SOCIETY OF ACTUARIES

Case Study

Spring 2024

Enterprise Risk Management Exam

EXAM ERM

ERM

ERM Case Study

Introduction and Recommendations

The case study is an integral part of the study material for the ERM exam. Some exam questions will be based on the material provided in this document.

This case study presents information for the following companies:

- Caerus Consulting (a global risk management and advisory consulting firm) and its clients (including financial, automotive, and energy companies)
- Lyon Corporation (a financial services holding company)
- Simple Life Insurance Company (SLIC)
- AHA Health (a health insurance company)
- Pryde P&C (a general insurance company)
- Helios (a non-U.S. insurance company)
- Various other companies that are potential partners or acquisition candidates

Candidates are responsible for reviewing all of the material in the case study.

You are encouraged to read this case study in conjunction with the recommended study materials. This will help you become familiar with the information that is provided in this case study and assist you in putting syllabus readings in context. The case study should be read critically, with the understanding that it is meant to depict hypothetical organizations with some good policies and some flaws; it is not a representation of best practices.

It is important that you become familiar with the information presented in the case study as it may pertain to the questions you will attempt in the exam. Candidates are expected to think about ERM holistically and how the issues raised in the exam case study questions will affect the ERM processes of the organization as a whole.

An electronic copy of this case study will be provided to you at the exam. You will not be allowed to bring your copy of this case study into the exam room.

The following table of contents should assist you in locating information within the case study.

This and the following pages contain tables for the standard normal distribution. These tables will be available as part of this case study at the examination and are for use in solving all problems on the examination, including those not related to the case study.

TABLES FOR THE STANDARD NORMAL DISTRIBUTION

Values of z for selected probabilities that $Z \leq z$.

Pr($Z \leq z$)	0.800	0.850	0.900	0.950	0.975	0.990	0.995
z	0.842	1.036	1.282	1.645	1.960	2.326	2.576

Table for $N(x)$ when $x \geq 0$. Use interpolation with these tables. For example, $N(0.6278) = N(0.62) + 0.78[N(0.63) - N(0.62)] = 0.7324 + 0.78(0.7357 - 0.7324) = 0.7350$.

x	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
2.0	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.2	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
2.9	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986
3.0	0.9987	0.9987	0.9987	0.9988	0.9988	0.9989	0.9989	0.9989	0.9990	0.9990
3.1	0.9990	0.9991	0.9991	0.9991	0.9992	0.9992	0.9992	0.9992	0.9993	0.9993
3.2	0.9993	0.9993	0.9994	0.9994	0.9994	0.9994	0.9994	0.9995	0.9995	0.9995
3.3	0.9995	0.9995	0.9995	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9997
3.4	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9998
3.5	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998
3.6	0.9998	0.9998	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999
3.7	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999
3.8	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999
3.9	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Table for $N(x)$ when $x \leq 0$. Use interpolation (entries are for the row value *minus* the column value). For example, $N(-0.1234) = N(-0.12) - 0.34[N(-0.12) - N(-0.13)] = 0.4522 - 0.34(0.4522 - 0.4483) = 0.4509$.

z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.5000	0.4960	0.4920	0.4880	0.4840	0.4801	0.4761	0.4721	0.4681	0.4641
-0.1	0.4602	0.4562	0.4522	0.4483	0.4443	0.4404	0.4364	0.4325	0.4286	0.4247
-0.2	0.4207	0.4168	0.4129	0.4090	0.4052	0.4013	0.3974	0.3936	0.3897	0.3859
-0.3	0.3821	0.3783	0.3745	0.3707	0.3669	0.3632	0.3594	0.3557	0.3520	0.3483
-0.4	0.3446	0.3409	0.3372	0.3336	0.3300	0.3264	0.3228	0.3192	0.3156	0.3121
-0.5	0.3085	0.3050	0.3015	0.2981	0.2946	0.2912	0.2877	0.2843	0.2810	0.2776
-0.6	0.2743	0.2709	0.2676	0.2643	0.2611	0.2578	0.2546	0.2514	0.2483	0.2451
-0.7	0.2420	0.2389	0.2358	0.2327	0.2296	0.2266	0.2236	0.2206	0.2177	0.2148
-0.8	0.2119	0.2090	0.2061	0.2033	0.2005	0.1977	0.1949	0.1922	0.1894	0.1867
-0.9	0.1841	0.1814	0.1788	0.1762	0.1736	0.1711	0.1685	0.1660	0.1635	0.1611
-1.0	0.1587	0.1562	0.1539	0.1515	0.1492	0.1469	0.1446	0.1423	0.1401	0.1379
-1.1	0.1357	0.1335	0.1314	0.1292	0.1271	0.1251	0.1230	0.1210	0.1190	0.1170
-1.2	0.1151	0.1131	0.1112	0.1093	0.1075	0.1056	0.1038	0.1020	0.1003	0.0985
-1.3	0.0968	0.0951	0.0934	0.0918	0.0901	0.0885	0.0869	0.0853	0.0838	0.0823
-1.4	0.0808	0.0793	0.0778	0.0764	0.0749	0.0735	0.0721	0.0708	0.0694	0.0681
-1.5	0.0668	0.0655	0.0643	0.0630	0.0618	0.0606	0.0594	0.0582	0.0571	0.0559
-1.6	0.0548	0.0537	0.0526	0.0516	0.0505	0.0495	0.0485	0.0475	0.0465	0.0455
-1.7	0.0446	0.0436	0.0427	0.0418	0.0409	0.0401	0.0392	0.0384	0.0375	0.0367
-1.8	0.0359	0.0351	0.0344	0.0336	0.0329	0.0322	0.0314	0.0307	0.0301	0.0294
-1.9	0.0287	0.0281	0.0274	0.0268	0.0262	0.0256	0.0250	0.0244	0.0239	0.0233
-2.0	0.0228	0.0222	0.0217	0.0212	0.0207	0.0202	0.0197	0.0192	0.0188	0.0183
-2.1	0.0179	0.0174	0.0170	0.0166	0.0162	0.0158	0.0154	0.0150	0.0146	0.0143
-2.2	0.0139	0.0136	0.0132	0.0129	0.0125	0.0122	0.0119	0.0116	0.0113	0.0110
-2.3	0.0107	0.0104	0.0102	0.0099	0.0096	0.0094	0.0091	0.0089	0.0087	0.0084
-2.4	0.0082	0.0080	0.0078	0.0075	0.0073	0.0071	0.0069	0.0068	0.0066	0.0064
-2.5	0.0062	0.0060	0.0059	0.0057	0.0055	0.0054	0.0052	0.0051	0.0049	0.0048
-2.6	0.0047	0.0045	0.0044	0.0043	0.0041	0.0040	0.0039	0.0038	0.0037	0.0036
-2.7	0.0035	0.0034	0.0033	0.0032	0.0031	0.0030	0.0029	0.0028	0.0027	0.0026
-2.8	0.0026	0.0025	0.0024	0.0023	0.0023	0.0022	0.0021	0.0021	0.0020	0.0019
-2.9	0.0019	0.0018	0.0018	0.0017	0.0016	0.0016	0.0015	0.0015	0.0014	0.0014
-3.0	0.0013	0.0013	0.0013	0.0012	0.0012	0.0011	0.0011	0.0011	0.0010	0.0010
-3.1	0.0010	0.0009	0.0009	0.0009	0.0008	0.0008	0.0008	0.0008	0.0007	0.0007
-3.2	0.0007	0.0007	0.0006	0.0006	0.0006	0.0006	0.0006	0.0005	0.0005	0.0005
-3.3	0.0005	0.0005	0.0005	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0003
-3.4	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0002
-3.5	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
-3.6	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
-3.7	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
-3.8	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
-3.9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

List of Excel Functions That May Be Useful on CFE/ERM Exams

Below, find a list of Excel functions that may be useful when taking the exams on Corporate Finance and ERM track (ERM, Foundations of CFE, and Strategic Decision Making). This reading is not required, but questions for this track have been developed assuming candidates are familiar with these Excel functions. Candidates may also use other functions. Many times, Excel offers multiple functions and tools that can be used to perform the same task.

In the descriptions below, an array is one-dimensional, while a range can be two-dimensional (multiple rows and columns). Logical values are either True or False. Some Excel functions require that the arrays be in the same direction (SUMPRODUCT), but most do not. Other function inputs are variables. Some variables have limitations (a value between 0 and 1); others do not.

This document will be available to candidates when taking the exam. An Excel file, accessible on the exam study page, provides examples of most of the functions below. The Excel file will not be available to candidates during the exam.

AVERAGE(range1, [range2], …) – returns the arithmetic mean of the cells in a range (ignores blank cells)

> **range1** is the first range, cell reference, or number for which you want in the average
> **range2, …** are additional ranges, cell references, or numbers for which you want to include in the average

BINOM.DIST(number_s, trials, probability_s, cumulative_logical_value) – returns the individual term binomial distribution probability when there are a fixed number of tests or trials, when the outcomes of any trial are only success or failure, when trials are independent, and when the probability of success is constant throughout the experiment

> **number_s** is the number of successes
> **trials** is the number of trials
> **probability_s** is the probability of success for each trial
> **cumulative_logical_value** is the logical values that determines the form of the function. If TRUE, the cumulative distribution function is returned, which is the probability that there are at most number_s successes; if FALSE, the probability mass function is returned, which is the probability that there are number_s successes

BINOM.INV(trials, probability_s, alpha) – returns the smallest value for which the cumulative binomial distribution is greater than the criterion value (or the number of successful trials for a cumulative binomial distribution based on a criterion value)

> **trials** is the number of trials

probability_s is the probability of success for each trial

alpha is a criterion value from 0 to 1 that determines the number of successful trials

CORREL(array1, array2) – returns the correlation coefficient of two data sets

array1 is an array of cell values

array2 is a second array of cell values

COUNTIF(range1, criteria) – returns the number of cells in a given range that meet the criteria

range1 is a range of cells that could include values or formula results

criteria is the criteria to be met such as “>0” or “=15”

COVARIANCE.P(array1, array2) – returns the population covariance, the average of the products of deviations for each data point pair in two data sets (for a complete population, uses N in the denominator)

array1 is the first array of cell values

array2 is the second array of cell values

COVARIANCE.S(array1, array2) – returns the sample covariance, the average of the products of deviations for each data point pair in two data sets (for a sample, uses N-1 in the denominator)

array1 is the first array of cell values

array2 is the second array of cell values

MMULT(range1, range2) – returns the matrix product of arrays into an range with the same number of rows as range1 and the same number of columns as range2

range1 and **range2** contain the arrays to be multiplied. The number of columns in range1 must be the same as the number of rows as range2, and both ranges must contain only numbers. As an example, if both ranges are 2x2, the top left cell in the output will equal the sumproduct of the array in the top row in the first range and the array in the left column of the second range. To produce the output, the range of the output table must be highlighted, then the formula entered, and then cntl/shift/enter hit

NORM.DIST(x, mean, standard_dev, cumulative_logical_value) – returns the normal distribution for the specified mean and standard deviation

x is the value for which you want the distribution

mean is the arithmetic mean of the distribution

standard_dev is the standard deviation of the distribution

cumulative_logical_value is the logical value that determines the form of the function. If TRUE, the cumulative distribution function is returned; if FALSE, the probability density function is returned

NORM.INV(probability, mean, standard_dev) – returns the inverse of the normal cumulative distribution for the specified mean and standard deviation

probability is a probability corresponding to the normal distribution (a number between zero and one inclusive)

mean is the arithmetic mean of the distribution

standard_dev is the standard deviation of the distribution

NORM.S.DIST(z, cumulative_logical_value) – returns the standard normal distribution (has a mean of zero and a standard deviation of one)

z is the value for which you want the distribution.

cumulative_logical_value is the logical value that determines the form of the function. If TRUE, the cumulative distribution function is returned; if FALSE, the probability mass function is returned

NORM.S.INV(probability) – returns the inverse of the standard normal cumulative distribution (has a mean of zero and a standard deviation of one)

probability is a probability corresponding to the normal distribution (a number between zero and one inclusive)

PERCENTILE(range, k) – returns the k^{th} percentile of the values in a range, interpolating if necessary

range is the array or range of data from which the percentile should be found; the data does not need to be sorted

k is the percentile value in the range 0 to 1 inclusive. 0 returns the lowest value; 1 returns the highest value

RANK(number, range, [order]) – returns the rank of a number in a list of numbers.

number is the number whose rank you want to find

range is the range that includes the list of numbers from which to find the rank of the number

order (optional) is ascending when the value is 1 and descending when the value is 0

SQRT(number) – returns a positive square root

number is the number for which a square root is desired

STDEV.P(range1, [range2], …) – calculates standard deviation based on the entire population given as arguments (ignores logical values and text; uses N in the denominator)

> **range1** is the first range, cell reference, or number corresponding to the population for which you want the standard deviation
>
> **range2,** … are additional ranges, cell references, or numbers corresponding to the population for which you want to include in the standard deviation

STDEV.S(range1, [range2], …) – estimates standard deviation based on a sample (ignores logical values and text in the sample; uses N-1 in the denominator)

> **range1** – is the first range, cell reference, or number corresponding to the population for which you want the standard deviation
>
> **range2,** … are additional ranges, cell references, or numbers corresponding to the population for which you want to include in the standard deviation

SUM(range1, [range2]) – adds all the numbers in a range of cells

> **range1** is the first range, cell reference, or number for which you want to include in the sum
> **range2, …** are the additional ranges, cell references, or numbers for which you want to include in the sum

SUMPRODUCT(array1, [array2], [array3], …) – returns the sum of the products of corresponding arrays

> **arrays1, array2, array3,…** are 2 to 255 arrays which the user wants to multiply and then add components. All arrays must have the same dimensions, vertical or horizontal

TRANSPOSE(array) – converts a vertical range of cells to a horizontal range, or vice versa

> **array** is a range of cells on a worksheet or an array of value that the user wants to transpose (for example, to use in the SUMPRODUCT function). When using the TRANSPOSE function in another function, the formula must be entered and then cntl/shift/enter hit. When using the TRANPOSE function to produce output, the range of the output table must be highlighted, then the formula entered, and then cntl/shift/enter hit

VLOOKUP(lookup value, table_range, column_ index_number, logical_value) – looks for a value in the leftmost column of a table and then returns a value in the same row from a column specified by the user

> **lookup_value** is the value to be found in the first column of the table. It can be a value, a reference, or a text string
>
> **table_range** is a table of text, numbers, or logical values in which data is retrieved
>
> **column_index_number** is the column number in table_range from which the matching value should be returned
>
> **logical_value** is a logical value to find the next lowest match in the first column (must be sorted in ascending order) when equal to TRUE or omitted; or an exact match when equal to FALSE

Table of Contents

1 Caerus Consulting

1.1 Overview

Caerus Consulting is a global risk management and advisory company with headquarters in Boston, MA (USA). Caerus has offices worldwide including Madrid (Spain), Singapore, and Shanghai (China). The firm has been in business since 1950, starting out as an automotive industry consultant. In 1976 Caerus expanded into the energy industry and then continued expanding into other markets beginning in 2000. A summary of the company and its clients as of 2023 follows.

1.2 Mission Statement

Caerus Consulting is committed to helping clients turn risk into opportunity. We develop and help implement solutions for:

- Managing risk
- Expansion and growth
- Strengthening core markets

Caerus Consulting believes in an innovative work environment that values creativity, diversity and mutual respect.

1.3 Services

- Strategic and Corporate Risk
  - Mergers and Acquisitions
  - New Market Explorations and Investments
- Insurance and Investment Risk
  - Insurance Regulatory Requirements
    - NAIC (U.S. Solvency): ORSA, RBC, etc.
    - MCCSR (Canadian Solvency)
    - Solvency II
  - Reinsurance
- Accounting Advisory Services
  - Provide guidance on current IFRS, U.S. GAAP, and other global accounting regulations.

1.4 Industries

- Automotive

  Caerus has significant experience in this industry, providing consulting to over 20 companies. The firm faced considerable scrutiny ten years ago as it was the advisor to U.S.-based Alpha Automotive at the time that Alpha went into bankruptcy.

- Energy and Power

  Caerus began consulting with global energy companies shortly after the energy crisis of the 1970s. The original consulting focus was on helping energy companies cope with volatile oil prices, complex government regulations, and global competition, but lately Caerus has been asked to consult more on the impact of climate change.

- Insurance

  In 2004 Caerus Consulting merged with an existing insurance consultant in order to expand into this market. The insurance consultant had been in business for over 50 years and had 200 employees, located in offices in Europe and the U.S. This branch is currently doing very well, providing guidance for all lines of insurance on financial, strategic, operational, human capital, and data management issues. Caerus is beginning to offer consulting services on the use of robotics and AI for insurance.

- Banking

  Caerus expanded into the banking industry five years ago. The firm is relying on its insurance industry expertise and a few specialized banking consultants to keep this group going. Caerus has had success with some smaller banks in Africa and the U.S. and would like to branch out to the larger banks in Europe and Asia.

