An Update to the Property & Casualty and Health Risk-Based Capital Bond Factors: Report to the NAIC Investment Risk-Based Capital (E) Working Group, Health Risk-Based Capital (E) Working Group, and Property and Casualty Risk-Based Capital (E) Working Group

American Academy of Actuaries

Joint P&C/Health Bond Factors Analysis Work Group:

Lauren Cavanaugh, MAAA, FCAS, chair

Tim Deno, MAAA, FSA, chair

Natalie Atkinson, MAAA, FIA

Shiwen Jiang. MAAA FCAS

Peter Kaczmarek, MAAA, FSA

Allan Kaufman, MAAA, FCAS, HONFIA

Julian Levin, MAAA, ASA

Derek Skoog, MAAA, FSA

Table of Contents

I. Summary

A. Background

This report has been prepared by an American Academy of Actuaries Joint Bond Factor Work Group of the Property & Casualty (P&C) RBC Committee and the Health Solvency Committee (P&C/Health Work Group, PCHWG, "we" or "our").

As requested by the National Association of Insurance Commissioners' (NAIC's) Investment Risk-Based Capital Working Group (IRBC), the PCHWG has developed indicated bond risk factors for the Property Casualty Risk Based Capital Formula (P&C RBC Formula) and the Health Risk Based Capital Formula (Health RBC Formula).

We are presenting this report to the IRBC, the NAIC Property & Casualty Risk-Based Capital Working Group and the NAIC Health Risk-Based Capital Working Group. We have presented preliminary versions of the findings in this report to those three NAIC working groups.

Scope

The primary purpose of the IRBC request to us was to provide risk factors for 20 bond rating classes, rather than the current six rating classes. Secondarily, the work was to update the factors which, for health and P&C, have not been updated since the original Health and P&C RBC Formulas were implemented in the 1990s.

The scope of our work did not include a systematic exploration of the structure of the asset risk factors in the RBC Formulas. However, we found that our work required us to address some of the simplifying assumptions and to update methods underlying the risk factor calibration from the early 1990s.

Moreover, the scope of our work did not include review of the Health and P&C RBC Formula fixed income features other than the bond factors, for example: the P&C bond size factors,[1,2] not applying bond size factors in the Health RBC Formula, the bond size factor treatment of US agency class 1 bonds issued by a US government agency but not backed by the full faith and credit (FFC) of the US government, the asset concentration adjustment, or risk factors for assets other than bonds that were set based on the bond risk factors, e.g., preferred stock and cash.

Contents

In the remainder of this section we describe our key assumptions and methods and resulting indicated risk factors (section I.B), we identify the key regulatory decisions that would underlie

---

[1] While our scope did not include design of bond size factors, we did test the impact of the current practice of using the life factors for P&C and not applying bond size factors of health. As we discuss in Section V, the effects do not appear unreasonable.

[2] These are called "portfolio adjustment factors" in C1WG reports.

the regulatory adoption of those indications (section I.C), and we discuss the potential impact on companies of adopting the indications (Section I.D).

Section II identifies key American Academy of Actuaries papers we considered in preparing this report. Section III describes our approach to calibration of investment grade (IG) bonds (NAIC classes 1 and 2). Section IV describes our approach to calibration of speculative grade (SG) bonds (NAIC classes 3-6). Section V describes our approach to bond size factors. In the course of our work, we identified features of the formula that might warrant exploration in future work. We list these in Section VI (Future Analysis).

B. PCHWG Indicated Risk Factors

1. Methods and Assumptions

Key elements underlying our indicated bond risk factors are the following:

- For IG[3] bonds, we use the bond default risk model prepared by the American Academy of Actuaries Life C1 Work Group (C1WG), described in the 2015 C1WG Report to IRBC listed in section II of this report. We modified that model, as needed, to reflect business differences, as described in this report.
- For IG bonds, we use a 96% target confidence level over a time horizon based on the P&C liability runoff duration (five years) for the P&C RBC Formula and health liability runoff duration (two years) for the Health RBC Formula.[4,5,6]
- For SG[7] bonds, we calibrate the risk factors based on market value risk (market risk),[8] recognizing that the asset value in health and P&C statutory accounting is the lower of amortized cost or market value. The confidence level and time horizon for that SG

[3] IG bonds constitute 94% of fixed income assets, for both health and P&C (2016 Annual Statements).

[4] We use the liability runoff periods in health and P&C calibrations, rather than the 10-year credit cycle period used in Life RBC calibration period, because health and P&C businesses are shorter-term and the main risks in the P&C and Health RBC Formulas are calibrated to much shorter-term time horizons than is the case for life insurance and the Life RBC formula. We discuss that difference further in section III.B.

[5] To estimate the liability runoff duration, we review (a) the duration of unpaid claim liabilities and (b) the duration of claim liabilities and related premium from an additional year of policies. In addition, we consider the extent to which duration of assets differs from the duration of the liability runoff.

[6] In section III.B.3 we observe that there is an alternative to the liability runoff period for health, but even in that case the time horizon for calibration is much shorter than 10 years.

[7] SG bonds constitute only 6% of fixed income assets, for both health and P&C (2016 Annual Statements).

[8] As described in the section IV, our risk metric is fluctuation in statutory carrying, i.e., the lower of amortized value and market value. Market value fluctuation is the largest component of that, and market value fluctuation is offset somewhat by the amortized value feature.

calibration is the same as the confidence level and time horizon in the 15% stock risk factor[9] in the Health RBC Formula and P&C RBC Formula.

The 96% confidence level has been selected by the regulators. For the reasons described in this report, PCHWG uses the C1WG default risk model for IG bonds, shorter time horizon assumptions, and the market value risk approach to SG bond calibration.

Other important elements of the PCHWG indications are the following:

- Life insurance adjustments—Adjustments to RBC risk factors reflecting the level of credit risk included in statutory policy reserves and the Asset Valuation Reserve (AVR) are specific to life insurers. Our risk factor indications for health and P&C do not make those adjustments.[10]
- Portfolio Size—There are differences in portfolio size and bond maturity between life, health and P&C insurers. We consider those differences in our indications.
- Bond size factors—
    - The P&C RBC Formula currently uses the bond size factors from the Life RBC Formula. Our indications assume no change to that practice.[11]
    - For the Health RBC Formula, there are currently no bond size factors. Our indications assume no change in that practice.[12]

[9] We recognize that within the P&C/Health RBC Formulas, there are other risk factors related to market risk. Schedule BA assets have a risk factor of 20%. The risk factor for affiliate stock investments is 22.5%.
Relative to those alternatives, we use the stock risk factor as a base because (a) it is a reasonable choice; (b) stocks are the largest balance sheet item with risk factors calibrated to market value variability; (c) stock price variability is often used as a benchmark for market risk; and (d) there is substantial long-term data on stock market variability, useful for calibration.

[10] Contributing to higher indicated risk factors.

[11] Although our scope did not include design of P&C bond size factors, we did test the impact of using the bond size factors from the Life RBC Formula. As we discuss in Section V.A, the effects do not appear unreasonable.

[12] Although our scope did not include design of health bond size factors, we tested the impact of including or excluding bond size factors and the impact is small, as we discuss in Section V.B.

- Federal Income Tax (FIT)—The PCHWG IG indicated risk factors are on a Before Federal Income Tax (BFIT) basis. The PCHWG SG indicated risk factors are on the same FIT basis as the 15% stock risk factor.[13]
- Discount rate—The C1WG model uses a discount rate of 5% BFIT based on its 10-year time horizon. We use a 2% discount rate BFIT based on the shorter health and P&C time horizons, and more recent data.[14]

[13] As described further in Section III, there are divergent interpretations on whether the current P&C and health asset risk factors are intended to be BFIT or after federal income tax (AFIT). Three implications of that situation are the following:

1. Depending on the tax basis that the regulators select, the risk factor indications in this report would need to be adjusted accordingly.
2. The comparison of current risk factors to indicated risk factors in this report might not be fully consistent with respect to the treatment of FIT.
3. In each exhibit and table in this report, we note the FIT treatment of current and indicated risk factors. In those notes, we refer to the current risk factor FIT calibration basis as "current FIT calibration basis."

[14] We explain our selection in section III.A.2.

2. Indicated Factors

The indicated risk factor is the risk factor associated with the typical portfolio size. The indicated base risk factor is the value in the RBC Formula.

For the Health RBC Formula, the indications assume there are no bond size factors. Therefore, the indicated base risk factor for the RBC Formula equals the indicated risk factor for the typical health portfolio size.

For the P&C RBC Formula, the indications assume the use of the C1WG September 2017 portfolio adjustment factors as bond size factors. On that basis, the bond size factor for the typical P&C portfolio is 1.125. Therefore, the indicated base risk factors for P&C equal the P&C indicated risk factors divided by 1.125.

Table I-1, below, shows the current and indicated base risk factors for the Health and P&C RBC Formulas, based on the assumptions listed above and methods discussed more fully in this report.

Table I-2, below presents the current and indicated bond size factors for the P&C RBC Formula, based on the 2017 C1WG proposed portfolio adjustment factors.

Table I-1
Current and Indicated Base Risk Factors

(1a)	(1b)	(1c)	(2)	(3)	(4)
NAIC Class	Moody's Rating Class	S&P Rating Class	Current Base Risk Factors	Indicated Base Risk Factors	
				PC	Health
IG Bonds - Based on Default Risk					
1	Aaa	AAA	0.3%	0.2%	0.1%
1	Aa1	AA+	0.3%	0.4%	0.1%
1	Aa2	AA	0.3%	0.6%	0.1%
1	Aa3	AA-	0.3%	0.8%	0.2%
1	A1	A+	0.3%	1.0%	0.3%
1	A2	A	0.3%	1.3%	0.5%
1	A3	A-	0.3%	1.5%	0.7%
2	Baa1	BBB+	1.0%	1.8%	1.0%
2	Baa2	BBB	1.0%	2.1%	1.2%
2	Baa3	BBB-	1.0%	2.5%	1.5%
SG Bonds - Based on Market Risk					
3	Ba1	BB+	2.0%	5.5%	6.9%
3	Ba2	BB	2.0%	6.0%	7.6%
3	Ba3	BB-	2.0%	6.6%	8.3%
4	B1	B+	4.5%	7.1%	8.9%
4	B2	B	4.5%	7.7%	9.7%
4	B3	B-	4.5%	8.7%	11.0%
5	Caa1	CCC+	10.0%	9.8%	12.3%
5	Caa2	CCC	10.0%	10.9%	13.7%
5	Caa3	CCC-	10.0%	12.0%	15.1%
6	Ca or lower	CC+ or lower	30.0%	30.0%	30.0%

P&C - Bond size factors from Table I-2 are to be applied to the P&C base risk factors.
Health – Bond size factors are NOT applied in the Health RBC Formula.
FIT basis notes: Current base risk factors are on the current FIT basis. IG indicated base risk factors are on a BFIT basis. SG indicated risk factors are on the tax basis of the 15% stock risk factor.

Table I-2
Current and C1WG Proposed Bond Size Factors[15] for P&C RBC Formula

Current				C1WG Proposed (Sept 2017)		
Size Band	**Issuers**	**Factor**		**Size Band**	**Issuers**	**Factor**
Up to	50	2.5		**Up to**	10	7.80
Next	50	1.3		**Next**	90	1.75
Next	300	1.0		**Next**	100	1.00
Over	400	0.9		**Next**	300	0.80
				Over	500	0.75
Bond Size Factors for Representative Portfolios:						
PC (535 issuers)		1.143		**PC (535 issuers)**		1.125
Life (824 issuers)		1.032		**Life (824 issuers)**		0.993

Indicated Bond Size Factors from C1WG October 10, 2017 Letter, Appendix B.
Representative portfolio for P&C has 535 issuers.
No bond size factor for the Health RBC Formula.

If the final life bond size factors (portfolio adjustment factors in the Life RBC Formula) differ from Table I-2, then corresponding changes will be necessary in the P&C and health base risk factors in Table I-1.

3. Indicated Risk Factors Compared to Current Risk Factors

We note the following about the indicated base risk factors in Table I-1:

Comparing Indicated Risk Factors to Current Risk Factors

- For P&C IG bond risk factors—indicated base risk factors are greater than current base risk factors for all rating classes other than Standard and Poor's (S&P) AAA, because of new data and revised assumptions[16] (more transparent than the original assumptions).

  The indicated AAA bond factor is lower than the current AAA bond risk factor because currently, the AAA bond risk factor is the same as the risk factor for all bonds within NAIC class 1. NAIC class 1 includes AA+, AA … A- bonds, and the current risk factor was based on combined experience for all of those S&P bond classes with NAIC class 1.

[15] These are called "Portfolio Adjustment Factors" in the C1WG reports, but they are used as "Bond Size Factors" in the P&C RBC Formula.

[16] The assumptions in the current risk factors are implicit, in that the health and P&C factors were set equal to the life factors. In doing so, there was no explicit consideration of issues that are now causing increases/decreases in the indicated risk factors. There are now increases because we consider factors such as (i) life insurance adjustments for the level of credit risk included in statutory policy reserves and the AVR, specific to life insurers, and (ii) tax treatment, in that life factors are on an AFIT basis, while the indicated risk factors are on a BFIT basis because the intended basis for health and P&C is unclear and because other health and P&C risk factors are on a BFIT basis. There are decreases because we consider time horizon—10 years for life, and, now, less than 10 years for health and P&C. In addition, there is an increase because of a lower discount factor based on more recent experience and the shorter time horizon for health and P&C.

- For health IG bond risk factors—indicated health base risk factors are lower than current health base risk factors for more classes than for P&C because the shorter time horizon offsets some, or all, of the considerations that resulted in increased P&C base risk factors.
- SG bond base risk factors have increased overall because of new data and a new approach with more transparent assumptions than the original risk factors.
- For P&C, because there is a change in bond size factors, the impact of applying the indicated risk factors, compared to applying the current risk factors, varies based on the number of issuers. Companies with a smaller number of issuers will experience a larger increase in investment risk RBC value. Companies with a larger number of issuers will experience a smaller increase in investment risk RBC value.[17] For example:
    - For the typical P&C company, with 535 issuers, the effect of the change in the bond size factors alone is a decrease, about -1.6% (1.125 versus 1.143 in Table I-2)
    - For the companies with only 50 or 100 issuers, the effects of the change in bond size factors alone are increases, +18% and +24%, respectively.
    - For the companies with as many as 1,200 or 2,000 issuers, the effects of the change in bond size factors alone are decreases, -9% and -12%, respectively.
- For health insurance, there is no proposed bond size factor adjustment, so the impact of the change in risk factors does not vary by number of issuers.

Comparing Risk Factors by Bond Rating Class

- For SG bonds, the percentage difference in risk factors from class 3 bond risk factors and class 5 bond risk factors has decreased. With current risk factors, the range is 2% to 10%, a factor of 5. With indicated risk factors, the range is 5.5% to 12.0% for P&C, a factor of slightly more than 2. The factor is the same for health. The narrower multiplicative range is the result of using market value fluctuation information rather than ad hoc adjustments to default risk model results.
- For health risk factors, the percentage movement in risk factors from the lowest rated IG bond to the highest rated SG bond has increased. With current risk factors, the range is 1% to 2%, a factor of 2. With indicated risk factors, the range is 1.5% to 6.9%, a factor of more than 4. This increase in relative bond risk recognizes the difference between the low default risk over a short (two-year) time horizon for IG bonds, compared to the market risk for the next lower rated bond. The short time horizon for health is not reflected in the current risk factors.

[17] See Table A4-2 for details on changes by number of bond issuers.

Comparing Health and P&C Risk Factors

- For health SG bonds – indicated health base risk factors are higher than comparable base risk factors for P&C, because P&C base risk factors are subject to bond size factors, but health base risk factors are not. For health, instead of bond size factors that vary by company size, the health base risk factors include the average bond size factor for the health representative portfolio, 1.259.[18]

C. Areas for Regulatory Review and Decision

The indicated risk factors are based on assumptions, some of which are regulatory decisions that are beyond the scope of PCHWG. In adopting these indications, the regulators would be adopting those assumptions. Those include:

- 96% percentile confidence level
- Five-year time horizon for P&C
- Two-year[19] time horizon for health
- Minimum risk factors, selected at 0.1%, applicable only to health
- Bond size factor approach- Continuing current practice of using life bond size factors for P&C (moving to the C1WG 2017 proposed bond size factors, Table I-2) and no bond size factors for health.[20]

---

[18] The bond size factors are approximately 1.0 for a portfolio with 824 issuers, which is the case for the life representative portfolio. For 535 issuers, the case for the P&C representative portfolio, the bond size factor is 1.125. For 382 issuers, the case for the health representative portfolio, the bond size factor is 1.259.

[19] Selecting the time horizon for health calibration requires a regulatory decision on the basis for the H1 risk factor. There are two main views:

One view is that the calibration basis should follow the P&C runoff approach. Consistency with the P&C approach on asset and credit risk factors has been the approach used by Health RBC committees in the past (See footnote 46 in section III.B.3). The indicated risk factors are based on that view.

An equally reasonable view, is that the calibration basis should follow the underwriting risk (H2) calibration. The Academy recommended factors for H2 risk in the original RBC calibration were "based on a 5% probability of ruin over a 3 to 5-year period for each line. The final factors incorporated NAIC modifications to these recommendations." (February 12, 2002, Comparison of the NAIC Life, P&C, and Health RBC Formulas, American Academy of Actuaries Joint RBC Task Force, Insurance Risk section, page 7).

From that perspective, the health bond risk factors could be calibrated with time horizons of 3, 4 or 5 years.

In section III.B.3 we discuss our selection of time horizon to calibrate health bond risk factors.

[20] For health, the bond size factor for the representative portfolio would be 'built into' the base risk factor, so all insurers would have the same bond size factor.

- Treatment of risk charges on BFIT or After FIT (AFIT) basis
    - Our IG indications are on a BFIT basis
    - Our SG indications are on the same tax basis as the current 15% stock risk factor
- Final selected risk factor values, in Table I-1, without regulator judgment-based changes or transition rules

The indicated bond risk factors imply possible changes to other health and P&C RBC factors. Analysis of those features is beyond the scope of our work, but we note the following:

- The risk factor for cash appears to have been based on the AAA bond base risk factor, and that risk factor might, therefore, be reduced from 0.3% to 0.1%.
- Preferred stock risk factors appear to have been set based on the bond base risk factors, so changes in bond risk factors might indicate corresponding changes in preferred stock risk factors.[21]

D. Impact of Adopting Indicated Risk Factors

The NAIC has prepared impact information that is attached in Appendix 6.

For each company in the 2017 RBC Filing database, the NAIC calculates the H1/R1 and Authorized Control Level (ACL) values, the total adjusted capital (TAC), the RBC Formula values for Trend Test, Company Action Level (CAL), Regulatory Action Level (RAL), ACL, and Mandatory Control Level (MCL). The NAIC compares the values with the current health or P&C RBC Formula to the values using several sets of alternative bond risk factors.

For each of the alternative bond risk factors, the NAIC calculates three types of exhibits:

- The H1/R1 and ACL values, and the percentage changes in those values when the current bond risk factors are replaced by the alternative bond risk factors.
- The distribution of changes in H1/R1 and ACL when the current bond risk factors are replaced by the alternative bond risk factors.
- The number of companies in each RBC action level, and the number that change action levels, when the current bond risk factors are replaced by the alternative bond risk factors.

[21] The natural preferred stock risk charge, following past practice, would be the base bond risk factor by rating class. The effect would be for there to be different health and P&C preferred stock risk factors because of the different time horizons. We have not explored that feature. The NAIC impact analyses used the health bond risk factors for health preferred stock and the P&C bond risk factors for P&C preferred stock.

The exhibits are prepared for all companies combined and separately for companies in each of six bands based on TAC, $0-5 million, $5-$25 million, $25-75 million, $75-250 million, $250 million-$1 billion, over $1 billion.

The NAIC tests included a change in the risk factor for net cash equivalents from 0.3% to 0.1%. The tests also apply the alternative bond risk factors to preferred stocks and hybrid securities, with hybrid securities RBC reclassified to R1 in the P&C RBC formula.[22]

We discuss the results separately for health and P&C in the sections below.

1. Health Findings

Results showing the impact of adopting the Table I-1 factors are provided by the NAIC in a scenario labeled "H2_0". Highlights from that scenario include:

- The H1 RBC value increases by 4.1%, but the ACL increases by only 0.3%.
    - The increase in H1 value is consistent with the change in risk factors.
    - The small increase in ACL value is consistent with the small role that H1 plays in total RBC.
- No insurers, of the 933 tested, show a change in action levels.
- The impact varies by insurer size band:
    - The size band with the largest average change in ACL, a change of 0.5%, is for insurers with TAC of over $1 billion.
    - The size band with the smallest insurers, under $5 million in TAC, on average experience a decrease of 0.2% impact on ACL.

2. P&C Findings

Results showing the impact of adopting the Table I-1 and I-2 factors are provided by the NAIC in a scenario labeled "P1\PC5P." Highlights from that scenario include:

- The R1 RBC value increases by 82%, but the ACL increases by only 0.3%.
    - The large increase in average R1 value is consistent with the large change in risk factors.
    - The small increase in average ACL value is consistent with the small role that R1 plays in total RBC.

[22] Using health bond risk factors for health preferred stock and P&C bond risk factors for P&C preferred stock.

- Only four of 2,486 insurers show a change in action levels. Two insurers change from CAL to RAL and two insurers change from No Action to Trend Test.

- Approximately 20% of all companies experience a 50% or greater increase in ACL. Many of these companies have only asset risk, and thus are more affected by these changes than the average company.

- The impact varies by insurer size.

    - The size band with the largest average change in ACL, a change of 2.9%, is for insurers with TAC of $5 million to $75 million.

      As the proposed bond size factors are higher for insurers with fewer bond issuers, it is not surprising that the effect of the new risk factors would be larger for smaller insurers.

    - The size band with the smallest insurers, under $5 million in TAC, on average experience the same average impact on ACL as all companies combined. That would appear to be because of their asset distribution, although PCHWG does not have the company-by-company detail to assess that.

    - Of the four insurers with a change in action level, one is in the $0-5 million TAC range, two in the $5-$25 million TAC range, and one in the $25-$75 million TAC range.

3. Further Note on Impact Calculation

The data from RBC filings used in the NAIC impact analysis does not contain S&P ratings by bond, only NAIC rating class. Therefore, to allow the NAIC to apply the test, PCHWG obtained the percentages of bond values by S&P rating class within each NAIC rating class, using Schedule D data not used in the RBC filing. PCHWG used those percentages to estimate the average indicated base risk factor for each NAIC rating class. The following features of the data by S&P class should be considered:

- The data has never been used in RBC filings, and probably not used routinely, hence may be subject to more reporting errors than would be the case for data used more routinely.

- The data is from 2011, and there may be changes over time in the distribution of bonds by S&P rating, within each of the current six NAIC classes.

- In the data, only 70% of health and 78% of P&C records provided S&P ratings. For purposes of the test, PCHWG assumed records with no S&P rating had the same distribution by S&P class within NAIC class as records with an S&P rating.

Therefore, when applied in practice, the impacts may vary from results presented in the NAIC study.

E. General Considerations in Assumptions and Confidence Levels

In developing the indications described above, consistency is an important PCHWG consideration. That is because for RBC, there is no prescribed target safety level for the overall formula, and there are differences in target safety levels and time frames over which risk is considered, within and between types of insurance (life, health and P&C),

In the context of RBC calibration, consistency can mean:

- Consistent with the risks inherent in the type of business (life/health/P&C)
- Consistent with other risk factors within the type of business
- Consistent with related risks in RBC formulas for the other types of business

We observe that consistency in factors is often not the same as using the same factors for different types of business. For example,

- Life insurance adjustments to RBC risk factors reflecting the level of credit risk included in statutory policy reserves and the AVR are specific to life insurers, and do not apply to health or P&C.
- The time horizon for risk is different for the three different types of business.

We believe our approach is consistent with these concepts. We also recognize that there are alternatives that are also consistent with those concepts. The regulators make the final decisions on assumptions and factors.

