

Wisconsin Retirement System

41st Annual Actuarial Valuation of Retired Lives

December 31, 2023



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February 23, 2024

Employee Trust Funds Board
Madison, Wisconsin

Ladies and Gentlemen:

The results of the **41st annual actuarial valuation of core and variable annuities** being paid from the Wisconsin Retirement System are presented in this report. The purpose of this report is to establish the ratio of assets to liabilities in the Core and Variable Funds and to make recommendations for related benefit adjustments in accordance with statutory provisions and administrative code. This report should not be relied on for any other purpose.

The date of this valuation was December 31, 2023. Actuarial assumptions used in the valuation are summarized in the Appendix. The assumptions used in this report are reasonable for the purposes of this valuation. The combined effect of the assumptions, excluding prescribed assumptions or methods set by law, is expected to have no significant bias (i.e., not significantly optimistic or pessimistic). The assumptions and methods were unchanged from those used in the prior valuation.

The results of the valuation may be briefly summarized as follows (\$ millions):

	Core	Variable
Number of Annuitants	238,111	43,560
Annual Amount of Annuities Paid	\$ 6,639.1	\$ 457.8
Fund Balance	75,583.6	5,089.2
Actuarial Reserve	72,951.6	4,404.8
Ratio	1.036	1.155

Based upon these results, core annuities will be increased 3.6% and variable annuities will be increased by 15.0%.

This report was prepared at the request of the Wisconsin Retirement System and those designated or approved by the Wisconsin Retirement System. This report may be provided to parties other than the Wisconsin Retirement System only in its entirety and only with the permission of the Wisconsin Retirement System. GRS is not responsible for unauthorized use of this report. The valuation was based upon data furnished by the Wisconsin Retirement System’s staff, concerning Fund assets and individual annuitants and beneficiaries. Data was checked for internal consistency, but was not audited. We are not responsible for the accuracy or completeness of the information provided by the Wisconsin Retirement System.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements; and changes in plan provisions or applicable law.

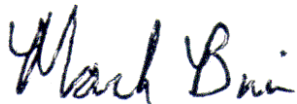
This report was prepared using our proprietary valuation model and related software which, in our professional judgment, has the capability to provide results that are consistent with the purposes of the valuation and has no material limitations or known weaknesses. We performed tests to ensure that the model reasonably represents that which is intended to be modeled.

This report does not include an assessment of the risks of future experience not meeting the actuarial assumptions. Additional assessment of risks was outside the scope of this assignment. However, an additional assessment of risk for the Wisconsin Retirement System was conducted in the fall of 2023 in conjunction with the State of Wisconsin Investment Board and the fall of 2020 by the Department of Employee Trust Funds. Additional discussion of various risk factors is also included in the active lives valuation report issued in June.

To the best of our knowledge this report is complete and accurate. All calculations have been made in conformity with generally accepted actuarial principles and practices and with the Actuarial Standards of Practice issued by the Actuarial Standards Board. Mark Buis, James D. Anderson and Richard C. Koch Jr. are all Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. The signing actuaries are independent of the plan sponsor.

The cooperation of the Secretary and his staff in gathering materials for this valuation is acknowledged with appreciation.

Respectfully submitted,
Gabriel, Roeder, Smith & Company



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MB/JDA/RCK:sc



SECTION A

EXECUTIVE SUMMARY

Executive Summary

1. Retiree Dividend in Core Annuities

The net of fee investment return of 11.4% in the core annuity fund was higher than the assumed investment return of 6.8% on a market value basis. However, under the asset valuation method, investment gains and losses are spread over a 5-year period. Partial recognition of this year's gain was combined with the continued phase-in of investment gains and losses from prior years resulting in a published effective earnings rate of 9.1%. The 9.1% published effective earnings rate exceeds the 5.0% investment return threshold that triggers an annuity adjustment. This valuation determined the amount of available surplus/deficit. The surplus in the core fund is \$2,632.0 million as of December 31, 2023. After adjusting for various items (described in detail on page 6), **the result is a 3.6% increase in the core annuity benefit.**

2. Change in Variable Annuities

The variable fund effective earnings rate was 22.0% resulting in a surplus of \$684.4 million. The surplus of \$684.4 million will **result in a 15.0% increase in all variable annuities in force.**

3. General Comments

Due to the asset smoothing method used in the core annuity fund, there are approximately \$4.7 billion in unrecognized asset losses as of December 31, 2023 which will be recognized over the next four years. Although only approximately half of this applies to the annuitant reserve, this may still decrease the probability of positive annuity adjustments in the future.

The present value of previously granted Core dividends is approximately \$13.7 billion prior to dividend adjustments and \$16.4 billion after the dividend adjustment. It is important that the value of dividend payments continue to build up in order to avoid the possibility of leveraged negative adjustments in the future. This buildup will happen naturally as long as investments in the core fund achieve results in excess of 5%.

4. Conclusion

In accordance with the Administrative Code, ETF 20.25, Section 40.27(2) and Section 40.28(2) of the Wisconsin Statutes:

- Core annuities will be increased by 3.6%, and
- Variable annuities will be increased by 15.0%.

SECTION B

OPERATION OF THE RETIREMENT SYSTEM

Operation of the Retirement System

Each year, as of December 31, an actuarial valuation of the liability for retired persons receiving benefits from the Wisconsin Retirement System is conducted. The purpose of the valuation is to determine the actuarial present value of future benefit payments on behalf of current retired lives. This present value is the “actuarial reserve.” Theoretically, if an amount of money equal to the actuarial present value were invested at a yield equal to the valuation interest rate, the initial amount plus the continuing investment income would provide exactly the right amount of money to pay the annuities of all current retired persons and their beneficiaries for the rest of their lives. The fund would decrease each year, and would become zero many decades in the future when the last annuitant dies.

The above is a “closed group” description of the operation of the annuity reserve fund. But the fund is really an “open group.” The size of the fund does not actually decrease because each year more benefits are added to the rolls than are removed and fresh money is transferred into the annuity reserve fund to finance the benefits of the new annuitants. The actuary calculates the reserve transfers for new annuitants each year as a by-product of the actuarial valuation.

According to theory, the fund will eventually reach a state when the number of people entering (retiring) each year is approximately equal to the number of people exiting (dying) each year. When this mature state is reached, the amount of money in the fund will remain approximately level in constant dollars from year to year. Each year, the reserve transfers for the new annuitants plus real investment earnings on the whole fund (total money in) will be approximately equal to the benefit payments (total money out). The only source of growth in assets would be the result of the effects of inflation. The dollars in the fund would increase, but the “real” value of the fund would not change.

There are at least two factors that cause the actual operation to be different from the theoretical operation described above. The first is that annuitants may have longer or shorter lifetimes than expected. In recognition of this, the actuary monitors mortality experience of the retirement system and recommends a new mortality table when appropriate in conjunction with the triennial experience study cycle. The second factor is that actual investment earnings are rarely equal to the assumed rate. When either mortality or investment earnings differ from expectations, the difference, positive or negative, is recorded in a supplemental reserve. The operation of the supplemental reserve is described on the next page.

Operation of the Retirement System

The Wisconsin Retirement System (WRS) maintains separate reserves for core and variable annuities.

The basic objective of the Core Fund is to earn an optimum long-term return while taking acceptable risk. The Core Fund has a significant amount of stocks, but also invests in other assets such as bonds, real estate and private equity. It is considered a fully diversified, balanced fund invested for the long-term needs of the Retirement System. The Variable Fund is an “all-stocks” fund. Participants in this fund are exposed to a higher degree of risk (because of possible losses from unfavorable stock market performance), in exchange for the possibility of greater returns over the life of the investment in the fund. Investment return in the Core Fund is smoothed via operation of the Market Recognition Account. Variable Fund returns are not smoothed.

Annuity adjustments for both Core and Variable annuities depend on whether or not returns credited to those funds exceed or fall short of 5%. Even if there are negative Core and/or Variable annuity adjustment rates, the Core portion of a participant’s annuity can never be decreased below the finalized initial amount. However, there is no limit to how much the Variable portion of a participant’s annuity can be reduced.

WRS’ practice with respect to annuity adjustments is described below.

Core Annuity Division: If the supplemental reserve is positive and is at least 0.5% of core annuity liabilities, core annuity increases (dividends) may be granted. If the supplemental reserve is negative and is equal to or greater than 0.5% of core annuity liabilities in absolute value, prior core annuity dividends are reduced by an aggregate amount equal to the shortfall. Increases or decreases are rounded to the nearest 1/10th of a percent and become effective in April following the December 31 valuation.

Variable Annuity Division: If the supplemental reserve is at least 2% of variable annuity liabilities, substantially all of the reserve (dropping fractions of a percent) is used to increase or decrease variable annuities for the ensuing year. Increases or decreases become effective in April following the December 31 valuation.

In calculating both the dividend for the Core annuities and the adjustment for Variable annuities, a 5.0% assumed investment return is used to develop liabilities. Returns in excess of 5.0% can produce an increase in a member’s annuity. Returns below 5% may result in a decrease. Please see page 29 for a full description of the statutory provisions.



SECTION C

CORE ANNUITIES

Core Annuity Division Development of Assets and Liabilities

	\$ Millions		Ratio
	Assets	Liabilities	
Ending Balance December 31, 2022	\$72,108.4	\$70,987.2	1.016
Closing Adjustments	0.9	0.0	
Variable Terminations	37.9	37.9	
2023 Core Annuity Average Adjustment: 1.6%	0.0	1,083.1	
Beginning Balance January 1, 2023	72,147.2	72,108.2	1.001
Increases			
Reserve Transfers	3,891.6	3,891.6	
Regular Interest (5%)	3,538.3	3,538.3	
Additional Earnings	2,605.9	0.0	
Addition for Experience Study	0.0	0.0	
Other	0.0	12.9	
Total Increases	10,035.8	7,442.8	
Decreases			
Annuities & Lump Sums	6,599.4	6,599.4	
Credit Re-establishments	0.0	0.0	
Subtraction for Experience Study	0.0	0.0	
Other	0.0	0.0	
Total Decreases	6,599.4	6,599.4	
Ending Balance December 31, 2023	\$75,583.6	\$72,951.6	1.036

The ending liability balance includes a data reserve of \$72.9 million and a liability for previously granted dividends of \$13,731 million (prior to any 2024 adjustments calculated in this December 31, 2023 valuation).

Core Fund Reserve Transfer Recommendation

Amounts to be transferred from the Employer Reserve and the Employee Reserve to the Annuity Reserve to cover liabilities for new annuities are computed as the first step in the annual actuarial valuation. The actuarial present value at time of retirement of core annuities reported as new since the last actuarial valuation is \$3,839,699,402. Adjustments to prior transfers, related to estimated annuities for which final computations have now been made, totaled \$51,863,184. Reserve transfers are distributed as follows:

Group	Regular Transfer	Adjustment to Prior Transfer	Total Transfer
General	\$3,166,200,630	\$47,070,910	\$3,213,271,540
Protective with Social Security	488,973,113	2,679,439	491,652,552
Protective without Social Security	147,107,765	1,364,854	148,472,619
Executive & Elected	37,417,894	747,981	38,165,875
Totals	\$3,839,699,402	\$51,863,184	\$3,891,562,586

Accordingly, we recommend that \$3,891,562,586 be transferred to the Core Annuity Reserve. The results in this report assume that this transfer has been made.

