



WISCONSIN LEGISLATIVE COUNCIL

# 2017-18 COMPARATIVE STUDY OF MAJOR PUBLIC EMPLOYEE RETIREMENT SYSTEMS

Prepared by:

Daniel Schmidt, Principal Analyst  
Wisconsin Legislative Council

February 2019 (Revised November 2021)

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## INTRODUCTION

This report compares significant features of major state and local public employee retirement systems in the United States. The report compares retirement benefits provided to general employees and teachers, rather than benefits applicable only to narrower categories of employees such as police, firefighters, or elected officials. Generally, the report has been prepared every two years since 1982 by the Wisconsin Retirement Research Committee staff or the Legislative Council staff.

The 2017-18 Report includes data from the same 87 public employee retirement systems that were compared in the prior report. Although this report does not cover all major public employee retirement systems, it describes at least one statewide plan from each state. The same public employee retirement systems have been covered in previous reports in an effort to show long-term trends in public employee retirement systems.

The methodology for preparing the 2017-18 Report was to primarily use the data reported to the Public Plans Data database (<http://publicplansdata.org>), and secondarily use information from the 2017 or 2018 actuarial analyses of the respective plans where data was collected for the Public Plans Data database (in a few instances, the 2016 analyses were used where the 2017 analyses were not available). We thank the Center for Retirement Research at Boston College, the Center for State and Local Government Excellence and the National Association of State Retirement Administrators for the use of this valuable tool.

In most cases, the public employee retirement systems in this report have features that differ according to when an employee was initially hired or the identity of the employer. Where this situation exists, the report describes the features of the plan applicable to the employees who are most recently hired.

A feature of the 2017-18 Report is a discussion of how retirement benefits and certain other aspects of the Wisconsin Retirement System (WRS) compare to the other plans in this report. This feature of the report is intended to be useful to Wisconsin legislators and persons interested in comparing the WRS to other plans, while maintaining the structure of prior reports for the convenience of retirement system administrators and policymakers from other states.

While attempts were made to ensure the accuracy of the large amount of data in this report, it is inevitable that errors have occurred in both prior and current reports. Please communicate reports of any errors or comments you may have about the report to: Daniel Schmidt, Principal Analyst and Operations Manager; Wisconsin Legislative Council Staff; Suite 401, One East Main Street; Madison, Wisconsin, 53703; or at the following e-mail address: [dan.schmidt@legis.wisconsin.gov](mailto:dan.schmidt@legis.wisconsin.gov).

Any corrections made to the report will be included in the version maintained at the Wisconsin Legislative Council website: <http://www.legis.wisconsin.gov>.

# PART I

## DESCRIPTION OF RETIREMENT SYSTEMS IN REPORT

### A. INTRODUCTION

Chart 1, on pages 5 to 7, provides descriptive data pertaining to the public employee retirement systems covered in this report.

### B. NUMBER OF PARTICIPANTS

The 87 plans in the 2017-18 Report provide pension coverage for 11,395,688 active employees and 8,328,086 retirees and beneficiaries, for a total of 19,723,774 participants. This total is 6.2% higher than the 18,579,652 participants in the 2015 Report. The number of active participants has increased between the 2015 and 2017-18 Reports by 3.2% while the number of beneficiaries and annuitants has increased by 10.5% in the same time period.

### C. CATEGORIES OF EMPLOYEES INCLUDED IN PLANS

The column entitled “Employee Coverage” in Chart 1 shows whether each plan provides pension coverage to state employees (“S”), local employees (“L”), teachers (“T”), or some combination thereof. The 87 plans are categorized as follows:

<u>Employee Coverage</u>	<u>Number of Plans</u>
State employees only	13
Teachers only	26
Local employees only	10
State and local employees	13
State employees and teachers	3
State employees, local employees, and teachers	22

See Figure 1, *2017-18 Employee Coverage*, for a graphical representation of the categories.

### D. RATIO OF ACTIVE EMPLOYEES TO RETIRED EMPLOYEES

Chart 1 also shows the ratio of active employees to retired employees in the 87 systems surveyed. The average ratio has generally declined over prior years and continued to decline in 2017-18. For 2017-18, the average ratio was 1.48 while the comparable figures for the 2015 Report, the 2012 Report, the 2010 Report, the 2008 Report, the 2006 Report, and the 2004 Report respectively, were 1.74, 1.70, 1.87, 2.00, 2.14, and 2.24 (see Figure 2, *Participant Growth 2008 to 2017*). Eighty-three of the systems had an active employees to retired employees ratio of less than two, with 12 systems having a ratio of less than one. For comparison, in the 2000 Report, 17 of the systems had an active employees to retired employees ratio of less than two.

### E. SOCIAL SECURITY COVERAGE

In 70 of the 87 plans, participants are also covered under the federal Social Security program. Of the 17 public employee retirement systems included in this report that do not provide Social Security coverage, 10 represent pension plans covering teachers only. The decision on whether to participate in the Social Security program was at one time elective, rather than mandatory, for public employers. However, for those employers who have elected coverage, future participation is mandatory.

## F. TRENDS

Chart 1 shows a small increase in the total number of participants in the plans surveyed. The number of active employees has increased slightly, perhaps indicating an increase in hiring of government employees, while the number of beneficiaries and annuitants has increased significantly, likely due to an increase in baby boomer retirements. Ultimately, this has resulted in a general trend toward declining ratios of active to retired participants since 2000, but minor change since the 2015 Report. As compared to the 2015 Report, there has been no change in the number of plans whose participants are covered by the federal Social Security program.

## G. THE WRS

In 2017, the WRS had 257,285 active employees and 197,647 beneficiaries and annuitants for a total of 454,932 participants. This total is an increase of 41,678 total participants and is 10.1% higher than the 413,254 participants in the 2015 Report. The number of active employees covered by the WRS increased by 2,271 and the number of beneficiaries and annuitants covered by WRS increased by 39,407 between 2015 and 2017-18. The WRS covers state and local employees and teachers. The ratio of active employees to retired employees in the WRS in 2017-18 is 1.30, which is a decrease from the ratio of 1.61 found in the 2015 Report. The ratio of active employees to retired employees in the WRS for 2017-18 (1.30) is slightly lower than the average ratio for all plans in the report (1.48). WRS employees are generally covered by Social Security.

CHART 1  
PUBLIC RETIREMENT SYSTEMS SURVEYED

	<u>State</u>	<u>Fund Name</u>	<u>Employee Coverage<sup>1</sup></u>	<u>Active Employees</u>	<u>Beneficiaries &amp; Annuitants</u>	<u>Ratio</u>	<u>S.S. Coverage</u>
1	Alabama	ERS	S, L	85,657	48,776	1.76	Yes
2	Alabama	TRS	T	136,941	93,850	1.46	Yes
3	Alaska	PERS	S, L	14,719	34,347	0.43	No
4	Alaska	TRS	T	4,772	12,983	0.37	No
5	Arizona	SRS	S, L, T	206,055	146,651	1.41	Yes
6	Arkansas	PERS	S, L	46,094	36,260	1.27	Yes
7	Arkansas	TRS	T	68,337	48,903	1.40	Yes
8	California	PERS-PERF	S, L	887,220	668,059	1.33	Yes
9	California	TRS	T	445,935	294,874	1.51	No
10	Colorado	PERA	S, L, T	207,769	118,480	1.75	No
11	Connecticut	SERS	S	50,019	48,191	1.04	Yes
12	Connecticut	TRS	T	50,877	36,065	1.41	No
13	Delaware	SEPP	S, T	37,119	27,452	1.35	Yes
14	Florida	FRS	S, L, T	518,622	434,400	1.19	Yes
15	Georgia	ERS	S	60,906	49,475	1.23	Yes
16	Georgia	TRS	T	222,902	122,687	1.82	Yes
17	Hawaii	ERS	S, L, T	65,911	46,927	1.40	Yes
18	Idaho	PERS	S, L, T	70,073	45,468	1.54	Yes
19	Illinois	SERS	S	60,612	72,004	0.84	Yes
20	Illinois	TRS	T	159,585	117,990	1.35	No

21	Illinois	MRF	L	175,566	127,070	1.38	Yes
22	Indiana	PERF	S, L, T	134,909	85,130	1.58	Yes
23	Indiana	TRF	S, L, T	71,225	59,036	1.21	Yes
24	Iowa	PERS	S, L, T	169,909	117,508	1.45	Yes
25	Kansas	PERS	S, L, T	151,687	99,807	1.52	Yes
26	Kentucky	KERS	S	41,281	49,009	0.84	Yes
27	Kentucky	CERS	L	91,693	68,011	1.35	Yes
28	Kentucky	TRS	T	72,130	52,966	1.36	No
29	Louisiana	SERS	S	39,055	50,199	0.78	No
30	Louisiana	TRSL	T	84,228	79,736	1.06	No
31	Maine	PERS	S, L, T	39,836	34,870	1.14	No
32	Maryland	SRPS- RCPB	S, L, T	188,389	151,449	1.24	Yes
33	Massachusetts	SERS	S	90,014	62,259	1.45	No
34	Massachusetts	TRS	T	92,128	65,036	1.42	No
35	Michigan	SERS	S	10,459	59,684	0.18	Yes
36	Michigan	MERS	L	34,843	38,774	0.90	Yes
37	Michigan	PSERS	T	187,735	213,989	0.88	Yes
38	Minnesota	MSRS- SERF	S	50,578	39,333	1.29	Yes
39	Minnesota	PERA - GERP	L	152,867	98,201	1.56	Yes
40	Minnesota	TRA	T	81,811	64,774	1.26	Yes
41	Mississippi	PERS	S, L, T	152,382	102,260	1.49	Yes
42	Missouri	SERS	S	48,910	47,587	1.03	Yes
43	Missouri	LAGERS	L	33,633	21,780	1.54	Yes
44	Missouri	PSRS	T	78,274	59,772	1.31	No
45	Montana	PERS	S, L	29,395	21,805	1.35	Yes
46	Montana	TRS	T	18,917	15,566	1.22	Yes
47	Nebraska	SERS	S	12,836	1,814	7.08	Yes
48	Nebraska	CERS	L	6,710	630	10.65	Yes
49	Nebraska	SRS	T	41,943	23,654	1.77	Yes
50	Nevada	PERS	S, L, T	93,276	55,975	1.67	No
51	New Hampshire	NHRS	S, L, T	47,886	35,694	1.34	Yes
52	New Jersey	PERS	S, L	251,913	175,631	1.43	Yes
53	New Jersey	TPAF	T	154,858	103,528	1.50	Yes
54	New Mexico	PERA	S, L	48,751	38,011	1.28	Yes
55	New Mexico	ERA	T	59,495	47,340	1.26	Yes
56	New York	ERS	S, L	496,441	417,499	1.19	Yes
57	New York	TRS	T	267,761	163,818	1.63	Yes
58	North Carolina	TSERS	S, T	305,013	208,443	1.46	Yes
59	North Carolina	LGERS	L	126,647	65,930	1.92	Yes
60	North Dakota	PERS	S, L	23,243	11,103	2.09	Yes
61	North Dakota	TRF	T	10,874	8,501	1.28	Yes
62	Ohio	PERS	S, L	330,982	225,664	1.47	No
63	Ohio	STRS	T	168,132	158,039	1.06	No
64	Oklahoma	PERS	S, L	38,873	34,579	1.12	Yes
65	Oklahoma	TRS	T	87,795	62,391	1.41	Yes
66	Oregon	PERS- OPSRP	S, L, T	172,483	138,783	1.24	Yes
67	Pennsylvania	SERS	S	102,978	129,473	0.80	Yes

68	Pennsylvania	PSERS	T	255,945	230,014	1.11	Yes
69	Rhode Island	ERS	S, T	24,462	22,289	1.10	Yes
70	South Carolina	SCRS	S, L, T	193,985	140,288	1.38	Yes
71	South Dakota	SRS	S, L, T	40,452	27,218	1.49	Yes
72	Tennessee	CRS	S, L, T	135,047	109,418	1.23	Yes
73	Texas	ERS	S	141,629	107,530	1.32	Yes
74	Texas	TRS	T	864,261	407,768	2.12	No
75	Texas	MRS	L	110,208	62,776	1.76	Yes
76	Utah	SRS- PERS	S, L, T	103,284	62,698	1.65	Yes
77	Vermont	SRS	S	8,620	6,727	1.28	Yes
78	Vermont	TRS	T	10,028	9,021	1.11	Yes
79	Virginia	SRS	S, L, T	332,538	194,103	1.71	Yes
80	Washington	PERS	S, L	156,144	95,543	1.63	Yes
81	Washington	TRS	T	70,915	48,317	1.47	Yes
82	West Virginia	PERS	S, L	36,094	27,053	1.33	Yes
83	West Virginia	TRS	T	34,318	35,964	0.95	Yes
84	Wyoming	WRS	S, L, T	35,013	26,808	1.31	Yes
85	Milwaukee	City	L	11,083	12,888	0.86	Yes
86	Milwaukee	County	L	3,488	8,063	0.43	Yes
87	Wisconsin	WRS	S, L, T	257,285	197,647	1.30	Yes
Totals: (87 Funds)				11,042,042	1,183,792	1.41	

<sup>1</sup>Coverage: S = State; L = Local; T = Teachers

<sup>2</sup>New employees are covered under a Defined Contribution Plan.

<sup>3</sup>Based on post-1995 account.

<sup>4</sup>Cash balance plan.

<sup>5</sup>New hybrid plan for employees hired after 2014.