II. Prior Research and Reports

The key American Academy of Actuaries documents that we draw from in this report are:

- March 2001, Tax Calculations by the American Academy of Actuaries Life Risk-Based Capital Committee's Codification Subgroup
- September 2001, Report of the Academy HRBC Asset Codification Work Group to the NAIC Health Risk-Based Capital (E) Working Group
- February 12, 2002, Comparison of the NAIC Life, P&C, and Health RBC Formulas, American Academy of Actuaries Joint RBC Task Force
- June 2011, Report of the American Academy of Actuaries Invested Assets Work Group regarding the C-1 Framework
- August 3, 2015, C1WG Report—Model construction and Development of RBC Factors for Fixed Income Securities for the NAIC Life Risk-Based Capital Formula (2015 C1WG Report)
- June 8, 2017, C1 letter captioned: Updated Recommendation of Corporate Bond Risk-Based Capital (RBC) Factors
- July 24, 2017 PC/H Committees letter, response to June 8, 2017 C1 Work Group Updated Recommendation of Corporate Bond Risk-Based Capital Factors (PCHWG 2017 Letter)
- October 10, 2017 C1WG letter captioned: Updated Recommendation of Corporate Bond Risk-Based Capital (RBC) Factors. (2017 C1WG Letter)
- February 14, 2018 C1WG response to Regulator Questions on Proposed Factors for Bonds

We refer to the model described in the 2015 C1WG Report, with the changes in the subsequent C1WG letters as the "C1WG model."

This report supersedes the PCHWG Discussion Drafts of January 29, 2018, May 29, 2018 and July 10, 2018.

III. IG Bonds—Indicated Risk Factors Based on Default Risk

IG bonds constitute 94% of fixed income assets, excluding US government securities, for both health and P&C.[23]

In the Life, Health and P&C RBC Formulas, the risk factors for IG bonds are based on default risk. The key elements in the calibration of default risk factors for IG bonds are the following:

- Default Risk Model
- Time Horizon
- Target Confidence Level

We discuss those features in the section below.

A. Default Risk Model

We have adapted the C1WG default risk model for application to P&C and Health RBC Formulas, as we describe below.

1. C1WG Default Model—Life Insurance RBC Formula

The 2015 C1WG report (page 12) introduces the modeling approach: "The C1 capital represents the [present value] amount of funds needed such that this amount is sufficient to cover losses in excess of those anticipated in policy reserves that could occur within the bond portfolio over the specified time horizon within the stated confidence level."

The C1WG model input includes information about the cost of bond defaults, as follows:

- Expected annual default rates (separately for bonds in each rating class),[24]
- Expected recovery rates (for bonds in all rating classes combined), and
- Adjustments to those expected default and recovery rates based on variable economic conditions, good or bad (separately for each rating class for default rates and for all rating classes combined for recovery rates).

For each rating class, the C1WG model calculates the cumulative default amount, net of other cash flows, at each year-end within the specified 10-year time horizon, for each of 10,000 trials. For each rating class, the model identifies the year-end with the greatest present value cumulative

---

[23] Appendix 2-Table A2-6.

[24] The expected annual default rates, also called annual spot rates in the 2015 C1WG Report, is derived for age-n by comparing cumulative default rates at age-n and age-n-1. The "spot rate" for rating class "X" and age "n" means the probability of default in n-th year after the valuation date, at which time the bond had rating "X."

default amount (worst year-end)[25] for each trial. For each rating class, the base factors produced by the C1WG model are intended to equal to the 96th percentile of those worst year-end values.[26]

The C1WG model considers the following features:

- Time horizon of 10 years
- Adjustments for the level of credit risk included in statutory policy reserves and the AVR, specific to life insurers.
- Representative portfolio,[27] i.e., the number of issuers by size[28] band (18 size bands). The C1WG model uses the same representative portfolio for each rating class.
- Federal income tax treatment
- Discount rate, related to time horizon

We discuss each of those features in section III.A.2, below.

2. Applying the C1WG Model to P&C and Health Bond Risk Factors

In the sections below, we discuss how we adjust the C1WG model, where necessary, to apply it in the Health and P&C RBC Formulas.

Time Horizon

In Appendix 1 to this report, we examine the default rates, recovery rates and economic conditions analysis used in the C1WG model, the three key C1WG model inputs related to the cost of bond defaults. Based on this review, we conclude those features of the C1WG model can be used for time horizons of 10 years or less.

For health and P&C, we use time horizons shorter than the 10-year time horizon used in the C1WG indicated factors. In section B, below, we explain the basis for the time horizons we use.

---

[25] The C1WG model calculates results gross and net of default experience anticipated in policy reserves. For purposes of this analysis we consider the results gross of policy reserves because there are no such reserves for P&C or health.

[26] The C1 base factors are determined by solving for the percentile of worst year-end values, which, when applied by rating class as risk factors to modeled actual life insurer portfolios, reproduces the sum of the individual insurer C1 amounts at a 96th percentile confidence level. The risk factor percentile that met that criterion for each rating class was slightly less than the 96th percentile. C1WG increased the base C1 risk factors by a small amount to address that. For P&C and health we have not tested the extent to which the sum of the modeled P&C or health insurer portfolios reach the same safety level as the safety level produced by the P&C and health representative portfolios. However, based on the C1WG analysis, it appears that the difference should be small.

[27] See the 2015 C1WG Report, Appendix D, for a description of how the representative portfolio is derived. We apply the same method to health and P&C.

[28] Issuer-size, or size, means the book adjusted carrying value (BACV) for that issuer. BACV is amortized value for life insurers, amortized value of IG bonds for health and P&C insurers and the lower of amortized value and fair value/market value for SG bonds for health and P&C insurers.

Life Insurance Adjustments—Risk Premium and AVR

The C1WG model allows adjustments to RBC risk factors to reflect the level of credit risk included in statutory policy reserves and the AVR that are specific to life insurers. We exclude the adjustment when we apply the C1WG model to produce health and P&C bond risk factors. Health and P&C bond risk factors would be higher than life C1 risk factors for that reason, all else being equal.

Representative Portfolio—Number of Issuers

Described in greater detail in the 2015 C1WG Report, Appendix D, in brief, the representative portfolio can be described as the number of issuers and the issuer-size distribution of bonds for rating classes 1 and 2, in actual life company portfolios, for companies that fall within the median range of total industry company cumulative Book Adjusted Carrying Value (BACV). This is considered to be a representative portfolio for a 'typical insurer.'

For this typical life insurer, the fixed income portfolio has 824 issuers, while the typical P&C company portfolio has 535 issuers and the typical health insurer portfolio has 382 issuers.

The number of issuers affects the default risk because more issuers means more diversification and lower risk. In section V, the bond size factor section, we describe how we address the difference in representative portfolios in life, health and P&C insurers.

Bond Maturity

Average bond maturity is longer for life insurers than P&C or health insurers, 10 years for life versus five years for health and six years for P&C.[29]

The C1WG model does not use bond maturity information. That is, losses from defaults are modeled relative to an initial mix of rating quality at the valuation date[30] and size distribution, but not bond maturity. That approach assumes that any maturing bonds are replaced by bonds of the same rating class.[31] Further, the model also assumes no residual credit risk at the end of the time horizon from bonds remaining in a portfolio.

Therefore, making the same assumptions, no adjustment in the C1WG model is necessary for health or P&C risk factor calibrations.

---

[29] Appendix 2 Table A2-5.

[30] By valuation date we mean the starting date for the default risk model. The bond rating at the valuation date may not equal the bond rating at all later dates in the modeling. Changes over time in bond ratings are implicit in the observed default rates and therefore are reflected, albeit implicitly, in the model results.

[31] The implicit assumption is one of the following: (1) there is no variation in default rates by bond maturity, or (2) the distribution of bonds by maturity in the Moody's data is the same as the distribution of bonds by maturity in the representative portfolio, or (3) the effect of any deviations from (1) and (2) are small enough that they do not need to be considered.

Federal Income Tax

The C1WG model calculates C1 risk factors on both BFIT and AFIT bases. Our indicated IG risk factors, for health and P&C, are on a BFIT basis.

There are divergent interpretations on whether the current health and P&C asset risk factors are intended to be BFIT or AFIT.[32] Three implications of that ambiguity are the following:

1. If the regulators select the AFIT basis, the risk factor indications in this report would need to be adjusted accordingly.

2. The comparison of current risk factors to indicated risk factors in this report might not be fully consistent with respect to the treatment of FIT.

3. In each table in this report, we note the FIT treatment of current and indicated risk factors and any inconsistencies or ambiguities in comparison. In those notes, we refer to the current risk factor FIT calibration basis as "current FIT calibration basis."

Discount rate

The life C1 factor is based on the present value of the projected cash flows. The discount rate used for bonds in developing the current factors is 5% before-tax. The model uses the same discount rate for all simulations and does not vary over the projection period.

Compared to the C1WG calibration, for health and P&C, the time horizon is shorter, and we use more recent data. Table A2-1 in Appendix 2 shows 10-year and 20-year US Treasury interest rates for durations of 1, 2 3, 5 and 7 years, June 8, 2018 US Treasury rates for the same durations and June 8, 2018 London Inter-bank Offered Rate (LIBOR) Swap rates. We observe that the June 2018 US Treasury rates and LIBOR Swap rates, and 20-year average interest rates for durations of 1-5 years range from 2% to 3%. Based on that, we use a discount rate of 2% for our health and P&C modeling.[33]

---

[32] On one hand, the original bond risk factors for P&C, health, and life were identical, except for the adjustment for SG bonds. Life insurance RBC risk factors, after adjustments related to the treatment of deferred taxes in statutory accounting, are understood to be on an AFIT basis. From that perspective, one view is that for consistency, life, P&C, and health risk factors would be on the AFIT basis. But another view is that the inconsistency is intentional and should remain. Also, the underwriting risk factors in P&C (R_4 and R_5) and Health (H_2) RBC Formulas are on a BFIT basis. If bond risk factors were intended to be on the same basis as those factors, then the investment risk factors would be on a BFIT basis.

[33] For data supporting this selection, see Appendix 2, Table A2-1. The indicated risk factors are not very sensitive to the interest rate selection. Using a 3% discount rate, rather than a 2% discount rate, indicated risk factors would be 1.2% lower for health and 3.0% lower for P&C.

B. Time Horizon

PCHWG uses calibration time horizons for health and P&C bond risk factors that are different than for life insurance. We discuss that in detail below.

1. Life RBC Time Horizon in Calibration of C1 Risk Factor

The C1WG model uses a 10-year time horizon in calibrating the C1 risk factors in the Life RBC Formula.[34] The C1WG identified two perspectives on this choice of a time horizon:

- Duration of liabilities[35]
- Length of business credit cycle[36]

2. P&C RBC—Time Horizon for Calibration of Bond Risk Factors

Framework

Underwriting (UW) risk is the largest risk for P&C insurers. UW risk includes reserve risk and premium risk. Reserve risk measures the potential adverse development over the period until all claims are settled (runoff period). Premium risk measures the potential adverse results of a single accident year, when claims are fully paid. Time horizons for those risks are considerably less than the 10-year time horizon used in the life RBC calibration for bond risk.

PCHWG proposes to use the duration of unpaid claim liabilities and the duration of claim liabilities and related premium from an additional year of policies as the basis for determining an appropriate time horizon for calibrating the risk factors for bond factors. We refer to that as a runoff time horizon. The reasons for using the liability runoff time horizon include:

- Using the runoff basis for bond risk time horizon would be consistent with the main elements of the P&C RBC Formula.
- Using a time horizon longer than the runoff period means that the P&C company needs to provide for bond default risk even though the company no longer has any policyholder obligations.

Length of the business credit cycle is one consideration noted by C1WG in support of selecting the 10—year life time horizon. C1WG observes as follows:[37]

---

[34] 2015 C1WG Report, p6, also notes that if the time horizon were changed then the 96th percentile confidence level might also need to be revisited. We have considered that issue, and we believe that if the time horizon is appropriate for the type of business then the 96th percentile for life with a 10-year time horizon is consistent 96th percentile for the shorter time horizons appropriate for P&C and health.

[35] 2015 C1WG Report, p26.

[36] 2015 C1WG Report, p26.

[37] 2015 C1WG Report, pp26 and 95.

- From the perspective that the time horizon is equated with the average length of a business credit cycle, the time horizon is independent of the products sold by the company;
- Current market conditions are not as relevant if the time horizon is set to be through the credit cycle. (Implying that, if the time horizon was not set to the credit cycle, then an adjustment may need to be made depending on where we are in the credit cycle); and
- The duration of the credit cycle is approximately equal to duration of assets for life insurers.

The implications of these three considerations, with respect to P&C RBC calibrations, are the following:

- Being independent of the company products is not necessarily an advantage when the products are as different as those among life, health and P&C insurers.
- The order in which good and bad economic conditions arise influences the default risk that a company will experience. However, whether the time horizon is equal to or shorter than the credit cycle, the simulated economic conditions will include the appropriate number and ordering of economic conditions over the selected time horizon.

  To the extent that economic conditions at the valuation date are favorable or unfavorable, there is an effect regardless of time horizon. That said, a similar problem arises for the UW cycle for P&C. The P&C RBC Formulas makes no adjustment because of practical timing issues[38] and because of the uncertainty in interpreting whether conditions are going to change after the valuation date.
- The duration of the credit cycle (assumed to be 10 years) is not equal to the duration of assets for P&C insurers (approximately 6.3 years).

Thus, PCHWG concludes that, for IG bonds, using a time horizon linked to the credit cycle is not appropriate for P&C risks.

Pro Forma Indicated Risk Factors at Various Time Horizons

The time horizon selection has a significant impact on the indicated bond risk factors. Table III-1, below, demonstrates this for different time horizons, for a sample of rating classes. Columns 2-9 show the indicated risk factors but with varying time horizons. Columns 10-14 show the percentage decrease in risk factors from a 10-year time horizon to each of the alternative time horizons. For example, in column 12 we see that the risk factor based on a five-year time horizon is 40% lower than for the 10-year time horizon for S&P class AAA.

[38] Reflecting current conditions in the P&C RBC Formula requires changing RBC formula parameters late in the year in which the formula was used. This is problematic for company capital planning and for the logistics of preparing and distributing RBC software tools to insurers.

Table III-1
Pro Forma Comparison of Risk Factors Calibrated to Various Time Horizons

Part A – Risk Factors at Various Time Horizons

Part B - Decrease in Risk Factor with Decrease in Time Horizon

			C1WG Model/Life RP/Various Time Horizons							% Reduction in Risk Charge Indication with Time				
(1a)	(1b)	(1c)	(2)	(3)	(6)	(7)	(8)	(9)		(10)	(11)	(12)	(13)	(14)
Rating Class			Current	Time Horizon						Time Horizon				
Moody's	S&P	NAIC		10	6	5	4	1		10	6	5	4	1
Aaa	AAA	1	0.30%	0.34%	0.25%	0.21%	0.14%	0.00%		Base	-26%	-40%	-58%	-100%
Aa2	AA	1	0.30%	0.76%	0.59%	0.53%	0.42%	0.01%		Base	-23%	-30%	-44%	-99%
A2	A	1	0.30%	1.84%	1.25%	1.12%	0.93%	0.19%		Base	-32%	-39%	-50%	-90%
Baa2	BBB	2	1.00%	3.43%	2.20%	1.82%	1.49%	0.45%		Base	-36%	-47%	-57%	-87%

Data from PCHWG application of C1WG model, using life representative portfolio and life discount rate on BFIT basis, without life insurance adjustments that affect life RBC, but are not applicable to health or P&C.
Intended solely as sensitivity test. 10-year time horizon risk factors are not Life C1WG recommendations.
Five-year time horizon risk factors in Table III-1 are not the same as the P&C risk factors in Table I-1, because Table III-1 uses different assumptions

Time Horizon for P&C Bond Risk Factors

The PCHWG indicated risk factors use a five-year time horizon for the P&C RBC Formula after considering the following:

- The P&C unpaid claim liability average runoff time is about 4.3 years, on the portion of fixed income assets corresponding to the unpaid claim reserve.[39,40]
- Adjusting for the additional default risk on assets related to unearned premium and an additional year of written premium, the time horizon is 4.1 years, on the larger portion of fixed income assets corresponding to loss reserves, unearned premium, and an additional year of premium.
- We also observe that the duration of assets for P&C insurers is 6.3 years, which is longer than the liability duration. Thus, in a runoff situation, assets might need to be sold prior to maturity and therefore would be subject to market value risk. That risk is mitigated because:
  - Insurers could sell cash/near-cash and/or stocks that are valued at market value,[41] rather than sell bonds for a market loss. Treating the cash/near-cash and equities as having a

[39] For details on liability duration calculation, see Appendix 2, Tables A2-3 and A2-4B.
[40] An average runoff time of four years means the liability decreases with payments over a period that averages four years. For example, payments for years 1 – –7 might be 29%, 17%, 11%, 8%, 6%, 4%, 3%... for up to 30 years, respectively. The risk factor calculation to implement this four-year average time horizon might be to calculate the average of risk factors based on time horizons from one year to 30 years, weighted by the payment pattern analogous to the illustration here. For simplicity we describe the time horizon as if the weighted average equaled the four-year time horizon risk factor.
[41] With equity RBC to cover possible market loss on stocks.

zero duration (can be sold immediately), the average duration is reduced from 6.1 years to 4.6 years.[42]

- The four-year average duration of claim assets leaves time for longer duration bonds to be sold without market loss on bonds, even without selling stocks or using cash.
- A company will receive new funds from the additional year of premium and from uncollected portions of the unearned premium reserve. In the case of financial difficulty, those funds could be directed to shorter term assets, reducing the average duration in the insurers portfolio, and the risk of needing to sell assets prior to maturity at a below book value.

- While the average liability and average bond duration are as noted above, some companies will have longer and shorter durations for assets and liabilities, and companies will vary in their distribution of bonds, stocks and other assets.[43]

3. Health RBC—Time Horizon for Calibration of Bond Risk

We have considered two ways to approach the calibration time horizon for bond risk factors in the Health RBC Formula:

- Consistent with the P&C approach.
- Consistent with the Health UW risk approach

We discuss both approaches below.

Consistency with P&C on asset and credit risk factors has been the approach used by Academy Health RBC committees in the past[44], and our indications are based on that approach.

---

[42] Further reduced to 4.2 years considering uncollected premium asset. For details on asset duration see Appendix 2, Tables 4B, 4C and 5.

[43] For example, for liability duration, for one large reinsurer we found that the average liability duration was 5.7 years. For one large personal lines insurer we found that the average liability duration was 2.0 years. (Source: 2017 Annual Statement data)
Regarding distribution of assets by type, a small number of companies have very large proportions of stock and many companies have much smaller proportions. If the typical company share of stocks were half of the average share, the effect would be to increase the average duration of 4.6 years to 5.3 years and increase 4.2 years (considering the uncollected premium asset) to 4.9 years. Those changes would not affect our conclusion.

[44] For example, September 2001, Report of the Academy HRBC Asset Codification Work Group to the NAIC Health Risk-Based Capital (E) Working Group. Studying tax-related changes to the life RBC Formula in 2000-2001 and discussion whether to make changes in the Health RBC Formula, on page 1 they observed the following:

3-In general, the RBC calculation for health entities, especially those with low RBC ratios, will be dominated by H2 risk. Thus, the H1 component will play a minor role in determining whether or not such an entity is subjected to RBC action levels. Consequently, it is not an appropriate use of resources for the Academy's Task Force on Health Risk-

Calibration Health Bond Risk Factor Based on P&C Approach to Time Horizon

Based on the P&C approach, the PCHWG indicated risk factors use a two-year time horizon for the Health RBC Formula after considering the issues discussed below.

Duration of Risk Related to Liabilities

The magnitude and duration of health unpaid claim liabilities is much lower and shorter than P&C. Unpaid claim reserves constitute less than 10% of premium and 36% of surplus.[45] The corresponding ratios for property casualty are ratios of over 100% [46] for reserves to premium and over 80% for reserves to surplus.

For health insurers, on average, 94% of claims reserves relate to the latest accident year.[47] For P&C insurers, on average 31% of claim reserves related to claims from the latest accident year.[48]

Certain liabilities, however, take materially longer to settle (e.g. risk adjustment or provider settlements) but it is generally understood that these liabilities typically settle in the year following the contract or performance year. Policy reserves including medical loss ratio rebates are under 30% of unpaid claim reserves.[49]

Lastly, some health insurers write long-term care and long-term disability business with materially longer tailed liabilities, but these liabilities likely make up a relatively small portion of total liabilities for health insurers. Insurers with substantial long-term care or long-term disability business would normally file life insurer Annual Statements, rather than health insurer Annual Statements, and would be subject to the Life RBC Formula rather than the Health RBC Formula.

Based Capital to make independent recommendations for Health RBC on asset treatment, except for those assets specific to the health industry (e.g., health care delivery assets, health care receivables, etc.).

4-As observed in our December 2000 report, health entities are far more similar to property & casualty insurers than to life insurers with respect to both their investment philosophies and the accounting rules to which their assets are subjected. Therefore, as a general principle, we believe that common asset risk and credit risk factors should be used in the Health RBC and P&C RBC formulas, except in circumstances where there are demonstrable, industry-specific, reasons why the factors should differ.

5. While the members of our group are not experts on the P&C world, we believe it to be the case that asset risks play a somewhat larger role in the P&C RBC formula than they do in the Health RBC formula. In the light of this observation and the previous two conclusions, we believe that the Academy's Committee on Property/Casualty Risk-Based Capital should play the lead role in 2 determining what revisions, if any, are appropriate to the treatment of asset risks in the P&C RBC and Health RBC formulas in light of the Life RBC tax consistency changes.

[45] Appendix 2, Table A2-4A.
[46] Appendix 2, Table A2-4A.
[47] Appendix 2, Table A2-2.
[48] 2016 P&C industry Schedule P, all lines combined.
[49] Appendix 2, Table A2-4A.

As such, the typical duration of material health insurer liability runout, on average, would not exceed one year.

Duration of Risk Related to Future Premium

In general, health contracts are annually renewed. From that perspective, the risks of future premium are like those of P&C.

Duration of Risk Related to Assets

We also observe that the duration of assets for health insurers is about 5.2 years, which is longer than the duration of health liabilities. Thus, assets might need to be sold prior to maturity and therefore would be subject to market value risk. That risk is mitigated because:

- Insurers could sell cash/near-cash and/or stocks that are valued at market value,[50] rather than sell bonds for a market loss. Treating the cash/near-cash and equities as having a zero duration (can be sold immediately), the average duration is reduced from 5.2 years to 3.9 years.[51]
- A company will receive new funds from the additional year of premium and from uncollected portions of the unearned premium reserve. In case of financial difficulty, those funds could be directed to shorter term assets, reducing the average duration in the insurers portfolio, and the risk of needing to sell assets prior to maturity at a below book value.

Calibration Health Bond Risk Factor Based on Health of UW Risk Factor Calibration

For health, the dominant risk relates to premium (called insurance risk, labeled H2). There is no reserve risk component, as reserves are paid quickly.

The recommended Academy factors for H2 risk were "based on a 5% probability of ruin over a three- to five-year period for each line. The final factors incorporated NAIC modifications to these recommendations."[52]

Therefore, an equally reasonable view is that the calibration basis could follow the underwriting risk (H2) calibration. This would suggest that the health bond risk factors could be calibrated with time horizons of 3, 4 or 5 years.

---

[50] With equity RBC to cover possible market loss on stocks.

[51] Further reduced to 3.3 years considering the uncollected premium asset. For details on asset duration see Appendix 2, Tables 4B, 4C and 5.

[52] February 12, 2002, Comparison of the NAIC Life, P&C, and Health RBC Formulas, American Academy of Actuaries Joint RBC Task Force, Insurance Risk section, page 7.

IV. SG Bonds—Indicated Risk Factors Based on Market Risk

SG bonds constitute only 6% of fixed income assets, excluding US government securities, for both health and P&C. [53]

A. SG Bond Risk Factors—Default-Based Risk Analysis

The original (and unchanged) risk factors for SG bonds, for health and P&C insurers, were set equal to 50% of the life insurance risk factors at the time (mid 1990s), and the life insurance factors were based on default rates. The 50% is described as representing the difference between risk factors for assets valued at the lower of market value or amortized cost and risk factors for the same assets valued at amortized cost.

Table IV-1, below, shows the SG risk factors based on the default risk approach described in Section III, for IG bonds, applied without the adjustment for the market value element of the SG bonds in statutory accounting. We show results summarized into S&P categories, consolidating bonds with +/- modifiers, to make the format consistent with the market value information presented later in this report.

Table IV-1
Indicated Risk Factors Based on Default Rates
Before Adjustment for Statutory Accounting Market Value basis of SG Bonds

Investment Rating	(1a) S&P Rating Class	(1b) Current NAIC Class	(2) Current Risk Factors	(3) 2-Year time horizon	(4) 5-year time horizon
SG	BB	3	2.0%	4.2%	9.2%
	B	4	4.5%	10.4%	22.1%
	CCC	5	10.0%	33.4%	53.4%
	CC	6	30.0%	Not modeled	Not modeled

Note: Within each S&P class there are usually 3 sub-classes. We calculate the indicated risk factor for the S&P class as the unweighted average of the three values.