Discussion of Dividend

The Core Annuity Fund balance, \$75,583.6 million, was higher than the actuarial present value of core annuities and reserves, \$72,951.6 million, by \$2,632.0 million, which resulted in an annuity adjustment of 3.6%. The following table reconciles the primary sources of the 3.6% adjustment:

	% of APV⁽¹⁾
1. SWIB net of fee investment return	11.40%
2. MRA adjustment	(2.30)%
3. Published effective earnings rate	9.10%
4. Adjustment to relate earnings to average core annuity fund balance	(0.42)%
5. Earnings rate based on average balance	8.68%
6. Expected dividend before adjustments: 1.0868/1.05-1	3.50%
7. Adjustment to relate average asset to ending liability	0.07%
8. Carryover from last year due to timing of dividend, accounting adjustments and rounding	0.05%
9. Experience study adjustment	0.00%
10. Experience and other effects	(0.01)%
11. Statutory adjustment to round to nearest one-tenth percent	(0.01)%
12. Computed average dividend rate: (6)+(7)+(8)+(9)+(10)+(11)	3.6%
13. Adjustment for members at or near the statutory floor	0.0%
14. Final computed dividend rate: (12)+(13), if greater than 0.5% (or less than -0.5%) of core annuities, otherwise 0%	3.6%

⁽¹⁾ Actuarial Present Value

See pages 30 and 31 for a description of items on this page.

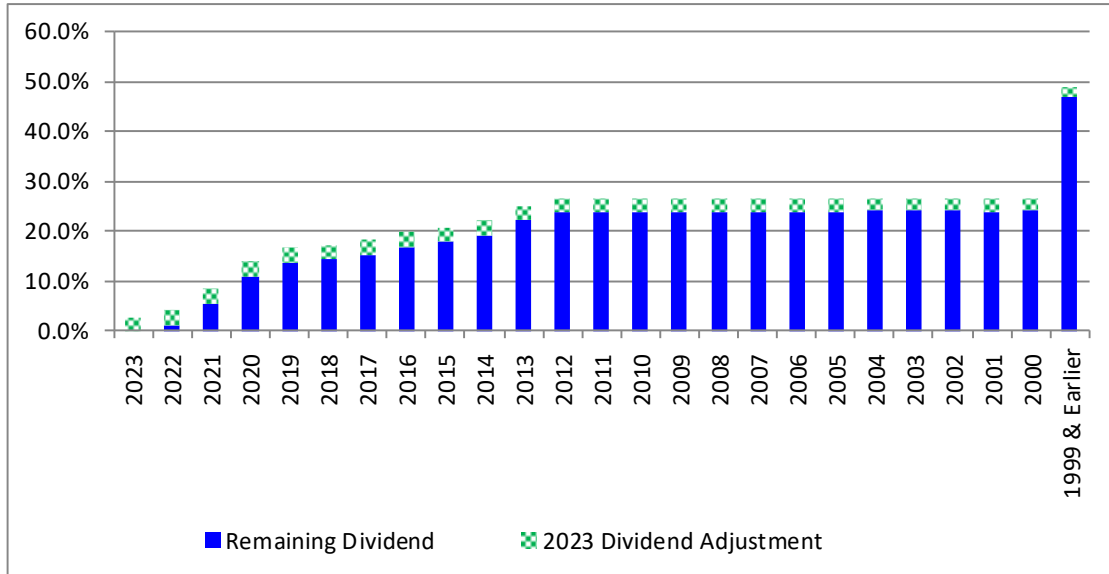
In accordance with the Administrative Code, ETF 20.25 and Section 40.27(2) Wisconsin Statutes (shown on page 29 of this report), the dividend adjustment is 3.6% effective April 1, 2024.



Discussion of Dividend

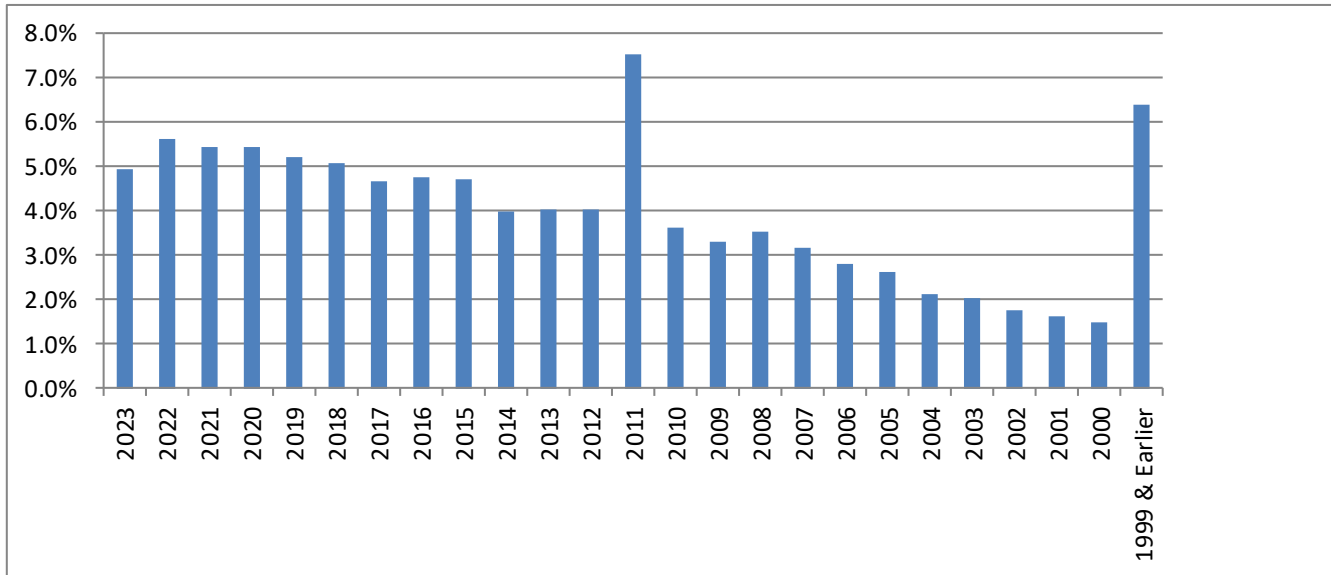
As shown on the prior page, the adjustment for core fund members is 3.6%.

Dividend Remaining (as a Percentage of Total Benefit) by Year of Retirement



After the 2024 dividend adjustment, members retired prior to 2000 continue to have the highest dividend remaining as a percentage of total benefit and also represent a shrinking portion of the liabilities. The chart below shows liabilities by year of retirement.

Liabilities (as a Percentage of Total) by Year of Retirement



Between 2008 and 2012, the liability for dividends decreased from about \$9.2 billion to \$3.0 billion. The value of previously granted dividends is approximately \$13.7 billion as of December 31, 2023 prior to the 2024 dividend adjustment and \$16.4 billion after the adjustment. In addition, there are currently about \$4.7 billion in unrecognized asset losses in the Market Recognition Account that will be recognized over the next four years, about half of which will be applied to the core annuitant reserve.



Transfers to Annuity Reserve to Finance Core Annuities Approved in 2023 Tabulated by Type of Annuity and Option

Alpha Code	Type of Benefit	Number	Annual Amount	Present Value
REGULAR RETIREMENT				
SL	Straight Life	1,411	\$ 30,076,333	\$ 419,455,851
SL	Straight Life (accelerated)	0	3,824,010	13,107,975
A60	Life Annuity with 60 payments guaranteed	656	15,731,421	220,257,564
A60	Life Annuity with 60 payments guaranteed (accelerated)	0	2,246,913	8,603,960
A180	Life Annuity with 180 payments guaranteed	1,944	44,621,237	654,915,357
A180	Life Annuity with 180 payments guaranteed (accelerated)	0	7,666,514	31,158,234
A180F	Life Annuity with 180 payments guaranteed (forced)	3	35,782	438,068
JOINT	Joint and 75% Survivor	755	20,997,822	326,218,982
JOINT	Joint and 75% Survivor (accelerated)	0	3,056,316	12,578,503
R25	Reduced 25% on First Death	338	11,006,570	161,003,598
R25	Reduced 25% on First Death (accelerated)	0	1,335,843	5,263,743
C100	100% Continued to Named Survivor	976	23,280,636	363,648,783
C100	100% Continued to Named Survivor (accelerated)	0	3,339,159	14,264,294
C180	100% Continued to Named Survivor with 180 payments guaranteed	3,237	89,178,961	1,427,994,835
C180	100% Continued to Named Survivor with 180 payments guaranteed (accelerated)	0	15,608,315	67,426,642
AC24	Annuity Certain with 24 Payments	2	451,447	907,329
AC60	Annuity Certain with 60 Payments	1	138,477	639,255
AC120	Annuity Certain with 120 Payments	3	299,247	2,377,005
AC180	Annuity Certain between 24 and 180 Payments	1	371,101	2,443,777
	Total Regular	9,327	\$ 273,266,104	\$ 3,732,703,755
	Average Age at Retirement	61.0 Years		
DISABILITY RETIREMENT				
SL	Straight Life	35	\$ 948,788	\$ 12,275,059
A60	Life Annuity with 60 payments guaranteed	16	478,347	5,878,072
A180	Life Annuity with 180 payments guaranteed	34	870,397	12,160,561
JOINT	Joint and 75% Survivor	4	104,313	1,720,005
R25	Reduced 25% on First Death	2	58,662	891,334
C100	100% Continued to Named Survivor	14	398,000	6,418,149
C180	100% Continued to Named Survivor with 180 payments guaranteed	90	2,829,905	47,827,115
	Total Disability	195	\$ 5,688,412	\$ 87,170,295
	Average Age at Retirement	53.5 Years		
DEATH-IN-SERVICE BENEFITS				
SL	Straight Life	18	\$ 443,729	\$ 6,052,939
SL	Straight Life (accelerated)	0	26,088	240,571
A60	Life Annuity with 60 payments guaranteed	3	17,474	260,839
A60	Life Annuity with 60 payments guaranteed (accelerated)	0	13,032	138,510
A180	Life Annuity with 180 payments guaranteed	34	840,607	12,299,675
A180	Life Annuity with 180 payments guaranteed (accelerated)	0	99,744	581,580
LOL	Life with Optional Length Guaranteed	1	24,892	251,238
	Total Death-in-Service	56	\$ 1,465,566	\$ 19,825,352
	Average Age at Retirement	53.0 Years		
GRAND TOTAL		9,578	\$ 280,420,082	\$ 3,839,699,402

In cases where an individual is receiving more than one annuity, the person only appears once in the above number counts, but the corresponding annual amounts can show up in several different places, depending on the option elected for the different annuities. This can result in, for example, a number count of zero (or a very low number count) combined with a significant annual dollar amount in the above table.