**Figure 1. 2017-18 Employee Coverage**

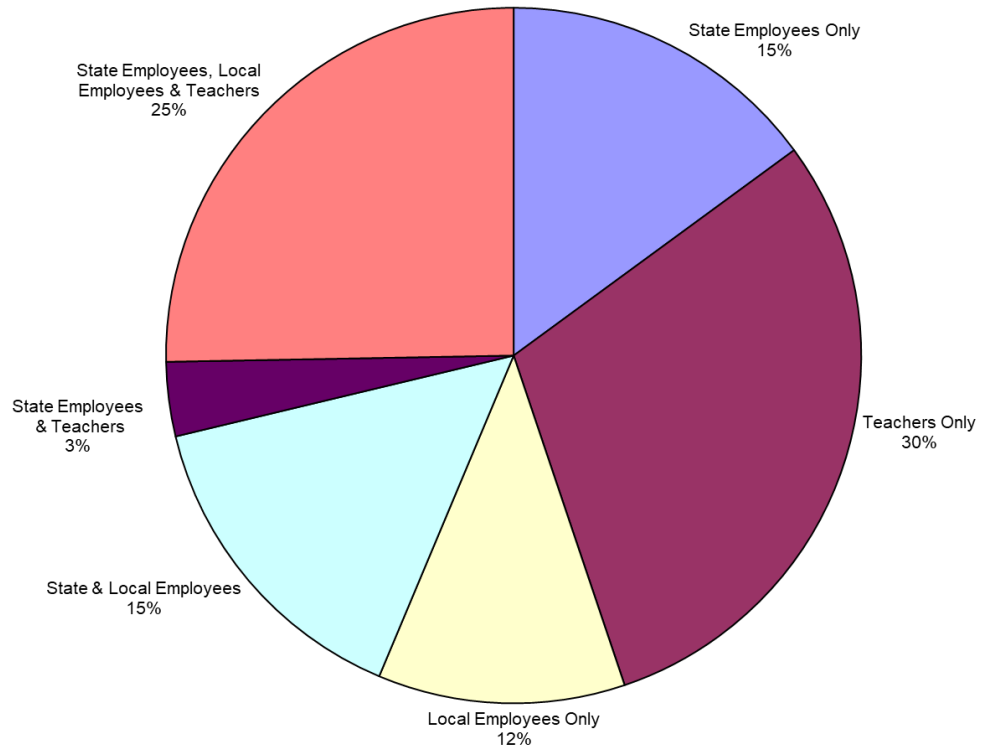
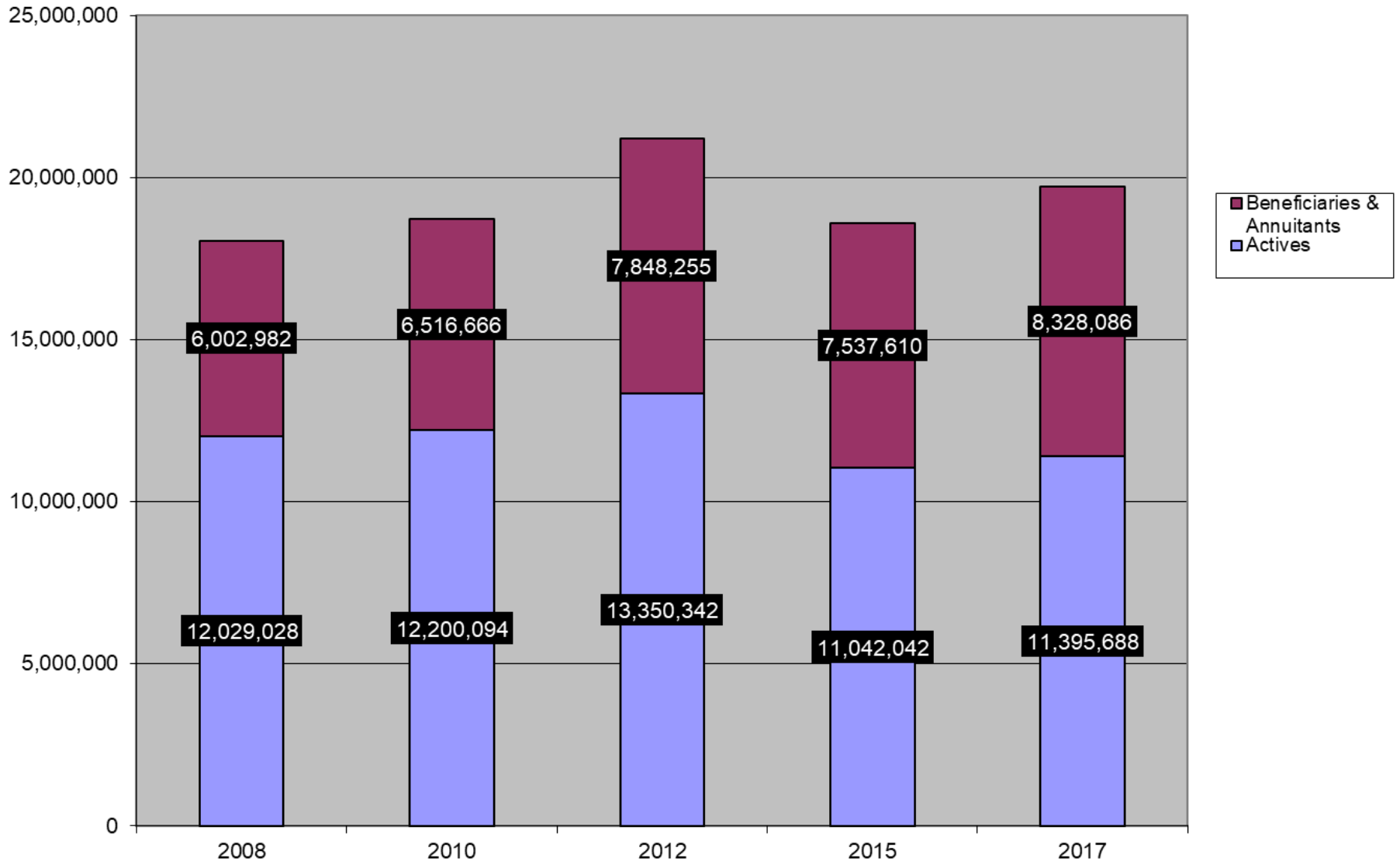


Figure 2. Participant Growth 2008-2017



## PART II

### NORMAL AND EARLY RETIREMENT PROVISIONS

#### A. INTRODUCTION

Chart 2, on pages 14 to 16, shows the normal and early retirement provisions for each of the plans covered in the report. Generally, the plans covered in this report are classified as “defined benefit plans” in which retirement benefits are calculated by a formula that takes into account years of service and final average salary.

Note that some of the defined benefit plans may also contain elements of defined contribution or money purchase plans. These provisions are generally not reflected in Chart 2, which seeks to describe the features of each plan that are standard and that apply to employees in general.

#### B. NORMAL RETIREMENT

“Normal retirement” refers to the age, number of years of service, or both, that a person must attain in order to qualify for full retirement benefits without an actuarial reduction in his or her annuity for early retirement. Most plans in this report have adopted multiple combinations of age and service under which a person may qualify for normal retirement. These are shown in the column entitled “Normal Retirement” in Chart 2.

Some retirement plans integrate normal retirement with the age under which a person is entitled to receive retirement benefits under the Social Security system. Age 65 is the age at which a person is entitled to receive full Social Security benefits, but this age is scheduled to increase to 66 and then to 67 over time.

Age 62 is the earliest age at which a person can receive Social Security retirement benefits, although the amount of the benefits are reduced to reflect the longer payout period. Chart 2 shows that 69 of the 87 plans allow normal retirement at age 62 or earlier for persons with many years of service. In addition, Chart 2 shows that 26 of the 87 plans permit normal retirement at age 62 or earlier with 10 or less years of service. Fifteen of the plans in this report restrict normal retirement to persons who are at least 65.

Some plans that permit persons to retire earlier than age 62 also allow them to elect to increase their annuity prior to age 62 to reflect the amount of Social Security benefits it is estimated that they will receive at that time. The amount of the annuity paid after age 62 is then adjusted to compensate for the earlier payments.

Many of the plans in this report have adopted “**X years and out**” provisions, which allow employees to retire at any age (or at a minimum age) with normal retirement benefits after “X” years of service. The most common provision is 30 years of service combined with a minimum age of 55. The following table shows the number of plans that, in 2015, had in effect “X years and out” provisions and compares these with the number of plans that had in effect “X years and out” provisions in the 2017-18 Report:

	<u>2015</u>	<u>2017-18</u>
35 years of service/age 55 or older	6 plans	6 plans
32 or 33 years of service/age 55 or older	2 plans	5 plans
30 years of service/age 55 or older	23 plans	23 plans
27 or 28 years of service/age 55 or older	3 plans	3 plans
25 years of service/age 55 or older	5 plans	6 plans
20 years of service/age 55 or older	6 plans	5 plans
<b>TOTAL</b>	45 plans	48 plans

See Figure 3, *2017-18 Normal Retirement “X Years and Out” Provisions*, for a graphical representation of the 2017-18 “X years and out” provisions.

In addition to the “X years and out” provisions, some plans have adopted “**Rule of Y**” provisions under which a person can retire with normal retirement benefits when that person's number of years of service, plus his or her age, equals a specified number. The following table shows the number of plans that, in 2017-18, had “Rule of Y” provisions and compares these with the number of plans that had “Rule of Y” provisions in 2015:

	<u>2015</u>	<u>2017-18</u>
Rule of 92	2 plans	2 plans
Rule of 90	10 plans	11 plans
Rule of 88	1 plan	1 plan
Rule of 87	4 plans	4 plans
Rule of 85	6 plans	6 plans
Rule of 80	4 plans	4 plans
<b>TOTAL</b>	27 plans	28 plans

See Figure 4, *2017-18 Normal Retirement “Rule of Y” Provisions*, for a graphical representation of the 2017-18 “Rule of Y” provisions.

## C. EARLY RETIREMENT

Seventy-nine of the 87 plans covered in the 2017-18 Report permit “early retirement” before the normal age and service requirements of the plans have been met. The annuity of a person who elects early retirement is reduced from the amount that would have been received if the person had reached the normal retirement requirements. The early retirement provisions of each of the plans are shown in the column entitled “Early Retirement” in Chart 2. The most common minimum age for early retirement is age 55, with some minimum years of service. The second most common minimum age for early retirement is age 60.

Fifty-eight of the 87 plans in the 2017-18 Report allow early retirement at a minimum age of 55 or more. Five of the 87 plans in the report allow early retirement at a minimum age of less than 55. Eight of the 87 plans in the report do not allow early retirement (see Figure 5, *2017-18 Early Retirement Provisions*).

The annuity of a person who elects to retire before reaching the minimum age and years of service required for normal retirement is subject to a reduction that is commonly referred to as an “**actuarial discount.**” The amount of the reduction for each of the plans is shown in the column entitled “Reduction for Early Retirement” in Chart 2. In many cases, the column in Chart 2 is not able to

show the details of how the amount of the reduction is actually computed, because this amount is frequently different for employees at different ages or with different numbers of years of service or for various classifications of employees. However, the column seeks to demonstrate the most common percentage reduction for each of the plans in the report.

## D. TRENDS

The 2017-18 Report indicates continued reversal of the trend noted in previous reports (2000-2015) that permitted retirement at earlier ages, although this is occurring at a slower pace than in prior years. Between the 2000 and 2004 Reports, nine plans reduced their normal retirement provisions by reducing the minimum age or the number of years of service required, or both. Between the 2004 and 2006 Reports, only two plans did so. Between the 2006 and 2008 Reports, an additional seven plans reduced their normal retirement provisions. Between the 2008 and 2010 Reports, 21 states increased their normal retirement provisions and one decreased its normal retirement provision. Between the 2010 and 2012 Reports, 29 states increased their normal retirement provisions and four decreased their normal retirement provisions. Between 2012 and 2015, nine states increased their normal retirement provisions and no states decreased their normal retirement provisions. Between 2015 and 2017-18, six states increased their normal retirement provisions and three states decreased their normal retirement provisions.

In addition, between the 2000 and 2004 Reports, 10 plans reduced their early retirement provisions by reducing the minimum age or the number of years of service required, or both. Between the 2004 and 2006 Reports, only two plans did so. Between the 2006 and 2008 Reports, an additional eight plans reduced their early retirement provisions. Between the 2008 and 2010 Reports, 11 plans increased their early retirement provisions. Between the 2010 and 2012 Reports, 19 states increased their early retirement provisions. Between the 2012 and 2015 Reports, five states increased their early retirement provisions. Between the 2015 and 2017-18 Reports, three states increased their early retirement provisions and no states decreased them.

## E. THE WRS

The normal retirement requirement for general employees in the WRS is 65 years of age. However, general employees who are at least 57 years of age and who have at least 30 years of service can retire without an actuarial discount. Also, general employees in the WRS may retire at 55 years of age with an actuarial discount. The amount of actuarial discount for early retirement for general employees in the WRS varies according to the employee's number of years of service.