Indicated risk factors, column 3-4 are on a BFIT basis, while current risk factors for bonds and stocks, column 2, are on the current FIT calibration basis. Therefore, depending on current FIT basis, the current and indicated risk factors may be on different tax bases.

Table IV-2, below, shows the indicated risk factors after applying the 50% adjustment to the indicated risk factors for SG bonds from Table IV-1. Looking at columns 3 and 4, we see that the indicated risk factors are higher than the current risk factors.

[53] Appendix A2, Table A2-6

Table IV-2
Indicated Risk Factors Based on Default Rates
After 50% Adjustment for SG Bonds

(1a)	(1b)	(2)	(3)	(4)
S&P Rating Class	Current NAIC Class	Current Risk Factors	2-Year time horizon	5-year time horizon
BB	3	2.0%	2.1%	4.6%
B	4	4.5%	5.2%	11.1%
CCC	5	10.0%	16.7%	26.7%
CC	6	30.0%	Not modeled	Not modeled

Note: Column 3= Table IV-1 Column 3* 0.5; Column 4 = Table IV-1 Column 4 * 0.5.
The indicated risk factors, column 3-4 are on a BFIT basis, while current risk factors, column 2, are on the current FIT calibration basis. Therefore, depending on current FIT basis, the current and indicated risk factors may be on different tax bases.

Appendix 3/Exhibit A3-4, the material highlighted in yellow, presents Feldblum's (PCAS 1996) understanding of the rationale for the calibration approach and the 50% adjustment. The basis for the 50% adjustment is simplified.[54] The basis may have been a reasonable compromise among considerations that we are not aware of.

We believe the 50% adjustment was used, at least in part, because the results appeared reasonable especially for a risk factor that was not expected to have significant impact on the overall RBC values.[55] For example, the class 2, 3, 4 and 5 risk factors (1%, 2%, 4.5%, and 10%) are each roughly double the risk factors for the next "safer" risk class, creating a plausible risk differential by class.

In the next section we examine the SG risk factors from a market value perspective.

[54] A few of the simplifications in selecting the 50% adjustment are the following. First, the fact that there is overlap between market valuation and risk, referred to as "double counting," does not mean that the overlap is 50-50. Second, the analysis does not explicitly address the risk of market valuation resulting from the statutory accounting treatment of those bonds. Third, the default risk factor calculation assumes that the bonds would be held to maturity or replaced by bonds of similar rating. There is no reason to assume that, for P&C and health insurer's portfolios, SG bonds will be held to maturity or replaced by SG bonds at maturity. Fourth, the analysis did not consider that the life insurer risk factor had offsets for aspects of life insurance financial reporting that do not apply to P&C or health insurers.

[55] SG bond risk factors have a small effect on RBC values largely because health and P&C insurers hold a relatively small amount in SG bonds, as a percent of all assets held. Appendix 2 Table A2-6 shows the proportion of industry bond holdings by rating class.

B. SG Bond Risk Factors—Market Value Risk Analysis

1. Rationale for Market Value Risk Analysis

In our calibration of risk factors for SG bonds, we consider market value risk (market risk),[56] rather than default risk. We do so for the following reasons:

- SG bonds are reported at the lower of market value/fair value[57] and amortized cost, for statutory accounting purposes, for health and P&C insurers.[58]

  Therefore, unlike the situation for IG bonds, annual statement financial reporting for an insurer holding SG bonds is affected by fluctuation in market values. We refer to that fluctuation as market risk.

- The calibration of risk factors for IG bonds of each rating class assumes that bonds of that class would be held through the selected time horizon.

  That assumption is less valid for SG bonds, as there is no business necessity for P&C or health insurers to hold SG bonds over any specific time horizon. SG bonds can be sold to purchase IG bonds any time, based on market conditions and the financial condition[59] of the insurer. To the extent that SG bonds are treated as salable at any time, the bond values are subject to market risk.

2. Analysis

In our analysis we use fluctuations in market value of SG bonds held by insurers during the 2008-2018 period, which includes the 2008 financial crisis. For our analysis we need both market value and amortized value for each bond. That is not available in P&C or health insurer Annual Statements, but it is available in life insurer Annual Statements.

From life insurer Annual Statements, Schedule D, for each bond, we compare the (a) lower of market value and amortized value, i.e., the statement value on health or P&C basis, (statement

---

[56] As described in the next section, our risk metric is fluctuation in statutory carrying, the lower of amortized value and market value. Market value fluctuation is the largest component of that, and the market value fluctuation is offset somewhat by the amortized value feature.

[57] For purposes of this report we treat fair value as the same as market value.

[58] And at amortized cost for life insurance insurers, for NAIC classes 3-5. SSAP No. 26. We did not use this data to calibrate risk factors for NAIC class 6 bonds.

[59] For example, it is reasonable to expect that, in case of financial stress, the insurer or regulator in control of the insurer would sell SG bonds and replace those with IG bonds, at or before maturity of those SG bonds.

value)[60] and (b) the life insurer's carried value, which we use as a proxy for amortized cost (amortized cost).[61]

We summarize the year-by-year all-company ratios of statement value to amortized cost for SG bonds by NAIC rating class, for all assets having both fair value and carried value. The amortized cost provides an asset value that is not sensitive to market value changes, but it does reflect changes in assets from year-to-year. The statement value reflects changes in market values, as well as changes in assets from year-to-year. Using the ratio, we can compare pairs of year-ends even though actual assets would likely change from year-to-year.

Table IV-3, Part A, below, shows those ratios, for each year end, from year-end 2007 to year-end 2016.[62] Table IV-3, Part B, shows the year-to-year percentage changes in the ratios. Since our data includes the 2008 financial crisis, the data shows the effect on market value from an extreme market event.

Looking at the 2007 column compared to the 2008 column, we see the decline in market value of SG bonds relative to amortized cost. For example, for class 5 we see a decline from 96% of amortized cost in 2007 to 70% of amortized cost in 2008. Looking at the 2008 column in Table IV-3 Part B, we see this is a 26.9% decline in value.

Table IV-3
Comparison of statement value movements of SG Bonds and Stocks 2008-2017

IV-3/Part A –Ratio of Statement Value to Amortized Cost at Each Year-End

NAIC Class	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
3	97%	83%	95%	97%	96%	98%	98%	98%	95%	97%
4	95%	77%	92%	94%	96%	98%	98%	98%	92%	98%
5	96%	70%	90%	95%	93%	96%	98%	96%	94%	96%

IV-3/Part B – Year-to-Year % Changes in Part A Ratios

NAIC Class	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
3		-14.8%	14.9%	2.2%	-0.6%	1.8%	0.1%	0.0%	-2.8%	2.0%
4		-18.9%	19.0%	2.7%	1.6%	1.8%	0.0%	0.6%	-6.0%	5.9%
5		-26.9%	28.5%	5.0%	-2.5%	3.5%	2.1%	-2.0%	-2.1%	2.4%
S&P Index		-37.0%	26.5%	15.1%	2.1%	16.0%	32.4%	13.7%	1.4%	12.0%

[60] Bonds for health and P&C insurers are valued in the annual statement at the lower of amortized cost or market value.

[61] Life insurers are required to write down impaired bonds. The impaired value might be market value, or different if the insurer viewed the impairment as temporary. In the way we used this data, this feature might mask some the decline in value due to market value fluctuation. Our analysis did not adjust for this write-down feature.

[62] A period longer than 10 years might have been helpful, but the NAIC no longer retains Annual Statement data for more than 10 years.
We find that the market value and statement value data is not shown for all assets for each insurer, but the gaps did not seem systemic enough to have affected our result.

In Table IV-3 Part B, we also show the change in the S&P 500 index, against which we can compare the SG bond change in value. Using the 15% stock risk factor as a base, we can use the 2008 experience to calculate indicated SG bond risk factors, as shown in Table IV-4. In this analysis, we measure the SG bond risk relative to the risk in the S&P 500 index, as that index was used to calibrate the market risk for stocks.

Table IV-4
SG Bond Indicated Risk Factors Based on 2008 Market Value Experience for Insurers' Portfolios

(1)	(2)	(3)	(4)	(5)
Current NAIC Class	Current Risk Factors	2008 Decline	Ratio to S&P 500	Indicated Risk Factors
3	2.0%	-14.8%	0.400	6.0%
4	4.5%	-18.9%	0.510	7.7%
5	10.0%	-26.9%	0.726	10.9%
S&P 500 Index	15.0%	-37.0%	1.000	15.0%

Tax Notes: The indicated risk factors, column 4, are on the same FIT basis as the current 15% stock risk factor. The current risk factors, column 5, are on the current FIT calibration basis.

Table IV-4, Column 2 shows the current risk factors, for comparison. Column 3 shows the decline in market value from 2007 to 2008, from Table IV-3, Part B. Column 4 shows the ratio of the column 3 values by rating class to the decline in the S&P 500 index, also in column 3, for example 0.400= 14.8/37.0. Column 5 shows indicated risk factor, relative to S&P index, column 3 times 15%, for example 6.0%=0.400 x 15%.[63]

Table IV-4 assumes that the underlying variability for SG bonds and stocks are proportional to each other, and consistent with the observed data. The assumptions underlying this calculation are highly simplified,[64] but we believe this approximation is more representative of the underlying market risk than the "50% rule."

---

[63] This paper does not intend to address the appropriateness of the stock risk factor. Nonetheless, we note that the 2008 decline in stock values is 37%, but the risk factor is only 15%. That might appear to suggest that the 15% is 'low.' However, the 2008 experience might reasonably be considered a remarkably severe year, say a 1-in-100-years-or-more event, worse than the confidence level implicit in the 15% risk factors, and therefore the 2008 decline in value would be larger than the risk factor.

[64] The calculation would be correct if the observed data were representative of the underlying risk and if the underlying risk met the following criteria: First, assume market value variation for stocks and for each type of SG bond and stocks is normally distributed, albeit with different standard deviations. Second, assume the worst year for each asset type is a "1-in-n-year" event, with the same "n" for each asset type. Third, assume that the expected values for each asset class is proportional to the risk relativity (column 3). Then, the decline (column 2) is proportional to the number of standard deviations from the mean required to reach the "1-in-n" level of risk. The ratio in column 3 is the relative size of the standard deviations for each asset type. Since 15% for stocks is based on the number of

Table IV-4, shows that, based on this analysis:

- Class 5—the current risk factor is relatively consistent with the indicated risk factor.
- Classes 3 and 4—the current risk factors are somewhat low considering their 2008 experience relative to stocks.

3. Sensitivity Tests

We compare the results in Table IV-4 against two other approaches to measure market risk, as follows:

1. Using S&P bond index fluctuations[65] versus S&P 500 fluctuations during the 2008 financial crisis.
2. Using S&P bond index 10-year[66] standard deviations compared to S&P 500 standard deviations for a 10-year period including the financial crisis.

In Appendix 3, Tables A3-1 through A3-2, we show those two analyses. We summarize the results in Table A3-3. These analyses produce results similar to those we show in Table IV-4. For the reasons described in Appendix 3, we believe the selections based on the analysis in Table IV-4 are the most appropriate.

C. SG Risk Factors for 20 Proposed NAIC Risk Classes

The data for the analyses we described above was made available to us only for the S&P rating classes without modifiers. In Table IV-5, below, we interpolated between major classes in Table IV-4 to obtain the risk factors with modifier detail requested by NAIC.

---

standard deviations required for target confidence level, 15% times the relative size of the standard deviations for each asset type gives the equivalent confidence level for each asset type.
If the risk distribution were skewed e.g., log normal, then we would do the calculations in Table IV-4 using the logarithms of the observed declines (rather than the declines themselves). The effect would be that the indicated risk factors for SG bonds would be somewhat smaller than shown.

[65] We used S&P published bond indices, for example "B" rated bonds at S&P U.S. Dollar Global High Yield Corporate Bond B Index.
A large list of S&P bond indices, with links to individual indices is at: Index Returns.
The data at the website covers a rolling ten-year period. We downloaded data from March 31, 2008, through April 2018. We used that data for our worst-year test. Because it covers a rolling ten-year period, data downloaded at different times will cover different time periods.

[66] Ten years ending March 31, 2018, from the S&P website "fact sheet."

Table IV-5
SG Bonds
Indicated Risk Factors with Rating Class Modifier
For Base Representative Portfolio (824 Issuers)

(1a)	(1b)	(1c)	(2)	(3)
Moody's	S&P	NAIC	Current Risk Factors	Indicated Risk Factors
Ba1	BB+	3	2.0%	5.5%
Ba2	BB	3	2.0%	6.0%
Ba3	BB-	3	2.0%	6.6%
B1	B+	4	4.5%	7.1%
B2	B	4	4.5%	7.7%
B3	B-	4	4.5%	8.7%
Caa1	CCC+	5	10.0%	9.8%
Caa2	CCC	5	10.0%	10.9%
Caa3	CCC-	5	10.0%	12.0%
Ca or lower	CC+ or lower	6	30.0%	30.0%

Tax basis notes:
The current risk factors are on the current FIT calibration basis.
The indicated risk factors are on the same FIT basis as the current 15% stock risk factor.

The interpolation increment between modifier sub-classes is 0.55% between BB+ and B and 1.08% between B and CCC.
For portfolio size equal to life representative portfolio.

Because there is limited life insurer data for class 6 bonds, S&P class CC, our indicated risk factor for class 6 risk is unchanged, at 30%.

V. Bond Size Factors and Base Risk Factors

The current P&C and Life RBC Formulas include bond size factors that increase/decrease the base bond risk factor depending on the number of issuers in the insurers portfolio. The Life and P&C RBC Formulas currently use the same factors. The C1WG has proposed a revised set of bond size factors for the Life RBC Formula.[67]

In sections V.A and V.B, below, we discuss the bond size factors and calculation of base rates used in our indications for health and P&C, respectively.

A. P&C Bond Size Factors and Base Risk Factors

1. Selecting P&C Bond Size Factors

Constructing a separate set of bond size factors for P&C was outside of our scope, and we assume that the NAIC continue the current practice and use the same bond size factors for P&C and life. In Table V-1, below, we show the current and proposed bond size factors. For the P&C representative portfolio, the current average bond size factor for P&C is 1.143 and the proposed bond size factor is 1.125.

Table V-1
Current and C1WG Proposed Bond size factors - P&C and Life RBC Formulas[67]

Current				C1WG Proposed (Sept 2017)		
Size Band	Issuers	Factor		Size Band	Issuers	Factor
Up to	50	2.5		Up to	10	7.80
Next	50	1.3		Next	90	1.75
Next	300	1.0		Next	100	1.00
Over	400	0.9		Next	300	0.80
				Over	500	0.75
Portfolio Adjustment Factors for Representative Portfolios:						
PC (535 issuers)		1.143		PC (535 issuers)		1.125
Life (824 issuers)		1.032		Life (824 issuers)		0.993

2. Calculating P&C Base Risk Factors

The indicated risk factors for P&C insurers is based on the P&C representative portfolio that has 535 bond issuers. The bond size factor for that portfolio is 1.125, not 1.0. Therefore, the risk factor to be used in the P&C RBC Formula, which we call the base risk factor, needs to be determined such that when multiplied by 1.125 the result equals the indicated risk factor from the default model.

---

[67] These are called "Portfolio Adjustment Factors" in the C1WG reports but used as "Bond Size Factors" in the P&C RBC Formula.

Table V-2, below, shows the derivation of the base risk factors from the indicated risk factors.

- Column 1 shows the bond rating class.
- Column 2 shows the current base risk factors.
- Column 3 shows the indicated risk factor for the P&C representative portfolio of 535 issuers:
    - For IG bonds, this is the factor indicated for the P&C representative portfolio using the C1WG model, with a five-year time horizon, and otherwise adjusted as described earlier in this report.
    - For SG bonds, our indication is based on life insurer experience, and we interpret the results as being appropriate for the life insurer representative portfolio with 824 issuers.[68] Therefore, we increase the indicated risk factor in Table IV-4 by 1.125, to adjust it to the P&C representative portfolio of 535 issuers.
- Column 4 shows the indicated base risk factors for the P&C RBC Formula. Column 4 equals column 3 divided by 1.125, the bond size factor for the representative portfolio. With that adjustment, the base risk factor, multiplied by the bond size factor for a company with 535 issuers will be the value shown in column 3.[69]

[68] This is simplified, as (a) market value diversification for SG bonds is not necessarily the same as default risk diversification for IG bonds, which provides the basis for the bond size factors (b) while life insurer bond portfolios overall are larger than P&C portfolios, that might be the case for SG bonds alone. However, as the bond size factor is based on total number of issuers (excluding US government issuers), rather than issuers by rating class, and as the proportion of SG bonds is not large for either life or P&C, we believe this approach is reasonable.

[69] Note that the indicated base risk factors in Table V-2, column 4, equal the indicated base risk factors in Table IV-5.

Table V-2
P&C - Calculation of Base Risk Factors

(1a)	(1b)	(1c)	(2)	(3)	(4)
NAIC Class	Moody's Rating Class	S&P Rating Class	Current Base Risk Factors	Indicated Risk Factors 535 issuers	Indicated Base Risk Factors
IG Bonds - Based on Default Risk					
1	Aaa	AAA	0.3%	0.3%	0.2%
1	Aa1	AA+	0.3%	0.5%	0.4%
1	Aa2	AA	0.3%	0.7%	0.6%
1	Aa3	AA-	0.3%	0.9%	0.8%
1	A1	A+	0.3%	1.2%	1.0%
1	A2	A	0.3%	1.5%	1.3%
1	A3	A-	0.3%	1.7%	1.5%
2	Baa1	BBB+	1.0%	2.0%	1.8%
2	Baa2	BBB	1.0%	2.4%	2.1%
2	Baa3	BBB-	1.0%	2.9%	2.5%
SG Bonds - Based on Market Risk					
3	Ba1	BB+	2.0%	6.2%	5.5%
3	Ba2	BB	2.0%	6.8%	6.0%
3	Ba3	BB-	2.0%	7.4%	6.6%
4	B1	B+	4.5%	8.0%	7.1%
4	B2	B	4.5%	8.7%	7.7%
4	B3	B-	4.5%	9.8%	8.7%
5	Caa1	CCC+	10.0%	11.0%	9.8%
5	Caa2	CCC	10.0%	12.3%	10.9%
5	Caa3	CCC-	10.0%	13.5%	12.0%
6	Ca or lower	CC+ or lower	30.0%	30.0%	30.0%

Column 4 = Column 3/1.125.

Tax Basis Notes:
Column 2, current base risk factors are on current FIT basis.
Columns 3 and 4, IG bonds on BFIT basis. SG bonds are the same basis as the 15% stock factor.

3. Testing P&C Bond Size Factors

The indicated risk factor for insurers with portfolios having fewer than 535 issuers will be higher than the indicated factor for the representative portfolio. The indicated risk factor for insurers with portfolios having more than 535 issuers will be lower than the indicated risk factor for the representative portfolio. In Appendix 4, we examine the extent to which indicated risk factors by portfolio size are consistent with the bond size factors times the base risk factor.

In Appendix 4, Table A4-3, we see that for class 1 alone, which constitutes the bulk of the bonds, the risk factors produced by applying the proposed bond size factors is within about 10% of the

indicated risk factors, for insurers with 250 issuers or more. For class 2 alone the formula is within about 20% of the indicated value.

A better match is not possible without much more analysis, and possibly by having separate bond size factors by risk class and/or by having a different bond size factor formula than that in the life formula.

B. Health Bond Size Factors and Base Risk Factors

1. Impact of Possible Health Bond Size Factors

The current Health RBC formula does not include a bond size factor in determining the bond risk factor. We believe this was related to the materiality of the impact of the risk factor on the overall RBC level for health insurers.[70]

We can use two of the scenarios in the NAIC impact analysis to examine the extent to which a bond size factor is significant. Scenario 1 uses the indicated health bond risk factors with no bond size factor adjustments. Scenario 2 uses the proposed bond size factors and the base risk factor appropriate for a two-year time horizon. Appendix 6 includes an exhibit showing the distribution of the differences between the current ACL value and the ACL value for each scenario.[71] With Scenario 1, for all company size bands combined, the ACL values are within 5% of the current ACL value for 859 of 933 companies, i.e., 92% of companies. With Scenario 2, the ACL values are within 5% of the current ACL value for 840 companies, i.e., 90% of companies.

Regarding the effect of the bond size factors, this means only 2% of companies move outside of the 5% range when the bond size factor is introduced.[72] For wider size bands, ±15% or higher, it is also the case that the number of companies that move outside the band is about 2%. For the largest movements, we observe 10 companies with changes in ACL higher than 50% in scenario 2 and none in scenario 1. This is 1% of the 933 companies.[73]

Moreover, the NAIC exhibits also show that the number of companies by RBC action level are the same for scenario 1 and scenario 2.

---

[70] Feldblum, page 305, see Appendix 4/Exhibit A3-5 for extract, observes that there was a debate on whether the bond size factor should apply to P&C, because of the low impact on RBC values and because of the quality of issuer data. The same issues would have applied to health insurers.

[71] See Appendix 6, page A6-15.

[72] This 2% is the net effect of, perhaps, some companies moving into that band and then somewhat more than 2% of companies moving outside that band, to produce a net effect of 2%.

[73] Our analysis uses the ACL values and not the H1 values, to recognize the low level of materiality of H1 in the total company RBC.

We understand this information to mean the absence of bond size factors does not have a large effect on the ability of the RBC Formula to assess total risk.

2. Calculating Health Base Risk Factors

Assuming there will be no health bond size factors, Table V-3, below, shows the derivation of health base risk factors.

- Column 1 shows the bond rating class.
- Column 2 shows the current base risk factors.
- Column 3 shows the indicated risk factor for the health representative portfolio of 382 issuers:
    - For IG bonds, this is the factor indicated for the health representative portfolio using the C1WG model, with a two-year time horizon, and otherwise adjusted as described earlier in this report.
    - For SG bonds, our indication is based on life insurer experience, and we interpret the results as being appropriate for the life insurer representative portfolio with 824 issuers.[74] Therefore, we increase the indicated risk factor in Table IV-4 by 1.259, to adjust it to the health representative portfolio of 382 issuers.
- Column 4 equals column 3, as there are no bond size factors, the risk factors for the representative portfolio, 382 issuers, equals the base risk factors.

We note the following about these factors:

- The Table V-3 health factors for IG bonds are lower than the corresponding P&C risk factors from Table V-2, because of the shorter time horizon for health insurance, only offset partially by average bond size factor, 1.259, included in health base risk factors that are not included in P&C base risk factors.
- The Table V-3 risk factors for SG bonds are higher than the corresponding P&C risk factors because P&C base risk factors are subject to bond size factors, but health base risk factors are not. For health, instead of bond size factors that vary by company size, the health base

[74] This is simplified, as (a) market value diversification for SG bonds is not necessarily the same as default risk diversification for IG bonds, which provides the basis for the bond size factors (b) while life insurer bond portfolios overall are larger than P&C portfolios, that might be the case for SG bonds alone. However, as the bond size factor is based on total number of issuers (excluding US government issuers), rather than issuers by rating class, and as the proportion of SG bonds is not large for either life or P&C, we believe this approach is reasonable.

risk factors include the average bond size factor for the health representative portfolio, 1.259.[75]

- The values are before the application of a 0.1% minimum risk factor, which affects bond factors for AAA and AA+ rating classes in Table I-1.

Table V-3
Health - Calculation of Base Risk Factors

(1a)	(1b)	(1c)	(2)	(3)	(4)
NAIC Class	Moody's Rating Class	S&P Rating Class	Current Base Risk Factors	Indicated Risk Factors 382 issuers	Indicated Base Risk Factors
IG Bonds - Based on Default Risk					
1	Aaa	AAA	0.3%	0.0%	0.0%
1	Aa1	AA+	0.3%	0.0%	0.0%
1	Aa2	AA	0.3%	0.1%	0.1%
1	Aa3	AA-	0.3%	0.2%	0.2%
1	A1	A+	0.3%	0.3%	0.3%
1	A2	A	0.3%	0.5%	0.5%
1	A3	A-	0.3%	0.7%	0.7%
2	Baa1	BBB+	1.0%	1.0%	1.0%
2	Baa2	BBB	1.0%	1.2%	1.2%
2	Baa3	BBB-	1.0%	1.5%	1.5%
SG Bonds - Based on Market Risk					
3	Ba1	BB+	2.0%	6.9%	6.9%
3	Ba2	BB	2.0%	7.6%	7.6%
3	Ba3	BB-	2.0%	8.3%	8.3%
4	B1	B+	4.5%	8.9%	8.9%
4	B2	B	4.5%	9.7%	9.7%
4	B3	B-	4.5%	11.0%	11.0%
5	Caa1	CCC+	10.0%	12.3%	12.3%
5	Caa2	CCC	10.0%	13.7%	13.7%
5	Caa3	CCC-	10.0%	15.1%	15.1%
6	Ca or lower	CC+ or lower	30.0%	30.0%	30.0%

Tax Basis Notes:
Column 2, current base risk factors are on current FIT basis.
Columns 3 and 4, IG bonds on BFIT basis. SG bonds are the same basis as the 15% stock factor.