Core Annuities Being Paid Tabulated by Type of Annuity and Option

Alpha Code	Type of Benefit	Number	Annual Amount	Present Value
REGULAR RETIREMENT				
SL	Straight Life	32,282	\$ 780,258,492	\$ 8,182,788,068
SL	Straight Life (accelerated)	0	18,467,024	46,390,091
A60	Life Annuity with 60 payments guaranteed	21,280	526,568,888	5,231,071,739
A60	Life Annuity with 60 payments guaranteed (accelerated)	0	10,271,668	25,189,301
A120	Life Annuity with 120 payments guaranteed	8	68,773	147,103
A180	Life Annuity with 180 payments guaranteed	45,500	1,072,227,919	11,317,593,554
A180	Life Annuity with 180 payments guaranteed (accelerated)	0	38,249,435	104,586,342
A180F	Life Annuity with 180 payments guaranteed (forced)	343	3,721,826	30,824,609
JOINT	Joint and 75% Survivor	24,656	766,598,789	8,494,504,363
JOINT	Joint and 75% Survivor (accelerated)	0	15,253,088	42,522,213
R25	Reduced 25% on First Death	13,707	461,074,484	4,498,314,278
R25	Reduced 25% on First Death (accelerated)	0	6,619,571	17,639,585
C100	100% Continued to Named Survivor	23,011	603,592,636	7,145,620,810
C100	100% Continued to Named Survivor (accelerated)	0	16,201,476	46,546,520
C180	100% Continued to Named Survivor with 180 payments guaranteed	67,342	1,986,034,268	24,948,713,173
C180	100% Continued to Named Survivor with 180 payments guaranteed (accelerated)	0	76,797,345	225,779,116
LOL	Life with Optional Length Guaranteed	20	530,829	3,500,878
LOLF	Life with Optional Length Guaranteed (Forced)	2	15,988	73,974
AC24	Annuity Certain with 24 Payments	4	664,740	926,086
AC60	Annuity Certain with 60 Payments	10	869,968	2,301,068
AC120	Annuity Certain with 120 Payments	10	1,441,830	7,439,862
AC180	Annuity Certain between 24 and 180 Payments	5	1,972,684	10,339,164
C50	50% Continued to One Beneficiary	12	95,323	353,412
C75WSS	75% Continued to One Beneficiary and Social Security Integrated	10	217,603	772,827
A60WSS	Life with 60 Months Guaranteed and Social Security Integrated	4	12,134	21,257
A180WSS	Life with 180 Months Guaranteed and Social Security Integrated	3	53,697	120,901
PF6213	Police and Firemen s.62.13 *	6	207,273	682,807
SLNSD	Straight Life - Named Survivor Deceased	876	28,229,720	257,274,187
Total Regular		229,091	\$6,416,317,471	\$70,642,037,288

(concluded on next page)

In cases where an individual is receiving more than one annuity, the person only appears once in the above number counts, but the corresponding annual amounts can show up in several different places, depending on the option elected for the different annuities. This can result in, for example, a number count of zero (or a very low number count) combined with a significant annual dollar amount in the above table.



Core Annuities Being Paid Tabulated by Type of Annuity and Option

Alpha Code	Type of Benefit	Number	Annual Amount	Present Value
DISABILITY RETIREMENT				
SL	Straight Life ⁽¹⁾	2,100	\$ 53,459,738	\$ 397,236,688
A60	Life Annuity with 60 payments guaranteed	348	10,579,944	95,287,342
A180	Life Annuity with 180 payments guaranteed	1,021	29,755,704	300,242,115
JOINT	Joint and 75% Survivor	462	12,759,336	138,226,707
R25	Reduced 25% on First Death	174	4,821,981	50,982,567
C100	100% Continued to Named Survivor	1,052	22,878,288	247,782,329
C180	100% Continued to Named Survivor with 180 payments guaranteed	2,363	60,622,075	769,015,304
DWSMC	Disability with Spouse or Minor/Dependent Child	1	20,609	113,306
PF6213	Police and Firemen s.62.13 *	3	63,482	353,880
SLNSD	Straight Life - Named Survivor Deceased	8	283,592	2,915,060
Total Disability		7,532	\$ 195,244,749	\$ 2,002,155,298
DEATH-IN-SERVICE BENEFITS				
SL	Straight Life	273	\$ 4,570,005	\$ 51,022,249
SL	Straight Life (accelerated)	0	136,324	529,144
A60	Life Annuity with 60 payments guaranteed	132	2,731,400	28,764,655
A60	Life Annuity with 60 payments guaranteed (accelerated)	0	62,984	213,613
A180	Life Annuity with 180 payments guaranteed	1,069	19,050,148	222,334,377
A180	Life Annuity with 180 payments guaranteed (accelerated)	0	717,444	3,476,487
C180	100% Continued to Named Survivor with 180 payments guaranteed	3	12,883	172,576
LOL	Life with Optional Length Guaranteed	5	160,261	655,297
AC60	Annuity Certain with 60 Payments	0	4,216	4,122
AC120	Annuity Certain with 120 Payments	0	27,276	186,563
A60WSS	Life with 60 Months Guaranteed and Social Security Integrated	5	4,821	17,963
PF6213	Police and Firemen s.62.13 *	1	31,914	76,254
Total Death-in-Service		1,488	\$ 27,509,676	\$ 307,453,300
GRAND TOTAL		238,111	\$ 6,639,071,896	\$ 72,951,645,886

⁽¹⁾ Includes 1,313 members formerly covered under the LTDI program.

In cases where an individual is receiving more than one annuity, the person only appears once in the above number counts, but the corresponding annual amounts can show up in several different places, depending on the option elected for the different annuities. This can result in, for example, a number count of zero (or a very low number count) combined with a significant annual dollar amount in the above table.

*Additional Information for Police and Firemen 62.13 Annuities

	<u>Regular Retirement</u>			<u>Disability Retirement</u>			<u>Death-in-Service Retirement</u>		
	Original	Dividends	Total	Original	Dividends	Total	Original	Dividends	Total
Benefit Amount	\$ 47,754	\$ 159,519	\$ 207,273	\$ 12,025	\$ 51,457	\$ 63,482	\$ 6,193	\$ 25,721	\$ 31,914
Present Value	151,862	530,945	682,807	67,036	286,844	353,880	14,797	61,457	76,254



Core Annuities Being Paid Tabulated by Attained Ages

Attained Ages	Regular		Disability		Death-in-Service		Totals	
	No.	Annual Amount	No.	Annual Amount	No.	Annual Amount	No.	Annual Amount
Under 20	0	\$ 0	0	\$ 0	10	\$ 60,377	10	\$ 60,377
20-24	0	0	3	56,739	7	80,855	10	137,594
25-29	0	0	4	42,364	16	142,520	20	184,884
30-34	0	0	15	328,450	27	231,907	42	560,357
35-39	2	14,332	57	1,359,158	35	253,906	94	1,627,396
40-44	6	106,212	122	3,427,700	48	448,025	176	3,981,937
45-49	44	704,601	267	6,907,337	43	543,599	354	8,155,537
50-54	1,675	61,587,854	537	14,853,885	86	1,263,784	2,298	77,705,523
55-59	12,842	421,934,925	921	25,709,569	115	2,039,524	13,878	449,684,018
60-64	28,218	795,949,297	1,469	37,445,573	202	3,524,093	29,889	836,918,963
65-69	45,474	1,207,786,613	1,070	29,801,385	253	5,155,189	46,797	1,242,743,187
70-74	51,217	1,474,766,136	1,097	29,551,068	227	5,365,863	52,541	1,509,683,067
75-79	41,413	1,172,483,852	851	21,409,509	171	3,925,279	42,435	1,197,818,640
80-84	24,716	664,481,482	593	13,770,006	110	2,210,116	25,419	680,461,604
85-89	14,087	370,183,661	361	7,597,007	62	1,069,573	14,510	378,850,241
90-94	6,341	172,822,123	132	2,432,464	31	321,880	6,504	175,576,467
95 & Up	1,804	43,664,845	33	552,535	14	259,263	1,851	44,476,643
Certain Only*	1,252	29,831,538	0	0	31	613,923	1,283	30,445,461
Totals	229,091	\$6,416,317,471	7,532	\$195,244,749	1,488	\$27,509,676	238,111	\$6,639,071,896

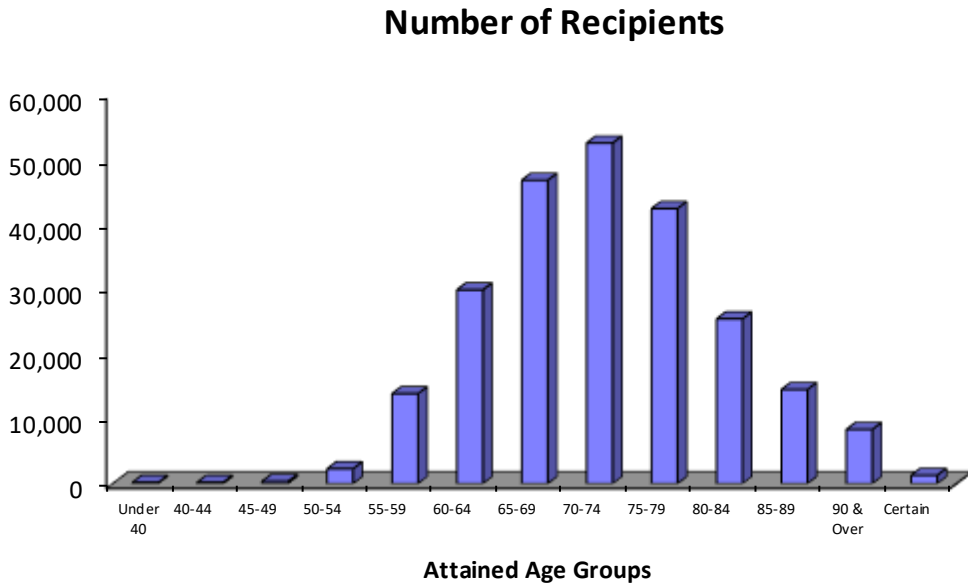
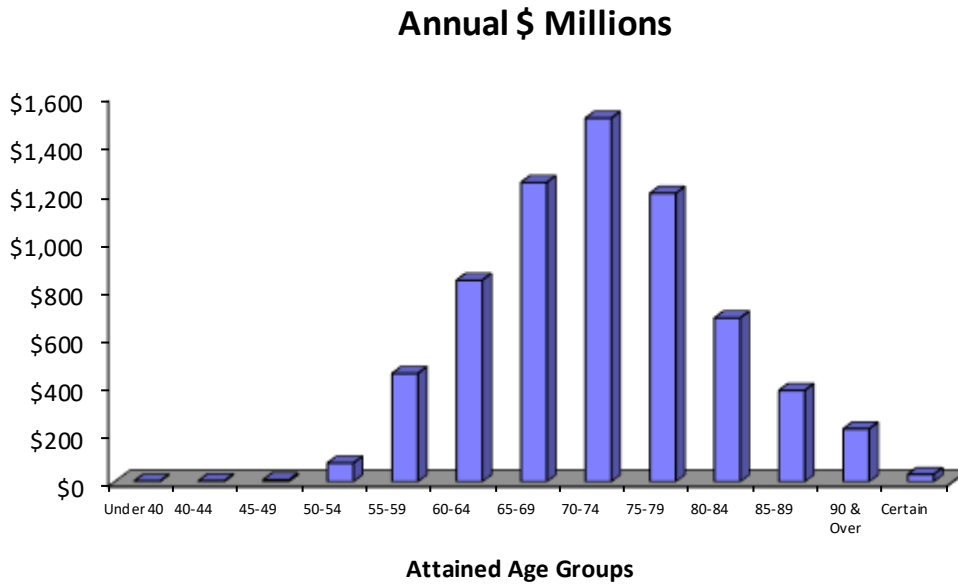
Averages in Years

Age at retirement	59.9	50.7	52.1	59.7
Attained age	71.9	65.4	66.9	71.7

* Certain Only category consists of continuations of 5, 10 and 15-year certain and life annuities to beneficiaries of deceased annuitants.

