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SPECIAL REPORT

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Quantification of Investment Security Risk

As requested by the Chair of the NAIC's Invested Asset Working Group (IAWG), we reviewed the risks to investment securities identified by the IAWG's Risk Subgroup in its 8/26/08 report (Attachment - 1) to determine the extent to which it would be possible to quantify these risks. While the aforementioned report focused most of its attention on individual security risk, we considered investment security risk from a holistic perspective, giving equal importance to security-specific risk as well as those risks characterized in the Subgroup's report as "other than security specific risks."

Summary

Even the most robust financial model is only as good as its underlying assumptions. With this caveat in mind, the current Risk Based Capital (RBC) assumptions for investments were evaluated by reviewing more current data that are comparable with the 1990s data from the original RBC study. Despite missing two credit down cycles, the expected default rate of the RBC model was sufficiently stress-tested to capture increased present versus past default rates. However, our assessment changes when considering that both the original and updated Moody's default study *excluded* structured finance securities, primarily because meaningful default history regarding structured finance securities did not exist at the time of the finalization of the original RBC study in 1992. Structured finance securities issuance has since soared due to relatively higher yields and low RBC charges, but with 70% of issuance concentrated in underlying pools of real estate collateral, defaults in 2007 were higher than in the previous 14 years combined (1993-2006). Thus, the actual percentage rate turned out to be higher than the expected default rate, although the exact percentage depends on the methodology used to include structured finance. Insurers should disclose liquidity of assets and liabilities under SAP based on GAAP guidelines.



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Introduction

The following **Security Specific Risks** section lists the IAWG definition¹ of each risk, our commentary, and quantification. The Risk Subgroup of the IAWG determined that eight **Security Specific Risks** are present in fixed income securities and defined their exact meaning. The **Security Specific Risks** are *Credit, Event, Liquidity, Call, Extension, Deferral, Currency, and Leverage*. The **Other Than Security Specific Risks** section lists our definition of each risk, our commentary, and quantification. **Other Than Security Specific Risks** addressed by us are *Portfolio Market Risk* and *Model Risk*.

Credit Risk

Definition

“Credit risk is the risk of non-performance of contractual payment obligations on bonds, cash equivalents and other invested assets with the characteristics of fixed income instruments.”

Commentary

Risk based capital requirements need to adapt to ratings inflation and differences in ratings among agencies. For example, only 53% of AA or above rated corporate bonds were rated the same by both Moody’s and S&P compared to 41% for non-investment grade bonds.² Regulations that make use of bond ratings are based on the assumption that a given rating has a fixed meaning that will not vary over time.³ The ratings agencies have faced considerable scrutiny over ratings inflation of structured finance securities and the efficacy of these ratings in accurately predicting default. In 2007, 51% of all structured finance securities ratings such as Constant Proportion Debt Obligations (CPDOs) were rated AAA⁴ compared to less than 2% of all corporate securities ratings.⁵ Also, 70% of all structured finance ratings were related to real estate investments.⁶

Classic credit analysis predicts the probability of default and loss given default based on factors such as business risk and financial risk inherent in a bond as well as macroeconomic

¹ The risk definitions used in this report were taken directly from the August 26, 2008 report of the Risk Subgroup of the NAIC Invested Asset Working Group. However, the opinions and recommendations in the “Commentary” and “Quantification” sections that follow each definition as well as the entire “Other Than Security Specific Risks” section are solely based on SVO analysis.

² “Managing Credit Risk”; John Caouette, Edward Altman, and Paul Narayanan; page 73

³ Ibid; pages 77 - 79

⁴ “Default & Loss Rates of Structured Finance Securities: 1993 – 2007”; Moody’s 2008

⁵ “Sector Trends in U.S. Ratings Distribution: Shift in Ratings Mix over the past 20 years”; Standard & Poor’s 2007

⁶ “Default & Loss Rates of Structured Finance Securities: 1993 – 2007”; Moody’s 2008. The percentage was derived by adding all asset-backed securities that reference commercial and residential real estate as well as home equity loans.



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conditions. S&P, Moody's and other ratings agencies use slightly different methodologies, financial models, default rate data, and rating scales to determine default probability.⁷ By design, ratings are supposed to capture all credit risks inherent in a bond that could lead to default. However, the risk of credit migration, which has caused substantial losses at financial institutions, market and liquidity risk are typically not considered in fundamental credit analysis.

Many structured finance securities referencing subprime mortgages achieved AAA ratings, because of payment priority tranches, credit enhancements from bond insurers, and higher collateral requirements. These AAA structured finance securities offered higher yields than Treasuries, but carried the lowest risk based capital charges. The highest capital charge for low quality bonds and common stock (30%) and the lowest capital charge for AAA-A bonds (0.3%) is a 100-fold difference. Quantitative finance may have reached the practical limits of overcoming credit fundamentals of referenced assets by design. The default rate of structured finance securities is more closely correlated to the default rate of the risky underlying assets than previously assumed. Moody's disclosed that one-year rating accuracy of structured finance was 9% below its historical average in 2007.⁸ Structured finance ratings and RBC factors have the same statistical distribution with a heavy concentration of high ratings matching low RBC charges.

Quantification of Credit Risk

RBC differentiates between life and property/casualty insurers because the actuarial models required to manage each of their liabilities and the liabilities themselves are inherently different. Life and property/casualty insurers are exposed to the same risks such as investment and underwriting risk.⁹ Some risks are more insurance sector specific. Property/casualty insurers face reserve risk and catastrophe exposure, while life insurers face asset/liability mismatch risk.¹⁰ Many life insurance policies are priced at inception and remain fixed, while property/casualty rates are typically adjusted annually based on actual loss experience. In our opinion, the longer-term financial projections of some life policies make their pricing assumptions less reliable over the life of the policy than those for property/casualty policies. Life insurers' duration risk management through the use of derivatives has improved the matching of assets and liabilities, but has not eliminated mismatch risk. RBC factors for life insurers are tax-adjusted, which brings the RBC charges in Table 1 down 26% across all ratings. There is no tax-adjustment for property/casualty insurers. While the tax-adjusted RBC factors for life insurers over property/casualty insurers are the same for the two highest ratings, the difference increases to about 68% for the next three lowest ratings, and to negative 27% for the lowest rating. Life

⁷ "Corporate Financial Distress and Bankruptcy"; Edward Altman and Edith Hotchkiss; page 178 - 182

⁸ "The Performance of Structured Finance Ratings: Full-Year 2007 Report"; Moody's 2008

⁹ "Life Insurance Rating Criteria"; Fitch Ratings; March 2007

¹⁰ "Non-Life Insurance Rating Criteria"; Fitch Ratings, March 2007



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insurers have equal or higher capital charges than property/casualty insurers, except for the lowest rating. Notwithstanding the arguments that life and property/casualty insurers face different insurance risks, it would appear to be logically inconsistent to have different RBC factors between life and property/casualty companies for the same investment risk. The RBC factor differences between life and property/casualty insurers need to reflect updated actuarial data and then the same percentage difference needs to be applied for all ratings. Table 1 shows the actual RBC charge for life insurers, property/casualty insurers, and the tax-adjusted percentage difference of RBC charges of life insurers over property/casualty insurers.

**Table 1: Risk-Based Capital Requirements
Reserve Percentage Factors**

<i>Class</i>	<i>Life</i>	<i>P/C</i>	<i>Tax-Adjusted % Difference¹¹</i>
NAIC 1	0.4%	0.3%	0%
NAIC 2	1.3%	1.0%	0%
NAIC 3	4.6%	2.0%	70%
NAIC 4	10.0%	4.5%	64%
NAIC 5	23.0%	10.0%	70%
NAIC 6	30.0%	30.0%	-27%

Source: NAIC Life Risk Based Capital Report: Overview and Instructions for Companies, 11/8/2007; NAIC Property/Casualty Risk Based Capital Report: Overview and Instructions for Companies, 11/8/2007

The NAIC RBC formula recognizes four major risk categories: credit risk of assets (C1), insurance risk (C2), interest rate risk (C3), and all other business risk (C4) to establish minimum capital requirements for insurers.¹² At the company level, simply adding C1-C4 risks together overstates risk exposure. Thus the RBC formula provides for a co-variance adjustment.¹³ In our view, a model is only as good as its underlying assumptions. With this

¹¹ The RBC percentage factor is the reserve difference of property/casualty insurers over life insurers, which is tax adjusted for life insurers. Life insurers RBC are tax adjusted, but property/casualty insurer RBC are not tax adjusted. The SVO Analyst would like to thank Dan Swanson for his comments on Table 1.