- Tourism

  This is a new industry for Caerus. The expansion to this field was driven by one of the newest board members who felt it would increase the diversity of the company. Consultants whose primary focus has been the automotive industry were asked to work with three new consultants with hotel and tourism experience.

1.5 Financial Engagement – Big Ben Bank

Caerus has analyzed the banking industry and considers its primary risks to be the following:

Banking Industry Key Risks

Strategic/Business Risks

- Significant competition in the rapidly evolving global financial services industry
- Reputational risk for banks

Profitability and Liquidity Risks

- Risks relating to models and assumptions
- Credit risk
- Liquidity risk
- Risk of adverse changes in market risk factors

Operational Risk

- Operational risk resulting from inadequate or failed internal processes and systems

Compliance

- Regulatory capital risk due to increasing stringency of banking regulations
- Fraud or conduct risks due to detrimental practices

Technology

- Competition and disruption emerging from new financial technology firms which develop new services and products based on innovative technologies including cloud, big data analytics, internet of things, and digital payments processes
- Cyber-security breaches

Company Overview

Big Ben Bank is a mid-sized bank domiciled in Luxembourg that operates primarily in European financial centers. Big Ben is a full-service bank, but its primary focus has been to provide exclusive wealth management services to high-net-worth clients.

Products / Services

Asset Management

Big Ben Bank is a world leader in the exchange-traded fund (ETF) market and has a strong brand and a loyal investor base. Big Ben's asset management products cover a comprehensive list of asset classes including equities, fixed income, real estate, private equity, and sustainable investments. In addition to ETFs, Big Ben offers mutual funds and separately managed accounts.

Advisory teams manage client relationships, provide advice, and enable clients to access Big Ben's asset management products and services. Big Ben also markets its offerings through its Commercial Banking division.

Since its inception, the critical profit driver has been the excess of the management expense ratio (MER) charged on the assets under management over the operational costs of fulfilling the fund management mandate. But MERs for ETFs are coming under increased downward pressure as more competitors come into this fund arena.

Commercial Banking

Traditional commercial banking has been a smaller, but significant, component of Big Ben's revenue pie. The Commercial Banking division's clients are individuals (retail banking) and small businesses. Products offered are checking account services; business, personal, and mortgage loans; and basic financial products such as certificates of deposit (CDs) and savings accounts. The operational model of the commercial banking division is primarily online, rather than through physical branches. This approach was meant to meet the needs of a globally mobile clientele. The physical distribution model is almost non-existent and cannot support broad-based banking.

Big Ben's Private Banking group provides a suite of services to high-net-worth individuals designed to grow wealth. In addition to the traditional commercial banking services, Big Ben provides custom-designed investment, tax, and estate planning solutions. The Private Banking group makes use of Big Ben's Asset Management products as part of its financial planning services.

Investment Banking

Big Ben has a small investment banking division which provides services related to the creation of capital for companies, governments, and other entities. Big Ben underwrites new debt and equity securities, aids in the sale of securities, facilitates mergers and acquisitions, and provides guidance to issuers regarding the issue and placement of stock.

Strategy

Big Ben's strategic plans include expansion of the Investment Banking and Asset Management businesses over the next year. Future plans include an expansion of the Commercial Banking business in the next three to five years.

Big Ben's strategy also includes an expansion of its client base. It will be a priority to lower the minimum investable assets requirement for participation in the services that had been traditionally offered exclusively to the bank's high-net-worth customers. The bank will also offer more holistic wealth management and financial planning services. Big Ben's excess economic capital will be deployed to fund the expansion.

The executive mindset has been to increase focus on the financial planning sales approach and to formulate a one-stop shopping interface to its globally mobile clientele. Big Ben believes that its expertise in emerging technologies will facilitate the execution of this strategy.

Risk Management

Big Ben Bank is committed to maintaining a strong capital base to support the risks associated with its businesses. Strength in capital management contributes to safety for Big Ben's customers, fosters investor confidence, and supports high credit ratings, while allowing the bank to take advantage of growth opportunities as they arise and to enhance shareholder returns through increased dividends and share repurchases.

Big Ben recognizes that liquidity risk is significant for banks. It monitors the contractual maturities of its assets and liabilities (See Exhibit B). Big Ben is considering introducing a Liquidity Assessment Program to enhance its liquidity risk management.

As part of Big Ben's asset liability management (ALM) process, the durations of the asset and liability portfolios are monitored, and the duration mismatch is not allowed to exceed a specified tolerance. The Board recently voted to establish an Asset Liability Management Committee (ALMCo) to oversee interest rate risk. The Chair of the ALMCo will be a recently hired senior manager from the insurance industry with significant asset liability management experience. The first job of the ALMCo will be to draft an ALM policy statement for approval by the Board. A key metric will be to calculate the sensitivity of assets and liabilities to changes in interest rates. The Board wants to be able to withstand a 200 bp parallel shift in the yield curve.

Big Ben uses various models to manage risks and to provide insight into decision making. The most important ones are as follows:

- A model to capture the correlation between mortgage prepayment rates and interest rates using statistical best fit techniques
- An internal model to calculate VaR for the trading book
- An economic capital model based on VaR to determine the amount of required economic capital

Big Ben uses frequency tests to validate VaR risk models based on the number of losses exceeding VaR and a significance level.

Economic Capital

Big Ben uses internal models to determine its required economic capital based on VaR. The quantile used for the VaR calculation is 99.5% over a one-year horizon. The business is modeled as a going concern, and the model has four components: credit risk, market risk, operational risk, and business risk.

Credit risk is estimated assuming there is common dependence of borrowers on systematic risk factors, such as country, region, or industry. These risk factors are assumed to fluctuate over time and follow a joint normal distribution. All borrowers are linked to these underlying systematic risk factors to varying degrees and the factors are assumed to move in a correlated way. Results are derived from loss distributions generated using Monte Carlo simulations.

Market risk includes interest rate risk, currency risk and equity market risk. These risks are measured using stochastic simulation. Big Ben's mortgage pre-payment risk model is utilized as part of the economic capital model. Assumptions about customer retention and repricing of interest crediting rates for deposits are also important behavioral assumptions used in the model.

Operational risk is measured through a simple add-on model which estimates the impacts of individual operational risks and aggregates them using simple correlation assumptions. Big Ben has considered more sophisticated modeling but has found it difficult to identify a single loss distribution function because operational risk loss data is distributed in two different manners: (i) loss data with high frequency and low magnitude that composes the body of the distribution; and (ii) loss data with low frequency and high magnitude that composes the tail distribution.

Strategic/Business Risk is the probability of loss related to the organization's environment (such as competition, overall economic climate, and government regulation) and sub-optimal business decisions in response to that environment. Big Ben uses scenario analysis to quantify economic capital for business risk.

The diversification benefit is measured using a variance-covariance matrix. This has the benefit of being relatively simple and intuitive, but the correlations are difficult to obtain. As a result, the correlations are updated infrequently. Big Ben has considered other methods of measuring the diversification benefit such as combining the marginal distributions through copula functions.

The economic capital is calculated in aggregate for the company by a team in the Corporate Treasury department. The results are updated quarterly. Allocation of economic capital to the business divisions is done based on simple rules of thumb and is done only upon request. As the EC models impact financial reporting, they are inventoried in the model governance system and subject to formal validation. However, validation of these component models is not scheduled until next year due to the backlog of other validations. As such, the developers are still in the process of completing the model documentation, including the implementation and change management testing, where applicable.

Capital adequacy is assessed as the ratio of the total available economic capital to the total required economic capital. Big Ben requires that each line of business maintain an Internal Capital Adequacy Ratio of 140%.

Capital Adequacy Analysis		
in millions of euros	**Dec 31,2022**	Dec 31,2021
Economic capital requirement		
Credit risk	**317**	314
Market risk	**214**	294
Operational risk	**133**	149
Business risk	**86**	161
Diversification benefit	**(114)**	(147)
Total required economic capital	**636**	772
Total available economic capital	**1,310**	1,382
Internal capital adequacy ratio	**206 %**	179 %

Value-at-Risk for Trading Book

Big Ben's trading book is its portfolio of financial instruments classified as available for sale. The financial instruments in the trading book are purchased or sold for reasons including: facilitating trading for the institution's customers, earning profits from trading spreads between the bid and ask prices, or hedging against various types of risk.

Big Ben's value-at-risk (VaR) for the trading book is based on an internal model. Regulatory authorities have approved the internal model for calculating the regulatory market risk capital for general and specific market risks. VaR is calculated using a 99 % confidence level and a one day holding period.

The model uses one year of historical market data as input to calculate VaR. The calculation employs a Monte Carlo Simulation technique and assumes that changes in risk factors follow a well-defined distribution, e.g., normal distribution or t-distribution. To determine aggregated VaR, Big Ben uses observed correlations between the risk factors during this one-year period.

The VaR model is designed to take into account a comprehensive set of risk factors across all asset classes. Key risk factors are swap curves, index and issuer-specific credit curves, funding spreads, single equity and index prices, foreign exchange rates, and commodity prices as well as their implied volatilities.

A separate VaR is calculated for each risk type, e.g., interest rate risk, credit spread risk, equity risk, foreign exchange risk, and commodity risk. For each risk type this is achieved by deriving the sensitivities to the relevant risk type and then simulating changes in the associated risk drivers. Diversification reflects the fact that the total VaR on a given day will be lower than the sum of the VaR relating to the individual risk types.

VaR metrics are shown below:

99% VaR of Big Ben Bank's Trading Book by Risk Type														
in thousands of euros	**Total**		**Diversification effect**		**Interest rate risk**		**Credit spread risk**		**Equity price risk**		**Foreign exchange risk**		**Commodity price risk**	
	2022	2021	**2022**	2021	**2022**	2021	**2022**	2021	**2022**	2021	**2022**	2021	**2022**	2021
Average	**1,014**	1,592	**(1,005)**	(1,189)	**624**	484	**754**	1,449	**351**	419	**257**	359	**30**	73
Maximum	**1,865**	3,603	**(568)**	(276)	**1,041**	981	**1,630**	3,165	**543**	832	**681**	873	**214**	238
Minimum	**749**	692	**(2,078)**	(2,281)	**305**	219	**473**	484	**184**	143	**119**	122	**8**	11
Period-end	**841**	1,300	**(730)**	(1,951)	**449**	732	**651**	1,497	**224**	365	**219**	608	**27**	49

Big Ben Bank Exhibits

Exhibit A - Financial Statements

2022 Annual Report – Big Ben

Consolidated Statement of Income

in millions of euros	**2022**	**2021**	**2020**
Interest income	449	481	681
Interest expense	147	170	310
Net interest income	**301**	**312**	**372**
Provision for credit losses	14	48	20
Net interest income after provision for credit losses	**288**	**263**	**352**
Commissions and fee income	296	255	257
Net gains (losses) on financial assets/liabilities at fair value through profit or loss	82	67	5
Net gains (losses) on financial assets available for sale	6	17	7
Net income (loss) from equity method investments	3	3	3
Other income (loss)	(2)	(4)	(18)
Total noninterest income	**385**	**338**	**254**
Compensation and benefits	282	283	301
General and administrative expenses	292	277	331
Impairment of goodwill and other intangible assets	0	0	28
Restructuring activities	7	13	17
Total noninterest expenses	**581**	**573**	**678**
Income (loss) before income taxes	**92**	**28**	**(71)**
Income tax expense	**24**	**11**	**71**
Net income (loss)	**68**	**17**	**(142)**

2022 Annual Report – Big Ben
Consolidated Balance Sheet

in millions of euros	**Dec 31, 2022**	**Dec 31, 2021**
Assets:		
Cash and central bank balances	5,190	4,492
Interbank balances (w/o central banks)	198	247
Central bank funds sold and securities purchased under resale agreements	226	231
Securities borrowed	2	0
Financial assets at fair value through profit or loss		
Trading assets	2,767	2,917
Positive market values from derivative financial instruments	8,101	9,283
Financial assets designated at fair value through profit or loss	2,408	2,069
Total financial assets at fair value through profit or loss	13,277	14,269
Financial assets available for sale	783	1,509
Equity method investments	29	24
Loans	12,738	11,540
Securities held to maturity	0	0
Property and equipment	150	150
Goodwill and other intangible assets	184	182
Other assets	2,805	2,984
Assets for current tax	33	27
Deferred tax assets	168	164
Total assets	**35,784**	**35,818**
Liabilities and equity:		
Deposits	16,318	15,352
Central bank funds purchased and securities sold under repurchase agreements	20	63
Securities loaned	1	46
Financial liabilities at fair value through profit or loss		
Trading liabilities	1,479	1,198
Negative market values from derivative financial instruments	7,760	8,859
Financial liabilities designated at fair value through profit or loss	1,580	1,259
Investment contract liabilities	15	14
Total financial liabilities at fair value through profit or loss	10,834	11,330
Other short-term borrowings	109	96
Other liabilities	2,643	3,087
Provisions	71	66
Liabilities for current tax	16	16
Deferred tax liabilities	14	15
Long-term debt	3,905	4,031
Trust preferred securities	14	36
Total liabilities	**33,945**	**34,137**
Total shareholders' equity	**1,568**	**1,481**
Additional equity components	224	157
Noncontrolling interests	46	43
Total equity	**1,839**	**1,681**
Total liabilities and equity	**35,784**	**35,818**

Big Ben Bank Exhibit B

Maturity of Assets and Liabilities

Analysis of the Earliest Contractual Maturity of Assets

Dec 31, 2022 *in millions of eruos*	On demand (incl. Overnight and one day notice)	Up to one month	Over 1 month to no more than 6 months	Over 6 months but no more than 1 year	Over 1 year but no more than 2 years	Over 2 years but no more than 5 years	Over 5 years	Total
Cash and central bank balances	5,028	149	13	0	0	0	0	5,190
Interbank balances (w/o central banks)	166	17	8	6	0	0	0	198
Securities borrowed	0	2	0	0	0	0	0	2
Trading assets	2,705	0	2	49	0	0	11	2,767
Positive market values from derivative financial instruments	8,101	0	0	0	0	0	0	8,101
Financial assets designated at fair value through profit or loss	572	1,291	259	80	20	53	133	2,408
Financial assets available for sale	0	59	86	44	60	161	372	783
Loans to banks	8	24	38	12	12	92	20	206
Loans to customers	451	1,038	1,366	645	786	2,334	5,913	12,533
Other financial assets	1,772	266	141	159	155	157	229	2,879
Total financial assets	**18,802**	**2,846**	**1,913**	**995**	**1,033**	**2,797**	**6,680**	**35,067**
Other assets	228	34	57	70	4	37	286	717
Total assets	**19,030**	**2,880**	**1,970**	**1,066**	**1,037**	**2,834**	**6,966**	**35,784**

Analysis of the Earliest Contractual Maturity of Liabilities

Dec 31, 2022 *in millions of eruos*	On demand (incl. Overnight and one day notice)	Up to one month	Over 1 month to no more than 6 months	Over 6 months but no more than 1 year	Over 1 year but no more than 2 years	Over 2 years but no more than 5 years	Over 5 years	Total
Deposits due to banks	1,140	62	471	196	64	138	207	2,279
Deposits due to retail customers	4,271	82	2,385	44	11	13	3	6,811
Deposits due to corporate customers	5,220	478	1,067	320	52	40	51	7,228
Trading securities	1,479	0	0	0	0	0	0	1,479
Negative market values from derivative financial instruments	7,760	0	0	0	0	0	0	7,760
Financial liabilities designed at fair value through profit or loss	325	617	132	435	10	40	21	1,581
Short term borrowings	79	17	19	2	12	0	0	130
Long-term debt	0	50	1,149	138	482	1,302	785	3,905
Other financial liabilities	2,117	45	85	41	22	40	52	2,401
Total financial liabilities	**22,391**	**1,352**	**5,308**	**1,175**	**653**	**1,574**	**1,119**	**33,573**
Other liabilities	372	0	0	0	0	0	0	372
Total liabilities	**22,763**	**1,352**	**5,308**	**1,175**	**653**	**1,574**	**1,119**	**33,945**

Big Ben Bank Exhibit C
Selected Economic Capital Model Results

I. Worst 15 of 1000 scenarios from the credit risk model from the March 31, 2023 model:

Scenario rank	Credit risk scenario #	Credit risk scenario required capital
986	141	350
987	321	353
988	173	355
989	812	357
990	795	360
991	272	362
992	484	363
993	926	364
994	401	364
995	212	365
996	454	367
997	84	369
998	811	371
999	261	373
1000	142	376

II. Worst 15 of 1000 scenarios from the market risk model from the March 31, 2023 model:

Scenario rank	Market risk scenario #	Market risk scenario required capital
986	693	115
987	183	115
988	954	116
989	221	117
990	11	118
991	466	143
992	358	162
993	407	177
994	813	205
995	550	223
996	27	227
997	235	472
998	642	616
999	185	672
1000	63	739

III. Allocation of December 31, 2022 economic capital requirement to business divisions:

	Dec 31, 2022			
in millions of euros	**Asset Management**	**Commercial Banking**	**Investment Banking**	**Total**
Economic capital requirement				
Credit risk	158	95	63	**317**
Market risk	107	64	43	**214**
Operational risk	67	40	27	**133**
Business risk	43	26	17	**86**
Diversification benefit	(57)	(34)	(23)	**(114)**
Total required economic capital	**318**	**191**	**127**	**636**
Available economic capital	**655**	**393**	**262**	**1,310**

Big Ben has provided an internal memo with respect to its modeling processes, for Caerus' review.

