

Retiree Benefits in Public Pension Systems

Law Enforcement Officers' and Fire Fighters'
(LEOFF) Plan 2 Retirement Board

December 12, 2012

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Washington State Institute for Public Policy
www.wsipp.wa.gov

Background

State Plans

Portability

Overtime

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Study Assignment

*"conduct an evaluation of the benefits provided in the pension
plans offered by public employers in the state"*

- Compare benefit levels across public retirement plans.
- Identify barriers to portability of retirement benefits among public employers in the state.
- Describe how "excess compensation" (including overtime) is handled in pension calculations.

Supplemental Operating Budget § 606 (13), 2012 Wash. Sess. Laws 2225

Link to report: <http://www.wsipp.wa.gov/rptfiles/12-12-4101r.pdf>

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Local Public Pensions in Washington

- LEOFF was created in 1970 to consolidate local police and firefighter plans
- Most local governments participate in state plans
- Exceptions:
 - ✓ Seattle
 - ✓ Spokane
 - ✓ Tacoma
 - ✓ Lakewood
 - ✓ Sound Transit

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Employee Job Mobility & Pension Portability

Stable vs. Mobile Employees in Hypothetical Plans

Plan Type	Employee A (stable)	Employee B (mobile)
DB	58%	38%
DC	22%	20%
Hybrid	37%	27%

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Washington State Portability Laws & Rules

- Dual membership:
 - ✓ Combine service credit across jobs for eligibility
 - ✓ Use highest salary across jobs
 - ✓ Purchase service credit
 - ✓ An option for most state plans (including LEOFF 2) and Seattle, Spokane, Tacoma
 - ✓ Does not apply to Lakewood, Sound Transit, other DC plans

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Overtime and Excess Compensation Data

Department of Retirement Systems (DRS) data

- Members retiring from state plans 1/2009 to 6/2012:
 - Demographics, employer, pension plan, retirement date, average final compensation (AFC), cash-outs, excess comp.
 - Earnings history: compensation and hours worked up to ten years prior to retirement.
- Limitations – overtime hours and earnings not reported separately; no indication if mandatory or voluntary

Human Resource Management System (HRMS) data

- Covers state agency employees

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Stylized Example 1: End-of-Career Increases

Worker 1: no overtime
Worker 2: no overtime until last 5 years of career, then 20 hours/month

For Worker 2:

- Pension benefits higher than anticipated
- Contributions cover a small portion of costs

Year in career	Worker 1 Annual Salary	Worker 2 Annual Salary
1	\$25,000	\$25,000
5	\$28,000	\$28,000
10	\$32,000	\$32,000
15	\$36,000	\$36,000
20	\$40,000	\$40,000
24	\$48,000	\$48,000
25	\$50,000	\$55,000
29	\$55,000	\$65,000

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Stylized Example 2: Higher Hours Throughout Career

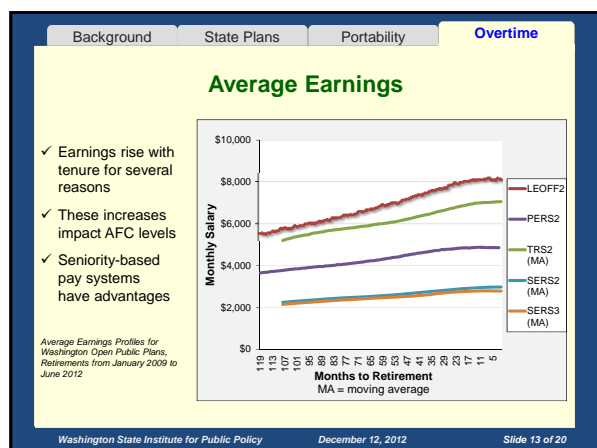
Worker 1: no overtime
Worker 2: consistent overtime hours throughout the career

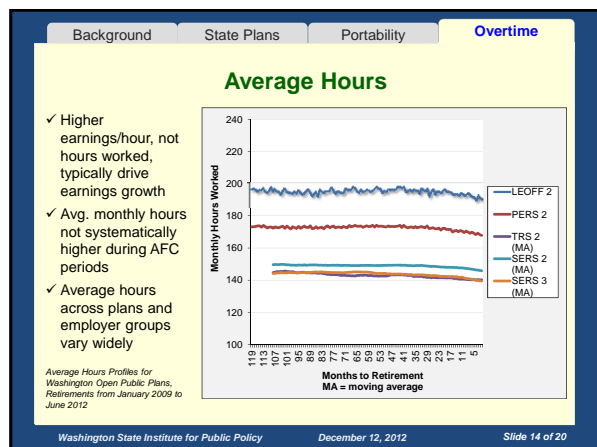
For Worker 2:

- Pension benefits higher as expected
- Worker and employer contributions cover the costs

Year in career	Worker 1 Annual Salary	Worker 2 Annual Salary
1	\$25,000	\$28,000
5	\$28,000	\$32,000
10	\$32,000	\$36,000
15	\$36,000	\$40,000
20	\$40,000	\$44,000
25	\$48,000	\$52,000
29	\$55,000	\$65,000

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Average Hours Before & During AFC Period

System/Plan	N	Avg. Hrs Pre-AFC	Avg. Hours AFC	Difference	Std Dev AFC Avg.
LEOFF1	109	186.3	182.9	-3.40	21.8
LEOFF2	731	195.4	194.9	-0.50	26.1
PERS1	3,577	170.2	169.3	-0.90	18.8
PERS2	6,182	173.0	172.1	-0.90	17.8
PERS3	158	171.1	169.0	-2.10	20.1
SERS2	1,115	147.2	146.1	-1.10	28.0
SERS3	251	143.0	140.8	-2.20	26.9
TRS1	1,968	153.1	154.1	1.00	18.7
TRS2	558	143.6	141.3	-2.30	14.1
TRS3	258	141.0	139.1	-1.90	18.3
WSPRS1	99	180.3	177.2	-3.10	9.7

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Variation in Hours Increases

- ✓ Across all systems, roughly 3% of retirees worked 20 or more additional hours per month during AFC periods than before.

Difference in Average Monthly Hours: All Systems and Plans

Average Hours Worked Gain/Loss Pre- and Post-AFC	Retirees	Percent
Less by > 2 hours	4,631	30.9%
Near, -2 to <2 hours	6,957	46.4%
More, 2 to <10	2,305	15.4%
More 10 to <20	698	4.7%
More, 20+	415	2.8%

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Variation in Hours Increases

- ✓ Most work roughly the same hours before and during the AFC period.
- ✓ Those who work overtime at the end of their career tended to do so earlier.
- ✓ There are exceptions; extreme increases in hours are rare.
- ✓ Hours decline for some members.

Retirees by Average Hours Before and During AFC Period: All Systems & Plans

Average Hours: Pre-AFC	(1) <128 (15-29/wk)	(2) 128-149 (30-34/wk)	(3) 150-166 (35-38/wk)	(4) 167-179 (39-41/wk)	(5) 180-192 (42-45/wk)	(6) 193-214 (45-49/wk)	(7) 215+ (50+/wk)
(1) <128 (15-29/wk)	699	131	35	20	3	0	1
(2) 128-149 (30-34/wk)	240	1153	382	65	11	7	2
(3) 150-166 (35-38/wk)	47	470	1189	369	32	5	9
(4) 167-179 (39-41/wk)	29	107	413	7151	357	34	13
(5) 180-192 (42-45/wk)	0	6	37	543	577	134	16
(6) 193-214 (45-49/wk)	1	2	4	59	137	236	50
(7) 215+ (50+/wk)	0	0	0	14	15	36	165

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Variation in Hours Increases

- ✓ Detail for LEOFF 2

LEOFF 2 Retirees by Average Hours Before and During AFC Period

Average Hours: Pre-AFC	(1) <128 (15-29/wk)	(2) 128-149 (30-34/wk)	(3) 150-166 (35-38/wk)	(4) 167-179 (39-41/wk)	(5) 180-192 (42-45/wk)	(6) 193-214 (45-49/wk)	(7) 215+ (50+/wk)
(1) <128 (15-29/wk)	0	0	0	0	0	0	0
(2) 128-149 (30-34/wk)	0	0	0	0	0	0	0
(3) 150-166 (35-38/wk)	0	0	9	4	2	2	1
(4) 167-179 (39-41/wk)	0	0	2	180	40	2	1
(5) 180-192 (42-45/wk)	0	1	0	53	126	28	4
(6) 193-214 (45-49/wk)	0	0	0	11	24	93	23
(7) 215+ (50+/wk)	0	0	0	4	3	14	104

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Variation in Hours Increases

✓ Detail for LEOFF 2

	N	Avg Hrs Pre-AFC	Avg Hours AFC	Std Dev AFC Avg
All LEOFF2	731	195.4	194.9	26.1
OSA Category				
Law Enforcement Officer 1st Class City	125	184.90	183.46	13.24
Law Enforcement Officer Other City	174	185.50	184.30	13.98
Sheriff or Deputy Sheriff	136	184.28	183.84	17.13
Fire Fighter 1st Class City	102	209.26	208.08	20.95
Fire Fighter Other City	171	213.15	214.38	34.39

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State Policies on Pensions and Overtime

- “Excess compensation” charges: WA, IL
- Limit AFC as % of final salary or as a \$ amount (less than half of states)
- Set longer AFC period (FL, IL at 10 years)
- Exclude overtime from AFC (28 states)
- Exclude leave cash-outs from AFC (about half of states)

AFC = average final compensation

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RETIREE BENEFITS IN PUBLIC PENSION SYSTEMS

This 12/5/12 revision corrects details about Seattle and Tacoma public pension plans on pages 13-14.

The 2012 Legislature directed the Washington State Institute for Public Policy (Institute) to evaluate pension benefits provided by public employers in Washington and other states.¹ The legislation calls for an examination of public plans':

- benefit levels and adequacy;
- benefit portability; and
- impacts from overtime and excess compensation.

The assignment is detailed in Appendix A.

The Institute consulted with the Office of the State Actuary, Department of Retirement Systems, and local government plan sponsors in conducting this study.² We surveyed public pension plans in the 50 states to compare benefit levels. We also analyzed state data on recent retirees in Washington State to examine overtime and excess compensation. Finally, we contracted with a professional actuary who has expertise in public employee retirement systems to review our methods and findings.³

The report is organized in three parts:

- Part 1: Public Pensions in Washington and Other States
- Part 2: Portability of Local Public Pensions
- Part 3: Overtime and Excess Compensation Analysis

¹ Supplemental Operating Budget § 606 (13), 2012 Wash. Sess. Laws 2225

² Suggested citation: Pennucci, A., Bauer, J., Lee, S., & DeShazo, A. (2012). *Retiree benefits in public pension plans* (Document No. 12-12-4101r). Olympia: Washington State Institute for Public Policy.

³ Mark C. Olleman, FSA, MAAA, EA, Consulting Actuary with Milliman. <http://www.milliman.com/why-milliman/consultants/olleman-mark.php>

Summary

The 2012 Legislature directed the Institute to evaluate three topics related to public pension policies: benefit levels, portability, and excess compensation.

Pension Benefit Levels. We surveyed all 50 states to analyze pension plan features and benefit levels. To provide an “apples-to-apples” comparison, we calculated pension benefits using an “income replacement” measure (the percentage of a worker’s salary replaced by the pension at the time of retirement).

We found that, for general state employees and teachers, Washington’s pension plans provide income replacement near the average of the state systems reviewed. For law enforcement and fire fighters, Washington’s benefit levels are in the lower end of the distribution among state pension plans.

Benefit Portability. We collected information about local public pension plans in Washington State. Most local governments enroll their employees in the state systems. We identified five public entities that sponsor their own plans. For defined benefit plans, Washington’s portability laws reduce, but do not eliminate, the reduction in benefits for workers who move between state and local public plans. The portability rules do not apply to defined contribution plans.

Excess Compensation. Washington’s excess compensation law requires public employers to increase contributions to the state pension fund if a retiree’s pensionable income is more than twice the salary earned in the last year of working. Such late-career compensation growth may be due to substantial increases in overtime hours.

To examine this issue, we analyzed salary histories of all recent state retirees. On average, we did not find systematic increases in hours worked in the years just prior to retirement. There are, however, exceptions; a small fraction of employees work substantially more in the years that determine their pension benefits than they did in earlier years.

We gratefully acknowledge the helpful assistance from the Office of the State Actuary and Department of Retirement Systems as we conducted this study.

OVERVIEW

PUBLIC PENSION BENEFIT LEVELS. Of the questions raised in the study legislation, the adequacy of retirement benefits is the most difficult to estimate. There is no agreed-upon standard for post-retirement income levels, in absolute or relative terms.

