![American Academy of Actuaries logo](Objective. Independent. Effective.)

AMERICAN ACADEMY *of* ACTUARIES

Objective. Independent. Effective.

June 8, 2017

Mr. Kevin Fry
Chair, Investment Risk-Based Capital Work Group
National Association of Insurance Commissioners

Re: Updated Recommendation of Corporate Bond Risk-Based Capital (RBC) Factors

Dear Kevin:

In August, 2015, the American Academy of Actuaries' C1 Work Group (C1WG) recommended risk-based capital factors for corporate bonds. This recommendation, *Model Construction and Development of RBC Factors for Fixed Income Securities for the NAIC's Life Risk-Based Capital Formula*, was exposed for comment and generated a number of comments and questions. The C1WG responded to those comments in our Oct. 17, 2016 letter to you.

Subsequent to our initial recommendation, we have continued to review our analysis, placing particular emphasis on those assumptions that are more subjective in nature with the potential to create unintended biases in the factors. In particular, we have focused on the following assumptions:
1. Composition of the Representative Portfolio
2. Recovery Assumptions
3. Discount Rate

Based on our analysis, we have revised our recommendation based on changes to the representative portfolio. We made no changes to the recovery assumptions or to the discount rate. Included with this letter is an updated set of base bond factors and portfolio adjustments for the Life RBC formula. In addition, we also provided a set of alternative factors that could be considered as a basis for the bond factors contained in the Health and P&C RBC formulas. A more detailed description of our analysis and results follows.

A. **Modifications to the Base Factors**

1. Composition of the Representative Portfolio
   In our August, 2015 recommendation, we developed the C1 factors based on a representative bond portfolio for the industry. This portfolio included 405 issuers, all of which were in the NAIC 1 category. Upon further reflection, we concluded that the representative portfolio should include issuers in the NAIC 2 category to better reflect the average credit risk for an insurer's portfolio. Consequently, our representative portfolio

was expanded to include 824 issuers. This revised portfolio resulted in a narrower dispersion of losses as expected for a bond portfolio, thereby decreasing the resulting C1 factors. The details of the representative portfolio are included in Appendix D of this report.

2. Recovery Assumptions
In the August 2015 recommendation, we inadvertently used recovery assumptions based on the issue, rather than the issuer. The default assumptions were based on issuer. Ideally, the basis for the default and recovery assumptions should be identical. We attempted, but were not able to obtain issuer based recovery assumptions from Standard & Poor's (S&P) at the necessary level of detail to revise the C1 factors.

S&P stated that the average recovery rate based on issuers was 43.0% versus an average recovery rate of 42.3% based on issues. We were not able to obtain more detailed data for each rating class for input into the C1 model. However, based on this high level of information provided by S&P, we do not think the C1 factors would have changed by much, if at all, if issuer-based recovery rates were used.

3. Discount Rate
There has been much discussion on the choice of the discount rate. The discount rate is used to determine the present value of the cash flows projected over ten years from the representative portfolios. The August 2015 recommended factors use a 5% pretax discount rate. This 5% was based on the ten-year LIBOR[1] swap rate, averaged over the previous twenty years (1994 – 2013). We considered an updated discount rate to include the most recent data (observed monthly ten-year swap rates May 1, 1997 - April 30, 2017); an updated rate would be 4.2% pretax.

The choice of a discount rate is subjective, but the C1WG thinks it is important to define the basis for the rate (risk-free, rationale for the time period, etc.). Use of the updated discount rate will increase the C1 factors, all other things being equal. At this time, the C1WG chose to leave the 5% discount rate unchanged given the subjectivity of this assumption.

Updated before-tax C1 factors for bonds are included in Appendix A. These factors are direct model output and have not been rounded. Note that these updated assumptions have no impact on the basic Asset Valuation Reserve (AVR) contribution factors. The basic AVR contribution is set equal to the risk premium.

B. **Portfolio Adjustment Formula**

The capital requirements for bond risk in the Life RBC formula are calculated in two steps. The first step involves the calculation of the base factors times each individual security. The second step involves an adjustment to the result from the first step to reflect differences between an individual insurer's bond portfolio and the representative portfolio used in developing the base factors. Primarily, the portfolio adjustment reflects risk differences due to the diversification benefits observed at an individual company's portfolio level. The

---

[1] London InterBank Offered Rate

average industry C1 charge for bonds increased from 1.35% to 1.67% on a before-tax, before-covariance basis and before any portfolio or top ten adjustments. The portfolio adjustment brings the aggregate industry capital requirement to the 96th percentile. The portfolio adjustment formula is intended to bring individual companies as close to the 96th percentile as possible, but an individual company's C1 results will be higher or lower than the prescribed 96th percentile.

Following a presentation to the IRBC, the C1WG obtained feedback from the IRBC in early 2017 on the desired structure of the portfolio adjustment. The IRBC expressed a preference for the simpler adjustment of the options presented, based solely on the number of issuers in a portfolio, which is consistent with the current portfolio adjustment approach. The C1WG is recommending a portfolio adjustment formula, consistent with the updated base C1 factors, as recommended earlier in this document, in Appendix B.