[75] The bond size factors are approximately 1.0 for a portfolio with 824 issuers, which is the case for the life representative portfolio. For 535 issuers, the case for the P&C representative portfolio, the bond size factor is 1.125. For 382 issuers, the case for the health representative portfolio, the bond size factor is 1.259.

VI. Future Analysis

The scope of our work did not include a systematic exploration of the structure of the asset risk factors in the RBC Formulas. However, we found that our work required us to address some of the simplifying assumptions and to update methods underlying the risk factor calibration in the early 1990s. In the course of our work, we also identified some features of the formula that might warrant exploration in future work. Many of these issues are not new, and we do not believe these issues need to be addressed now. We list those areas below:

Bond size factors

1. Bond size factors are calibrated based on the default risk model. The indicated base risk factors for SG bonds are calibrated based on market risk. That difference is not reflected in the bond size factors.

2. US government agency bonds, not backed by the full faith and credit of US government (not-FFC bonds), are not included in the count of number of issuers used for the bond size factor calculation and are not subject to the bond size factor. However, the C1WG includes these agency bonds in the determination of the life representative portfolio and bond size factors. While that aspect of C1WG calibration is not consistent with the RBC formula, to maintain consistency in our calibration with the C1WG calibration, we also included these in our estimate of the P&C and health representative portfolios.

   We have not identified any documentation describing the basis for the treatment in the RBC Formulas.

   Also, we collected no data on the number of such not-FFC bonds. If the proportion of not-FFC bonds is material, the effect on the calibration of health and P&C base risk factors would be:

   - The P&C base risk factor (and the health base risk factor, if bond size factors were applicable) should be higher, but for many companies the impact will be more than offset because no bond size factor would be applied to the not-FFC bonds in the portfolio.
   - For health, if bond size factors are not applicable, there is no effect.

SG Bond factor calibration

3. For the P&C RBC formula, as the indicated risk factors for SG bonds are calibrated to market risk, SG bonds might be combined with equity asset risk (R2) rather than fixed income asset risk (R1).[76]

[76] Fixed income and equity asset classes are not treated separately in the Health RBC Formula.

4. The data for calibration of SG bond risk factors are limited, as described in section IV and Appendix 4. In particular, the data cover only 10 years.

General

5. There is more recent data available, but, for consistency with the C1WG work, we used 2011 data to estimate the health and P&C representative portfolios.

Appendix 1 – Suitability of C1WG Model for Shorter Time Horizons

This section details our analysis and conclusions regarding the applicability of the 2015 C1WG model to time horizons of less than 10 years. The relevant features of the 2015 C1WG model are the following:

- Baseline default rates (by bond rating class and year since rating)—2015 C1WG Report Appendix A
- Recovery rates, Given Bond Default—2015 C1WG Report Appendix B
- Economic cycle effect on baseline default rates and recovery rates—2015 C1WG Report Appendix C

Our discussion in this appendix addresses the features potentially most relevant to the time horizon issue and is not a complete description of the 2015 C1WG model.

A. Baseline Default Rates—2015 C1WG Report Appendix A

The baseline default rate element of the model is described in Appendix A of the 2015 C1WG Report.

1. 2015 C1WG Method

Determination of the baseline default rate element of the model considers the following:

- Moody's provides issuer-weighted average cumulative default rates (from 1983-2012), by rating class over investment horizons (ages 1–20).[77]
- The 2015 C1WG analysis uses only the data for investment horizons (ages[78]) 1–10, and the C1WG smooths that raw data to ensure the patterns are appropriate, notwithstanding anomalous data points due to low credibility or other factors.
- The 2015 C1WG analysis derives annual spot rates for age-n by comparing cumulative default rates at age-n and age-n-1. The spot rate for rating class "X" and age "n" means the probability of default in n-th year after the valuation date, at which time the bond had rating "X."

[77] This data is organized by cohort date, rather than issue date. As such, it is not affected by changes in rating class over time.

[78] Age, sometimes called 'years' or 'years of experience' means the number of years from the date at which the bond rating was last reported, e.g., rating class at the annual statement date, when applied in the RBC formula.

- Bond maturity is not a feature of the 2015 C1WG model. Losses from defaults are modeled relative to an initial mix of rating quality at the valuation date[79] and size distribution, but not bond maturity. That approach assumes one of the following: (1) there is no variation in default rates by bond maturity, or (2) the distribution of bonds by maturity in the Moody's data is the same as the distribution of bonds by maturity in the representative portfolio, or (3) the effect of any deviations from (1) and (2) are small enough that they do not need to be considered.

2. Health/P&C Approach

In applying the 2015 C1WG model using a time horizon of n years, where n is less than 10, the applicability of the smoothing used by the 2015 C1WG analysis is one issue to consider. In this regard, there are two choices:

A. Use the first n ages of annual spot rates from the model, or

B. Create a new table with n ages of smoothed spot rates that have been derived by smoothing only the first n ages of the Moody's cumulative default rates.

Alternative A is preferable for the following reasons:

1. This ensures consistency among default rates that might be applied to different time horizons, e.g., five years for P&C, two years for health and 10 years for life.

2. Using a different number of years in smoothing would produce somewhat different results, but the shorter period smoothing is not necessarily more reflective of future experience (i.e., not necessarily "more correct for the first n-years") than the result of smoothing the 10-year period.

In other respects, the bond default rates as applied in the 2015 C1WG model are appropriate for time horizons shorter than 10 years.

B. Recovery Rates—2015 C1WG Appendix B

The recovery rate element of the 2015 C1WG model is described in Appendix B of the 2015 C1WG Report.

[79] By 'valuation date' we mean the starting date for the default risk model. Bond rating at the valuation date may not equal the bond rating at all later dates in the modeling. The change over time in bond ratings are implicit in the observed default rates and therefore implicit in the model results.

1. 2015 C1WG model

The 2015 C1WG model uses proprietary S&P recovery data by calendar year to develop recovery rates typical of the entire economic cycle. The model uses the same baseline values for all the rating classes and at all ages.

2. Health/P&C Approach

The 2015 C1WG model values are independent of age, and the long-term average is relevant to any time horizon shorter than 10 years.

Thus, the recovery rates as applied in the 2015 C1WG model are appropriate for time horizons shorter than 10 years.

C. Economic Cycle Effect on Default and Recovery Rates-2015 C1WG Appendix C

Appendix C of the 2015 C1WG Report describes how the model determines the C1 risk factor by stochastically simulating how the default and recovery rates might vary, around the baseline levels, from year to year as economic conditions change. In the sections below, we describe the 2015 C1WG approach and the application of that approach to health and P&C.

1. 2015 C1WG model

The default rates and recovery rates, determined as described above, represent long term averages over various economic conditions. To reflect variations from year-to-year due to varying economic conditions, the model produces simulations of economic conditions for each year in the time horizon. The C1 factors were developed from running 10,000 economic simulations. The model uses a four-state representation of economic conditions with the following four states:

1) Continued contraction
2) Contraction
3) Expansion
4) Continued expansion

The 2015 C1WG analysis uses a four-state conditional transition probability distribution (e.g., given a year of expansion, what is the probability of continued expansion). C1WG uses more than 30 years of economic condition data to derive those transition probabilities.

For each year, in each simulation, the 2015 C1WG model adjusts the baseline default rates and the baseline recovery rates to reflect the simulated economic condition. For default rates on bonds with ratings lower than A, the 2015 C1WG model uses all four economic condition states. For default rates on bonds rated A and higher and for recovery rates on all bonds, the C1WG consolidates the four-state transition probabilities into two-state transition probabilities

(contraction/expansion only regardless of prior year economic condition). These are cases where the C1WG believes the two-state approach is more appropriate.

Variation by Age

Using the 1983-2012 Moody's cohort default data and the year-to-year classification by economic condition, the C1WG determines indicated default rate relativities to adjust the base default rates, up or down, to reflect the applicable economic condition. The 2015 C1WG report refers to these adjustments as economic scalars. The economic scalars vary widely and counter-intuitively by age. Therefore, for each economic condition, the C1WG calculates and uses all-age average economic scalars, called leveled economic scalars.

For recovery rates, the 2015 C1WG report states, "we utilize the proprietary calendar year S&P recovery data and then assign it to the expansion and contraction years to derive recovery rates varying by the two economic states."[80] The 2015 C1WG report uses the average relativity for all for all 10 ages combined so recovery rate relativities do not vary by age.

2. Health/P&C

In applying the model with a shorter time horizon, e.g., five years, we note the following:

- For a five-year model, we could calculate leveled economic scalers over five years, rather than ten years, but for the reasons described with respect to smoothing of baseline default factors, we believe using the ten-year average model values is preferable.
- As the n-year model uses only n years, it is selecting the appropriate proportion of good outcomes and bad outcomes within that n-year horizon. Therefore, a five-year horizon from the five-year model is as good a representation of five-year outcomes as is the case for ten-year outcomes from a ten-year model.
- Five-year results might include more extreme cumulative default results than ten-year results, e.g., five good years vs. ten good years or five bad years vs. ten bad years, as there is less chance of good offsetting bad in a shorter time horizon. However, that would be appropriate for a five-year time horizon risk factor.

Thus, the economic cycle features of the model are appropriate for time horizons shorter than ten years.

D. Conclusion

We conclude that the 2015 C1WG model can be adapted to use a time horizon shorter than ten years without any adjustment to:

---

[80] 2015 C1WG Report, p55.

- Baseline default rates
- Recovery rates, given bond default, or
- Economic cycle effect on baseline default rates and recovery rates.

Appendix 2 – Supporting Data

Appendix 2 Contents

Table	Description and Purpose
Information considered in selection of 2% discount rate used in C1WG model when applied in health and P&C default risk model.	
Table A2-1	US Treasury Interest Rates at Various Duration for Alternative Historical Time Periods—LIBOR Swap Rates at June 8, 2018
Information considered in selection of two-year time horizon for health IG bond model and five-year time horizon for P&C IG bond model	
Table A2-2	Health Liability Duration
Table A2-3	P&C Liability Duration
Table A2-4	Health and P&C Key Ratios A. Unpaid claims as ratio to premium and surplus (2017 data) B. Distribution of assets by main asset class (2016 data) C. Maturity of assets considering fixed income, stocks and cash (2016 data)
Table A2-5	Asset Duration—life, health and P&C (2016 data)
Information used to calculate average effect of changes in risk factors	
Table A2-6	Distribution of Bonds by NAIC Rating Class—life, health and P&C (2016 data) Information considered in understanding the average effects of the risk factors.
Table A2-7	Bonds by S&P rating—20 classes (2011 data)

Table A2-1
US Treasury Interest Rates at Various Durations for Alternative Historical Time Periods
LIBOR Swap Rates at June 8, 2018

Time Period	Duration				
	1	2	3	5	7
20-year average	2.1%	2.4%	2.6%	3.0%	3.4%
10-year average	0.5%	0.8%	1.1%	1.7%	2.1%
June 8, 2018	2.3%	2.5%	2.6%	2.8%	2.9%
LIBOR swaps @ June 8 2018		2.8%		2.9%	

Table A2-2
Health Liability Duration
From 2016 Health Industry Aggregate Annual Statement
From UNDERWRITING AND INVESTMENT EXHIBIT, PART 2C, Section C

Years in which Premium Earned and Claims Incurred	Claims Unpaid	Unpaid Claims Adjustment Expenses	Total Unpaid Claims and Claim Expenses
2012	98,087	312	98,399
2013	158,315	3,254	161,569
2014	150,529	551	151,080
2015	1,891,370	51,623	1,942,993
2016	58,921,016	1,407,110	60,328,126
Total	61,219,317	1,462,850	62,682,167

Percentage of unpaid claims and claim expense years from the latest year:

60,328,126/62,682,167 = 96%

Table A2-3 P&C Liability Duration

To estimate the average duration of loss and loss adjustment expense (LAE) liabilities for P&C insurers, we used aggregated 2016 Schedule P, Part 3 summary data for all P&C insurance companies. From this information, we selected the weighted all-year average loss development factors (LDF) to determine a paid development pattern. We selected a tail factor of 1.04 based on a review of the industry ultimate estimates compared to the cumulative paid at 120 months. Based on this analysis, the following cumulative payment pattern was estimated:

Table A2-3A
P&C Liability Duration
Estimated Cumulative Payment Pattern by Maturity

Maturity	Cumulative % Paid
12	47%
36	69%
60	79%
84	86%
108	90%
132	92%
156	94%
180	95%
204	96%
228	96%

We then extrapolated to 28 years by decaying the incremental payouts.

We then used the reserves by accident year for 2016 and applied the estimated payout pattern by accident year. For the prior row, we used the simplifying assumption that all claims were incurred in 2006.

The resulting estimated payout pattern is shown in Table S3-3B below.

Table A2-3B
P&C Liability Duration
Estimated Payment Pattern of Loss & LAE Liabilities

# Years	%
0.5	29.0%
1.5	17.1%
2.5	11.4%
3.5	7.9%
4.5	5.7%
5.5	4.1%
6.5	3.4%
7.5	2.9%
8.5	2.6%
9.5	2.4%
10.5	1.8%
11.5	1.7%
12.5	1.5%
13.5	1.4%
14.5	1.3%
15.5	1.2%
16.5	1.2%
17.5	0.7%
18.5	0.6%
19.5	0.5%
20.5	0.4%
21.5	0.3%
22.5	0.3%
23.5	0.2%
24.5	0.2%
25.5	0.1%
26.5	0.1%

This payout averages to 4.33 years.

Table A2-4
Health and P&C Key Ratios

Part A—Unpaid Claims as Percentage of Premium and Surplus

Unpaid Claim Related Information	Health		P&C	
Unpaid claim & claim expense	64,861,260,188		650,657,077,139	
Surplus	182,534,362,650		767,117,305,919	
Ratio of unpaid claim and expense to surplus		35.5%		84.8%
Revenue/Net Earned Premium	665,650,112,873		546,113,687,926	
Ratio of unpaid claim and expense to Revenue		9.7%		119.1%
Aggregate health policy reserves	17,029,378,465			
Ratio of policy reserves to unpaid claim & expense		26.3%	Not applicable	

Part B—Distribution of Assets by Main Asset Class

Asset/Liability Item	Health	% to total assets	P&C	% to total assets
Bonds	125,163,134,211	67%	1,021,940,034,491	64%
Cash and near cash (net of short term assets shown in Schedule D)	20,530,931,492	11%	43,536,468,765	3%
Stocks	24,259,734,686	13%	348,314,364,165	22%
BA assets	8,287,286,541	4%	128,703,734,018	8%
Other	7,463,793,593	4%	46,262,962,855	3%
Subtotals, cash and invested assets	185,704,880,523	100%	1,588,757,564,294	100%
Uncollected Premium	26,893,766,758		130,826,916,404	

Part C—Maturity of Assets Considering Fixed Income, Stocks and Cash

Average Maturity of Assets			
Asset Type	Health		P&C
Bonds	5.2		6.3
Cash	0		0
Stocks	0		0
Weighted Average (Weights from Part B)	3.9		4.6
Uncollected premium	0		0
Weighted Average including uncollected premium	3.3		4.2

Part A 2017 Annual Statement—pages 2 and 3.
Part B from 2016 Annual Statement—pages 2 and 3 and Schedule D, Part 1A, Section 1.
Part C from 2016 Annual Statement—derived from Schedule D, Part 1A, Section 1.

Table A2-5
Asset Duration

Type of Insurer	Maturity				
	1 Year or Less	Over 1 Year Through 5 Years	Over 5 Years Through 10 Years	Over 10 Years Through 20 Years	Over 20 Years
Health	31,654,330,216	48,295,433,676	32,197,303,092	5,776,337,247	6,508,248,966
Life	234,909,172,673	726,883,403,948	884,184,731,951	482,882,328,682	609,225,260,160
P&C	158,701,189,790	370,830,562,199	351,477,689,999	88,110,686,444	51,667,597,580

Type of Insurer	Maturity				
	1 Year or Less	Over 1 Year Through 5 Years	Over 5 Years Through 10 Years	Over 10 Years Through 20 Years	Over 20 Years
Health	25%	39%	26%	5%	5%
Life	8%	25%	30%	16%	21%
P&C	16%	36%	34%	9%	5%
Midpoint	0.5	3	7.5	15	25
Duration at 3%	0.99	0.92	0.80	0.64	0.48

	Average Maturity	Average Duration
Health	5.2	4.8
Life	10.7	9.7
P&C	6.3	5.9

Table A2-6
Distribution of bonds by NAIC rating class
2016 Annual Statements

NAIC class	Health	P&C	Life
1	74.4%	77.8%	58.9%
2	19.3%	16.5%	34.5%
3	3.9%	2.6%	4.2%
4	2.1%	1.9%	1.8%
5	0.2%	1.0%	0.5%
6	0.0%	0.2%	0.1%
Total	100.0%	100.0%	100.0%

Data from 2016 Annual Statement, Schedule D, Part 1A, Section 1.
Percentage of bond statement value for bonds excluding US government bonds.

Table A2-7
Distribution of Bond Amounts Within NAIC Rating Classes
2011 Annual Statement Data

Rating Class			Distribution of Bond $ Within NAIC Rating Class	
(1a)	(1b)	(1c)	(2)	(3)
Moody's	S&P	Current NAIC	P&C	Health
Aaa	AAA	1	26.4%	22.7%
Aa1	AA+	1	16.5%	11.3%
Aa2	AA	1	18.0%	14.8%
Aa3	AA-	1	12.8%	12.8%
A1	A+	1	9.4%	12.2%
A2	A	1	9.7%	14.9%
A3	A-	1	7.1%	11.3%
Class 1 Total			100.0%	100.0%
Baa1	BBB+	2	39.2%	38.6%
Baa2	BBB	2	42.2%	43.3%
Baa3	BBB-	2	18.6%	18.0%
Class 2 Total			100.0%	100.0%
Ba1	BB+	3	45.1%	40.5%
Ba2	BB	3	27.5%	30.1%
Ba3	BB-	3	27.5%	29.4%
Class 3 Total			100.0%	100.0%
B1	B+	4	43.1%	44.2%
B2	B	4	24.6%	26.9%
B3	B-	4	32.3%	28.8%
Class 4 Total			100.0%	100.0%
Caa1	CCC+	5	31.3%	18.5%
Caa2	CCC	5	31.3%	50.8%
Caa3	CCC-	5	37.4%	30.8%
Class 5 Total			100.0%	100.0%
Ca or lower	CC+ or lower	6	100.0%	100.0%
Class 6 Total			0.0%	0.0%

Note—Excludes US government bonds with zero risk factor.
Approximately 70% of health and 78% of P&C bond records included S&P rating. The distributions above exclude bonds that did not include S&P rating information. Therefore, those bonds are treated as "average."

Appendix 3—SG Bonds: Supplemental Analysis

In this supplement to section IV, we describe two market value analyses of risk factors for SG bonds, as follows:

1. Using S&P bond index fluctuations[81] versus stock value fluctuations during the 2008 financial crisis.

2. Using S&P bond index 10-year[82] standard deviations compared to S&P 500 standard deviations for a 10-year period including the financial crisis. In this section we summarize the three market-value analyses of risk factors for SG bonds.

In this appendix we also include three extracts from Feldblum 1996 risk-based capital paper that relate to the contemporaneous understanding of the basis for some of the original asset risk factors.

A. Bond Index Experience vs. S&P 500 Experience in the Financial Crisis Decline

In Table A3-1 below, we determine the worst percentage change in bond values by rating class, using the bond market value index, and we compare that to the worst percentage change in stock values, using the S&P 500 Index. For context, we show the results of this calculation for IG bonds as well as SG bonds, although we consider the results only for SG bonds, as IG bonds are not the subject of this appendix. To emphasize that point, we have shaded the IG section in Table A3-1.

---

[81] We used S&P published bond indices, for example "B" rated bonds at S&P U.S. Dollar Global High Yield Corporate Bond B Index.
A large list of S&P bond indices, with links to individual indices is at: Index Returns.
The data at the website covers a rolling ten-year period. We downloaded data from March 31, 2008 through April 2018. We used that data for our worst-year test. Because it is based on a rolling ten-year period, data downloaded at different times will cover different time periods.

[82] Ten years ending March 31, 2018, from the S&P website "fact sheet.". See footnote 81 for sources.

Table A3-1
SG Bond Indicated Market Risk Factors Based on Financial Crisis Decline - Index Experience

(1a)	(1b)	(2)	(3)	(4)	(5)
Current NAIC Class	S&P Rating Class	Current Risk Factors	Financial Crisis Decline	Ratio to S&P 500	Indicated Risk Factors
IG Bonds					
1	AAA	0.3%	-2.8%	0.059	0.9%
1	AA	0.3%	-6.0%	0.126	1.9%
1	A	0.3%	-2.9%	0.062	0.9%
2	BBB	1.0%	-13.5%	0.284	4.3%
SG Bonds					
3	BB	2.0%	-21.1%	0.443	6.6%
4	B	4.5%	-29.8%	0.626	9.4%
5	CCC	10.0%	-39.0%	0.820	12.3%
6	CC	30.0%	-57.9%	1.216	18.2%
	S&P500	15.0%	-47.6%	1.000	15.0%

Data Notes:

Our data begins March 31, 2008 and extends to April 2018.

If we had data that began earlier than March 31, 2008, we would measure one-year declines in market value. Given the available data, we use short term declines for periods ending from April 1, 2008, to March 30, 2009, and annual declines for periods ending after March 30, 2009.

Thus, for each ending date we measure the change over the shorter of the period (a) from March 31, 2008 to the ending date or (b) from 12 months prior to the ending date.

Most, but not all, of the worst declines were in late 2008 or early 2009. For example:

The worst period for AAA bonds is the period from March 31, 2008, to June 13, 2008.

The worst period for CCC bonds is the period from March 31, 2008, to December 16, 2008.

The worst period for the S&P 500 is the period from March 31, 2008, to March 9, 2009

However, the worst period for CC bonds (57.9%) is for the year ending June 13, 2016. In the months following March 31, 2008, worst maximum declines for CC bonds was 52.6%.

Tax Basis Notes:

The current risk factors are on the current FIT calibration basis.

The indicated risk factors are on the current FIT calibration basis of the 15% stock risk factor.

For each S&P rating class, Column 2 shows the current risk factor. Column 3 shows the financial crisis decline. Column 4 shows the ratio of column 3 to the column 3 value for the S&P 500 index. Column 5 shows the indicated risk factor using the 15% stock risk factor as the base, column 4 times 15%.

The assumptions in this calculation are the same as those in the Table IV-4 analysis.

B. Bond Index Experience vs. S&P 500 Experience - —Standard Deviation Analysis

In Table A3-2, below, column 2 shows the 10-year standard deviation, ending April 30, 2018, for bonds in each S&P rating class and for the S&P 500. The standard deviations for a period that includes an extreme event, like the 2008 financial crisis, as this time period does, provides a broader basis for comparing market value fluctuations of SG bonds and stocks, than we obtain by considering only the most extreme period.

Using the standard deviations, we calculate the indicated market value bond risk factors shown in column 3. The assumptions in this calculation are like those in the Table IV-4 analyses.

As in Table A3-1, for context, we show the results of this calculation for IG bonds as well as SG bonds, although we consider the results only for SG bonds, as IG bonds are not the subject of this appendix. To emphasize that point, we have shaded the IG section in the Table A3-2 below.

Table A3-2
SG Bond Indicated Market Risk Factors Based on 10-year Standard Deviation

(1a)	(1b)	(2)	(3)	(4)	(5)
Current NAIC Class	S&P Rating Class	Current Risk Factors	10 year Std Deviation	Ratio to S&P 500	Indicated Risk Factors
IG Bonds					
1	AAA	0.3%	2.0%	0.133	2.0%
1	AA	0.3%	3.1%	0.209	3.1%
1	A	0.3%	4.0%	0.267	4.0%
2	BBB	1.0%	6.0%	0.403	6.0%
SG Bonds					
3	BB	2.0%	7.6%	0.509	7.6%
4	B	4.5%	8.9%	0.596	8.9%
5	CCC	10.0%	13.3%	0.887	13.3%
6	CC	30.0%	24.9%	1.660	24.9%
	S&P 500	15.0%	15.0%	1.000	15.0%

Calculation Notes: Column 2, 10 year-standard deviation from S&P Fact sheets in April 2018.
Column 3 values are ratios of column by bond class to column S&P 500 value.
Column 4 = column 3 times 15%, the stock risk factor.

