But if the primary company buying the cover embraces the proposed framework, then XL Capital's quote is valid and thus can be considered for participation in the reinsurance program; then the market clearing price for 100% placement would be 7.0% (7.95% on a credit risk adjusted basis), resulting in cost savings for the buyer. In this case, the company that insists on restricting reinsurers to an "approved list" would squander several hundred thousand dollars on just this single transaction.

3.3 Simplified Case Study 3: Transcending "Reinsurance Exposure Limits"

The prior case study describes a case of a reinsurer being "approved" or "not approved", but a similar situation can occur when a reinsurer is approved but is bumping up against maximum exposure limits. In such a situation, a primary company finds that one of its approved reinsurers has taken on a certain amount of the primary company's reinsurance exposure; the primary company is not willing to concentrate any additional exposure with this single reinsurer. Now what happens if the primary company is now seeking to buy reinsurance cover and this particular reinsurer provides the most favorable quote? The current approach to reinsurance credit risk would require the buyer to disqualify the reinsurer from the bidding and thus ignore the quote, leading to a higher price. Or, the primary company could try to enter into a commutation agreement to finalize any outstanding exposure from prior contracts; this action reduces the total exposure concentrated with the reinsurer, thus allowing it to once again qualify as "approved" for providing the prospective reinsurance cover. This approach, too, extracts a price from the buyer by forcing it to close out the prior reinsurance contracts for a fixed amount before all the risk has ebbed, possibly for a lower payment than deserved. In contrast, the proposed paradigm for managing reinsurance credit risk would take a wholly different approach. If the primary insurance company feels that its credit exposure to a particular reinsurer is beginning to exceed a comfort level, it now has a new solution: reduce the existing credit exposure by hedging the risk via CDS, thus allowing the reinsurer to quote and participate on the new prospective reinsurance cover. Here we emphasize that the goal of hedging in this case is not simply to reduce risk per se, but rather to exploit risk and optimize it: by hedging the current concentration of exposure, the primary company can potentially buy new cover from this low priced reinsurer, leading to savings on the reinsurance purchase. Exhibits 5a and 5b compare the approaches:

Exhibit 5a: Reinsurance price in light of exposure limits, with no CDS hedging

Reinsurer	CDS spread	Status	Buyer's Preselected Maximum Allowable Credit Exposure	Accumulated Exposure via Existing Reinsurance Contracts	Available Capacity
Munich Re	13.25	Approved	750,000,000	750,000,000	-
Swiss Reinsurance Company Ltd	73.50	Approved	750,000,000	600,000,000	150,000,000
Berkshire Hathaway Inc	102.37	Approved	750,000,000	400,000,000	350,000,000

	1	2	3 = 1 * 2	4	5	6 = 4 / 10k * 5	7 = 3 + 6	8 = 7 / 1	9	10	11
Reinsurer	Reinsurance Occurrence Limit	Quoted Reinsurance Rate on Line (RoL)	Quoted Reinsurance Price	Price of CDS (in basis points)	Notional amount of CDS protection	Price of one year CDS protection	Credit risk adjusted reinsurance price	Credit risk adjusted reinsurance RoL	Share authorized by reinsurer	Available Capacity	Share authorized by buyer
Munich Re	100,000,000	5.00%	5,000,000	13.250	100,000,000	132,500	5,132,500	5.13%	50.00%	-	0.00%
Swiss Reinsurance Company Ltd	100,000,000	6.00%	6,000,000	73.500	100,000,000	735,000	6,735,000	6.74%	50.00%	150,000,000	50.00%
Berkshire Hathaway Inc	100,000,000	9.00%	9,000,000	102.370	100,000,000	1,023,700	10,023,700	10.02%	50.00%	350,000,000	50.00%

[A] Market Clearing Price: 10,023,700

Exhibit 5b: Reinsurance price in light of exposure limits, with CDS hedging

Reinsurer	CDS spread	Status	Buyer's Preselected Maximum Allowable Credit Exposure	Accumulated Exposure via Existing Reinsurance Contracts	Initial Available Capacity prior to Hedging via CDS	Buyer reduces prior exposure by buying CDS protection of	CDS Cost	Accumulated Exposure via Existing Reinsurance Contracts after buying CDS	Available Capacity after buying CDS on prior exposure
Munich Re	13.25	Approved	750,000,000	750,000,000	-	50,000,000	66,250	700,000,000	50,000,000
Swiss Reinsurance Company Ltd	73.50	Approved	750,000,000	600,000,000	150,000,000	-	-	600,000,000	150,000,000
Berkshire Hathaway Inc	102.37	Approved	750,000,000	400,000,000	350,000,000	-	-	400,000,000	350,000,000