The level of benefits provided in various public pension plans, however, can be estimated given a set of common assumptions. In this report, we compare benefit levels using the percentage of a worker's salary that is replaced by pension benefits at the time of retirement (for simplicity, we call this measure "income replacement").⁴

Washington's state pension income replacement for general employees and teachers is near the average of 65 state pension plans reviewed. For law enforcement and fire fighters, Washington's state pension income replacement is in the lower end of the distribution among 43 plans in other states.

PUBLIC PENSION BENEFIT PORTABILITY. Most local governments in Washington State enroll their employees in the state retirement systems. We identified five public entities that sponsor their own plans outside of the state system.⁵ The three first-class cities (Seattle, Spokane, and Tacoma) have defined benefit (DB) plans.

In DB plans, salary contributions are pooled across participants and pension benefits are guaranteed for life. Pension benefits are determined by a formula based on years of service, average salary, and a benefit multiplier.

⁴ This measure is frequently used by researchers, policy analysts, and actuaries to evaluate pension benefits. More complex metrics, such as the net-present value of pension wealth, would take into account factors such as cost-of-living adjustments (COLAs), which can substantively alter the value of pension benefits over the life span. To minimize the number of assumptions required to estimate pension benefit levels, we opted to use the simpler income replacement measure for this comparative study.

⁵ This review excludes optional 401(k)-type deferred compensation plans that supplement the state retirement systems.

Washington's pension portability laws decrease, but do not eliminate, the reduction in benefits for workers who move between state and local public defined benefit (DB) plans.

At least two local governments in Washington State sponsor defined contribution (DC) plans rather than a DB plan (the City of Lakewood and Sound Transit). DC plans are similar to private 401(k) plans. These plans accumulate salary contributions in an individual investment account. DC benefit levels are less predictable than in DB plans because their value depends on investment performance.

In DC plans, the benefits are more portable—that is, they are not tied to years of service with a single employer. Mobile workers who move among state DB plans and local public DC plans may incur benefit reductions, but Washington's portability laws do not apply to DC plans.

EXCESS COMPENSATION AND OVERTIME.

Washington's excess compensation law requires public employers to increase contributions to the state pension fund if a retiree's pensionable income is more than twice the salary earned in the last year of working. Such late-career compensation growth may be due to substantial increases in overtime hours.

We examined work histories for recent state pension plan retirees. These histories include information on ten years of earnings and hours worked and allow us to discern if behavior changes during the period in which average final compensation (AFC) is determined. On average, we did not find pervasive, systematic increases in hours worked during AFC periods. There are, however, exceptions; a small fraction of employees work substantially more in later years than they did in earlier years.

PART 1: PUBLIC PENSIONS IN WASHINGTON AND OTHER STATES

The Washington State Legislature directed the Institute to compare Washington's state public pension plans with other states' plans. We begin with an overview of Washington State pension systems, and then compare plan features and benefit levels among states.

The sub-sections are organized as follows:

- 1A) Washington State Pension Plans
- 1B) Comparison of Public Pension Plans across the United States

1A. WASHINGTON STATE PENSION PLANS

Exhibit 1 lists Washington State's major retirement systems.⁶ The systems provide pension benefits to general state employees, teachers and school staff, and public safety personnel. Each system includes one to three pension plans. Which plan employees join depends on where they work and when they were hired.

Exhibit 1
Washington State Pension Plans

System	Plans		
	1	2	3
Public Employees' Retirement System (PERS)	✓	✓	✓
Teachers' Retirement System (TRS)	✓	✓	✓
School Employees' Retirement System (SERS)		✓	✓
Public Safety Employees' Retirement System (PSERS)		✓	
Law Enforcement Officers' and Fire Fighters' Retirement System (LEOFF)	✓	✓	
Washington State Patrol Retirement System (WSPRS)	✓	✓	

WSIPP survey of state plans (see Appendix B).

⁶ Because we had a short time frame for this study, we exclude plans for judges (now closed to new employees, who now join PERS) and TIAA-CREF for higher education faculty (this plan is not administered by the state). We also exclude optional "deferred compensation" plans.

Plans 1. Washington State began offering public employee pensions soon after the creation of Social Security in 1935. The Teachers' Retirement System (TRS) opened in 1938,⁷ and the Public Employees' Retirement System (PERS) and Washington State Patrol Retirement System (WSPRS) followed in 1947. The Law Enforcement Officers' and Fire Fighters' Retirement System (LEOFF) opened in 1970 to consolidate local policy and fire fighters into a state system.⁸

These first generation pension plans were closed to new employees starting in 1977.

Washington's early public pension plans provide retirees with a "defined benefit"—a monthly payment for life based on a formula. The formula includes an employee's years of service, highest salary, and a set benefit multiplier (2%):

Plans 1 Benefit Formula

$$\text{Pension Benefit} = \text{Up to 30 years of service} \times \text{Average of 2 highest salary years} \times \text{2\% multiplier}$$

An employee must work five years before becoming eligible to eventually collect these benefits. This eligibility requirement is called "vesting." A pensioner's years of service, including vesting years, are counted in the benefit formula. Individuals can draw retirement benefits after 30 years of service.⁹ WSPRS and LEOFF have earlier retirement ages (see Appendix B for details).

To illustrate: a state employee who retires after 30 years with \$50,000 highest average salary would have a PERS annual pension benefit of \$30,000:

For example:

$$\$30,000 = 30 \times \$50,000 \times 2\%$$

⁷ The Judges Retirement Fund, now closed, pre-dated TRS by one year (1937).

⁸ <http://www.drs.wa.gov/employer/employerhandbook/chpt1/history.htm>

⁹ Plans 1 members can also retire at age 60 (vested at five years) or age 55 with 25 years of service.

Public employers and employees contribute a percentage of employee salaries to the pension fund.¹⁰ The combined contributions are invested by the Washington State Investment Board (WSIB). Investment returns pay for most of the plan's benefits.¹¹

If a person leaves state employment before vesting (five years), there is no formula benefit. The employee contributions plus interest can be withdrawn (with tax penalties) or rolled over into a new retirement account. If a member is vested and leaves employment before their retirement age, they have the option to leave their contributions in the account while accruing interest. A member may collect their benefit when they reach the age of normal retirement with five years of service.

Plans 2. In 1977, Washington State opened new "Plan 2" pensions and PERS, TRS, and LEOFF (now referred to as "Plans 1") were closed.¹² New employees who would have previously joined Plans 1 instead enrolled in Plans 2. Like Plans 1, the new plans were designed to give retirees a "defined benefit" for life following the same basic formula, although there are differences in retirement ages and other provisions.

The Plans 2 have a set retirement age; members cannot collect pensions before age 65 without reductions in benefits.¹³ The Plans 2 also have a longer time frame for the average final salary period (five years rather than two). There is no service cap for Plans 2 (service beyond 30 years counts in the benefit calculation) and Plans 2 members get an automatic cost-of-living adjustment (COLA).¹⁴

¹⁰ Plans 1 employees contribute 6% and employers contribute an actuarially determined amount.

¹¹ http://www.leg.wa.gov/SCPP/Documents/2008/Pensions_101.pdf

¹² One reason for this change was to address the actuarial funded status of the plans. As of November 2012, the PERS 1 funded ratio was 71% (81% for TRS 1); all other Washington State plans' funded ratios are over 100%. See http://osa.leg.wa.gov/Actuarial_Services/Publications/PDF_Docs/Presentations/SOSP-WSIB11-15-12.pdf

¹³ The 2012 Legislature set the early retirement factors (ERFs) at a reduction of 5% of benefits per year younger than 65.

¹⁴ Up to 3% based on the Consumer Price Index (CPI). For Plans 1, COLAs are not automatic and must be authorized in new legislation, except for LEOFF 1 which has an automatic COLA.

Plans 2 Benefit Formula

Pension Benefit	=	Years of service	X	Average of 5 highest salary years	X	2% multiplier
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WSPRS Plan 2 was created in 2003, after some systems had already introduced a new type of plan, the "Plans 3."

Plans 3. In 1996, Washington State began to offer teachers a "Hybrid" retirement option (TRS 3) which includes both a DB and a DC component. DC retirement plans are similar to 401(k) plans, which were becoming more common in the private sector. In DC plans, the accumulated contributions plus interest and investment returns are distributed as a lump sum upon retirement.¹⁵

The rationale for adding a DC component was to improve the portability of pensions, given an increasingly mobile workforce and desires to benefit from stock market gains during this period.¹⁶

In Washington State's Plan 3 pensions, employees contribute to the DC component and employers contribute to the DB component. The defined benefit is half the amount as in Plans 1 and 2 (a 1% multiplier instead of 2%). The vesting period is longer (ten versus five years).¹⁷ Plans 3 early retirement requires fewer service credit years (ten versus twenty years as in Plans 2).

¹⁵ Retirees can also purchase annuities that convert the lump sum into a stream of payments similar to a DB plan.

¹⁶ The enacting legislation for TRS 3 indicated intent for "a new public retirement system that balances flexibility with stability, provides both increased employee control of investments and responsible protection of the public's investment in employee benefits, and encourages the pursuit of public sector careers without preventing employees from transitioning into other public or private sector employment." Teachers' retirement system plan III, 1995 Wash. Sess. Laws 805.

¹⁷ Plans 3 members can vest in five years if at least one year of service occurred when the employee was older than age 44.

Plans 3 Benefit Formula

$$\text{Pension Benefit} = \text{Years of service} \times \text{Average of 5 highest salary years} \times \text{1\% multiplier} \\ \text{-plus-} \\ \text{Defined contributions, interest, and investment returns}$$

Plans 3 in SERS and PERS were opened to new employees in 2000 and 2002.

For the DC component, individuals can choose to invest 5-15% of their salary and can direct how contributions are invested.¹⁸ For this part of the plan, there is no guaranteed post-retirement income. The value of a worker's DC assets upon retirement is determined by contribution levels and investment performance. There is no vesting requirement for the DC component; if public employees leave their positions before the end of the vesting period, they can take their contributions plus interest with them.

Exhibit 2 displays the number of members in each of Washington's major pension plans. Exhibit 3 summarizes the main characteristics of Plans 1, 2, and 3.

Exhibit 2

2011 Membership by Washington Pension Plan and Employment/Retirement Status

System		Plans		
		1	2	3
PERS	Employed	7,733	117,096	27,588
	Retired	53,264	24,711	1,388
TRS	Employed	3,740	10,285	52,178
	Retired	36,118	2,657	2,934
SERS	Employed		20,784	31,548
	Retired		3,823	2,605
PSERS	Employed		4,187	
	Retired		15	
LEOFF	Employed	250	16,805	
	Retired	7,932	2,015	
WSPRS	Employed	767	315	
	Retired	875	0	

Data source: Office of the State Actuary, Actuarial Valuation Report, Washington, September 2012

Exhibit 3

Washington State Pension Plan Features

System	Plans		
	1	2	3
Years to vest	5	5	10
Normal retirement age (NRA)	NA*	65	65
Earliest possible retirement age	NA	55**	55**
Average final salary period (yrs)	2	5	5
Benefit multiplier	2%	2%	1%
Automatic COLA***	No	Yes	Yes
Maximum years of service	30	NA	NA
DC component	No	No	Yes

WSIPP survey of state plans (see Appendix B)

*Any age with 30 years experience, age 55 with 25, or age 60 with 5.

**With benefit reductions for each year between ages 55-65.

***Indexed to Consumer Price Index up to 3%.

¹⁸ Individuals can manage their own investments under the "self-directed investment program" (SDIP), or choose to have their contributions directed to the WSIB to be invested in the "total allocation portfolio" (TAP).

1B. COMPARISON OF PUBLIC PENSION PLANS ACROSS THE UNITED STATES

This section describes retirement plans in other states and presents a comparative analysis of benefit levels.

How were plans selected for comparison? The design of public retirement systems is complex. Each plan has its own eligibility criteria, retirement ages, contribution rates, benefit calculation factors, and distribution methods. To compare like-plans to like, we limit our review to open state public pension plans that:

- cover general state employees, teachers, and/or law enforcement and fire fighters;¹⁹
- are the most recently opened plan in the state that is currently enrolling new hires; and
- allow members to pay into Social Security (as Washington State employees may do).²⁰

Our review includes 65 plans for general state employees and teachers, and 43 for law enforcement and fire fighters. Institute staff searched plan documents, laws, rules, and websites of state-administered retirement systems in each of the 50 states. Appendix B provides details on each plan included in our comparative review.

¹⁹ We selected general state employees and teachers because they represent two of the largest systems (PERS and TRS). We examined law enforcement and firefighter plans separately because they tend to have lower retirement ages. We did not collect comparative information for other retirement systems in Washington because we had a short time frame for the study.

²⁰ This excludes plans from these states: Alaska, Colorado, Louisiana, Maine, Massachusetts, Nevada, and New Hampshire. It is important to note that Washington members of LEOFF and WSPRS plans have the option to choose whether to contribute to Social Security, and most do not. Likewise, in many state plans, such as California STRS, most employees opt out of Social Security; they are included in our analysis because individuals can choose to opt in.