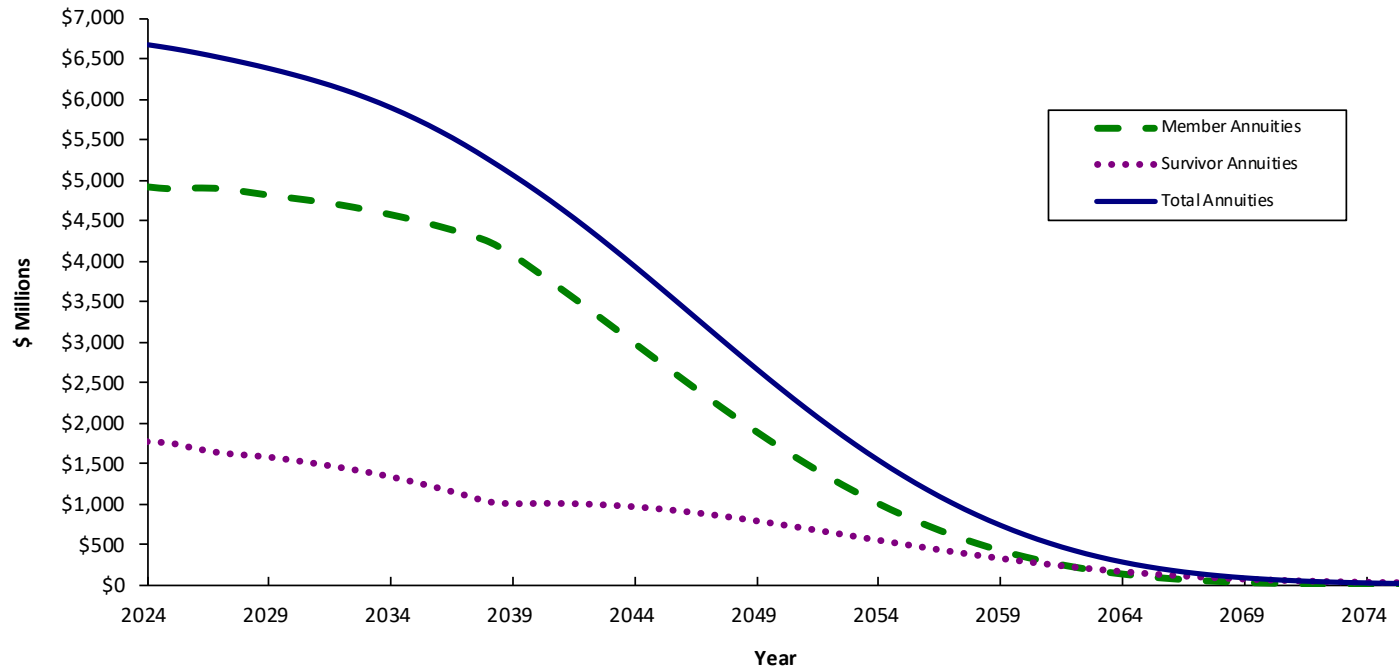


Core Annuities Being Paid by Attained Age*



* Includes regular and disability retirees and survivor beneficiaries. The “certain” category includes annuities paid for a fixed period which is not dependent upon the age of the recipient.

Projected Future Core Annuity Payments on Behalf of Present Retired Lives Including Present and Future Expected Dividends



	\$ Billions	
	<u>With Expected Dividends</u>	<u>Without Expected Dividends</u>
Total Future Benefit Payments	\$153.0	\$121.7
Present Assets	75.6	75.6
Future Investment Return Needed	77.4	46.1

Based upon the assumptions used in the valuation, future dividends are expected to be approximately 1.7% per year. Of course actual dividends will be based upon actual future investment return and the operation of the Market Recognition Account.

SECTION D

VARIABLE ANNUITIES

Variable Annuity Division Development of Assets and Liabilities

	\$ Millions		Ratio
	Assets	Liabilities	
Ending Balance December 31, 2022	\$4,403.0	\$5,586.5	0.788
Closing Adjustments	(2.5)	0.0	
Variable Terminations	(37.9)	(37.9)	
2023 Adjustment: -21%	0.0	(1,156.2)	
Beginning Balance January 1, 2023	4,362.6	4,392.4	0.993
Increases			
Reserve Transfers	295.6	295.6	
Regular Interest (5%)	214.9	214.9	
Additional Earnings	702.8	0.0	
Addition for Experience Study	0.0	0.0	
Other	0.0	0.0	
Total Increases	1,213.3	510.5	
Decreases			
Annuities & Lump Sums	486.7	486.7	
Credit Re-establishments	0.0	0.0	
Subtraction for Experience Study	0.0	0.0	
Other	0.0	11.4	
Total Decreases	486.7	498.1	
Ending Balance December 31, 2023	\$5,089.2	\$4,404.8	1.155

Variable Fund Reserve Transfer Recommendation

Amounts to be transferred from the Employer Reserve and the Employee Reserve to the Annuity Reserve to cover liabilities for new annuities are computed as the first step in the annual actuarial valuation. The actuarial present value at time of retirement of variable annuities reported as new since the last actuarial valuation is \$277,790,621. Adjustments to prior transfers, relating to estimated annuities for which final computations have now been made, totaled \$17,764,695. Reserve transfers were distributed as follows:

Group	Regular Transfer	Adjustment to Prior Transfer	Total Transfer
General	\$245,788,350	\$15,988,904	\$261,777,254
Protective with Social Security	22,172,594	2,141,270	24,313,864
Protective without Social Security	6,399,492	(139,073)	6,260,419
Executive & Elected	3,430,185	(226,406)	3,203,779
Totals	\$277,790,621	\$17,764,695	\$295,555,316

Accordingly, we recommend that \$295,555,316 be transferred to the Variable Annuity Reserve. The results in this report assume that this transfer has been made.

Discussion of Variable Annuity Change

Variable Annuity Reserves, \$5,089.2 million, were more than the actuarial present value of variable annuities, \$4,404.8 million, by \$684.4 million as of December 31, 2023 or 15.5% of the Actuarial Present Value (APV) of variable annuity payments. In accordance with Section 40.28(2) of the Wisconsin Statutes (see page 29 of this report), variable annuities will be increased by 15.0% effective April 1, 2024. The following table reconciles the primary sources of the 15.0% adjustment:

	% of APV⁽¹⁾
1. SWIB net of fee investment return	22.2%
2. Adjustment to published effective rate	(0.2)%
3. Published effective earnings rate	22.0%
4. Adjustment to relate earnings to average variable annuity fund balance	(0.5)%
5. Earnings rate based on average balance	21.5%
6. Expected change before adjustments: 1.215/1.05-1	15.7%
7. Adjustment to relate average asset to ending liability	0.3%
8. Carryover from last year due to timing of distribution, accounting adjustments and truncation	(0.7)%
9. Experience study adjustment	0.0%
10. Experience and other effects	0.2%
11. Statutory adjustment: (truncate to whole percent)	(0.5)%
12. Variable annuity change: (6)+(7)+(8)+(9)+(10)+(11)	15.0%

⁽¹⁾ Actuarial Present Value.

Please see pages 30 and 31 for a description of the items on this page.

In accordance with the Administrative Code, ETF 20.25 and Section 40.28(2) Wisconsin Statutes (shown on page 29 of this report), variable annuities will be increased by 15.0% effective April 1, 2024.



Transfers to Annuity Reserve to Finance Variable Annuities Approved in 2023 Tabulated by Type of Annuity and Option

Alpha Code	Type of Benefit	Number	Annual Amount	Present Value
REGULAR RETIREMENT				
SL	Straight Life	224	\$ 1,944,001	\$ 27,690,895
SL	Straight Life (accelerated)	0	320,386	1,114,442
A60	Life Annuity with 60 payments guaranteed	96	867,363	11,953,567
A60	Life Annuity with 60 payments guaranteed (accelerated)	0	117,795	449,290
A180	Life Annuity with 180 payments guaranteed	385	3,537,379	51,929,355
A180	Life Annuity with 180 payments guaranteed (accelerated)	0	769,566	3,197,999
JOINT	Joint and 75% Survivor	169	1,682,235	26,470,201
JOINT	Joint and 75% Survivor (accelerated)	0	374,505	1,466,112
R25	Reduced 25% on First Death	94	1,144,181	16,913,501
R25	Reduced 25% on First Death (accelerated)	0	208,922	808,265
C100	100% Continued to Named Survivor	181	1,549,554	24,799,429
C100	100% Continued to Named Survivor (accelerated)	0	260,312	1,159,518
C180	100% Continued to Named Survivor with 180 payments guaranteed	639	5,970,192	97,004,240
C180	100% Continued to Named Survivor with 180 payments guaranteed (accelerated)	0	1,452,255	6,441,239
AC24	Annuity Certain with 24 Payments	1	24,043	56,052
AC60	Annuity Certain with 60 Payments	0	6,668	34,211
AC120	Annuity Certain with 120 Payments	0	22,935	184,199
AC180	Annuity Certain between 24 and 180 Payments	0	4,721	27,667
	Total Regular	1,789	\$ 20,257,013	\$ 271,700,182
	Average Age at Retirement	59.8 Years		
DISABILITY RETIREMENT				
SL	Straight Life	4	\$ 23,419	\$ 284,151
A60	Life Annuity with 60 payments guaranteed	3	28,487	355,538
A180	Life Annuity with 180 payments guaranteed	6	43,457	602,722
JOINT	Joint and 75% Survivor	1	12,161	183,752
C100	100% Continued to Named Survivor	4	35,888	540,456
C180	100% Continued to Named Survivor with 180 payments guaranteed	18	179,203	2,938,545
	Total Disability	36	\$ 322,615	\$ 4,905,164
	Average Age at Retirement	55.0 Years		
DEATH-IN-SERVICE BENEFITS				
SL	Straight Life	6	\$ 24,705	\$ 342,557
A60	Life Annuity with 60 payments guaranteed	1	1,092	16,329
A180	Life Annuity with 180 payments guaranteed	10	53,420	826,389
	Total Death-in-Service	17	\$ 79,217	\$ 1,185,275
	Average Age at Retirement	48.0 Years		
GRAND TOTAL		1,842	\$ 20,658,845	\$ 277,790,621

In cases where an individual is receiving more than one annuity, the person only appears once in the above number counts, but the corresponding annual amounts can show up in several different places, depending on the option elected for the different annuities. This can result in, for example, a number count of zero (or a very low number count) combined with a significant annual dollar amount in the above table.