	1	2	3 = 1 * 2	4	5	6 = 4 / 10k * 5	7 = 3 + 6	8 = 7 / 1	9	10	11
Reinsurer	Reinsurance Occurrence Limit	Quoted Reinsurance Rate on Line (RoL)	Quoted Reinsurance Price	Price of CDS (in basis points)	Notional amount of CDS protection	Price of one year CDS protection	Credit risk adjusted reinsurance price	Credit risk adjusted reinsurance RoL	Share authorized by reinsurer	Available Capacity	Share authorized by buyer
Munich Re	100,000,000	5.00%	5,000,000	13.250	100,000,000	132,500	5,132,500	5.13%	50.00%	50,000,000	50.00%
Swiss Reinsurance Company Ltd	100,000,000	6.00%	6,000,000	73.500	100,000,000	735,000	6,735,000	6.74%	50.00%	150,000,000	50.00%
Berkshire Hathaway Inc	100,000,000	9.00%	9,000,000	102.370	100,000,000	1,023,700	10,023,700	10.02%	50.00%	350,000,000	0.00%

[B]	Market Clearing Price	6,735,000
[C]	Price Improvement	3,288,700
[D]	Cost of CDS to reduce prior exposure	66,250
[E]	Total Price Savings	3,222,450

3.4 Simplified Case Study 4: Long Tail Casualty Lines of Business

Until now we have simplified the problem by assuming a one time period perspective. What happens, however, if the there is a significant lag between the time when a claim occurs and when the primary company pays the claim and seeks reimbursement from its reinsurer? Now one ought to calculate the cost of credit risk protection across more than a single period. When one analyzes multiple time periods, one confronts 2 complexities:

1. The notional amount of protection needed varies across the different time periods; the price of CDS protection also varies across the time horizon. Therefore, using estimates of the payment pattern, one needs to forecast the CDS costs for each period of the time horizon.

2. Typically the buyer pays for CDS protection each period, but these payments are contingent, not definite. The payment for each period is contingent on the fact that the reference entity (for example, the reinsurer) has not yet experienced a "credit event"; when a credit event occurs, the buyer ceases making payments. Thus the probability that the buyer makes a payment at time (t) is always (1-P(t)), where P(t) is the cumulative

probability that the entity has defaulted by time t.

In exhibit 6, we oversimplify the analysis by treating the purchase payments as definite rather than contingent; we do so in order to focus on how a small difference in credit default risk per year can compound into a substantial difference over the multiple period payment time horizon:

Exhibit 6: Long Tail Casualty Cost of Reinsurance Credit Risk

Reinsurer #1

Reinsurer: Hannover Rueckversicherung AG

1	2	3	4	5	6	7	8	9	10	11	12
Time	% Paid	Expected Loss	NPV Expected Loss	Incremental VaR (t)	NPV Incremental VaR(t)	CDS spread (bps): annual price for cover through time t	Number of years need to hold CDS	Interest rate	Discount Factor from time (t) to t=0	Total NPV CDS cost	Total NPV CDS cost (bps) as % of total VaR
1	5%	1,250,000	1,245,268	5,000,000	4,981,072	15.00	1	0.38%	99.62%	7,472	0.75
2	10%	1,250,000	1,227,800	5,000,000	4,911,201	21.50	2	0.90%	98.22%	21,118	2.11
3	25%	3,750,000	3,602,491	15,000,000	14,409,963	22.25	3	1.35%	96.07%	96,186	9.62
4	45%	5,000,000	4,656,854	20,000,000	18,627,418	28.50	4	1.79%	93.14%	212,353	21.24
5	70%	6,250,000	5,594,687	25,000,000	22,378,749	32.25	5	2.24%	89.51%	360,857	36.09
6	85%	3,750,000	3,244,233	15,000,000	12,976,934	33.45	6	2.44%	86.51%	260,447	26.04
7	90%	1,250,000	1,041,014	5,000,000	4,164,056	34.65	7	2.65%	83.28%	100,999	10.10
8	95%	1,250,000	998,178	5,000,000	3,992,713	35.60	8	2.85%	79.85%	113,712	11.37
9	99%	1,000,000	762,677	4,000,000	3,050,707	36.55	9	3.06%	76.27%	100,353	10.04
10	100%	250,000	181,392	1,000,000	725,569	37.50	10	3.26%	72.56%	27,209	2.72
				-							
Total		25,000,000	22,554,595	100,000,000	90,218,380					1,300,707	130.07
									% of NPV Expected Loss	5.8%	