¹² "Raising the Safety Net, Risk-Based Capital for Life Insurance Companies"; Bernard L. Webb & Claude Lilly, NAIC, page 3 - 4

¹³ Ibid, page 19 -23



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caveat in mind, the current RBC assumptions were evaluated by reviewing updated sources that are comparable with data from the original study. More specifically, the NAIC used Moody's default data when completing its study in 1992 and increased the expected default rate by factoring in a worst-case scenario, based on judgment. Table 2 shows the expected cumulative default rate assumptions as used in the 1992 study. These figures are comparable with the data in Table 3 which shows the actual cumulative default rates experienced from 1983 to 2007. However, this data does not include structured finance defaults.

In 1993, after the NAIC completed its RBC study, Moody's began tracking default and loss rates of structured finance securities separately from corporate securities. Current RBC factors shown in Table 1 are based entirely on corporate securities and do not include the riskier credit profile of structured finance securities.¹⁴ In our view, this is a critical shortcoming of the current RBC system. Structured finance and corporate finance securities compile default data using different methodologies and different terminology. In 2003, Moody's first introduced the concept of material impairment in order to differentiate between the definitions of default between corporate securities versus structured finance securities.¹⁵ In 2007, more credit impairments occurred than the combined total from the previous 14 years.¹⁶

Table 2 below shows the expected cumulative default rate over five years (used in the original RBC study) based on Moody's actual default data from the early 1990s. The expected default rate was computed for RBC by taking the actual default rates and stress-testing them upward to reflect an unfavorable economic environment. Table 3 shows Moody's actual cumulative default rate of corporate securities over 5 years from 1983 to 2007. Table 4 below shows Moody's actual 5-year cumulative default rate of structured finance securities from 1993 to 2007. Table 2, 3 and 4 were adjusted to allow for easy comparison.¹⁷ Different time periods are covered in Table 3 and 4, because the actual default data for structured securities does not go back as far as that for corporate securities. While one could argue that the aforementioned comparisons of corporate default rates in Table 2 and Table 3 do not necessarily indicate a consistent directional skew, our assessment changes dramatically when structured finance securities in Table 4 are factored into our analysis. Table 4 shows substantially higher default rates for NAIC 1 – 3 structured finance securities

¹⁴ "Corporate Default and Recovery Rates, 1920 – 2007"; Moody's 2008 page 58: "Moody's bases the results of this study on its proprietary database of ratings and defaults for corporate bond and loan issuers. Municipal and sub-sovereign debt issuers, structured finance securities, private placements, and issuers with only short-term debt ratings are excluded unless otherwise noted."

¹⁵ "Default & Loss Rates of Structured Finance Securities: 1993 – 2007"; Moody's 2008.

¹⁶ Ibid

¹⁷ The NAIC's expected default rates were converted from annual to cumulative to allow for easy comparison of cumulative default rates of corporate and structured finance securities. The time period was shortened to 5 years from 10 years, as Table 2, 3, and 4 covered different time periods and 5 years was the lowest denominator.



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than for corporate securities (both actual and expected) in Table 2 and 3. When structured finance securities are included in our comparisons, actual default rates of NAIC 1- 3 designations are above the expected default rate. Instead of combining the two default tables, credit risk of assets (C1) could be split into (C1-A) corporate and (C1-B) structured finance. In essence, invested assets would be categorized as either C1-A or C1-B and corresponding assumptions could be developed for two, separate RBC models.



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**Table 2: Worst-Case Expected Cumulative Default Rate (Assumptions)
(As used for the original RBC study completed in 1992)**

Year	NAIC-1			NAIC-2	NAIC-3	NAIC-4	NAIC-5
	AAA/Aaa	AA/Aa	A/A	BBB/Baa	BB/Ba	B/B	CCC/Caa
1	0.00%	0.02%	0.04%	0.25%	1.80%	7.50%	18.00%
2	0.00	0.06	0.16	0.65	5.00	14.00	31.00
3	0.02	0.18	0.36	1.15	8.00	19.50	41.00
4	0.06	0.28	0.60	1.70	10.80	24.00	49.00
5	0.12	0.48	0.88	2.30	13.30	28.00	55.00

Source: *Raising the Safety Net, Risk-Based Capital for Life Insurance Companies*, Bernard L. Webb & Claude Lilly, NAIC, p. 142. The study was completed in 1992.

Table 3: Actual Corporate Cumulative Default Rates (1983 – 2007)

Year	NAIC-1			NAIC-2	NAIC-3	NAIC-4	NAIC-5
	AAA/Aaa	AA/Aa	A/A	BBB/Baa	BB/Ba	B/B	CCC/Caa
1	0.00%	0.01%	0.02%	0.19%	1.17%	4.66%	15.37%
2	0.00	0.02	0.10	0.53	3.24	10.29	25.50
3	0.00	0.05	0.24	0.94	5.84	15.75	33.792
4	0.04	0.12	0.37	1.44	8.45	20.57	40.66
5	0.08	0.18	0.50	1.94	10.69	25.02	45.80

Source: Corporate Default and Recovery Rates, 1920 – 2007, Moody's Investors Service, February 2008

Table 4: Actual Structured Finance Cumulative Default¹⁸ Rates (1993 – 2007)

Year	NAIC-1			NAIC-2	NAIC-3	NAIC-4	NAIC-5
	AAA/Aaa	AA/Aa	A/A	BBB/Baa	BB/Ba	B/B	CCC/Caa
1	0.06%	0.25%	0.79%	2.58%	4.91%	0.27%	0.82%
2	0.08	0.53	1.62	5.77	13.17	1.91	0.82
3	0.10	0.63	1.99	7.18	16.07	6.28	3.13
4	0.14	1.01	2.50	9.35	18.97	10.48	10.05
5	0.26	1.65	3.17	12.51	21.57	14.53	22.04

Source: Default and Loss Rates of Structured Finance Securities, 1993 – 2007, Moody's Investors Service, July 2008

In our view, the original stress-tested expected default rates adopted in the 1992-completed RBC methodology may not capture today's actual default rates for two reasons. First, the older Moody's data missed two credit down cycles that peaked in 1991 and 2001 as seen in

¹⁸ In 2003, Moody's first introduced the concept of material impairment in order to differentiate between the definitions of default between corporate securities versus structured finance securities.