CHART 2  
NORMAL AND EARLY RETIREMENT REQUIREMENTS

	<u>State</u>	<u>Fund Name</u>	<u>Coverage*</u>	<u>Normal Retirement (Age/Years)</u>	<u>Early Retirement (Age/Years)</u>	<u>Annual Reduction for Early Retirement</u>
1	Alabama	ERS	S, L	62/10	None	N/A
2	Alabama	TRS	T	62/10	None	N/A
3	Alaska	PERS	S, L	60/5; any/30	55/5	Actuarially determined
4	Alaska	TRS	T	60/8; any/20	55/8	Actuarially determined
5	Arizona	SRS	S, L, T	65; 62/10; 60/25; 55/30	50/5	Table
6	Arkansas	PERS	S, L	65/5; any/28	55/5; any/25	6% yr
7	Arkansas	TRS	T	60/5; any/28	any/25	5% yr < 28 yrs/age 60
8	California	PERS- PERF	S, L	62/5	52/5	Multiplier varies
9	California	TRS	T	62/5	55/5	6% yr
10	Colorado	PERA	S, L, T	65/5; 60/R90; any/35	50/25; 55/20; 60/5	6% yr to 55; 3% yr 55 to 60; 4% yr after 60
11	Connecticut	SERS	S	63/25; 65/10	58/10	6% yr
12	Connecticut	TRS	T	60/20; any/35	any/25; 55/20; 60/10	3% yr
13	Delaware	SEPP	S, T	65/10; 60/20; any/30	55/15; any/25	4.8% yr
14	Florida	FRS	S, L, T	65/8; any/33	any/8	5% yr
15	Georgia	ERS	S	60/10; any/30	any/25	7% yr
16	Georgia	TRS	T	60/10; any/30	any/25	7% yr
17	Hawaii	ERS	S, L, T	65/10; 60/30	55/20	5% yr
18	Idaho	PERS	S, L, T	65/5; R90	55/5	3% yr for 1st 5 yr, then 5.75 yr
19	Illinois	SERS	S	60/8; any/35	55/25	6% yr
20	Illinois	TRS	T	67/10	62/10	6% a yr
21	Illinois	MRF	L	67/10; 62/35	62/10	6% a yr
22	Indiana	PERF	S, L, T	65/10; 60/15; 55/R85	50/15	5% a yr to 60; 1.2% a yr age 60 to 65
23	Indiana	TRF	S, L, T	65/10; 60/15; 55/R85	50/15	5% a yr to 60; 1.2% a yr age 60 to 65
24	Iowa	PERS	S, L, T	65; 62/20; 55/R88	55/4	6% a yr
25	Kansas	PERS	S, L, T	65/5; 60/30	55/10	Factor-based -- 35% at age 60; 57.5% at age 55
26	Kentucky	KERS	S	65/5; 57/R87	N/A	Account balance converted to annuity
27	Kentucky	CERS	L	65/5; 57/R87	N/A	Account balance converted to annuity
28	Kentucky	TRS	T	60/5; any/27	55/10	6% a yr
29	Louisiana	SERS	S	62/5	any/20	Actuarially determined
30	Louisiana	TRSL	T	62/5	any/20	Actuarially determined
31	Maine	PERS	S, L, T	65/5	any/25	6% a yr
32	Maryland	SRPS- RCPB	S, L, T	65/10; R90	60/15	6% a yr
33	Massachusetts	SERS	S	67/10	60/10	.125% a yr, for each yr before 67
34	Massachusetts	TRS	T	67/10	60/10	.125% a yr, for each yr before 67
35	Michigan	SERS	S	60/10; 55/30	55/15	6% a yr
36	Michigan	MERS	L	60/10; 55/15-30; 50/25 or 30	55/15; 50/25	Table
37	Michigan	PSERS	T	60/10; 55/30	55/15	6% a yr
38	Minnesota	MSRS- SERF	S	65/5	55/5	2.5% a yr

39	Minnesota	PERA - GERP	L	65/5	55/5	Table
40	Minnesota	TRA	T	66/3	55/3	Table
41	Mississippi	PERS	S, L, T	60/8; any/30	any less than 30	Table
42	Missouri	SERS	S	67/5; 55/R90	62/5	6% a yr
43	Missouri	LAGERS	L	60/5; R80 option	55/5	6% a yr
44	Missouri	PSRS	T	60/5; R80; any/30	55/5	Actuarially determined
45	Montana	PERS	S, L	65/5; age 70	55/5	Actuarially determined
46	Montana	TRS	T	60/5; 55/30	55/5	Actuarially determined
47	Nebraska	SERS	S	55	N/A	Cash balance
48	Nebraska	CERS	L	55	N/A	Cash balance
49	Nebraska	SRS	T	65; 55/R85	60/5; any/35	3% a yr
50	Nevada	PERS	S, L, T	65/5; 62/10; 55/30; any/33 1/3	any/5	6% a yr
51	New Hampshire	NHRS	S, L, T	65/any	60/30	3% a yr
52	New Jersey	PERS	S, L	65/any	any/30	3% a yr
53	New Jersey	TPAF	T	65/any	any/30	3% a yr
54	New Mexico	PERA	S, L	65/8; R85/8	None	N/A
55	New Mexico	ERA	T	67/5; any/30; R80/65	R85	Table
56	New York	ERS	S, L	63/10	55/10	Table
57	New York	TRS	T	63/10	55/10	6.5% a yr
58	North Carolina	TSERS	S, T	65/5; 60/25; any/30	60/5; 50/20	3% a yr >65 + 5% a yr. for each year > 60
59	North Carolina	LGERS	L	65/5; 60/25; any/30	60/5; 50/20	3% a yr >65 + 5% a yr. for each year > 60
60	North Dakota	PERS	S, L	65/any; 60+R90	55/3	8% a yr
61	North Dakota	TRF	T	65/5; R90	55/5	8% a yr
62	Ohio	PERS	S, L	55/32; 67/5	57/25; 62/5	Table
63	Ohio	STRS	T	60/5; 55/25; 30+ Table	Prior to Age 60/5; >30	Table
64	Oklahoma	PERS	S, L	65; 60/R90	55/10	6.67% a yr
65	Oklahoma	TRS	T	65/7; R90	60/7	Table
66	Oregon	PERS-OPSRP	S, L, T	65; 58/30	55/5	Full actuarial reduction
67	Pennsylvania	SERS	S	65/3; R92 with 35 yrs	any/10	Table
68	Pennsylvania	PSERS	T	65/3; R92 with 35 yrs	55/25	3% a yr
69	Rhode Island	ERS	S, T	65/30; 64/31; 63/32; 62/33	60/20	7% - 9% a year
70	South Carolina	SCRS	S, L, T	65/8; R90	60/8	5% a yr
71	South Dakota	SRS	S, L, T	67/3	55/3	5% a yr
72	Tennessee	CRS	S, L, T	65/5; R90	60/5; R80	Table
73	Texas	ERS	S	65/10	R80/5	5% a yr before 62
74	Texas	TRS	T	65/5; 62/R80	55/5; any/30	Table
75	Texas	MRS	L	60/5; any/20	Varies	Varies
76	Utah	SRS-PERS	S, L, T	65/4; any/30	62/10; 60/20; any/35	Table
77	Vermont	SRS	S	65/any; R87	55/5	Table
78	Vermont	TRS	T	65/any; R90	55/5	Full actuarial reduction
79	Virginia	SRS	S, L, T	Social Security normal age/5; R90	60/5	Full actuarial reduction
80	Washington	Washington	Washington	65/10	55/10	3% a yr or table
81	Washington	TRS	T	65/10	55/10	3% a yr or table
82	West Virginia	PERS	S, L	62/10	60/10; 57/20; 55/30	Full actuarial reduction

83	West Virginia	TRS	T	62/10	60/10; 57/20; 55/ 30	Full actuarial reduction
84	Wyoming	WRS	S, L, T	65/4; R85	55/4; any/25	5% a yr
85	Milwaukee	City	L	65; 60/30	N/A	N/A
86	Milwaukee	County	L	64; 55/30	55/15	5% a yr
87	Wisconsin	WRS	S, L, T	65/5; 30/R87	55	Varies by service amount

\*Coverage: S = State; L = Local; T = Teachers; x/y = Age/Service



Figure 3. 2017-18 Normal Retirement "X Years & Out" Provisions

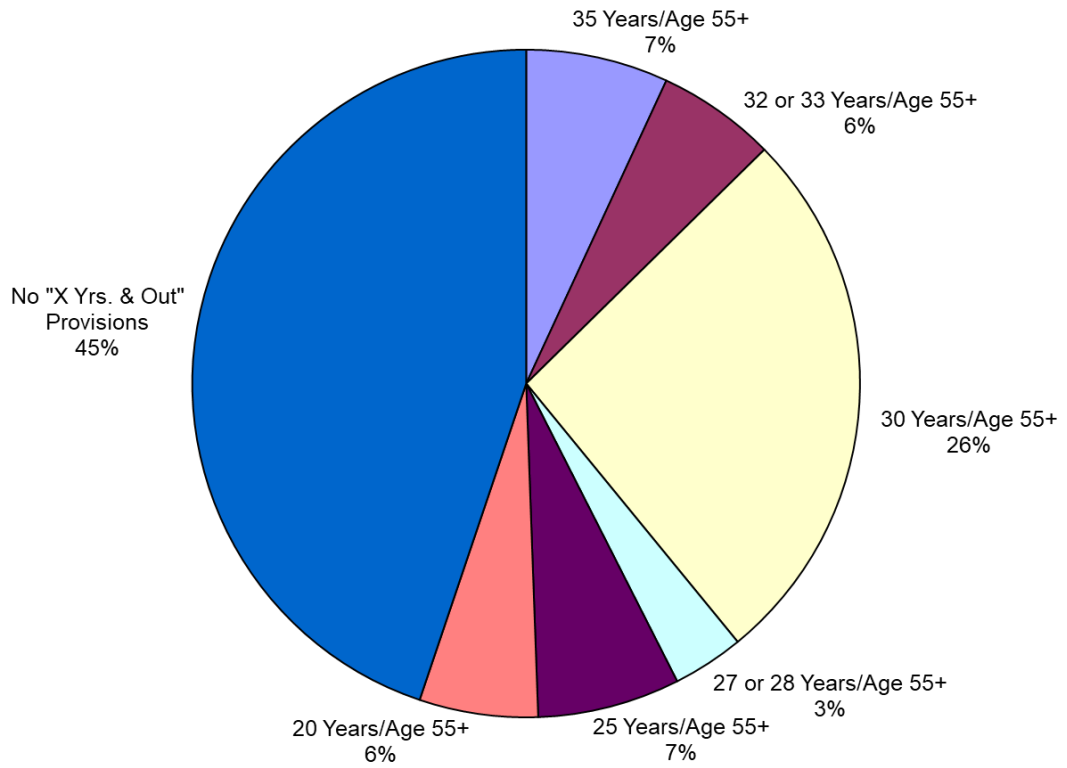
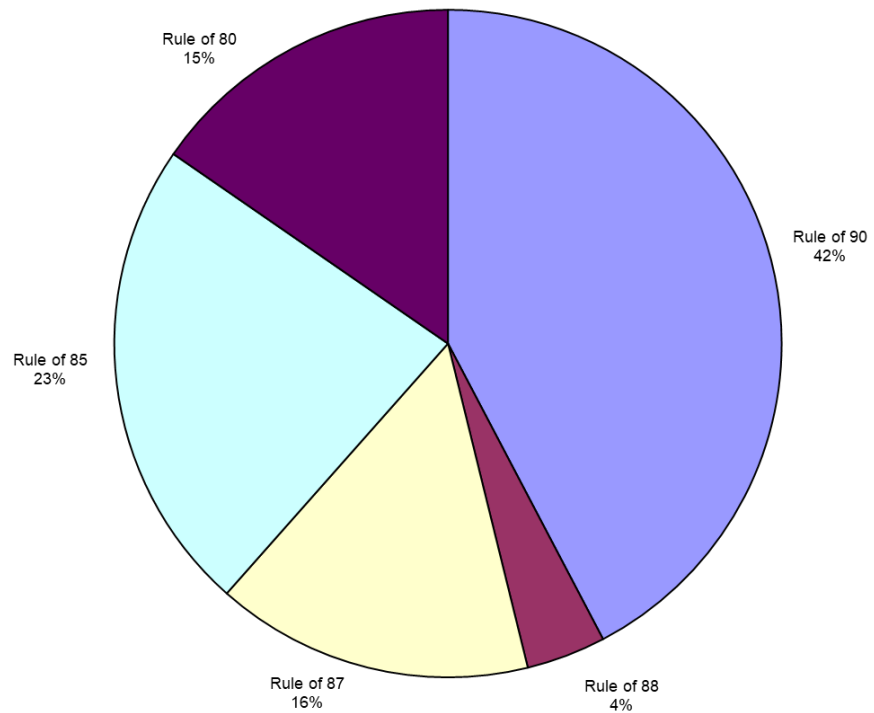
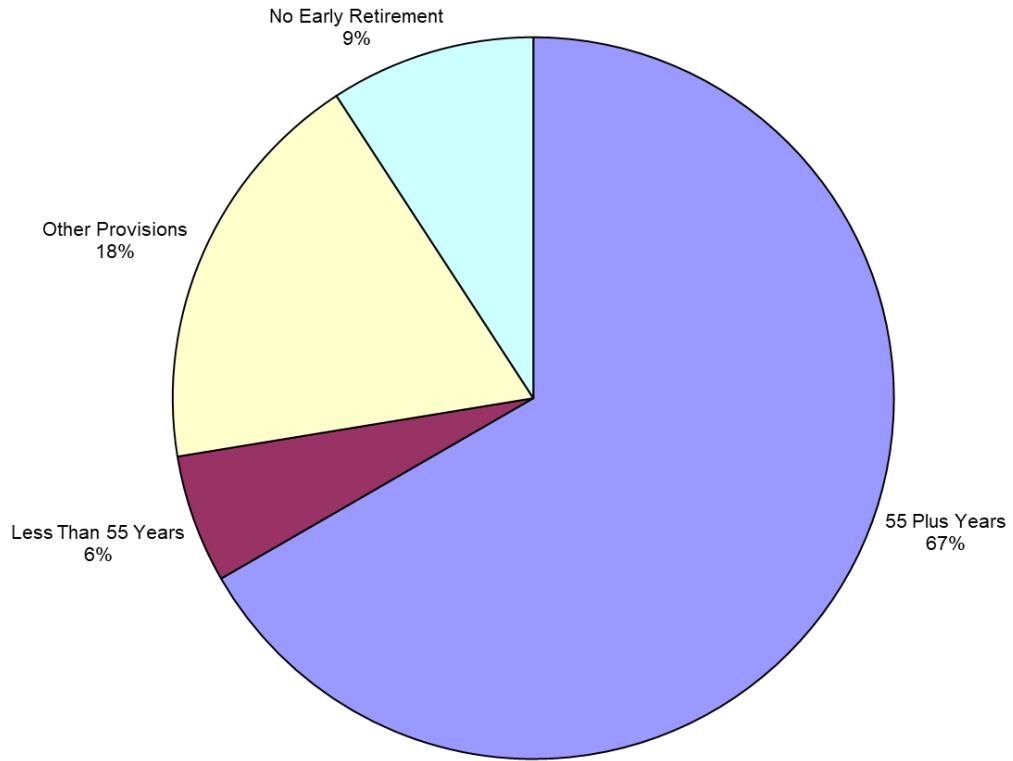


Figure 4. 2017-18 Normal Retirement "Rule of Y" Provisions



**Figure 5. 2017-18 Early Retirement Provisions**



## PART III

### CONTRIBUTION RATES AND VESTING REQUIREMENTS

#### A. INTRODUCTION

Chart 3, on pages 22 and 23, shows the employee normal cost contribution rate, the employer normal cost contribution rate, and the vesting period for each of the 87 plans in the report. The contribution rates are shown as a percentage of salary.