Notes
1 Column 11 = Column 6 * Column 7 /10k * Column 8
2 Column 12 = Column 11 / (Column 5 total / 10k)

Reinsurer #2

Reinsurer: Swiss Reinsurance Company Ltd

1	2	3	4	5	6	7	8	9	10	11	12
Time	% Paid	Expected Loss	NPV Expected Loss	Incremental VaR (t)	NPV Incremental VaR(t)	CDS spread (bps): annual price for cover through time t	Number of years need to hold CDS	Interest rate	Discount Factor from time (t) to t=0	Total NPV CDS cost	Total NPV CDS cost (bps) as % of total VaR
1	5%	1,250,000	1,245,268	5,000,000	4,981,072	73.50	1	0.38%	99.62%	36,611	3.66
2	10%	1,250,000	1,227,800	5,000,000	4,911,201	87.00	2	0.90%	98.22%	85,455	8.55
3	25%	3,750,000	3,602,491	15,000,000	14,409,963	101.00	3	1.35%	96.07%	436,622	43.66
4	45%	5,000,000	4,656,854	20,000,000	18,627,418	109.50	4	1.79%	93.14%	815,881	81.59
5	70%	6,250,000	5,594,687	25,000,000	22,378,749	123.50	5	2.24%	89.51%	1,381,888	138.19
6	85%	3,750,000	3,244,233	15,000,000	12,976,934	125.55	6	2.44%	86.51%	977,552	97.76
7	90%	1,250,000	1,041,014	5,000,000	4,164,056	127.60	7	2.65%	83.28%	371,933	37.19
8	95%	1,250,000	998,178	5,000,000	3,992,713	129.23	8	2.85%	79.85%	412,793	41.28
9	99%	1,000,000	762,677	4,000,000	3,050,707	130.87	9	3.06%	76.27%	359,312	35.93
10	100%	250,000	181,392	1,000,000	725,569	132.50	10	3.26%	72.56%	96,138	9.61
				-							
Total		25,000,000	22,554,595	100,000,000	90,218,380					4,974,186	497.42
									% of NPV Expected Loss	22.1%	

Notes
1 Column 11 = Column 6 * Column 7 /10k * Column 8
2 Column 12 = Column 11 / (Column 5 total / 10k)

In Exhibit 6, the price of credit risk is different for the two reinsurers. Although the difference in the CDS spreads is a small number in absolute terms, the accumulation of risk protection charges across multiple future years generates a significant difference in the value of credit risk charges of the two reinsurers. For Reinsurer #1, the total cost today of future CDS costs is approximately $1.3m or 5.8% of NPV Expected Loss; for Reinsurer #2, however, the total cost today is approximately $5m or 22.1% of NPV Expected Loss, a significant difference. Essentially this difference means that if both reinsurers quote the same reinsurance price, then the "credit risk adjusted reinsurance price" quoted by Reinsurer #2 would be significantly higher than the "credit risk adjusted reinsurance price" of Reinsurer #1.

4. RISK STRATEGY: HEDGE OR RETAIN?

Until now we have focused mainly on using CDS data for informational purposes, which facilitates the comparison of reinsurance prices. Should, however, a primary company actually buy CDS protection on its reinsurers to neutralize its reinsurance credit risk? Or should it retain the risk and price for it and model it and hold capital for it? Or, analogous to its handling of underwriting risk, should it retain some risk, but hedge part of it to protect against unusually large losses? We indentify 4 perspectives:

- Perspective #1: "Rely on quantitative modeling and risk capital". This perspective believes that the firm can model the risk of reinsurance credit risk and can hold capital to absorb any downside losses. According to this approach, CDS should be used only for informational purposes for comparing reinsurance prices, but would not be needed for hedging; the company will retain the reinsurance credit risk completely.
- Perspective #2: "Focus on the tail event". This perspective believes that the company can accurately model its reinsurance credit risk, but notes that a tail event of extreme severity will threaten the firm. So the company only needs to worry about an extreme loss, e.g. the joint probability of a large P&C event creating large underwriting losses and simultaneously having more than one reinsurer failing to pay its obligations. Therefore, the company ought to shun the standard CDS protection on individual reinsurers and instead buy a custom CDS that pays off only in the joint scenario in which:
    a. there is a large loss to the company
    b. and several of its reinsurers are unable to pay claims.
- Perspective #3: "Be wary of epistemological and methodological uncertainty". Our ability

to accurately model anything complex is inherently problematical; there is a very large risk of error. Moreover, modeling the credit risk of one's counterparty is exceptionally difficult, because one cannot truly know the types and quantities of risk exposure that a counterparty has taken upon its own balance sheet. Therefore, this perspective argues for some amount of hedging, even if the company has sufficient capital.