To: Jennifer Oakhurst, Deputy CFO, Big Ben

From: Martin Willow, Financial Analyst, Big Ben

Subject: Model Governance

Date: April 12, 2023

Just wanted to give you a status update on the Model Governance framework project. Overall, the implementation is going well.

One of the first things we did was to decide upon the definition of a model, and then determined which models would be subject to the formal model validation aspects of the framework. Models that are excluded from model validation would still be subject to inventorying, documentation and change management controls.

We are defining models to include anything that forecasts values using judgment, approximations or assumptions. However, to be cost effective, we're only going to consider for validation models that are used for financial reporting purposes since these pose the most risk.

As alluded to above, we will create an inventorying system for both the models subject to model validation and those that aren't. For the ones that are subject to model validation, the model user(s) will rank each model as High, Medium or Low risk. The High-risk models will be validated on a strict 3-year rotation schedule through a centralized Model Validation group.

Models that are not subject to validation will still need to be reviewed by an independent analyst (i.e., somebody who was not the developer) who is familiar with the model's topic and purpose. This review will be qualitative in nature, with no formal report required, but the reviewer will have to sign off to ensure accountability.

Model documentation requirements include:

- Model purpose
- Significant model output and intended users
- Model methodology with extended commentary if the methodology is in any way considered unorthodox
- A summary of significant assumptions and their bases
- A summary of model testing
  - At implementation and at model revision
  - Ongoing testing
  - Validation testing, if applicable
- A summary of model controls and why they are considered effective and sufficient

Minimal requirements for input and calculation testing by the model developer are static and dynamic validation, respectively. This testing is performed upon model implementation, as well as expected for model change management purposes for material changes (see below). There is no formal testing requirement for output testing, but it is expected that developers will compare current model results to previous model results and qualitatively assess the movement in light of changes to inputs, assumptions or external environment.

We also will be formalizing change management requirements. The model developer will determine if a change is deemed material, and if so, will require a colleague to review both the coding change and model output for unintended consequences. Immaterial changes require the developer to self assess the change for accuracy. While no formal documentation is required, a change log is kept with applicable review signoffs.

The formal model validation exercise will require a report with a pass or fail grade, regardless of the findings. If the model fails, a remediation plan will need to be developed by the developer and executed in a timely manner. Since a model can have many attributes that require assessment, determining pass or fail will necessarily have to be judgmental. While the developer of a passing model is expected to implement suggested remediations, this is not a requirement since the model was deemed fit for purpose by the very definition of "passing".

Every quarter, the Model Validation group will prepare a summary for executive leadership illustrating the total number of inventoried models, their passing status and the number of models reviewed during the period with their validation results.

Sincerely,

Martin Willow
Financial Analyst, Big Ben Bank

1.6 Non-Financial Engagement – Giant Auto Motors

Caerus' automotive consultants have prepared the following summary of the industry and its key risks.

Automotive Industry Overview

The automotive marketplace is dominated by a few large "legacy" manufacturers, which currently focus on Petroleum Combustion Vehicles (**PCV**s) – i.e., gasoline, diesel and hybrid gasoline/battery vehicles. Several years ago, one quickly growing company began offering Battery Electric Vehicles (**BEV**s) only. While many industry experts were convinced the legacy automakers would quickly put this BEV company out of business, that has not happened. Instead, it became the largest automaker by market capitalization.

There have been significant entry barriers to the automotive industry for PCV manufacturers, including:

- Heavy capital commitments for physical plant and research & development
- Specialized expertise in engines and transmissions, varying by market segment
- Long lead times from design to production
- Ability to anticipate consumer buying preferences

BEV manufacturers have similar entry barriers; however, the BEV cars are simpler to build, requiring only 20% of the number of parts as a conventional PCV. BEV automakers have also invested heavily in automation. Combined with the reduction in the number of parts, they can produce a car three times faster than legacy auto manufacturers.

As petroleum scarcity/price volatility, climate change concerns, tax incentives and enhanced charging infrastructures move customers to BEVs, the product mix between PCV and BEV vehicles may shift dramatically. For traditional PCV manufacturers, there is pressure to enter the BEV market.

Industry Key Risks

Strategic Risks

- Obsolescence: Companies that choose not to enter the BEV market may find their vehicles becoming obsolete and their current business model unsustainable.
- Production workforce: Legacy automakers use mostly unionized labor to assemble PCVs. Increased automation and the greatly reduced number of parts in BEVs will shrink the factory headcount needs significantly.
- Supply chain: Automakers have typically sourced parts from around the world from third party companies. The pandemic and shipping backlogs led to many factories being idled or running far below capacity and demand greatly exceeding supply.
- Critical competencies: Engines and transmissions are the critical competencies of PCVs. For those auto manufacturers switching to, or adding, a BEV product line, batteries and software development become the critical competencies.

Profitability and Liquidity Risks

- PCV makers have three primary profit drivers – manufacturing profit, sales commissions and mark-ups, and dealer services. Currently, PCV dealers make more on maintenance than on car sales. Some BEV competitors have eliminated commissions and dealer mark-ups.
- Due to having significantly fewer parts, BEVs are significantly cheaper to maintain than PCVs. Battery recharging costs are significantly lower than gas/diesel costs. Ultimately, the total cost of ownership (purchase price + fuel + maintenance – resale value) for BEVs will likely be comparable to that of PCVs.
- As BEVs increase in popularity, trade-in values of PCVs will plummet. This has already been observed in the luxury performance car market.

Compliance/Regulatory Risk

- Regulations restrict the level of automotive emissions and require onboard diagnostic systems. Automotive Emission requirements vary by area, with China, Europe, and the U.S. (particularly California), impacting PCV manufacturers the most. Failure in emissions or diagnostics must be remedied by recalls.
- Corporate Fuel Economy Standards must be met in each model year in the U.S., with civil penalties for non-compliance. China applies fuel economy standards both to individual vehicles and fleet averages.
- BEVs are not adversely impacted by emissions and fuel economy standards. BEV companies can sell Regulatory Credits to PCV manufacturers who need them.
- Many jurisdictions are planning to ban manufacture of new PCVs in the next five to fifteen years due to concerns that PCVs contribute significantly to global warming.

Company Overview

Giant Auto Motors (GAM) is an automobile manufacturer that designs, manufactures, markets, and services vehicles. At times in its long history, GAM has been the largest auto maker in the world. At its peak, it sold more cars in the U.S. than all other manufacturers put together. It is currently the largest of the U.S. auto companies and in the top ten of global automobile manufacturers.

Products / Services

GAM currently sells cars, trucks and sport utility vehicles. However, its leading sales in the U.S. are luxury sedans, trucks, and SUVs, where profit margins are larger. GAM's product line has traditionally been focused on the PCV market.

Strategy

Following a strategic assessment in 2021, GAM divested half of its brands and now focuses on China and North America, which constitute 85% of its sales. GAM operates in the Chinese market via a joint venture (JV), under which GAM holds a 10% share. GAM sold more cars in China than in the U.S. in 2021, all PCVs. However, China is the largest BEV market in the world, and GAM and other legacy automakers have been steadily losing market share in China to the BEV manufacturers.

After a recent board meeting, GAM concluded that it is vital to maintain a strong presence in the PCV market in the hope that continued profits from that business could be used to help cover the high upfront costs of entering the BEV market. However, the CEO is worried that staying in the PCV market is not a viable long-term strategy.

Pension Plan

GAM sponsors traditional defined benefit pension plans for most of its large workforce. Following are the abbreviated 2022/2023 financial results for GAM, including select results for the pension plans:

1/1/2023 Balance Sheet	(in millions)
Company Assets	144,600
Pension Assets	108,800
Total Assets	253,400
Company Liabilities	105,600
Pension Liabilities	134,200
Total Debt	239,800
Equity	13,600

Other 2022 Financial Information	(in millions)
Pretax Income	6,000
Components of Pension Expense	
Service Cost	900
Interest Cost	6,100
Expected Return on Assets	(7,500)
(Gain)/Loss Amortization	180
Prior Service Cost Amortization	10
Pension Contribution	2,000
Actual Pension Return	10,100

2022 Cash Flows	(in millions)
Operating Cash Flow	7,500
Financing Cash Flow	750

2023 Assumptions	
Pension Liability Discount Rate	4.75%
PBGC Variable Rate Premium (as a % of unfunded liabilities)	3.00%

1.7 Non-Financial Engagement – Energetix Power

Caerus consultants have prepared the following overview of the energy industry and its primary risks.

Energy Utility Industry Overview

Energy Utilities in the U.S. generally operate as geographic monopolies under the oversight of state utility commissions in retail markets and the Federal Energy Regulatory Commission (FERC) in wholesale markets. They are required to make substantial investments in the generation, distribution and transmission of electricity and natural gas during normal periods, peak periods and natural disasters. State Utility Commissions are required to ensure each utility is profitable, over time, in the retail sector, but no such profitability requirement exists for the wholesale side.

Key Risks

Strategic Risks

- Demand risks
  - Decline in customer demand
  - Increasing customer demand for green energy
  - Inability to meet the growing demand for energy
- Disruptive technologies (e.g., techniques to extract oil from nonconventional sources) could change the balance of energy supply and demand
- Climate risk

Regulatory, Legislative, and Legal risks

- Revenues, earnings, and the ability to recover costs are impacted by:
  - Legislation and regulation affecting utility operations
  - The rates that state utility commissions allow utilities to charge
- Deregulation or restructuring in the electric industry may result in increased competition
- Environmental laws and regulations related to global climate change may require significant capital expenditures

Operational risks

- Ability to provide energy and the cost to provide it may be affected by:
  - Natural disasters
  - Operational accidents
  - Terrorist activities, military activity or other government actions
- The reputation and financial condition of utilities could be impacted by:
  - Cyberattacks and data security breaches
  - Construction projects that are started and cancelled prior to completion
  - Consumer dissatisfaction over power outages

Market/price risk

- Financial results may be affected by:
  - The overall market, economic conditions, and fluctuations in commodity prices
  - Extreme weather conditions (including those associated with climate change)

Company Overview

Energetix Power Company ("Energetix") is an energy company headquartered in Denver, Colorado. It is a holding company doing business in seven states in the western United States through business segments. The three main operating business segments are:

- Electric Utilities and Infrastructure
- Gas Utilities and Infrastructure
- Commercial Renewables

Energetix has about 25,000 employees. About 25% of the employees are represented by labor unions under various collective bargaining agreements.

The CFO of Energetix has become interested in Enterprise Risk Management in the energy industry. She has outlined some thoughts for developing a comprehensive ERM function at Energetix:

- It is important to understand the nature of the risks in the energy industry and the specific unique or biggest risks for our company. We should have a risk register.
- What is our philosophy of risk? How can we characterize our risk appetite?
- If we have a vision for ERM, it will help spread the message throughout the company.

  <u>Draft ERM Vision:</u>

  Effective risk management is of primary importance to the success of Energetix. We will develop a comprehensive risk management process to monitor, evaluate and manage the principal risks we assume in conducting our activities.
- How could we reflect the external views from regulators, rating agencies, other stakeholders in our ERM implementation?
- Where should we start? Should we target one division first and then roll out to the rest of the company? We will need an ERM governance model.
- How to quantify / analyze the risks?
  - Which risks measures and techniques should be applied for quantifiable risks?
  - How to analyze the non-quantifiable risks such as operational risks
  - What is the best way to get data to measure potential losses? 1) using historical data (e.g., the 2011 nuclear disaster in Japan) for stress testing, 2) surveying our inhouse experts and getting their opinions for scenario testing or any other approaches.
- Which tools, techniques and strategies could be applied for our risk management?

    - Which hedging instruments / strategies could we apply for financial risks (e.g., pricing risk)?
    - Which approaches (e.g., transfer the risks via insurance contract) could we apply further for other risks such as operational / strategic risks?
- Maybe we should consider engaging Caerus to help us get started with this process.

Electric Utilities and Infrastructure (EUI)

EUI operates in retail and wholesale electricity markets.

a. In the retail market, its businesses operate as the sole supplier of electricity within their service areas. EUI owns and operates facilities necessary to generate, transmit and distribute electricity. Services are priced by state approved rates designed to include the costs of providing these services and a reasonable return on invested capital.

   Competition in the regulated electric distribution business is primarily from the development and deployment of alternative energy sources, such as private on-site solar.

b. In the wholesale market, Energetix competes with other utilities for bulk power sales, sales to municipalities and cooperatives and wholesale transactions under cost-based contracts approved by the Federal Energy Regulatory Commission (FERC). The principal factors in competing for these sales are price, availability of capacity, and reliability of service. Prices are influenced primarily by market conditions and fuel costs.

Energy requirements in excess of a utility's own capacity are supplied through contracts with other generators of electricity and purchased on the open market. The EUI companies complete projections under various scenarios to test what actions would be needed if one or more counterparties failed to provide the contractual amount of energy.

EUI owns the power wires used to transmit electricity to its customers. Several of the EUI subsidiaries have considered making extensive upgrades to their lines and the equipment used to support them. However, these companies have delayed doing any maintenance because the wiring is located in difficult-to-reach wooded areas and because the regulator-approved rates have not allowed for a focus on maintenance.

EUI's generation portfolio is a balanced mix of energy resources having different operating characteristics and fuel sources, designed to provide energy at the lowest possible cost to meet its obligation to serve retail customers. All options, including owned generation resources and purchased power opportunities are evaluated every three to five years to select the lowest-cost resources available to meet system load requirements.

Last year, the state regulator for one of the EUI companies mandated that, within the next 20 years, 50% of all electricity in that state must be generated from renewable resources such as wind or solar energy. Energetix is working on identifying the current and projected renewable energy providers, the amounts of renewable energy that they will be able to provide, and whether the EUI subsidiary can meet the mandate. It is expected that other EUI companies will have to meet similar requirements at some point in the future.

EUI relies principally on coal, nuclear fuel, and natural gas for its generation of electricity.

Gas Utilities and Infrastructure (GUI)

GUI conducts natural gas operations through regulated public utilities in five states. GUI serves residential, commercial, industrial and power generation natural gas customers.

GUI also owns, operates, and has investments in various pipeline transmission and natural gas storage facilities.

Its natural gas procurement strategy is to contract primarily with major and independent producers and marketers for natural gas supply. It also purchases a diverse portfolio of transportation and storage service from interstate pipelines. This allows GUI to assure reliable natural gas supply and transportation for its customers during peak winter conditions.

Commercial Renewables (CR)

CR primarily acquires, builds, develops, and operates wind and solar renewable power generation throughout the continental United States. Revenues are generated by selling the power produced from renewable generation through long-term contracts to utilities, electric cooperatives, municipalities and commercial and industrial customers.

As part of its growth strategy, CR has expanded its investment portfolio through the addition of distributed solar companies and projects, energy storage systems and energy management solutions specifically tailored to commercial businesses.

CR is subject to regulation at the federal level.

The market price of commodities and services, along with the quality and reliability of services provided, drive competition in the wholesale energy business. CR's main competitors include other nonregulated generators and wholesale power providers.

Pension Plan

Energetix sponsors traditional defined benefit pension plans for all employees. Following are the abbreviated 2022/2023 financial results for Energetix, including select results for the pension plans:

1/1/2023 Balance Sheet	(in 000s)
Company Assets	140,000
Pension Assets	50,000
Total Assets	190,000
Company Liabilities	80,000
Pension Liabilities	80,000
Total Debt	160,000
Equity	30,000

Other 2022 Financial Information	(in 000s)
Pretax Income	1,100
Components of Pension Expense	
Service Cost	2,000
Interest Cost	2,994
Expected Return on Assets	(3,500)
(Gain)/Loss Amortization	(440)
Prior Service Cost Amortization	550
Pension Contribution	2,660
Actual Pension Return	1,770

2022 Cash Flows	(in 000s)
Operating Cash Flow	880
Financing Cash Flow	990

2023 Assumptions	
Pension Liability Discount Rate	3.75%
PBGC Variable Rate Premium (as a % of unfunded liabilities)	3.00%

1.8 Non-Financial Engagement – SeaLux Cruise Lines

Caerus consultants have prepared the following overview of the cruise industry and its primary risks.