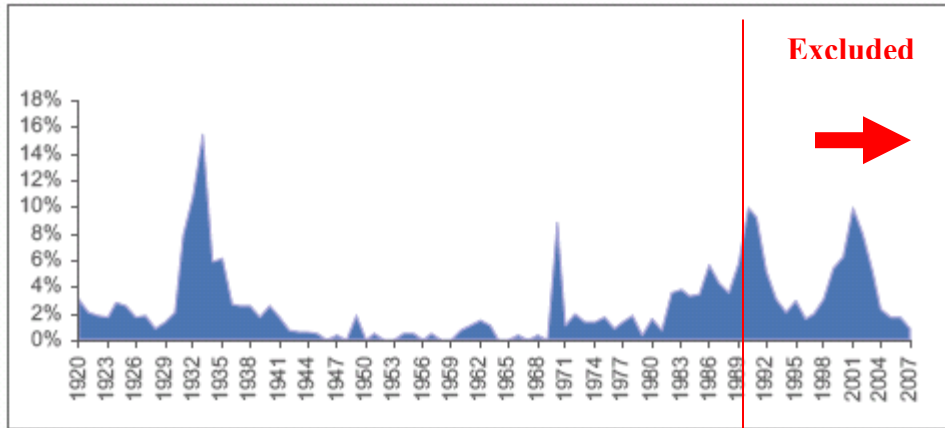


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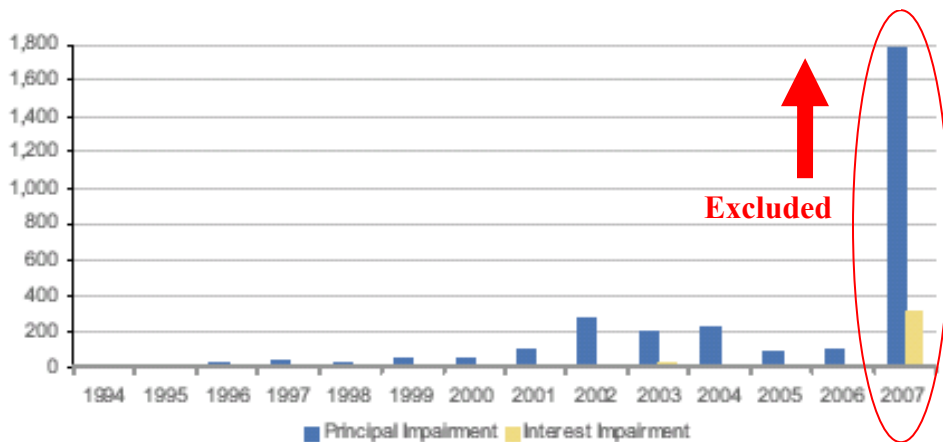
Chart 1. Second, structured finance securities were excluded from the data for Chart 1 and defaults are substantially elevated in the subprime-led credit down cycle as seen in Chart 2. Had structured finance defaults in 2007 and the corporate credit down cycles of 1991 and 2001 been fully factored in, we believe that the actual default rate experienced would have been higher than the expected default rate used in the RBC model.

Chart 1: Annual Speculative-Grade Default Rates, 1920-2007



Source: Corporate Default and Recovery Rates, 1920 – 2007, Moody’s Investors Service, February 2008

Chart 2: Structured Finance Material Impairments, 1993-2007



Source: Default and Loss Rates of Structured Finance Securities, 1993 – 2007, Moody’s Investors Service, July 2008



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Event Risk

Definition

“Event risk is the risk of regulatory changes or other external occurrences that are significant, unanticipated and external, which impact the value of a security.”

Commentary

Event risk is the exposure to loss from a change in the credit quality of a security resulting from a merger or acquisition, a leveraged buyout, or force majeure.¹⁹ Actuaries forecast event risk for insurance companies such as the probability of another Hurricane Katrina, but the definition above only includes the asset side. If one compares financial institutions’ expected versus unexpected losses of invested assets over the last year, the difference is astounding. The main reason for these unexpected losses is largely attributable to the impact of the subprime crisis on financial institutions.

Quantification of Event Risk

Models of unexpected and expected losses can capture risk. Expected losses are long-run average losses and thus can be reflected in ratings/pricing.²⁰ Unexpected losses are not reflected in the ratings but require that capital be set aside to absorb the shock so the insurer is not debilitated by their occurrence.²¹ In a normal distribution of risk, the higher the confidence level, the more risk is captured by shortening the tails.²² Quantifying unexpected loss sounds counterintuitive, but it really means the maximum potential loss at a given confidence level, say 95%.²³ Event risk is even more rare, but often quite severe. Extreme Value Theory (EVT) is one attempt to quantify event risk.²⁴ The probability of extreme events would have a confidence level between 99.2% and 99.9%.²⁵ The advantage of EVT is that we can access extreme probabilities, such as the chance of the 1987 crash or housing prices declining the most since the Great Depression.²⁶ The disadvantage of EVT is a small sample size given that a sufficient number of different extreme events are needed for accuracy.²⁷ However, because we were unable to integrate the EVT concept into the current RBC methodology we were unable to find a suitable way to quantify event risk in a security.

¹⁹ Dictionary of Financial Risk Management; Gary Gastineau

²⁰ “Managing Credit Risk”; John Caouette, Edward Altman, and Paul Narayanan; page 242 - 244

²¹ Ibid, page 242 - 244

²² “Enterprise Risk Management”; David Olson and Desheng Dash Wu; page 18 - 26

²³ Ibid, page 18 - 26

²⁴ “Risk Management: A Modern Perspective”; Michael Ong; page 512 - 535

²⁵ Ibid, page 512 - 535

²⁶ Ibid, page 512 - 535

²⁷ Ibid, page 512 - 535



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Liquidity Risk

Definition

“Liquidity risk is the risk that an investor will not be able to buy or sell an asset into the market with the expected bid/ask spread, anticipated price continuity or sufficient depth; thus causing price realization or execution that is unfavorable or nonexistent”.

Commentary

Liquidity risk is usually reflected in a wide bid/ask spread and large price movements in response to any attempt to buy or sell a security.²⁸ Many structured finance instruments are illiquid to the point that they cannot be sold at any price in the current credit down cycle.

Quantification of Liquidity Risk

Accounting is backward instead of forward looking, so liquidity measurement is not timely. With that caveat in mind, liquidity for individual securities can be measured by evaluating the manner in which the insurer determines the fair value of its bonds. Pursuant to FASB-157, there are three levels of hierarchy that an insurer could use to determine fair value (See Attachment - 2). In our view, it would be fairly easy to code these three levels, i.e., Level – 1, Level – 2 and Level – 3, into Schedule D Part 1 of the Annual Statement and use these three levels as a proxy for liquidity, with Level – 1 being the most liquid and Level – 3 being the least liquid.

²⁸ Dictionary of Financial Risk Management; Gary Gastineau



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Call Risk

Definition

“Call risk is the risk that an issuer may elect to retire an asset, in whole or in part, when the investor would have preferred that the asset remain outstanding.”

Commentary

The lender faces a potential economic opportunity cost associated with unscheduled premature prepayment of principal on a debt instrument. Call risk is a special case of reinvestment risk, because it will usually be impossible to reinvest the funds in a similar asset with an equally high yield.²⁹

Quantification of Call Risk

For all callable bonds, the insurer could be required to list on Schedule D Part 1, the most recent price at which the bond could be called. It would then be possible for the examiner to compare this callable price with the current fair value of the bond and assess the likelihood of the bond being called.

²⁹ Dictionary of Financial Risk Management; Gary Gastineau



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Extension Risk

Definition

“Extension risk is the risk that an issuer may elect not to retire an asset, in whole or in part, prior to its maturity date when the investor might have anticipated and might have preferred early retirement.”

Commentary

Extension risk, which is a form of interest rate risk, is mainly the result of rising interest rates and is generally associated with mortgage related securities.³⁰ As interest rates rise, the likelihood of prepayment decreases. Since loans in a pool underlying a security are being prepaid at a slower rate, investors are unable to capitalize on higher interest rates because their investments are locked in at a lower rate for a longer period of time.³¹ Asset/Liability management at insurance companies requires duration risk management, which involves quantifying exposure to interest rate risk to ensure that returns on assets match outstanding liabilities. Varieties of interest rate risk include prepayment risk, reinvestment risk, volatility risk, call risk, and long-term interest rate risk. Insurance companies often use interest rate swaps to hedge exposure to interest rate risk.³²

Quantification of Extension Risk

Based on a review of finance literature, extension debt covenants would have to be analyzed on a case-by-case basis to quantify risk as part of the ratings process. The more generous the option or debt covenant to the issuer, the higher the risk. In view of the above, we were unable to determine an effective means of quantifying extension risk.

³⁰ Ibid

³¹ Ibid

³² Ibid



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Deferral Risk

Definition

“Deferral risk is the risk of the issuer’s right to delay payments of interest or dividends (temporarily or indefinitely) on certain instruments.”