#### B. EMPLOYEE CONTRIBUTIONS

Large private sector corporations that provide defined benefit pension plans frequently do not require employee contributions to the primary plan, but frequently also provide supplemental profit-sharing or savings plans that allow employees to contribute to the plan and receive an employer “match” to some or all of the contribution. Conversely, most public employee pension plans at least nominally require employees to contribute a certain percentage of their salary to the plan, although some public employee pension plans provide for employer “pick-up” of the employee contribution. In addition, secondary savings plans for public employees, such as Section 457 deferred compensation plans, are funded totally from employee contributions with no employer match.

In plans where amounts designated as employee contributions for accounting purposes are paid by the employer, there are financial advantages to both the employer and the employee if, instead of granting compensation increases, an employer pays the employee contribution to the retirement plan. Compensation payments are subject to old age, survivors and disability insurance payments (Social Security), and Medicare payments while contributions to a retirement plan are not. In addition, the practice may be attractive to employers because employer pick-up of retirement contributions is not added into employee base wages, reducing the amount of future percentage-based salary increases.

The column in Chart 3 entitled “Employee Contribution” shows the 2017-18 employee normal cost contribution rates for the 87 plans covered in the report, derived from the Public Plan Database and expressed as a percentage of payroll. The normal cost rate is stated exclusive of accrued liabilities and appears to offer improved comparability relative to data from prior reports. Medical and other nonpension costs are generally not included. These requirements are compared with employee contributions in the 2015 Report in the following table:

<u>Employee Contribution Rates</u>	<u>2015</u>	<u>2017-18</u>
5% or less	23 plans	31 plans
More than 5%	58 plans	56 plans
Rate varies (usually by age or employee classification)	5 plans	0 plans
Plan is noncontributory	1 plan	0 plans
<b>TOTAL</b>	<b>87 plans</b>	<b>87 plans</b>

See Figure 6, *2017-18 Employee Contribution Rates*, for a graphical representation.

## C. EMPLOYER CONTRIBUTIONS

The employer contribution rates shown in Chart 3 are derived from self-reported data from the Public Plan Database mentioned in the introduction of this report. Again, the normal cost rate is stated exclusive of accrued liabilities and appears to offer improved comparability relative to data from prior reports. Medical and other nonpension costs are generally not included.

In addition, the employer contributions reported in Chart 3 are intended to reflect actual contributions made by the employer. In some plans covered by the report, employers may have paid contributions to the retirement plans at rates less than those that were determined by actuarial valuation as necessary to fully fund the pension plan.

## D. VESTING

The term “vesting” refers to an employee’s right, after satisfying some minimum service requirement, to receive some pension benefits regardless of whether the employee remains in a job covered by the pension plan. Vesting requirements for the plans included in the 2017-18 Report are displayed in the last column of Chart 3. The following table shows the changes that have occurred between 2015 and 2017-18 in the plans covered by the report:

	<u>2015</u>	<u>2017-18</u>
Immediate or >1 year vesting	2 plans	1 plan
Vesting after 3 years	7 plans	5 plans
Vesting after 4 or 5 years	45 plans	41 plans
Vesting after 7 or 8 years	6 plans	7 plans
Vesting after 10 years	26 plans	30 plans
Graded or varying	1 plan	3 plans
<b>TOTAL</b>	<b>87 plans</b>	<b>87 plans</b>

In 2017-18, a total of 49 plans, or 56.3% of the 87 plans in the report, require five or less years of service to vest. This is a decrease of five plans since the 2015 Report. The number of plans that require 10 years of service to vest increased by two between 2015 and 2017-18. See Figure 7, *2017-18 Vesting Rates*, for a graphical representation.

## E. TRENDS

The long-term trend in public employee pension plan vesting is generally biased toward vesting periods of five years or less. Longer vesting periods have increased slightly, particularly those vesting after eight years. Thirty-five of the 87 plans covered in the 2017-18 Report had vesting requirements that were greater than five years. Employee normal cost rates are new to the report and will be monitored for changes in future editions. Employer normal cost contribution rates generally fluctuate with investment returns. It is important to note that many of the reported normal cost rates are separated from existing accrued liabilities. If accrued liabilities were included, many of these rates would be significantly higher.

## F. THE WRS

No vesting period was required for employees in the WRS prior to 2011. Employees who began work on or after July 1, 2011 must accrue five years of creditable service to be vested in the WRS. The employee contribution rate for general employees for 2017-18 decreased slightly to 6.55% from 6.8% in 2015. Employees and employers split the annual actuarial cost of maintaining the retirement trust fund by splitting the full cost into equal contributions. Thus, the employer contribution rate for 2017-18 was also 6.55%.

CHART 3  
CONTRIBUTION AND VESTING REQUIREMENTS

	<u>State</u>	<u>Fund Name</u>	<u>Social Security</u>	<u>Employee Normal Cost Contribution</u>	<u>Employer Normal Cost or Statutory Contribution</u>	<u>Vesting Period</u>
1	Alabama	ERS	Yes	7.39%	2.25%	10 years
2	Alabama	TRS	Yes	7.50%	2.28%	10 years
3	Alaska	PERS	No	6.94%	8.01%	5 years
4	Alaska	TRS	No	4.89%	10.36%	8 years
5	Arizona	SRS	Yes	11.94%	2.47%	Immediate
6	Arkansas	PERS	Yes	3.47%	8.16%	5 years
7	Arkansas	TRS	Yes	6.41%	6.44%	5 years
8	California	PERS- PERF	Yes	7.70%	10.69%	5 years
9	California	TRS	No	10.22%	10.05%	5 years
10	Colorado	PERA	No	8.43%	2.29%	5 years
11	Connecticut	SERS	Yes	0.00%	6.38%	10 years
12	Connecticut	TRS	No	6.00%	4.56%	10 years
13	Delaware	SEPP	Yes	3.52%	6.44%	10 years
14	Florida	FRS	Yes	3.00%	4.41%	8 years
15	Georgia	ERS	Yes	1.31%	4.65%	10 years
16	Georgia	TRS	Yes	6.00%	7.77%	10 years
17	Hawaii	ERS	Yes	5.94%	8.02%	10 years
18	Idaho	PERS	Yes	7.03%	7.80%	5 years
19	Illinois	SERS	Yes	5.44%	1.59%	10 years
20	Illinois	TRS	No	9.81%	8.27%	10 years
21	Illinois	MRF	Yes	4.50%	5.61%	10 years
22	Indiana	PERF	Yes	3.28%	3.94%	10 years
23	Indiana	TRF	Yes	0.00%	5.00%	10 years
24	Iowa	PERS	Yes	6.29%	4.11%	4 years
25	Kansas	PERS	Yes	6.00%	2.17%	5 years
26	Kentucky	KERS	Yes	5.29%	7.38%	5 years
27	Kentucky	CERS	Yes	5.53%	5.20%	5 years
28	Kentucky	TRS	No	9.25%	5.59%	5 years
29	Louisiana	SERS	No	8.01%	3.75%	5 years
30	Louisiana	TRSL	No	7.98%	4.14%	5 years
31	Maine	PERS	No	7.65%	4.04%	5 years
32	Maryland	SRPS- RCPB	Yes	6.75%	3.83%	10 years
33	Massachusetts	SERS	No	9.78%	4.87%	10 years
34	Massachusetts	TRS	No	9.00%	3.41%	10 years
35	Michigan	SERS	Yes	4.00%	5.39%	10 years
36	Michigan	MERS	Yes	4.89%	7.37%	5 to 10 years
37	Michigan	PSERS	Yes	4.94%	5.68%	10 years
38	Minnesota	MSRS- SERF	Yes	5.50%	2.69%	5 years
39	Minnesota	PERA - GERP	Yes	6.50%	1.41%	5 years
40	Minnesota	TRA	Yes	7.50%	1.27%	3 years
41	Mississippi	PERS	Yes	8.23%	1.97%	8 years
42	Missouri	SERS	Yes	1.34%	7.05%	5 years
43	Missouri	LAGERS	Yes	1.35%	9.92%	5 years
44	Missouri	PSRS	No	14.5%	2.52%	5 years

45	Montana	PERS	Yes	7.90%	1.96%	5 years
46	Montana	TRS	Yes	8.15%	1.67%	5 years
47	Nebraska	SERS	Yes	4.80%	7.50%	3 years
48	Nebraska	CERS	Yes	4.50%	6.75%	3 years
49	Nebraska	SRS	Yes	9.78%	3.54%	5 years
50	Nevada	PERS	No	2.97%	13.67%	5 years
51	New Hampshire	NHRS	Yes	7.72%	2.45%	10 years
52	New Jersey	PERS	Yes	7.10%	3.12%	10 years
53	New Jersey	TPAF	Yes	7.08%	5.73%	10 years
54	New Mexico	PERA	Yes	11.90%	3.91%	8 years
55	New Mexico	ERA	Yes	10.70%	2.92%	5 years
56	New York	ERS	Yes	1.56%	8.30%	10 years
57	New York	TRS	Yes	0.79%	10.23%	10 years
58	North Carolina	TSERS	Yes	6.00%	4.48%	5 years
59	North Carolina	LGERS	Yes	6.00%	6.54%	5 years
60	North Dakota	PERS	Yes	7.00%	3.96%	3 years
61	North Dakota	TRF	Yes	11.75%	0.20%	5 years
62	Ohio	PERS	No	10.00%	3.32%	Varies
63	Ohio	STRS	No	14.00%	-3.35%	Varies
64	Oklahoma	PERS	Yes	4.14%	6.10%	8 years
65	Oklahoma	TRS	Yes	7.00%	3.34%	7 years
66	Oregon	PERS- OPSRP	Yes	0.04%	12.13%	5 years
67	Pennsylvania	SERS	Yes	6.25%	4.88%	10 years
68	Pennsylvania	PSERS	Yes	7.57%	8.31%	10 years
69	Rhode Island	ERS	Yes	3.95%	4.44%	5 years
70	South Carolina	SCRS	Yes	9.00%	1.72%	8 years
71	South Dakota	SRS	Yes	6.61%	5.04%	3 years
72	Tennessee	CRS	Yes	5.00%	4.53%	5 years
73	Texas	ERS	Yes	9.50%	4.45%	10 years
74	Texas	TRS	No	7.70%	2.36%	5 years
75	Texas	MRS	Yes	6.42%	8.43%	5 years
76	Utah	SRS- PERS	Yes	0.00%	11.67%	4 years
77	Vermont	SRS	Yes	6.79%	3.01%	5 years
78	Vermont	TRS	Yes	5.00%	1.23%	5 years
79	Virginia	SRS	Yes	4.68%	4.61%	5 years
80	Washington	PERS	Yes	7.90%	7.92%	10 years
81	Washington	TRS	Yes	7.77%	8.15%	10 years
82	West Virginia	PERS	Yes	4.50%	4.69%	10 years
83	West Virginia	TRS	Yes	6.00%	4.69%	10 years
84	Wyoming	WRS	Yes	8.25%	2.71%	4 years
85	Milwaukee	City	Yes	5.73%	10.59%	4 years
86	Milwaukee	County	Yes	6.52%	2.29%	5 years
87	Wisconsin	WRS	Yes	6.55%	6.55%	5 years

<sup>1</sup>Average of all S/L contributions.

<sup>2</sup>Average of S/T contributions.