The following summary highlights key features of state public pension plans:

- Plan type (DB, DC, or Hybrid)
- Vesting rules
- Retirement ages
- Experience requirements
- Contribution rates
- Benefit calculation factors
- Cost of living adjustments (COLAs)

Plan Type. Of the 65 state plans for general employees and teachers included in our review, 50 (77%) are DB plans. We also identified four DC plans and 11 Hybrid plans.

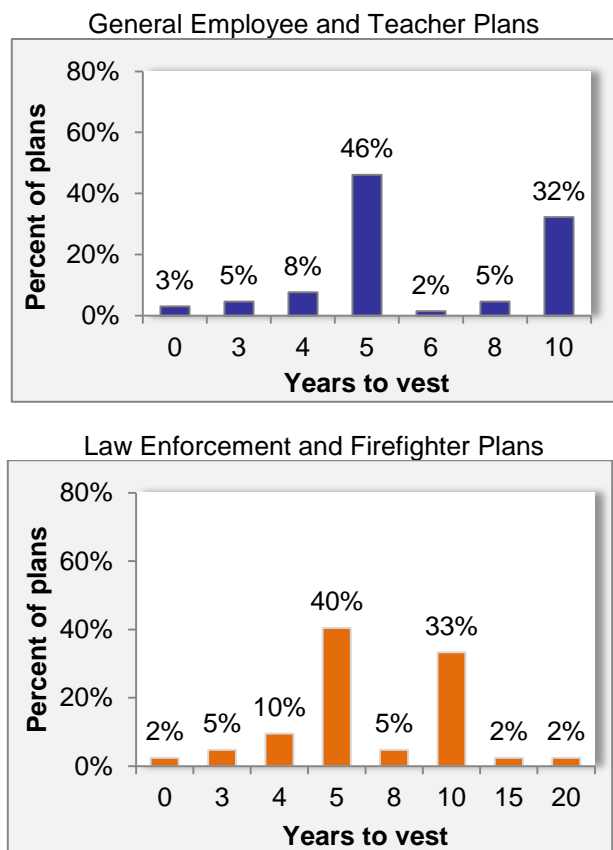
Thirty-eight (88%) of the 43 state pensions reviewed for law enforcement and fire fighters are DB plans; one is DC and four are Hybrid.

Vesting. In most (78%) of the open public plans reviewed, employees vest at five or ten years (see Exhibit 4). The average of the total vesting years across plans is seven years. Most of Washington's open plans require ten years to vest for DB retirement; LEOFF and PSERS plan members vest in five years.

Normal Retirement Age. Among the plans we reviewed, the most common age for normal retirement is 65. Because some plans allow for earlier retirements, the average normal retirement age is 63.5 years. In Washington State, normal retirement age is 65 for general plans and teachers, and 55 for law enforcement and fire fighters.

Service Credit Years. In DB and Hybrid plans, once members reach normal retirement age, they can retire and receive benefits if they have worked a certain number of years (usually five; the average is 6.5). Some plans require as many as ten years of service before an individual can retire with full benefits. In Washington State, Plans 1 and 2 require five, and Plans 3 require ten.

Exhibit 4 Vesting Requirements



WSIPP survey of state plans (see Appendix B)

Early Retirement. Among the plans reviewed for this report, early retirement is usually allowed at age 55, with reductions in benefits. The average number of required service credit years for early retirement is 11, but the most common number of service years required to retire early is five.

When individuals retire early, their benefits are reduced by a certain amount based on how far they are from normal retirement age. The most frequent benefit reduction percentage is 5% per year younger than normal retirement age.²¹

Employee Contribution Rates. To fund pensions, employees contribute 5% of their salary, on average. Some employees contribute as much as 10%, and some as little as 2%. Some plans are “non-contributory”—

only the employer contributes to the pension fund. We identified two non-contributory plans for general employees and teachers, and five for law enforcement plans.

Employer Contribution Rates. For general and teacher plans, the most common employer contribution is 6%, while the average is 12%. Some employers pay up to 34% for pension benefits. For law enforcement and fire fighters, the employer contributions tend to be higher—an average of 17% and a maximum of 61%.

Benefit Multiplier. The most frequent benefit multiplier used in the average final compensation calculation (AFC) is 2%, the same as Washington’s Plans 1 and 2. (See Exhibit 5, next page). The average multiplier is 1.84%. The highest benefit multiplier is 3.13%, and the lowest is 1%. Law enforcement and firefighter plans tend to have higher multipliers (average of 2.2%).²²

Hybrid plans generally have lower benefit multipliers because the plans include a DC component. For example, in Washington, the Hybrid Plans 3 benefit multiplier is 1%, and 2% in the DB Plans 1 and 2.

Average Final Compensation (AFC) Years. Most of the DB and Hybrid plans reviewed calculate retiree benefits based on the highest average salary in a three or five year period (see Exhibit 6, next page).

Cost-of-Living Adjustments (COLAs). A COLA increases the retiree’s benefit based on the changes of the Consumer Price Index (CPI). The adjustments are granted annually and can be automatic or on an ad hoc basis. Of the general and teacher plans reviewed, 57% offer an automatic post-retirement COLA. In 29% of the plans, COLAs are determined by the state legislature or the funded ratio of their plan. Nine plans do not offer a post-retirement COLA (some recently suspended theirs). Of plans that do offer an automatic COLA, 38% are a fixed amount, the average being 2.5%, with 3% being the most common.

²¹ This is the amount that Washington changed its early retirement factors to in 2012; it was previously 3%.

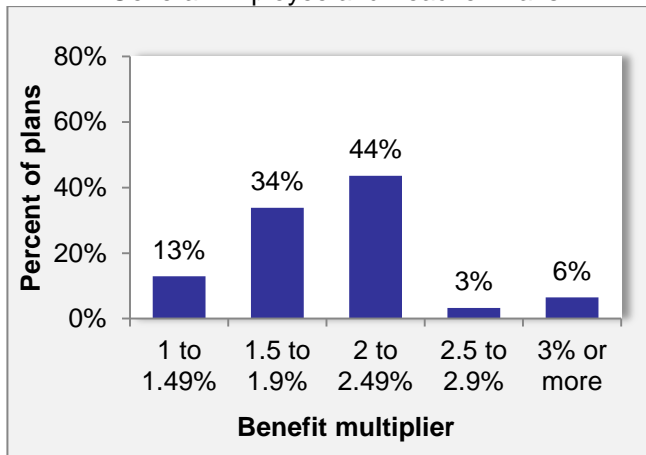
²² Washington LEOFF and WSPRS plan members can opt to pay in to Social Security, and most choose not to.

Washington’s Plans 2 and 3 offer a COLA (up to 3%, indexed to the Consumer Price Index), but not the closed Plans 1.²³ The percentage of law enforcement and firefighter plans that offer COLAs is similar to general and teacher plans.

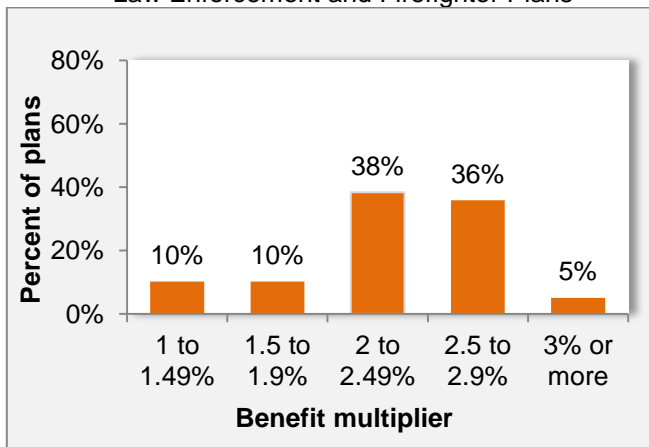
DC plans do not have COLAs. Retirees from DC plans can purchase a life-annuity that may include a COLA, such as Washington’s Total Allocation Portfolio (TAP) annuity.²⁴

**Exhibit 5
Benefit Multipliers**

General Employee and Teacher Plans



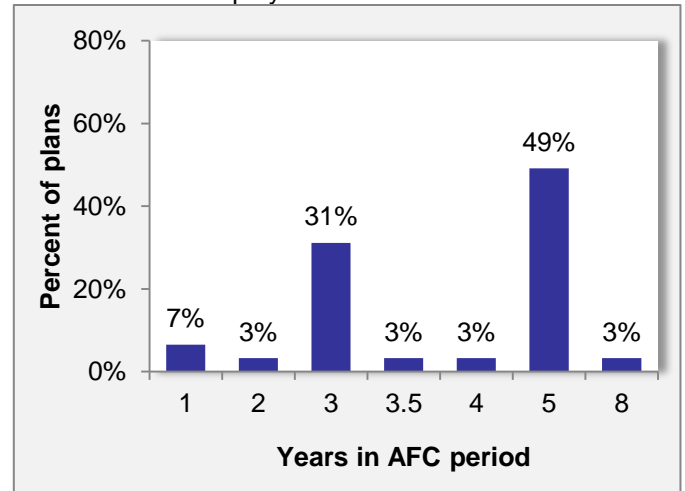
Law Enforcement and Firefighter Plans



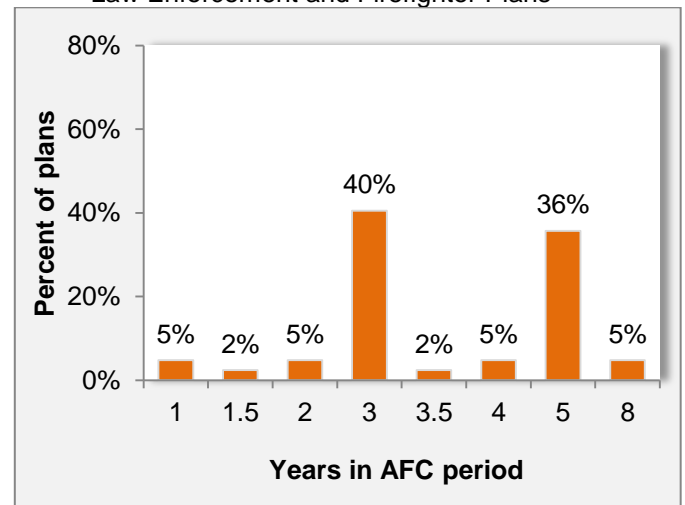
WSIPP survey of state plans (see Appendix B)

**Exhibit 6
AFC Periods**

General Employee and Teacher Plans



Law Enforcement and Firefighter Plans



WSIPP survey of state plans (see Appendix B)

²³ Washington Plans 1 allow members to decide whether they want to reduce their benefit multiplier and receive a COLA after they retire. The maximum COLA option is the same as Plans 2/3, up to 3% annually.

²⁴ Plan 3 retirees in Washington can opt to purchase a TAP Annuity under RCW 41.34.060. This annuity product offers an automatic 3% annual COLA and currently grows at the Pension Funding Council rate of 7.9%.

Plan by Plan Comparison of Benefit Levels

Of the questions raised in the study legislation, the adequacy of retirement benefits is the most difficult to estimate. There is no agreed-upon standard for post-retirement income levels, in absolute or relative terms.

The level of benefits provided in various pension plans, however, can be estimated and compared, given a set of common assumptions. In this report, we compare benefit levels using a metric commonly used by researchers, policy analysts, and actuaries—the percentage of a worker’s salary that is replaced by retirement benefits at the time of retirement, which we refer to as “income replacement.”²⁵

This income replacement measure allows us to directly compare pension benefits in different public plans for a certain person at a single point in time. Using salary history data from the Department of Retirement Systems (DRS), we developed earnings profiles of recent retirees. We then estimated what each profile’s income replacement would be in Washington’s and other state pension systems. The technical details are in Appendix C.

Assumptions. To construct an “apples-to-apples” comparison of different types of retirement plans, we had to make a variety of assumptions. First, we created earnings profiles for two hypothetical Washington retirees, one age 65 and one age 55,²⁶ both with 30 years of service. This allowed us to compute average final compensation (AFC) under the various plan definitions. We used assumptions about pension fund growth (7.9%) currently adopted by the Washington State Pension Funding Council. When comparing various state plans, we used default

contribution rates for each plan, and when plans had more than one possible benefit factor for retirees under a DB plan, we selected the midpoint. Key features of each plan, including AFC, contribution rates, and benefit factors, are described in Appendix B.

Limitations. This analysis examines only the state benefit portion of retirement income, and not other important sources such as Social Security and individual savings plans.

Because we examined benefit levels at the time of retirement rather than over the lifespan, the results do not account for provisions such as COLAs,²⁷ health or disability benefits, or joint (spouse) and survivor benefits.²⁸

In addition, because DC plans do not usually provide for automatic payment of benefits after retirement, we assumed that DC plan beneficiaries would not cash out a lump sum of benefits at retirement, but rather purchase an annuity that would guarantee them regular income for a number of years into the future. The details of all assumptions can be found in Appendix C.