While the C1WG is recommending both updated base C1 factors and a portfolio adjustment formula, we are not recommending any changes to the treatment of the largest ten holdings. In the current RBC formula, the C1 factors for the top ten assets are doubled to reflect the higher risk due to concentration. We recommend that the top ten treatment be retained in the determination of RBC.

Additional documentation of the recommended portfolio adjustment formula is included in Representative Portfolio Documentation in Appendix D.

C. **Estimated Impact on Life RBC**

It is difficult to estimate the aggregate dollar increase for the recommended C1 charges due to the multiple steps that must be followed in calculating the C1 component for an insurer's aggregate Total Adjusted Capital. The C1 component is affected by federal income taxes, the top ten holdings, the portfolio adjustment, and the covariance adjustment (i.e., how the C1 component relates to the other RBC components). While the C1WG cannot predict how the updated factors will affect future investment decisions of life insurers, we have attempted to estimate how the proposed C1 factors will affect the C1 calculation for bonds.

The NAIC provided data on the bond portfolios for approximately 700 life insurers as of December 31, 2011. The average C1 charge is derived from the industry holdings at December 31, 2011 of non-defaulted bonds of companies with five or more issuers. These estimates are based on the data used to develop the recommendations; however, there are certain assets subject to the C1 bond factors that are not included in our bonds. The estimates are based on 73% of the total Book Adjusted Carrying Value (BACV) reported in 2011. For example, the average C1 percentages do not include the effect of short term paper and other non-corporate bonds that are included in total BACV subject to C1 (e.g., structured securities in Schedule D).

Based on the December 31, 2011 data used to develop the base factors, the average industry C1 charge for bonds would have increased from 1.00% to 1.20% on an after-tax, before-covariance basis and before any portfolio or top ten concentration adjustments. The average industry C1 charge for bonds increased from 1.35% to 1.67% on a before-tax, before-covariance basis and before any portfolio or top ten adjustments. The covariance adjustment

contained in the Life RBC formula will further reduce the total capital requirements approximately 20-25%, depending on the individual insurer's risk profile. It is important to note that the change in C1 capital requirements for an individual insurer will differ from the average.

Regarding these estimates, we note that our average C1 modeled percentage is higher than the actual C1 percentage because we have not included all the reported bond data in the C1 model. We note that the average reported C1 as of December 31, 2011 for the entire industry was only 1.21% compared to the average 1.35% for the modeled bonds.

We estimate that the dollar impact on an after-tax basis, before covariance and any portfolio and top ten concentration adjustments for 2016 would be approximately $6 billion, or approximately 20%. This $6 billion is a fairly crude estimate that is on the higher end of the range for C1 results due to the simplified assumptions and data used to calculate this estimate.

D. <u>Alternative Base Factors for Health and P&C</u>

The C1WG is recommending C1 factors for the Life RBC formula. We recognize that there is a desire to update the investment risk factors in all of the RBC formulas for consistency. Because the investment risk is the largest risk for most life insurers, changing the C1 bond factors has a material impact on the RBC ratios for the life industry. However, changing the investment factors in the Health and P&C RBC formulas has a much smaller impact since investment risks as a percentage of the whole are relatively smaller for most health and P&C companies.

At the request of the IRBC, the C1WG has created a set of alternative factors that could be used as the basis for updated bond factors in the Health and P&C formulas. These factors, contained in Appendix C, have been developed by adjusting the basic Life C1 factors as follows:

1. Federal taxes are zeroed out to produce pre-tax factors
2. The provision for credit risk contained in statutory life reserves, as defined by the Risk Premium, has been zeroed out. Health and P&C statutory reserves contain no provision for credit risk.

All other assumptions remain the same. Note that the bond factors in the current Health and P&C RBC formulas contain an adjustment to the bonds reported in NAIC 3-5 categories. These below-investment-grade securities are reported at market value in the Health and P&C financial statements, but are reported at amortized cost in the Life financial statement. The C1WG was not able to find any documentation of the current adjustment for reporting differences (largely a 50% reduction in the P&C and Health factors). The adjusted factors contained in Appendix C do not include any adjustment for this reporting difference.

The C1WG is not recommending these factors for the P&C and Health RBC formulas, but have provided these alternative factors as a potential starting point for consideration by regulators to create a more consistent set of updated charges across all RBC formulas.

****

If you have any questions or would like to further discuss these topics, please contact Heather Jerbi, Assistant Director of Public Policy, at jerbi@actuary.org or Nancy Bennett, Senior Life Fellow, at bennett@actuary.org.