Tax Basis Notes:
The current risk factors are on the current FIT calibration basis.
The indicated risk factors are on the current FIT calibration basis of the 15% stock risk factor.

C. Summary of Market Value Analysis of Risk Factors

Table A3-3, below, summarizes the indications from the different approaches.

Table A3-3
Summary of Indicated Risk Factors

(1a)	(1b)	(1c)	(2)	(3)	(4)	(5)	(6)	(7)
Current NAIC class	S&P Rating Class	Current Risk Factors	Life Insurer Portfolio - 2008 Experience	Based on Bond Index		Default Risk over Time Horizon:		Selected
			Statement Value Risk	Financial Crisis decline	10 Yr Std Dev	2 YR.	5 YR.	
3	BB	2.0%	6.0%	6.6%	7.6%	2.1%	4.6%	6.0%
4	B	4.5%	7.7%	9.4%	8.9%	5.2%	11.1%	7.7%
5	CCC	10.0%	10.9%	12.3%	13.3%	16.7%	26.7%	10.9%
6	CC	30.0%	NA	18.2%	24.9%			30.0%
Stocks	S&P 500	15.0%						

Notes: Column 2 from Table IV-4; Column 3 from Table A3-1. Column 4 from Table A3-2. Columns 5–6 from Table IV-2.

Tax Basis Notes:

The current risk factors are on the current FIT calibration basis.

The indicated risk factors in columns 2–4 are on the current FIT calibration basis of the 15% stock risk factor.

The indicated risk factors in columns 5–6 are on a BFIT basis.

The selected risk factors, based on column 7, are on the current FIT calibration basis of the 15% stock risk factor.

For class 6 bonds, S&P class CC, we see that the indicated market risk is higher than the market risk for stocks; 18.2% risk factor based on the financial market decline analysis and 24.9% based on standard deviation analysis. We also note that CC bonds had two price declines exceeding 50% in the decade beginning March 31, 2008 (Table A3-1 notes). Rather than analyze the CC risk factor more deeply, our indicated risk factor for class 6 risk equals the current class 6 risk factor, 30%.

The results in columns 2–6 should be evaluated considering the following:

1. The results accept the current 15% stock risk factor as appropriate for this calibration.

   This creates consistency between market risk elements in the RBC formula. However, If the NAIC were to conclude the 15% risk factor should be changed, then the indicated SG risk factors would need comparable changes.

   The FIT basis of the indicated SG risk factors is the same as the FIT basis of the 15%.

2. Our analysis assumes that the 2008 financial crisis data was the same 1-in-n year event for each asset class. However, that may not be correct, as the 2008 financial crisis may not have affected all asset types equivalently.

Moreover, even if that assumption were correct for the 2008 financial crisis, other extreme events might have different characteristics.

3. The data covers a period of only 10 years. That is a short period for measuring variability.

   Items 2 and 3 create uncertainty, but no apparent bias towards higher or lower indications.

4. We use life insurer experience in Section IV, and repeat the results in Table A3-3, column 2. The SG bonds in a life insurer portfolio might differ from SG bonds in P&C/health insurer portfolios, in duration or other respects. An analysis based on P&C/health insurer experience might produce different indicated risk factors.

   Also, life insurer bond selection might be more conservative than the entire bond universe. Thus, the life insurer experience might be less risky than the bond universe experience, contributing to the observations that column 3 is lower than columns 4 and 5.

5. Our calibration of SG bond variability uses the simplifying assumption that SG bond variability is proportional to stock variability at all confidence levels. This includes the assumption that the SG bond variability distribution is not a skewed distribution. This creates uncertainty. Also, the assumption that the distributions are not skewed implies that the indications might be high rather than low.

D. Exhibit A3-4 - Fixed Income Risk, Feldblum 1996

Unaffiliated Fixed Income Securities- page 303,[83] Feldblum, 1996

The major risk for fixed income securities is default risk: the risk that the issuer will not make the required interest or principal payments. The risk factor varies by the NAIC bond class (or "asset class"). The factor ranges from 0% for Treasury securities, since the default risk is virtually non-existent, to 30% for bonds in NAIC class 6, which are primarily bonds in or near default. The full set of risk-based capital default risk factors is shown in Table 1.[4]

Feldblum footnote 4:

[4]The *NAIC Instructions*, p. 2, explain that "these bond factors are based on cash flow modeling, using historically-adjusted default rates for each bond category. For each of 2,000 trials, annual economic conditions were generated for the ten-year modeling period. Each bond of a 400-bond portfolio was annually tested for default (based on a "roll of the dice") where the default probability varies by rating category and that year's economic environment. When a default takes place, the actual loss considers the expected principal loss by category, the time until the sale actually occurs, and the assumed tax consequences." (This analysis was performed by the actuarial advisory committee to the life insurance risk-based capital working group.)

For investment grade bonds (classes 1 and 2), the factors in the property/casualty risk-based capital formula are the same as those in the life insurance formula, since these bonds are reported at amortized cost by both sets of insurers. Bonds below "investment grade" (classes 3, 4, and 5) are reported at market value in the property/casualty statutory statement but may be reported at amortized cost in the life insurance statutory statement. To use the same risk-based capital charges for the two sets of companies would amount to a double charge for property/casualty insurers. Consequently, the class 3, 4, and 5 charges in the property/casualty formula are half as large as those in the life formula [**highlight added for emphasis**]. This is the intent of the comment in the *NAIC Instructions* that "the factors for classes 3 through 6 bonds recognize that the statement value of these bonds reflects a loss of value upon default by being marked to market."

Cash – page 305, Feldblum, 1996

Cash deposited in a banking institution is subject to the risk that the cash may be uncollectible if the bank becomes insolvent. This is similar to the risk that bonds issued by a high quality corporation may default, so the NAIC Working Group chose a 0.3% charge for cash, similar to the charge on Class 1 bonds. Non-government money market funds, which are similar to cash deposits, have the same charge.

[83] Feldblum, Sholom. "NAIC Property/Casualty Insurance Company Risk-Based Capital Requirement," Proceedings of the Casualty Actuarial Society (PCAS), LXXXIII, 1996.

E. Exhibit A3 - 5-Bond Size Adjustment Factor, Feldblum, 1996

Footnote on Page 305, Feldblum, 1996

[6]For property/casualty insurers, the bond size adjustment factor has little effect on the final risk-based capital ratios, though calculating the factor is time-consuming. The AAA Task Force is presently (mid-1996) preparing a recommendation that this factor be dropped from the risk-based capital formula. Moreover, since the number of issuers subject to the bond size adjustment factor is not shown in the Annual Statement, errors in calculating the factor abound. Michael Barth, the research associate at the NAIC in charge of analyzing the risk-based capital results, has commented that "it is hard to argue that the bond size factor is meaningful when so many companies report it incorrectly"

F. Exhibit A3-6 - Unaffiliated Common Stock Risk, Feldblum, 1996

Pages 308-309[84], Feldblum, 1996

Three Perspectives

Members of three risk-based capital committees offered critiques of the 30% charge, leading to the reduction of the charge to 15% for property/casualty companies. Many regulators are uncomfortable with differing charges in the life insurance and property/casualty formulas for the same risk, and one can expect efforts in the coming years to equalize the charges in the two formulas.[8] The key issues involved are well represented by the following three perspectives on the common stock risk charge.

1. Robert Bailey, deputy insurance commissioner of the State of Michigan and a member of the NAIC Working Group, thought the 30% charge was too high, both for life insurers and for property/casualty insurers. However, since the life insurance risk-based capital actuarial advisory committee would not revise their 30% charge, Mr. Bailey recommended that this charge differ between life insurers and property/casualty insurers, for the following reason: Many life insurers, especially those selling traditional whole-life insurance policies, have liabilities that are expressed in fixed dollar terms, such as $100,000 of life insurance. For such insurance contracts, common stocks can be a risky investment, since the market value of the stocks may fluctuate while the insurance liability remains fixed. Property/casualty insurers, however, have inflation-sensitive liabilities: when inflation accelerates, the dollar amount of required liability loss reserves also increases. Property/casualty insurers may use inflation- inflation-sensitive liabilities.[9]

---

[84] Feldblum, Sholom. "NAIC Property/Casualty Insurance Company Risk-Based Capital Requirement," Proceedings of the Casualty Actuarial Society (PCAS), LXXXIII, 1996.

2. William Panning (Hartford) and Peter Storms (Travelers), members of the Accounting Advisory Committee to the NAIC Working Group, reexamined the work of the life insurance risk-based capital actuarial advisory committee on common stock risks, using different investment years and different holding periods. Using 90% and 95% confidence intervals, they concluded that the 30% charge was excessive; a more appropriate number would be between 10% and 12%.

3. Robert Butsic of the Fireman's Fund Insurance Companies, a member of the AAA RBC Task Force, calibrated the common stock charge using a 1% "expected policyholder deficit." He also concluded that the 30% charge was excessive, and that a more appropriate number would be 15%.[10]

Feldblum footnotes:8, 9, and 10:

[8]During late 1993, for instance, consideration was given to reducing the common stock charge in the life insurance risk-based capital formula as well. In early 1994, however, the life insurance actuarial advisory committee to the NAIC Working Group again concluded that 30% is an appropriate charge, and it should not be reduced to 15%.

[9]On the inflation sensitivity of property/casualty loss reserves, see Butsic [10]. The inflation sensitivity of common stocks is a much debated issue; see Fama and Schwert [18] and Feldblum [19]. Bailey's position is best summed up in his July 6, 1992, letter to Sholom Feldblum: "I supported a lower RBC charge for common stocks for casualty insurers on the theoretical grounds that casualty insurers have a greater proportion of their liabilities that are inflation-sensitive and therefore need more assets that are inflation sensitive in the same direction."

[10]Butsic chose a 1% "expected policyholder deficit" (EPD) ratio because the reserving risk charges in the risk-based capital formula, when viewed from an expected policyholder deficit perspective, produce an expected policyholder deficit ratio of about 1%. See Butsic [11] for a discussion of the expected policyholder deficit concept and its application to risk-based capital requirements. Butsic argues that the various components of the risk-based capital formula should be internally consistent: each should be calibrated to approximately the same "solvency" level. With regard to the Accounting Advisory Committee comments on the "holding period," see Butsic's Exhibit 4 and the related text regarding the "time horizon" for the risk-based capital system. For common stock investments and casualty loss reserves, the longer the time horizon, the greater the capital needed to satisfy a given EPD ratio.

[See Feldblum, 1996, for references [10], [11], [18], and [19]

Appendix 4 – Bond Size Factors and Base Risk Factors

A. P&C

As noted earlier in the report, the current and proposed bond size factors for P&C are the same as the factors in the life RBC Formula, as follows:

Table A4-1
Current and C1WG Proposed Bond size factors

Current				C1WG Proposed (Sept 2017)		
Size Band	Issuers	Factor		Size Band	Issuers	Factor
Up to	50	2.5		Up to	10	7.80
Next	50	1.3		Next	90	1.75
Next	300	1.0		Next	100	1.00
Over	400	0.9		Next	300	0.80
				Over	500	0.75
Portfolio Adjustment Factors for Representative Portfolios:						
PC (535 issuers)		1.143		PC (535 issuers)		1.125
Life (824 issuers)		1.032		Life (824 issuers)		0.993

Source: Appendix B; October 10, 2017 C1WG Letter

Table A4-2, below, shows the effect of the change in bond size factors, with no change in risk factors.

Table A4-2
Effect of Change in Bond size factors, by Size of Company Portfolio

Issuers	Current	Proposed	% Change
50	2.500	2.960	18.4%
100	1.900	2.355	23.9%
200	1.450	1.678	15.7%
250	1.360	1.502	10.4%
300	1.300	1.385	6.5%
382	1.236	1.259	1.9%
400	1.225	1.239	1.1%
500	1.160	1.151	-0.8%
535	1.143	1.125	-1.6%
600	1.117	1.084	-2.9%
824	1.032	0.993	-3.7%
1000	1.030	0.951	-7.7%
1200	1.008	0.917	-9.0%
2000	0.965	0.850	-11.9%

In Table A4-3, below, based on these bond size factors, we compare the indicated risk factors at various portfolio sizes against the base risk factor multiplied by the bond size factor, as described below.

Indicated Risk Factors Based on Bond Default Model at Different Portfolio Sizes

Part A of Table A4-3 shows the indicated risk factors, based on the bond default model described earlier, by bond rating, for a range of portfolio sizes, from 50 issuers to 2000 issuers, for class 1 and class 2 bonds.[85] Class 1 and 2 bonds constitute 94% of fixed income assets, and the bond default model would not apply to classes 3-5 under our proposal.

In Part B, for each of the sub-classes within classes 1 and 2, we combine the risk factors into a single risk factor using the weights by S&P class from Table A2-9, which is based on 2011 information. We combine classes 1 and 2 using the distribution by NAIC class from 2016 Annual Statements. These are the average indicated risk factors, at various portfolio sizes, based on the default risk model.

The final row in Part B shows the bond size factor based on the portfolio size and the proposed bond size table.

Indicated Risk Factors Based on Bond Size Factors at Different Portfolio Sizes

In Part C, we calculate the risk factor using the indicated base risk factor from Table I-1 and the bond size factor using Table A4-1. This is the base risk factor in column 2 times the portfolio risk factor from the last row of Part B, the indicated risk factors, at various portfolio sizes, based on the bond size factors

Comparison of Methods at Different Portfolio Sizes

If the bond size factors were perfect, insofar as that is possible, the Part B values would equal to Part C values. Part D gives the percentage difference between risk factors from Part B and Part C, which shows the following:

1. The factors are identical for the portfolio of 535 issues, because we calibrated the base risk factors to make that the case.

2. For portfolios of 250 or more issuers, we observe:

    a. For class 1 alone, the formula is within about 10% of the indicated value.

    b. For class 2 alone the formula is within about 15% of the indicated value.

[85] This analysis assumes that distribution of bonds by size are the same regardless of portfolio size. We tested the effect of health portfolio distribution of bonds by size with for a 50-issuer company and we tested the effect of life portfolio distribution of bonds by size with a 1,200-issuer company. Those sensitivity tests did not show any significant changed in indicated risk factor. Therefore, assuming the same distribution of bonds by size does not appear to distort the findings.

c. For classes 1 and 2 combined the formula is within about 10% of the indicated value.

A better match is not possible without having separate bond size factors by risk class and by having a different bond size factor formula than the life formula.

For portfolios smaller than 250 issuers, the differences are larger. For the insurers which have only 50 or 100 issuers and high rated bonds, the chance of default is so low that extremely good results can occur with 96% probability. Therefore, the indicated risk factors are lower than the risk factors for insurers with larger number of issuers. This is statistically correct, but using low risk factors might reward undue concentration of risk. Also, the bond default model may not reflect significant features that vary with number of issuers in the insurer's portfolio.

Using the C1WG bond size factors avoids discounts for high concentration, may better reflect the variation by company size that are not reflected in the bond default model, and maintains consistency with this aspect of the Life RBC Formula.

Table A4-3
Various Portfolio Sizes
Compare Default Risk Model Indicated Risk Factors to Risk Factors Based on Applying Bond Size Factors to Indicated Base Risk Factors

(1a)	(1b)	(1c)	(2)	(3)	(4)	(5)	(6)	(9)	(10)	(11)
NAIC Class	**Moody's Rating Class**	**S&P Rating Class**	**Base Risk Factors**	**Indicated Risk Factor for Portfolio With Number of Issuers Shown**						
Part A										
			535	2000	1200	824	535	250	100	50
1	Aaa	AAA	0.24%	0.17%	0.21%	0.24%	0.27%	0.31%	0.29%	0.00%
1	Aa1	AA+	0.43%	0.30%	0.35%	0.40%	0.48%	0.61%	0.79%	0.75%
1	Aa2	AA	0.62%	0.48%	0.55%	0.60%	0.70%	0.89%	1.26%	1.49%
1	Aa3	AA-	0.84%	0.71%	0.78%	0.81%	0.95%	1.19%	1.72%	2.17%
1	A1	A+	1.05%	0.93%	1.00%	1.06%	1.18%	1.46%	2.13%	2.88%
1	A2	A	1.30%	1.14%	1.23%	1.31%	1.46%	1.74%	2.47%	3.40%
1	A3	A-	1.51%	1.36%	1.48%	1.56%	1.70%	2.07%	2.86%	3.89%
2	Baa1	BBB+	1.79%	1.59%	1.76%	1.87%	2.01%	2.33%	3.23%	4.50%
2	Baa2	BBB	2.12%	1.91%	2.07%	2.21%	2.38%	2.78%	3.62%	5.04%
2	Baa3	BBB-	2.55%	2.35%	2.50%	2.64%	2.86%	3.27%	4.17%	5.75%
Part B										
Avg Indicated		Class 1	0.69%	0.57%	0.63%	0.68%	0.77%	0.95%	1.30%	1.55%
		Class 2	2.07%	1.87%	2.03%	2.16%	2.33%	2.70%	3.57%	4.96%
		Class 1+2	0.93%	0.79%	0.88%	0.94%	1.04%	1.26%	1.70%	2.14%
Bond Size Factor-Proposed			1.12	0.85	0.92	0.99	1.12	1.50	2.36	2.96
Part C										
Avg calculated		Class 1		0.58%	0.63%	0.68%	0.77%	1.03%	1.62%	2.03%
		Class 2		1.76%	1.90%	2.05%	2.33%	3.11%	4.87%	6.12%
		Class 1+2		0.79%	0.85%	0.92%	1.04%	1.39%	2.19%	2.75%
Part D										
% difference		Class 1		2.9%	-0.3%	0.3%	0.0%	8.3%	24.4%	31.3%
		Class 2		-5.9%	-6.6%	-4.9%	0.0%	15.2%	36.5%	23.4%
		Class 1+2		-0.7%	-2.9%	-1.8%	0.0%	10.9%	28.8%	28.1%

B. Health

As noted earlier in this report, the Health RBC Formula currently does not use bond size factors, and we propose no change in that practice. Instead, the base risk factors include the bond size factor for a typical portfolio.

In section V, we discussed the NAIC impact analysis showing that there is limited effect on the RBC Formula values of having no bond size factors.

Appendix 5 – Impact of Indicated Risk Factors and Sensitivity Tests

The NAIC has prepared impact information that is attached in Appendix 6.

In Section I.D we describe the components of that NAIC analysis and highlight key features from the comparison of the current risk factors to the indicated risk factors. In this Appendix we describe the alternative factors, separately for health and P&C in the sections below.

A. Health Impact Analysis

For health, PCHWG asked NAIC to show the effect of the seven bond risk factor alternatives listed in Table A5-1. below. These tests cover the following variations:

- Three time horizons: one-year, two-year and five-year,
- Three possible bond size factor approaches:
  - no bond size factor,
  - the current P&C bond size factors, the same as the current life portfolio adjustment factors, and
  - the proposed P&C bond size factors, the same as the C1WG September 2017 proposed life portfolio adjustment factors.
- Two portfolio sizes:
  - The representative portfolio with 382 issuers
  - A portfolio of 267 issuers, assuming 30% of issuers are from US government agencies with bonds that are not backed by the full faith and credit of the US government.[86]

[86] As discussed in section VI, the issuers of "not-FFC" bonds are not included in the count of issuers. With fewer issuers, the C1WG model indicates larger risk factors. We collected no data on the number of such "not-FFC" bonds, but test an assumption using 30% of issuers.

Table A5-1
Alternative Risk Factor Analyses-Health

Scenario	Label	Description		
		Time Horizon	Bond Size Factors	# Issuers
1	H2_0	2-year	None	382
2	H2P	2-year	Proposed Life	382
3	H2C	2-year	Current Life	382
4	H1P	1-year	Proposed Life	382
5	H1C	1-year	Current Life	382
6	H2_0/FFC	2-year	None	267
7	H5_0	5-year	None	382

Scenario 1 represents the indicated bond risk factors shown in Table I-1. We discussed highlights from that comparison in Section I.D.

B. P&C Impact Analysis

For P&C, PCHWG asked the NAIC to show the effect of the four bond risk factor alternatives listed in Table A5-2. below. These tests cover the following variations:

- Two time horizons: four-year and five-year,
- Two possible bond size factor approaches:
  - the current P&C bond size factors, the same as the current life portfolio adjustment factors, and
  - the proposed P&C bond size factors, the same as the C1WG September 2017 proposed life portfolio adjustment factors.

Table A5-2
Alternative Risk Factor Analyses-P&C

Scenario	Label	Description	
		Time Horizon	Bond Size Factors
1	PC5P	5-year	Proposed Life
2	PC5C	5-year	Current P&C/Life
3	PC4P	4-year	Proposed Life
4	PC4C	4-year	Current P&C/Life

Scenario 1 represents the indicated bond risk factors shown in Table I-1; bond risk factors that are calibrated using a five-year time horizon and incorporating an average portfolio of 535 issuers. We discussed highlights from that comparison in Section I.D.

Appendix 6 – NAIC Exhibits

This appendix contains the results of the NAIC analysis of the scenarios described in Appendix 5.

2017 P&C RBC - Distribution of Companies by Change in R1 Charges

	P1\PC5P	P2\PC5C	P3\PC4P	P4\PC4C
Less Than -50%	225	232	226	233
-50% to -25%	12	16	13	25
-25% to -15%	1	9	6	9
-15% to -5%	14	16	11	24
-5% to 5%	31	39	35	54
5% to 15%	6	26	8	34
15% to 25%	8	30	22	51
25% to 50%	42	80	86	241
Over 50%	2,147	2,038	2,079	1,815
Total	2,486	2,486	2,486	2,486

Distribution of Companies by Change in 2017 ACL RBC

	P1\PC5P	P2\PC5C	P3\PC4P	P4\PC4C
Less Than -50%	11	11	11	11
-50% to -25%	6	7	6	7
-25% to -15%	10	11	11	11
-15% to -5%	11	10	10	14
-5% to 5%	1,849	1,971	1,906	2,027
5% to 15%	129	95	106	74
15% to 25%	48	43	45	49
25% to 50%	52	63	62	124
Over 50%	370	275	329	169
Total	2,486	2,486	2,486	2,486

Notes:

2017 P&C RBC results based on the following Base Risk Factors and Bond Size Factors. Base Factors are applied to unaffiliated bonds, preferred stocks and hybrid securities, with hybrid securities RBC re-classified to R1. In additon, RBC factor for Cash and Net Cash Equivalents (Line 3 and Line 7 of PR009) is set at 0.10%.