Global Cruise Industry Overview

Cruises offer a broad range of products to suit vacationing guests of many ages, backgrounds and interests. Cruise brands can be broadly classified as offering contemporary (short, casual cruises), premium (7 to 14 days, higher quality, destination-focused), and luxury (very high standards of accommodation and service, exotic itineraries) experiences.

Industry Key Risks

- World events impacting the ability or desire of people to travel
- Weather conditions, natural disasters, or other incidents affecting cruise ships and/or passengers
- Technology risks, including breaches in data security, disruptions to information technology operations, and failure to keep pace with developments in technology
- Ability to recruit, develop and retain qualified shipboard personnel
- Increases in fuel prices, changes in the types of fuel consumed, and availability of fuel supply

Company Overview

SeaLux Cruise Lines is a publicly traded leisure travel company in the cruise and vacation industries, headquartered in Seattle, Washington. SeaLux is active in all categories of cruises, ranging from family-friendly and budget-conscious up to prestigious high-priced cruises to exclusive port cities.

SeaLux is a leading provider of vacations to all major cruise destinations throughout the world.

With operations in North America, Australia, Europe and Asia, the company sells tailored cruise products, services and vacation experiences on 92 ships to the world's most desirable locations.

SeaLux believes there are large, addressable markets with low penetration rates in numerous countries where it is already an established presence. It particularly sees Asia as a market with large potential, where economic growth has raised discretionary income levels, fueling an increasing demand for travel.

Strategy

Major goals for the company over the next five years include:

1) Development of two new vacation destinations in the Caribbean
2) Adding six new ships to the fleet -- three of the ships are additions to the fleet (i.e., the ship count will increase from 92 to 95), and the other three will replace existing ships
3) Increasing marketing efforts in Asian countries, especially China, which will require increasing awareness of cruises as a vacation alternative

Potential Caerus Engagements

- Due to the COVID-19 pandemic, SeaLux ceased operations world-wide for 12 months but began limited operations again in 2021. It wants to determine what actions to take to ensure its survival during the ongoing pandemic.
- SeaLux wants to understand the impact of COVID-19 on its strategy to penetrate the Chinese market.
- SeaLux is concerned about political risk and the impact it could have on global operations.
- SeaLux wants to consider alternatives to petroleum-based fuels for operating its ships. It believes this could provide an opportunity for more cost-efficient operation of its fleet, and also will enhance the company's reputation as an environmentally-friendly company.

1.9 Financial Engagement – Lyon Corporation

Company Overview

Lyon Corporation is a financial services holding company. It is described in detail in the remaining sections of the case study and therefore the background on the company is not included here.

Engagements with Caerus

Over the past ten years Lyon has established a beneficial relationship with Caerus and continues to hire Caerus for periodic consulting engagements. Some previous engagements have focused on the following areas:

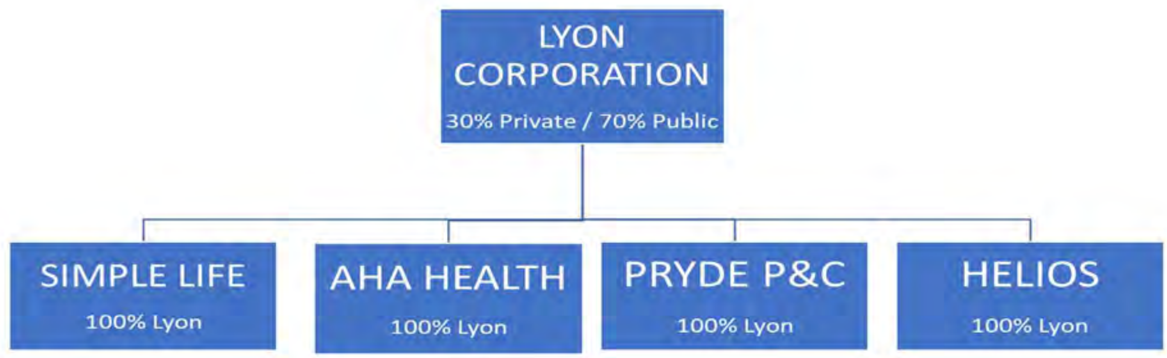
- Evaluation of potential and actual acquisitions, including specifically Pryde and Helios
- Advice in the area of board composition and governance
- Education in the development and uses of economic capital models

2 Lyon Corporation

2.1 Structure

Lyon Corporation is a diversified U.S. public holding company with interests in financial services companies.

Lyon is a Massachusetts public company (LCC: NYE and TSX) with a significant shareholder, Lyon Family, which owns about 30% of the outstanding shares. The holding company has the following structure:



Percentages denote equity interest and voting rights.

2.2 Lyon Board of Directors

The Lyon Board consists of twelve members, four of whom directly or indirectly represent the Lyon family interest. One of these four, R. Tomas Lyon III, also serves as the Board Chairman of SLIC. There are six outside board members, four of whom are Chief Executive Officers or Board Chairmen in leading public companies in the United States or Canada. The other two board members are the Board Chairmen of AHA Health and Pryde P&C.

Mandate of the Board

The mandate of the Board, which it discharges directly or through one of the five Board Committees, is to supervise the management of the business and affairs of the Corporation. Responsibilities include approval of strategic goals and objectives, review of operations, disclosure and communication policies, oversight of financial reporting and other internal controls, corporate governance, Director orientation and education, senior management compensation and oversight, and Director nomination, compensation, and assessment.

Board Committees

Executive Committee

The Executive Committee has and may exercise all or any of the powers vested in and exercisable by the Board, except approval of the annual strategic plan.

Audit Committee

The primary mandate of the Audit Committee is to provide to the Board an independent review of the procedures, controls, and results of the financial statements of the Corporation and public disclosure documents containing financial information.

Risk Committee

The primary mandate of the Risk Committee is to approve the Risk Strategy of the Corporation including the Risk Appetite and Risk Tolerance statements, identification of risks, monitoring of risks, and remediation of risks where necessary.

Compensation Committee

The primary mandate of the Compensation Committee is to approve compensation policies and guidelines for employees of the Corporation, to approve compensation arrangements for executives and Directors of the Corporation, and to oversee the management of incentive compensation plans.

Related Party and Conduct Review Committee

The primary mandate of the Related Party and Conduct Review Committee is to review and recommend approval of proposed transactions with related parties of the Corporation.

Governance and Nominating Committee

The primary mandate of the Governance and Nominating Committee is to oversee the Corporation's approach to governance issues, to assess the effectiveness of the Board of Directors, the Board's Committees, and the Directors, and to recommend to the Board candidates for election as Directors and for appointment to Board Committees.

Code of Conduct and Business Ethics

The Board of Directors has adopted a Code of Business Conduct and Ethics to promote and maintain a culture of integrity throughout the Corporation. The Code is applicable to Directors, officers and employees of the Corporation.

Board Minutes

The Board is involved with the management of Lyon at both a strategic and an operational level. Excerpts from the March 12, 2023 Board meeting are provided here.

1. NEW BUSINESS
    a. Corporate Audit Head

       The Audit Committee announced that they had recently approved the hire of John Marmot, to be appointed as Head of the Corporate Audit team, reporting to the chair of the Audit Committee. John and his team will review financial statements, develop a risk management framework, and make sure that we all follow the ERM framework that we established for Lyon and subsidiaries, in alignment with our strategic objectives.

b. Review of Current Sales and Potential New Products

Bob Seoul, VP of Operations for AHA Health, reported that AHA is meeting its sales target levels for all current businesses, and his department is now in development of a new Critical Illness product.

A question was asked about the viability of a Critical Illness product given that at least three competitors have stopped selling this type of product. Seoul responded that his staff was still validating their market analysis but felt that the exit of the other companies from this market would only help AHA's proposed sales.

There was a lot of discussion, and a motion was made to stop the development of the Critical Illness product. The motion was seconded and passed by a 5 to 3 vote.

c. Review of Potential "quick sale" Acquisition

R. Tomas Lyon III reported that he has been approached about a potential acquisition. Tyger Corporation is looking to exit the annuity market and wants to sell its wholly owned subsidiary CUB Annuity. Because this would be a quick sale, it is being handled outside the company's normal acquisition protocols. CUB Annuity provided financials for the past three years. The data has not been independently validated by an auditor, but Mr. Lyon stated that he knows the CFO of Tyger Corporation very well and would feel comfortable trusting their numbers.

There was extensive discussion, but, since a decision needed to be made prior to the next board meeting, the board decided to vote. The board agreed to sign a letter of commitment for the acquisition by a 4 to 4 vote, with R. Tomas Lyon III having the deciding vote when there is a tie.

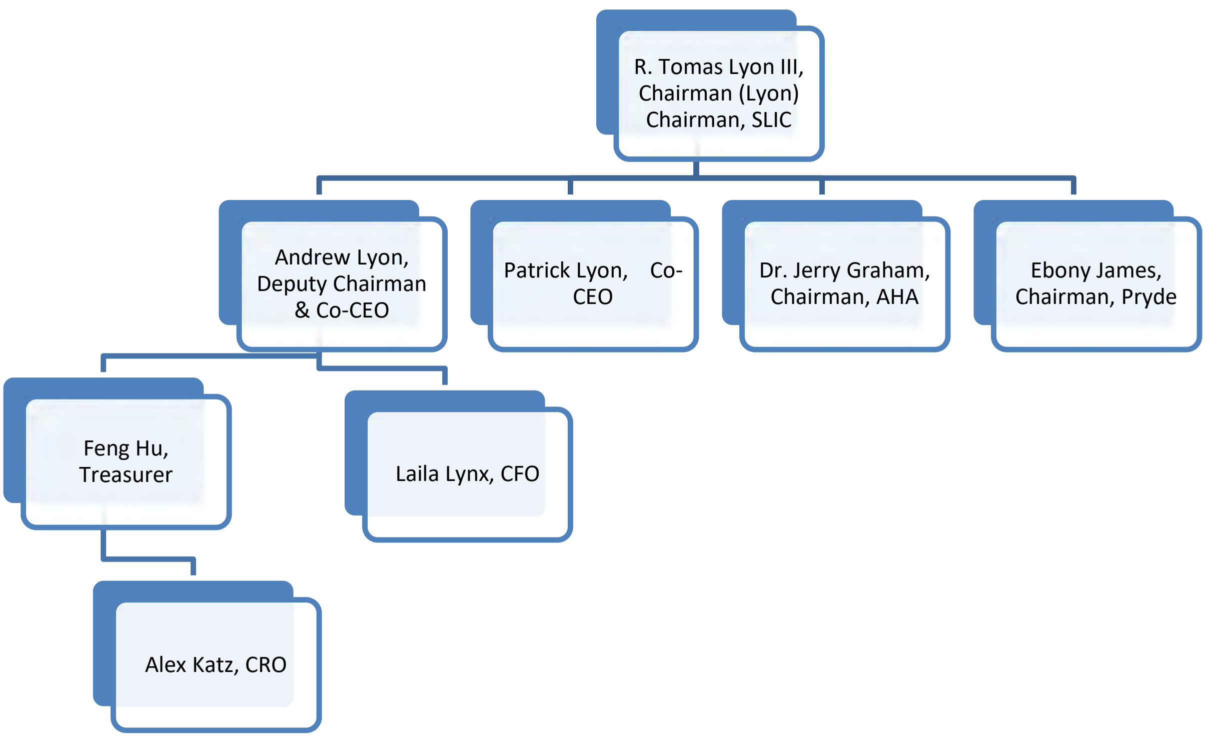
3 Lyon Subsidiaries

3.1 Oversight of Lyon Companies

Lyon Corporation functions as a holding company with four fully owned subsidiaries: Simple Life Insurance Company (SLIC), AHA Health Insurance Company (AHA), Pryde P&C, and Helios Insurance Company. Lyon Corporation is publicly owned, with 30% of the shares held by the Lyon family. The company has $50 million in debt outstanding in the form of 20-year bonds issued in 2006 at 7.75% interest and uses an after-tax cost of capital of 10% to determine the value of an acquisition or a project.

Lyon Corporation, SLIC, AHA Health, and Pryde P&C are each managed by an executive team (comprising the CEO, CFO, and COO and four to six other executives). Each CEO reports directly to his respective board. SLIC, AHA Health, and Pryde P&C each have an independent Board of Directors.

A simplified organization chart for Lyon follows:



The Lyon ERM department regularly asks each of the primary affiliates (SLIC, AHA, and Pryde) to provide an update on the state of the company, including product lines, outside relationships, risk assessments and concerns, and current business issues. Though operational information has historically been limited, it has improved with the establishment of the Corporate Risk Committee one year ago.

Lyon requires its U.S. subsidiaries to dividend excess capital up to the holding company. In turn, Lyon will consider providing capital contributions to subsidiaries that fall short of their capital requirements.

The documents in this section of the case study comprise various reports, e-mails, and memos related to the operation of Lyon Corporation.

The first set of reports that follow represent the first submissions from SLIC, AHA, and Pryde in response to Corporate's request for summary descriptions of each company.

3.2 SLIC Report to Corporate

Company Summary

The Simple Life Insurance Company (SLIC) is 100% owned by Lyon Corporation. R. Tomas Lyon III serves as Chairman of the Board, President and CEO.

SLIC is a U.S. life insurance company located in Boston, Massachusetts, selling throughout the U.S. SLIC has four lines of business: Universal Life (UL); Term Life; Single Premium Immediate Annuities (SPIA); and Variable Annuities (VA). SLIC issues its products only in the United States.

Capitalization and Investments

The company strives to maintain a strong statutory risk-based capital (RBC) ratio, targeting capital at 350% of Company Action Level RBC, and to have an available to required economic capital ratio of 110% or greater. Any surplus in excess of the larger of 400% of Company Action Level RBC and 110% of required economic capital is distributed to Lyon Corporation through a dividend paid in cash annually at the end of the first quarter based on the year-end balance sheet. Surplus positions less than the larger of 300% of Company Action Level RBC and 90% of required economic capital are addressed through a capital contribution from Lyon Corporation.

The company's general account is invested primarily in fixed-income assets. VA fixed accounts, which are minimal, are part of the general account; VA separate account investments are held in a segregated account and are managed by a third-party investment advisor.

Within the general account, there are separate investment portfolios for each of the four main product lines.

Portfolio Summary

The following is a breakdown by asset class of the market value of SLIC's general account investment portfolios ($ million) as of 12/31/2022, excluding derivatives and VA separate (segregated) accounts.

LOB	US Govt	US Corporate Investment Grade Public	Private	US Corp Below Inv Grade	US CMBS/ ABS	Mortgages	Real Estate	Common Stock	Cash & Short-Term	Other	Total
Term	65	659	173	33	374	345	0	0	66	15	1,731
UL	73	531	291	54	455	482	0	0	72	54	2,012
VA	29	348	67	28	100	78	0	0	37	6	693
SPIA	7	73	18	4	55	42	0	0	31	10	240
Corp	2	31	4	2	6	6	8	4	20	13	97
Total	176	1,643	553	121	990	953	8	4	225	99	4,773

The “Other” investment class includes foreign sovereign debt, private equity, and other assets outside the traditional categories.

Risk Policies

Credit Risk: Fixed-income securities in the general account have exposure limits at individual obligor (issuer) and sector levels. For each portfolio, there are weighted average credit quality targets.

Market Risk: The company measures the effective duration of the assets and liabilities, quarterly within the Term, UL and SPIA lines of business. If the asset and liability durations are further apart than 0.5, the asset portfolio is rebalanced within 30 days such that its new effective duration equals that of the liabilities.

For the Term, UL, and SPIA lines of business, any non-U.S. dollar fixed income positions are currency-hedged back to U.S. dollars using currency derivatives.

VA hedging is done on an economic basis. The hedging uses a dynamic approach updated monthly for market factors and quarterly for liability inforce changes. The key risk measures are delta and rho, and the program updates its equity and interest rate derivatives such that at least 80% of liability delta and rho are hedged. This “opportunistic” hedging methodology allows the hedging team to take some bets, as long as these hedging targets are met.

Liquidity Risk: The liquidity policy requires SLIC to hold sufficient liquid assets to meet expected demands for cash in a unique liquidity stress-test scenario. The scenario focuses on a reputational liquidity crisis, where markets continue to operate normally and the liquidity crunch affects only the company. The liquidity stress test anticipates situations where the company’s ability to sell assets to meet cash needs from its liability products is hindered by the market taking advantage of the company during the crisis. In addition, testing periodically considers a systemic stress scenario where the entire market is not able to sell assets at a reasonable value. However, SLIC’s liquidity policy does not require it to hold sufficient liquid assets to be able to meet cash demands in such a scenario, since it expects regulatory relief in a systemic crisis.

Operational Risk: The SLIC Chief Risk Officer is responsible for collecting and disseminating risk information. A report will be prepared monthly and distributed to executive management.