Sincerely,

Nancy Bennett, FSA, CERA, MAAA
Jerry Holman, FSA, CFA, MAAA
Co-Chairs, C1 Work Group
American Academy of Actuaries

Cc: Julie Garber, NAIC

Base C1 Factors for Corporate Bonds for the Life RBC Formula

Before Tax, Direct Model Output

Appendix A

	Aug-15	Jun-17	Current
Aaa	0.28%	0.22%	0.40%
Aa1	0.43%	0.32%	0.40%
Aa2	0.63%	0.44%	0.40%
Aa3	0.79%	0.56%	0.40%
A1	0.96%	0.68%	0.40%
A2	1.13%	0.82%	0.40%
A3	1.30%	0.98%	0.40%
Baa1	1.49%	1.13%	1.30%
Baa2	1.68%	1.32%	1.30%
Baa3	2.01%	1.57%	1.30%
Ba1	3.55%	2.88%	4.60%
Ba2	4.39%	3.74%	4.60%
Ba3	5.62%	4.89%	4.60%
B1	5.99%	5.07%	10.00%
B2	7.86%	6.89%	10.00%
B3	10.31%	9.45%	10.00%
Caa1	14.45%	13.87%	23.00%
Caa2	19.85%	19.02%	23.00%
Caa3	29.82%	29.06%	23.00%

Portfolio Adjustment Factors

Appendix B

Current PA Formula			Recommended PA Formula (June, 2017)		
	Issuers	Factor		Issuers	Factor
Up to	50	2.50	Up to	20	6.75
Next	50	1.30	Next	130	1.70
Next	300	1.00	Next	250	1.05
Over	400	0.90	Next	500	1.00
			Over	900	0.95

Alternative Base C1 Factors for Corporate Bonds
Direct Model Output, No Taxes, No Statutory Reserve Offset
Appendix C

All Factors Stated at 92nd % Confidence Level*

	Current Life	Alt 6/17	Life Factors 6/17
Aaa	0.40%	0.26%	0.22%
Aa1	0.40%	0.43%	0.32%
Aa2	0.40%	0.64%	0.44%
Aa3	0.40%	0.92%	0.56%
A1	0.40%	1.27%	0.68%
A2	0.40%	1.64%	0.82%
A3	0.40%	2.07%	0.98%
Baa1	1.30%	2.56%	1.13%
Baa2	1.30%	3.12%	1.32%
Baa3	1.30%	3.88%	1.57%
Ba1	4.60%	8.66%	2.88%
Ba2	4.60%	11.44%	3.74%
Ba3	4.60%	15.39%	4.89%
B1	10.00%	20.10%	5.07%
B2	10.00%	28.18%	6.89%
B3	10.00%	39.47%	9.45%
Caa1	23.00%	54.63%	13.87%
Caa2	23.00%	69.19%	19.02%
Caa3	23.00%	72.49%	29.06%

* The Life RBC formula contains a portfolio adjustment factor to capture how an individual insurer's portfolio differs from the representative portfolio due to diversification.

The Portfolio Adjustment increases or decreases the base C1 factors with the objective of holding required capital for the bond portfolio at the 96th %ile over 10 years.

These alternative factors have not been adjusted for any reporting differences between NAIC 3-5 bonds.

Representative Portfolio Documentation
Appendix D

The following section replaces Appendix D from the original 2015 report mentioned in the first paragraph of this document.

A. General

The representative portfolio is a generic portrayal of a bond portfolio structure that captures key features which differentiate C1 risk. This approach is used because it would be impractical to model every aspect of life company portfolios. The portfolio relies on the assumption that all bonds are generic and produce the same result given the same rating. Thus, all bonds of a given rating have the same default and recovery assumptions.

The main factors affecting a generic analysis of corporate bond portfolio risk are the mix of ratings, size distribution, and number of bonds held. The representative portfolio captures these variables to evaluate aggregate portfolio risk. This process can also be thought of as using "modeling cells" or "model points" to represent a portfolio. While the term "representative portfolio" is used in the singular, this process defines a family of portfolios that are characterized by those seen in actual life company portfolios.

The NAIC supplied comprehensive data covering the bond portfolios of every life company completing an RBC filing as of December 31, 2011 (no company identifying data was provided). The data comprising over 287,000 positions and 734 companies was anonymous as to company and was non-CUSIP[2] specific. The data was adjusted to remove bonds guaranteed by the full faith and credit (FFC) of the US government, affiliate bonds and bonds with zero value. These bonds were excluded because US FFC bonds and zero value bonds generate no C1 charge and affiliate bonds have their own C1 classification that looks through to the holdings of the affiliate.

An averaging process, described later, was used to define a given representative portfolio. Because meaningful differences could get lost with too broad an averaging of the data, the portfolios were developed with respect to size categories. The categories roughly corresponded to breakpoints of industry bond portfolio sizes. The categories are shown below.

---

[2] Committee on Uniform Securities Identification Procedures

Table D1. Life Company Representative Portfolio Size Categories

Size Category	$Billion		$Billion	Count
1	0.0	-	0.5	503
2	0.5	-	1.0	54
3	1.0	-	2.5	70
4	2.5	-	5.0	35
5	5.0	-	10.0	32
6	10.0	-	25.0	24
7	25.0	-	80.0	16

A consolidated view of each company's bond portfolio rating and size distribution was used to develop an average portfolio for each size category. Each company's bonds were rank-ordered by Book Adjusted Carrying Value (BACV). Using an ascending sort order of the bonds by position size, eighteen groups or bins were created such that the first two and last two bins each hold 1/32nd of the BACV and the other bins, 3 - 16, each hold 1/16th of the BACV. The average BACV of each bin is taken as the set of model points to define the overall size distribution. The actual distribution by rating is determined by assigning the bonds in a given size bin to their associated rating categories.