Base Risk Factors:

Scenario P1\PC5P: Class 1: 0.66%; Class 2: 2.06%; Class 3: 5.94%; Class 4: 7.76%; Class 5: 10.97% and Class 6: 30.00%
Scenario P2\PC5C: Class 1: 0.66%; Class 2: 2.06%; Class 3: 5.61%; Class 4: 7.33%; Class 5: 10.36% and Class 6: 30.00%
Scenario P3\PC4P: Class 1: 0.53%; Class 2: 1.60%; Class 3: 5.94%; Class 4: 7.76%; Class 5: 10.97% and Class 6: 30.00%
Scenario P4\PC4C: Class 1: 0.53%; Class 2: 1.58%; Class 3: 5.61%; Class 4: 7.33%; Class 5: 10.36% and Class 6: 30.00%

Bond Size Factors:

Cum Issuers	10	50	100	200	400	500	800	1000	1200	2300
Next # Issuers	10	40	50	100	200	100	300	200	300	1000
Scenario P1\PC5P	7.80	1.75	1.75	1.00	0.80	0.80	0.75	0.75	0.75	0.75
Scenario P2\PC5C	2.50	2.50	1.30	1.00	1.00	0.90	0.90	0.90	0.90	0.90
Scenario P3\PC4P	7.80	1.75	1.75	1.00	0.80	0.80	0.75	0.75	0.75	0.75
Scenario P4\PC4C	2.50	2.50	1.30	1.00	1.00	0.90	0.90	0.90	0.90	0.90

2017 P&C RBC - Distribution of Companies by Change in R1 Charges

(Companies with TAC Less Than $5M)

	P1\PC5P	P2\PC5C	P3\PC4P	P4\PC4C
Less Than -50%	115	118	115	118
-50% to -25%	3	5	4	6
-25% to -15%	0	0	1	4
-15% to -5%	5	7	3	8
-5% to 5%	10	14	13	13
5% to 15%	1	5	1	5
15% to 25%	3	4	2	11
25% to 50%	3	9	4	32
Over 50%	170	148	167	113
Total	310	310	310	310

(Companies with TAC Between $5M and $25M)

	P1\PC5P	P2\PC5C	P3\PC4P	P4\PC4C
Less Than -50%	75	76	75	77
-50% to -25%	5	8	6	15
-25% to -15%	1	8	3	2
-15% to -5%	6	6	7	10
-5% to 5%	14	16	14	30
5% to 15%	4	11	5	14
15% to 25%	4	15	9	18
25% to 50%	15	29	25	89
Over 50%	671	626	651	540
Total	795	795	795	795

(Companies with TAC Between $25M and $75M)

	P1\PC5P	P2\PC5C	P3\PC4P	P4\PC4C
Less Than -50%	23	25	24	25
-50% to -25%	2	1	1	2
-25% to -15%	0	1	2	1
-15% to -5%	2	1	0	3
-5% to 5%	1	1	2	2
5% to 15%	0	4	0	6
15% to 25%	1	4	2	10
25% to 50%	3	14	11	44
Over 50%	560	541	550	499
Total	592	592	592	592

2017 P&C RBC - Distribution of Companies by Change in R1 Charges

(Companies with TAC Between $75M and $250M)

	P1\PC5P	P2\PC5C	P3\PC4P	P4\PC4C
Less Than -50%	4	4	4	4
-50% to -25%	1	1	1	1
-25% to -15%	0	0	0	2
-15% to -5%	0	1	0	0
-5% to 5%	0	1	0	2
5% to 15%	0	1	0	3
15% to 25%	0	3	4	4
25% to 50%	5	9	7	35
Over 50%	409	399	403	368
Total	419	419	419	419

(Companies with TAC Between $250M and $1B)

	P1\PC5P	P2\PC5C	P3\PC4P	P4\PC4C
Less Than -50%	6	7	6	7
-50% to -25%	1	1	1	1
-25% to -15%	0	0	0	0
-15% to -5%	0	0	0	1
-5% to 5%	2	3	2	3
5% to 15%	0	2	1	3
15% to 25%	0	2	2	4
25% to 50%	7	12	14	22
Over 50%	222	211	212	197
Total	238	238	238	238

(Companies with TAC Over $1B)

	P1\PC5P	P2\PC5C	P3\PC4P	P4\PC4C
Less Than -50%	2	2	2	2
-50% to -25%	0	0	0	0
-25% to -15%	0	0	0	0
-15% to -5%	1	1	1	2
-5% to 5%	4	4	4	4
5% to 15%	1	3	1	3
15% to 25%	0	2	3	4
25% to 50%	9	7	25	19
Over 50%	115	113	96	98
Total	132	132	132	132

Distribution of Companies by Change in 2017 ACL RBC

(Companies with TAC Less Than $5M)

	P1\PC5P	P2\PC5C	P3\PC4P	P4\PC4C
Less Than -50%	6	6	6	6
-50% to -25%	2	3	2	3
-25% to -15%	6	6	7	6
-15% to -5%	4	3	3	5
-5% to 5%	238	261	245	266
5% to 15%	17	9	15	4
15% to 25%	8	2	3	1
25% to 50%	1	2	6	15
Over 50%	28	18	23	4
Total	310	310	310	310

(Companies with TAC Between $5M and $25M)

	P1\PC5P	P2\PC5C	P3\PC4P	P4\PC4C
Less Than -50%	4	4	4	4
-50% to -25%	3	3	3	3
-25% to -15%	4	5	4	5
-15% to -5%	6	6	6	7
-5% to 5%	523	574	540	596
5% to 15%	42	36	44	29
15% to 25%	27	17	18	24
25% to 50%	17	37	25	58
Over 50%	169	113	151	69
Total	795	795	795	795

(Companies with TAC Between $25M and $75M)

	P1\PC5P	P2\PC5C	P3\PC4P	P4\PC4C
Less Than -50%	1	1	1	1
-50% to -25%	1	1	1	1
-25% to -15%	0	0	0	0
-15% to -5%	1	1	1	2
-5% to 5%	406	433	422	447
5% to 15%	36	31	30	30
15% to 25%	12	15	12	14
25% to 50%	19	15	18	28
Over 50%	116	95	107	69
Total	592	592	592	592

Distribution of Companies by Change in 2017 ACL RBC

(Companies with TAC Between $75M and $250M)

	P1\PC5P	P2\PC5C	P3\PC4P	P4\PC4C
Less Than -50%	0	0	0	0
-50% to -25%	0	0	0	0
-25% to -15%	0	0	0	0
-15% to -5%	0	0	0	0
-5% to 5%	333	350	346	360
5% to 15%	24	13	11	10
15% to 25%	1	9	11	7
25% to 50%	13	5	9	19
Over 50%	48	42	42	23
Total	419	419	419	419

(Companies with TAC Between $250M and $1B)

	P1\PC5P	P2\PC5C	P3\PC4P	P4\PC4C
Less Than -50%	0	0	0	0
-50% to -25%	0	0	0	0
-25% to -15%	0	0	0	0
-15% to -5%	0	0	0	0
-5% to 5%	220	223	223	227
5% to 15%	7	4	4	0
15% to 25%	0	0	1	3
25% to 50%	2	4	4	4
Over 50%	9	7	6	4
Total	238	238	238	238

(Companies with TAC Over $1B)

	P1\PC5P	P2\PC5C	P3\PC4P	P4\PC4C
Less Than -50%	0	0	0	0
-50% to -25%	0	0	0	0
-25% to -15%	0	0	0	0
-15% to -5%	0	0	0	0
-5% to 5%	129	130	130	131
5% to 15%	3	2	2	1
15% to 25%	0	0	0	0
25% to 50%	0	0	0	0
Over 50%	0	0	0	0
Total	132	132	132	132

Comparisons of 2017 R1 and ACL RBC Charges between different Scenarios

	Current	P1\PC5P	P2\PC5C	P3\PC4P	P4\PC4C
R1	8,576,188,886	15,574,901,145	15,121,872,902	13,703,335,811	13,420,463,025
% Change in R1		81.6%	76.3%	59.8%	56.5%
ACL RBC	149,906,686,400	150,376,837,127	150,270,687,668	150,235,512,830	150,161,367,524
% Change in ACL RBC		0.3%	0.2%	0.2%	0.2%

Notes:

2017 P&C RBC results based on the following Base Risk Factors and Bond Size Factors. Base Factors are applied to unaffiliated bonds, preferred stocks and hybrid securities, with hybrid securities RBC re-classified to R1. In additon, RBC factor for Cash and Net Cash Equivalents (Line 3 and Line 7 of PR009) is set at 0.10%.

Base Risk Factors:

Scenario P1\PC5P: Class 1: 0.66%; Class 2: 2.06%; Class 3: 5.94%; Class 4: 7.76%; Class 5: 10.97% and Class 6: 30.00%
Scenario P2\PC5C: Class 1: 0.66%; Class 2: 2.06%; Class 3: 5.61%; Class 4: 7.33%; Class 5: 10.36% and Class 6: 30.00%
Scenario P3\PC4P: Class 1: 0.53%; Class 2: 1.60%; Class 3: 5.94%; Class 4: 7.76%; Class 5: 10.97% and Class 6: 30.00%
Scenario P4\PC4C: Class 1: 0.53%; Class 2: 1.58%; Class 3: 5.61%; Class 4: 7.33%; Class 5: 10.36% and Class 6: 30.00%

Bond Size Factors:

Cum Issuers	10	50	100	200	400	500	800	1000	1200	2300
Next # Issuers	10	40	50	100	200	100	300	200	300	1000
Scenario P1\PC5P	7.80	1.75	1.75	1.00	0.80	0.80	0.75	0.75	0.75	0.75
Scenario P2\PC5C	2.50	2.50	1.30	1.00	1.00	0.90	0.90	0.90	0.90	0.90
Scenario P3\PC4P	7.80	1.75	1.75	1.00	0.80	0.80	0.75	0.75	0.75	0.75
Scenario P4\PC4C	2.50	2.50	1.30	1.00	1.00	0.90	0.90	0.90	0.90	0.90

Distributions of 2017 R1 and ACL RBC by TAC Range under different bond factors and bond size factors							
TAC Range	Less than $5M	$5M to $25M	$25M to $75M	$75M to $250M	$250M to $1B	Over $1B	Total
R1 - Current	21,718,846	103,866,695	292,580,106	664,213,505	1,302,051,753	6,191,757,981	8,576,188,886
R1 - P1\PC5P	47,342,910	291,669,513	775,838,784	1,607,515,685	2,684,045,016	10,168,489,237	15,574,901,145
% Change in R1	118.0%	180.8%	165.2%	142.0%	106.1%	64.2%	81.6%
R1 - P2\PC5C	36,698,097	197,196,092	588,233,723	1,345,797,231	2,452,432,387	10,501,515,373	15,121,872,902
% Change in R1	69.0%	89.9%	101.1%	102.6%	88.4%	69.6%	76.3%
R1 - P3\PC4P	40,080,002	241,175,405	640,772,294	1,339,397,054	2,279,862,177	9,162,048,879	13,703,335,811
% Change in R1	84.5%	132.2%	119.0%	101.7%	75.1%	48.0%	59.8%
R1 - P4\PC4C	31,170,779	162,104,349	486,169,014	1,127,022,897	2,083,868,064	9,530,127,921	13,420,463,025
% Change in R1	43.5%	56.1%	66.2%	69.7%	60.0%	53.9%	56.5%
ACL RBC	824,181,675	1,156,925,890	2,698,944,383	7,414,734,105	17,462,371,286	120,349,529,061	149,906,686,400
ACL RBC - P1\PC5P	826,642,983	1,189,965,724	2,777,786,640	7,515,209,352	17,549,372,697	120,517,859,731	150,376,837,127
% Change in ACL RBC	0.3%	2.9%	2.9%	1.4%	0.5%	0.1%	0.3%
ACL RBC - P2\PC5C	824,907,904	1,168,722,841	2,737,694,715	7,475,571,779	17,528,597,766	120,535,192,662	150,270,687,668
% Change in ACL RBC	0.1%	1.0%	1.4%	0.8%	0.4%	0.2%	0.2%
ACL RBC - P3\PC4P	826,045,065	1,180,802,900	2,754,215,666	7,482,062,574	17,519,321,371	120,473,065,254	150,235,512,830
% Change in ACL RBC	0.2%	2.1%	2.0%	0.9%	0.3%	0.1%	0.2%
ACL RBC - P4\PC4C	824,650,788	1,164,005,117	2,723,020,853	7,453,109,175	17,503,480,488	120,493,101,102	150,161,367,524
% Change in ACL RBC	0.1%	0.6%	0.9%	0.5%	0.2%	0.1%	0.2%

Comparisons of 2017 P&C Current RBC Action Level and RBC Action Level under Different Scenarios

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario P1\PC5P	MCL	19						19
	ACL		5					5
	RAL			6	2			8
	CAL				26			26
	Trend Test					16	2	18
	No Action						2,410	2,410
	Total	19	5	6	28	16	2,412	2,486

Scenario P1\PC5P - 2017 RBC results based on the following base bond factors - Class 1: 0.66%; Class 2: 2.06%; Class 3: 5.94%; Class 4: 7.76%; Class 5: 10.97% and Class 6: 30.00%
and following Bond Size Factor - 7.80 for first 10 issuers; 1.75 for next 90 issuers; 1.00 for next 100 issuers; 0.80 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario P2\PC5C	MCL	19						19
	ACL		5					5
	RAL			6	1			7
	CAL				27			27
	Trend Test					16	2	18
	No Action						2,410	2,410
	Total	19	5	6	28	16	2,412	2,486

Scenario P2\PC5C - 2017 RBC results based on the following base bond factors - Class 1: 0.66%; Class 2: 2.06%; Class 3: 5.61%; Class 4: 7.33%; Class 5: 10.36% and Class 6: 30.00%
and following Bond Size Factor - 2.50 for first 50 issuers; 1.30 for next 50 issuers; 1.00 for next 300 issuers and 0.90 for # issuers in excess of 400 issuers. Cash and Net Cash Equivalents RBC = 0.10%

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario P3\PC4P	MCL	19						19
	ACL		5					5
	RAL			6	2			8
	CAL				26			26
	Trend Test					16	2	18
	No Action						2,410	2,410
	Total	19	5	6	28	16	2,412	2,486

Scenario P3\PC4P - 2017 RBC results based on the following base bond factors - Class 1: 0.53%; Class 2: 1.60%; Class 3: 5.94%; Class 4: 7.76%; Class 5: 10.97% and Class 6: 30.00%
and following Bond Size Factor - 7.80 for first 10 issuers; 1.75 for next 90 issuers; 1.00 for next 100 issuers; 0.80 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario P4\PC4C	MCL	19						19
	ACL		5					5
	RAL			6	1			7
	CAL				27			27
	Trend Test					16	1	17
	No Action						2,411	2,411
	Total	19	5	6	28	16	2,412	2,486

Scenario P4\PC4C - 2017 RBC results based on the following base bond factors - Class 1: 0.53%; Class 2: 1.58%; Class 3: 5.61%; Class 4: 7.33%; Class 5: 10.36% and Class 6: 30.00%
and following Bond Size Factor - 2.50 for first 50 issuers; 1.30 for next 50 issuers; 1.00 for next 300 issuers and 0.90 for # issuers in excess of 400 issuers. Cash and Net Cash Equivalents RBC = 0.10%

Comparisons of 2017 P&C Current RBC Action Level and RBC Action Level under Different Scenarios
(Companies with Total Adjusted Capital Less than $5 Million)

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario P1\PC5P	MCL	16						16
	ACL		5					5
	RAL			4	1			5
	CAL				13			13
	Trend Test					5		5
	No Action						266	266
	Total	16	5	4	14	5	266	310

Scenario P1\PC5P - 2017 RBC results based on the following base bond factors - Class 1: 0.66%; Class 2: 2.06%; Class 3: 5.94%; Class 4: 7.76%; Class 5: 10.97% and Class 6: 30.00%
and following Bond Size Factor - 7.80 for first 10 issuers; 1.75 for next 90 issuers; 1.00 for next 100 issuers; 0.80 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario P2\PC5C	MCL	16						16
	ACL		5					5
	RAL			4				4
	CAL				14			14
	Trend Test					5		5
	No Action						266	266
	Total	16	5	4	14	5	266	310

Scenario P2\PC5C - 2017 RBC results based on the following base bond factors - Class 1: 0.66%; Class 2: 2.06%; Class 3: 5.61%; Class 4: 7.33%; Class 5: 10.36% and Class 6: 30.00%
and following Bond Size Factor - 2.50 for first 50 issuers; 1.30 for next 50 issuers; 1.00 for next 300 issuers and 0.90 for # issuers in excess of 400 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario P3\PC4P	MCL	16						16
	ACL		5					5
	RAL			4	1			5
	CAL				13			13
	Trend Test					5		5
	No Action						266	266
	Total	16	5	4	14	5	266	310

Scenario P3\PC4P - 2017 RBC results based on the following base bond factors - Class 1: 0.53%; Class 2: 1.60%; Class 3: 5.94%; Class 4: 7.76%; Class 5: 10.97% and Class 6: 30.00%
and following Bond Size Factor - 7.80 for first 10 issuers; 1.75 for next 90 issuers; 1.00 for next 100 issuers; 0.80 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario P4\PC4C	MCL	16						16
	ACL		5					5
	RAL			4				4
	CAL				14			14
	Trend Test					5		5
	No Action						266	266
	Total	16	5	4	14	5	266	310

Scenario P4\PC4C - 2017 RBC results based on the following base bond factors - Class 1: 0.53%; Class 2: 1.58%; Class 3: 5.61%; Class 4: 7.33%; Class 5: 10.36% and Class 6: 30.00%
and following Bond Size Factor - 2.50 for first 50 issuers; 1.30 for next 50 issuers; 1.00 for next 300 issuers and 0.90 for # issuers in excess of 400 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

Comparisons of 2017 P&C Current RBC Action Level and RBC Action Level under Different Scenarios
(Companies with Total Adjusted Capital between $5 Million and $25 Million)

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario P1\PC5P	MCL	3						3
	ACL							0
	RAL			2	1			3
	CAL				8			8
	Trend Test					5	1	6
	No Action						775	775
	Total	3	0	2	9	5	776	795

Scenario P1\PC5P - 2017 RBC results based on the following base bond factors - Class 1: 0.66%; Class 2: 2.06%; Class 3: 5.94%; Class 4: 7.76%; Class 5: 10.97% and Class 6: 30.00%
and following Bond Size Factor - 7.80 for first 10 issuers; 1.75 for next 90 issuers; 1.00 for next 100 issuers; 0.80 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario P2\PC5C	MCL	3						3
	ACL							0
	RAL			2	1			3
	CAL				8			8
	Trend Test					5	1	6
	No Action						775	775
	Total	3	0	2	9	5	776	795

Scenario P2\PC5C - 2017 RBC results based on the following base bond factors - Class 1: 0.66%; Class 2: 2.06%; Class 3: 5.61%; Class 4: 7.33%; Class 5: 10.36% and Class 6: 30.00%
and following Bond Size Factor - 2.50 for first 50 issuers; 1.30 for next 50 issuers; 1.00 for next 300 issuers and 0.90 for # issuers in excess of 400 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario P3\PC4P	MCL	3						3
	ACL							0
	RAL			2	1			3
	CAL				8			8
	Trend Test					5	1	6
	No Action						775	775
	Total	3	0	2	9	5	776	795

Scenario P3\PC4P - 2017 RBC results based on the following base bond factors - Class 1: 0.53%; Class 2: 1.60%; Class 3: 5.94%; Class 4: 7.76%; Class 5: 10.97% and Class 6: 30.00%
and following Bond Size Factor - 7.80 for first 10 issuers; 1.75 for next 90 issuers; 1.00 for next 100 issuers; 0.80 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario P4\PC4C	MCL	3						3
	ACL							0
	RAL			2	1			3
	CAL				8			8
	Trend Test					5		5
	No Action						776	776
	Total	3	0	2	9	5	776	795

Scenario P4\PC4C - 2017 RBC results based on the following base bond factors - Class 1: 0.53%; Class 2: 1.58%; Class 3: 5.61%; Class 4: 7.33%; Class 5: 10.36% and Class 6: 30.00%
and following Bond Size Factor - 2.50 for first 50 issuers; 1.30 for next 50 issuers; 1.00 for next 300 issuers and 0.90 for # issuers in excess of 400 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

Comparisons of 2017 P&C Current RBC Action Level and RBC Action Level under Different Scenarios
(Companies with Total Adjusted Capital between $25 Million and $75 Million)

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario P1\PC5P	MCL							0
	ACL							0
	RAL							0
	CAL				3			3
	Trend Test					4	1	5
	No Action						584	584
	Total	0	0	0	3	4	585	592

Scenario P1\PC5P - 2017 RBC results based on the following base bond factors - Class 1: 0.66%; Class 2: 2.06%; Class 3: 5.94%; Class 4: 7.76%; Class 5: 10.97% and Class 6: 30.00%
and following Bond Size Factor - 7.80 for first 10 issuers; 1.75 for next 90 issuers; 1.00 for next 100 issuers; 0.80 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario P2\PC5C	MCL							0
	ACL							0
	RAL							0
	CAL				3			3
	Trend Test					4	1	5
	No Action						584	584
	Total	0	0	0	3	4	585	592

Scenario P2\PC5C - 2017 RBC results based on the following base bond factors - Class 1: 0.66%; Class 2: 2.06%; Class 3: 5.61%; Class 4: 7.33%; Class 5: 10.36% and Class 6: 30.00%
and following Bond Size Factor - 2.50 for first 50 issuers; 1.30 for next 50 issuers; 1.00 for next 300 issuers and 0.90 for # issuers in excess of 400 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario P3\PC4P	MCL							0
	ACL							0
	RAL							0
	CAL				3			3
	Trend Test					4	1	5
	No Action						584	584
	Total	0	0	0	3	4	585	592

Scenario P3\PC4P - 2017 RBC results based on the following base bond factors - Class 1: 0.53%; Class 2: 1.60%; Class 3: 5.94%; Class 4: 7.76%; Class 5: 10.97% and Class 6: 30.00%
and following Bond Size Factor - 7.80 for first 10 issuers; 1.75 for next 90 issuers; 1.00 for next 100 issuers; 0.80 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario P4\PC4C	MCL							0
	ACL							0
	RAL							0
	CAL				3			3
	Trend Test					4	1	5
	No Action						584	584
	Total	0	0	0	3	4	585	592

Scenario P4\PC4C - 2017 RBC results based on the following base bond factors - Class 1: 0.53%; Class 2: 1.58%; Class 3: 5.61%; Class 4: 7.33%; Class 5: 10.36% and Class 6: 30.00%
and following Bond Size Factor - 2.50 for first 50 issuers; 1.30 for next 50 issuers; 1.00 for next 300 issuers and 0.90 for # issuers in excess of 400 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

Comparisons of 2017 P&C Current RBC Action Level and RBC Action Level under Different Scenarios
(Companies with Total Adjusted Capital between $75 Million and $250 Million)

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario P1\PC5P	MCL							0
	ACL							0
	RAL							0
	CAL				2			2
	Trend Test					1		1
	No Action						416	416
	Total	0	0	0	2	1	416	419

Scenario P1\PC5P - 2017 RBC results based on the following base bond factors - Class 1: 0.66%; Class 2: 2.06%; Class 3: 5.94%; Class 4: 7.76%; Class 5: 10.97% and Class 6: 30.00%
and following Bond Size Factor - 7.80 for first 10 issuers; 1.75 for next 90 issuers; 1.00 for next 100 issuers; 0.80 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario P2\PC5C	MCL							0
	ACL							0
	RAL							0
	CAL				2			2
	Trend Test					1		1
	No Action						416	416
	Total	0	0	0	2	1	416	419

Scenario P2\PC5C - 2017 RBC results based on the following base bond factors - Class 1: 0.66%; Class 2: 2.06%; Class 3: 5.61%; Class 4: 7.33%; Class 5: 10.36% and Class 6: 30.00%
and following Bond Size Factor - 2.50 for first 50 issuers; 1.30 for next 50 issuers; 1.00 for next 300 issuers and 0.90 for # issuers in excess of 400 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario P3\PC4P	MCL							0
	ACL							0
	RAL							0
	CAL				2			2
	Trend Test					1		1
	No Action						416	416
	Total	0	0	0	2	1	416	419

Scenario P3\PC4P - 2017 RBC results based on the following base bond factors - Class 1: 0.53%; Class 2: 1.60%; Class 3: 5.94%; Class 4: 7.76%; Class 5: 10.97% and Class 6: 30.00%
and following Bond Size Factor - 7.80 for first 10 issuers; 1.75 for next 90 issuers; 1.00 for next 100 issuers; 0.80 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario P4\PC4C	MCL							0
	ACL							0
	RAL							0
	CAL				2			2
	Trend Test					1		1
	No Action						416	416
	Total	0	0	0	2	1	416	419

Scenario P4\PC4C - 2017 RBC results based on the following base bond factors - Class 1: 0.53%; Class 2: 1.58%; Class 3: 5.61%; Class 4: 7.33%; Class 5: 10.36% and Class 6: 30.00%
and following Bond Size Factor - 2.50 for first 50 issuers; 1.30 for next 50 issuers; 1.00 for next 300 issuers and 0.90 for # issuers in excess of 400 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

Comparisons of 2017 P&C Current RBC Action Level and RBC Action Level under Different Scenarios
(Companies with Total Adjusted Capital between $250 Million and $1 Billion)

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario P1\PC5P	MCL							0
	ACL							0
	RAL							0
	CAL							0
	Trend Test					1		1
	No Action						237	237
	Total	0	0	0	0	1	237	238

Scenario P1\PC5P - 2017 RBC results based on the following base bond factors - Class 1: 0.66%; Class 2: 2.06%; Class 3: 5.94%; Class 4: 7.76%; Class 5: 10.97% and Class 6: 30.00%
and following Bond Size Factor - 7.80 for first 10 issuers; 1.75 for next 90 issuers; 1.00 for next 100 issuers; 0.80 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario P2\PC5C	MCL							0
	ACL							0
	RAL							0
	CAL							0
	Trend Test					1		1
	No Action						237	237
	Total	0	0	0	0	1	237	238

Scenario P2\PC5C - 2017 RBC results based on the following base bond factors - Class 1: 0.66%; Class 2: 2.06%; Class 3: 5.61%; Class 4: 7.33%; Class 5: 10.36% and Class 6: 30.00%
and following Bond Size Factor - 2.50 for first 50 issuers; 1.30 for next 50 issuers; 1.00 for next 300 issuers and 0.90 for # issuers in excess of 400 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario P3\PC4P	MCL							0
	ACL							0
	RAL							0
	CAL							0
	Trend Test					1		1
	No Action						237	237
	Total	0	0	0	0	1	237	238