Figure 6. 2017-18 Employee Contribution Rates

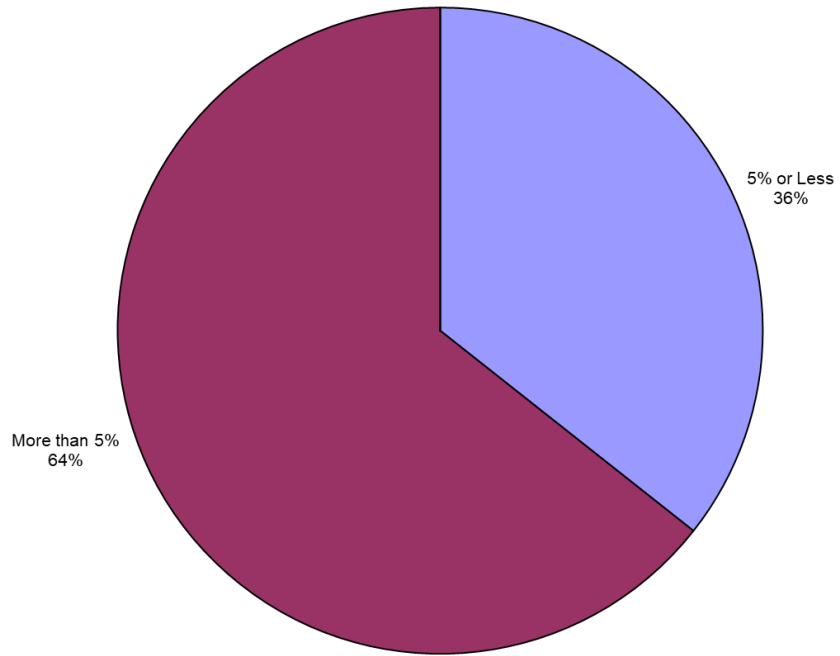
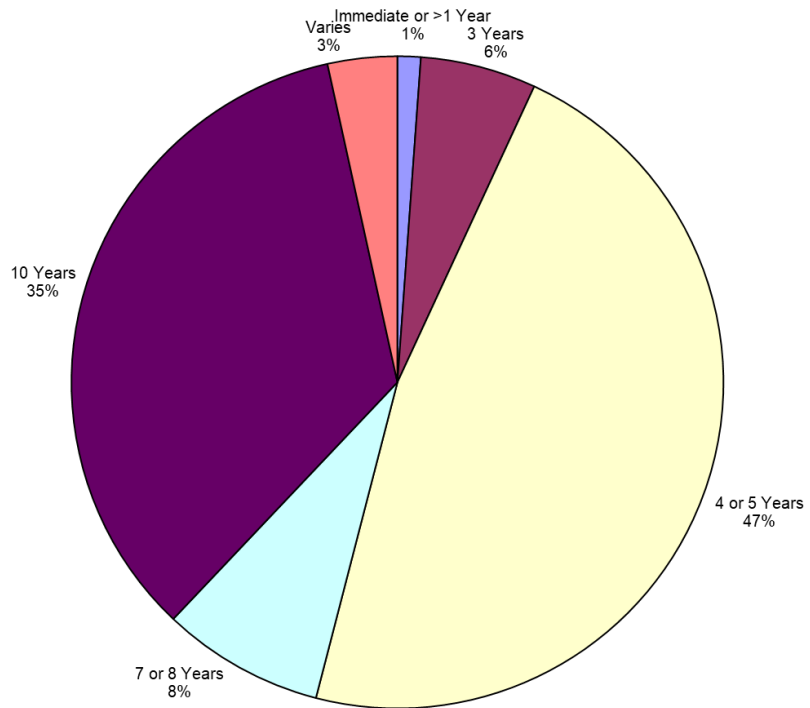


Figure 7. 2017-18 Vesting Rates





## PART IV RETIREMENT BENEFIT CALCULATIONS

### A. INTRODUCTION

Chart 4, on pages 28 and 29, shows the retirement benefit formulas in effect for 2017-18 for each of the plans. The formulas are those used to calculate the benefits of general employees and teachers and may not apply to other categories of employees. For example, elected officials and employees who are classified as “protective employees” generally have higher formula benefit multipliers and earlier normal retirement dates.

In addition, many of the plans in the report have different “tiers” of formula benefits that apply to employees depending upon when they were hired. In Chart 4, the data presented for each plan generally refers to the **most recent** category of newly hired employees. Generally, the lowest category of formula multiplier is noted where states’ multipliers vary by years of service.

As is shown in Chart 4, all but six of the current plans in the report are “defined benefit plans” in which an employee’s retirement benefits are generally calculated by multiplying the employee’s number of years of service by a “formula multiplier” and multiplying the product of this calculation by the employee’s final average salary:

$$\text{Years of Service} \times \text{Formula Multiplier} \times \text{Final Average Salary} = \text{Retirement Annuity}$$

In effect, the formula multiplier is the annualized percentage of the final average salary that an employee earns as a retirement annuity for each year of service.

Some of the defined benefit plans in the report also include “money purchase” elements. The remaining plans are defined contribution or cash balance plans where the value of contributions plus interest equals the retirement benefit.

### B. “BASIC” PLANS IN WHICH EMPLOYEES ARE NOT COVERED BY SOCIAL SECURITY

Employees of 17 of the 87 plans are not covered by Social Security (see Chart 1). The plans in which employees are not covered by Social Security frequently have a higher formula multiplier to compensate for the lack of Social Security coverage. The 17 plans in which employees are not covered by Social Security generally have formula multipliers ranging between 2% and 2.5% for each year of service.

### C. “COORDINATED” PLANS IN WHICH EMPLOYEES ARE COVERED BY SOCIAL SECURITY

Seventy of the 87 plans in this report are “coordinated” with the Social Security system, meaning that employees earn Social Security benefits for their employment. There are a wide range of formula multipliers in effect for these 70 plans, which sometimes vary by number of years of service, by date of employment, or by age at retirement. For 2017-18, the formula multiplier for the coordinated plans that are not money purchase plans, defined contribution plans, or plans in which the employer determines the formula multiplier generally fall into a range between 1.5% and 2.5%. This number may actually be somewhat higher because a number of plans increase their multiplier rates following a certain number of years of service, generally 15, 25, or 30 years, or have other returns (defined contribution or money purchase) associated with the core multiplier.

The formula benefits for 2017-18, as shown in Chart 4, are summarized and compared with the data found in the 2015 Report in the following table:

<u>Formula Multiplier</u>	<u>2015</u>	<u>2017-18</u>
1.5 to 1.7	17 plans	17 plans
Over 1.7% to 1.9%	8 plans	8 plans
Over 1.9% to 2.1%	14 plans	18 plans
Over 2.1%	9 plans	13 plans
Varies or N/A	39 plans	28 plans

See Figure 8, *2017-18 Formula Multipliers*, for a graphical representation.

#### D. FINAL AVERAGE SALARY

Defined benefit plans base the amount of a retirement annuity on the employee’s “final average salary.” The final average salary is generally the employee’s highest earnings over a specified number of years or months, which are sometimes required to be consecutive years or months. Typically, an employee’s highest salary will be the amount of salary he or she earned immediately prior to retirement.

Since the 2015 Report, there has been no net increase in the number of years required to calculate final average salary (three increased and three decreased). The most common method is to use a five-year average, which may require calculation of consecutive years or of years that fall within a given period. (For example, the five highest years within a 10-year period.) Forty-five of the 87 plans in the report use a five-year final average salary. The next most prevalent calculation of final average salary is a three-year period--25 of the 87 plans used a three-year period in 2017-18. See Figure 9, *2017-18 Final Average Salary Period*, for a graphical representation.

#### E. LIMITATIONS ON BENEFITS

The last column of Chart 4 shows the plans that have established a limit on the amount of pension benefits that may be received by a retiree. This limitation may be expressed as a maximum percentage of final average salary, as a maximum number of years that may be credited, or as a maximum percentage of highest salary. The majority of plans surveyed in the report state no maximum benefit limitation. They are followed by those with a limit of 100% of final average salary.

#### F. TRENDS

Multipliers remain stable with some growth in the 1.9% to over 2.1% range between 2015 and 2017. As noted in Section D., the number of years required to calculate final average salary figures remains fundamentally the same. Plan caps continue to trend toward lower limits with a number of states adopting maximums for new employees in the last few years.

#### G. THE WRS

The WRS is primarily a defined benefit plan. However, it also has a “money purchase” feature that computes an employee’s retirement benefits by the amount of an annuity that can be purchased with moneys in the employee’s retirement account. The employee receives the higher of either the formula-based defined benefit annuity or the money purchase annuity.

The formula multiplier for general employees in the WRS is 1.6%. Final average salary under the WRS is an average of the three highest years of an employee's salary. Annuities for general employees are capped at 70% of final average salary.

CHART 4  
FINAL AVERAGE SALARY PERIODS-FORMULAS-LIMITATIONS

	<u>State</u>	<u>Fund Name</u>	<u>FAS Period<sup>1</sup></u>	<u>Formula Multiplier</u>	<u>Limitation</u>
1	Alabama	ERS	5 H/10	1.65%	80%
2	Alabama	TRS	5 H/10	1.65%	80%
3	Alaska	PERS	5 HC	2.0% (1st 10 yrs); 2.25% (next 10 yrs); 2.5% (rem. yrs)	None
4	Alaska	TRS	3 H	2.0% (1st 20 yrs); 2.5% (rem. yrs)	None
5	Arizona	SRS	5 HC	2.1% (1st 20 yrs); 2.15% (next 5); 2.2% (next 5); 2.3% 30+ yrs	80% FAS
6	Arkansas	PERS	3 H	2% + .5% for yrs of service over 28 yrs	100% FAS
7	Arkansas	TRS	3 H	2.15%	120% of final salary
8	California	PERS-PERF	3 H	2% at 62; increases with retirement age	\$118,775 Maximum
9	California	TRS	3 HC	2% at 62; increases with retirement age	120% Of SS wage base
10	Colorado	PERA	3 H	2.5%	100% FAS
11	Connecticut	SERS	5 H (130% cap)	1.40% + .433% over SS breakpoint; 1.625% 35+ yr	None
12	Connecticut	TRS	3 H	2%	75% FAS
13	Delaware	SEPP	3 H	1.85%	None
14	Florida	FRS	8 H	1.6% to 1.68% (age and yrs of service)	100% FAS
15	Georgia	ERS	2 HC	2%	35 yrs max
16	Georgia	TRS	2 HC	2%	40 yrs max
17	Hawaii	ERS	5 H	1.75%	None
18	Idaho	PERS	3 1/2 HC	2%	100% of highest 3 yr salary avg
19	Illinois	SERS	4h/10	1.67%	75% FAS
20	Illinois	TRS	8 HC/10	1.67/1st 10; 1.9/10 to 20; 2.1/20 to 30; 2.3/30+	75% FAS
21	Illinois	MRF	8 HC/10	1.67% (1st 15 yrs); 2% (addtl. yrs)	75% FAS
22	Indiana	PERF	5 H	1.1% + moneypurchase annuity	None
23	Indiana	TRF	5 H	1.1% + moneypurchase annuity	None
24	Iowa	PERS	5 H	2% (1st 30 yrs); 1% (next 5 yrs)	65% FAS
25	Kansas	PERS	NA	Annuity factor based calculation (based on cash balance)	None
26	Kentucky	KERS	N/A	All contributions + interest credits	None
27	Kentucky	CERS	N/A	All contributions + interest credits	None
28	Kentucky	TRS	5 H; 3 H w/27 yr	1.7-3% depending on yrs service	None
29	Louisiana	SERS	3 HC	2.5%	100% FAS
30	Louisiana	TRSL	5 HC	2.5%	100% FAS
31	Maine	PERS	3 H	2%	None
32	Maryland	SRPS-RCPB	5 H	1.5%	None
33	Massachusetts	SERS	5 HC	.5 to 2.5% (age-related)	80% FAS
34	Massachusetts	TRS	5 HC	.5% to 2.5% (age-related)	80% FAS
35	Michigan	SERS	3 HC	1.5%	None
36	Michigan	MERS	3 or 5 HC	1.0% to 2.5% (employer option)	80% FAS
37	Michigan	PSERS	5 HC	1.5%	None
38	Minnesota	MSRS-SERF	5 HC	1.7%	None
39	Minnesota	PERA - GERP	5 HC	2.2% for 1st 10 years; 2.7% thereafter	None
40	Minnesota	TRA	5 HC	1.9%	None
41	Mississippi	PERS	4 H	2% (1st 30 yrs); 2.5% (added yrs)	None
42	Missouri	SERS	3 HC	1.7% (and .8% to age 62 if R90 met)	None

43	Missouri	LAGERS	5 HC/3 HC opt.	1-2.5% (varies by employer option)	None
44	Missouri	PSRS	3 HC	2.5%	100%
45	Montana	PERS	5 HC	1.5% 1st 10 yrs; 1.785% 10 to 30 yrs; 2.0% 30+ yrs	110%
46	Montana	TRS	5 HC	1.85%	None
47	Nebraska	SERS	N/A	Cash balance	N/A
48	Nebraska	CERS	N/A	Cash balance	N/A
49	Nebraska	SRS	5 H	2%	None
50	Nevada	PERS	3 HC	2.25%	75% FAS
51	New Hampshire	NHRS	5 H	1.52%	85% or \$120,000
52	New Jersey	PERS	5 HC	1.67%	None
53	New Jersey	TPAF	5 HC	1.67%	None
54	New Mexico	PERA	5 HC	2.5%	90% FAS
55	New Mexico	ERA	5 HC	2.35%	None
56	New York	ERS	5 HC (10% cap)	1.67% (under 20 yrs); 1.75% @ 20 yrs; 2% (over 20 yrs)	None
57	New York	TRS	5 HC	1.67% (under 25 yrs); 1.75% @ 20 yrs; 35% + 2.5% (20+ yrs)	None
58	North Carolina	TSERS	4 HC	1.82%	None
59	North Carolina	LGERS	4 HC	1.85%	None
60	North Dakota	PERS	3 H/last 15	2%	None
61	North Dakota	TRF	5 H	2%	None
62	Ohio	PERS	5 H	2.50%	100% FAS
63	Ohio	STRS	3 H	2.2%; 35+ Table	None
64	Oklahoma	PERS	5 H/10	2%	100% FAS
65	Oklahoma	TRS	5 H	2%	None
66	Oregon	PERS- OPSRP	3 H	1.50%	None
67	Pennsylvania	SERS	3 H	1.25% (Class A-5)	100% high yr
68	Pennsylvania	PSERS	3 H	1.25% (Class T-G)	100% FAS
69	Rhode Island	ERS	5 HC	1.6-2.5%	80% FAS
70	South Carolina	SCRS	5 HC	1.82%	None
71	South Dakota	SRS	5 HC/10	1.80%	None
72	Tennessee	CRS	5 HC	1.0%	90% FAS
73	Texas	ERS	5 H	2.3%	100% AMC
74	Texas	TRS	5 H	2.3%	None
75	Texas	MRS	N/A	Money purchase	75% of member deposits + Int.
76	Utah	SRS-PERS	3 H	2%	None
77	Vermont	SRS	3 HC	1.67%	60% FAS
78	Vermont	TRS	3 HC	1.25% to 2%	60% FAS
79	Virginia	SRS	5 HC	1% + defined contribution return	Member's contributions + interest
80	Washington	PERS	5 HC	1% + .25% with 20 yrs.+	None
81	Washington	TRS	5 HC	1% + .25% with 20 yrs.+	None
82	West Virginia	PERS	5 H/Last 15	2%	None
83	West Virginia	TRS	5 H/Last 15	2%	None
84	Wyoming	WRS	5 HC	2%	None
85	Milwaukee	City	3 H	1.6%	70% FAS
86	Milwaukee	County	3 HC	1.6%	80% FAS
87	Wisconsin	WRS	3 H	1.6%	70% FAS

<sup>1</sup>FAS= final average salary H = highest HC = highest consecutive

<sup>2</sup>Future COLA increases may not exceed 80% of original benefit.