Commentary

Deferral options or covenants increase the risk of bonds. For example, hybrid securities pay a predictable (fixed or floating rate) rate of return for a specified period of time at which point the holder has a number of options that can be exercised including conversion to equity. Hybrid securities also provide the issuer with the option to suspend coupon payments to conserve cash for operations and more senior claims without triggering a default. Optional deferral features vary greatly among hybrids. Hybrids with the option of unconditional deferral that can be made at any time, at management’s discretion, on a non-cumulative basis, for an unlimited time period, are the most equity like. In contrast, convertible bonds differ from hybrids in that coupon payment may not be suspended, but the holder may have the right to convert to equity.³³

Quantification of Deferral Risk

Based on a review of finance literature, deferral debt covenants would have to be analyzed on a case by case basis to quantify risk as part of the ratings process. The more generous the option or debt covenant to the issuer, the higher the risk. In view of the above, we were unable to determine an effective means of quantifying deferral risk. Insurers could be asked to disclose in their Notes to the Annual Statement the terms of their deferral and the number of deferrals.

³³ Ibid



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Currency Risk

Definition

“Currency risk is the risk that a nondollar-denominated bond (i.e., a bond whose payments occur in a foreign currency) has uncertain U.S. dollar cash flows. The dollar cash flows are dependent on the foreign exchange-rate at the time the payments are received.”

Commentary

Currency risk is the return volatility in a cross-border asset that is due to changes in foreign exchange rates. When the U.S. dollar weakens against other foreign currencies, cash flows from foreign bonds increase. When the U.S. dollar strengthens, cash flows from foreign bonds decline. Insurance companies with significant foreign currency exposure hedge with foreign exchange rate swaps and/or match foreign bonds with foreign liabilities, which mitigates foreign exchange rate risk.³⁴

Quantification of Currency Risk

Foreign currency risk can be quantified by looking at the historic volatility of major indices. Volatility translates into risk as it immediately impacts cash flow. The U.S. dollar is at a historic low, which is boosting U.S. dollar cash flow of foreign bonds. Cross-currency indices track the U.S. dollar against major currencies like the Euro, the British Pound, the Japanese Yen, the Mexican Pesos, the Brazilian Real, the Thai Baht, etc. The U.S. dollar can also be tracked against a basket of foreign currencies. Insurers could be asked to disclose in their Notes to the Annual Statement their foreign currency exposure and the instruments through which these exposures are hedged on the insurer’s balance sheet.

³⁴ Ibid



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Leverage Risk

Definition

“Leverage risk is the risk associated with increasing the volatility of periodic payments. Using leverage, principal repayment terms may be also structured to increase their uncertainty, which increases credit risk. Security specific leverage is generally accomplished through structuring periodic payments according to formulae”.

Commentary

The amount of leverage increases the potential for loss. Leverage can come from debt structure or imbedded options in loans, which may subject the asset to a multiplied effect on profit/loss from small quantitative changes. Inverse floaters, Collateralized Debt Obligations (CDOs), and CPDOs are examples of leveraged debt structures. CDOs package credit risk into tranches with different ratings through payment priority and credit enhancements that reference the same portfolio of bonds.³⁵ CPDOs are synthetic debt instruments that promise to earn a fixed return for investors by making highly leveraged investment bets on CDS spreads. A CDS is a derivative that provides bond default protection. In the case of CPDOs, no lower rated tranches absorb the losses and there are no performance guarantees.³⁶ Instead, as losses mount due to widening spreads on CDS indices, leverage increases up to 15 times principal amount. If the CPDOs net asset value drops to 10%, then a cash-out triggers liquidation and investors lose 90% of their investment. With an inverse floater note, as interest rates rise the coupon rate falls.³⁷ The floating interest rate/coupon link magnifies the fluctuation in the bond’s price. Leveraged inverse floaters have a multiplier of the fixed rate that is greater than two and thus responds disproportionately (in reverse) to changes in floating rates.³⁸ Loan and debt can be imbedded with option-like structures that are triggered at certain price levels, which can substantially increase the risk. Puts, calls, straddles, strangles, and collars are options that impact the amount of leverage.³⁹

Quantification of Leverage Risk

Based on a review of finance literature, leverage factors would have to be analyzed on a case by case basis to quantify risk as part of the ratings process. Insurers that chose to use leverage could be asked to disclose it in their Notes to the Annual Statement.

³⁵ “Options, Futures, and other Derivatives”; John Hull, page 744

³⁶ “First Generation CPDO: Case Study on Performance and Ratings”; Fitch 2007

³⁷ Dictionary of Financial Risk Management; Gary Gastineau

³⁸ Ibid

³⁹ “Options, Futures, and other Derivatives”; John Hull, page 741 - 759



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Other Than Security Specific Risks

Market Portfolio Risk

Definition

“Market Portfolio Risk is the risk that remains after portfolio diversification that is attributable to marketwide risk sources that impact security valuations such as volatility of the stock market, real estate, or interest rates.”⁴⁰

Commentary

Market risk accounts for most of the risk of a well-diversified portfolio.⁴¹ The most commonly used measure of market risk in a portfolio is value-at-risk (VAR). VAR is a systematic methodology to quantify potential losses based on statistical estimates of the probability of a loss being greater than a particular dollar amount.⁴² While VAR is the gold standard for financial institutions, it failed to detect the scope of the subprime mortgage market collapse that has triggered losses that have surpassed \$500 billion. Professor Philippe Jorion is probably the most respected academic on VAR, but Professor Nassim Taleb has been a convincing challenger of his own theory. Finance is dominated by rare events that VAR does not take into account like the flaws associated with subprime credit ratings. The quantitative tools developed in finance do not work with what Professor Taleb calls the Black Swan phenomenon.⁴³ Just as it was assumed that all swans were white until the first black species was discovered in Australia during the 17th century, historical analysis is inadequate to solely judge risk.⁴⁴ While EVT addresses some shortcomings of VAR, some risks cannot be computed.⁴⁵

Quantification of Market Portfolio Risk

Scenario analysis (what-if-analysis) offers a useful way to assess potential loss by analyzing the value of a bond under different, arbitrarily determined scenarios. Bear Stearns and many other financial institutions only used a confidence level of 95%, which is acceptable for VAR, but too low for EVT.⁴⁶ Scenario analysis is straightforward and can also stress-test a portfolio and measure its sensitivity to certain assumptions. However, stress tests may need to be broader and include more scenarios, because they also did not detect the subprime crisis. History has proven that the assumed worst-case-scenario understated by far the actual

⁴⁰ “Essentials of Investments”; Zvi Bodie, Alex Kane, and Alan Marcus; page 170 - 171

⁴¹ “Principles of Corporate Finance”; Richard Brealey, Stewart Myers, and Franklin Allen; page 169

⁴² “Value-at-Risk: The New Benchmark for Managing Financial Risk”; Phillippe Jorion

⁴³ “Death of VAR evoked as Risk-Taking VIM Meets Taleb’s Black Swan”; Christine Harper; Bloomberg, January 27, 2008

⁴⁴ Ibid

⁴⁵ “Risk Management”; Michael Crouhy, Dan Galai, Robert Mark; page 339 - 355

⁴⁶ Ibid



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scenario. Effective risk management lies in the behavior of markets during times of crisis, when investment value is most at risk.⁴⁷

In many ordinary simulation models, the probabilities of the independent variables and the correlation among them may be modeled only in a qualitative way. Monte Carlo simulation is a procedure in which the input variables are not single values but are drawn from a pre-specified statistical distribution. For example, a Monte Carlo simulation may assume that interest rates are normally distributed and then runs this scenario millions of times. The end result is a probability of outcomes for an entire distribution of interest rates. The advantage of Monte Carlo simulation is that it can model complex relationships without having a mathematical solution.⁴⁸ CreditMetrics, a system developed by JP Morgan to estimate portfolio value distribution to changes in credit quality, and the NAIC RBC model, uses Monte Carlo simulation. The disadvantage of the Monte Carlo approach is that it may not be able to handle options imbedded in debt.⁴⁹ In sum, risk can be quantified on many scales like VAR, EVT, standard deviation or beta⁵⁰, but many of them cannot be readily applied to the current security specific RBC reserve requirements.