The average portfolio for a size category is determined by combining the consolidated portfolios for each company in the category. Each bin size amount, which defines the bin model point, is the average of all companies' BACV held in the same associated bin number. In other words, after each company's assets are assigned to a bin, those assets for all companies in aggregate are used to define the average company size amount for that bin. The average number of bonds held in each bin and rating category defines the model points of the average portfolio for the size category. As an example, the average portfolio for size category 6 is shown below. The portfolios for all categories are shown in Section C.

Table D2. Category 6 Portfolio Size and Rating Distribution

Bin	NAIC Rating					
	1	**2**	**3**	**4**	**5**	**$Million**
1	82	76	47	35	8	2.013
2	37	36	15	10	1	5.062
3	56	53	13	6	2	7.789
4	39	42	7	2	1	11.108
5	30	34	5	1	0	14.229
6	25	30	3	1	0	17.209
7	21	26	2	0	0	20.336
8	19	22	2	0	0	23.561
9	16	20	1	0	0	26.895
10	15	17	1	0	0	30.664
11	13	15	1	0	0	34.746
12	13	12	0	0	0	39.485
13	11	11	0	0	0	46.288
14	8	9	0	0	0	55.684
15	8	7	0	0	0	65.445
16	6	6	0	0	0	81.004
17	3	2	0	0	0	95.349
18	3	1	0	0	0	142.017
Issuer Count	405	419	97	55	12	
Coefficient of Variation	1.13	1.00	1.02	0.83	0.77	
Issuer Count %	41%	42%	10%	6%	1%	
Amount %	47%	47%	4%	1%	0%	

Average Portfolio Size ($Millions)	16,009.9
Average Issuer Size ($Millions)	16.2
Portfolio Coefficient of Variation	1.14

The sum of the number of issuers and their associated amount with respect to each bin in the shaded areas of the Category 6 chart are used as the size distribution for all ratings to determine the C1 base factors. These factors cover losses at the 92nd percentile confidence level for each rating with respect to the size distribution in the shaded areas in the Category 6 chart above. An independent process utilizing the bond engine with all other assumptions consistent with the derivation of the base factors is used to determine the required C1 for the entire portfolio at the target 96th percentile, as specified by regulators.

The 96th percentile target C1 of the Category 6 portfolio is 1.10%. The base factors applied to the full portfolio produce an average 0.90% base factor, equivalent to a 93rd percentile confidence level. This variation to the 96th percentile target is an expected result. The difference between the unadjusted 0.90% C1 and the target 1.10% C1 is resolved by applying a company specific adjustment, as described below, to the unadjusted C1 percentage.

In general, each insurer's portfolio will vary from the preliminary 96th% confidence target depending on its structure. For example, the full size category six portfolio has a higher coefficient of variation than the base factor distribution (a measure of size distribution), but only a marginally greater number of issuers (i.e., 988 vs. 824) and falls short of the 96th percentile target. Portfolios with a different number of issuers and/or coefficient of variation from the base factor distribution will have a portfolio confidence level that does not equal the 96th percentile target without company specific adjustments to the unadjusted C1 percentage. Generally, a greater number of bonds and lower coefficient of dispersion contribute to reducing risk.

The same distribution was used for each rating class to have consistency between the C1 factors even though each rating class has different size distributions. Arguably, the actual distributions for each rating could have been used. But, using actual distributions would also suggest using smaller numbers of bonds in those ratings, resulting in substantially overstated base C1 factors relative to the risk of those bonds in the portfolio. While using actual distributions for each rating is theoretically correct when considered on a standalone basis (i.e., for each separate rating), the use of actual distributions for each rating class will overstate risk on a portfolio basis. Consequently, the same distribution was assumed for each rating category.

The category 6 portfolio size was chosen for the basis of the ratings factors because it contains the 50% cumulative BACV point with a cumulative range of 33% - 56% of industry BACV. While the category 6 companies are much bigger than the average industry size, they represent portfolios that are central in size to the greatest proportion of industry assets that are concentrated in category sizes 5 - 7. The chart below shows asset concentration by issuer counts and BACV for all companies in ascending order of their portfolio size.

Chart D1.

Cumulative Industry BACV vs. Count Concentration
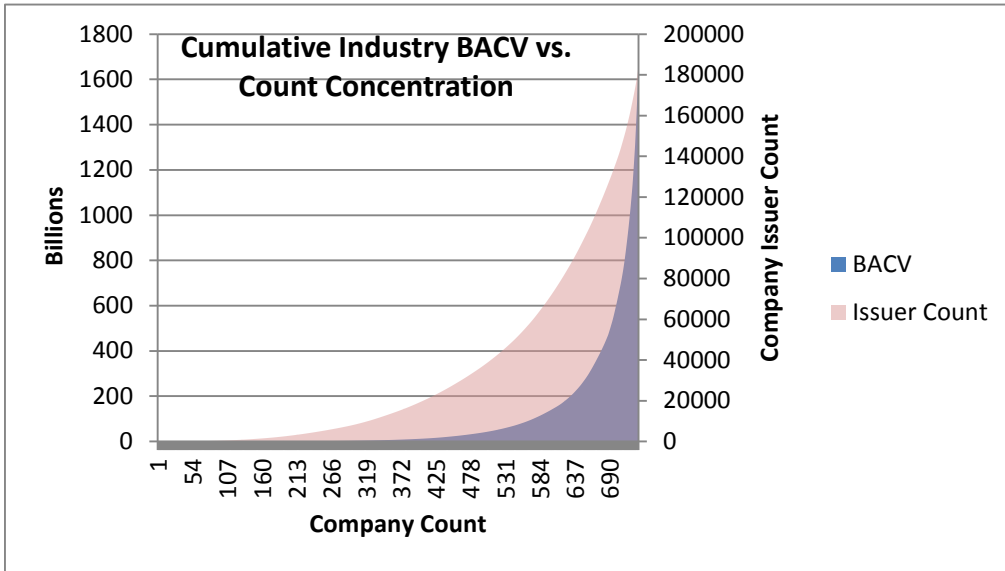
B. Company Specific Adjustments