²⁵ More complex metrics, such as the net-present value of pension wealth, would take into account plan provisions such as cost-of-living allowances (COLAs), which can substantively alter the value of pension benefits over the life span. To minimize the number of assumptions required to estimate pension benefit levels, we opted to use the simpler income replacement measure for this comparative study.

²⁶ For early retirement, we calculated benefits using the 5% (per year younger than 65) reduction in benefits set by the 2012 Legislature (SB 6378). For other states, we collected information about the plans’ early retirement percentage-per-year benefit reduction and calculated the benefits the same way.

²⁷ Our computations of first-year income replacement for DB plans (which make up the majority of plans) do not include COLAs; COLAs would not apply in the first year after retirement. However, our computations of income replacement for DC and Hybrid plans do. Because we must compute the long-term growth of DC plan investments in order to calculate the first-year income replacement, we necessarily had to assume post-retirement COLAs and a rate of growth for DC plans and the DC portion of Hybrid plans. These assumptions are described in detail in Appendix C.

²⁸ In many plans, these provisions are optional. Our estimates do not include these in order to minimize the number of assumptions made in our analysis.

Results. Exhibits 7 and 8 (next two pages) display the income replacement measure for each state plan reviewed.

For general and teacher plans, Washington's income replacement for a worker retiring at age 65 with 30 years of service is near average among states. The income replacement is 57% for Plans 2 and 56% for Plans 3.²⁹

Washington's general and teacher plans rank lower among states at the earlier retirement age (55). Plans 3 fall slightly below average and Plans 2 in the bottom quarter of states.

Washington's income replacement for law enforcement and fire fighters retiring at age 65 with 30 years of service is the same as for general and teacher plans (57%). These plans rank low (in the bottom quarter) in comparison with other states' plans for law enforcement and fire fighters.

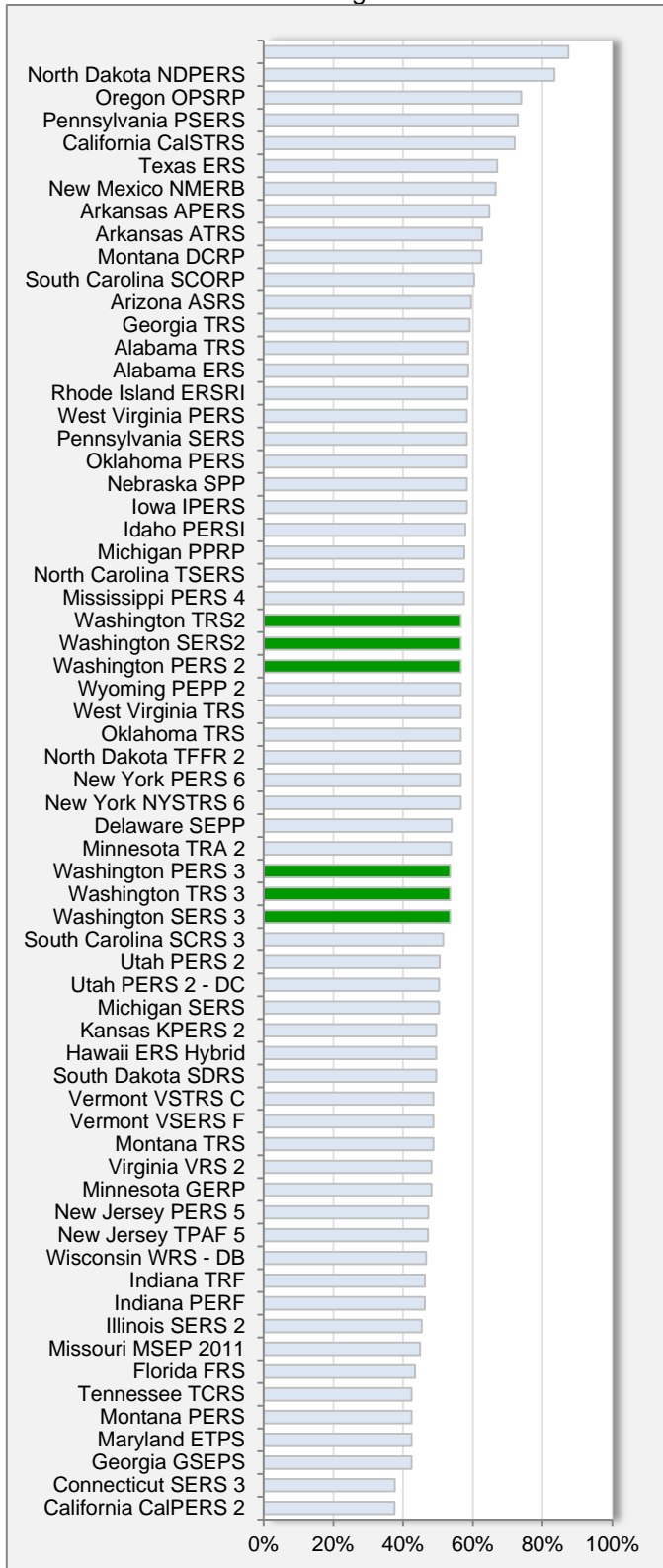
For an earlier retirement age (55), LEOFF 2 and WSPRS 2 provide the same income replacement (57%) and rank below average. For PSERS 2 members, retiring at age 55 involves an early retirement benefit reduction, so the income replacement is 48%, in the bottom quarter of the plans reviewed.

²⁹ For the DC component of Plans 3, we assume the default contribution rate (5% of salary). These plans would rank higher if employees opted for higher contribution rates.

Exhibit 7

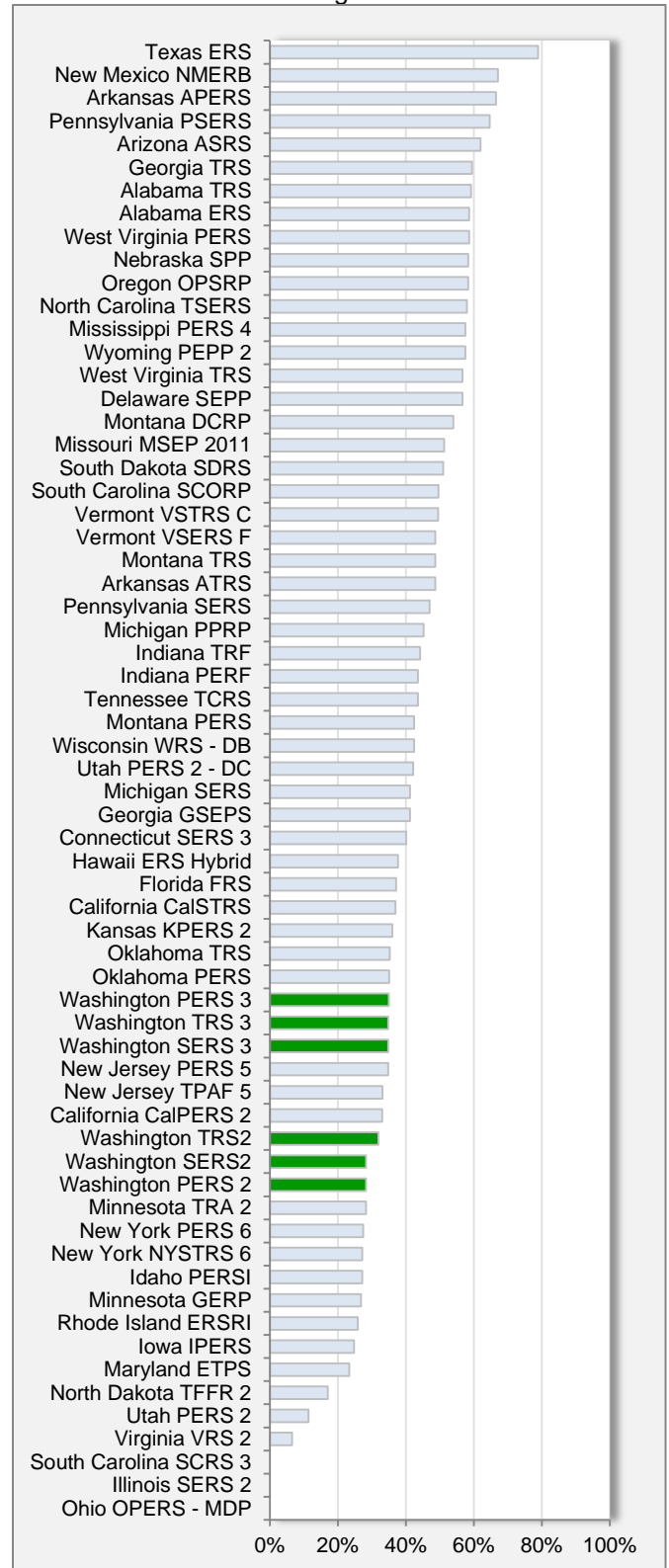
Income Replacement for General and Teacher State Retirement Plans

Retire at age 65



WSIPP analysis of state benefits (see Appendix C)

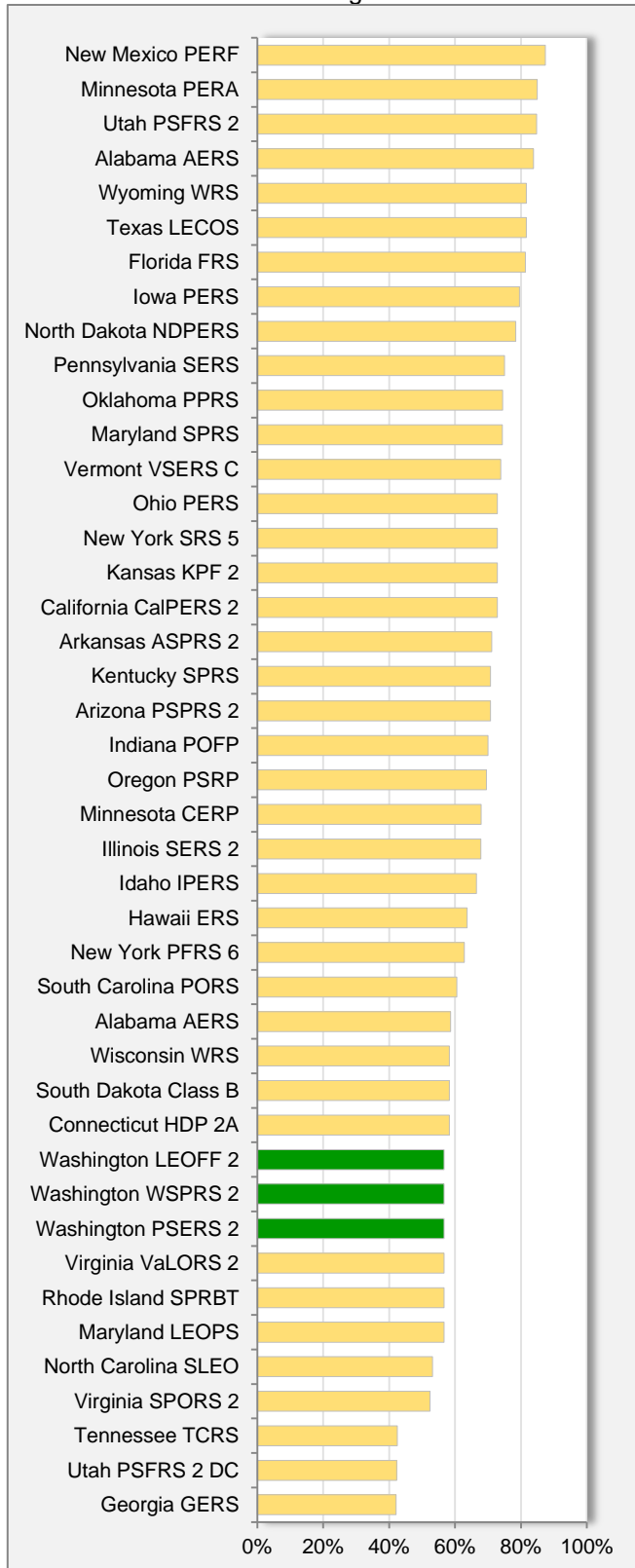
Retire at age 55



WSIPP analysis of state benefits (see Appendix C)