Model Risk

Definition

“Model risk is a type of risk that occurs when a financial model used to measure the value or rating of a security does not perform the tasks or capture the risks it was designed to.”⁵¹

Commentary

Structured finance introduces model risk, which is not just a computer error as was the case for CPDOs⁵², but simply wrong assumptions in otherwise robust models. In fact, risk based capital requirements are based on a financial model with underlying assumptions that were correct at the time. If these underlying assumptions change due to updated data, then the RBC model output changes as well.

Quantification of Model Risk

⁴⁷ “Essentials of Risk Management”; Karen Horcher; page 205 - 221

⁴⁸ “Investment Risk Management”; Yen Yee Chang; page 28 - 31

⁴⁹ Ibid

⁵⁰ The beta of an individual security measures its sensitivity to market movements.

⁵¹ Investopedia Dictionary, Forbes Magazine

⁵² “S&P, Following Moody’s, Finds Errors in CPDO Models”; Mark Pittman; Bloomberg, June 13, 2007; “Moody’s Says Some Employees Breached Code of Conduct”, Neil Unmack and John Glover, Bloomberg, July 1, 2007; “Moody’s May Downgrade CPDOs After Error in New Model”, Neil Unmack and John Glover, Bloomberg, September 4, 2007



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Based on a review of finance literature, model risk factors are hard to quantify. However, model risk tends to increase, the more complex the model and the referenced asset. Derivatives that reference structured finance securities have some of the highest model risk of fixed income securities. The use of derivatives for activities other than hedging may need to be re-examined to ensure that RBC requirements reflect the risks inherent in these activities. Insurers need sufficient reserves to handle short-term value fluctuations in derivatives positions. Selling credit default swaps (CDS)⁵³ on AAA rated CDOs⁵⁴ is much riskier than what is reflected in the reserve requirements because not all noncredit risks are being captured in the current RBC framework. Security-specific risk is unique risk attached to an individual security that is not caused by characteristics which the security shares with the overall market or even its industry.⁵⁵ However, structured finance has blurred the line between security and portfolio specific risk as well as between credit and market risk. CDOs often hold diversified assets to the point that an individual security may contain portfolio-type risks, while leverage can be high and liquidity low. Many CDS are exposed to market risk, because they are as liquid as stocks and valuations fluctuate. For example, the complexity in evaluating the risk of selling a CDS on CDOs should not be rated the same as the credit risk of bonds issued by a single corporate obligor.

RBC reserve requirements could also be adjusted to encourage proper risk management by hedging with derivatives. Insurance companies can substantially lower investment risk through hedging with credit default swaps, interest rate swaps, foreign currency swaps, and many other derivatives. If an insurer can demonstrate hedge effectiveness, then RBC capital relief may be appropriate. For example, a CDS that hedges a BBB bond with an AAA counterparty, would simply add RBC reserve requirements for both the BBB bond and the AAA counterparty, when in fact RBC should be netted to reflect the joint default probability and that the risk has actually been transferred to the counterparty. A revision of RBC reserve requirements will not make regulatory arbitrage disappear, but it may encourage insurers to seek more risk-adjusted returns. Regulatory arbitrage involves financial transactions designed entirely or in part to enable one or both parties to accomplish a financial or operating objective, which is unavailable to them directly because of regulatory obstacles.⁵⁶

⁵³ A credit default swap is a derivative that gives the holder the right to sell a bond for its face value in the event of a default by the issuer.

⁵⁴ CDOs package credit risk into tranches with different ratings through payment priority and credit enhancements that reference the same portfolio of bonds.

⁵⁵ Dictionary of Financial Risk Management; Gary Gastineau

⁵⁶ Ibid



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Attachment -1
Report of the Risk Subgroup of the IAWG

Memorandum

To: Invested Asset Working Group
From: Risk Subgroup of the Invested Asset Working Group
Date: August 26, 2008
Subject: Review of Investment Risks

This is the report of the Risk Subgroup of the NAIC Invested Asset Working Group (IAWG). The Subgroup was formed to evaluate all investment risks to determine which risks are individual security risks for fixed income securities and to review how those individual security risks are handled in the current NAIC regulatory framework.

The need to undertake the review of investment risks stemmed from the events that followed the hybrid security decisions taken by the NAIC in 2006. The issues were finally resolved by the adoption of the American Academy of Actuaries (AAA) report by the NAIC earlier this year. A full review of all possible investment risks by the IAWG, as part of the NAIC's transparency initiative, was necessary to minimize future problems.

To the extent that the Subgroup observed deficiencies, it would recommend improvements to the IAWG. There were no boundaries on the risks that could be considered as part of the deliberations. The Subgroup consisted of the following regulators and industry representatives:

Max McGee, Prudential, Chair of the Risk Subgroup
Chris Anderson, Anderson Insights
Bob Carcano, NAIC Securities Valuation Office (SVO)
Kevin Fry, Illinois Department of Insurance
Wally Givler, Northwestern Mutual
Trond Odegaard, Allstate
Matti Peltonen, New York Insurance Department
Ruth Sayasith, MetLife
Elaine Weiche, Connecticut Department of Insurance

Aside from the subgroup members listed above, significant input was also provided by Allen Elstein (Connecticut), Jeff Evans (SVO) and Jim Everett (New York).



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Although a member of the Subgroup may be associated with a particular company or insurance department, his or her participation in the Subgroup was as an individual, in a professional capacity, rather than representing their company or state. The subgroup was composed of participants with various specialties including: regulatory, financial/capital markets, risk management, actuarial and accounting/reporting.

Risk Subgroup Process

The Subgroup began its work in late January 2008 and conducted weekly conference calls to discuss issues regarding investment risks. The calls did include other regulators from the states represented on the Subgroup, NAIC staff and the SVO. However, the Subgroup members made all decisions regarding the content of the report. All conference calls were documented and the Subgroup members approved minutes of the calls. There was a full and complete discussion of the issues during those calls.

The focus of the Subgroup was fixed income securities only. We began the process by developing a list of all potential investment risks. Our initial list included approximately twenty risks and it swelled to almost thirty as we worked through the process. We used a very deliberate process to discuss each risk on our list. We focused on risks associated with individual securities and not portfolio risks although we did discuss portfolio risks during our deliberations.

We first discussed and arrived at a definition for each risk. Based on that definition, we determined whether a particular risk was an individual security risk. Some risks were discussed and disposed of quickly. Other risks took several calls to reach a conclusion. Ultimately, each risk discussed ended up on one of two lists (Individual Security Risk or Not an Individual Security Risk).

Any discussion of fixed income investment risks should include a discussion of interest rate risk as that risk can fundamentally alter the return of a fixed income instrument. Although interest rate risk was determined not to be an individual security risk but rather a systematic risk, we did discuss it in some detail.

Whenever possible, we considered existing definitions for the risks identified rather than creating new definitions. The definitions may have been changed slightly to reflect the insurance context. The sources used were the NAIC and the Federal Reserve System Joint subgroup on Financial Issues from June 2003 and textbooks such as The Handbook of Fixed Income Securities by Frank Fabozzi.



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Discussion of Investment Risks

The Subgroup reviewed twenty-eight potential individual security risks, and through a full and detailed discussion, determined that eight of these risks were present in fixed income securities. The eight risks are credit, event, liquidity, call, extension, deferral, currency and leverage. After discussing all of the risks identified, the Subgroup agreed that there were no material additional individual security risks related to fixed income securities. We also discussed Financial Innovation, which is covered in more detail in Exhibit 4.