Variable Annuities Being Paid Tabulated by Type of Annuity and Option

Alpha Code	Type of Benefit	Number	Annual Amount	Present Value
REGULAR RETIREMENT				
SL	Straight Life	5,369	\$ 49,799,256	\$ 467,489,450
SL	Straight Life (accelerated)	0	1,036,432	2,559,984
A60	Life Annuity with 60 payments guaranteed	3,464	33,539,646	291,768,595
A60	Life Annuity with 60 payments guaranteed (accelerated)	0	468,005	1,254,073
A120	Life Annuity with 120 payments guaranteed	2	4,555	9,129
A180	Life Annuity with 180 payments guaranteed	8,386	74,239,380	706,644,590
A180	Life Annuity with 180 payments guaranteed (accelerated)	0	2,396,965	7,423,753
A180F	Life Annuity with 180 payments guaranteed (forced)	32	211,916	1,550,612
JOINT	Joint and 75% Survivor	4,983	61,046,367	589,001,650
JOINT	Joint and 75% Survivor (accelerated)	0	1,001,765	2,908,910
R25	Reduced 25% on First Death	3,109	48,906,592	384,788,344
R25	Reduced 25% on First Death (accelerated)	0	609,113	1,888,457
C100	100% Continued to Named Survivor	4,152	43,283,858	444,018,334
C100	100% Continued to Named Survivor (accelerated)	0	964,884	2,840,119
C180	100% Continued to Named Survivor with 180 payments guaranteed	12,265	123,037,761	1,366,254,144
C180	100% Continued to Named Survivor with 180 payments guaranteed (accelerated)	0	4,143,397	13,078,954
LOL	Life with Optional Length Guaranteed	2	51,262	92,782
AC24	Annuity Certain with 24 Payments	2	69,923	90,153
AC60	Annuity Certain with 60 Payments	2	33,513	90,764
AC120	Annuity Certain with 120 Payments	2	136,285	733,601
AC180	Annuity Certain between 24 and 180 Payments	1	290,072	644,380
C50	50% Continued to One Beneficiary	5	60,738	178,581
C75WSS	75% Continued to One Beneficiary and Social Security Integrated	6	50,477	196,725
A60WSS	Life with 60 Months Guaranteed and Social Security Integrated	1	2,618	4,955
A180WSS	Life with 180 Months Guaranteed and Social Security Integrated	0	1,624	3,099
SLNSD	Straight Life - Named Survivor Deceased	148	2,192,230	16,324,353
	Total Regular	41,931	\$447,578,634	\$4,301,838,491

(concluded on next page)

In cases where an individual is receiving more than one annuity, the person only appears once in the above number counts, but the corresponding annual amounts can show up in several different places, depending on the option elected for the different annuities. This can result in, for example, a number count of zero (or a very low number count) combined with a significant annual dollar amount in the above table.



Variable Annuities Being Paid Tabulated by Type of Annuity and Option

Numeric Code	Alpha Code	Type of Benefit	Number	Annual Amount	Present Value
DISABILITY RETIREMENT					
1	SL	Straight Life	128	\$ 757,714	\$ 7,084,858
3	A60	Life Annuity with 60 payments guaranteed	69	513,690	4,289,355
7	A180	Life Annuity with 180 payments guaranteed	244	1,264,171	12,563,346
10	JOINT	Joint and 75% Survivor	101	867,771	8,266,906
12	R25	Reduced 25% on First Death	42	289,312	2,568,833
14	C100	100% Continued to Named Survivor	194	1,214,895	10,887,389
16	C180	100% Continued to Named Survivor with 180 payments guaranteed	481	2,860,783	32,543,518
		Total Disability	1,259	\$ 7,768,336	\$ 78,204,205
DEATH-IN-SERVICE BENEFITS					
1	SL	Straight Life	77	\$ 583,766	\$ 5,811,886
2	SL	Straight Life (accelerated)	0	6,196	21,969
3	A60	Life Annuity with 60 payments guaranteed	27	218,549	1,669,502
7	A180	Life Annuity with 180 payments guaranteed	264	1,563,644	16,699,364
8	A180	Life Annuity with 180 payments guaranteed (accelerated)	0	61,297	330,681
22	AC120	Annuity Certain with 120 Payments	0	35,598	243,239
28	A60WSS	Life with 60 Months Guaranteed and Social Security Integrated	2	1,857	3,974
		Total Death-in-Service	370	\$ 2,470,907	\$ 24,780,615
GRAND TOTAL			43,560	\$ 457,817,877	\$ 4,404,823,311

In cases where an individual is receiving more than one annuity, the person only appears once in the above number counts, but the corresponding annual amounts can show up in several different places, depending on the option elected for the different annuities. This can result in, for example, a number count of zero (or a very low number count) combined with a significant annual dollar amount in the above table.



Variable Annuities Being Paid Tabulated by Attained Ages

Attained Ages	Regular		Disability		Death-in-Service		Totals	
	No.	Annual Amount	No.	Annual Amount	No.	Annual Amount	No.	Annual Amount
Under 20	0	\$ 0	0	\$ 0	3	\$ 2,851	3	\$ 2,851
20-24	0	0	1	1,325	1	742	2	2,067
25-29	0	0	2	2,267	5	7,897	7	10,164
30-34	0	0	5	12,895	4	3,910	9	16,805
35-39	0	0	9	23,999	7	6,621	16	30,620
40-44	1	6,878	17	69,473	10	27,681	28	104,032
45-49	14	103,167	25	126,813	12	60,593	51	290,573
50-54	271	3,178,386	88	487,313	29	171,399	388	3,837,098
55-59	2,301	27,657,736	141	800,969	26	160,320	2,468	28,619,025
60-64	4,723	37,101,297	187	867,201	56	292,322	4,966	38,260,820
65-69	7,417	46,312,717	206	743,636	49	236,129	7,672	47,292,482
70-74	8,860	67,188,678	214	1,007,317	54	264,002	9,128	68,459,997
75-79	8,235	99,125,130	157	1,435,778	44	410,242	8,436	100,971,150
80-84	4,491	76,269,408	94	1,116,420	33	422,049	4,618	77,807,877
85-89	2,635	53,846,582	79	812,761	11	137,977	2,725	54,797,320
90-94	1,397	27,335,216	28	224,681	9	132,839	1,434	27,692,736
95 & Up	444	7,839,601	5	35,488	9	90,538	458	7,965,627
Certain Only*	1,142	1,613,838	1	0	8	42,795	1,151	1,656,633
Totals	41,931	\$447,578,634	1,259	\$7,768,336	370	\$2,470,907	43,560	\$457,817,877

Averages in Years

Age at retirement	59.2	52.7	51.6	59.0
Attained age	71.8	66.8	66.8	71.6

* Certain only category consists of continuations of 5, 10 and 15-year certain and life annuities to beneficiaries of deceased annuitants.



SECTION E

COMPARATIVE STATEMENTS

Core Annuities Comparative Statement 1989 Through 2023

Valuation Date	Number	\$ Millions				Change in			
		Annual	Fund	Actuarial	Ratio	Annuities		CPI*	
		Annuities	Balance	Reserve		Average	Maximum		
1989	73,232	\$ 488.7	\$ 5,487.4	\$ 4,928.1	1.113	11.3 %		4.6 %	
1990	77,666	611.3	6,443.8	6,219.1	1.036	3.6 %		6.2 %	
1991	79,465	660.4	7,137.8	6,711.3	1.063	6.3 %		3.0 %	
1992	81,508	732.3	7,782.4	7,456.6	1.044	4.4 %		3.0 %	
1993	83,836	801.7	8,608.2	8,205.3	1.049	4.9 %		2.7 %	
1994	86,214	882.2	9,286.2	9,029.6	1.028	2.8 %		2.7 %	
1995	88,998	955.8	10,351.7	9,804.1	1.056	5.6 %		2.6 %	
1996	92,198	1,065.8	11,699.8	10,977.1	1.066	6.6 %		3.3 %	
1997	95,128	1,188.4	13,185.1	12,240.4	1.077	7.7 %		1.7 %	
1998	99,112	1,349.5	14,951.8	13,943.0	1.072	7.2 %		1.6 %	
1999	102,817	1,513.8	16,857.8	15,687.2	1.075	17.1 % **		2.7 %	
2000	107,425	1,867.0	20,517.8	19,405.3	1.057	5.7 %		3.4 %	
2001	112,142	2,048.6	21,979.7	21,283.6	1.033	3.3 %		1.6 %	
2002	116,289	2,226.6	23,142.4	23,202.9	0.997	0.0 %		2.4 %	
2003	121,582	2,364.7	25,071.9	24,724.0	1.014	1.4 %		1.9 %	
2004	126,211	2,500.3	26,920.0	26,232.2	1.026	2.6 %		3.3 %	
2005	131,674	2,691.4	28,575.3	28,359.7	1.008	0.8 %		3.4 %	
2006	137,117	2,843.6	31,180.5	30,273.9	1.030	3.0 %		2.6 %	
2007	142,906	3,075.3	35,050.1	32,877.5	1.066	6.6 %		4.1 %	
2008	144,033	3,399.3	35,798.1	36,551.5	0.979	(2.1)%	(2.1)%	0.1 %	
2009	150,671	3,449.3	36,655.8	37,072.7	0.989	(1.1)%	(1.3)%	2.7 %	
2010	155,775	3,532.4	37,798.4	38,148.5	0.991	(0.9)%	(1.2)%	1.5 %	
2011	167,453	3,842.0	40,411.5	42,078.3	0.960	(4.0)%	(7.0)%	3.0 %	
2012	173,655	3,806.3	40,591.6	41,852.4	0.970	(3.0)%	(9.6)%	1.7 %	
2013	180,056	3,800.7	44,273.2	42,300.5	1.047	4.7 %		1.5 %	
2014	185,605	4,102.3	47,135.7	45,790.7	1.029	2.9 %		0.8 %	
2015	191,795	4,364.9	49,147.0	48,897.5	1.005	0.5 %		0.7 %	
2016	197,647	4,523.1	51,972.0	50,941.4	1.020	2.0 %		2.1 %	
2017	203,202	4,747.0	54,900.0	53,590.0	1.024	2.4 %		2.1 %	
2018	211,126	5,040.9	56,493.8	56,629.3	0.998	0.0 %		1.9 %	
2019	216,944	5,183.7	59,138.4	58,157.0	1.017	1.7 %		2.3 %	
2020	222,723	5,423.2	63,805.8	60,691.1	1.051	5.1 %		1.4 %	
2021	228,161	5,842.6	69,910.7	65,085.4	1.074	7.4 %		7.0 %	
2022	233,804	6,409.7	72,108.4	70,987.2	1.016	1.6%		6.5 %	
2023	238,111	6,639.1	75,583.6	72,951.6	1.036	3.6%		3.4 %	
35-Year Average							3.4 %		2.7 %
20-Year Average							1.6 %		2.6 %
10-Year Average							2.7 %		2.8 %
5-Year Average							3.9 %		4.1 %

* CPI percentage increase determined by ratio of current year CPI-U67 December index over prior year December index.

** Including 10.6% Act 11 transfer.

In cases where there is a negative dividend, a maximum decrease is calculated to account for annuitants that are already at the floor and whose dividend cannot be reduced.