Two key portfolio characteristics account for most of the variation between the risks of an individual portfolio versus the average or representative portfolio: the number of issuers and the issuer amount. The current C1 factors reflect concentration risk by doubling the C1 of the 10 largest issuers held across all debt related asset classes. The initial filter excludes bonds with C1 RBC equal to 0 and NAIC 1 bonds. As applicable after the first filter, if a top ten issuer has NAIC 1 bonds, they are added back. Up to 10 bond issuers of a bond portfolio can be subject to the top 10 doubling rule for concentration risk.

Size variation can be measured with respect to the bond portfolio on a standalone basis as the coefficient of variation. The coefficient of variation is the standard deviation divided by the mean. Generally, a higher/lower coefficient of variation and lower/higher number of issuers held will produce higher/lower risk. The chart below shows the coefficient of variation and number of issuers for each of the size category average portfolios. Generally, the coefficient of variation and number of issuers increase with size category.

Chart D2.
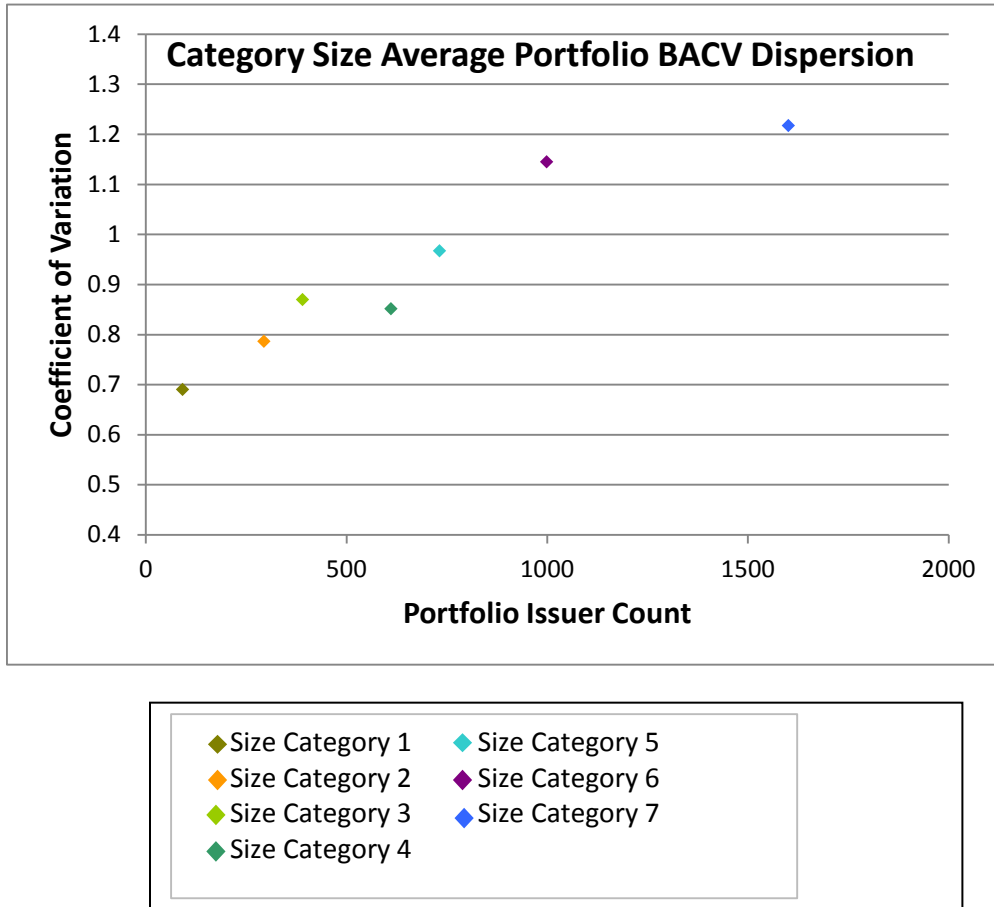
There is significant variation in the size distribution and the number of issuers held across companies within each category.

Adjustment formulas applied to the base C1 factors need to accommodate this variety of portfolio structures. A condensed view of these portfolios is given below for category 1 companies and for category 2 - 7 companies combined. Category 1 companies are shown separately here because they comprise two thirds of the number of companies with the bulk of those companies holding 300 or fewer issuers (excluding US FFC bonds). The corresponding graphs for each size category are provided in Section C.