Figure 8. 2017-18 Formula Multipliers

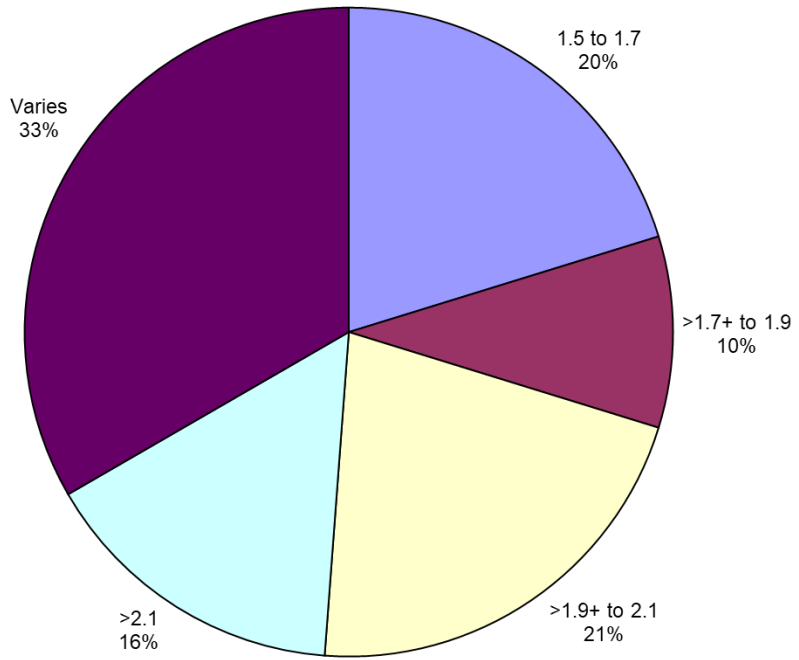
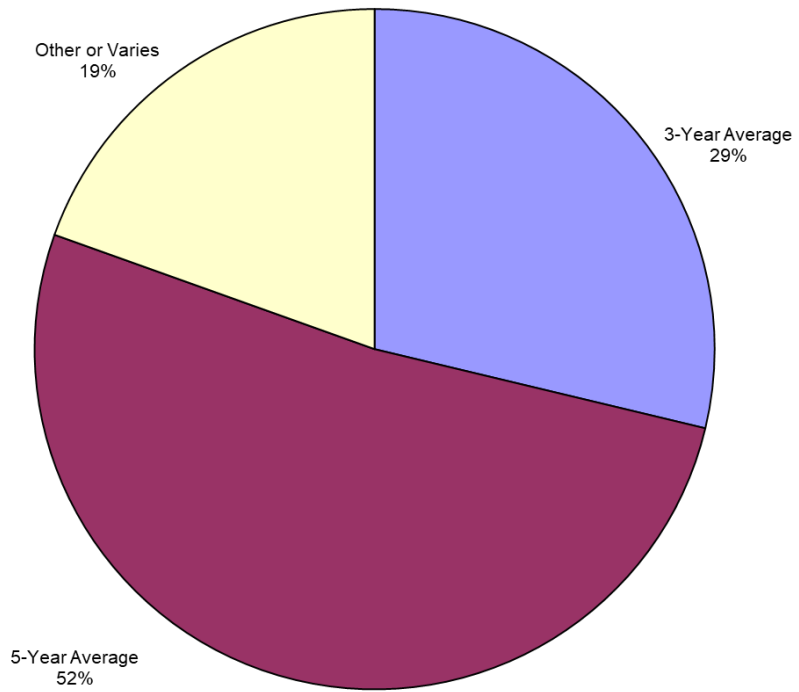


Figure 9. 2017-18 Final Average Salary Period



<p><b>PART V</b></p> <p><b>POST-RETIREMENT ANNUITY INCREASES AND TAXES</b></p>
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**A. INTRODUCTION**

Chart 5, on pages 34 to 36, shows the provisions of each plan for increasing retirement annuities after an employee has retired. Chart 5 also shows how annuity payments from each plan are treated under that state's income tax laws. In addition, benefit adjustments in the Social Security program over the last 10 years and income taxation of Social Security benefits are also discussed in this part.

**B. SOCIAL SECURITY**

Pension designers are concerned with the adequacy of benefits at the time of retirement and also with the continuing purchasing power of those benefits during retirement as affected by inflation. Since 1975, Social Security benefits have been automatically adjusted each year by the percentage increase in the consumer price index (CPI). The increases in Social Security benefits for each of the last 10 years are shown below and displayed in Figure 10, *Social Security CPI % Adjustments 2002 to 2019*:

<u>CPI Year</u>	<u>Date on Which First Payable</u>	<u>Percentage Increase</u>
2002	1/1/2003	1.4%
2003	1/1/2004	2.1%
2004	1/1/2005	2.7%
2005	1/1/2006	4.1%
2006	1/1/2007	3.3%
2007	1/1/2008	2.3%
2008	1/1/2009	5.8%
2009	1/1/2010	0.0%
2010	1/1/2011	0.0%
2011	1/1/2012	3.6%
2012	1/1/2013	1.7%
2013	1/1/2014	1.5%
2014	1/1/2015	1.5%
2015	1/1/2016	1.7%
2016	1/1/2017	0.0%
2017	1/1/2018	0.3%
2018	1/1/2019	2.0%
2019	1/1/2020	2.8%

For those employees in the 70 of the 87 plans in this report (80%) that are also covered by the Social Security program, the portion of their total retirement income that is received from Social Security automatically keeps pace with inflation.

Under federal law, up to 50% of Social Security benefits are subject to income taxation if the taxpayer's adjusted gross income is between \$25,000 and \$34,000 for single taxpayers or between \$32,000 and \$44,000 for married taxpayers filing a joint income tax return. If a taxpayer's income exceeds these levels, then 85% of his or her Social Security benefits are subject to federal income taxation.

State income taxation of Social Security benefits varies. Thirty-seven states exempt Social Security benefits from income taxation, or have no personal income tax or very limited income tax that does not affect Social Security payments. Thirteen states impose income taxes on some portion of Social Security benefits.

### C. POST-RETIREMENT ANNUITY COST-OF-LIVING ADJUSTMENTS

Most of the plans in this report have provisions for post-retirement annuity adjustments to protect the purchasing power of annuities against inflation. The provisions of each of the plans are described in the fourth column of Chart 5. The following table summarizes and compares the post-retirement annuity adjustment provisions found in the 2015 Report against those found in the 2017-18 Report:

	<u>2015</u>	<u>2017-18</u>
Adjustments indexed to CPI	37 plans	34 plans
Automatic percentage increase	19 plans	16 plans
Other	3 plans	11 plans
Ad hoc	24 plans	22 plans
No increase	4 plans	4 plans
<b>TOTAL</b>	<b>87 plans</b>	<b>87 plans</b>

Note that, as shown in Chart 5, many of the plans in which post-retirement annuity increases are indexed to the CPI also include a cap on the total percentage adjustment that may be made within any given year. Also, many of the plans in which post-retirement annuity increases are indexed to the CPI or are automatic include provisions for additional annuity adjustments if there are investment surpluses in the retirement fund. Twenty-two of the 87 plans provide post-retirement annuity increases only on an "ad hoc" basis, where either the Legislature or a decision-making board determines whether, and when, a post-retirement annuity increase is granted. See Figure 11, *2017-18 Cost-of-Living Adjustments*, for a graphical representation.

### D. STATE INCOME TAXATION OF ANNUITIES

The last column of Chart 5 shows the treatment of pension benefits under each of the plans by the state income tax laws in effect in that state. In 20 of the 87 plans, pension benefits are subject to state income taxation and no specific amount of retirement benefits is tax exempt. In 18 of the 87 plans, pension benefits are totally exempt from state income taxation. Eleven of the plans are in states with no income taxation. The remainder of the plans vary in the amounts of retirement income that may be exempt from taxation.

Caution must be used in interpreting the information in the last column of Chart 5. In many of the states in which pension income is fully taxable, other provisions of state income tax laws may ameliorate or completely eliminate the effect of the state income tax laws on retirees. For example, some state income tax laws have a level of exemptions, deductions, or tax credits that substantially reduce or eliminate state income taxation for persons at certain income levels. In addition, some of these exemptions, deductions, or tax credits may be increased for taxpayers who have reached



a certain age. In these states, the level of income taxation on retirees may be equal to or less than that in states where public employee pension income is exempt from state income taxation.

## E. TRENDS

Most of the plans in this report have adopted provisions in which retirement annuities are annually increased, either by a set percentage or in response to changes in the CPI. Most of these provisions were initially adopted in the 1970s and 1980s in response to high inflation. Recent trends continue to show an increase in the number of states basing cost-of-living adjustments (COLAs) on investment returns.

## F. THE WRS

Retirees in the WRS whose annuities are paid from the “core” fund receive annual annuity adjustments tied to whether reserve surpluses in the fund, as adjusted by a formula, are sufficient to generate an increase. In addition, the annual adjustment may result in a reduction of annuities if investment losses are severe, particularly if investment losses occur over a number of consecutive years. However, annuities paid from the “core” fund may not be reduced below the level initially paid to a retiree. For annuities paid in 2017, the annuity adjustment in the core fund was 2.4%.

WRS retirement benefits are subject to state income taxation except for certain payments made with respect to persons who were employees prior to 1964 or who had retired prior to 1964. Income from Social Security is exempt from Wisconsin income taxes. In addition, up to \$5,000 per year of income from qualified retirement plans is exempt from Wisconsin income taxes for taxpayers with an adjusted gross income of \$15,000 or less (\$30,000 for married joint filers) who are 65 or older.