Last year SLIC completed a review of the back-office operations of its investment department. There were several goals it wanted to fulfill with this review:

- Assure completion of trades on a timely and accurate basis
- Maintain compliance with governmental regulations.
- Ensure adequate procedures and staffing in light of the COVID-19 global pandemic

One result of the review was the recognition that the asset administrative system was outdated. This led to the purchase and installation of the Asset Valuation and Accounting (AVA) system, a new computer system to value assets and maintain records of all trades. The system was purchased partly on the basis of its stated ability to reconcile all trades without human intervention once the information is entered into the system. This automation will allow SLIC to devote more money to maintaining competitive salaries for its investment analysts. AVA was installed in less time than the vendor had claimed was needed, allowing SLIC to save money on consulting and installation fees it would have otherwise paid to the vendor. SLIC was also impressed with AVA's ability to automatically handle the accounting of all asset trades and update daily asset values.

In the course of installing AVA, SLIC implemented a review of all procedures related to asset transactions initiated by the Investment Department. The review was beneficial because it showed that the department had been handling certain trading and recordkeeping functions the same way for the past 40 years. After instituting efficiency improvements, the Investment Department was able to reduce operations staff by five people (20 percent).

SLIC Risk Management Committee

The committee meets on a quarterly basis. Meetings focus on reviewing internal risk reports and interviews with key employees in finance, systems, and audit.

In accordance with the mandate of Lyon's Corporate Risk Committee, requiring that each affiliate put a Chief Risk Officer (CRO) in place, the SLIC Risk Management Committee recently defined the CRO responsibilities and hired an executive to fill that role. The CRO leads an independent ERM department, is responsible for developing and implementing a comprehensive company-wide ERM program and serves as the risk liaison across various business segments.

The CRO serves as the Chairperson of the Risk Management Committee, ensuring all relevant risk topics are addressed within the Committee according to the Company's Risk Policy.

Initial Product Report

The Company distributes its products through an independent brokerage system. The Company supplies marketing materials and product descriptions. Brokers are responsible for their own training.

Level Premium Term Insurance

Product Description: The term life insurance line has two series of products. The fully underwritten line, Secure Term, offers three term periods: 10, 20 and 30 years. The simplified issue line, Simple Term, offers a 10-year level term product. Both lines are renewable after the level term period on a steeply increasing annual premium scale and are convertible to the currently issued UL product during the level term period.

For both term insurance lines, SLIC makes use of reinsurance, the terms of which have been fairly consistent for many product generations. The fully underwritten line is coinsured at 60% to Trust Us Re, and any single life issue over $1 million is 100% reinsured with the same reinsurer. The simplified issue line is reinsured under YRT treaties to a pool of four reinsurers, each with an 8% quota share.

Based on the emerging experience results and increasing face amounts for more recent issues of these products, SLIC is re-evaluating its reinsurance agreements and retention limits.

Market Position: Sales have been strong, due to competitive pricing, higher-than-average first year sales compensation, and a strong advertising campaign.

Experience: The fully underwritten line has shown improving mortality relative to pricing and lower-than-priced lapse rates. In contrast, the simplified issue line shows deteriorating mortality relative to pricing and higher-than-priced lapse rates.

The SLIC Pricing department has implemented cutting edge approaches to assess mortality experience, including performing predictive modeling exercises to better understand sensitivity to various independent variables (e.g., policy duration, insured's socio-economic status, state of issue, etc.). In addition, SLIC participates in and uses Society of Actuaries (SOA) industry studies to assess its relative experience. The SOA studies span the last five years of mortality incidence and are refreshed annually. Pricing systematically distributes the experience study report to other modeling areas, so their assumptions can be kept current.

A recent study of the term conversion experience has shown a sharp increase in utilization of the conversion privilege and poor mortality experience on the conversions.

SLIC's current annual lapse experience studies are based on the last five years of experience but are being refined. Currently, studies exist for aggregate experience by issue age and policy year, but enhancements are planned to include splits for gender and underwriting risk class.

Proposed New Product: SLIC is considering introducing an Accelerated Underwriting (AUW) term product.

Variable Annuity

Product Description: All Variable Annuity contracts provide a Return of Premium (ROP) GMDB. Partial withdrawals are permitted, with the GMDB reduced dollar for dollar by the amount of the withdrawal. The VA offers a collection of eight proprietary mutual fund choices (seven domestic and one foreign) and a fixed fund invested in the general account.

Two optional Guaranteed Living Benefits (GLBs) are offered as riders, only one of which may be chosen for a single underlying contract: (i) a Guaranteed Minimum Accumulation Benefit (GMAB), which guarantees the contractholder's account value will not drop below the premium deposit (reduced by any withdrawals) as of the 10^{th} year anniversary; or (ii) a Guaranteed Minimum Withdrawal Benefit (GMWB) that guarantees the contractholder the ability to withdraw 5% of the benefit base per year for life, regardless of whether the account value is sufficient to support these withdrawals. The benefit base equals net deposits rolled up at 5% per year until the contractholder starts to take withdrawals. The annual fee for this rider is 1% of the benefit base.

The most recent sales mix, as measured by account value, shows 30% without a GLB, 20% with a GMAB and 50% with a GMWB.

Experience:

All SLIC VA modeling applications use industry mortality experience as published by a large actuarial consulting firm seven years ago. Other assumptions (e.g., surrenders or GMWB utilization) are those used by the Pricing department.

Universal Life

Product Description: When SLIC began selling Universal Life in 2004, the company sold a mix of various UL products, with 4% guarantees, which were common at that time. Some of those products are still in force.

The company's current universal life offerings consist of two different products:

The Saver Supreme product is designed to accumulate high cash surrender values relative to the death benefit over time and guarantees its investment performance at 3% per year. The Protector Plus product is designed for the consumer who wants death benefit protection at the lowest possible premium; it guarantees that the policy will stay in force if the specified premium is paid each year. Both products are surrenderable.

SLIC currently supports these products with investment grade corporate bonds and U.S. Treasuries, targeting a 2% spread.

Current Issues: The administrative system needs additional programming to handle some product features that are now available to the policyholder. To date these features selections have been tracked manually through electronic notes in the policy file.

The company is behind its competitors in handling admin processes for the UL product. Other companies have either made the difficult decision to invest in new systems or, in some cases, have entered into relationships with administrative services companies.

Experience:

SLIC has not yet implemented a separate mortality study for its UL product. Instead, SLIC bases its UL mortality assumption for all modeling applications on the Secure Term mortality experience studies, since both products have the same risk class structure and underwriting criteria.

SLIC's lapse study on the UL product is fairly comprehensive, reflecting the surrender charge period and the dynamic impacts of crediting rates. It includes the last five years of lapse experience and is updated semi-annually by Pricing, which then systematically distributes these reports to all other modeling groups.

The UL product is not currently reinsured.

Single Premium Immediate Annuity

Product Description: The SPIA product is available as a straight life-only annuity (75% of portfolio by reserve) and as a period certain annuity, with annuitant-specified certain periods up to 20 years. Neither product version has a death benefit or a surrender benefit.

Experience: Recent mortality studies have shown mortality about equal to what was expected in pricing. However, mortality seems to be improving faster than expected.

SLIC's pricing mortality assumption is based on Pricing's annual experience study spanning the last two years of experience. Pricing makes this study available to the other modeling groups upon request. The mortality improvement assumption for all modeling applications is based on industry experience as released in a study performed by a large consulting firm two years ago. A more recent study received a few weeks ago showed an uptick in mortality improvement at older ages, which SLIC has not yet reflected in pricing.

Market Position and Investment Strategy: The product is selling well, but the changing interest rate environment has significantly reduced SLIC's pricing advantage. Traditionally, assets supporting this block have been high quality long term corporate bonds and treasuries. However, in response to the recent economic environment, higher yielding investments have been considered to help meet the desired profit margin. Potential new investments include real estate, domestic private equity and emerging markets common equity. To further expand the available universe of assets, synthetic securities may be used to efficiently replicate cash flows of desired risky assets (e.g., replicating an unavailable convertible bond of a specific issuer by purchasing a corporate bond plus a long-term call option on that issuer's stock). In addition, financial contracts may be used to meet our risk management objectives by customizing the terms and obligations of these investments. Examples of such financial contracts include swaps, options, futures, and forwards.

3.3 AHA Report to Corporate

Note to File with respect to AHA's report, from Jean Manx, Lyon Risk Manager:

Because Lyon management has little experience with health insurance, the company has been content to allow the AHA management a great deal of autonomy. AHA feels this arrangement has continued to work well and AHA objected to any additional oversight by Corporate. AHA was reluctant to provide a very thorough report to Lyon, but eventually submitted the following.

Company Summary

AHA Health Insurance Company (AHA) is a national insurance company located in California with its home office in Los Angeles. AHA is wholly owned by Lyon Corporation. AHA sells individual and group health insurance.

Management / Culture

AHA management tends to be aggressive and willing to take risks. The company is aware of the Lyon mandate to name a CRO but has failed to hire one to this point. It is a general belief among AHA management that a CRO will obstruct the company's currently aggressive underwriting practices and sales mentality.

AHA's management team has a generous incentive plan. The incentive compensation plan criteria include sales, membership growth, and quality of care. AHA's plan covers management staff from top management to frontline management. The goal is to have all management focused on the key drivers of success.

AHA is also implementing a set of contingent compensation agreements for its brokers.

Products

AHA sells individual, small group, and large group health insurance in California and 14 other states. Products are sold primarily by brokers, who maintain a relationship with AHA.

AHA's health insurance policies include comprehensive major medical coverage of hospital services, physician services, and prescription drugs. In addition, the group policies may include dental coverage. Dental is offered as an additional benefit attached to the medical policies.

Provider Networks & Medical Management

AHA has staff that negotiates with physician and monitors hospital providers in each state in which it is licensed. One of its largest providers is NCHS, a community health system located in northern California. AHA also has contracts with three national vendors:

- Networks 'R Us provider networks when members need services outside of states in which AHA is licensed
- Carefree Rx, a nationwide drug plan, to manage and administer its prescription drug coverage
- Painless Dental to manage and administer its dental plans.

AHA's centralized medical management staff administers its medical management policies consistently in all states in which it is licensed. AHA's staff continually reviews and revises these policies to keep costs down and to keep up with the latest developments. Its three national vendors work with AHA to make sure their medical management policies do not conflict with those of AHA.

Operations

AHA has a claims system developed and maintained by a well-respected national vendor. AHA maintains a close relationship with this vendor to make sure that the system meets all of its needs. AHA's claim department has experienced turnover due to the recent pandemic, resulting in lower staff levels than desired and more inexperienced and untrained staff.

AHA uses credibility rating to underwrite large group business coverage. While the underwriting decision is systematically determined in most cases, Jose Gambas, the Senior Pricing Actuary, makes the ultimate underwriting decision for the largest cases, relying on his extensive experience in the industry.

AHA captures claims experience at a granular level, allowing for quick updates to pricing, repricing, and forecasting assumptions based on the regular monitoring of active claims. In addition, the data are used for research, ad hoc financial analyses, group reporting, and financial reporting. In fact, the group reports have proved helpful in showing groups how to lower their costs.

Risk Management

AHA has never had a CRO. The company has a risk committee with limited scope and authority that reacts to emerging risk as necessary, and different senior managers take on a CRO role as needed.

The risk committee issues reports as deemed necessary to affected Departments. Risks are managed in silos, relying on the expertise within each Department.

AHA currently targets holding capital at 600% of Authorized Control Level RBC (300% of Company Action Level RBC). Surplus in excess of 700% of Authorized Control Level RBC (350% of Company Action Level RBC) is distributed annually to Lyon Corporation through a dividend paid in cash at the end of the first quarter based on the year-end balance sheet. Surplus positions less than 500% of Authorized Control Level RBC (250% of Company Action Level RBC) are considered deficient and result in a request for a capital contribution from Lyon Corporate.

Acquisitions

AHA management is open to acquisition opportunities and is currently looking into one of two possible acquisition targets.

The primary target for purchase is Eureka Insurance Company (Eureka), a health insurance company domiciled in New York. The driving force behind this acquisition would be to help AHA enter a new market without needing to build a lot of infrastructure. Initially, Eureka management would remain in place to run the company and integration would proceed over several years. AHA management is putting together a due diligence team including staff from AHA finance, actuarial, marketing, and medical management.

Alternatively, AHA is considering the purchase of Columbia, a New York LTC insurer. Columbia is active in most U.S. states.

3.4 Pryde Property & Casualty Report to Corporate

Company Summary

Pryde P&C is an Omaha, Nebraska-based U.S. general insurer writing commercial lines of business. Pryde's two products are commercial multiple peril and workers compensation. It is 100% owned by Lyon Corporation.

Pryde is licensed in all 50 states and the District of Columbia. Pryde's business is geographically spread throughout the United States with its largest state (California) representing 17% of total premium volume. The next largest states include Texas, (6.0%); Georgia (5.5 %); Florida (5.4%); and Mississippi (5.3%), all of which are in the area of the U.S. most prone to hurricanes. The 46 other jurisdictions constitute 61.3% of the total business, with no single state having a share greater than 5%.

Commercial Multiple Peril

Pryde sells a range of commercial multi-peril insurance policies. The policies cover various types of business risk, such as, business interruption, risks to mechanical equipment, physical damage to business facilities and automobiles, and general liability. Pryde is willing to work with customers to offer unusual coverages, as requested, and to bundle coverages in whatever combinations the client requests. The lack of standardization in the policies has made it difficulty to analyze the experience of this product accurately.

Over the past two years, the marketing area has pushed for innovative underwriting approaches that better recognize each individual client's risk and for new product features that are quite attractive to Pryde's potential customers.

Workers Compensation

Pryde's Workers Compensation policies provide typical coverage of medical expenses and loss of salary due to work-related injuries. Pryde's stated target market is upscale, low-risk companies. However, the actual mix of business has gradually trended toward a higher percentage of industrial enterprises. Pryde uses a simplified pricing model that does not distinguish between the type of company in setting premium rates. Furthermore, Pryde has not conducted formal experience studies focusing on whether the experience of these two types of customers is materially different.

Catastrophe Exposure

The group's primary catastrophe exposure stems from hurricanes and earthquakes. However, the risk of wildfires in California has also been increasing over the past several years.

The hurricane and earthquake exposures are mitigated through excess of loss reinsurance, as well as catastrophe protection that has enabled the group to improve its net catastrophe leverage to a very manageable level. As a result, the group's estimated net probable maximum losses (PML) stemming from a combined 1-in-250-year hurricane and a 1-in-250-year earthquake depicted in a PML analysis represents approximately 5% of statutory capital and surplus.

Pryde reinsures with high-quality reinsurers with credit ratings of A or higher.

<u>Production and Operations</u>

Business is produced primarily through wholesale and retail agents on a national basis. Customer service is highly rated as evidenced in consistently high customer retention levels.

Pryde maintains its claims operations and client service in-house. It utilizes legacy computer systems to process data. These systems were developed prior to Pryde's acquisition by Lyon Corporation and have continued to be maintained by the company's internal information technology department. Pryde believes that its long-standing personalized processes provide the best service to its clients.

Pryde monitors underwriting performance using ultimate claim losses by accident year. Ultimate losses include claim amounts paid, claim adjuster estimates of case reserves, and incurred but not reported (IBNR) loss estimates. Accident year data reflect losses for claims that occurred in the twelve-month period containing the date of accident of the claim.

ERM Framework

Pryde has an ERM Committee that meets quarterly, chaired by the Company's Chief Risk Officer. Committee membership includes senior management and key risk owners. Key risk owners are company experts who understand the nature of specific leading risks for Pryde. The ERM team interviews risk owners each quarter to aid the team in the process of identifying and managing risks. Risk surveys are used to identify risks and opportunities for each unit and the company.

Pryde has a Risk Appetite statement including risk preferences, tolerances, and limits for the enterprise overall and for leading risks including strategy, operational, and financial risks. The risk tolerances and limits are reviewed quarterly, and breaches are reported to the ERM Committee each quarter. The ERM team follows up on risk tolerance breaches to understand the nature of the breach and develop a plan to manage the risk to be within the tolerance.

Key risks for Pryde are

- Strategic risk
- Operational risk
- Reserve risk
- Pricing risk
- Growth risk
- Catastrophe risk
- Investment risk
- Liquidity risk
- Reinsurance Credit risk

Pryde performs stress testing on each key risk using a 5-year financial plan as the base case. Stress tests are defined as 1 in 10 year, 1 in 100 year, and 1 in 250 year events.

3.5 Helios

Helios Life is located in Triangle City, Atlantis, a jurisdiction that uses the Euro as its currency. It is 100% owned by Lyon Corporation. Helios offers life insurance, disability insurance, and a combination illness/disability/life insurance product.

Helios was acquired by Lyon Corporation in 2020. It was hoped that Helios would be a strategic entry into more global markets though Lyon has not as yet devoted much time to developing Helios.