The C1WG considered two different types of adjustment formulas. The first type reflected the number of issuers and the second type reflected number of issuers and the coefficient of variation. While the C1WG thought the addition of coefficient of variation improved the accuracy of the results and better reflected portfolio risk for an individual insurer, the NAIC's Investment RBC Work Group expressed a preference to retain a simpler formula using number of issuers only. The portfolio adjustments were developed using the target C1 factors calculated for each of the 677 companies. Companies with less than five issuers were excluded from the analysis. The goal was to develop a formula resulting in a portfolio adjustment factor that would scale the base factors, such that the 96th percentile target is achieved for a bond portfolio in aggregate. Further, the formula was designed to target a 96th percentile C1 target for each individual bond portfolio,

not just for the industry in total. As such, the formula was designed by statistically "fitting" the formulaic results to the entire distribution of results for each company. The "fit" was defined as one that would minimize the weighted sum of the squared differences between a company's target C1 factor and the result of a company's adjusted C1 factor, base factor times the average portfolio adjustment factor. Target C1 dollars were used as the weights. Determination of the formula, number of issuer breakpoints and factors, was done using *Excel's Solver*, an optimization tool, to create best fit.

Runs were done including all companies with five and greater number of issuers. Initial results produced rather high factors. Analysis of the cause indicated that one company, #161 a company with 40 issuers and over 40% of its portfolio in non-investment grade, was a primarily cause. This company was viewed as an outlier and dropped from further analysis. Results excluding this company produced more reasonable factors. We also investigated excluding all companies with less than 50 issuers from the optimization. This optimization produced lower factors for less than 50 issuers, while at the same time only minimally worsening fit. Our recommendation is based on this run, optimization based on only companies with 50 and greater number of issuers but applied to all companies.

Recommended factors

# of Issuers	Factor
First 20 issuers	6.75
Next 130 issuers	1.70
Next 250 issuers	1.05
Next 500 issuers	1.00
Issuers over 900	0.95

Weighted average size adjustment is calculated using the above table as a sliding scale. The average is the sum of the issuers times the factors, the result divided by the total number of issuers. For example, for a company with 500 issuers, the weighted average size adjustment is equal to $[20 * 6.75 + 130 * 1.70 + 250 * 1.05 + (500 - 400)*1.00]/500 = 1.437$.

A company's bond portfolio C1 factor is then equal to weighted average size adjustment factor times its average base C1 factor.

Category Size 1 BACV Dispersion

Category Sizes 2-7 BACV Dispersion

Legend:
- Size Category 2
- Size Category 3
- Size Category 4
- Size Category 5
- Size Category 6
- Size Category 7
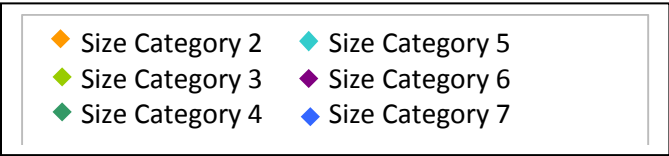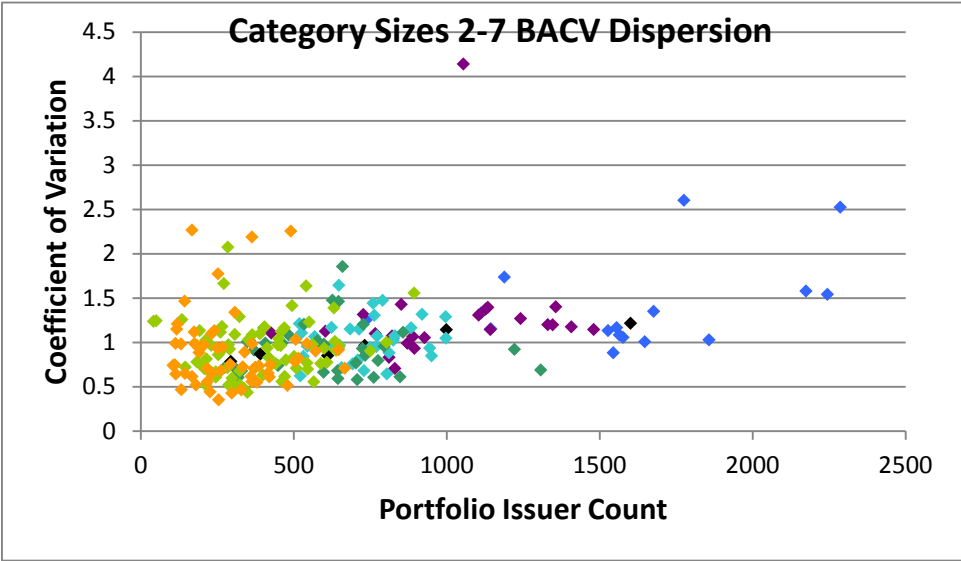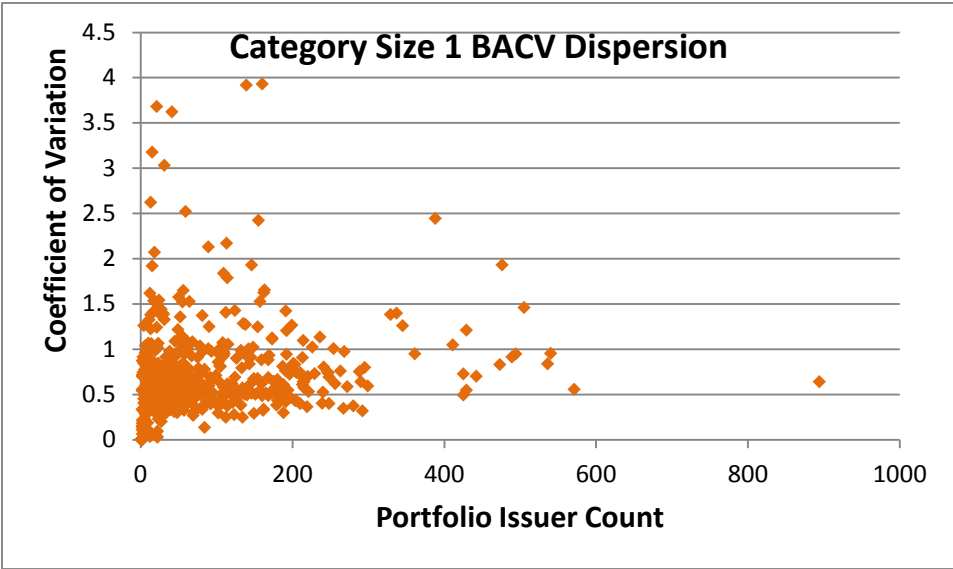
C. Additional Data