- Perspective #4: "Add value based on the theory of the firm". This perspective notes that a firm ought to identify which risks it wants to take and which risks are better left to others. Investors, too, construct a particular narrative (with guidance from company management) about what the firm's core activities are, what types of risk it takes, and how the firm's competitive advantage creates value. Therefore, according to this approach, even if the company can accurately model its reinsurance credit risk, and even if it has enough capital to absorb most losses, it might be preferable for the company to hedge and buy protection on all of its reinsurance credit risk. The insurance company should neutralize its exposure to reinsurance credit risk simply because the firm's expertise and core mission is not to make money by retaining reinsurance credit risk, nor do investors anticipate or expect any kind of loss from a credit default event. Investors do expect a primary company to sustain a moderately large loss in the event of a catastrophe, but they expect that the company has ceded most of the catastrophic loss to reinsurers, and do not expect the loss to redound to the primary company through reinsurer default. Executives ought to not surprise investors with a type of loss that is completely unanticipated.

Each of these perspectives suggests a different strategy for if, how, and to what extent the company should hedge its reinsurance credit risk.

5. CAVEATS AND HURDLES TO IMPLEMENTATION

5.1 Residual Credit Risk via Counterparty

If a primary company were to buy CDS protection to hedge its reinsurance credit risk exposure, it would then face the residual credit risk that the counterparty provider of the CDS protection might not fulfill its promises. One way to mitigate this risk is to require the provider of CDS protection to post collateral each night based on the market movement of the CDS contract that day. In such a situation, the buyer would be exposed to no more than the one day drift in the market price of the CDS. However, the "event driven" nature of property catastrophe risk underscores a drawback to this remedy; it is possible that a one day movement in the CDS market price could be very substantial and thus dwarf the collateral funds previously collected via nightly collateralization. For example, on the day when a massive earthquake hits, there could be large jumps in the prices of CDS for reinsurers. The fact that the primary company had required the CDS counterparty to post collateral the previous night would not necessarily serve as foolproof protection against the new price of CDS post catastrophe. Therefore the purchaser of CDS would still need to carefully consider the reliability of the counterparty, with emphasis on the counterparty's financial strength being uncorrelated with property catastrophe risk.

5.2 Basis Risk

A reinsurer's default to its cedants is not the exactly the same as a "credit event" that triggers a CDS payment; this imprecise alignment generates "basis risk". Basis risk is a significant issue that one must analyze when evaluating whether or not to hedge via CDS. For example, a reinsurer may be an operating subsidiary within a larger conglomerate; the reinsurer might default on its obligations even as the parent company is able to pay its debts, thus not triggering a CDS credit event.

Yet basis risk could be less problematic than it appears at first blush because of the interim stages that arise when a reinsurer transitions from a state of health to a state of financial distress. When a reinsurer begins to sustain financial distress of any sort, its ultimate financial health is unknowable; its debt creditors forecast an increased likelihood of default and simultaneously its customers worry about collecting their reinsurance recoveries. The worry about receiving recoveries tends to incent the companies claiming reinsurance recoverables to "take a haircut" and settle for cents on the dollar via commutation agreements; thus, uncertainty about possible ultimate future inability to pay generates definite settlement losses in the present. Simultaneously, as creditors forecast an increased likelihood of default, the market value of the CDS protection would likely increase significantly; the primary insurer can sell the CDS contract and collect the proceeds to offset the haircut loss on the reinsurance recoverables. Thus the primary insurer need not wait until the ultimate resolution of the reinsurer's financial health; rather, when the reinsurer's financial distress first manifests, the insurer can monetize the credit risk by simultaneously taking a haircut loss on the reinsurance recoverables and also realize an offsetting gain on the CDS position. Of course, at this early moment in the unfolding financial distress of the reinsurer, basis risk lingers: since the likelihood of bond default may be different than the likelihood of reinsurance default, the gain on the CDS could differ from the haircut loss on reinsurance recoverables. If the insurance company buyer initially forecasts that potential future reinsurer financial distress will lead to a gain from CDS protection that will over-indemnify its loss on reinsurance recoverables, then the buyer can "underhedge" by purchasing somewhat less CDS notional coverage than its exposure. On the other hand, if reinsurer financial distress would likely lead to a smaller gain on the CDS than the loss on the reinsurance recoverables, then the buyer ought to "overhedge" by purchasing somewhat more notional coverage than its exposure. Finally, this entire strategy depends upon the ability to exit the position by selling the CDS, but if one could not easily sell the CDS instrument, one would need to reevaluate the effectiveness of this strategy, in which case significant basis risk could remain.