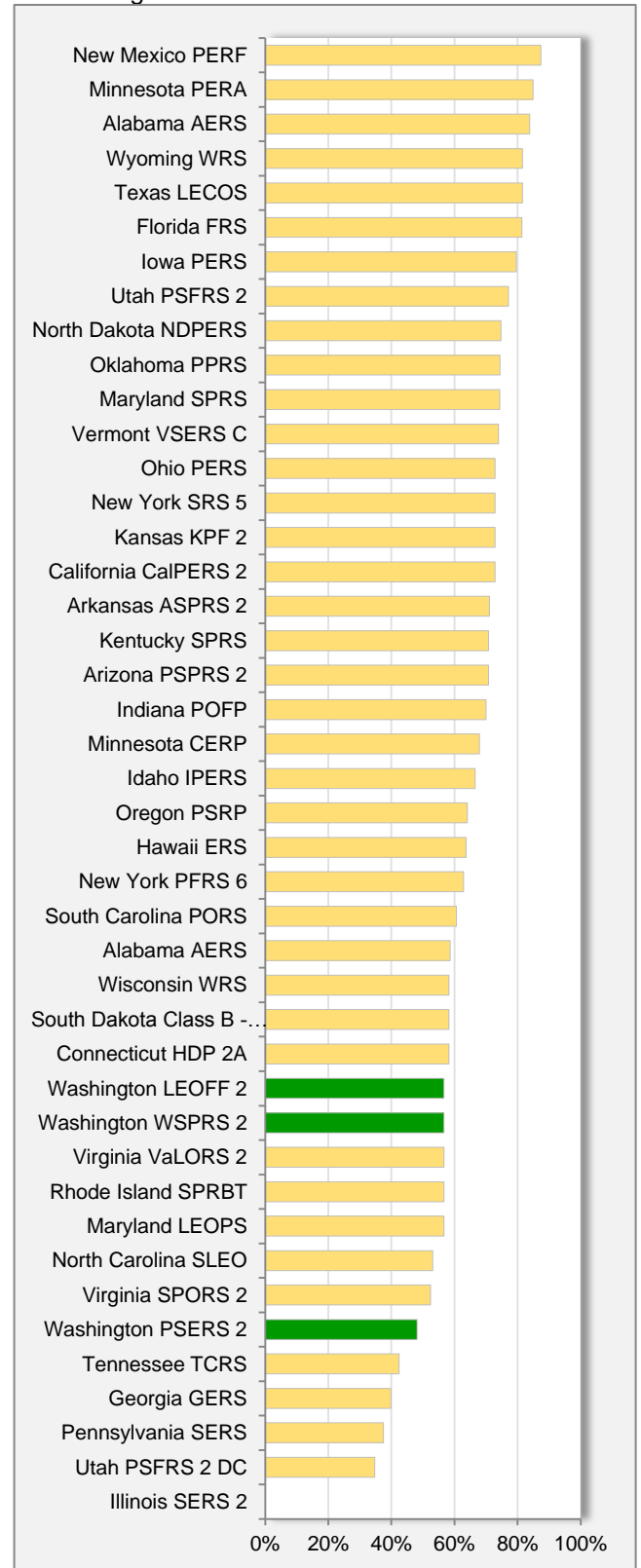
Exhibit 8
Income Replacement for Law Enforcement and Firefighter State Retirement Plans

Retire at age 65



WSIPP analysis of state benefits (see Appendix C)

Retire at age 55



WSIPP analysis of state benefits (see Appendix C)

PART 2: PORTABILITY OF LOCAL PUBLIC PENSION PLANS

Part of the legislative direction for this study calls for an examination of “barriers to the portability of retirement benefits between public employers in the state.” This section describes locally sponsored public retirement plans, defines “portability,” and describes policy options to address portability issues.

LOCAL PUBLIC RETIREMENT PLANS IN WASHINGTON STATE

Most public employers in Washington participate in one of the state-administered systems described in the previous section. All county and most city employees enroll in the state systems administered by the Washington State Department of Retirement Systems (DRS).

As shown in Exhibit 9, we identified only four cities that offer their own retirement plans in lieu of DRS-administered plans—the three first-class cities (Seattle, Tacoma, and Spokane), and Lakewood. Most other public employees (such as utilities, ports, and local law enforcement) participate in the state system. Sound Transit is one public entity that offers its own plan with no option to enroll in PERS or another state system.³⁰

³⁰ We identified these plans by conducting Internet searches and consulting with DRS, OSA, legislative staff and members, and retirement benefit professionals. Our list of local plans may not be exhaustive; we did not have time to conduct a comprehensive survey of all local governments in the state. Additionally, we did not review supplementary, optional defined contribution plans that many local governments offer in addition to the state-administered plans. We restricted our review to all locally sponsored plans that are the primary source of retirement benefits for local governments in Washington State.

Exhibit 9
Local Public Retirement Plans in Washington

Plan	Type
Seattle City Employees' Retirement System	DB
Spokane City Employees' Retirement System	DB
Tacoma Employees' Retirement Services	DB
Lakewood International City Management Association - Retirement Corporation (ICMA-RC) 401A plan	DC
(Sound Transit) Central Puget Sound Regional Transit Authority Pension Plan	DC

WSIPP review of local public plans

DB = defined benefit DC = defined contribution

All three first-class cities sponsor DB plans. For each, the benefit multiplier is 2% and the AFC period is two years (similar to the state's Plans 1).

Seattle. The City of Seattle's plan has a retirement age of 62 with five years of creditable service, or any age with 30 years. Employees vest after five years and contribute 10.03% of their salary to the fund (the city contributes 11.01%). The pension includes a post-retirement COLA of 1.5% per year. Members participate in Social Security.

Spokane. Spokane's plan has a retirement age of 62 with five years creditable service. Employees can also retire if they meet the “rule of 75” (age 50 with 25 years of service, or age 55 with 20 years, and so on). Employees vest after five years. Both employees and employers contribute 8% of salary to the pension fund. No post-retirement COLA is provided. Pension benefits are limited to 70% of the final average salary. Members participate in Social Security.

Tacoma. Tacoma's plan has a retirement age of 60 with any years of service, any age with 30 years, or the “rule of 80” (e.g., age 55 with 25 years). Employees vest after five years. Employees contribute 9.2% of salary and employers, 10.8%, to the pension fund. An automatic COLA is provided, depending on

the CPI. Members participate in Social Security.

Lakewood. In Lakewood, the city and employees make contributions to the International City Management Association-Retirement Corporation (ICMA-RC) Internal Revenue Code (IRC) 401(a) plan.³¹ The employee chooses how contributions are invested, given choices ranging from conservative (low risk) to aggressive (high risk). Employees vest 20% for each of first five years of service, after which they are fully vested.

Prior service credit in Washington State DRS plans is credited towards the vesting schedule in Lakewood. For example, if an individual had worked in a full-time job with a DRS-administered plan for two years, upon employment with the city of Lakewood, the employee would be 100% vested in three years.

Individuals covered under Lakewood's plan do not pay into Social Security; instead, the city and county contribute an additional percentage of salary for an "SS Replacement" plan.³²

Sound Transit. Similar to Lakewood, the Central Puget Sound Regional Trust Authority (Sound Transit) offers employees an ICMA-RC administered 401(a) retirement plan. Both employees and Sound Transit contribute to the benefits³³ and employees vest 20% per year of service for the first five years of service. Sound Transit also offers an optional Internal Revenue Code section 457 deferred compensation plan.³⁴ Members do not participate in Social Security.

Other Local Public Plans. Some public employers in Washington allow newly hired employees a choice between a local plan and a state plan. For example, the University of Washington offers employees a choice

between a state plan and the University's own tax-deferred DC plan.³⁵

For other public employers, such as the Port of Seattle, whether individuals join a DRS-administered plan or a local plan depends on whether their union offers retirement benefits. For example, while most Port employees are in a PERS plan, members of Local 32³⁶ instead join the Plumbers and Pipefitters DB pension plan.³⁷ The Port also matches employee contributions to a DC plan for up to \$2,200 annually.

Similar to most local public employers, Washington State retirement systems include an option for state employees to voluntarily participate in a DC plan.³⁸

WHAT IS "PORTABILITY"?

Pension portability refers to the ability of workers to change jobs without losing value in their retirement benefits. There is a tradeoff between predictability and portability in the design of pension plans.

Portability issues tend to arise with DB plans and mobile workers (members who change jobs over the course of their careers). In these plans, the pension benefit is based on the length of job tenure and salary level. DB plans provide predictable benefits that increase the longer employees stay on the job. When employees leave, they no longer accrue additional benefits.

In contrast, the accumulated contributions in DC retirement accounts continue growing from investment returns whether an employee

³⁵ For more information about the University of Washington Retirement Plan, see <http://www.washington.edu/admin/hr/benefits/retirement/plans/urp/index.html>

³⁶ Local 32 of the United Association of Journeymen and Apprentices of the Plumbing and Pipefitting Industry of the United States and Canada- AFL-CIO

³⁷ http://www.portseattle.org/Business/Labor-Relations/Documents/Labor_Mgt_Agreement_2008_2011.pdf

³⁸ Participants are charged a 0.129% administrative fee. For more information about Washington's deferred compensation program, see: https://www.dcpprovider.com/PDF/washington/DCP_Overview.pdf

³¹ 7.62% and 5.08% of salary, respectively.

³² 6.20% and 4.77% respectively. For the Social Security component, individuals are vested immediately.

³³ 10% and 12% respectively.

³⁴ In deferred compensation plans, employees can divert up to \$17,000 in salary per year to a tax-deferred investment account.

stays in the same job or not (so long as the employee does not cash out the balance when changing jobs). In this case, the benefits are not pre-determined by formula (they depend on investment performance), so the ultimate benefit level is more uncertain.

DC plans have become more common in the private sector as the American workforce has become increasingly mobile. In the public sector, DB plans continue to be the norm for state retirement systems, as shown in the previous section.

Comparison of Benefit Levels for Stable and Mobile Workers

To illustrate how retirement benefits are impacted by job mobility, we estimated benefit levels comparing two hypothetical workers with similar earnings profiles:

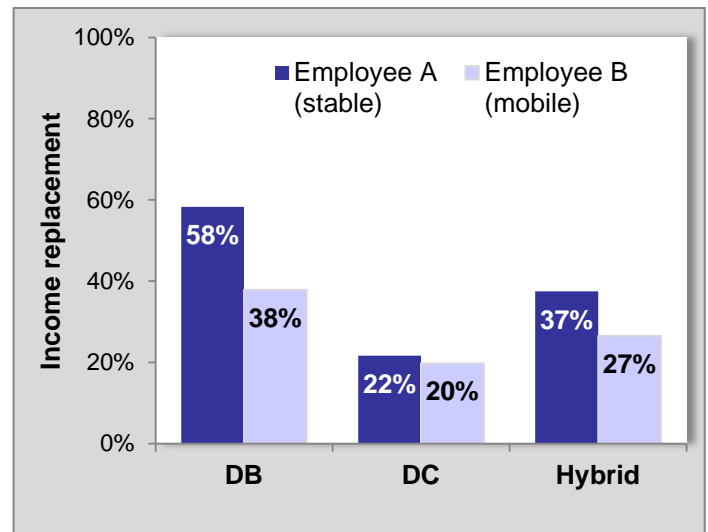
- a “stable employee” (Employee A); and
- a “mobile employee” (Employee B).

Employee A stays in the same job for 30 years, whereas Employee B changes jobs over the course of their career. We compare pension benefits at the time of retirement for each of these workers. Appendix D provides details about the analysis.

Across pension plan types, at the time of retirement, the hypothetical mobile employee accrues annual pension benefits that are 14% to 21% less than those of a stable employee in DB and Hybrid plans (see Exhibit 10). In DC plans, assuming that salaries tend to increase with a job change, the mobile employee receives a slightly higher benefit at the time of retirement than a stable employee (although as a percentage of income, the value is slightly lower).³⁹

³⁹ We assume that the employee's salary increases by 5% at each job change, which increases the value of the DC contributions. We also assume that employees roll over the DC account upon each job change (rather than cashing it out). We varied some of the assumptions in the analysis to see how sensitive our results are to different specifications. Appendix D discusses the sensitivity analysis.

Exhibit 10
Income Replacement at Retirement:
Two Hypothetical Employees⁴⁰



WSIPP modeling of plan structures (see Appendix D)

Washington State Portability Rules

To address portability issues for DB and Hybrid plans, Washington allows individuals to be part of more than one state pension plan under “dual membership” provisions.⁴¹ Individuals qualify for dual membership if they:

- are currently a member of one of Washington's systems;
- previously contributed to a different Washington system; and
- have not yet retired or received disability benefits.

Dual membership rules apply to defined benefits in the following plans:

- | | |
|----------------|--|
| • PERS 1, 2, 3 | • LEOFF 2 |
| • TRS 1, 2, 3 | • WSPRS 1, 2 |
| • SERS 2, 3 | • First class cities (Seattle, Spokane and Tacoma) |
| • PSERS 2 | |

⁴⁰ This example is not specific to Washington's plans.

⁴¹ RCW 41.54. The deferred indexed vested benefit for Plans 3 and LEOFF 2 also provide for greater portability.

Dual membership allows people who have accumulated retirement benefits in more than one system to:

- **Combine service credit** earned in all dual member systems to become eligible for retirement.

For example, if an employee works five years for the state in PERS2 and 15 years for the city of Spokane, the employee could retire at age 55 with benefits from both systems.

- **Use the highest base salary** across jobs to calculate your retirement benefit for both systems.