Average Portfolios by Size Category

<u>**Category Size 7**</u>

Rounded Average Issuer Counts

Bin	Rating					$Millions
	1	2	3	4	5	
1	159	120	63	58	20	3.304
2	62	56	19	15	5	8.991
3	78	81	25	17	2	13.916
4	60	60	15	10	2	19.409
5	47	52	10	4	1	25.010
6	39	43	8	2	1	30.675
7	34	36	5	2	1	36.349
8	31	32	3	1	0	42.080
9	28	26	3	0	0	48.760
10	24	24	2	0	0	55.833
11	23	20	2	0	0	63.547
12	20	17	1	0	0	72.550
13	19	15	0	0	0	83.359
14	16	13	0	0	0	96.977
15	15	10	0	0	0	116.763
16	13	5	0	0	0	150.028
17	4	2	0	0	0	209.337
18	4	1	0	0	0	316.080
Issuer Count	676	613	156	109	32	
Coefficient of Variation	1.21	1.04	0.98	0.90	1.02	
Issuer Count %	43%	39%	10%	7%	2%	
Amount %	51%	42%	5%	2%	1%	

Average Portfolio Size ($Millions)	45,125.8
Average Issuer Size ($Millions)	28.5
Portfolio Coefficient of Variation	1.22

Category Size 6

Rounded Average Issuer Counts

	Rating					
Bin	1	2	3	4	5	$Millions
1	82	76	47	35	8	2.013
2	37	36	15	10	1	5.062
3	56	53	13	6	2	7.789
4	39	42	7	2	1	11.108
5	30	34	5	1	0	14.229
6	25	30	3	1	0	17.209
7	21	26	2	0	0	20.336
8	19	22	2	0	0	23.561
9	16	20	1	0	0	26.895
10	15	17	1	0	0	30.664
11	13	15	1	0	0	34.746
12	13	12	0	0	0	39.485
13	11	11	0	0	0	46.288
14	8	9	0	0	0	55.684
15	8	7	0	0	0	65.445
16	6	6	0	0	0	81.004
17	3	2	0	0	0	95.349
18	3	1	0	0	0	142.017
Issuer Count	405	419	97	55	12	
Coefficient of Variation	1.13	1.00	1.02	0.83	0.77	
Issuer Count %	41%	42%	10%	6%	1%	
Amount %	47%	47%	4%	1%	0%	

Average Portfolio Size ($Millions)	16,009.9
Average Issuer Size ($Millions)	16.2
Portfolio Coefficient of Variation	1.14

Category Size 5

Rounded Average Issuer Counts

| Bin | Rating | |
	1	2	3	4	5	$Millions
1	53	46	28	24	4	1.306
2	28	24	9	5	1	2.989
3	40	38	9	4	1	4.402
4	31	29	5	2	0	6.030
5	24	26	4	1	0	7.480
6	21	21	3	1	0	8.955
7	18	19	2	0	0	10.465
8	16	16	2	0	0	11.970
9	14	14	1	0	0	13.661
10	13	13	1	0	0	15.330
11	11	12	1	0	0	17.086
12	11	9	1	0	0	19.189
13	10	9	0	0	0	21.660
14	9	7	0	0	0	24.570
15	8	6	0	0	0	27.934
16	7	5	0	0	0	33.089
17	3	2	0	0	0	41.415
18	3	1	0	0	0	61.528
Issuer Count	320	297	66	37	6	
Coefficient of Variation	0.95	0.86	0.93	0.78	0.57	
Issuer Count %	44%	41%	9%	5%	1%	
Amount %	50%	44%	5%	1%	0%	

Average Portfolio Size ($Millions)	6,519.2
Average Issuer Size ($Millions)	9.0
Portfolio Coefficient of Variation	0.97