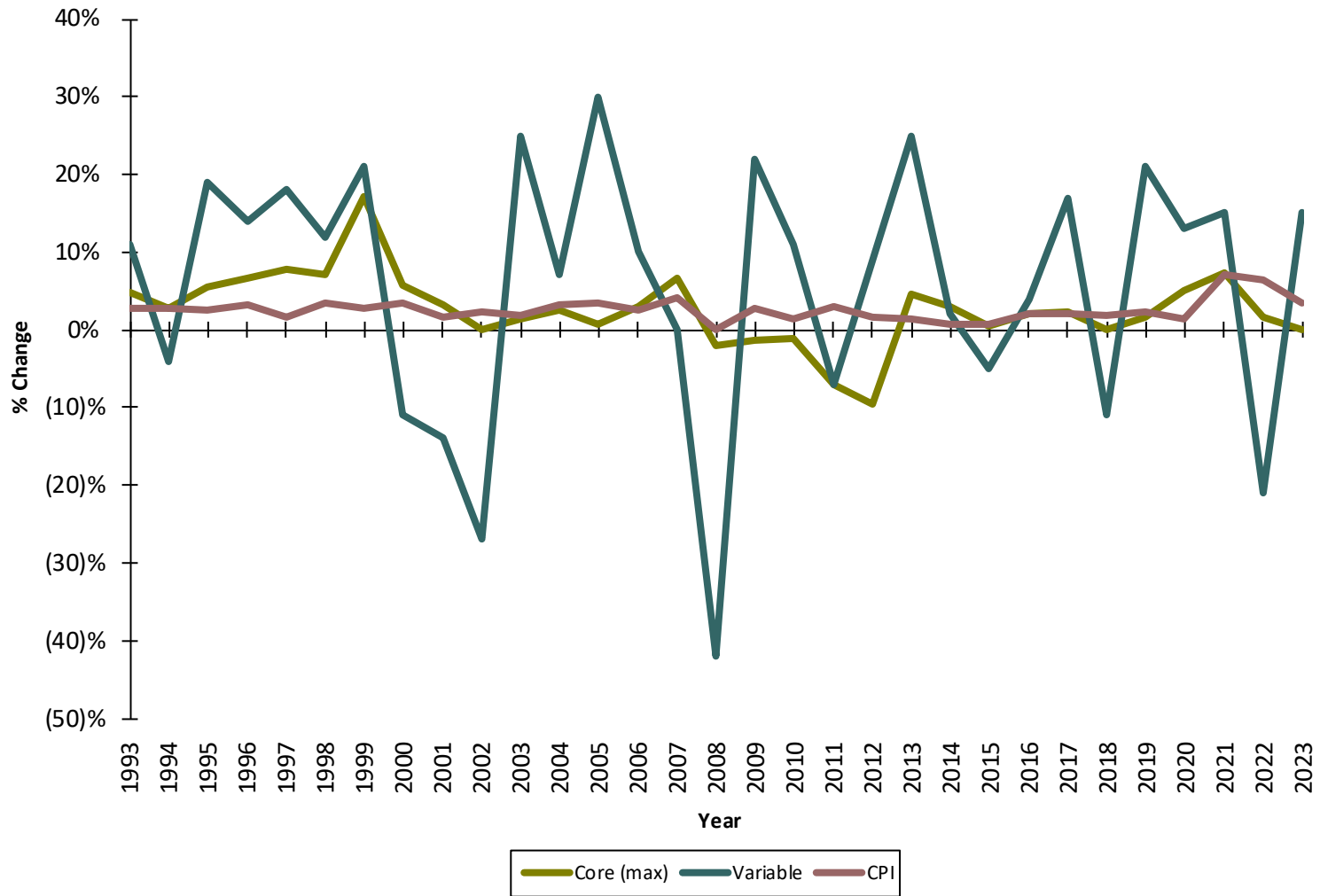
Variable Annuities Comparative Statement 1989 Through 2023

Valuation Date	Number	\$ Millions				Change in	
		Annual Annuities	Fund Balance	Actuarial Reserve	Ratio	Annuities	CPI*
1989	18,502	\$ 75.9	\$ 878.1	\$ 756.5	1.161	16.0 %	4.6 %
1990	19,922	101.0	868.6	1,013.4	0.857	(14.0)%	6.2 %
1991	20,538	91.5	1,101.3	929.7	1.184	18.0 %	3.0 %
1992	20,968	112.6	1,208.6	1,147.4	1.053	5.0 %	3.0 %
1993	21,623	123.7	1,407.9	1,268.6	1.110	11.0 %	2.7 %
1994	22,248	144.6	1,418.0	1,487.0	0.954	(4.0)%	2.7 %
1995	22,978	150.2	1,854.2	1,556.0	1.192	19.0 %	2.6 %
1996	23,725	189.8	2,264.9	1,976.7	1.146	14.0 %	3.3 %
1997	24,462	228.2	2,800.0	2,371.5	1.181	18.0 %	1.7 %
1998	25,424	289.5	3,400.5	3,035.5	1.120	12.0 %	1.6 %
1999	26,257	345.8	4,432.9	3,659.1	1.212	21.0 %	2.7 %
2000	27,321	445.3	4,211.4	4,749.3	0.887	(11.0)%	3.4 %
2001	28,314	424.4	3,901.8	4,547.4	0.858	(14.0)%	1.6 %
2002	28,662	374.0	2,899.3	3,999.1	0.726	(27.0)%	2.4 %
2003	29,496	273.3	3,635.9	2,892.2	1.257	25.0 %	1.9 %
2004	30,270	346.0	3,909.9	3,654.5	1.070	7.0 %	3.3 %
2005	31,499	376.5	4,092.7	3,970.7	1.031	3.0 %	3.4 %
2006	32,683	391.8	4,594.2	4,145.2	1.108	10.0 %	2.6 %
2007	33,880	432.6	4,625.0	4,563.7	1.013	0.0 %	4.1 %
2008	34,927	427.0	2,574.5	4,491.0	0.573	(42.0)%	0.1 %
2009	34,836	240.3	3,078.4	2,512.7	1.225	22.0 %	2.7 %
2010	35,866	288.4	3,340.6	3,005.4	1.111	11.0 %	1.5 %
2011	38,949	330.3	3,197.9	3,462.9	0.924	(7.0)%	3.0 %
2012	39,873	304.6	3,463.9	3,169.6	1.093	9.0 %	1.7 %
2013	40,317	324.5	4,187.3	3,347.0	1.251	25.0 %	1.5 %
2014	39,420	386.5	3,995.4	3,917.1	1.020	2.0 %	0.8 %
2015	40,152	387.8	3,704.8	3,910.1	0.947	(5.0)%	0.7 %
2016	40,647	363.6	3,792.0	3,645.1	1.040	4.0 %	2.1 %
2017	40,877	369.9	4,324.9	3,682.1	1.175	17.0 %	2.1 %
2018	41,187	425.8	3,738.6	4,207.6	0.891	(10.0)%	1.9 %
2019	41,777	379.7	4,519.4	3,728.6	1.212	21.0 %	2.3 %
2020	41,753	449.7	4,954.0	4,383.0	1.130	13.0 %	1.4 %
2021	42,251	502.6	5,618.0	4,866.0	1.155	15.0 %	7.0 %
2022	43,007	578.5	4,403.0	5,586.5	0.788	(21.0)%	6.5 %
2023	43,560	457.8	5,089.2	4,404.8	1.155	15.0 %	3.4 %
35-Year Average						3.8 %	2.7 %
20-Year Average						3.1 %	2.6 %
10-Year Average						4.2 %	2.8 %
5-Year Average						7.4 %	4.1 %

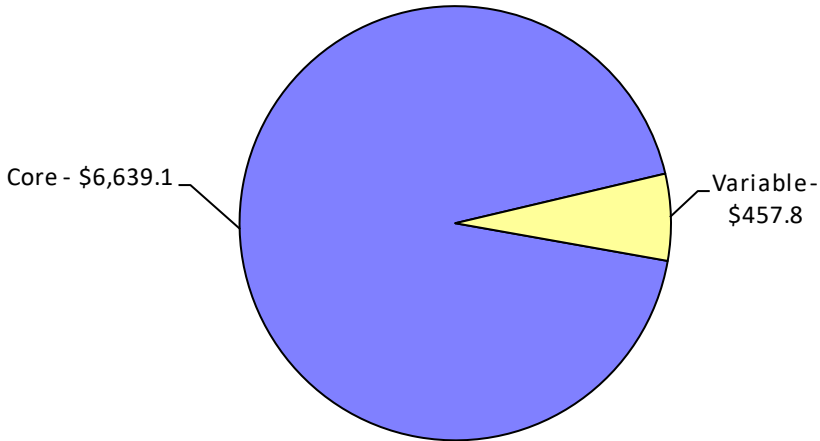
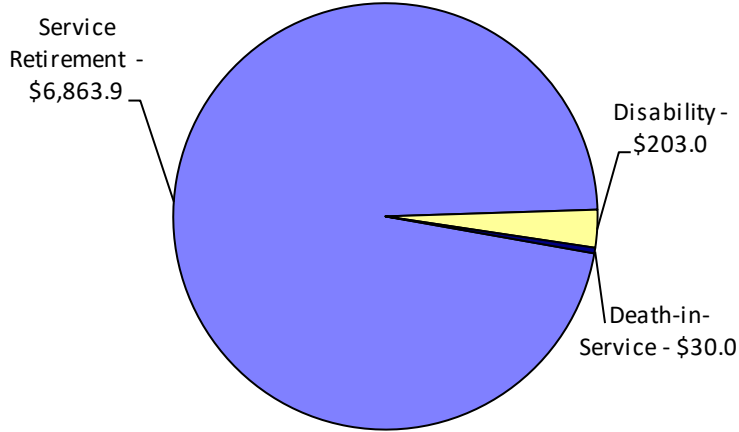
* CPI percentage increase determined by ratio of current year CPI-U67 December index over prior year December index.