There are four additional attachments to this report which supplement our written report. Exhibit 1 provides a summary of the risks that were determined to be individual security risks along with a definition for each risk. Exhibit 2 is a listing of the balance of the risks covered as part of our deliberations, which were determined not to be individual security risks. Exhibit 3 is a grid that describes how each of the eight risks determined to be individual security risks are addressed in the current regulatory framework and recommendations to further improve the regulatory process. Exhibit 4 is Jeff Evans' report on how the ratings of rating agencies reflect loss and recovery given defaults as part of the ratings process.

Credit Risk

Credit risk is the risk of non-performance of contractual payment obligations on bonds, cash equivalents and other invested assets with the characteristics of fixed income instruments. As part of our discussions, we covered the history and development of C-1 (Asset Risk) in the RBC formula and how that relates to credit risk.

The American Academy of Actuaries (AAA) performed a review of default history in the early 1990's in order to develop the AVR and C-1 factors. The AAA utilized the Moody's default statistics as part of that review to classify securities into six rating categories. The study resulted in recommendations on the factors regardless of cause for default.

We also discussed whether the definition should be modified, as it does not explicitly state that there is a risk of downgrades of debt instruments which could lead to greatly reduced market values well before scheduled maturity dates or defaults. It was observed that the C-1 factors contemplated defaults (using a ten-year horizon) and that as an asset is downgraded RBC factors will increase and marking-to-market may even be required. Still, this does not address whether the possibility of downgrades should be stated explicitly in the definition. Ultimately, the Subgroup concluded that the present definition was adequate, however, following the concept that adverse developments for the investor with respect to any risk



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factor should be expected to result in market price declines for the asset and as such credit risk was not materially different from other risks identified in this regard.

Our conclusion is that C-1 covers the risk of default and is synonymous with credit risk. Credit risk is an individual security risk. Defaults are cyclical and the factors used in C-1 should be reviewed by the NAIC on a periodic basis. We did determine that default experience is reflected in ratings provided by the rating agencies.

We recommend that the Capital Adequacy Task Force review the default studies periodically (at least once every five years or more frequently as circumstances dictate) to determine whether material changes have occurred. Based on that review, a more in-depth study of default experience may be warranted.

Deferral Risk

Deferral risk is the risk of the issuer's right to delay payments of interest or dividends (temporarily or indefinitely) on certain instruments. It was noted that the impact of deferral is already explicitly incorporated in rating agency credit ratings and is also covered as an element of C-1. Deferral risk is required to be disclosed in the bond characteristics codes in Schedule D.

Event Risk

Event risk is the risk of regulatory changes or other external actions or occurrences that are significant and unanticipated, and which impact the value of a security. It includes governmental actions that limit payments from borrowers that are otherwise willing and able to fulfill their obligations. Some examples of event risk are corporate restructuring, takeovers or changes in tax or accounting treatment of an investment as well as natural disasters. Actual or potential corporate restructurings and takeovers, in particular, may have an adverse impact on the holders of fixed-income securities in a number of ways. In general, the impact of an event can be immediate or gradual over time.

Event risk is not a risk that is included in the credit ratings of individual hybrid and other securities, according to papers by the SVO and Standard & Poor's. This is because it is generally believed that it is impossible to factor in predictions of surprise events, such as corporate restructurings and major changes to accounting or regulation, into the ratings of individual securities. Because the factors for AVR and RBC C-1 are intended to set levels for entire portfolios of securities, the impact of defaults caused by unexpected events is



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actually included in AVR and RBC, even though individual ratings do not reflect event risk. This is because the historical studies that formed the basis for AVR and RBC looked at the occurrences and consequences of all defaults regardless of cause, so if an unexpected event caused a default then that event was included in the calibration of C-1. This is consistent with the understanding that all factors that cause defaults are contemplated by AVR and C-1, and factors that do not cause defaults (such as foreign currency risk) are not included in AVR or C-1 risk factors.

Liquidity Risk

Liquidity risk is defined as the risk that an investor will not be able to buy or sell an asset into the market with the expected bid/ask spread, anticipated price continuity or sufficient depth, thus causing price realization or execution that is unfavorable or nonexistent. The Subgroup agreed that liquidity is both a portfolio level risk as well as an individual security risk. Liquidity risk could also change over time based on the occurrence of certain events that could make the security less liquid.

Liquidity risk is addressed in the Examiners Handbook as part of the risk-focused examination approach. The Subgroup believes that liquidity risk is a significant risk and recommends, at a minimum that, the NAIC Financial Analysis Handbook be reviewed and potentially strengthened to better address portfolio liquidity risk.

Call Risk

Call risk is the risk that an issuer may elect to retire an asset, in whole or in part, when the investor would have preferred that the asset remain outstanding. Call risk and extension risk are closely related.

Call risk is currently addressed for life insurers through asset liability management, statutory cash flow testing and RBC C-3 Phase I. Call risk is required to be disclosed in the bond characteristics in Schedule D for all insurers but the details of the call provisions for a security are not readily available to state insurance regulators. Provisions should be made for facilitating access by regulators to the specific call features, possibly by including them in the SVO database project.

Extension risk



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Extension risk is the risk that an issuer may elect not to retire an asset, in whole or in part, prior to its maturity date when the investor might have anticipated and might have preferred early retirement.

Extension risk is currently addressed for life insurers through asset liability management, statutory cash flow testing and RBC C-3 Phase I. Extension risk is required to be disclosed in the bond characteristics in Schedule D for all insurers. Provisions should be made for facilitating access by regulators to the specific extension features, possibly by including them in the SVO database project.

We also discussed how mortgage-backed securities are impacted by call and extension risk. In the case of mortgage-backed securities, the cash flow depends on the timing of principal repayments made by the borrowers in the pool of mortgages that serve as collateral for the security. Prepayment risk is the risk that borrowers will prepay all or part of their mortgage sooner than anticipated. Extension risk is the risk that prepayments will be slower than anticipated.

Currency Risk

Currency risk is the risk that a nondollar-denominated bond (i.e., a bond whose payments occur in a foreign currency) has uncertain U.S. dollar cash flows. The dollar cash flows are dependent on the foreign exchange rate at the time the payments are received.

Payments linked to foreign exchange rates are required to be disclosed in the bond characteristics codes in Schedule D. The Subgroup believes that currency risk is adequately disclosed in the annual statement, but recommends that the IAWG review the disclosures for potential enhancement.

Leverage Risk

Leverage risk is the risk associated with increasing the volatility of periodic payments. Using leverage, principal repayment terms also may be structured to increase their uncertainty, which increases credit risk. Security specific leverage is generally accomplished through structuring periodic payments according to formulae.

Rating agencies consider the risk of credit leveraging when assigning a rating to a security or a tranche of a structured security. Therefore, the risk of credit leveraging would be captured through the C1 (Credit Risk) component of the life RBC formula. In the situation where periodic payments (e.g. interest payments) may be leveraged, modeling of the security in C-3



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Phase I of the life RBC formula would capture the impact of leveraging of periodic payments of the security in the Asset-Liability mismatch risk.

Leverage risk is required to be disclosed in the bond characteristics codes in Schedule D which identifies when the insurer can vary the amount of periodic payments.

Other Considerations

- We also discussed the Bond Characteristics (Schedule, D Part 1, Column 5) and their development during the implementation of Provisional Exemption to enhance disclosure. Realizing that credit ratings referred only to default risk (and its costs), IAWG members sought a mechanism to flag risks other than credit risks. Disclosure of these risks (call, foreign currency *etc.*) for each individual asset was considered at the time to be an enhancement to the explicit reliance on ratings based solely on credit as the basis for AVR and C-1. The IAWG should consider expanding the Bond Characteristic codes to enhance disclosure and transparency.
- It was pointed out during our discussions that we need to be thinking about the cumulative effect of a specific risk across a number of asset classes. It could be more significant than just an individual security.
- There were also seventeen additional risks that were considered as part of our discussions. Those risks are outlined in Exhibit 2. The discussion on most of those risks was very short since the Subgroup members quickly agreed that they were not individual security risks. In some instances, the risks were already embodied in the eight risks that were deemed to be individual security risks. In many instances, we agreed that they represented legitimate risks but were not individual security risks. The details on the risks deemed not to be individual security risks are documented in Exhibit 2 (further details are contained in the minutes from the meetings which are included in the Appendix).
- We had an interesting discussion on conversion risk. If a security has a mandatory conversion provision, it is treated in RBC as if it had already converted so the risk is addressed from a solvency supervision standpoint. If the conversion is not mandatory, there is no incremental risk because the conversion is at the investor's option. We concluded that conversion risk does not warrant further attention at this time but this should be documented in our work product.