To date, Helios has provided steady profits. Helios reports earning on an IFRS basis. Earnings are translated to a U.S. GAAP dollar basis for reporting Lyon's consolidated financial statements. Lyon has allowed earnings to be retained within Helios to date but is now considering taking a dividend from Helios to provide Lyon with additional financial flexibility.

4 Lyon Operations

4.1 Corporate Financial Statements

Memorandum to Lyon Senior Management

Date: February 27, 2023

Subject: Corporate Financial Statements

Please find below the Corporation's financial statements, as recently completed for year-end 2022.

The current year financial statements are provided for Lyon Corporation on a consolidated basis, and multi-year summary statements are provided for each of the subsidiaries. In the subsidiary statements, 2021 and 2022 are actual results; 2023–2025 are projections.

Lyon Consolidated 2022 Statements

2022 FINANCIAL STATEMENTS	SLIC	AHA	Pryde	Helios	Lyon Corporate *	Combined Financials
Income Statement (000s)						
Premiums & Policy Fees	952,071	6,088,018	810,608	166,675	0	8,017,372
Investment Income	291,724	47,261	51,599	89,947	14,115	494,646
TOTAL REVENUE	**1,243,795**	**6,135,279**	**862,207**	**256,622**	**14,115**	**8,512,018**
Property and casualty losses and loss expense	0	0	618,908	0	0	618,908
Life, accident and health benefits	551,815	4,997,155	0	114,655	0	5,663,625
Other expenses	609,644	877,547	209,158	118,026	5,281	1,819,656
TOTAL EXPENSES	**1,161,459**	**5,874,702**	**828,066**	**232,681**	**5,281**	**8,102,189**
Income Before Income Tax	82,336	260,577	34,141	23,941	8,834	409,829
Income Tax	23,054	72,962	8,535	5,253	2,385	112,189
Net Income	59,282	187,615	25,606	18,688	6,449	297,640
Balance Sheet (000s)						
General account assets	4,772,644	2,854,213	3,550,518	1,581,999	334,366	13,093,740
Separate account assets	1,490,165	0	0	0	0	1,490,165
Total Assets	**6,262,809**	**2,854,213**	**3,550,518**	**1,581,999**	**334,366**	**14,583,905**
Property and casualty loss and other liabilities	0	0	2,494,956	0	0	2,494,956
Separate account liabilities	1,490,165	0	0	0	0	1,490,165
Future policy benefits and claims, other liabilities	4,246,600	1,016,699	0	1,397,199	0	6,660,498
Other liabilities	0	0	0	0	52,235	52,235
Total Liabilities	**5,736,765**	**1,016,699**	**2,494,956**	**1,397,199**	**52,235**	**10,697,854**
Surplus	**526,044**	**1,837,514**	**1,055,562**	**184,799**	**282,130**	**3,886,049**
RBC Ratio**	421%	700%	400%			
Total Liabilities and Surplus	**6,262,809**	**2,854,213**	**3,550,518**	**1,581,999**	**334,366**	**14,583,905**
Additional Balance Sheet Information						
Dividend/Capital Transfer from/(to) Lyon	(12,166)	0	(59,011)	0	71,177	0
Economic Capital						
Required Economic Capital	459,659	1,934,409	918,978	170,109	27,752	3,510,907
Excess Capital	(184,701)	208,332	195,029	63,810	265,099	547,569
Avalable Economic Capital	**274,958**	**2,142,741**	**1,114,007**	**233,919**	**292,851**	**4,058,476**

* Excluding investments in subsidiaries

** RBC Ratio reduced by any dividend to Lyon paid in following year

Note: Lyon and Pryde use Company Action Level RBC; AHA uses Authorized Control Level RBC

SLIC Financial Statements

TOTAL	2021	2022	2023	2024	2025
Statutory Income Statement (000s)					
Premiums & Policy Fees	1,410,009	1,519,039	1,643,355	1,782,693	1,938,875
Ceded Premiums	(516,395)	(566,968)	(624,848)	(691,301)	(767,773)
Net Investment Income	268,098	291,724	327,704	354,581	389,062
Total Revenue	**1,161,712**	**1,243,795**	**1,346,211**	**1,445,973**	**1,560,164**
Surrender & Annuity Benefits	121,968	129,817	142,298	156,458	170,386
Death Benefits	759,713	788,085	825,368	909,929	1,007,129
Ceded Benefits	(344,159)	(366,087)	(386,952)	(430,343)	(481,103)
Increase in Net Reserves	284,430	318,976	354,433	375,705	400,556
Expenses	164,273	177,386	190,710	205,987	223,592
Net Transfers to/(from) Separate Account	117,154	113,282	105,428	96,728	87,095
Total Benefits & Expenses	**1,103,379**	**1,161,459**	**1,231,285**	**1,314,464**	**1,407,655**
Income Before Income Tax	58,333	82,336	114,926	131,509	152,509
Federal Income Tax	16,333	23,054	32,179	36,823	42,703
Net Income	**42,000**	**59,282**	**82,747**	**94,686**	**109,806**
Statutory Balance Sheet (000s)					
General account assets	4,406,552	4,772,644	5,209,822	5,680,215	6,067,010
Separate account assets	1,376,883	1,490,165	1,737,491	1,997,444	2,270,171
Total Assets	**5,783,435**	**6,262,809**	**6,947,313**	**7,677,659**	**8,337,181**
Net General Account Reserve Liabilities	3,927,624	4,246,600	4,601,031	4,976,738	5,377,293
Separate Account Liabilities	1,376,883	1,490,165	1,737,491	1,997,444	2,270,171
Total Liabilities	**5,304,507**	**5,736,765**	**6,338,522**	**6,974,182**	**7,647,464**
Surplus	**478,928**	**526,044**	**608,791**	**703,477**	**689,717**
RBC Ratio	409%	421%	453%	400%	400%
Total Liabilities and Surplus	**5,783,435**	**6,262,809**	**6,947,313**	**7,677,659**	**8,337,181**
Additional Balance Sheet Information					
Dividend/Capital Transfer (to)/from Lyon	(18,591)	(12,166)	0	0	(123,566)
Economic Capital Balance Sheet (000s)					
Market Value of Assets	**6,026,339**	**6,262,809**	**7,086,259**	**8,023,154**	**8,712,354**
Economic Reserve	5,553,124	5,987,851	6,611,722	7,262,353	7,948,054
Required Economic Capital	419,136	459,659	493,958	531,595	564,318
Excess Capital	54,079	(184,701)	(19,421)	229,206	199,982
Total Liabilities and Surplus	**6,026,339**	**6,262,809**	**7,086,259**	**8,023,154**	**8,712,354**

* RBC Ratio reduced by any dividend to Lyon paid in following year

AHA Financial Statements

TOTAL	2021	2022	2023	2024	2025
Statutory Income Statement (000s)					
Earned Premiums	5,609,546	6,088,018	6,700,167	7,286,846	7,800,484
Health benefits	4,604,397	4,997,155	5,450,498	5,873,053	6,257,843
General expenses	844,394	877,547	933,996	947,394	975,021
Total Expenses	**5,448,791**	**5,874,702**	**6,384,494**	**6,820,447**	**7,232,864**
Investment Income	**45,676**	**47,261**	**56,257**	**65,294**	**76,205**
Income Before Income Tax	**206,431**	**260,577**	**371,930**	**531,693**	**643,825**
Federal Income Tax	**57,801**	**72,962**	**104,140**	**148,874**	**180,271**
Net Income	**148,630**	**187,615**	**267,790**	**382,819**	**463,554**
Statutory Balance Sheet (000s)					
Total Assets	**2,578,278**	**2,854,213**	**3,188,157**	**3,586,130**	**3,936,276**
Liability for unpaid claims and claim adjustment expenses	603,026	669,682	737,018	801,553	858,053
Other Liabilities	325,353	347,017	381,910	415,350	444,627
Total Liabilities	**928,379**	**1,016,699**	**1,118,928**	**1,216,903**	**1,302,680**
Surplus	**1,649,899**	**1,837,514**	**2,069,229**	**2,369,227**	**2,633,596**
RBC Ratio	697%	700%	700%	700%	700%
Total Liabilities and Surplus	**2,578,278**	**2,854,213**	**3,188,157**	**3,586,130**	**3,936,276**
Additional Balance Sheet Information					
Surplus Transfer from/(to) Corporate	0	0	0	0	0
Dividend/Capital Transfer (to)/from Lyon	0	0	(36,075)	(82,821)	(199,185)
Economic Capital Balance Sheet (000s)					
Market Value of Assets	**3,129,837**	**3,465,470**	**3,874,142**	**4,350,754**	**4,770,905**
Economic Reserve	1,204,041	1,322,730	1,460,379	1,592,967	1,710,671
Required Economic Capital	1,735,925	1,934,409	2,182,401	2,497,485	2,775,590
Excess Capital	189,872	208,332	231,362	260,303	284,643
Total Liabilities and Surplus	**3,129,838**	**3,465,471**	**3,874,142**	**4,350,755**	**4,770,904**

* RBC Ratio reduced by any dividend to Lyon paid in following year

Pryde Financial Statements

TOTAL	2021	2022	2023	2024	2025
Statutory Income Statement (000s)					
Underwriting Income					
Premiums earned	828,134	810,608	793,639	813,480	833,817
Losses and loss adjustment expenses incurred	539,498	618,908	570,399	577,296	583,769
Expenses	**227,891**	**209,158**	**210,653**	**211,782**	**212,837**
Net Underwriting Gain (loss)	**60,745**	**(17,458)**	**12,587**	**24,402**	**37,211**
Investment Income	**52,431**	**51,599**	**56,327**	**60,341**	**63,435**
Income Before Income Tax	**113,176**	**34,141**	**68,914**	**84,743**	**100,646**
Federal Income Tax	**28,294**	**8,535**	**17,229**	**21,186**	**25,162**
Net Income	**84,882**	**25,606**	**51,686**	**63,557**	**75,485**
Statutory Balance Sheet (000s)					
Total Assets	**3,495,384**	**3,550,518**	**3,717,339**	**3,746,342**	**3,815,299**
Losses and loss adjustment expenses	1,749,914	1,882,776	2,027,131	2,047,013	2,065,800
Unearned Premium	418,688	391,920	401,719	411,761	422,056
Other Liabilities	237,815	220,260	228,979	234,704	240,571
Total Liabilities	**2,406,417**	**2,494,956**	**2,657,829**	**2,693,478**	**2,728,427**
Surplus	**1,088,967**	**1,055,562**	**1,059,510**	**1,052,864**	**1,086,872**
RBC Ratio*	**400%**	**400%**	**400%**	**400%**	**400%**
Total Liabilities and Surplus	**3,495,384**	**3,550,518**	**3,717,339**	**3,746,342**	**3,815,299**
Additional Balance Sheet Information					
Surplus Transfer from/(to) Corporate	0	0	0	0	0
Dividend/Capital Transfer (to)/from Lyon	(36,424)	(59,011)	(47,737)	(70,204)	(41,476)
Economic Capital Balance Sheet (000s)					
Market Value of Assets	**3,438,818**	**3,508,333**	**3,672,238**	**3,726,967**	**3,804,528**
Economic Reserve	2,300,292	2,394,326	2,561,508	2,606,581	2,651,260
Required Economic Capital	932,852	918,978	908,082	930,570	956,562
Excess Capital	205,674	195,029	202,648	189,816	196,706
Total Liabilities and Surplus	**3,438,818**	**3,508,333**	**3,672,238**	**3,726,967**	**3,804,528**

* RBC Ratio reduced by any dividend to Lyon paid in following year

4.2 Credit Ratings

Lyon Corporation is preparing for a financial strength rating review by Kelly Rating Agency, an internationally recognized rating agency. Kelly has previously focused on its ratings of stand-alone insurance companies, such as SLIC, AHA, and Pryde, but beginning last year required that insurance groups be rated in aggregate for the group. Lyon Corporation received a financial strength rating of A (Excellent) from Kelly for the insurance group. The rating reflects the sufficient capital position of SLIC, Lyon's initiatives to implement ERM practices across the group, and Lyon's overall positive financial results. Lyon's debt rating is BBB. The individual insurance companies, SLIC, AHA Health, and Pryde P&C strive to maintain AA Kelly ratings.

During its review last year, Kelly identified several issues that it expects Lyon to address before the next review, scheduled for later this year. Correspondence related to the prior review and Kelly's most recent rating report are provided starting on the following page.

Kelly Ratings & Analysis - **When it comes to ratings, clearly you need Kelly**

1 Kelly Drive, Capital City ph 123/555-6500

February 10, 2023
R. Tomas Lyon III
Lyon Corporation

Dear Mr. Lyon:

It is time once again for Kelly Ratings & Analysis' annual review of Lyon Corporation. I will call you next week to set up a date. Ideally, Paula Silver, Director of our Financial Services Practice, and I would like to meet with Lyon Corporation sometime in early April. As in past years, we will come to your offices for a day of meetings with your senior management team. Count on the presentation from Lyon Corporation taking the first half of the meeting; the second half will be a free form Q&A with your management. We can finalize the agenda during next week's call.

Attached is Kelly's rating rationale from last year. Due to last year being the initial group-level review and the lack of available group financial data, the rationale was based primarily on our qualitative assessment of the group and its component companies. Please look through this document and make note of any aspects that you wish to discuss. In addition, we will need your 2022 financial information. I would like to receive that in advance of our meeting.

I want to remind you: since last year was the first year for a group-level rating review, our Kelly Financial Wherewithal Rating™ (commonly known as the "Kelly Rating") was not publicly disclosed. It was intended to help you understand our group assessment criteria and how Lyon Corporation would be evaluated, so you would have an opportunity to improve any deficient processes before this year's public rating. The financial strength rating determined for Lyon Corporation last year was **A**.

Evaluating implementation and effectiveness of insurers' ERM processes has become an increasingly important part of Kelly's evaluation and rating of insurer's financial strength. We acknowledge the progress Lyon has made toward building an effective ERM framework, and during this year's annual review we would like to discuss with management your progress in several areas: ERM culture and policies, risk governance, risk control and mitigation processes, strategic risk management, and management of specific risks (e.g., ALM, credit risk, liquidity risk, operational risk, business continuity).

Sincerely,

Otto Gold
Director, Financial Services Rating Bureau

LYON CORPORATION

2021 Kelly Financial Wherewithal Rating™ - Group Level

Based on our opinion of the company's financial strength, it is assigned a **Kelly Financial Wherewithal Rating™ of A**(Excellent). The company's Financial Size Category is Class VIII.

Rating Rationale

Rating Rationale: The financial strength rating for Lyon Corporation reflects the company's strong capital position, reasonable operating performance and the long-term stability of its management. However, profitability has not been as strong as its rating peers, and Lyon Corporation will continue to face challenges as a public company.

Rating History

No history – Initial Group Rating

Business Review

Lyon Corporation began operations in 1908. For most of its history, it has been controlled by the Lyon family. R. Tomas Lyon III is its fourth-generation leader.

Lyon Corporation began as a life insurance company selling innovative term life insurance at very aggressive rates. That continues to be a hallmark of the company today.

The company began to broaden its scope in the 1990's by offering public stock. The Lyon Family originally maintained a majority ownership of the company but has subsequently divested a substantial portion of its shares. The Lyon Corporation is now 30% privately held by the Lyon Family. A holding company structure was put in place. The original life insurance company became Simple Life (SLIC), owned 100% by Lyon Corporation. The Corporation also acquired a health insurance company, AHA Health, early in 2005 and a property and casualty company, Pryde P&C, in 2010. Lyon Corporation became an international group in 2020 with the acquisition of Atlantis-based Helios Insurance Company. All of the subsidiaries are owned 100% by Lyon Corporation.

SLIC has significantly increased its product offerings beyond term insurance and now has a growing SPIA line of business, as well as universal life and variable annuities. However, all of the SLIC products face competitive pressures and likely will require updated features and pricing.

AHA has provided solid results and takes a proactive approach to the health market.

Pryde has made significant improvements to its ERM process that should help protect the company's capital adequacy and reduce earnings volatility.

Helios has shown steady profitability and has provided a reasonable means for Lyon Corporation to gain international experience on a small scale.

Investment operations have not performed especially well on a risk-adjusted basis, and there is some concern if the low interest rate environment persists.

After several years of sluggish growth, Lyon Corporation has set some very aggressive growth targets for the future. The company appears to have the capital to fund this growth internally; however, the plan to actually achieve sales at these levels remains unclear.

Earnings

Lyon Corporation's earnings have benefited over the years from solid product profitability in most lines of business. We expect product earnings to decline in the future as the company attempts to grow its business in a very competitive market. The current low interest rate environment will also continue to put pressure on earnings.

Profitability Analysis

(in millions of dollars)

Net Op Gain	2018	2019	2020	2021
SLIC	44.8	62.8	53.8	44.3
AHA	165.9	155.9	234.9	148.9
Pryde	49.8	32.6	59.0	72.5
Other	12.2	13.8	14.0	14.2
Total	272.7	265.1	361.6	279.9

* Net Op Gain excludes non-business-related impacts in Net Income, such as realized capital gains and losses.