History of % Changes in Annuities and CPI



Annual Annuities Being Paid by Type \$ Millions



Annuities Being Paid Tabulated by Year of Retirement⁽¹⁾ (\$1,000s annually)

Year Ret'd ⁽²⁾	Core Annuities				Variable Annuities				Avg. Total Annuity
	No.	Initial	Increases	Total	No.	Initial	Increases	Total	
2023	9,036	\$ 265,854	\$ 0	\$ 265,854	1,744	\$ 18,960	\$ 0	\$ 18,960	\$35,526
2022	10,997	301,896	2,631	304,527	1,882	23,389	(4,909)	18,480	32,525
2021	10,599	284,907	15,922	300,829	1,677	17,079	(1,539)	15,540	32,832
2020	10,664	269,345	32,582	301,927	1,525	13,647	369	14,016	32,014
2019	10,242	251,311	39,522	290,833	1,526	10,018	2,427	12,445	32,233
2018	10,045	245,741	40,804	286,545	1,471	11,110	1,311	12,421	32,345
2017	9,638	226,183	40,679	266,862	1,439	7,926	2,442	10,368	31,396
2016	9,936	226,776	46,205	272,981	1,500	8,013	2,888	10,901	31,375
2015	10,014	227,453	49,706	277,159	1,610	8,594	2,512	11,106	31,248
2014	9,046	192,476	45,995	238,471	1,631	8,347	2,657	11,004	30,090
2013	9,336	192,776	54,977	247,753	1,608	6,570	4,256	10,826	30,208
2012	9,177	192,064	60,210	252,274	1,629	5,680	4,519	10,199	31,359
2011	14,688	365,915	115,433	481,348	2,959	13,619	9,128	22,747	38,025
2010	7,964	181,834	57,132	238,966	1,528	5,214	4,453	9,667	34,214
2009	7,432	171,371	54,034	225,405	1,338	3,716	4,690	8,406	34,531
2008	7,887	184,807	58,244	243,051	1,531	9,068	2,833	11,901	33,042
2007	7,620	169,367	53,312	222,679	1,666	10,079	3,151	13,230	31,110
2006	7,300	152,847	48,185	201,032	1,552	10,191	4,516	14,707	29,659
2005	7,217	148,615	46,838	195,453	1,523	10,331	5,028	15,359	29,320
2004	6,370	124,023	39,191	163,214	1,416	9,979	5,893	15,872	28,265
2003	6,249	122,373	38,679	161,052	1,303	8,231	8,132	16,363	28,500
2002	5,756	109,466	34,599	144,065	1,123	10,827	4,895	15,722	27,905
2001	5,775	109,479	34,519	143,998	1,177	16,998	4,217	21,215	28,818
2000	5,547	104,743	33,107	137,850	967	19,224	2,132	21,356	28,962
1999	4,512	73,754	36,059	109,813	779	12,018	4,134	16,152	28,067
1998	4,205	65,504	38,377	103,881	774	10,742	5,429	16,171	28,845
1997	3,301	50,299	35,055	85,354	613	7,151	5,548	12,699	30,004
1996	3,059	45,879	37,501	83,380	636	6,457	6,598	13,055	31,932
1995	2,560	37,328	34,115	71,443	522	4,344	6,130	10,474	32,494
1994	2,159	29,518	29,426	58,944	485	3,973	5,220	9,193	32,201
1993	1,835	24,028	25,467	49,495	415	2,790	4,362	7,152	31,365
1992	1,419	16,930	19,913	36,843	319	2,056	3,487	5,543	30,472
1991	1,141	13,270	17,037	30,307	281	1,435	3,129	4,564	31,330
1990	1,767	21,995	30,515	52,510	457	2,747	4,774	7,521	34,922
1989	1,158	14,285	22,190	36,475	279	1,470	3,193	4,663	36,276
1988	653	5,871	10,432	16,303	174	696	1,821	2,517	29,406
1987	473	3,694	7,077	10,771	127	410	988	1,398	26,746
1986	385	3,164	7,076	10,240	113	404	1,080	1,484	31,859
1985	316	2,502	5,997	8,499	82	194	705	899	30,613
1984	185	1,223	3,271	4,494	51	129	467	596	28,921
Prior	448	1,447	4,745	6,192	128	150	776	926	9,326
Total	238,111	\$5,232,313	\$1,406,759	\$6,639,072	43,560	\$323,976	\$133,842	\$457,818	\$29,805

⁽¹⁾ Includes 1,313 members formerly covered under the LTDI program based on year of termination.

⁽²⁾ The number of retirements during 2023 may not match the number of new retirees on page 8 of this report due to a reporting lag.

As of December 31, 2023, the median annual Core benefit is approximately \$23,400, the median annual Variable benefit is approximately \$6,400 and the median combined benefit is \$25,500.



Liabilities as of December 31, 2023 Tabulated by Year of Retirement⁽¹⁾ (\$1,000s)

Year Ret'd ⁽²⁾	Core Liabilities				Variable Liabilities				Total Liabilities
	No.	Initial	Increases	Total	No.	Initial	Increases	Total	
2023	9,036	\$ 3,617,730	\$ 0	\$ 3,617,730	1,744	\$ 256,983	\$ 0	\$ 256,983	\$ 3,874,713
2022	10,997	4,067,293	35,385	4,102,678	1,882	314,383	(65,978)	248,405	4,351,083
2021	10,599	3,773,118	210,805	3,983,923	1,677	225,098	(20,326)	204,772	4,188,695
2020	10,664	3,536,756	427,724	3,964,480	1,525	171,230	4,633	175,863	4,140,343
2019	10,242	3,279,808	515,728	3,795,536	1,526	128,276	31,074	159,350	3,954,886
2018	10,045	3,181,444	528,313	3,709,757	1,471	135,973	16,041	152,014	3,861,771
2017	9,638	2,878,240	520,708	3,398,948	1,439	99,538	30,666	130,204	3,529,152
2016	9,936	2,869,170	589,762	3,458,932	1,500	98,201	35,388	133,589	3,592,521
2015	10,014	2,824,569	621,973	3,446,542	1,610	104,005	30,406	134,411	3,580,953
2014	9,046	2,331,603	562,778	2,894,381	1,631	98,500	31,356	129,856	3,024,237
2013	9,336	2,294,077	660,582	2,954,659	1,608	76,335	49,451	125,786	3,080,445
2012	9,177	2,245,433	709,812	2,955,245	1,629	65,163	51,892	117,055	3,072,300
2011	14,688	4,187,577	1,325,095	5,512,672	2,959	148,138	99,287	247,425	5,760,097
2010	7,964	1,998,275	631,099	2,629,374	1,528	55,493	47,385	102,878	2,732,252
2009	7,432	1,842,263	583,394	2,425,657	1,338	37,954	47,901	85,855	2,511,512
2008	7,887	1,955,020	617,811	2,572,831	1,531	91,458	28,563	120,021	2,692,852
2007	7,620	1,763,919	556,584	2,320,503	1,666	101,863	31,834	133,697	2,454,200
2006	7,300	1,549,986	490,154	2,040,140	1,552	100,178	44,390	144,568	2,184,708
2005	7,217	1,456,374	459,893	1,916,267	1,523	98,538	47,952	146,490	2,062,757
2004	6,370	1,170,242	370,107	1,540,349	1,416	93,166	55,014	148,180	1,688,529
2003	6,249	1,118,747	353,970	1,472,717	1,303	75,370	74,470	149,840	1,622,557
2002	5,756	965,117	305,084	1,270,201	1,123	96,927	43,833	140,760	1,410,961
2001	5,775	913,040	287,950	1,200,990	1,177	139,159	34,526	173,685	1,374,675
2000	5,547	833,010	263,163	1,096,173	967	151,007	16,746	167,753	1,263,926
1999	4,512	560,623	272,953	833,576	779	89,461	30,770	120,231	953,807
1998	4,205	470,158	275,273	745,431	774	74,012	37,404	111,416	856,847
1997	3,301	340,508	236,707	577,215	613	48,280	37,456	85,736	662,951
1996	3,059	293,280	239,119	532,399	636	39,119	39,974	79,093	611,492
1995	2,560	225,008	205,555	430,563	522	25,389	35,832	61,221	491,784
1994	2,159	167,116	166,528	333,644	485	22,083	29,021	51,104	384,748
1993	1,835	128,738	136,802	265,540	415	14,177	22,149	36,326	301,866
1992	1,419	85,807	101,184	186,991	319	10,025	16,998	27,023	214,014
1991	1,141	63,411	81,568	144,979	281	6,642	14,489	21,131	166,110
1990	1,767	102,545	142,511	245,056	457	12,454	21,641	34,095	279,151
1989	1,158	61,120	95,237	156,357	279	6,066	13,176	19,242	175,599
1988	653	24,580	43,767	68,347	174	2,701	7,065	9,766	78,113
1987	473	14,781	28,388	43,169	127	1,555	3,746	5,301	48,470
1986	385	11,413	25,629	37,042	113	1,427	3,813	5,240	42,282
1985	316	9,105	22,074	31,179	82	713	2,589	3,302	34,481
1984	185	4,287	11,555	15,842	51	454	1,649	2,103	17,945
Prior	448	5,471	18,160	23,631	128	497	2,556	3,053	26,684
Total	238,111	\$59,220,762	\$13,730,884	\$72,951,646	43,560	\$3,317,991	\$1,086,832	\$4,404,823	\$77,356,469

⁽¹⁾ Includes 1,313 members formerly covered under the LTDI program based on year of termination.

⁽²⁾ The number of retirements during 2023 may not match the number of new retirees on page 8 of this report due to reporting lag.



Comparison of Actual vs. Expected Deaths Among Retired Lives (Normal Retirement Only) During 2023

Age	Male Deaths			Female Deaths			Total Deaths		
	Actual	Expected	Exposure	Actual	Expected	Exposure	Actual	Expected	Exposure
30-34									
35-39						3			3
40-44						7			7
45-49			12			49			61
50-54	5	2	1,216	2		620	7	2	1,836
55-59	23	19	5,661	23	20	7,217	46	39	12,878
60-64	73	55	10,735	60	71	17,415	133	126	28,150
65-69	181	151	17,253	149	190	28,943	330	341	46,196
70-74	377	320	19,914	317	377	32,031	694	697	51,945
75-79	456	488	16,571	470	520	23,808	926	1,008	40,379
80-84	531	562	10,153	555	612	14,509	1,086	1,174	24,662
85-89	554	563	5,448	663	708	8,860	1,217	1,271	14,308
90-94	414	430	2,372	631	647	4,427	1,045	1,077	6,799
95-99	145	139	497	377	332	1,370	522	471	1,867
100 & Up	22	20	50	73	76	210	95	96	260
Totals	2,781	2,749	89,882	3,320	3,553	139,469	6,101	6,302	229,351
Prior Year									
Totals	2,749	2,641	88,444	3,455	3,419	135,772	6,204	6,060	224,216
Average									
Ages	81.5	82.0	72.2	84.1	83.5	72.6	82.9	82.8	72.5



SECTION F

APPENDIX

Actuarial Assumptions Used in the Retired Life Actuarial Valuation

The interest rate used in the valuation was 5.0% per year, compounded yearly, as provided in Section 40.02 of the Wisconsin Statutes. The liability for current dividends was calculated assuming those dividends would always be paid. However, continued payment of those dividends is not guaranteed. Unfavorable investment performance or other factors could cause all or a portion of those dividends to be rolled back. If that happened, liabilities would be lower than reported in this valuation. The mortality table used in the valuation was the 2020 WRS Experience Table, as adopted by the Board in connection with the 2018-2020 Experience Study. This table includes margin for future improvements in mortality by incorporating 100% of the MP-2021 fully generational mortality projection scale. The impact of the new mortality tables was minor, so the new tables were fully recognized in the 2021 valuation.