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Recommendations

The Risk Subgroup recommends:

- The Capital Adequacy Task Force should review the default studies periodically (at least every five years or more frequently if circumstances dictate) to determine whether material changes have occurred. Based on that review, a more in-depth review may be warranted.
- The NAIC Financial Analysis Handbook should be reviewed and potentially strengthened to better address portfolio liquidity risk.
- The IAWG should consider expanding the current database project by the SVO, or other alternatives to address regulators concerns about additional data on call and extension characteristics of specific securities.
- The VOS Task Force should consider expanding the Bond Characteristics codes to incorporate additional needs of regulators to identify attributes of securities.
- The Subgroup believes that currency risk is adequately disclosed in the annual statement, but recommends that the IAWG review the disclosures for potential enhancement.



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Exhibit 1

Individual Security Risks

Credit risk is the risk of non-performance of contractual payment obligations on bonds, cash equivalents and other invested assets with the characteristics of fixed income instruments.

Event risk is the risk of regulatory changes or other external occurrences that are significant, unanticipated and external, which impact the value of a security.¹

Liquidity risk is the risk that an investor will not be able to buy or sell an asset into the market with the expected bid/ask spread, anticipated price continuity or sufficient depth; thus causing price realization or execution that is unfavorable or nonexistent.

Call risk is the risk that an issuer may elect to retire an asset, in whole or in part, when the investor would have preferred that the asset remain outstanding.²

Extension risk is the risk that an issuer may elect not to retire an asset, in whole or in part, prior to its maturity date when the investor might have anticipated and might have preferred early retirement.

Deferral risk is the risk of the issuer's right to delay payments of interest or dividends (temporarily or indefinitely) on certain instruments.

Currency risk is the risk that a nondollar-denominated bond (i.e., a bond whose payments occur in a foreign currency) has uncertain U.S. dollar cash flows. The dollar cash flows are dependent on the foreign exchange-rate at the time the payments are received.

Leverage risk is the risk associated with increasing the volatility of periodic payments. Using leverage, principal repayment terms may be also structured to increase their uncertainty, which increases credit risk. Security specific leverage is generally accomplished through structuring periodic payments according to formulae.³

Exhibit 2

¹ Includes governmental actions that limit payments from borrowers that are otherwise willing and able to fulfill their obligations.

² In the case of mortgage-backed securities, the cash flow depends on the timing of principal payments made by the borrowers in the pool of mortgages that serve as collateral for the security. Prepayment risk is the risk that borrowers will repay all or part of their mortgage sooner than anticipated. Extension risk is the risk that prepayments will be slower than anticipated.

³ As an example of leverage risk under this definition, Inverse Floating Rate instruments may be used to lever the risk and returns of periodic payments (e.g., interest payments). Other instruments, such as Collateralized Debt Obligations, or CDOs, can be used to lever credit risk (as defined herein) and the effect of this leverage is reflected in rating agency ratings, NAIC Designations and C-1 factors.



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Risks Not Considered as Individual Security Risks

Conversion risk of a mandatory convertible security is not an individual security risk.

Systemic or systematic risk is not an individual security risk because it relates to classes of securities, securities markets or even broader market place.

Reinvestment risk is not an individual security risk but is considered a portfolio risk.

Refinancing risk is not an individual security risk and is already covered in call and extension risk.

Prepayment risk is part of call and extension risk.

Political risk is not an individual security risk and is already considered as part of event risk.

Sovereign risk is not an individual security risk and is already considered as part of event risk.

Recovery risk is not an individual security risk since it already covered in credit risk. This was confirmed in discussions with rating agencies and by reviewing their documentation.(See Exhibit 5)

Risk of permanence is not an individual security risk but is an example of extension risk.

Option risk is already addressed in other risks (call, extension and leverage).

Market risk is not an individual security risk since it is the sum of all the other individual security risks which have already been identified.

Reinsurer risk.

Counterparty risk.

Lack of accountability risk.

Yield-Curve (Maturity) risk.

Inflation risk.

Market manipulation risk.



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Security Specific Investment Risks and the Insurance Regulatory Framework

EXHIBIT 3

<u>Risk</u>	<u>Manner in which addressed in the 2008 regulatory framework</u>	<u>Recommendations</u>
Credit	Covered through C-1	Capital Adequacy Task Force should review the default studies periodically (at minimum every five years) to determine whether material changes have occurred. It is important to note that the default studies by their nature are backward-looking and need to incorporate low probability/high severity events (such as a depression). These studies should be reviewed periodically since financial innovation may impact future experience.
Event	Covered through C-1 in the aggregate if it results in default In other cases not addressed since it is unanticipated The balance of the risk is addressed in C-4 for life insurers.	None
Liquidity	Important at the portfolio level and how it impacts the insurance company Not explicitly addressed in current structure for RBC or reporting Companies use varied internal calculations to monitor liquidity Risk-focused exam can be a platform for examining and assessing company liquidity practices	NAIC Financial Analysis Handbook needs to be reviewed and potentially strengthened to address liquidity risk.
Call	Covered through ALM and C-3 Phase I for life insurers only. Covered through statutory cash flow testing for life insurers. Required to be disclosed in the bond characteristics codes in Schedule D.	Provisions should be made for facilitating access by regulators to the specific call features, possibly by including them in the SVO database project.
Extension	Covered through ALM and C-3 Phase I for life insurers only. Covered through statutory cash flow testing for life insurers Required to be disclosed in the bond characteristics codes in Schedule D.	Provisions should be made for facilitating access by regulators to the specific extension features, possibly by including them in the SVO database project.
Deferral	Covered through C-1, see reports from AAA and Hybrid RBC Working Group It is noted that NRSROs rate for significant deferral risk Required to be disclosed in the bond characteristics codes in Schedule D.	None
Currency	Payments linked to foreign exchange rates are required to be disclosed in the bond characteristics codes in Schedule D.	The Subgroup believes that currency risk is adequately disclosed in the annual statement, but recommends that the IAWG review the disclosures for potential enhancement.
Leverage	Required to be disclosed in the bond characteristic codes in Schedule D and identifies where the issuer can vary the amount of periodic payments. The risk of credit leveraging is addressed in C-1. The leveraging of interest rate risk is addressed in C-3 Phase I of the life RBC formula.	None



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Exhibit 4

Financial Innovation

The members of the Subgroup considered the risks related to financial innovation (a/k/a financial engineering, financial structuring), including modeling risk, information risk, and complexity risk. Fixed income investments subject to such risks include, but are not limited to: callable/escrowable municipal bonds, municipal inverse floaters, auction rate securities (ARS), mortgage backed securities (including pass-throughs, CMOs, IOs/POs and other MBS variants), asset backed securities, and cash market and funded synthetic collateralized debt/loan obligations (CDOs/CLOs). Any security that is not a straightforward non-callable bond would be subject to some degree of the risks attendant to financial innovation.

However, a true statement for the general category may not be true (in a practical sense at least) for an individual security in that category. For example, a cash market AAA CDO tranche would arguably have less risk under almost all conceivable circumstances than the underlying pool of collateral, financial engineering notwithstanding. Further, a true statement for the general category may not be true for an individual security when considered in an asset portfolio context – for example, MBS IOs (which may be used as a tool to reduce portfolio duration – arguably reducing interest rate risk). These examples begin to illustrate the challenge of a one-size-fits-all approach, or a security specific approach, to characterizing financial innovation risk.