Capitalization

Capital and surplus within the subsidiaries are quite strong, totaling $3.2 billion. It appears that the company's excess capital could be deployed more effectively to increase earnings and returns for shareholders. The company's growth strategy may be a means to accomplish this, if implemented appropriately.

We note Lyon Corporation's group-wide ERM initiatives, including efforts to implement economic capital as a measurement tool. We believe this is a strong step in strategically understanding the true underlying risks and risk correlations of the business. We hope to see continued progress across this initiative as it evolves.

We also note that the company continues to operate with minimal long-term debt. While this capital structure can be appropriate for a corporation, in our opinion, Lyon Corporation has not done any evaluation to justify that this is the best structure for the company.

Investments and Liquidity

Lyon Corporation maintains a conservative investment portfolio, based primarily on high-quality investment grade corporates and Treasuries. As a result, default experience in the fixed income portfolio has been very good and can be viewed as much better than insurance industry averages over the most recent years. The portfolio has also provided sufficient liquidity.

We understand that Lyon Corporation is exploring the possibility of moving to more aggressive portfolios for select lines of business by adding high yield and BBB-rated debt securities, as well as equities. This is an area that Kelly will continue to monitor.

Officers

Chairman (Lyon Corporation); Chairman and CEO (SLIC) -- R. Tomas Lyon III
Deputy Chairman of the Board, Co-CEO (Lyon Corporation) – Andrew Lyon
Co-CEO (Lyon Corporation) – Patrick Lyon
Chairman and CEO (AHA Health) – Dr. Jerry Graham
CEO (Pryde) – Ebony James

For information, we include the following summary of the stand-alone ratings of the Lyon subsidiary companies:

SLIC – The most recent rating, determined in 2022, was AA, reflecting the company's diverse product offerings, moderately strong competitive position, and appropriate risk management processes. Offsetting these positive factors are concerns about increased competitive pressures, which may reduce future profitability.

AHA – The most recent rating, determined in 2022, was A, reflecting the company's proactive positioning in the health market and aggressive pursuit of growth through sales and potential acquisitions. However, Kelly has concerns about the level of risk that may result from AHA's strategies.

Pryde – The most recent rating, determined in 2021, was A-, reflecting the company's adequate capitalization and its nationally recognized position in its core businesses. Partially offsetting these positive factors are the company's significant adverse reserve development on prior accident years, its dependence on reinsurance, and inconsistent operating results.

4.3 Lyon Acquisition Activity

Lyon has grown from a simple life insurance company to a multi-line, multi-national insurer through acquisition. It continues to seek out appropriate acquisitions as a means of growth.

Following are potential acquisition targets that Lyon is considering:

1) Single Premium Deferred Annuity (SPDA) writer that has a strong sales-oriented culture

2) Larger block of Single Premium Immediate Annuity (SPIA) business to manage in combination with its small existing block

3) Reinsurer, to allow for both expansion to a new market and the offering of reinsurance solutions to existing subsidiaries

4) Writer of institutional insurance / asset management business

5) Canadian company to increase its presence internationally with moderate risk

6) European insurer to develop a presence in one of the largest insurance markets

Information for three of the potential acquisitions has been gathered for review:

Target 1: SPDA Writer

AnnCo is a single-line U.S. company, which sells only fixed SPDAs. The product that is currently being sold is a multi-year guaranteed annuity with 5, 7, or 10-year interest rate guarantees, based on current interest rates, and a market value adjustment (MVA) on withdrawal before the end of the guarantee period. After the guarantee period there is an underlying minimum guarantee rate of 0.25%. It has been noted that most annuitants lapse at the end of the initial interest rate guarantee period.

Reserves for the current product total about $1 billion. The investment portfolio supporting the product is somewhat aggressive in order to support competitive rate guarantees. It includes a mix of private equity, asset-backed securities, and high-yield bonds, along with traditional fixed income securities.

AnnCo also has a legacy block of SPDAs with $400 million in reserves. These legacy SPDAs were sold in the 1990s, with high minimum guaranteed interest rates for the life of the policy. In the current low interest rate environment, all policies are being credited at the guaranteed rate. This block has not met its original profit objectives. These annuities have been in force long enough that there are no remaining surrender charges; therefore, the account value is available for withdrawal without a market value adjustment at any time.

AnnCo's culture emphasizes sales over any other objectives. The SPDAs are sold through independent agents and other financial advisors. Sales have grown by 10% per year for the past three years.

Lyon's life insurance subsidiary, SLIC, is considering two options for acquiring AnnCo:

(1) Acquiring only the $400 million legacy block
(2) Acquiring the entire company

SLIC is currently pricing the transaction to return 10% on invested capital.

Target 2: SPIA Writer

This block of business is being sold because the current company wants to get out of the market. In recent years the company has faced a significant amount of competition and was able to increase sales in 2022 only by changing its investment strategy in order to obtain a higher yield.

SPIA	2018	2019	2020	2021	2022
Statutory Income Statement (000s)					
Premiums & Policy Fees	80,888	82,829	28,266	43,398	88,830
Ceded Premiums					
Net Investment Income	50,584	56,894	59,897	63,338	66,784
Total Revenue	**131,472**	**139,723**	**88,163**	**106,736**	**155,614**
Surrender & Annuity Benefits	54,288	58,648	63,029	67,424	71,820
Death Benefits	-	-	-	-	-
Ceded Benefits	-	-	-	-	-
Increase in Net Reserves	55,130	54,803	27,238	27,077	53,845
Expenses	20,934	25,452	30,121	34,945	39,928
Net Transfers to/(from) Separate Account	-	-	-	-	-
Total Benefits & Expenses	**130,352**	**138,902**	**120,388**	**129,447**	**165,593**
Income Before Income Tax	1,120	821	(32,225)	(22,711)	(9,979)
Federal Income Tax	392	287	(11,279)	(4,769)	(2,096)
Net Income	**728**	**534**	**(20,946)**	**(17,941)**	**(7,884)**
Statutory Balance Sheet (000s)					
General account assets	807,736	865,322	903,527	945,389	998,383
Separate account assets	-	-	-	-	-
Total Assets	**807,736**	**865,322**	**903,527**	**945,389**	**998,383**
Net General Account Reserve Liabilities	768,755	823,462	859,757	899,526	949,870
Separate Account Liabilities	-	-	-	-	-
Total Liabilities	**768,755**	**823,462**	**859,757**	**899,526**	**949,870**
Surplus	**38,981**	**41,860**	**43,770**	**45,863**	**48,513**
Total Liabilities and Surplus	**807,736**	**865,322**	**903,527**	**945,389**	**998,383**
Economic Capital Balance Sheet (000s)					
Market Value of Assets	**1,021,673**	**1,097,889**	**1,149,890**	**1,206,852**	**1,278,398**
Economic Reserve	983,236	1,056,502	1,106,508	1,161,287	1,230,082
Required Economic Capital	38,437	41,387	43,382	45,565	48,317
Free Surplus	-	-	-	-	-
Total Liabilities and Surplus	**1,021,673**	**1,097,889**	**1,149,890**	**1,206,852**	**1,278,398**

Target 3: Reinsurer

MPS Re is a reinsurer based in California, USA. It has been in business for 20 years, reinsuring Personal Property, Personal Auto and Construction Insurance.

The aggregate financials for MPS Re are below.

MPS Re	**2018**	**2019**	**2020**	**2021**	**2022**
Statutory Income Statement (000s)					
Underwriting Income					
Premiums earned	1,189,105	951,288	858,269	884,023	910,543
Losses and loss adjustment expenses incurred	801,288	1,300,000	619,454	639,538	660,224
Expenses	**369,942**	**294,771**	**261,286**	**269,123**	**277,199**
Net Underwriting Gain (loss)	**17,875**	**(643,483)**	**(22,471)**	**(24,638)**	**(26,880)**
Investment Income	**81,508**	**68,075**	**56,821**	**55,804**	**57,481**
Income Before Income Tax	**99,383**	**(575,407)**	**34,350**	**31,166**	**30,601**
Federal Income Tax	**34,784**	**(201,393)**	**12,023**	**6,545**	**6,426**
Net Income	**64,599**	**(374,015)**	**22,328**	**24,621**	**24,175**
Statutory Balance Sheet (000s)					
Total Assets	**2,799,951**	**2,009,647**	**2,006,101**	**2,103,384**	**2,203,738**
Losses and loss adjustment expenses	785,262	1,209,300	619,454	639,538	660,224
Unearned Premium	528,493	422,795	435,480	448,543	462,001
Other Liabilities	300,184	237,610	248,223	255,671	263,339
Total Liabilities	**1,613,940**	**1,869,705**	**1,303,158**	**1,343,752**	**1,385,564**
Surplus	**1,186,011**	**139,943**	**702,943**	**759,633**	**818,174**
Total Liabilities and Surplus	**2,799,951**	**2,009,647**	**2,006,101**	**2,103,384**	**2,203,738**
Economic Capital Balance Sheet (000s)					
Market Value of Assets	**3,007,090**	**2,163,329**	**2,165,032**	**2,275,459**	**2,389,721**
Economic Reserve	1,801,085	1,525,198	1,457,343	1,506,641	1,557,584
Required Economic Capital	270,163	228,780	218,601	225,996	233,638
Free Surplus	935,842	409,351	489,088	542,822	598,499
Total Liabilities and Surplus	**3,007,090**	**2,163,329**	**2,165,032**	**2,275,459**	**2,389,721**

4.4 ORSA

Lyon completes an annual ORSA report, as required by various regulatory authorities. The process for the development of the ORSA involves the following:

- Lyon has a dedicated team whose primary responsibility is completing the ORSA report.
- The team is divided into sub-units, each of which focuses on one of the subsidiaries – SLIC, AHA, Pryde, and Helios. The material used from each subsidiary is based on the processes that the subsidiary already has in place, in order to reduce the amount of additional work required.
- A separate section of the ORSA report is prepared for each subsidiary.
- The consolidated report is submitted to the Board as part of its reading package for the March Board meeting.

The Executive Summary of the most recent report follows:

"Lyon Corporation has carried out an assessment of all of the risks that it believes can materially affect its business. Lyon has determined its capital requirements based on its current business plan to be $3.511 billion as of December 31, 2022. This assessment has been overseen by the Board throughout the process.

"The ORSA process has considered the firm's strategy and business model in light of its business plans, risk tolerances and capital requirements. No immediate changes are proposed in those areas, although several areas for consideration were identified.

"The ORSA process requires that we consider the effectiveness of our risk assessment, risk management, and capital management processes within the firm. Several enhancements have been implemented since the last ORSA report, including the introduction of a Corporate Risk Committee and a Corporate Risk Appetite statement and the establishment of a Chief Risk Officer role at each material entity within the group (though not all positions are currently filled).

"This report which follows is a summary of important results from the ORSA.

Excerpt from the Capital Assessment section of Lyon's ORSA Report:

Lyon determines its capital requirements based on the economic capital process that is already in place within its subsidiary companies.

- *SLIC has an internal economic capital model tailored to its own company-specific risks. Risks are quantified based on a one-year 99.0% VaR measure. The model quantifies exposure to interest rate risk, equity price risk, and credit risk.*
- *AHA uses an internal economic capital model calibrated to an AA financial strength based on Kelly ratings, which is considered equivalent to a one-year 99.0% confidence interval.*
- *Pryde follows a similar approach to AHA.*
- *Helios provides economic capital results based on the requirements of its jurisdiction, Atlantis.*

The ORSA capital requirement for Lyon is equal to the sum of the economic capital requirements reported by the subsidiaries plus a credit risk factor applied to the Lyon Corporate assets.

Excerpts from the Risk Assessment section of Lyon's ORSA Report:

"The acceptance of risk is the primary responsibility of the subsidiary. Risk is first identified, measured and managed at the subsidiary entity level. Diversification across risk types is calculated at the subsidiary level. Risk aggregation to the corporate level is the sum of all subsidiary-level risks by risk category. Lyon Corporation is in process of establishing a risk appetite statement with the intent of constraining specific aggregate risks within acceptable ranges."

"Risks of a less quantifiable nature are currently addressed on an ad hoc basis within each subsidiary's risk management program but are not reflected in their reported economic capital. For instance, while all the subsidiaries recognize that reputational risks arise at both the corporate and subsidiary levels, they believe the impacts to their respective businesses vary significantly. Thus, one subsidiary may only address the risk through risk management processes and controls, while another may explicitly try to estimate it and report it within operational risk economic capital."

4.5 Corporate ERM Department

Memorandum:	To All Lyon and Affiliate Executive Staff
From:	Patrick Lyon, Co-CEO
Subject:	Corporate ERM Department

The Lyon Corporate Enterprise Risk Management (ERM) Department is led by Alex Katz, Lyon's s Chief Risk Officer (CRO). The ERM Department exists within the Treasurer's Division, and Alex reports to Feng Hu, Treasurer. The ERM staff is predominantly made up of actuaries and has expertise in market risk, credit risk, underwriting risk, liquidity risk, and operational risk.

Lyon takes a Three Levels of Defense approach to risk management. The first line of defense lies with the business and process owners who are responsible for maintaining effective internal controls over daily procedures. The second line of defense includes independent risk experts who monitor first line risks and procedures. This line includes the ERM Department and the Compliance Department. The third line of defense, residing with the Internal Audit Department, provides assurance to management and the Board that first and second line efforts are consistent with expectations.

Consistent with the Second Line of Defense, the objectives of the Corporate ERM Department are:

- Establish a consistent ERM process among the Lyon Corporation companies
- Promote a strong risk culture within Lyon Corporation
- Develop a corporate-level Economic Capital modeling process
- Create a risk appetite statement and assess overall risk exposure in relation to risk appetite
- Develop a strategic risk profile in conjunction with the Corporate Strategic Planning Department
- Ensure development of risk remediations for risks exceeding defined limits and tolerances

The ERM Department establishes risk reporting communications that are provided to the management and the Board on a regular basis. The ERM Department has primary responsibility for preparing the communications and reports presented at quarterly Risk Committee meetings. Currently, the Corporate ERM Department regularly gathers subsidiary data and analysis to prepare the following management reports:

- Monthly risk limit report
- Quarterly Risk Dashboard
- Quarterly risk sensitivities (market, credit, underwriting)
- Quarterly market risk summary
- Quarterly credit risk summary
- Quarterly liquidity report
- Quarterly operational risk summary
- Annual ORSA

Economic Capital Modeling

The three affiliated companies have provided information on the status of economic capital modeling within their organizations. The statutory and economic balance sheets for each affiliate are independent of each other. The assets assigned to a line of business on an economic basis may not be the same as the assets assigned on the statutory basis.

SLIC

SLIC has implemented an internal economic capital model tailored to its own company-specific risks. The intent is to quantify the risks to the company's net equity (on a market-consistent basis) using a one-year 99.0% Value at Risk (VaR) measure. The model quantifies exposure to interest rate risk, equity price risk, and credit risk. The model targets a total economic capital level that is calibrated to an AA financial strength based on Kelly ratings.

Stochastic scenario testing is supplemented with deterministic scenario-based stress tests, performed annually. Each test is applied as an instantaneous shock to the economic conditions as of the valuation date. Interest rates have a floor of 0.10%. Interest rates are modeled stochastically using a single-factor model calibrated to monthly historical data for 10-year U.S. Treasury yields since 2002. Equity returns are modeled stochastically using a regime-switching lognormal distribution that is calibrated to thirty years of daily S&P 500 equity index returns.

For term, UL, and SPIA products, a traditional actuarial approach is used to estimate the economic reserves and revalue them under different interest rate scenarios in the VaR calculation.

For the VA and its GMAB and GMWB, the VaR is calculated with liabilities net of hedging assets and derivatives. Implied volatility is derived from current exchange-traded 10-year at-the-money equity puts. As an approximation, the test assumes expiring derivatives can be replaced with current at-the-money instruments.

For credit risk, the model assumes that existing investment grade fixed income assets are sold immediately if they fall below investment grade. Therefore, the company does not quantify the risk of credit default or loss given default. Credit risk is modeled through the stochastic simulation of credit ratings migration. The calibration uses ten years of historical data for corporate bond ratings migrations and yield spreads. Since the company has a general buy and hold investment strategy, credit spreads are only considered to be a risk factor if and when investment grade assets are downgraded below investment grade. SLIC calculates the risk of fluctuations in market value due to credit spread movements in the absence of ratings downgrades but excludes the results since its statutory surplus is based upon asset book value and it has a general buy and hold investment strategy.

For each insurance risk (e.g., mortality, longevity, lapse):

- The economic balance sheet is recalculated using the stressed assumption (with the other risks at the baseline assumptions)

- The required economic capital for that risk equals the decrease in economic surplus as a result of that stress

At this point, the Company does not have an operational risk model and, therefore, operational risk is estimated to be 10% of the fair value of liabilities, whose calculation excludes any provisions for this risk.