Continuing the example above, if the AFC was \$50,000 at the state and \$55,000 at the city, the pension benefits for both would be based on the higher AFC.

- **Purchase service credit** for previously withdrawn service by repaying the amount withdrawn plus interest.

*If the employee had cashed out their PERS 2 balance upon taking the city job, the employee could purchase five years of service credit based on their time at the state, so the city benefit would be $AFC * 20 * 2\%$ rather than $AFC * 15 * 2\%$.⁴²*

Across Washington State plans, retirees can also purchase up to five years of “air time” service credits (years not worked).⁴³ This credit cannot be used to determine eligibility for retirement, but can increase the monthly retirement benefit for life.

For Washington State workers in a DB plan, the portability laws increase the mobile employee’s pension benefits so that they are more comparable to those of a stable employee. Using assumptions similar to those used to compare state plans (see Appendix D for details), we found that for a

stable employee, income replacement might be 58%, compared to 38% for a mobile employee without portability. The mobile employee’s income replacement would increase to 51% with portability rules applied.

Portability rules have fiscal implications, because they increase benefits for mobile workers. Washington’s Office of the State Actuary analyzes data regarding these fiscal implications and uses the results to adjust contribution rates to cover the increased costs.

The portability rules do not apply to DC plans, and income replacement tends to be lower for these types of benefits. If the state desired to offer portability for individuals who move from a state plan to a local public DC plan, policy options include:

- allowing the service years at the DC job to count in determining retirement eligibility and/or the benefit amount for the DB plan; and
- allowing the final salary for the DC job to count in determining the benefit amount for the DB plan.

Like dual membership, these potential policy options have fiscal implications for state pension funds. Under the second option, employees who start out in a DRS-administered plan would have contributions made at an earlier (lower) salary rate, but their benefits would be based on the higher end-of-career AFC while in the DC plan. These higher costs would be borne by the DRS plans, unless provisions were made to charge sponsors of DC plans for the higher DB pension costs.

⁴² <http://drs.wa.gov/publications/member/multisystem/dualMemberships.htm#ex1>

⁴³ The purchase cost is based on an annuity factor that varies by age and plan.

PART 3: OVERTIME AND EXCESS COMPENSATION ANALYSIS

As part of this study's assignment, the Legislature directed the Institute to examine the:

*"treatment of overtime earnings in public employee retirement plans relative to the treatment of earnings in other states, including the impact of excess compensation on state retirement system contribution rates with a particular emphasis on agencies that operate on a 24-hour basis, such as the state patrol, ferry system, and state prisons."*⁴⁴

We begin with an overview of "excess compensation" definitions and rules in Washington and other states. We then use data from Washington State DRS to examine changes in earnings and hours worked among recent retirees. The data allow us to determine the extent to which behavior changes during AFC determination periods. We also assess the contribution of overtime payments to total compensation for recent state agency retirees using Human Resource Management System (HRMS) data.

The sub-sections are organized as follows:

- 2A) Excess Compensation Rules in Washington and Other States
- 2B) Overtime and Excess Compensation Analysis of Washington Data

2A. EXCESS COMPENSATION RULES IN WASHINGTON AND OTHER STATES

In Washington State, "excess compensation" refers to specific types of reportable compensation that exceed statutory limits for inclusion in pension benefit calculations. When an individual is reported by DRS as having excess compensation, the employer is billed the present value of the resulting increase in an employee's retirement benefit.

Washington State statute defines "excess compensation" as one of the following:

- (a) A cash-out of unused annual leave in excess of two hundred forty hours;
- (b) A cash-out of other forms of leave, including sick leave and holiday leave;
- (c) A payment for a personal expense, if the payment qualifies as reportable compensation in the employee's own retirement system;
- (d) That portion of any payment, such as an overtime or incentive payment, that exceeds twice the employee's regular rate of pay for the period of time that the overtime or incentive payment applies; and
- (e) A termination or severance payment.⁴⁵

Excess compensation is rare, especially among members of open plans. (See Appendix E, Exhibit E3.) Among employees retiring between January 2009 and June 2012, 18% of PERS1 members had some reported excess compensation. Only seven of the more than 10,000 PERS2 retirees (less than a tenth of 1%) over this period had reported excess compensation. In Plans 2 and 3, leave cash-outs are not included in pension calculations.

Implications of End-of-Career Compensation Increases

Salary growth over the course of an individual's career is expected as experience and productivity increase. If pay jumps sharply at the end of a career, the resulting increase in pension benefits can substantially raise pension costs. The increase in costs may not be fully borne by the retiree and their employer. To the extent that these costs are unexpected, they could force future contribution rates to rise.

The following two stylized examples illustrate how overtime hours or salary increases concentrated at the end of a career impact pensions.

⁴⁴ Supplemental Operating Budget § 606 (13), 2012 Wash. Sess. Laws 2225

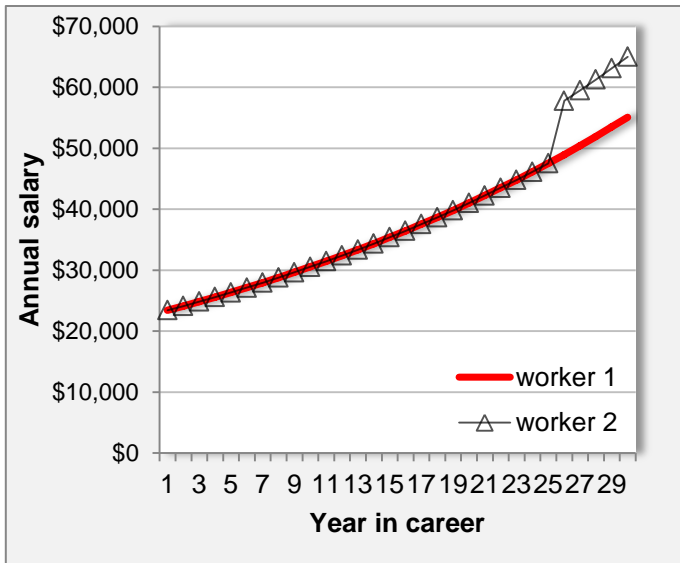
⁴⁵ RCW 41.50.150.

Stylized Example 1: End-of-career increases. This example illustrates the fiscal implications of hours and/or salaries that increase substantially and unexpectedly during the AFC period. The example illustrates the strong incentives for employees to supply more hours of work toward the end of a career. It also demonstrates that the costs of resulting extra pension benefits are not fully covered by the worker's or employer's contributions.

The specific assumptions used in this analysis are described in Appendix E.

In Exhibit 11, Worker 1 supplies the same number of hours every year and annual salary increases steadily throughout the career. Worker 2's hours and earnings follow a similar trajectory until the last five years of the career (the AFC period). During the AFC period, Worker 2 supplies 250 hours of overtime (just over 20 hours a month).

Exhibit 11
Stylized Example 1:
Illustration of Late-career Salary Increases



WSIPP stylized model (see Appendix E)

The resulting impact on AFC and pension benefits is summarized in Exhibit 12. Worker 2 contributes an extra \$2,500 to the system and gets an extra \$97,000 in expected pension benefits. The worker and employer contributions combined cover only a small portion of the gain in benefits.

The Office of the State Actuary measures and accounts for wage trends in its pension funding analyses. Any required increases in contribution rates are spread across all employers and employees in a plan. Excess compensation (monitored by DRS) applies if overtime or other late-career compensation increases cause salary to more than double.

Exhibit 12
Stylized Example 1: Summary Impact of Overtime on Pension Benefits and Contributions

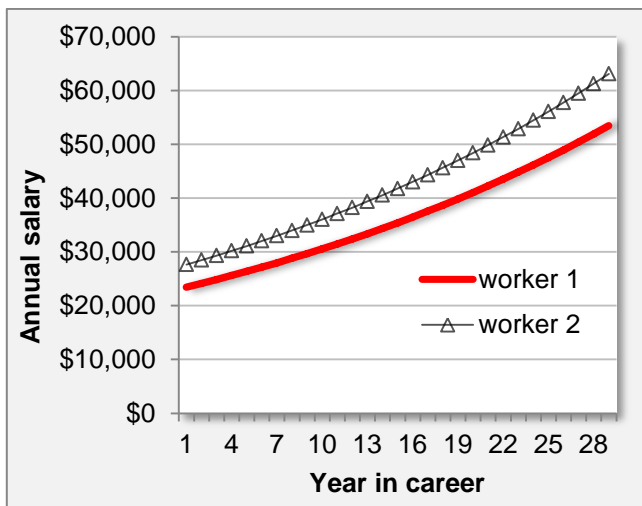
	Worker 1	Worker 2
AFC	\$51,967	\$61,337
Annual Pension Benefit	\$31,180	\$36,802
PDV Pension Benefits	\$537,116	\$633,951
Value worker contributions at retirement	\$161,721	\$164,234
Value employer contributions at retirement	\$246,098	\$249,921
Total contribution value	\$407,819	\$414,154
Extra contribution by Worker 2		\$2,512
Extra contribution by Employer 2		\$3,823
Total extra contributions		\$6,335
PDV of extra pension benefit (gain)		\$96,836

WSIPP analysis of stylized model (see Appendix E)

PDV = present discounted value.

Stylized Example 2: Overtime worked throughout the course of a career. This example demonstrates that a constant level of overtime increases pension benefits, but in this case the cost of the extra benefit is largely borne by worker and employer contributions. All parameters are the same as in Example 1, except that Worker 2 works 250 overtime hours throughout their career (Exhibit 13).

Exhibit 13
Stylized Example 2:
Illustration of Career-long Salary Increases



WSIPP stylized model (see Appendix E)

In this case, Worker 2 still receives \$97,000 more in expected pension benefits than Worker 1. The worker and employer, in this example, pay for much of the cost of the benefit increase (see Exhibit 14).

Exhibit 14
Stylized Example 2: Summary Impact of Overtime on Pension Benefits and Contributions

	Worker 1	Worker 2
AFC	\$51,967	\$61,337
Annual Pension Benefit	\$31,180	\$36,802
PDV Pension Benefits	\$537,116	\$633,951
Value worker contributions at retirement	\$161,721	\$190,878
Value employer contributions at retirement	\$246,098	\$290,467
Total contribution value	\$407,819	\$481,345
Extra contribution by Worker 2		\$29,157
Extra contribution by Employer 2		\$44,369
Total extra contributions		\$73,525
PDV of extra pension benefit (gain)		\$96,836

WSIPP analysis of stylized model (see Appendix E)
PDV = present discounted value.

Policy Options to Minimize Unexpected Impacts on Pension Systems

Some states, including Washington, have laws to limit end-of-career increases to pensionable salary, including:

- charging employers for excess compensation;
- placing a limit on how high the AFC can be;
- lengthening the AFC period; and
- restricting includable compensation (e.g. excluding leave cash-outs).⁴⁶

Charging Employers. In our review of other states' pension plans, we identified one other state, Illinois, that charges employers for excess compensation as Washington does. In Illinois, the employer pays contributions on any salary increase that exceeds 6% of the members' final average salary.

Limiting AFC or Benefit Amounts. Rather than charging for excess compensation, we found that many states simply limit the size of the AFC, either in terms of a percentage of the final year of salary or as a set benefit dollar amount.

Nineteen states limit AFC to between 60% and 120% of final salary in at least one of their open public pension plans. Most of these states set the limit at 100% (see Exhibit 15).⁴⁷

Federal law limits the amount of AFC to be included in pension benefit calculations to less than \$250,000.⁴⁸ Eight states set lower limits for general state employee and teacher plans. At least six states set a lower limit for law enforcement and fire fighters (see Exhibit 16).