Scenario P3\PC4P - 2017 RBC results based on the following base bond factors - Class 1: 0.53%; Class 2: 1.60%; Class 3: 5.94%; Class 4: 7.76%; Class 5: 10.97% and Class 6: 30.00%
and following Bond Size Factor - 7.80 for first 10 issuers; 1.75 for next 90 issuers; 1.00 for next 100 issuers; 0.80 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario P4\PC4C	MCL							0
	ACL							0
	RAL							0
	CAL							0
	Trend Test					1		1
	No Action						237	237
	Total	0	0	0	0	1	237	238

Scenario P4\PC4C - 2017 RBC results based on the following base bond factors - Class 1: 0.53%; Class 2: 1.58%; Class 3: 5.61%; Class 4: 7.33%; Class 5: 10.36% and Class 6: 30.00%
and following Bond Size Factor - 2.50 for first 50 issuers; 1.30 for next 50 issuers; 1.00 for next 300 issuers and 0.90 for # issuers in excess of 400 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

Comparisons of 2017 P&C Current RBC Action Level and RBC Action Level under Different Scenarios
(Companies with Total Adjusted Capital over $1 Billion)

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario P1\PC5P	MCL							0
	ACL							0
	RAL							0
	CAL							0
	Trend Test							0
	No Action						132	132
	Total	0	0	0	0	0	132	132

Scenario P1\PC5P - 2017 RBC results based on the following base bond factors - Class 1: 0.66%; Class 2: 2.06%; Class 3: 5.94%; Class 4: 7.76%; Class 5: 10.97% and Class 6: 30.00%
and following Bond Size Factor - 7.80 for first 10 issuers; 1.75 for next 90 issuers; 1.00 for next 100 issuers; 0.80 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario P2\PC5C	MCL							0
	ACL							0
	RAL							0
	CAL							0
	Trend Test							0
	No Action						132	132
	Total	0	0	0	0	0	132	132

Scenario P2\PC5C - 2017 RBC results based on the following base bond factors - Class 1: 0.66%; Class 2: 2.06%; Class 3: 5.61%; Class 4: 7.33%; Class 5: 10.36% and Class 6: 30.00%
and following Bond Size Factor - 2.50 for first 50 issuers; 1.30 for next 50 issuers; 1.00 for next 300 issuers and 0.90 for # issuers in excess of 400 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario P3\PC4P	MCL							0
	ACL							0
	RAL							0
	CAL							0
	Trend Test							0
	No Action						132	132
	Total	0	0	0	0	0	132	132

Scenario P3\PC4P - 2017 RBC results based on the following base bond factors - Class 1: 0.53%; Class 2: 1.60%; Class 3: 5.94%; Class 4: 7.76%; Class 5: 10.97% and Class 6: 30.00%
and following Bond Size Factor - 7.80 for first 10 issuers; 1.75 for next 90 issuers; 1.00 for next 100 issuers; 0.80 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario P4\PC4C	MCL							0
	ACL							0
	RAL							0
	CAL							0
	Trend Test							0
	No Action						132	132
	Total	0	0	0	0	0	132	132

Scenario P4\PC4C - 2017 RBC results based on the following base bond factors - Class 1: 0.53%; Class 2: 1.58%; Class 3: 5.61%; Class 4: 7.33%; Class 5: 10.36% and Class 6: 30.00%
and following Bond Size Factor - 2.50 for first 50 issuers; 1.30 for next 50 issuers; 1.00 for next 300 issuers and 0.90 for # issuers in excess of 400 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

2017 Health RBC - Distribution of Companies by Change in H1 Charges

	H2_0	H2P	H2C	H1P	H1C	H2_0/FFC	H5_0
Less Than -50%	**326**	**308**	**315**	**318**	**328**	**324**	**310**
-50% to -25%	**62**	**20**	**24**	**115**	**160**	**53**	**16**
-25% to -15%	**41**	**16**	**26**	**46**	**52**	**27**	**11**
-15% to -5%	**84**	**31**	**41**	**53**	**71**	**53**	**15**
-5% to 5%	**297**	**238**	**264**	**250**	**257**	**272**	**120**
5% to 15%	**57**	**71**	**72**	**34**	**29**	**87**	**92**
15% to 25%	**21**	**37**	**50**	**15**	**9**	**42**	**48**
25% to 50%	**28**	**62**	**51**	**30**	**8**	**44**	**44**
Over 50%	**17**	**150**	**90**	**72**	**19**	**31**	**277**
Total	**933**	**933**	**933**	**933**	**933**	**933**	**933**

2017 Health RBC - Distribution of Companies by Change in ACL RBC

	H2_0	H2P	H2C	H1P	H1C	H2_0/FFC	H5_0
Less Than -50%	**33**	**32**	**32**	**32**	**33**	**33**	**32**
-50% to -25%	**21**	**22**	**22**	**23**	**22**	**21**	**22**
-25% to -15%	**5**	**5**	**5**	**5**	**6**	**5**	**5**
-15% to -5%	**11**	**8**	**8**	**11**	**11**	**8**	**8**
-5% to 5%	**859**	**840**	**847**	**846**	**856**	**858**	**834**
5% to 15%	**3**	**9**	**9**	**3**	**4**	**4**	**15**
15% to 25%	**0**	**3**	**4**	**4**	**0**	**3**	**3**
25% to 50%	**1**	**4**	**3**	**2**	**0**	**1**	**2**
Over 50%	**0**	**10**	**3**	**7**	**1**	**0**	**12**
Total	**933**	**933**	**933**	**933**	**933**	**933**	**933**

Notes:

2017 Health RBC results based on the following Base Risk Factors and Bond Size Factors. Base Factors are applied to unaffiliated bonds, preferred stocks and hybrid securities. In addition, RBC factor for Cash and Net Cash Equivalents (Line 10 and Line 14 of XR007) is set at 0.10%.

Base Risk Factors:

Scenario 1 - H2_0: Class 1: 0.26%; Class 2: 1.18%; Class 3: 7.52%; Class 4: 9.72%; Class 5: 13.87% and Class 6: 30.00%
Scenario 2 - H2P: Class 1: 0.24%; Class 2: 0.96%; Class 3: 5.97%; Class 4: 7.72%; Class 5: 11.04% and Class 6: 30.00%
Scenario 3 - H2C: Class 1: 0.24%; Class 2: 0.98%; Class 3: 5.64%; Class 4: 7.29%; Class 5: 10.42% and Class 6: 30.00%
Scenario 4 - H1P: Class 1: 0.14%; Class 2: 0.48%; Class 3: 5.97%; Class 4: 7.72%; Class 5: 11.04% and Class 6: 30.00%
Scenario 5 - H1C: Class 1: 0.14%; Class 2: 0.48%; Class 3: 5.64%; Class 4: 7.29%; Class 5: 10.42% and Class 6: 30.00%
Scenario 6 - H2_0/FFC: Class 1: 0.29%; Class 2: 1.36%; Class 3: 8.68%; Class 4: 11.23%; Class 5: 16.10% and Class 6: 30.00%
Scenario 7 - H5_0: Class 1: 1.01%; Class 2: 2.49%; Class 3: 7.52%; Class 4: 9.72%; Class 5: 13.87% and Class 6: 30.00%

Bond Size Factors:

Cum Issuers	10	50	100	200	400	500	800	1000	1200	2300
Next # Issuers	10	40	50	100	200	100	300	200	300	1000
Scenario 1 - H2_0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Scenario 2 - H2P	7.80	1.75	1.75	1.00	0.80	0.80	0.75	0.75	0.75	0.75
Scenario 3 - H2C	2.50	2.50	1.30	1.00	1.00	0.90	0.90	0.90	0.90	0.90
Scenario 4 - H1P	7.80	1.75	1.75	1.00	0.80	0.80	0.75	0.75	0.75	0.75
Scenario 5 - H1C	2.50	2.50	1.30	1.00	1.00	0.90	0.90	0.90	0.90	0.90
Scenario 6 - H2_0/FFC	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Scenario 7 - H5_0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

2017 Health RBC - Distribution of Companies by Change in H1 Charges

(Companies with TAC Less Than $5M)

	H2_0	H2P	H2C	H1P	H1C	H2_0/FFC	H5_0
Less Than -50%	176	173	175	174	176	176	173
-50% to -25%	12	3	3	6	13	9	4
-25% to -15%	13	4	6	7	11	9	4
-15% to -5%	13	7	5	6	9	13	5
-5% to 5%	27	17	21	19	27	27	17
5% to 15%	1	1	2	2	7	6	3
15% to 25%	1	3	6	3	0	2	2
25% to 50%	0	5	8	6	0	1	3
Over 50%	0	30	17	20	0	0	32
Total	243	243	243	243	243	243	243

(Companies with TAC Between $5M and $25M)

	H2_0	H2P	H2C	H1P	H1C	H2_0/FFC	H5_0
Less Than -50%	103	96	97	99	100	102	96
-50% to -25%	16	7	9	12	30	15	6
-25% to -15%	14	2	7	10	18	7	5
-15% to -5%	19	5	7	12	17	17	5
-5% to 5%	50	29	37	44	41	44	27
5% to 15%	11	10	7	7	8	14	11
15% to 25%	3	5	13	1	1	10	6
25% to 50%	3	16	16	8	1	8	5
Over 50%	1	50	27	27	4	3	59
Total	220	220	220	220	220	220	220

(Companies with TAC Between $25M and $75M)

	H2_0	H2P	H2C	H1P	H1C	H2_0/FFC	H5_0
Less Than -50%	35	28	32	33	38	34	30
-50% to -25%	24	6	5	36	47	19	5
-25% to -15%	7	5	10	15	12	10	1
-15% to -5%	17	7	12	9	11	11	2
-5% to 5%	70	49	51	55	60	60	28
5% to 15%	13	21	30	11	1	15	26
15% to 25%	4	12	9	5	4	15	7
25% to 50%	4	19	13	4	0	8	15
Over 50%	5	32	17	11	6	7	65
Total	179	179	179	179	179	179	179

2017 Health RBC - Distribution of Companies by Change in H1 Charges

(Companies with TAC Between $75M and $250M)

	H2_0	H2P	H2C	H1P	H1C	H2_0/FFC	H5_0
Less Than -50%	10	9	9	10	12	10	9
-50% to -25%	10	4	7	39	47	10	1
-25% to -15%	3	4	2	12	8	1	1
-15% to -5%	30	4	9	17	24	8	3
-5% to 5%	78	70	77	61	59	80	25
5% to 15%	11	20	18	7	6	23	26
15% to 25%	7	10	13	3	3	7	15
25% to 50%	14	17	12	9	4	17	8
Over 50%	7	32	23	12	7	14	82
Total	170	170	170	170	170	170	170

(Companies with TAC Between $250M and $1B)

	H2_0	H2P	H2C	H1P	H1C	H2_0/FFC	H5_0
Less Than -50%	2	2	2	2	2	2	2
-50% to -25%	0	0	0	20	21	0	0
-25% to -15%	4	1	1	2	3	0	0
-15% to -5%	4	7	7	9	10	4	0
-5% to 5%	57	53	58	50	49	47	20
5% to 15%	15	17	13	6	6	22	14
15% to 25%	5	5	7	2	0	7	14
25% to 50%	4	4	1	1	1	8	10
Over 50%	3	5	5	2	2	4	34
Total	94	94	94	94	94	94	94

(Companies with TAC Over $1B)

	H2_0	H2P	H2C	H1P	H1C	H2_0/FFC	H5_0
Less Than -50%	0	0	0	0	0	0	0
-50% to -25%	0	0	0	2	2	0	0
-25% to -15%	0	0	0	0	0	0	0
-15% to -5%	1	1	1	0	0	0	0
-5% to 5%	15	20	20	21	21	14	3
5% to 15%	6	2	2	1	1	7	12
15% to 25%	1	2	2	1	1	1	4
25% to 50%	3	1	1	2	2	2	3
Over 50%	1	1	1	0	0	3	5
Total	27	27	27	27	27	27	27

2017 Health RBC - Distribution of Companies by Change in ACL RBC

(Companies with TAC Less Than $5M)

	H2_0	H2P	H2C	H1P	H1C	H2_0/FFC	H5_0
Less Than -50%	26	26	26	26	26	26	26
-50% to -25%	19	19	19	19	19	19	19
-25% to -15%	5	5	5	5	5	5	5
-15% to -5%	8	7	7	7	8	7	7
-5% to 5%	184	178	180	179	184	185	178
5% to 15%	1	1	1	1	1	0	2
15% to 25%	0	1	2	1	0	1	1
25% to 50%	0	0	2	1	0	0	0
Over 50%	0	6	1	4	0	0	5
Total	243	243	243	243	243	243	243

(Companies with TAC Between $5M and $25M)

	H2_0	H2P	H2C	H1P	H1C	H2_0/FFC	H5_0
Less Than -50%	7	6	6	6	7	7	6
-50% to -25%	2	3	3	4	3	2	3
-25% to -15%	0	0	0	0	0	0	0
-15% to -5%	2	1	1	2	2	1	1
-5% to 5%	209	200	203	203	206	209	200
5% to 15%	0	4	5	1	2	1	4
15% to 25%	0	2	1	1	0	0	1
25% to 50%	0	1	0	1	0	0	1
Over 50%	0	3	1	2	0	0	4
Total	220	220	220	220	220	220	220

(Companies with TAC Between $25M and $75M)

	H2_0	H2P	H2C	H1P	H1C	H2_0/FFC	H5_0
Less Than -50%	0	0	0	0	0	0	0
-50% to -25%	0	0	0	0	0	0	0
-25% to -15%	0	0	0	0	1	0	0
-15% to -5%	1	0	0	2	1	0	0
-5% to 5%	176	174	175	174	176	176	171
5% to 15%	1	2	2	1	0	1	5
15% to 25%	0	0	1	1	0	1	0
25% to 50%	1	2	0	0	0	1	1
Over 50%	0	1	1	1	1	0	2
Total	179	179	179	179	179	179	179

2017 Health RBC - Distribution of Companies by Change in ACL RBC

(Companies with TAC Between $75M and $250M)

	H2_0	H2P	H2C	H1P	H1C	H2_0/FFC	H5_0
Less Than -50%	0	0	0	0	0	0	0
-50% to -25%	0	0	0	0	0	0	0
-25% to -15%	0	0	0	0	0	0	0
-15% to -5%	0	0	0	0	0	0	0
-5% to 5%	169	167	168	169	169	169	167
5% to 15%	1	2	1	0	1	0	1
15% to 25%	0	0	0	1	0	1	1
25% to 50%	0	1	1	0	0	0	0
Over 50%	0	0	0	0	0	0	1
Total	170	170	170	170	170	170	170

(Companies with TAC Between $250M and $1B)

	H2_0	H2P	H2C	H1P	H1C	H2_0/FFC	H5_0
Less Than -50%	0	0	0	0	0	0	0
-50% to -25%	0	0	0	0	0	0	0
-25% to -15%	0	0	0	0	0	0	0
-15% to -5%	0	0	0	0	0	0	0
-5% to 5%	94	94	94	94	94	93	93
5% to 15%	0	0	0	0	0	1	1
15% to 25%	0	0	0	0	0	0	0
25% to 50%	0	0	0	0	0	0	0
Over 50%	0	0	0	0	0	0	0
Total	94	94	94	94	94	94	94

(Companies with TAC Over $1B)

	H2_0	H2P	H2C	H1P	H1C	H2_0/FFC	H5_0
Less Than -50%	0	0	0	0	0	0	0
-50% to -25%	0	0	0	0	0	0	0
-25% to -15%	0	0	0	0	0	0	0
-15% to -5%	0	0	0	0	0	0	0
-5% to 5%	27	27	27	27	27	26	25
5% to 15%	0	0	0	0	0	1	2
15% to 25%	0	0	0	0	0	0	0
25% to 50%	0	0	0	0	0	0	0
Over 50%	0	0	0	0	0	0	0
Total	27	27	27	27	27	27	27

2017 Health RBC - Comparisons of H1 and ACL RBC Charges between different Scenarios

	Current	H2_0	H2P	H2C	H1P	H1C	H2_0/FFC	H5_0
H1	8,313,604,896	8,658,540,157	8,594,329,063	8,560,651,244	8,337,157,583	8,310,310,166	8,817,083,258	9,571,313,605
% Change in H1		4.1%	3.4%	3.0%	0.3%	0.0%	6.1%	15.1%
ACL RBC	23,227,466,986	23,287,150,511	23,263,177,853	23,263,039,064	23,236,120,174	23,235,673,357	23,311,495,040	23,399,795,070
% Change in ACL RBC		0.3%	0.2%	0.2%	0.0%	0.0%	0.4%	0.7%

Notes:

2017 P&C RBC results based on the following Base Risk Factors and Bond Size Factors. Base Factors are applied to unaffiliated bonds, preferred stocks and hybrid securities, with hybrid securities RBC re-classified to R1. In addition, RBC factor for Cash and Net Cash Equivalents (Line 3 and Line 7 of PR009) is set at 0.10%.

Base Risk Factors:

Scenario 1 - H2_0: Class 1: 0.26%; Class 2: 1.18%; Class 3: 7.52%; Class 4: 9.72%; Class 5: 13.87% and Class 6: 30.00%
Scenario 2 - H2P: Class 1: 0.24%; Class 2: 0.96%; Class 3: 5.97%; Class 4: 7.72%; Class 5: 11.04% and Class 6: 30.00%
Scenario 3 - H2C: Class 1: 0.24%; Class 2: 0.98%; Class 3: 5.64%; Class 4: 7.29%; Class 5: 10.42% and Class 6: 30.00%
Scenario 4 - H1P: Class 1: 0.14%; Class 2: 0.48%; Class 3: 5.97%; Class 4: 7.72%; Class 5: 11.04% and Class 6: 30.00%
Scenario 5 - H1C: Class 1: 0.14%; Class 2: 0.48%; Class 3: 5.64%; Class 4: 7.29%; Class 5: 10.42% and Class 6: 30.00%
Scenario 6 - H2_0/FFC: Class 1: 0.29%; Class 2: 1.36%; Class 3: 8.68%; Class 4: 11.23%; Class 5: 16.10% and Class 6: 30.00%
Scenario 7 - H5_0: Class 1: 1.01%; Class 2: 2.49%; Class 3: 7.52%; Class 4: 9.72%; Class 5: 13.87% and Class 6: 30.00%

Bond Size Factors:

Cum Issuers	10	50	100	200	400	500	800	1000	1200	2300
Next # Issuers	10	40	50	100	200	100	300	200	300	1000
Scenario 1 - H2_0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Scenario 2 - H2P	7.80	1.75	1.75	1.00	0.80	0.80	0.75	0.75	0.75	0.75
Scenario 3 - H2C	2.50	2.50	1.30	1.00	1.00	0.90	0.90	0.90	0.90	0.90
Scenario 4 - H1P	7.80	1.75	1.75	1.00	0.80	0.80	0.75	0.75	0.75	0.75
Scenario 5 - H1C	2.50	2.50	1.30	1.00	1.00	0.90	0.90	0.90	0.90	0.90
Scenario 6 - H2_0/FFC	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Scenario 7 - H5_0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

2017 Health RBC - Distributions of H1 and ACL RBC by TAC Range under different bond factors and bond size factors							
TAC Range	Less than $5M	$5M to $25M	$25M to $75M	$75M to $250M	$250M to $1B	Over $1B	Total
H1 - Current	4,574,509	68,877,979	298,207,264	1,094,498,964	2,758,508,396	4,088,937,784	8,313,604,896
H1 - H2_0	3,709,102	65,668,974	297,182,827	1,116,699,188	2,860,881,537	4,314,398,529	8,658,540,157
% Change in H1	-18.9%	-4.7%	-0.3%	2.0%	3.7%	5.5%	4.1%
H1 - H2P	4,570,907	73,932,009	321,022,089	1,168,491,042	2,843,917,146	4,182,395,870	8,594,329,063
% Change in H1	-0.1%	7.3%	7.7%	6.8%	3.1%	2.3%	3.4%
H1 - H2C	3,975,055	69,106,662	308,634,132	1,140,145,870	2,835,649,712	4,203,139,813	8,560,651,244
% Change in H1	-13.1%	0.3%	3.5%	4.2%	2.8%	2.8%	3.0%
H1 - H1P	4,030,844	68,074,624	296,062,160	1,096,680,655	2,761,737,186	4,110,572,114	8,337,157,583
% Change in H1	-11.9%	-1.2%	-0.7%	0.2%	0.1%	0.5%	0.3%
H1 - H1C	3,693,671	65,157,869	287,566,220	1,075,183,094	2,754,595,567	4,124,113,745	8,310,310,166
% Change in H1	-19.3%	-5.4%	-3.6%	-1.8%	-0.1%	0.9%	0.0%
H1 -H2_0/FFC	3,752,710	66,491,697	303,436,337	1,139,259,324	2,908,436,076	4,395,707,113	8,817,083,258
% Change in H1	-18.0%	-3.5%	1.8%	4.1%	5.4%	7.5%	6.1%
H1 -H5_0	4,399,270	75,403,942	358,905,976	1,323,189,354	3,164,150,434	4,645,264,630	9,571,313,605
% Change in H1	-3.8%	9.5%	20.4%	20.9%	14.7%	13.6%	15.1%
ACL RBC	70,530,469	478,980,208	1,783,355,703	5,487,483,461	7,840,460,867	7,566,656,278	23,227,466,986
ACL RBC - H2_0	70,408,031	478,864,866	1,785,001,372	5,488,716,694	7,857,648,471	7,606,511,078	23,287,150,511
% Change in ACL RBC	-0.2%	0.0%	0.1%	0.0%	0.2%	0.5%	0.3%
ACL RBC - H2P	70,528,025	479,447,772	1,786,450,415	5,491,800,024	7,852,090,921	7,582,860,695	23,263,177,853
% Change in ACL RBC	0.0%	0.1%	0.2%	0.1%	0.1%	0.2%	0.2%
ACL RBC - H2C	70,434,130	479,084,916	1,785,327,884	5,490,063,659	7,851,784,380	7,586,344,094	23,263,039,064
% Change in ACL RBC	-0.1%	0.0%	0.1%	0.0%	0.1%	0.3%	0.2%
ACL RBC - H1P	70,450,811	479,072,398	1,783,877,599	5,487,302,985	7,844,699,441	7,570,716,940	23,236,120,174
% Change in ACL RBC	-0.1%	0.0%	0.0%	0.0%	0.1%	0.1%	0.0%
ACL RBC - H1C	70,407,466	478,877,909	1,783,034,715	5,486,057,878	7,844,339,654	7,572,955,735	23,235,673,357
% Change in ACL RBC	-0.2%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%
ACL RBC - H2_0/FFC	70,411,689	478,910,575	1,786,004,712	5,490,148,946	7,864,326,271	7,621,692,847	23,311,495,040
% Change in ACL RBC	-0.2%	0.0%	0.1%	0.0%	0.3%	0.7%	0.4%
ACL RBC - H5_0	70,477,912	479,459,089	1,792,477,706	5,502,731,135	7,889,222,151	7,665,427,076	23,399,795,070
% Change in ACL RBC	-0.1%	0.1%	0.5%	0.3%	0.6%	1.3%	0.7%

2017 Health RBC - Comparisons of Current RBC Action Level and RBC Action Level under Different Scenarios

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 1 - H2_0	MCL	3						3
	ACL							0
	RAL			5				5
	CAL				10			10
	Trend Test					13		13
	No Action						902	902
	Total	3	0	5	10	13	902	933

Scenario 1 - H2_0: Base bond factors - Class 1: 0.26%; Class 2: 1.18%; Class 3: 7.52%; Class 4: 9.72%; Class 5: 13.87% and Class 6: 30.00%. Bond size factor of 1.00 for all bond classes. Cash and Net Cash Equivalents = 0.1%

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 2 - H2P	MCL	3						3
	ACL							0
	RAL			5				5
	CAL				10			10
	Trend Test					13		13
	No Action						902	902
	Total	3	0	5	10	13	902	933

Scenario 2 - H2P: Base bond factors - Class 1: 0.24%; Class 2: 0.96%; Class 3: 5.97%; Class 4: 7.72%; Class 5: 11.04% and Class 6: 30.00%. Bond Size factor - 7.80 for the first 10 issuers; 1.75 for next 90 issuers; 1.00 for next 100 issuers; 0.80 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 3 - H2C	MCL	3						3
	ACL							0
	RAL			5				5
	CAL				10			10
	Trend Test					13		13
	No Action						902	902
	Total	3	0	5	10	13	902	933