Procedurally, the economic capital for each risk is calculated for each line of business; these values are then aggregated for that line of business using a correlation matrix derived from the prior ten years of market movements. All negative correlations are floored at zero. Operational risks are assumed to have zero correlation with other factors. The economic capital for each product line is then summed to get SLIC's total economic capital.

AHA

AHA uses an internal economic capital model. The model targets a total economic capital level that is calibrated to an AA financial strength based on Kelly ratings. AHA defines the model economic capital required as being the capital required to protect AHA's policyholders in order to meet all of their claims with a confidence level of 99.0 percent over a one-year time horizon.

AHA invests in liquid, highly rated bonds with asset/liability matching to support their health liabilities. The investment returns are sufficient to support the company's pricing.

Pryde

The ERM team created an internal economic capital model with help from the actuarial department and outside consultants.

Pryde utilizes a software product called CapitalSim that is a stochastic simulation tool that generates a one-year financial statement. The software has been around for 20 years and has specific application to insurance products.

The Economic Capital balance sheet is based on the market value of assets and liabilities calculated on a GAAP basis rather than a statutory basis. Individual large claims and catastrophe events are simulated by the model and the appropriate reinsurance terms are applied to each event. Lines of business are correlated using a Student's t copula. CapitalSim utilizes a built-in economic scenario generator that provides distributions around interest rates, spreads, inflation, and other economic variables.

Pryde defines required capital as the capital necessary to protect Pryde's policyholders in order to meet all of their claims on a VaR basis with a confidence level of 99.6 percentile over a one-year time horizon. Pryde uses 100,000 simulation results to estimate the amount of required capital.

Pryde allocates capital to lines and products using a Co-TVAR approach on modeled GAAP equity at the 99.0 percentile using the outputs from the economic capital model over a one-year horizon. Return on risk adjusted capital (RORAC) is calculated for each line and product using projected net income after tax divided by the risk capital allocated for each segment.

AHA Memoranda – Economic Capital

Note To: *Neisha Kampango, CFO, AHA*
From: *Laila Lynx, CFO, Lyon*
Date: *August 15, 2022*

Neisha,

I am concerned about the lack of information forthcoming on AHA's economic capital modeling. We need to see that you are taking this issue seriously at AHA; thus, I would like to see a concrete plan for improvement by mid-September.

Best regards,
Laila

Date: August 20, 2022

Subject: Economic Capital Modeling
To: Adele Pike, Valuation Actuary
From: Neisha Kampango, CFO

I'm starting to get pressure from Lyon Corporate to provide them with a more robust description of how we are developing our internal EC model. Ultimately, I think we will need to complete a major overhaul of our EC process.

I would like you to start with the group lines of business and see what we can do to improve the forecasting that is part of the EC. That should be a good first step.

Please have a report for me within the next two weeks.

Strategic Risk Analysis

Risk Appetite

Lyon recognizes that it will take on certain business risks in an informed and proactive manner, such that the level of risk is aligned with its strategic business objectives. Lyon's most important strategic objectives include:

- Maintaining a stable dividend on its stock, which is dependent upon consistent dividends from its subsidiaries
- Maintaining financial flexibility, which is dependent on being able to issue debt at a reasonable cost
- Maintaining positive brand recognition and its current reputation as a responsible corporate citizen

Using these strategic objectives, as well as industry norms, the company has drafted the following risk appetite statement components:

Insurance Risk - Lyon cannot suffer more than a $400 million increase in required Economic Capital for a 1-in-200-year event due to insurance risk.

Liquidity Risk – Lyon needs to maintain a liquidity level to meet payment requirements for a 1-in-200-year event for a continuing period of three months.

Market Risk - Lyon cannot suffer more than a 10% decrease in economic available capital due to market risk for a 1-in-200-year event.

Lyon's risk management process is designed to facilitate management's regular review of current risk exposures against Lyon's risk appetite. Any risk with the potential to have a material impact on shareholder value will be included within the scope of the risk management process. The Board will, on a regular basis, review and approve Lyon's risk appetite.

Cybersecurity

In light of recent highly publicized information security breaches, the Lyon Board has mandated the Corporate ERM Department to implement a cybersecurity program. This initiative is a top priority for senior management, and they have been keen to extend their risk management culture to encompass information security as well.

PRYDE Data Breach – E-mail Correspondence

Date: October 24, 2022

To: Patrick Lyon, Co-CEO
From: Archie Daniels, CFO, Pryde

Patrick,

I felt I should make you aware of a potential problem that's just come up at Pryde. I'm forwarding a copy of the note I just sent to Jane Williams. I'll certainly keep you informed of the steps we're taking to address this.

Sincerely,

Archie

Date: October 24, 2022

Subject: Customer Data Integrity
To: Jane Williams, VP Operations, Pryde
From: Archie Daniels, CFO, Pryde

Jane,

I'm extremely concerned about the data breach that occurred this week in our workers compensation line customer data base. You're aware that there are both serious financial implications for Pryde and sensitive public relations issues as a result.

Your team needs to get on top of this right away –

- What was the cause of this breach?
- How was the problem found?
- What do we need to do at this point to address the immediate problems resulting from the breach?
- How do we mitigate the risk of this situation occurring again in the future?

Business Continuity Planning – E-mail Correspondence

To: R. Tomas Lyon, Chairman
From: Patrick Lyon, Co-CEO

Date: May 25, 2023

Tomas,

You asked me to deal with the request from Kelly Ratings for a copy of our Business Continuity Plan.

As I think you're aware, Lyon Corporation doesn't have a complete plan that covers all of our subsidiaries. But I talked with Ted Gato in our IT department to see what they have in place. He said that they have nightly backups of all our electronic data, so if something happened to our system, they could get our data restored without losing more than one day of work. We've also contracted recently with DataShield to protect us against cybersecurity attacks.

I'm including with this note a memo from Ted that provides more details.

In summary, I think we're in pretty good shape! We'll just write something up for Kelly Ratings.

Patrick

Forwarding e-mail from Lyon IT Department

To: Patrick Lyon, Co-CEO
From: Ted Gato, Head of IT

Date: May 20, 2023

The IT department has a disaster recovery plan in place that addresses technical recovery actions to be taken in the event of a significant disruption.

Our recovery plan addresses damage (physical or electronic) to the following areas:

- Computer room environment – includes routers, firewalls, network switches, cabling panels, servers, and network storage
- Office hardware – desktops, laptops, peripherals, and printers
- Connectivity – to external service providers for internet and communication systems
- Software applications – business systems, email, and office productivity
- Database systems – supporting business systems and reporting functions

We maintain a systems inventory of both software and hardware for all departments and employees to facilitate the recovery process.

In the event of wide-spread damage to the corporate office's physical space, we have space available to us at SLIC's offices across town. We have enough extra desktop computers stored there for use by key employees to continue our core operations for a brief period of time, as well as a handful of laptops we could provide. Obviously, there isn't enough space or equipment for all of our employees there, but it is enough for one or two from each department.

SLIC Accelerated Underwriting – E-mail Correspondence

From: William Xu, SVP, SLIC
To: Henri Jay, EVP, SLIC

Date: November 15, 2022

I was thinking about adding an Accelerated Underwriting (AUW) term product to our term product line-up. AUW appeals to many potential clients by making it easier for folks in good health and with strong credit to obtain term life insurance, without having to go through the hassle of invasive UW techniques or the delays in receiving doctor statements and medical tests. AUW is a very popular product in the industry right now.

We can leverage our simplified issue (SI) underwriting infrastructure and obtain the data needed (for example, credit scores, driving record, and so on) to determine if the AUW policy can be issued, or if a fully underwritten (FUW) application is required, or if the application needs to be rejected.

I expect our underwriting system to be robust, and as such, do not expect to have to limit the death benefit requested. However, to be safe, we may want to find a reinsurance partner to cover the excess of our desired retention level.

I'd appreciate your thoughts on this approach.

Sincerely,

William

Operational Risk Measurement Refinement Initiative – E-mail Correspondence

Date: March 25, 2023
To: Pierre LeGrouse, CFO, SLIC
From: Jamal Robinson, VP and Actuary – Operational Risk Management
Subject: Op Risk Measurement Refinement

I have started a project to investigate holding operational risk economic capital calculated based on first principles, instead of our current approach of holding 10% of the fair value of liabilities. I feel that our current approach leads to an overly conservative amount that can be justifiably reduced with a more accurate calculation.

That means we need to be able to model both frequency and severity for potential operational risk events. I suggest that we start by developing capital calculation methodologies for the following common operational risk events before expanding the analysis more broadly.

1) Theft of policyholder information by a hacker
2) IT Systems failure for one day or longer
3) Internal fraud
4) Office shutdown due to weather-related event
5) Model Risk (specifically, modeling errors)

To develop our models, I think we can use SLIC internal data in conjunction with financial services industry studies, as well as insurance industry payouts for some of these risks. After starting to dig into the data, here are some preliminary observations about these risks:

The frequency distributions for these different risks vary considerably, so it may not be appropriate to model them all the same way. Risks 3) and 5) both have average frequencies that are greater than their variances. Risk 4) has the same mean and variance for its frequency distribution. Finally, risks 1 and 2) have frequency distribution variances that are greater than their means.

Regarding severity, for some of these risk events we were lucky to have multiple external data sources that we could piece together (e.g., both General Insurance and Life Insurance model error events). Also, some of these external data sources have events that would not be likely for our insurance operation, so I had these events carved out of the data. Finally, I made adjustments to the severity data to account for the differences in size between our company and the companies in the study. After these modifications to the raw data, we then used a Maximum Likelihood Estimation (MLE) technique to find and fit an appropriate distribution for this data for each risk.

The above of course is just a start, and our approach may need to change as we get further into the details. However, I wanted to invite any thoughts you have at this stage.

AHA Contingent Compensation Program for Brokers – Email Correspondence

Date: January 24, 2023

To: Patrick Lyon, Co-CEO
From: Jean Manx, Lyon Risk Manager

You asked me to get further information on the new compensation program that AHA intends to put in place for the brokers. I learned the following from AHA:

For brokers, AHA has implemented a set of contingent compensation agreements to provide for payment when the broker achieves pre-set goals for: (i) volume and (ii) growth and retention. A broker may have separate contingent compensation plans with our different business units. AHA will evaluate performance against pre-set goals annually. If the broker has met the goals, the payment amount is usually a percentage of the premium a broker has placed with us for specific types of insurance. The sales department will monitor this system.

The contingent compensation plan will use one or more goals, separately or in combination, to determine if a broker will receive a payment. These goals may include:

Volume

AHA will measure the premium volume of policies a broker places with us. We may measure one or more types of insurance.

Growth and Retention

AHA will measure whether the amount of business a broker has with us is increasing or decreasing. We may look at change in premium volume, change in the actual number of policies, number of newly written polices, policy-renewal ratios, or a combination of these. These calculations may vary by type of insurance.

Profitability has been excluded from the plan due to the timing difficulties of measuring profitability by case in the year of the sale.

Patrick, please let me know if you have any concerns or want me to do further follow-up.

Merger and Acquisition – Email Correspondence

From: Feng Hu, Treasurer
To: Laila Lynx, CFO

Date: March 20, 2023

Laila,

You are aware of Lyon Corporation's policy on acquisitions by our subsidiaries. We allow the affiliates to pursue potential acquisitions if they are supported by the affiliate business plan approved by the Lyon Board. I've become aware of certain activity occurring within AHA, and I think we need to keep ourselves informed of how these potential transactions are progressing.

The Lyon Board has three overarching principles for approval of any acquisition identified by the affiliates:

1. The acquisition should be strategic to the affiliate.

2. The acquisition should provide clearly identifiable benefits.

3. The risks involved in the integration must be clearly identified, along with appropriate risk management responses to be taken.

I'm not sure that AHA is appropriately focused on these principles.

I have obtained the following summaries from Neisha Kampango, the AHA CFO. I'd appreciate it if you could make sure she keeps you up to date on AHA's progress.

Potential Acquisitions

I. Currently, AHA has targeted Eureka Insurance Company (Eureka), a health insurance company, as a potential acquisition target. Eureka is domiciled in New York and is in the small and large group medical markets in the state of New York. About 40% of Eureka's large group premium represents employer groups with fewer than 101 employees.

Eureka's products include comprehensive major medical coverage of hospital services, physician services, dental services, and prescription drugs. Dental is offered as an additional benefit on medical.

Eureka has contracted with Networks 'R Us to use their provider networks for physician and hospital services. It also has contracts with Carefree Rx, a Prescription Benefit Management company (PBM), and Painless Dental to manage and administer their prescription drug and dental plans, respectively. In order to lower costs, it periodically puts its network contracts out to bid. While this may lower premiums, it has been disruptive to members in the past.

Eureka relies on its vendors for standard medical claims management. The company has a medical management staff that coordinates with the vendors' medical managers to ensure that the vendors meet New York requirements and that their policies are consistent with the Eureka product language.

Compared to AHA, the management of Eureka appears to be more conservative. However, since their company covers the entire state of New York, they have experience dealing in diverse markets (rural to cosmopolitan).

According to Neisha, due diligence related to the potential acquisition identified certain key issues that need closer review:

1. Determine whether the Eureka administration system, which is a home-grown system, is compatible with AHA's system.

2. Ensure that the policy and claims reserves at Eureka are adequate and that the underlying assumptions and calculations are reasonable.

3. Understand why the broker and administrative costs are higher than expected.

Two years of historical financial statements and a one-year projection for Eureka are attached at the end of this report, as well as an internal memo from the manager Neisha assigned to oversee this project. AHA would value the acquisition of Eureka at a hurdle rate of 10%.

II. Recently, AHA has become aware of another potential acquisition target, Columbia Health. Through research, AHA has learned the following information about this potential target:

-Industry: Columbia operates in the LTC market.

-Geography: Although Columbia is based in New York, it operates in almost all U.S. States. It focuses its efforts in smaller cities and towns where it perceives that there is less competition.

-Products: Columbia offers long term care insurance to individuals and small groups. Columbia does not sell any other insurance products, and the company does not have any insurance subsidiaries.

-Provider Networks: Columbia negotiates contracts directly with external providers. It targets individual primary care doctors, who are sole practitioners, and home care agencies for its LTC product; as a result, Columbia is able to negotiate more profitable arrangements than might otherwise be available.

-Internal administration processes and systems: Columbia has contracted out all aspects of this function. Policyholders submit claims to an external third-party administrator, and payments are processed by that company.

-Underwriting function: Most of Columbia's underwriters have been with the company since its inception and have developed close relationships with their small business clients. For cases with unusual features, Columbia relies on its reinsurer for advice.

-Governance: Managed by its founder, Columbia is a very conservative company. The founder treats his employees as if they are family members. Their compensation is well above industry average and is totally fixed; there is no variable compensation. Columbia does not have an internal ERM function. It relies on external consultants for all regulatory considerations, such as valuation reports, economic capital, and rate filings.

Attachment I: Eureka Financial Statements

2021 – 2022 are actual results; 2023 is projected

TOTAL	**2021**	**2022**	**2023**
Statutory Income Statement (000s)			
Earned Premiums	1,449,283	1,460,556	1,472,408
Health benefits	1,209,507	1,198,706	1,217,317
General expenses	269,862	270,152	273,353
Total Expenses	**1,479,370**	**1,468,859**	**1,490,670**
Investment Income	**7,501**	**7,618**	**8,068**
Income Before Income Tax	**(22,585)**	**(685)**	**(10,194)**
Federal Income Tax	**(6,324)**	**(192)**	**(2,854)**
Net Income	**(16,261)**	**(493)**	**(7,340)**
Statutory Balance Sheet (000s)			
Total Assets	**363,091**	**366,654**	**361,293**
Liability for unpaid claims and claim adjustment expenses	155,798	160,661	161,965
Other Liabilities	84,058	83,252	83,927
Total Liabilities	**239,856**	**243,913**	**245,892**
Surplus	**123,235**	**122,741**	**115,401**
Total Liabilities and Surplus	**363,091**	**366,654**	**361,293**

Attachment II: Project Manager Memo – Eureka Acquisition

Date: March 15, 2023

Subject: Eureka Acquisition

To: Neisha Kampango, CFO, AHA

From: Sue Mahi, MBA, Project Manager, AHA

I have been working with our consultant and broker on this project and I believe it is an important and exciting opportunity for our organization. Our consultant's actuaries and financial folks asked that I pass along several minor details that they have found while digging around in the publicly available data and financials. They say they need to look at these areas more closely during due diligence.

- They think the medical loss ratio is low.
- Broker fees and administrative costs are a bit high.
- Low surplus backed by illiquid assets.

None of these items are insurmountable, especially considering our financial strength and marketing expertise. As a result, I do not see any deal breakers here.

Again, I cannot stress enough the fact that this is an important and exciting opportunity.