As evidenced by the instruments listed above, financial innovation is not a new market phenomenon. Relative to non-callable fixed income instruments, financially engineered instruments generally require more sophisticated analysis (including modeling) and more information to properly characterize their expected cash flows, the risks associated with timely (either premature or belated) and complete receipt of these cash flows, and as events have recently unfolded, in some cases, their liquidity. The members of the sub-group were in general agreement that financial engineering risk is, at least conceptually, security specific. For instance, the risks presented by student loan ARS are completely different from the risks presented by funded synthetic corporate CDOs, and derive from the respective nature of the underlying collateral and the structure of the instruments. Analysis of the risk, therefore, naturally requires an understanding of the specific characteristics of the instrument in question. However, comprehensive characterization of the risks generally extends beyond instrument specifics, and for many instruments includes an underlying interest rate simulator/generator (generally monte carlo or lattice based, depending on the particulars of the instrument). Interest rate simulators are at the heart of many fixed income instrument risk analyses, and their implementation involves as much judgment and skill as the modeling of the specific instruments. In some cases, the nature of the instrument requires modeling of



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default correlations – a non-security specific (more accurately a cross security) parameter. These realities complicate a myopic focus on the security specific aspects of the risk in question.

There was considerable debate within the sub-group regarding whether financial innovation represents an individual security risk or an operational risk. However, there was agreement that it is a legitimate concern and should be addressed within the regulatory framework. The sub-group felt that it is less important that financial innovation be characterized as an individual security risk, than it is for regulators to have a process to identify securities that are so affected, so that they can engage companies in further dialogue about how they manage the risks often attendant to these securities.

Summarizing the preceding, the general sense of the sub-group is that 1) the risks presented by financial innovation represent a legitimate concern worthy of regulatory attention, 2) while aspects of the risk are security specific, a security specific approach to addressing such risk is incomplete and otherwise problematic, and 3) a more appropriate approach to handling financial innovation risk is to regard it as a subset of operational/management risk, and to improve the regulatory review of management processes and expertise. Further, the sub-group recommends that the IAWG consider ways to make improved security information more readily available for regulator use, perhaps through the Bond Characteristics column of Schedule D.



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Exhibit 5

Recovery Ratings and Loss Given Default Assessments How Standard & Poor's and Moody's Incorporate Recovery and Losses Following Default in Their Ratings Processes

Prepared by:

Jeffrey L. Evans, CFA
NAIC SVO
IAWG subgroup on Risks
07/24/2008

Both of the two largest NRSROs incorporate recovery analysis (S&P) or loss given default assessments (Moody's) in their below investment grade corporate ratings. Essentially, in their efforts to incorporate recovery in default, both rating agencies notch lower (usually) or higher (less frequently) from the baseline probability of default rating. Thus, the issue rating as published is a blend of the strict probability of default, combined with recovery of the investment in the event of a default.

The notching is based on the agencies' assessments of what proportion of the face value of the obligation a debt holder is likely to receive on their investment should the issuer default on its obligations. These assessments are influenced by three main factors: 1) the quality of the collateral of the issuer overall; 2) by the relative size of the claim relative to the collateral; and 3) the order of priority of claim in the capital structure that each issue represents. An issue backed by substantial collateral, that is higher in priority, will be notched higher; while one backed with little or no collateral, that it lower in priority, will be notched lower

Conceptually, this means that between two issues with the same rating (say "B+/B1" rated senior subordinated bonds of ABC and XYZ); one (XYZ) might actually be more likely than the other (ABC) to default. In default, however, expected recovery on XYZ would be higher than ABC.

The methodologies by which the two rating agencies arrive at their conclusions are very different in process, if not so greatly different in outcome. For a discussion on the agencies' respective methodologies, see S&P "Corporate Ratings Criteria 2008", available at:

<http://www2.standardandpoors.com/portal/site/sp/en/us/page.article/2,1,1,4,1204836634695.html>¹

¹ Free registration is required. Once logged in, click "Research and Knowledge/Criteria & Methodologies/Ratings – Corporates.



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“Probability of Default Ratings and Loss Given Default Assessments for Non-Financial Speculative-Grade Corporate Obligors in the United States and Canada” is available at:

<http://www.moodys.com/cust/content/loadcontent.aspx?source=staticcontent/free%20pages/LGD/lgdadpage.htm>²

What follows is an examination of the hypothetical case above, following the steps that end with identical ratings, but with different probabilities of default and corresponding different levels of expected recovery.

For the two issuers, ABC and XYZ, to have identical issue ratings but with different probabilities of default, they must have different baseline or enterprise level ratings. In S&P’s nomenclature, this is called a Corporate Rating, or an Issuer Rating. Moody’s calls it their Corporate Family Rating. In the case of ABC, imagine that it has an Issuer rating of “BB+” from S&P and a Corporate Family Rating of “Ba1” from Moody’s. XYZ, on the other hand, has an S&P issuer rating of “B” and a corporate family rating from Moody’s of “B2.” In this case ABC and XYZ baseline or enterprise level ratings are four notches apart, with ABC rated higher. It is interesting to note that using Moody’s published historical default statistics, a “B2” rated bond has a nearly 36% likelihood of defaulting over 10 years, while for a “Ba1” rated bond the likelihood of default over 10 years is just over 10%.

Let us assume that ABC is a company that has relatively little collateral for bondholders to claim in the event of a default. ABC could be a services company that is rated on the basis of its cash flow. Let us further assume that there is a substantial amount of debt on ABC’s balance sheet that is senior to the issue in question. Should ABC default, what little collateral there is would be claimed by the senior debt holders, leaving nothing for the issue we are looking at. In this case, both S&P and Moody’s might notch ABC’s senior subordinated debt *lower* by two steps, to “BB-/Ba3.”

With the other issuer, assume that XYZ, although lower rated, has good collateral for the bondholders. Perhaps it is a company with more leverage, or a weaker competitive position, but one that has valuable and marketable assets for collateral. XYZ might be an independent oil producer with proven oil reserves in its portfolio, reserves that would fetch a good price from another buyer. Let us further assume that XYZ has very little debt on its balance sheet that is senior to the issue in question. Were XYZ to default, the senior subordinated investors could expect to receive the full face value of their investment, because the collateral coverage

² Free registration is required. Once logged in, this report is listed under “Reports” dated August 23, 2006.



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is so strong. In this case, both agencies might notch XYZ's senior subordinated debt *higher* by two steps, to "BB-/Ba3."



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Attachment – 2

As stated by FASB-157: “**Level 1** inputs are quoted prices (unadjusted) in active markets for identical assets or liabilities that the reporting entity has the ability to access at the measurement date. An active market for the asset or liability is a market in which transactions for the asset or liability occur with sufficient frequency and volume to provide pricing info on an ongoing basis.

“**Level 2** inputs are inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly or indirectly. Level 2 inputs include the following: A. Quoted prices for similar assets or liabilities in active markets. B. Quoted prices for identical or similar assets or liabilities that are not active, that is in which there are few transactions for the asset or liability, the prices are not current, or price quotations vary substantially either over time or among market makers. C. Inputs other than quoted prices that are observable for the asset or liability. D. Inputs that are derived from principally or corroborated by observable market data by correlation or other means.

“**Level 3** inputs are unobservable inputs for the asset or liability. Unobservable inputs shall be used to measure fair value to the extent that observable inputs are not available, thereby allowing for situations in which there is little, if any market activity for the asset or liability at the measurement date. However, the fair value measurement objective remains the same, that is, an exit price from the perspective of a market participant that holds the asset or owes the liability. Therefore, unobservable inputs shall reflect the reporting entity’s own assumptions about the assumptions that market participants would use in pricing the asset or liability (including assumptions about risk). Unobservable inputs shall be developed based on the best information available in the circumstances, which might include the reporting entity’s own data.”