Scenario 3 - H2C: Base bond factors - Class 1: 0.24%; Class 2: 0.98%; Class 3: 5.64%; Class 4: 7.29%; Class 5: 10.42% and Class 6: 30.00%. Bond Size factor - 2.50 for first 50 issuers; 1.30 for next 50 issuers; 1.00 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 4 - H1P	MCL	3						3
	ACL							0
	RAL			5				5
	CAL				9			9
	Trend Test					13		13
	No Action				1		902	903
	Total	3	0	5	10	13	902	933

Scenario 4 - H1P: Base bond factors - Class 1: 0.14%; Class 2: 0.48%; Class 3: 5.97%; Class 4: 7.72%; Class 5: 11.04% and Class 6: 30.00%. Bond Size factor - 7.80 for the first 10 issuers; 1.75 for next 90 issuers; 1.00 for next 100 issuers; 0.80 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 5 - H1C	MCL	3						3
	ACL							0
	RAL			5				5
	CAL				10			10
	Trend Test					13		13
	No Action						902	902
	Total	3	0	5	10	13	902	933

Scenario 5 - H1C: Base bond factors - Class 1: 0.14%; Class 2: 0.48%; Class 3: 5.64%; Class 4: 7.29%; Class 5: 10.42% and Class 6: 30.00%. Bond Size factor - 2.50 for first 50 issuers; 1.30 for next 50 issuers; 1.00 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 6 - H2_0/FFC	MCL	3						3
	ACL							0
	RAL			5				5
	CAL				10			10
	Trend Test					13		13
	No Action						902	902
	Total	3	0	5	10	13	902	933

Scenario 6 - H2_0/FFC: Base bond factors - Class 1: 0.29%; Class 2: 1.36%; Class 3: 8.68%; Class 4: 11.23%; Class 5: 16.10% and Class 6: 30.00%. Bond size factor =1.00 for all bond classes. Cash and Net Cash Equivalents = 0.1%

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 7 - H5_0	MCL	3						3
	ACL							0
	RAL			5				5
	CAL				10			10
	Trend Test					13		13
	No Action						902	902
	Total	3	0	5	10	13	902	933

Scenario 7 - H5_0: Base bond factors - Class 1: 1.01%; Class 2: 2.49%; Class 3: 7.52%; Class 4: 9.72%; Class 5: 13.87% and Class 6: 30.00%. Bond size factor =1.00 for all bond classes. Cash and Net Cash Equivalents = 0.1%

2017 Health RBC - Comparisons of Current RBC Action Level and RBC Action Level under Different Scenarios
(Companies with Total Adjusted Capital less than $5 Million)

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 1 - H2_0	MCL	3						3
	ACL							0
	RAL			4				4
	CAL				2			2
	Trend Test					5		5
	No Action						229	229
	Total	3	0	4	2	5	229	243

Scenario 1 - H2_0: Base bond factors - Class 1: 0.26%; Class 2: 1.18%; Class 3: 7.52%; Class 4: 9.72%; Class 5: 13.87% and Class 6: 30.00%. Bond size factor of 1.00 for all bond classes. Cash and Net Cash Equivalents = 0.1%

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 2 - H2P	MCL	3						3
	ACL							0
	RAL			4				4
	CAL				2			2
	Trend Test					5		5
	No Action						229	229
	Total	3	0	4	2	5	229	243

Scenario 2 - H2P: Base bond factors - Class 1: 0.24%; Class 2: 0.96%; Class 3: 5.97%; Class 4: 7.72%; Class 5: 11.04% and Class 6: 30.00%. Bond Size factor - 7.80 for the first 10 issuers; 1.75 for next 90 issuers; 1.00 for next 100 issuers; 0.80 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 3 - H2C	MCL	3						3
	ACL							0
	RAL			4				4
	CAL				2			2
	Trend Test					5		5
	No Action						229	229
	Total	3	0	4	2	5	229	243

Scenario 3 - H2C: Base bond factors - Class 1: 0.24%; Class 2: 0.98%; Class 3: 5.64%; Class 4: 7.29%; Class 5: 10.42% and Class 6: 30.00%. Bond Size factor - 2.50 for first 50 issuers; 1.30 for next 50 issuers; 1.00 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 4 - H1P	MCL	3						3
	ACL							0
	RAL			4				4
	CAL				2			2
	Trend Test					5		5
	No Action						229	229
	Total	3	0	4	2	5	229	243

Scenario 4 - H1P: Base bond factors - Class 1: 0.14%; Class 2: 0.48%; Class 3: 5.97%; Class 4: 7.72%; Class 5: 11.04% and Class 6: 30.00%. Bond Size factor - 7.80 for the first 10 issuers; 1.75 for next 90 issuers; 1.00 for next 100 issuers; 0.80 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 5 - H1C	MCL	3						3
	ACL							0
	RAL			4				4
	CAL				2			2
	Trend Test					5		5
	No Action						229	229
	Total	3	0	4	2	5	229	243

Scenario 5 - H1C: Base bond factors - Class 1: 0.14%; Class 2: 0.48%; Class 3: 5.64%; Class 4: 7.29%; Class 5: 10.42% and Class 6: 30.00%. Bond Size factor - 2.50 for first 50 issuers; 1.30 for next 50 issuers; 1.00 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 6 - H2_0/FFC	MCL	3						3
	ACL							0
	RAL			4				4
	CAL				2			2
	Trend Test					5		5
	No Action						229	229
	Total	3	0	4	2	5	229	243

Scenario 6 - H2_0/FFC: Base bond factors - Class 1: 0.29%; Class 2: 1.36%; Class 3: 8.68%; Class 4: 11.23%; Class 5: 16.10% and Class 6: 30.00%. Bond size factor =1.00 for all bond classes. Cash and Net Cash Equivalents = 0.1%

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 7 - H5_0	MCL	3						3
	ACL							0
	RAL			4				4
	CAL				2			2
	Trend Test					5		5
	No Action						229	229
	Total	3	0	4	2	5	229	243

Scenario 7 - H5_0: Base bond factors - Class 1: 1.01%; Class 2: 2.49%; Class 3: 7.52%; Class 4: 9.72%; Class 5: 13.87% and Class 6: 30.00%. Bond size factor =1.00 for all bond classes. Cash and Net Cash Equivalents = 0.1%

2017 Health RBC - Comparisons of Current RBC Action Level and RBC Action Level under Different Scenarios
(Companies with Total Adjusted Capital between $5 Million and $25 Million)

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 1 - H2_0	MCL							0
	ACL							0
	RAL			1				1
	CAL				3			3
	Trend Test					5		5
	No Action						211	211
	Total	0	0	1	3	5	211	220

Scenario 1 - H2_0: Base bond factors - Class 1: 0.26%; Class 2: 1.18%; Class 3: 7.52%; Class 4: 9.72%; Class 5: 13.87% and Class 6: 30.00%. Bond size factor of 1.00 for all bond classes. Cash and Net Cash Equivalents = 0.1%

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 2 - H2P	MCL							0
	ACL							0
	RAL			1				1
	CAL				3			3
	Trend Test					5		5
	No Action						211	211
	Total	0	0	1	3	5	211	220

Scenario 2 - H2P: Base bond factors - Class 1: 0.24%; Class 2: 0.96%; Class 3: 5.97%; Class 4: 7.72%; Class 5: 11.04% and Class 6: 30.00%. Bond Size factor - 7.80 for the first 10 issuers; 1.75 for next 90 issuers; 1.00 for next 100 issuers; 0.80 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 3 - H2C	MCL							0
	ACL							0
	RAL			1				1
	CAL				3			3
	Trend Test					5		5
	No Action						211	211
	Total	0	0	1	3	5	211	220

Scenario 3 - H2C: Base bond factors - Class 1: 0.24%; Class 2: 0.98%; Class 3: 5.64%; Class 4: 7.29%; Class 5: 10.42% and Class 6: 30.00%. Bond Size factor - 2.50 for first 50 issuers; 1.30 for next 50 issuers; 1.00 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 4 - H1P	MCL							0
	ACL							0
	RAL			1				1
	CAL				3			3
	Trend Test					5		5
	No Action						211	211
	Total	0	0	1	3	5	211	220

Scenario 4 - H1P: Base bond factors - Class 1: 0.14%; Class 2: 0.48%; Class 3: 5.97%; Class 4: 7.72%; Class 5: 11.04% and Class 6: 30.00%. Bond Size factor - 7.80 for the first 10 issuers; 1.75 for next 90 issuers; 1.00 for next 100 issuers; 0.80 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 5 - H1C	MCL							0
	ACL							0
	RAL			1				1
	CAL				3			3
	Trend Test					5		5
	No Action						211	211
	Total	0	0	1	3	5	211	220

Scenario 5 - H1C: Base bond factors - Class 1: 0.14%; Class 2: 0.48%; Class 3: 5.64%; Class 4: 7.29%; Class 5: 10.42% and Class 6: 30.00%. Bond Size factor - 2.50 for first 50 issuers; 1.30 for next 50 issuers; 1.00 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 6 - H2_0/FFC	MCL							0
	ACL							0
	RAL			1				1
	CAL				3			3
	Trend Test					5		5
	No Action						211	211
	Total	0	0	1	3	5	211	220

Scenario 6 - H2_0/FFC: Base bond factors - Class 1: 0.29%; Class 2: 1.36%; Class 3: 8.68%; Class 4: 11.23%; Class 5: 16.10% and Class 6: 30.00%. Bond size factor =1.00 for all bond classes. Cash and Net Cash Equivalents = 0.1%

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 7 - H5_0	MCL							0
	ACL							0
	RAL			1				1
	CAL				3			3
	Trend Test					5		5
	No Action						211	211
	Total	0	0	1	3	5	211	220

Scenario 7 - H5_0: Base bond factors - Class 1: 1.01%; Class 2: 2.49%; Class 3: 7.52%; Class 4: 9.72%; Class 5: 13.87% and Class 6: 30.00%. Bond size factor =1.00 for all bond classes. Cash and Net Cash Equivalents = 0.1%

2017 Health RBC - Comparisons of Current RBC Action Level and RBC Action Level under Different Scenarios
(Companies with Total Adjusted Capital between $25 Million and $75 Million)

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 1 - H2_0	MCL							0
	ACL							0
	RAL							0
	CAL				3			3
	Trend Test							0
	No Action						176	176
	Total	0	0	0	3	0	176	179

Scenario 1 - H2_0: Base bond factors - Class 1: 0.26%; Class 2: 1.18%; Class 3: 7.52%; Class 4: 9.72%; Class 5: 13.87% and Class 6: 30.00%. Bond size factor of 1.00 for all bond classes. Cash and Net Cash Equivalents = 0.1%

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 2 - H2P	MCL							0
	ACL							0
	RAL							0
	CAL				3			3
	Trend Test							0
	No Action						176	176
	Total	0	0	0	3	0	176	179

Scenario 2 - H2P: Base bond factors - Class 1: 0.24%; Class 2: 0.96%; Class 3: 5.97%; Class 4: 7.72%; Class 5: 11.04% and Class 6: 30.00%. Bond Size factor - 7.80 for the first 10 issuers; 1.75 for next 90 issuers; 1.00 for next 100 issuers; 0.80 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 3 - H2C	MCL							0
	ACL							0
	RAL							0
	CAL				3			3
	Trend Test							0
	No Action						176	176
	Total	0	0	0	3	0	176	179

Scenario 3 - H2C: Base bond factors - Class 1: 0.24%; Class 2: 0.98%; Class 3: 5.64%; Class 4: 7.29%; Class 5: 10.42% and Class 6: 30.00%. Bond Size factor - 2.50 for first 50 issuers; 1.30 for next 50 issuers; 1.00 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 4 - H1P	MCL							0
	ACL							0
	RAL							0
	CAL				3			3
	Trend Test							0
	No Action						176	176
	Total	0	0	0	3	0	176	179

Scenario 4 - H1P: Base bond factors - Class 1: 0.14%; Class 2: 0.48%; Class 3: 5.97%; Class 4: 7.72%; Class 5: 11.04% and Class 6: 30.00%. Bond Size factor - 7.80 for the first 10 issuers; 1.75 for next 90 issuers; 1.00 for next 100 issuers; 0.80 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 5 - H1C	MCL							0
	ACL							0
	RAL							0
	CAL				3			3
	Trend Test							0
	No Action						176	176
	Total	0	0	0	3	0	176	179

Scenario 5 - H1C: Base bond factors - Class 1: 0.14%; Class 2: 0.48%; Class 3: 5.64%; Class 4: 7.29%; Class 5: 10.42% and Class 6: 30.00%. Bond Size factor - 2.50 for first 50 issuers; 1.30 for next 50 issuers; 1.00 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 6 - H2_0/FFC	MCL							0
	ACL							0
	RAL							0
	CAL				3			3
	Trend Test							0
	No Action						176	176
	Total	0	0	0	3	0	176	179

Scenario 6 - H2_0/FFC: Base bond factors - Class 1: 0.29%; Class 2: 1.36%; Class 3: 8.68%; Class 4: 11.23%; Class 5: 16.10% and Class 6: 30.00%. Bond size factor =1.00 for all bond classes. Cash and Net Cash Equivalents = 0.1%

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 7 - H5_0	MCL							0
	ACL							0
	RAL							0
	CAL				3			3
	Trend Test							0
	No Action						176	176
	Total	0	0	0	3	0	176	179

Scenario 7 - H5_0: Base bond factors - Class 1: 1.01%; Class 2: 2.49%; Class 3: 7.52%; Class 4: 9.72%; Class 5: 13.87% and Class 6: 30.00%. Bond size factor =1.00 for all bond classes. Cash and Net Cash Equivalents = 0.1%

2017 Health RBC - Comparisons of Current RBC Action Level and RBC Action Level under Different Scenarios
(Companies with Total Adjusted Capital between $75 Million and $250 Million)

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 1 - H2_0	MCL							0
	ACL							0
	RAL							0
	CAL				1			1
	Trend Test					3		3
	No Action						166	166
	Total	0	0	0	1	3	166	170

Scenario 1 - H2_0: Base bond factors - Class 1: 0.26%; Class 2: 1.18%; Class 3: 7.52%; Class 4: 9.72%; Class 5: 13.87% and Class 6: 30.00%. Bond size factor of 1.00 for all bond classes. Cash and Net Cash Equivalents = 0.1%

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 2 - H2P	MCL							0
	ACL							0
	RAL							0
	CAL				1			1
	Trend Test					3		3
	No Action						166	166
	Total	0	0	0	1	3	166	170

Scenario 2 - H2P: Base bond factors - Class 1: 0.24%; Class 2: 0.96%; Class 3: 5.97%; Class 4: 7.72%; Class 5: 11.04% and Class 6: 30.00%. Bond Size factor - 7.80 for the first 10 issuers; 1.75 for next 90 issuers; 1.00 for next 100 issuers; 0.80 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 3 - H2C	MCL							0
	ACL							0
	RAL							0
	CAL				1			1
	Trend Test					3		3
	No Action						166	166
	Total	0	0	0	1	3	166	170

Scenario 3 - H2C: Base bond factors - Class 1: 0.24%; Class 2: 0.98%; Class 3: 5.64%; Class 4: 7.29%; Class 5: 10.42% and Class 6: 30.00%. Bond Size factor - 2.50 for first 50 issuers; 1.30 for next 50 issuers; 1.00 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 4 - H1P	MCL							0
	ACL							0
	RAL							0
	CAL							0
	Trend Test					3		3
	No Action				1		166	167
	Total	0	0	0	1	3	166	170

Scenario 4 - H1P: Base bond factors - Class 1: 0.14%; Class 2: 0.48%; Class 3: 5.97%; Class 4: 7.72%; Class 5: 11.04% and Class 6: 30.00%. Bond Size factor - 7.80 for the first 10 issuers; 1.75 for next 90 issuers; 1.00 for next 100 issuers; 0.80 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 5 - H1C	MCL							0
	ACL							0
	RAL							0
	CAL				1			1
	Trend Test					3		3
	No Action						166	166
	Total	0	0	0	1	3	166	170

Scenario 5 - H1C: Base bond factors - Class 1: 0.14%; Class 2: 0.48%; Class 3: 5.64%; Class 4: 7.29%; Class 5: 10.42% and Class 6: 30.00%. Bond Size factor - 2.50 for first 50 issuers; 1.30 for next 50 issuers; 1.00 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 6 - H2_0/FFC	MCL							0
	ACL							0
	RAL							0
	CAL				1			1
	Trend Test					3		3
	No Action						166	166
	Total	0	0	0	1	3	166	170

Scenario 6 - H2_0/FFC: Base bond factors - Class 1: 0.29%; Class 2: 1.36%; Class 3: 8.68%; Class 4: 11.23%; Class 5: 16.10% and Class 6: 30.00%. Bond size factor =1.00 for all bond classes. Cash and Net Cash Equivalents = 0.1%

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 7 - H5_0	MCL							0
	ACL							0
	RAL							0
	CAL				1			1
	Trend Test					3		3
	No Action						166	166
	Total	0	0	0	1	3	166	170

Scenario 7 - H5_0: Base bond factors - Class 1: 1.01%; Class 2: 2.49%; Class 3: 7.52%; Class 4: 9.72%; Class 5: 13.87% and Class 6: 30.00%. Bond size factor =1.00 for all bond classes. Cash and Net Cash Equivalents = 0.1%

2017 Health RBC - Comparisons of Current RBC Action Level and RBC Action Level under Different Scenarios
(Companies with Total Adjusted Capital between $250 Million and $1 Billion)

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 1 - H2_0	MCL							0
	ACL							0
	RAL							0
	CAL				1			1
	Trend Test							0
	No Action						93	93
	Total	0	0	0	1	0	93	94

Scenario 1 - H2_0: Base bond factors - Class 1: 0.26%; Class 2: 1.18%; Class 3: 7.52%; Class 4: 9.72%; Class 5: 13.87% and Class 6: 30.00%. Bond size factor of 1.00 for all bond classes. Cash and Net Cash Equivalents = 0.1%

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 2 - H2P	MCL							0
	ACL							0
	RAL							0
	CAL				1			1
	Trend Test							0
	No Action						93	93
	Total	0	0	0	1	0	93	94

Scenario 2 - H2P: Base bond factors - Class 1: 0.24%; Class 2: 0.96%; Class 3: 5.97%; Class 4: 7.72%; Class 5: 11.04% and Class 6: 30.00%. Bond Size factor - 7.80 for the first 10 issuers; 1.75 for next 90 issuers; 1.00 for next 100 issuers; 0.80 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 3 - H2C	MCL							0
	ACL							0
	RAL							0
	CAL				1			1
	Trend Test							0
	No Action						93	93
	Total	0	0	0	1	0	93	94

Scenario 3 - H2C: Base bond factors - Class 1: 0.24%; Class 2: 0.98%; Class 3: 5.64%; Class 4: 7.29%; Class 5: 10.42% and Class 6: 30.00%. Bond Size factor - 2.50 for first 50 issuers; 1.30 for next 50 issuers; 1.00 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 4 - H1P	MCL							0
	ACL							0
	RAL							0
	CAL				1			1
	Trend Test							0
	No Action						93	93
	Total	0	0	0	1	0	93	94

Scenario 4 - H1P: Base bond factors - Class 1: 0.14%; Class 2: 0.48%; Class 3: 5.97%; Class 4: 7.72%; Class 5: 11.04% and Class 6: 30.00%. Bond Size factor - 7.80 for the first 10 issuers; 1.75 for next 90 issuers; 1.00 for next 100 issuers; 0.80 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 5 - H1C	MCL							0
	ACL							0
	RAL							0
	CAL				1			1
	Trend Test							0
	No Action						93	93
	Total	0	0	0	1	0	93	94

Scenario 5 - H1C: Base bond factors - Class 1: 0.14%; Class 2: 0.48%; Class 3: 5.64%; Class 4: 7.29%; Class 5: 10.42% and Class 6: 30.00%. Bond Size factor - 2.50 for first 50 issuers; 1.30 for next 50 issuers; 1.00 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 6 - H2_0/FFC	MCL							0
	ACL							0
	RAL							0
	CAL				1			1
	Trend Test							0
	No Action						93	93
	Total	0	0	0	1	0	93	94

Scenario 6 - H2_0/FFC: Base bond factors - Class 1: 0.29%; Class 2: 1.36%; Class 3: 8.68%; Class 4: 11.23%; Class 5: 16.10% and Class 6: 30.00%. Bond size factor =1.00 for all bond classes. Cash and Net Cash Equivalents = 0.1%

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 7 - H5_0	MCL							0
	ACL							0
	RAL							0
	CAL				1			1
	Trend Test							0
	No Action						93	93
	Total	0	0	0	1	0	93	94

Scenario 7 - H5_0: Base bond factors - Class 1: 1.01%; Class 2: 2.49%; Class 3: 7.52%; Class 4: 9.72%; Class 5: 13.87% and Class 6: 30.00%. Bond size factor =1.00 for all bond classes. Cash and Net Cash Equivalents = 0.1%

2017 Health RBC - Comparisons of Current RBC Action Level and RBC Action Level under Different Scenarios
(Companies with Total Adjusted Capital greater than $1 Billion)

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 1 - H2_0	MCL							0
	ACL							0
	RAL							0
	CAL							0
	Trend Test							0
	No Action						27	27
	Total	0	0	0	0	0	27	27

Scenario 1 - H2_0: Base bond factors - Class 1: 0.26%; Class 2: 1.18%; Class 3: 7.52%; Class 4: 9.72%; Class 5: 13.87% and Class 6: 30.00%. Bond size factor of 1.00 for all bond classes. Cash and Net Cash Equivalents = 0.1%

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 2 - H2P	MCL							0
	ACL							0
	RAL							0
	CAL							0
	Trend Test							0
	No Action						27	27
	Total	0	0	0	0	0	27	27

Scenario 2 - H2P: Base bond factors - Class 1: 0.24%; Class 2: 0.96%; Class 3: 5.97%; Class 4: 7.72%; Class 5: 11.04% and Class 6: 30.00%. Bond Size factor - 7.80 for the first 10 issuers; 1.75 for next 90 issuers; 1.00 for next 100 issuers; 0.80 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 3 - H2C	MCL							0
	ACL							0
	RAL							0
	CAL							0
	Trend Test							0
	No Action						27	27
	Total	0	0	0	0	0	27	27

Scenario 3 - H2C: Base bond factors - Class 1: 0.24%; Class 2: 0.98%; Class 3: 5.64%; Class 4: 7.29%; Class 5: 10.42% and Class 6: 30.00%. Bond Size factor - 2.50 for first 50 issuers; 1.30 for next 50 issuers; 1.00 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 4 - H1P	MCL							0
	ACL							0
	RAL							0
	CAL							0
	Trend Test							0
	No Action						27	27
	Total	0	0	0	0	0	27	27

Scenario 4 - H1P: Base bond factors - Class 1: 0.14%; Class 2: 0.48%; Class 3: 5.97%; Class 4: 7.72%; Class 5: 11.04% and Class 6: 30.00%. Bond Size factor - 7.80 for the first 10 issuers; 1.75 for next 90 issuers; 1.00 for next 100 issuers; 0.80 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 5 - H1C	MCL							0
	ACL							0
	RAL							0
	CAL							0
	Trend Test							0
	No Action						27	27
	Total	0	0	0	0	0	27	27

Scenario 5 - H1C: Base bond factors - Class 1: 0.14%; Class 2: 0.48%; Class 3: 5.64%; Class 4: 7.29%; Class 5: 10.42% and Class 6: 30.00%. Bond Size factor - 2.50 for first 50 issuers; 1.30 for next 50 issuers; 1.00 for next 300 issuers and 0.75 for # issuers in excess of 500 issuers. Cash and Net Cash Equivalents RBC = 0.10%.

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 6 - H2_0/FFC	MCL							0
	ACL							0
	RAL							0
	CAL							0
	Trend Test							0
	No Action						27	27
	Total	0	0	0	0	0	27	27

Scenario 6 - H2_0/FFC: Base bond factors - Class 1: 0.29%; Class 2: 1.36%; Class 3: 8.68%; Class 4: 11.23%; Class 5: 16.10% and Class 6: 30.00%. Bond size factor =1.00 for all bond classes. Cash and Net Cash Equivalents = 0.1%

		Current RBC Action Level						
		MCL	ACL	RAL	CAL	Trend Test	No Action	Total
RBC Action Level - Scenario 7 - H5_0	MCL							0
	ACL							0
	RAL							0
	CAL							0
	Trend Test							0
	No Action						27	27
	Total	0	0	0	0	0	27	27

Scenario 7 - H5_0: Base bond factors - Class 1: 1.01%; Class 2: 2.49%; Class 3: 7.52%; Class 4: 9.72%; Class 5: 13.87% and Class 6: 30.00%. Bond size factor =1.00 for all bond classes. Cash and Net Cash Equivalents = 0.1%