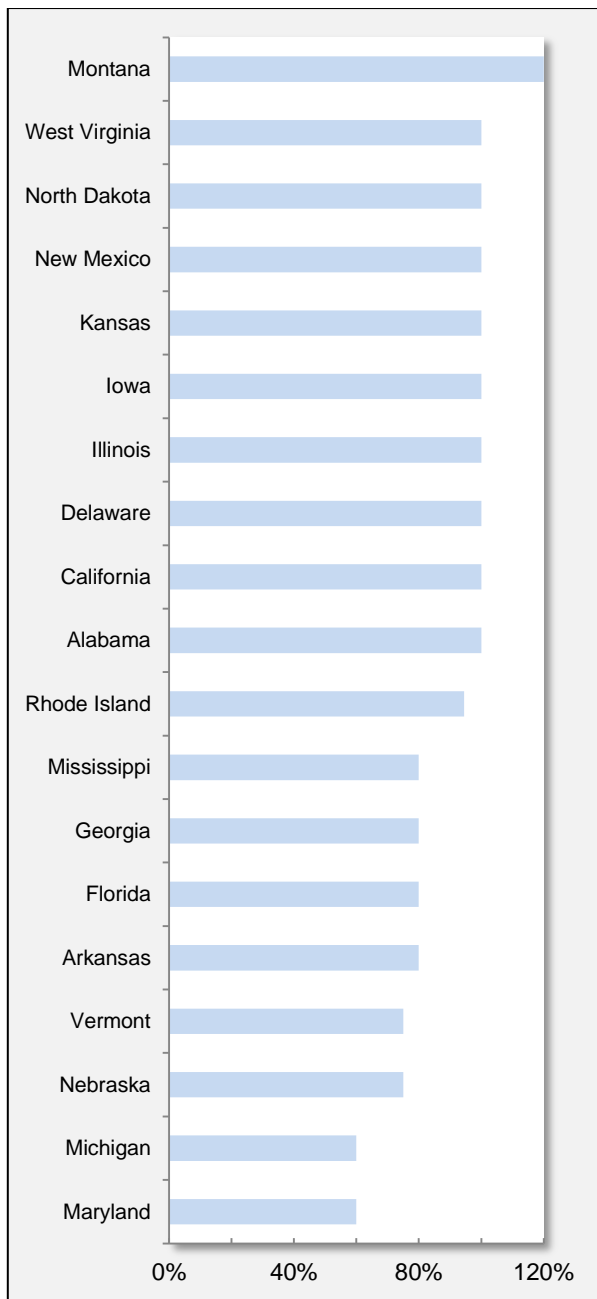
⁴⁶ Painter, D. (2012, May). *Pension spiking*. Presentation to the Washington State Joint Select Committee on Pension Policy, Olympia, WA.

⁴⁷ Note that some states have different limits for different plans; in the graphs, we display the higher one or states that have multiple plans

⁴⁸ Internal Revenue Code (IRC) Section 401(a)(17)

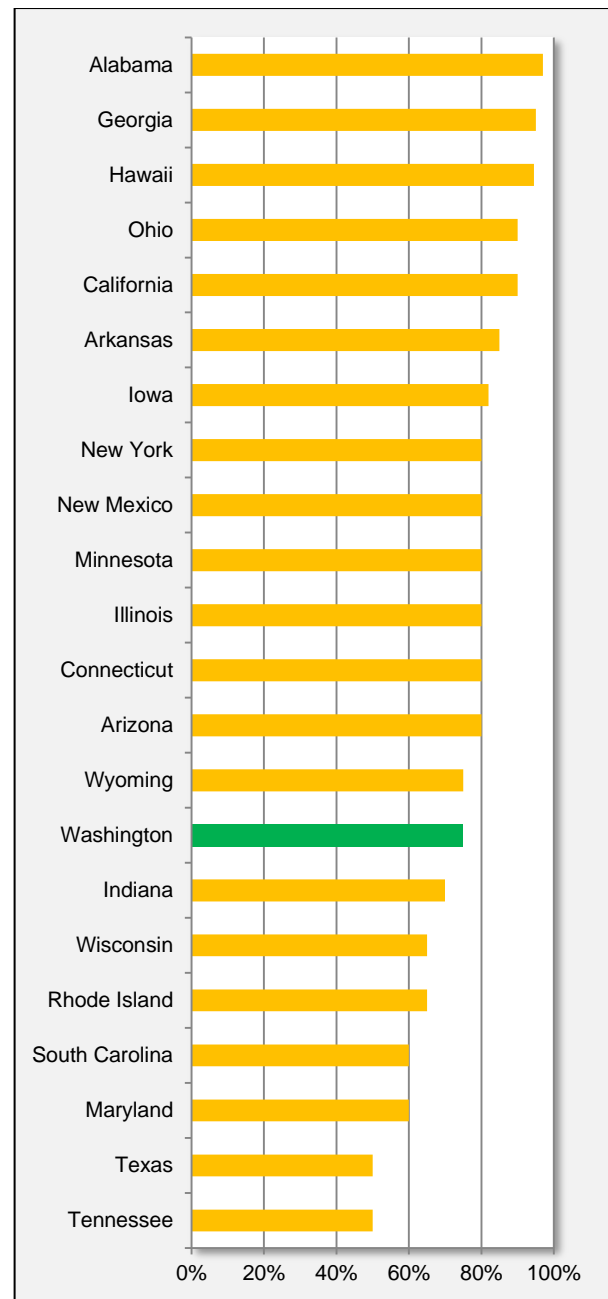
Exhibit 15
States that Limit AFC as a Percentage of the Highest Average Salary

General Employee and Teacher Plans



WSIPP survey of state plans (see Appendix B)

Law Enforcement and Firefighter Plans⁴⁹

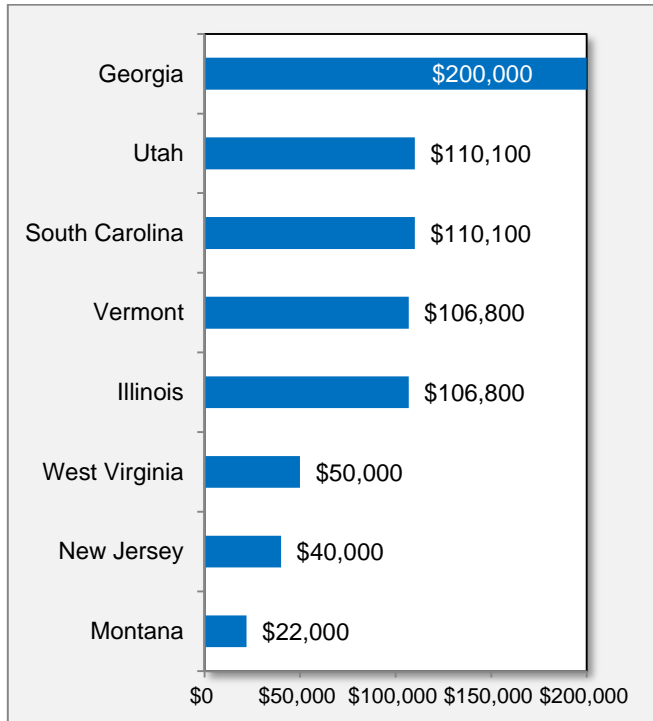


WSIPP survey of state plans (see Appendix B)

⁴⁹ Washington's 75% limitation is for WSPRS 2.

Exhibit 16
States that Limit AFC to Less than the Federal Limit (\$250,000)

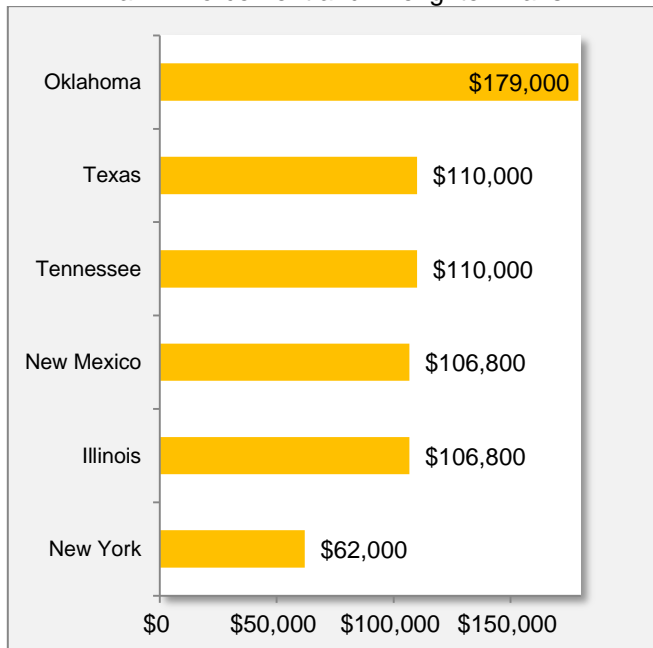
General and Teacher Plans



WSIPP survey of state plans (see Appendix B)

AFC Periods. Twenty-six states have the same AFC periods as Washington's open plans. Two states have longer AFC periods (Illinois and Florida). For law enforcement and firefighter plans, most states have an AFC period of three to five years; Washington's is five years. Two states have eight-year AFC periods (see Exhibit 17).

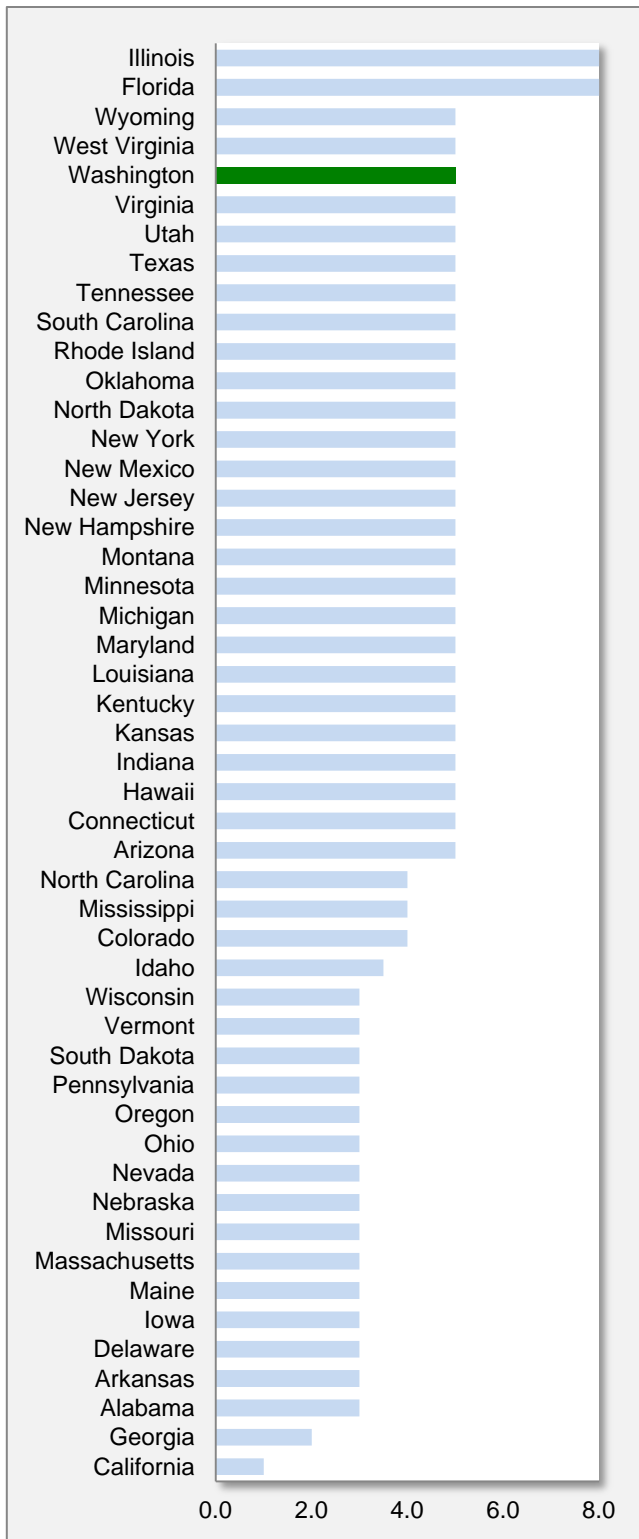
Law Enforcement and Firefighter Plans



WSIPP survey of state plans (see Appendix B)

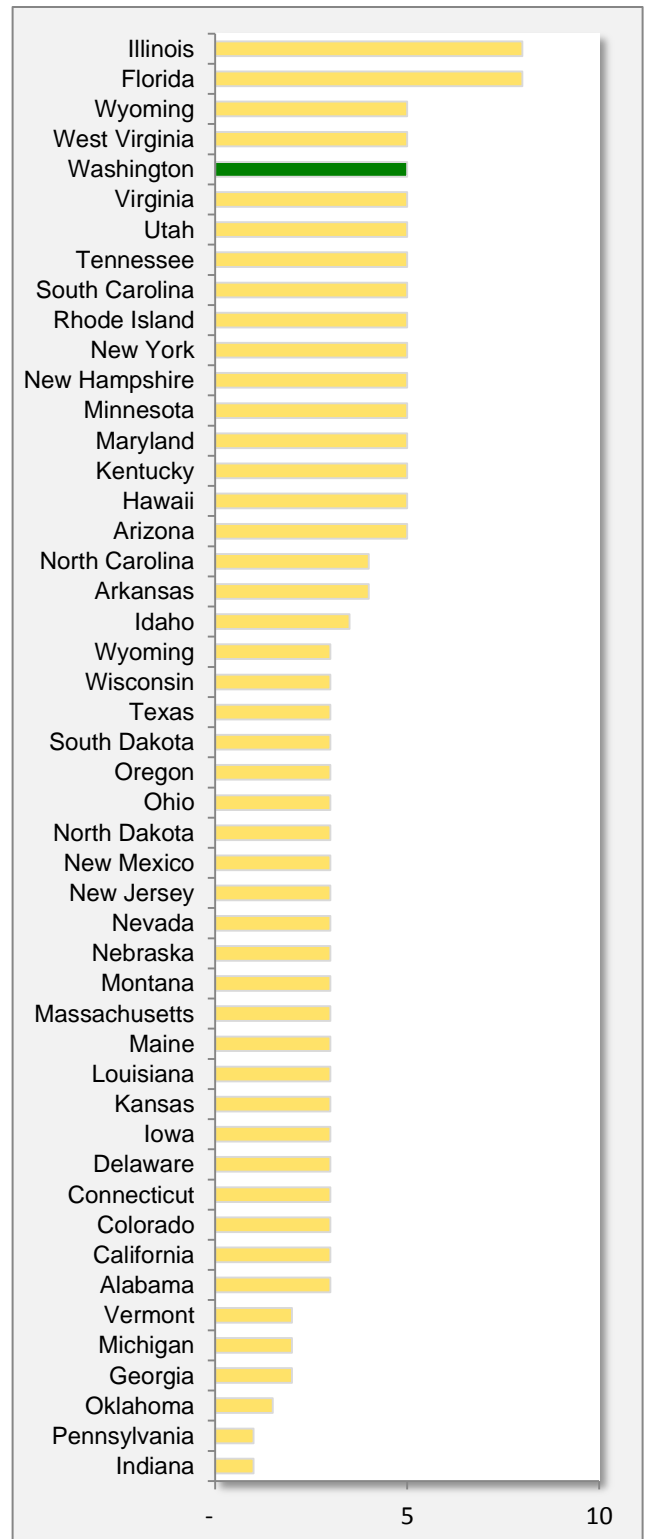
Exhibit 17
States by AFC Period

General and Teacher plans



WSIPP survey of state plans (see Appendix B)