Category Size 4

Rounded Average Issuer Counts

Bin	Rating					
	1	2	3	4	5	$Millions
1	39	36	20	16	3	.951
2	21	22	6	4	1	2.035
3	33	33	6	2	1	2.953
4	26	25	3	1	0	4.014
5	21	21	3	0	0	4.826
6	18	19	2	0	0	5.676
7	15	17	2	0	0	6.569
8	15	14	1	0	0	7.329
9	11	14	2	0	0	8.211
10	11	11	1	0	0	9.117
11	11	10	1	0	0	10.126
12	10	9	1	0	0	11.169
13	9	8	1	0	0	12.415
14	8	7	0	0	0	13.967
15	7	6	0	0	0	16.231
16	7	4	0	0	0	19.032
17	3	2	0	0	0	23.063
18	3	1	0	0	0	30.218
Issuer Count	268	259	49	23	5	
Coefficient of Variation	0.83	0.77	0.89	0.58	0.52	
Issuer Count %	44%	43%	8%	4%	1%	
Amount %	50%	45%	5%	1%	0%	

Average Portfolio Size ($Millions)	3,509.3
Average Issuer Size ($Millions)	5.8
Portfolio Coefficient of Variation	0.85

Category Size 3

Rounded Average Issuer Counts

Bin	Rating					$Millions
	1	2	3	4	5	
1	26	24	10	8	1	.690
2	15	14	3	2	0	1.439
3	22	20	4	2	0	1.981
4	17	16	3	1	0	2.667
5	15	12	2	1	0	3.266
6	12	12	1	0	0	3.828
7	11	11	1	0	0	4.363
8	10	9	1	0	0	4.956
9	9	7	0	0	0	5.715
10	8	7	0	0	0	6.363
11	8	6	0	0	0	7.010
12	7	5	0	0	0	7.686
13	7	4	0	0	0	8.696
14	6	4	0	0	0	9.370
15	5	3	0	0	0	11.085
16	5	2	0	0	0	12.910
17	2	1	0	0	0	14.839
18	2	1	0	0	0	24.597
Issuer Count	187	158	25	14	1	
Coefficient of Variation	0.85	0.82	0.67	0.64	0.00	
Issuer Count %	49%	41%	6%	4%	0%	
Amount %	55%	41%	3%	1%	0%	

Average Portfolio Size ($Millions)	1,547.4
Average Issuer Size ($Millions)	4.0
Portfolio Coefficient of Variation	0.88

Category Size 2

Rounded Average Issuer Counts

Bin	Rating 1	2	3	4	5	$Millions
1	21	15	5	4	1	.466
2	12	10	2	1	0	.910
3	18	14	2	1	0	1.262
4	14	12	1	1	0	1.594
5	12	10	1	0	0	1.900
6	11	8	0	0	0	2.251
7	9	8	1	0	0	2.555
8	9	6	0	0	0	2.890
9	8	6	0	0	0	3.182
10	7	5	0	0	0	3.489
11	7	4	0	0	0	3.826
12	6	4	0	0	0	4.282
13	6	4	0	0	0	4.681
14	5	3	0	0	0	5.286
15	5	2	0	0	0	5.978
16	4	2	0	0	0	6.775
17	2	1	0	0	0	8.443
18	2	1	0	0	0	12.816
Issuer Count	158	115	12	7	1	
Coefficient of Variation	0.79	0.77	0.62	0.54	0.00	
Issuer Count %	54%	39%	4%	2%	0%	
Amount %	59%	39%	2%	1%	0%	

Average Portfolio Size ($Millions)	715.5
Average Issuer Size ($Millions)	2.4
Portfolio Coefficient of Variation	0.81

Category Size 1

Rounded Average Issuer Counts

Bin	Rating	
	1	2	3	4	5	$Millions
1	6	4	1	1	0	.205
2	4	2	1	0	0	.373
3	6	3	1	0	0	.498
4	5	3	0	0	0	.628
5	4	2	0	0	0	.735
6	4	2	0	0	0	.832
7	4	2	0	0	0	.908
8	4	2	0	0	0	1.001
9	3	1	0	0	0	1.100
10	3	1	0	0	0	1.198
11	3	1	0	0	0	1.314
12	2	1	0	0	0	1.441
13	2	1	0	0	0	1.643
14	2	1	0	0	0	1.773
15	2	1	0	0	0	1.995
16	2	1	0	0	0	2.255
17	1	0	0	0	0	2.498
18	1	0	0	0	0	3.788
Issuer Count	58	28	3	1	0	
Coefficient of Variation	0.67	0.62	0.34	0.00	0.00	
Issuer Count %	64%	31%	3%	1%	0%	
Amount %	69%	29%	1%	0%	0%	

Average Portfolio Size ($Millions)	84.0
Average Issuer Size ($Millions)	.9
Portfolio Coefficient of Variation	0.68

Size Category Portfolio Dispersion and Number of Issuers Held

Company Size 1 Portfolio BACV Dispersion

Company Size 2 Portfolio BACV Dispersion

Company Size 3 Portfolio BACV Dispersion

Company Size 4 Portfolio BACV Dispersion

Company Size 5 Portfolio BACV Dispersion

Company Size 6 Portfolio BACV Dispersion

Company Size 7 Portfolio BACV Dispersion