Single Life Retirement Values 2020 WRS Experience Table – with 5% Interest

Sample Attained Ages in 2023	Present Value of \$1 Monthly for Life		Future Life Expectancy (years)		Probability of Death Next Year	
	Males	Females	Males	Females	Males	Females
40	\$216.74	\$218.40	47.2	49.3	0.065%	0.043%
45	208.80	210.91	42.0	44.0	0.083%	0.055%
50	198.73	201.49	36.8	38.8	0.122%	0.086%
55	186.28	190.05	31.7	33.7	0.242%	0.222%
60	171.45	176.66	26.7	28.8	0.416%	0.347%
65	154.03	160.48	22.0	24.0	0.679%	0.496%
70	133.88	141.17	17.5	19.3	1.126%	0.786%
75	111.37	119.15	13.4	15.0	2.045%	1.493%
80	87.79	95.72	9.8	11.0	3.902%	2.994%
85	65.19	72.73	6.8	7.8	7.533%	5.909%

The values shown above are for non-disabled participants. Sample values for disabled participants are as follows:

Sample Attained Ages in 2023	Present Value of \$1 Monthly for Life		Future Life Expectancy (years)		Probability of Death Next Year	
	Males	Females	Males	Females	Males	Females
40	\$175.71	\$179.24	32.3	35.1	1.001%	0.879%
45	165.16	168.81	28.3	31.0	1.249%	1.121%
50	153.72	158.68	24.6	27.3	1.724%	1.578%
55	142.05	149.28	21.3	23.8	2.294%	2.005%
60	130.34	139.27	18.3	20.7	2.920%	2.367%
65	118.28	126.98	15.5	17.6	3.489%	2.511%
70	104.86	111.70	12.9	14.4	4.104%	2.921%
75	89.25	94.26	10.2	11.3	5.229%	4.090%
80	72.37	76.33	7.8	8.5	7.455%	6.383%
85	56.23	59.93	5.7	6.3	11.258%	10.238%



Statutory Provisions – Post-Retirement Adjustments

Core Annuities – 40.27(2)

“CORE ANNUITY RESERVE SURPLUS DISTRIBUTIONS. Surpluses in the core annuity reserve established under s. 40.04 (6) and (7) shall be distributed by the board if the distribution will result in at least a 0.5% increase in the amount of annuities in force, except as otherwise provided by the department by rule, on recommendation of the actuary, as follows:

(a) The distributions shall be expressed as percentage increases in the amount of the monthly annuity in force, including prior distributions of surpluses but not including any amount paid from funds other than the core annuity reserve fund, preceding the effective date of the distribution. For purposes of this subsection, annuities in force include any disability annuity suspended because the earnings limitation had been exceeded by that annuitant in that year.

(b) Prorated percentages based on the annuity effective date may be applied to annuities with effective dates during the calendar year preceding the effective date of the distribution, as provided by rule, but no other distinction may be made among the various types of annuities payable from the core annuity reserve.

(c) The distributions shall not be offset against any other benefit being received but shall be paid in full, nor shall any other benefit being received be reduced by the distributions. The annuity reserve surplus distributions authorized under this subsection may be revoked by the board in part or in total as to future payments upon recommendation of the actuary if a deficit occurs in the core annuity reserves and such deficit would result in a 0.5 percent or greater decrease in the amount of annuities in force, except as otherwise provided by the department by rule.

(d) Notwithstanding s 40.03 (2) (i), (7) (d), and (8) (d), the department may promulgate rules under this subsection without the approval of the teachers retirement board and the Wisconsin retirement board.”

Variable Annuities – 40.28(2)

“Whenever the balance in the variable annuity reserve, as of December 31 of any year, exceeds or is less than the then present value of all variable annuities in force, determined in accordance with the rate of interest and approved actuarial tables then in effect, by at least 2% of the present value of all variable annuities in force, the amount of each variable annuity payment shall be proportionately increased or decreased, disregarding fractional percentages, and effective on a date determined by rule, so as to reduce the variance between the balance of the variable annuity reserve and the present value of variable annuities to less than one percent.”

Narrative Regarding the Development of Core and Variable Annuity Adjustments Shown on Pages 6 and 16

- 1. SWIB Net of Fee Investment Return**
State of Wisconsin Investment Board net earnings rate on the Core/Variable Fund.
- 2. MRA Adjustment (Core)/Adjustment to Published Effective Rate (Variable)**
Item 3 below minus Item 1 above. For core annuities, this is the MRA adjustment which takes into account five-year smoothing of gains and losses.
- 3. Published Effective Earnings Rate**
The earnings rate published by DETF is funds' earnings credits expressed as a percentage of the beginning year balance adjusted for benefit payments and reserve transfers.
- 4. Adjustment to Relate Earnings to Average Core/Variable Annuity Balance**
Item 5 below minus Item 3 above.
- 5. Earnings Rate Based on Average Balance**
This is similar to the published earnings rate except that the rate is determined as a percentage of the average balance during the year instead of the adjusted beginning of year balance.
- 6. Expected Core/Variable Adjustment before Adjustments**
The relative difference in fund growth based on actual versus the 5% assumed earnings rates.
- 7. Adjustment to Relate Average Asset to Ending Liability**
The final core/variable adjustment is calculated based on the end of year assets divided by the end of year liabilities. Since the calculations in Items 5 and 6 are based on average (approximately mid-year) balances, this adjustment is needed so that the final adjustment will be based on the end of year liabilities.
- 8. Carryover from Last Year Due to Timing of Distribution and Accounting Adjustments (and Truncation for Variable Annuity)**
The core or variable annuity adjustments are made effective April 1 of each year. This adjustment takes into account the fact that the prior year core/variable adjustment was in effect for less than a full year as well as any accounting adjustments made to the asset value at the beginning of the year. This adjustment also carries over any truncated or rounded amounts from the prior year.

Narrative Regarding the Development of Core and Variable Annuity Adjustments Shown on Pages 6 and 16

9. Experience Study Adjustment

A study is conducted for WRS every three years to analyze the assumptions that are made in the valuation versus the experience that actually occurred. If the results of the study show material changes in experience, WRS generally adopts a new set of assumptions. When assumptions are changed, this item displays the effect of the change on the core/variable adjustment. Although the mortality table now includes a projection for expected future improvements in mortality, each valuation may phase into the full table incrementally over the three year experience study cycle, depending on the size of the adjustment. By increasing reserves gradually each year, instead of all at once every three years, the effect on core and variable annuity adjustments will also be more gradual.

10. Experience and Other Effects

After making all other known adjustments, this is the remainder of all other experience. Changes here are primarily attributable to mortality experience and, generally to a lesser extent, on any data adjustments.

11. Statutory Adjustment to Round/Truncate

By statute, the core annuity adjustment is calculated to the nearest one-tenth of a percent. For the variable annuity adjustment, the adjustment is truncated to a whole percent. This is the adjustment made from the calculated core/variable annuity adjustment without rounding/truncation to the statutory rate.

12. Computed Average Core/Variable Annuity Adjustment

This is the end of year asset value divided by the end of year liability. It is reconciled to the published earnings rate (Item 3) by making the adjustments in Items 6 through 11.

13. Adjustment for Members Not Eligible for Negative Dividend

This is an adjustment that is sometimes made for Core Fund recipients to reflect that some members may not have any remaining dividends and hence are not subject to a further negative adjustment.

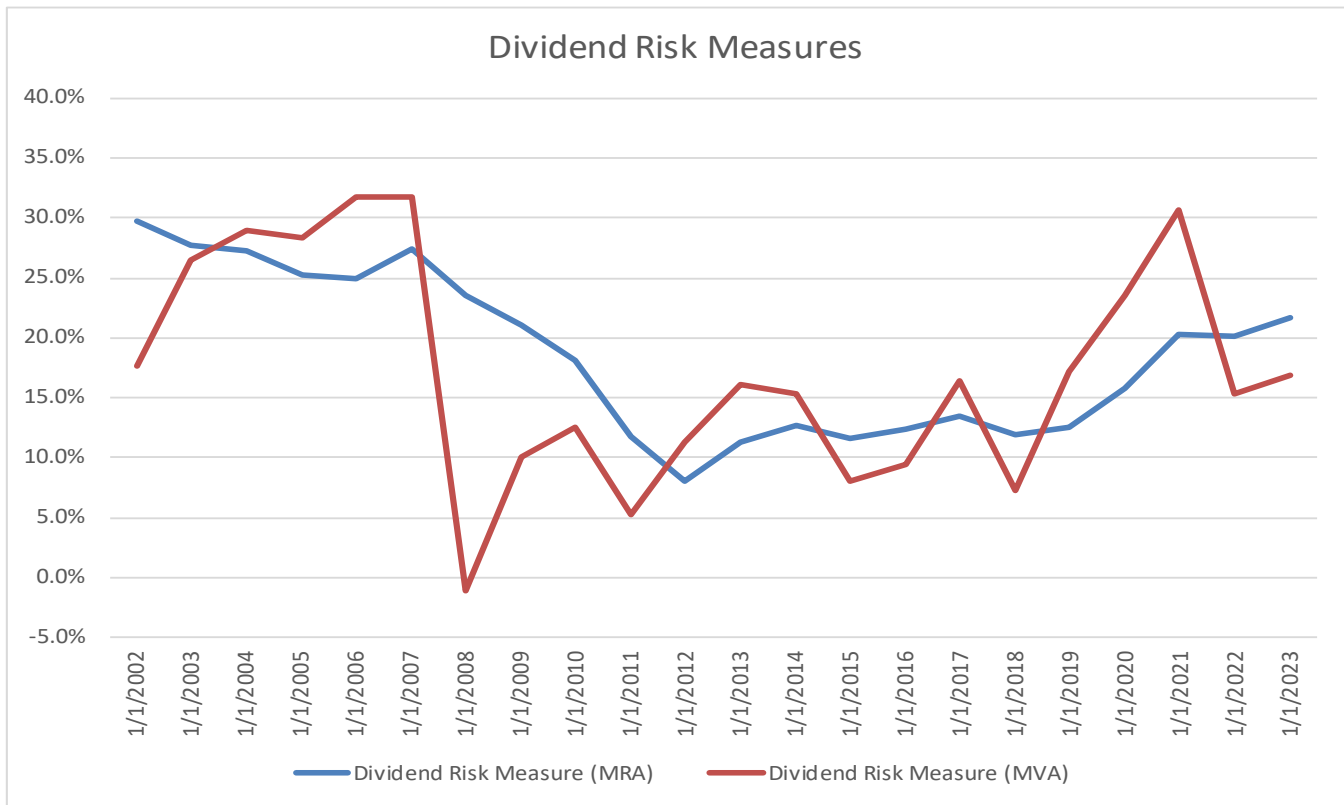
14. Final Maximum Computed Core Annuity Adjustment

When there is a negative core annuity adjustment for the Core Fund, this will affect people differently based upon year of retirement. In years when there is a negative core annuity adjustment, this will be the largest negative core annuity adjustment that will occur in the Core Fund. If greater in absolute value than 0.5% of core annuities, Item 12 plus Item 13, otherwise 0%.

Dividend Risk Measure

In accordance with the Funding Policy, a Dividend Risk Measure (DRM) is calculated annually.

The Dividend Risk Measure is defined as the dividend liability divided by the total retiree core assets in the MRA. For 2023, dividend liability (after the dividend adjustment in April) is approximately \$16.4 billion. As of December 31, 2023, the total retiree assets are approximately \$75.6 billion, resulting in a DRM of 21.7%. This means that the retiree assets would need to decrease by 21.7% to deplete the existing dividend liability. The higher the DRM ratio, the less likely it is for the dividend liability to be depleted. Shown below is the historical DRM measure based on the Market Recognition account as well as the DRM measure on a market value basis.



In December 2021, the Actuarial Standards Board (ASB) adopted a revision to Actuarial Standard of Practice (ASOP) No. 4, Measuring Pension Obligations and Determining Pension Plan Costs or Contributions. Effective for valuation dates after February 15, 2023, the revised ASOP No. 4 requires the calculation and disclosure of a liability referred to by the ASOP as the “Low-Default Risk Obligation Measure” (LDRM). This measure will be provided in the active lives valuation report.