5.3 Willingness to Pay

Sometimes the reinsurer is able to pay but is unwilling to pay because of a disagreement about whether the reinsurance contract covers the disputed claims or not. In this situation, CDS will not help the buyer of the protection. Therefore, if an insurance company chooses to use CDS to hedge reinsurance credit risk, it would still need to evaluate the claim payment practices and trustworthiness of potential reinsurer counterparties, as well as the importance of drafting clear contract wording in order to reduce the likelihood of claim disputes.

5.4 Other Practical Considerations

For some reinsurers, there may be no active market to hedge their credit risk via CDS. So even if a primary company seeks to hedge all its reinsurance credit risk, the realities of the market will interfere with this goal. This inability to actively hedge the risk of these reinsurers might require the primary company to hold the risk on its balance sheet, which would likely suggest the need for an even more substantial credit risk charge against these reinsurers when evaluating their quoted prices. Moreover, the primary company might choose to "not approve" a reinsurer whose credit risk cannot be easily hedged.

6. CURRENT USA ACCOUNTING RULES HARM ERM EFFORTS

6.1 USA Statutory Accounting

Under USA statutory accounting rules, a primary company presents its loss reserves as a liability, but is allowed to deduct from this liability the losses ceded to its reinsurers. Thus the primary company presents its loss reserve liability on its balance sheet on a "net of reinsurance" basis; yet, the very existence of reinsurance credit risk highlights that receiving reimbursements from reinsurers is not a definite proposition. Treating uncertain reinsurance recoveries as a certainty harms efforts to foster a risk management approach to reinsurance recoveries and reinsurance credit risk.

6.2 USA GAAP Accounting

Under USA GAAP accounting rules, a primary company books its gross loss reserves and books a corresponding asset for its reinsurance recoverables. This is an improvement over statutory accounting, because it explicitly disaggregates the company's direct liability to its policyholders from the company's right to collect reimbursements from its reinsurers. Moreover, the explicit listing of the reinsurance recoveries as an asset allows for writing down the value of this asset to reflect the risk that the reinsurers might not fulfill their promises.

The GAAP rules for writing down the reinsurance recoverables asset, however, undermine good risk management, for the following reason. In theory the financial statements showing reinsurance recoverables as an asset should be written down for the small probability that the reinsurer might not fulfill its promises; indeed, this would be the approach in a market-consistent or fair value type of system. If primary insurers had to post a reduction in the reinsurance recoverables asset even for a small risk of non-performance, then there would be a larger incentive to measure and charge reinsurers for their variations in credit risk. However, current GAAP accounting does not impose this regime on insurers; rather, the reinsurance recoverables asset is tested for impairment arising from probable credit losses. Yet even when reinsurers have varying degrees of creditworthiness, their likelihoods of default are still typically low in absolute magnitude, so the reinsurers all pass the impairment test equally and the primary company's recoverables can all be listed at full value. This approach is at odds with good risk management, which incorporates the potential downside loss even of events that have only a small probability of occurring. The accountants' approach is also at odds with market consistent valuation, because market pricing takes into account a wide array of possible future outcomes, not just the most likely scenario. Moreover, the primary companies' ability to book reinsurance recoverables at full value, disregarding the credit risk of the reinsurers, reduces their incentive to hedge this risk. In contradistinction, if financial reporting required primary companies to deduct the "market price of credit default risk" from their reinsurance recoverables, this requirement would further encourage firms to pursue risk management approaches and would incent the firms to hedge their reinsurance credit risk.

7. CONCLUSION

This paper proposes that property-casualty insurance companies should deploy a new paradigm in managing reinsurance credit risk. The proposal advocates using market based information to quantify the cost of reinsurance credit risk; doing so facilitates the evaluation of the tradeoffs of different price quotes from multiple reinsurers of varying creditworthiness. The result of applying such a framework would be to move companies away from a compliance mentality that seeks to avoid reinsurance credit risk and towards a mentality that instead seeks to measure, hedge, exploit, and optimize risk.

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Biography of the Author

Neil M. Bodoff can be contacted at neil.bodoff@willis.com and neil_bodoff@yahoo.com