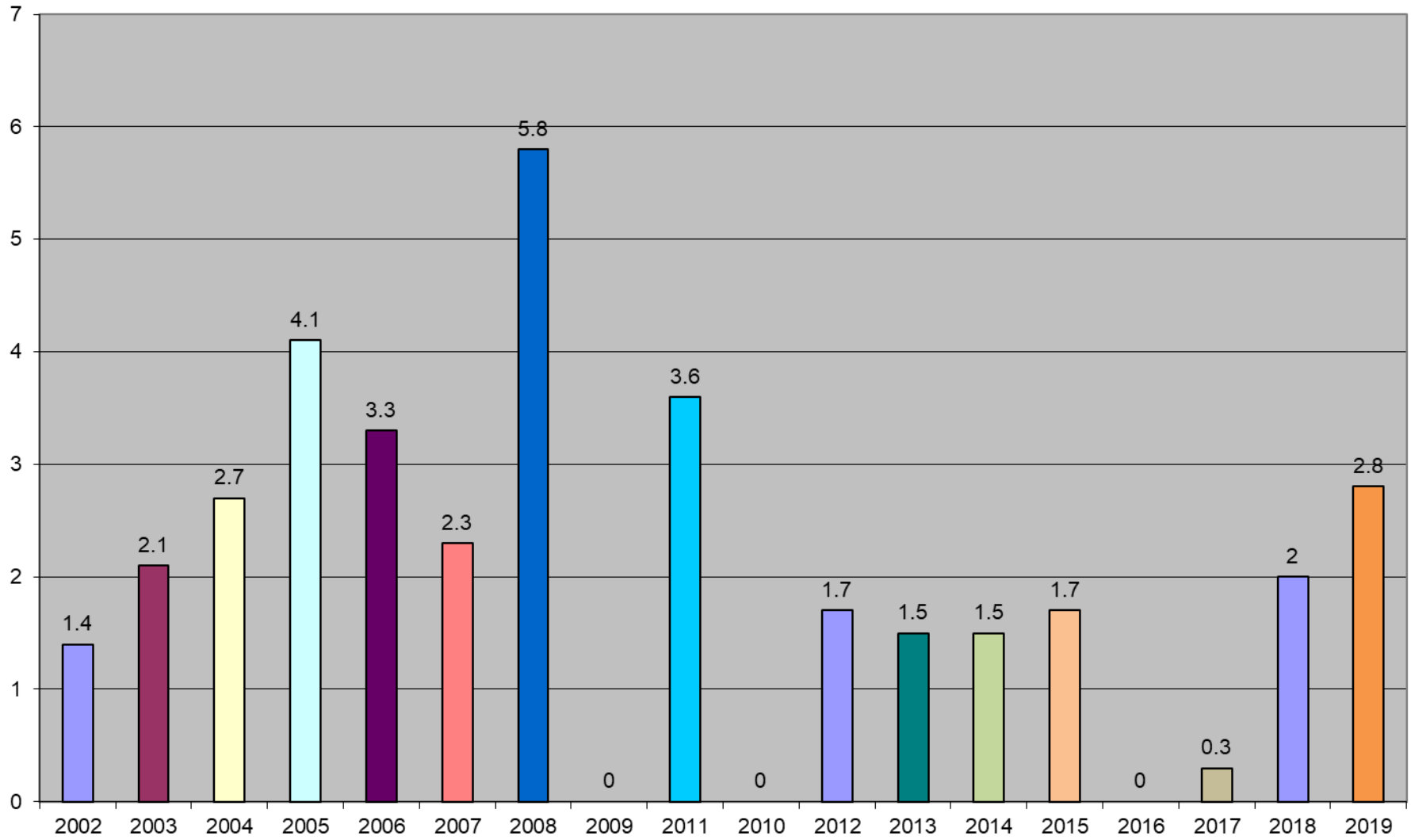
CHART 5  
POST-RETIREMENT INCREASES AND STATE TAX PROVISIONS

	<u>State</u>	<u>Fund Name</u>	<u>Social Security</u>	<u>Annual Post-Retirement Increases</u>	<u>State Taxation of PERS Benefits</u>
1	Alabama	ERS	Yes	Ad hoc	Benefits exempt
2	Alabama	TRS	Yes	Ad hoc	Benefits exempt
3	Alaska	PERS	No	50-75% of CPI	No income tax
4	Alaska	TRS	No	50-75% of CPI	No income tax
5	Arizona	SRS	Yes	Excess earnings - 4% cap	Exempt to \$2,500
6	Arkansas	PERS	Yes	3%	Exempt to \$6,000
7	Arkansas	TRS	Yes	3%	Exempt to \$6,000
8	California	PERS- PERF	Yes	2% standard, based on CPI	Benefits taxable
9	California	TRS	No	2% standard, based on CPI	Benefits taxable
10	Colorado	PERA	No	2%; Lesser of 2% or CPI-W, if neg. return	Exempt to \$20,000/\$24,000
11	Connecticut	SERS	Yes	60% of CPI up to 6%, 2.0% min; 7.5% max	Benefits taxable
12	Connecticut	TRS	No	1-3% based on return on fund assets	Benefits taxable
13	Delaware	SEPP	Yes	Ad hoc	Exempt to \$12,500
14	Florida	FRS	Yes	None	No income tax
15	Georgia	ERS	Yes	Ad hoc	Deduction of \$65,000
16	Georgia	TRS	Yes	1.5% max in any 6 mo. Period, based on CPI	Deduction of \$65,000
17	Hawaii	ERS	Yes	1.5%	Benefits exempt
18	Idaho	PERS	Yes	>1% = CPI, 6% max reduction; 1% -6% < CPI	Benefits taxable
19	Illinois	SERS	Yes	3%	Benefits exempt
20	Illinois	TRS	No	3% or 1/2 of CPI	Benefits exempt
21	Illinois	MRF	Yes	3% or 1/2 of CPI	Benefits exempt
22	Indiana	PERF	Yes	Ad hoc	Benefits taxable
23	Indiana	TRF	Yes	Ad hoc	Benefits taxable
24	Iowa	PERS	Yes	Excess earnings - CPI; 3% cap	Exempt to \$6,000/\$12,000
25	Kansas	PERS	Yes	Benefit option of cash balance plan	Benefits exempt
26	Kentucky	KERS	Yes	75% of investment returns in excess of 4%	Exempt to \$41,110
27	Kentucky	CERS	Yes	75% of investment returns in excess of 4%	Exempt to \$41,110
28	Kentucky	TRS	No	1.5%	Exempt to \$41,110
29	Louisiana	SERS	No	Ad Hoc	Exempt to \$6000/\$12,000
30	Louisiana	TRSL	No	Ad Hoc	Exempt to \$6000/\$12,000
31	Maine	PERS	No	CPI - 3% cap	Exempt to \$10,000
32	Maryland	SRPS- RCPB	Yes	CPI - 3% cap	Exempt to \$29,900
33	Massachusetts	SERS	No	CPI - on 1st \$13,000-conditional, 3% cap	Benefits exempt
34	Massachusetts	TRS	No	CPI - on 1st \$13,000-conditional, 3% cap	Benefits exempt
35	Michigan	SERS	Yes	3%	Benefits exempt
36	Michigan	MERS	Yes	Varies depending on employer agreement	Benefits exempt
37	Michigan	PSERS	Yes	Investment earnings in excess of 8%	Benefits exempt

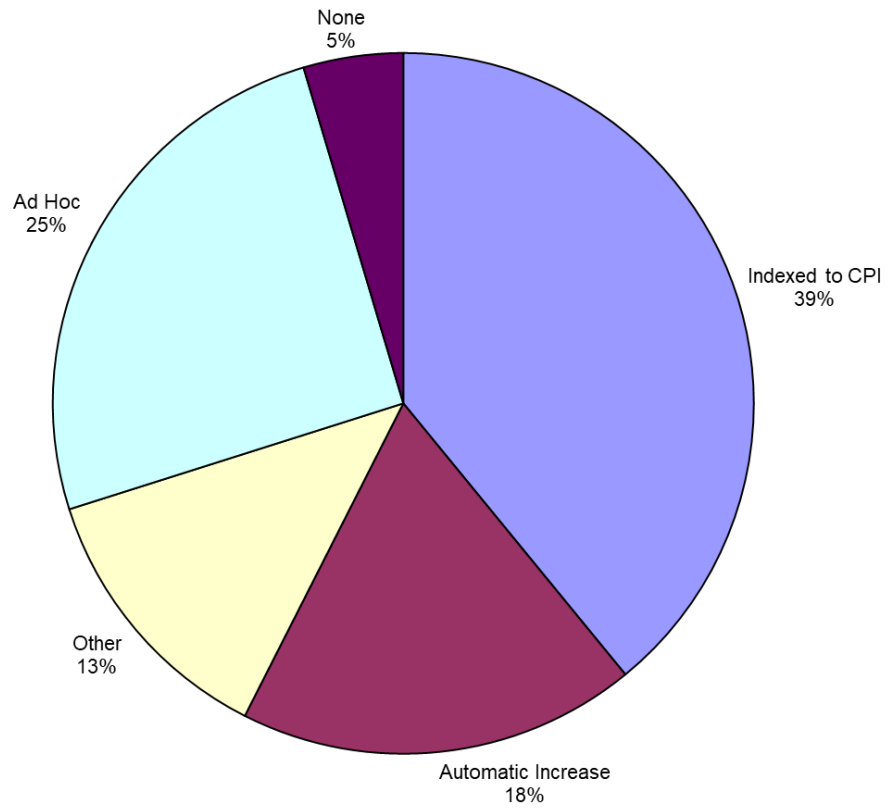
38	Minnesota	MSRS-SERF	Yes	2% - 2.5%	Benefits taxable
39	Minnesota	PERA - GERP	Yes	1% - 2.5%	Benefits taxable
40	Minnesota	TRA	Yes	2% - 2.5%	Benefits taxable
41	Mississippi	PERS	Yes	3%	Benefits exempt
42	Missouri	SERS	Yes	80% CPI - 5% cap	Exempt 100% up to \$85,000/\$100,000 AGI
43	Missouri	LAGERS	Yes	CPI - 4% cap	Exempt 100% up to \$85,000/\$100,000 AGI
44	Missouri	PSRS	No	CPI - 2% or 5% cap	Exempt 100% up to \$85,000/\$100,000 AGI
45	Montana	PERS	Yes	1.5% based on funded status	Exempt to \$4,070 per individual
46	Montana	TRS	Yes	0.5%	Exempt to \$4,070 per individual
47	Nebraska	SERS	Yes	2.5% Annuity option	Benefits taxable
48	Nebraska	CERS	Yes	2.5% Annuity option	Benefits taxable
49	Nebraska	SRS	Yes	CPI - 1.0% cap	Benefits taxable
50	Nevada	PERS	No	CPI - 2 to 4% max	No income tax
51	New Hampshire	NHRS	Yes	Ad hoc	Benefits exempt
52	New Jersey	PERS	Yes	None	Exclusion to \$30,000/\$60,000 for >\$100,000 Inc.
53	New Jersey	TPAF	Yes	None	Exclusion to \$30,000/\$60,000 for >\$100,000 Inc.
54	New Mexico	PERA	Yes	2.0%	Exempt to \$2500 (low income only)
55	New Mexico	ERA	Yes	50% of CPI - 2% min; 4% cap; Full CPI, if >2%	Exempt to \$2500 (low income only)
56	New York	ERS	Yes	50% of CPI: min. 1% - max 3%	Benefits exempt
57	New York	TRS	Yes	50% of CPI, max 3% on 1st \$18,000	Benefits exempt
58	North Carolina	TSERS	Yes	Ad hoc	Benefits Taxable
59	North Carolina	LGERS	Yes	Ad hoc	Benefits Taxable
60	North Dakota	PERS	Yes	Ad hoc	Up to \$5000 excluded
61	North Dakota	TRF	Yes	Ad hoc	Up to \$5000 excluded
62	Ohio	PERS	No	CPI - 3% cap	\$50 to \$200 credit
63	Ohio	STRS	No	Ad hoc	\$50 to \$200 credit
64	Oklahoma	PERS	Yes	Ad hoc	Exclude up to \$10,000
65	Oklahoma	TRS	Yes	Ad hoc	Exclude up to \$10,000
66	Oregon	PERS-OPSRP	Yes	1.25% on 1st \$60,000 + .15% on \$60,000+	Benefits taxable
67	Pennsylvania	SERS	Yes	Ad hoc	Benefits exempt
68	Pennsylvania	PSERS	Yes	None	Benefits exempt
69	Rhode Island	ERS	Yes	CPI - 3% cap	Benefits taxable
70	South Carolina	SCRS	Yes	Lesser of 1% or \$500	\$15,000 deduction
71	South Dakota	SRS	Yes	.5% to 3.5% based on CPI	No income tax
72	Tennessee	CRS	Yes	CPI - 3% cap	Benefits taxable
73	Texas	ERS	Yes	Ad hoc	No income tax
74	Texas	TRS	No	Ad hoc	No income tax
75	Texas	MRS	Yes	Up to 70% of CPI (employer option)	No income tax
76	Utah	SRS-PERS	Yes	CPI - 2.5% cap	Tax credit up to \$450/\$900
77	Vermont	SRS	Yes	1/2 of CPI - 5% cap	Benefits taxable
78	Vermont	TRS	Yes	1/2 of CPI - 5% cap	Benefits taxable
79	Virginia	SRS	Yes	CPI - 3% cap	Deduction up to \$12,000, age-based
80	Washington	PERS	Yes	CPI - 3% cap	No income tax
81	Washington	TRS	Yes	CPI - 3% cap	No income tax

82	West Virginia	PERS	Yes	Ad hoc	Exempt to \$2,000; Exclusions for \$8000/\$16000
83	West Virginia	TRS	Yes	Ad hoc	Exempt to \$2,000; Exclusions for \$8000/\$16000
84	Wyoming	WRS	Yes	1% to 3% - self-funded	No income tax
85	Milwaukee	City	Yes	Ad hoc	Limited exemptions
86	Milwaukee	County	Yes	2%	Limited exemptions
87	Wisconsin	WRS	Yes	Investment earnings; reductions possible	Limited exemptions

Figure 10. Social Security CPI % Adjustments 2002 to 2019



**Figure 11. 2017-18 Cost of Living Adjustments**



## PART VI ACTUARIAL AND ACCOUNTING INFORMATION

### A. INTRODUCTION

Chart 6, on pages 41 and 42, provides selected actuarial and accounting information about each of the plans in the report. This part of the report discusses the actuarial method used by each of the plans, provides the interest assumption, wage inflation assumption, and economic spread for each of the plans, and provides the Governmental Accounting Standards Board (GASB) 25 funding ratio for each of the plans for 2017-18.

### B. ACTUARIAL METHODS

The third column in Chart 6 lists the actuarial methods used by each of the 87 plans. An actuarial method is a procedure for determining the present value of pension benefits that will be paid in the future and allocating that value and the cost of the benefits to specific time periods. There are a number of accepted actuarial methods that presumably will reach the goal of fully funding all pension obligations as they become due, but they allocate costs in different ways during the period of employment of participants in the plan.

Seventy-eight, or 90%, of the 87 plans use the entry age actuarial method; five of the 87 plans use the unit credit method; and four of the 87 plans use the aggregate cost method.

### C. INTEREST ASSUMPTION

The interest assumption, which is also sometimes referred to as the “earnings assumption,” is one of the key economic assumptions in determining the level of contribution rates. The fourth column in Chart 6 provides the interest assumption for each of the 87 plans in the report. This information is compared with previous reports in the following table:

<b><u>Interest Assumption</u></b>	<b><u>2008</u></b>	<b><u>2010</u></b>	<b><u>2012</u></b>	<b><u>2015</u></b>	<b><u>2017-18</u></b>
From 5% to 7%	1 plan	4 plans	4 plans	6 plans	19 plans
Over 7% to 8%	63 plans	65 plans	72 plans	78 plans	66 plans
Over 8%	21 plans	16 plans	8 plans	3 plans	2 plans
Not determined or not applicable	2 plans	2 plans	3 plans	0 plans	0 plans
<b>TOTAL</b>	87 plans	87 plans	87 plans	87 plans	87 plans

See Figure 12, *2017-18 Plan Interest Assumptions*, for a graphical representation of current data.

### D. ECONOMIC SPREAD

Another key economic assumption in pension planning is the assumption of the wage inflation rate or general salary increases in excess of those provided for merit or seniority. The difference between the wage inflation assumption and the interest assumption is often referred to as the “economic spread,” which is the assumed real rate of return on invested assets above the wage inflation rate. The fifth and sixth columns of Chart 6 show the wage inflation assumptions and the resultant economic spread for each of the plans in the report.

## E. FUNDING RATIO

Until 1995, the GASB required public pension plans to disclose the “pension benefit obligation,” which is a measure of the present value of pension benefits, adjusted for the effects of projected salary increases. The pension benefits were estimated only on service earned by employees up to the date of the estimate.

GASB 25, issued in November 1994, requires that, beginning with periods after June 15, 1996, funding disclosures be based upon regular actuarial valuations. Included in the requirements under GASB 25 is a “schedule funding progress that reports the actuarial value of assets, the actuarial accrued liability and the relationship between the two over time...”

The following table summarizes the funding ratios for each of the plans in the 2017-18 Report and compares them with the 2015, 2012, 2010, and 2008 Reports.

<u>Funding Ratio</u>	<u>2008</u>	<u>2010</u>	<u>2012</u>	<u>2015</u>	<u>2017-18</u>
More than 100%	10 plans	4 plans	0 plans	3 plans	2 plans
90% to 100%	19 plans	11 plans	11 plans	11 plans	13 plans
80%, but less than 90%	18 plans	23 plans	17 plans	15 plans	14 plans
70%, but less than 80%	24 plans	16 plans	18 plans	22 plans	21 plans
60%, but less than 70%	6 plans	17 plans	21 plans	23 plans	20 plans
50%, but less than 60%	6 plans	7 plans	12 plans	9 plans	11 plans
Less than 50%	2 plans	7 plans	5 plans	4 plans	6 plans
Not determined	2 plans	2 plans	3 plans	0 plans	0 plans
<b>TOTAL</b>	85 plans	87 plans	87 plans	87 plans	87 plans

See Figure 13, *2017-18 Plan Funding Ratios*, for a graphical representation of current data.

## F. TRENDS

Funding ratios of more than 100% have generally decreased over the last 10 years. Ten plans had funding ratios in excess of 100% in 2008. Two plans have a funding ratio in excess of 100% in 2017-18. Overall funding has also decreased. Thirty-three percent of the plans studied had funding ratios of 90% or more in 2008. In 2017-18, that percentage was 17%.

The entry age method remains the predominant method used by the plans studied with a number of plans converting to the entry age method in the last few years (Arizona, Connecticut, Illinois, and Oregon).

## G. THE WRS

The actuarial method used by the WRS is the entry age method. The interest assumption for unretired employees remains 7.2% and the “economic spread” is currently 4.0%.

For 2017-18, the funding ratio for the WRS was 100%.



CHART 6  
ACTUARIAL AND ACCOUNTING PROVISIONS

	<u>State</u>	<u>Fund Name</u>	<u>Actuarial Method</u>	<u>Interest Assumption</u>	<u>Wage Inflation<sup>1</sup></u>	<u>Economic Spread</u>	<u>Funded Ratio</u>
1	Alabama	ERS	Entry age	7.75%	2.75%	5.00%	67.80%
2	Alabama	TRS	Entry age	7.75%	2.75%	5.00%	68.90%
3	Alaska	PERS	Entry age	8.00%	3.12%	4.88%	66.70%
4	Alaska	TRS	Entry age	8.00%	3.12%	4.88%	75.90%
5	Arizona	SRS	Entry age	7.50%	2.30%	5.20%	70.50%
6	Arkansas	PERS	Entry age	7.50%	2.50%	5.00%	77.60%
7	Arkansas	TRS	Entry age	7.50%	3.25%	4.25%	100.00%
8	California	PERS- PERF	Entry age	7.50%	2.75%	4.75%	68.30%
9	California	TRS	Entry age	7.50%	3.00%	4.50%	63.00%
10	Colorado	PERA	Entry age	7.25%	2.40%	4.85%	57.50%
11	Connecticut	SERS	Entry age	6.90%	2.50%	4.40%	38.10%
12	Connecticut	TRS	Entry age	8.50%	3.00%	5.50%	56.00%
13	Delaware	SEPP	Entry age	7.00%	2.50%	4.50%	86.50%
14	Florida	FRS	Entry age	7.50%	2.60%	4.90%	84.30%
15	Georgia	ERS	Entry age	7.50%	2.75%	4.75%	74.70%
16	Georgia	TRS	Entry age	7.50%	2.75%	4.75%	74.20%
17	Hawaii	ERS	Entry age	7.00%	2.50%	4.50%	54.90%
18	Idaho	PERS	Entry age	7.50%	3.25%	4.25%	89.60%
19	Illinois	SERS	Unit credit	7.00%	2.75%	4.25%	35.40%
20	Illinois	TRS	Unit credit	7.50%	2.50%	5.00%	40.20%
21	Illinois	MRF	Entry age	7.50%	3.25%	4.25%	92.90%
22	Indiana	PERF	Entry age	6.75%	2.25%	4.50%	79.00%
23	Indiana	TRF	Entry age	6.75%	2.25%	4.50%	48.05%
24	Iowa	PERS	Entry age	7.00%	2.60%	4.40%	81.39%
25	Kansas	PERS	Entry age	7.75%	2.75%	5.00%	68.40%
26	Kentucky	KERS	Entry age	5.75%	2.30%	3.45%	16.30%
27	Kentucky	CERS	Entry age	5.75%	2.30%	3.45%	51.60%
28	Kentucky	TRS	Entry age	7.50%	3.00%	4.50%	56.40%
29	Louisiana	SERS	Entry age	7.70%	2.75%	4.95%	63.70%
30	Louisiana	TRSL	Entry age	7.70%	2.50%	5.20%	64.50%
31	Maine	PERS	Entry age	6.88%	3.50%	3.38%	80.90%
32	Maryland	SRPS- RCPB	Entry age	7.50%	2.65%	4.85%	68.92%
33	Massachusetts	SERS	Entry age	7.50%	3.50%	4.00%	64.70%
34	Massachusetts	TRS	Entry age	7.50%	3.50%	4.00%	52.10%
35	Michigan	SERS	Entry age	8.00%	2.50%	5.50%	66.50%
36	Michigan	MERS	Entry age	7.75%	3.75%	4.00%	66.78%
37	Michigan	PSERS	Entry age	7.05%	2.50%	4.55%	61.60%
38	Minnesota	MSRS- SERF	Entry age	8.00%	2.75%	5.25%	85.22%
39	Minnesota	PERA - GERP	Entry age	8.00%	2.75%	5.25%	77.75%
40	Minnesota	TRA	Entry age	8.47%	2.75%	5.72%	76.79%
41	Mississippi	PERS	Entry age	7.75%	3.00%	4.75%	61.10%
42	Missouri	SERS	Entry age	7.50%	2.50%	5.00%	67.50%
43	Missouri	LAGERS	Entry age	7.25%	3.25%	4.00%	94.80%
44	Missouri	PSRS	Entry age	7.60%	2.25%	5.35%	84.00%
45	Montana	PERS	Entry age	7.65%	2.75%	4.90%	73.00%

46	Montana	TRS	Entry age	7.75%	3.25%	4.50%	70.49%
47	Nebraska	SERS	Entry age	7.50%	3.25%	4.25%	102.52%
48	Nebraska	CERS	Entry age	7.50%	3.25%	4.25%	102.36%
49	Nebraska	SRS	Entry age	7.50%	2.75%	4.75%	86.70%
50	Nevada	PERS	Entry age	7.50%	2.75%	4.75%	73.90%
51	New Hampshire	NHRS	Entry age	7.25%	2.50%	4.75%	61.80%
52	New Jersey	PERS	Unit credit	7.50%	3.08%	4.42%	60.08%
53	New Jersey	TPAF	Unit credit	7.50%	2.50%	5.00%	42.12%
54	New Mexico	PERA	Entry age	7.75%	2.75%	5.00%	74.90%
55	New Mexico	ERA	Entry age	7.25%	2.50%	4.75%	62.90%
56	New York	ERS	Aggregate	7.00%	2.50%	4.50%	94.12%
57	New York	TRS	Aggregate	7.50%	2.50%	5.00%	97.70%
58	North Carolina	TSERS	Entry age	7.20%	3.00%	4.20%	90.40%
59	North Carolina	LGERS	Entry age	7.20%	3.00%	4.20%	95.20%
60	North Dakota	PERS	Entry age	7.75%	2.50%	5.25%	70.70%
61	North Dakota	TRF	Entry age	7.75%	2.75%	5.00%	63.70%
62	Ohio	PERS	Entry age	7.50%	3.25%	4.25%	81.14%
63	Ohio	STRS	Entry age	7.45%	2.50%	4.95%	75.10%
64	Oklahoma	PERS	Entry age	7.00%	2.75%	4.25%	94.50%
65	Oklahoma	TRS	Entry age	7.50%	2.50%	5.00%	70.40%
66	Oregon	PERS- OPSRP	Entry age	7.20%	2.50%	4.70%	75.40%
67	Pennsylvania	SERS	Entry age	7.25%	2.75%	4.50%	56.30%
68	Pennsylvania	PSERS	Entry age	7.25%	2.60%	4.65%	59.40%
69	Rhode Island	ERS	Entry age	7.00%	2.50%	4.50%	54.03%
70	South Carolina	SCRS	Entry age	7.25%	2.25%	5.00%	56.30%
71	South Dakota	SRS	Entry age	6.50%	2.25%	4.25%	100.00%
72	Tennessee	CRS	Entry age	7.50%	3.00%	4.50%	95.44%
73	Texas	ERS	Entry age	8.00%	3.50%	4.50%	70.10%
74	Texas	TRS	Entry age	8.00%	2.50%	5.50%	80.50%
75	Texas	MRS	Entry age	6.75%	2.50%	4.25%	87.40%
76	Utah	SRS- PERS	Entry age	6.95%	2.50%	4.45%	85.50%
77	Vermont	SRS	Entry age	7.50%	2.50%	5.00%	71.43%
78	Vermont	TRS	Entry age	7.50%	2.50%	5.00%	54.22%
79	Virginia	SRS	Entry age	7.00%	2.50%	4.50%	77.03%
80	Washington	PERS	Aggregate	7.70%	3.00%	4.70%	89.00%
81	Washington	TRS	Aggregate	7.70%	3.00%	4.70%	91.00%
82	West Virginia	PERS	Entry age	7.50%	3.00%	4.50%	91.45%
83	West Virginia	TRS	Entry age	7.50%	3.00%	4.50%	67.05%
84	Wyoming	WRS	Entry age	7.00%	2.25%	4.75%	76.28%
85	Milwaukee	City	Unit credit	8.00%	2.50%	5.50%	89.90%
86	Milwaukee	County	Entry age	8.00%	3.00%	5.00%	77.10%
87	Wisconsin	WRS	Entry age	7.20%	3.20%	4.00%	100.00%

<sup>1</sup>Where no specific wage inflation or payroll growth figure was given, the price inflation assumption was used.

Figure 12. 2017-18 Plan Interest Assumptions

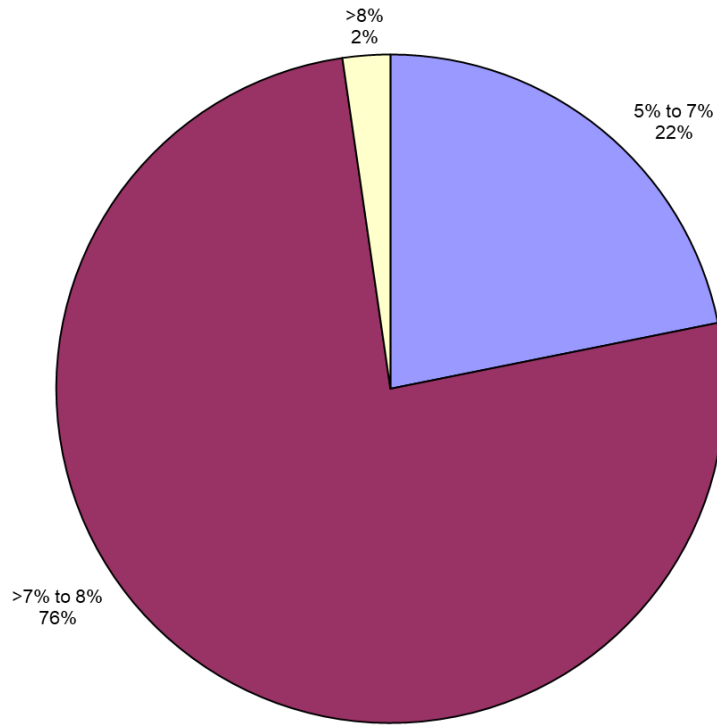


Figure 13. 2017-18 Plan Funding Ratios