Law Enforcement and Firefighter Plans



WSIPP survey of state plans (see Appendix B)

Overtime. Overtime is generally defined as hours worked beyond the regular 40-hour work week. Employers typically offer a higher rate of pay (1.5 to 2 times more than base pay) for overtime. Some types of jobs require more overtime than others (such as law enforcement, ferry workers, and corrections officers).

For the general public employee and teacher plans, 12 states include overtime in AFC calculations,⁵⁰ and 11 plans do for law enforcement and fire fighters.⁵¹

In Washington State, overtime is included in AFC calculations for general plans,⁵² as well as for the LEOFF 2 plan. There is no limit on the amount of overtime that counts in the AFC, but if the overtime pushes AFC to more than twice the regular pay, the employer must pay additional contributions (determined by the state actuary) under the “excess compensation” law described earlier.

Unused Sick and Vacation Leave. When an employee retires with a balance of sick or vacation leave, some states allow that amount to be included in AFC. Twenty-six states allow sick leave to be included and 15 allow vacation leave (see Appendix B for details). In Washington State, leave cash-outs are only included in AFC in Plans 1.

Severance and Subsistence Pay.

Severance pay is additional pay granted to an employee when they leave employment. Our review of other states’ open plans found that no states include this payment in with AFC calculations. Subsistence pay is money paid to an employee for reimbursement of expenses while on the job. The only state that includes subsistence pay in the AFC within the general plans is Oregon. For law

enforcement plans, Virginia also includes subsistence pay in AFC calculations.

2B. OVERTIME AND EXCESS COMPENSATION ANALYSIS OF WASHINGTON DATA

The Data

Washington State DRS provided data for individuals retiring from one of the state plans during the three and a half years from January 2009 to June 2012. These data included information for roughly 27,000 pension system members from LEOFF, PERS, SERS, TRS and WSPRS plans.⁵³

In addition to information about their pensions, data also included monthly compensation and hours worked histories for about 20,500 of the retirees. These histories, which include up to ten years of data, allowed us to examine the extent to which earnings and hours increase during AFC determination periods (see Appendix E for a more detailed description of these data).

The main limitation with the DRS data is that overtime earnings are not reported separately by employers. Job classification and job title are also not reported. We support the current efforts by DRS to increase the level of detail that employers report regarding types of compensation, hours worked and job classification.

Average Earnings and Hours

On average, earnings rise gradually with tenure. Exhibit 18 displays the average earnings profiles for recent retirees in Washington’s open plans. The graph presents average monthly earnings over the ten years prior to retirement.⁵⁴

The rise in earnings over a career does increase average final compensation levels. These increases vary across plans and workers. It is important to note that the extent

⁵⁰ Alabama, Arizona, California, Connecticut, Delaware, Hawaii, Illinois, Kentucky, Maryland, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Hampshire, New Jersey, New York, Ohio, South Dakota, Vermont, and Washington.

⁵¹ Arizona, California, Connecticut, Kentucky, Louisiana, Montana, Nebraska, New Jersey, New Mexico, New York, Oklahoma, Rhode Island, South Dakota, Virginia, Washington (LEOFF 2 only), and Wisconsin.

⁵² TRS 1 also includes overtime; TRS 2 and 3 do not.

⁵³ The data include information for 119 WSPRS1 retirees; no information was available for WSPRS2.

⁵⁴ Earnings and hours vary dramatically by month for SERS and TERS plan members, so the chart uses 12-month moving averages (MA) for these members.

to which earnings increase with tenure is determined by many factors. Workers with more education, for example, tend to have steeper earning profiles. Also, seniority-based pay systems tend to create steeper earnings profiles by providing regular salary step increases.

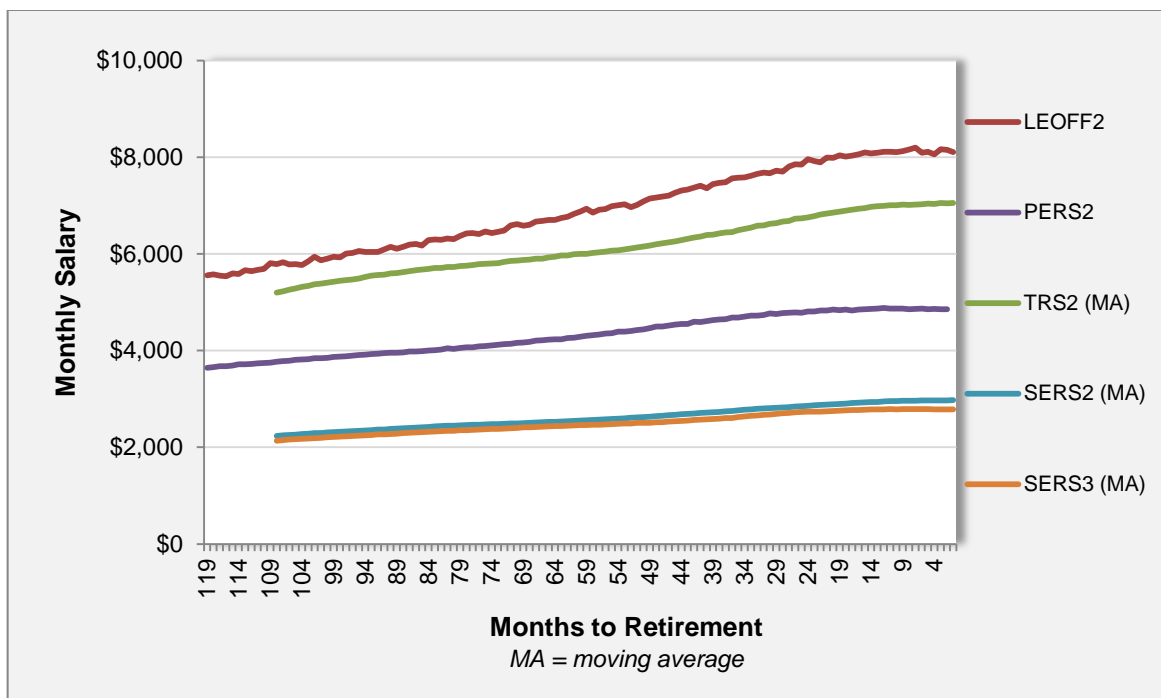
Increases in average earnings per hour, rather than total hours, largely drive the observed increases in earnings with tenure. Among recent retirees in Washington's state pension systems, monthly hours worked tend to be stable throughout a worker's tenure, though there is a tendency for hours to decline marginally when workers are closer to retirement. In all of Washington's state-administered public pension systems, average monthly hours are not systematically higher during AFC periods (Exhibit 19, next page).

Overtime practices vary across occupations and employers, and we see large differences in average hours per month across plans and groups of workers. Persistently high overtime is common among some employers (per our Stylized Example 2), and this contributes to the high AFCs for their employees.

Exhibit 20 (next page) examines earnings growth across plans and groups in greater detail.

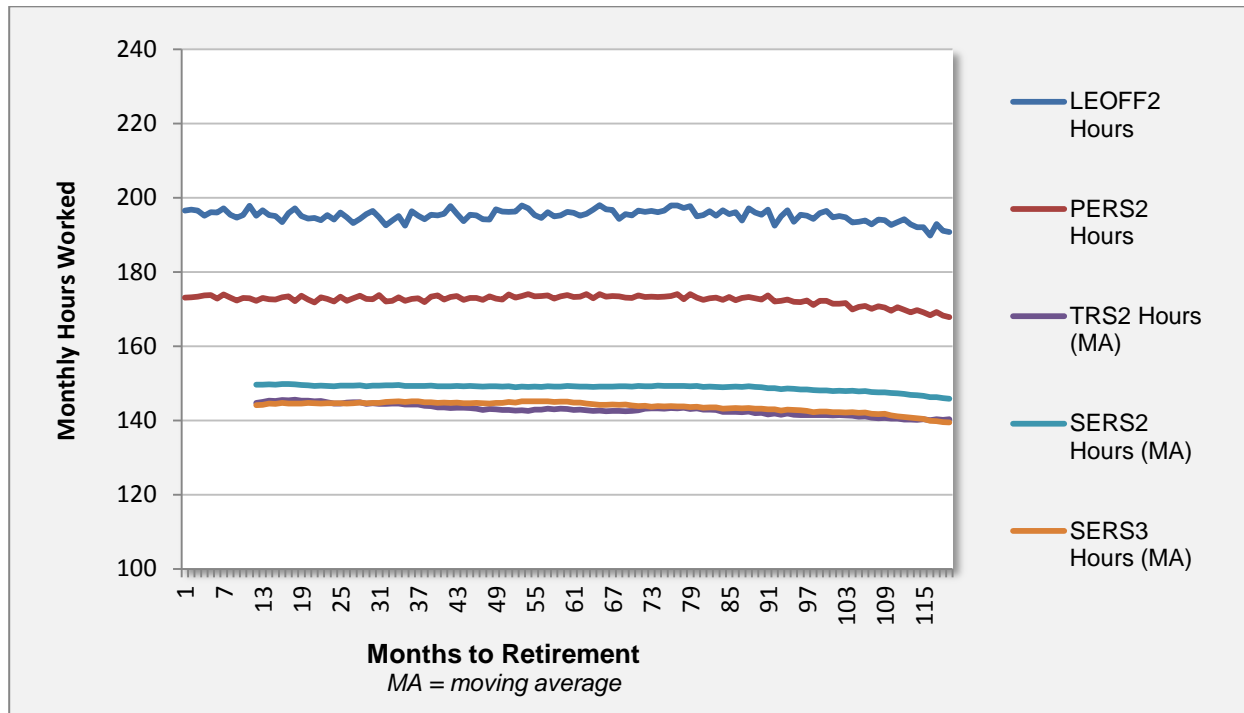
Variation in earnings growth across these groups does not tend to be driven by changes in *average* hours worked over time (Exhibit 21, page 27). See Appendix E for additional detailed analysis across employers.

Exhibit 18
Average Earnings Profiles for Washington's Open Public Plans
 Retirements from January 2009 to June 2012



WSIPP analysis of DRS data on recent retirees (see Appendix E)

Exhibit 19
Hours Profiles for Washington's Open Public Plans



WSIPP analysis of DRS data on recent retirees (see Appendix E)

Exhibit 20
Average Monthly Earnings Before and During AFC Period
 Retirements from January 2009 to June 2012

Plan/System	N	Avg. Earnings Pre-AFC	Avg. Earnings AFC	Avg. Increase	% Increase
LEOFF1	109	\$6,811	\$8,458	\$1,647	24.2%
LEOFF2	731	\$6,149	\$7,633	\$1,484	24.1%
PERS1	3577	\$4,287	\$5,088	\$801	18.7%
PERS2	6182	\$3,946	\$4,672	\$726	18.4%
PERS3	158	\$4,201	\$4,991	\$789	18.8%
SERS2	1115	\$2,345	\$2,756	\$411	17.5%
SERS3	251	\$2,254	\$2,616	\$362	16.1%
TRS1	1968	\$6,031	\$7,142	\$1,111	18.4%
TRS2	558	\$5,631	\$6,674	\$1,043	18.5%
TRS3	258	\$5,276	\$6,282	\$1,006	19.1%
WSPRS1	99	\$6,190	\$7,348	\$1,158	18.7%
PERS2: FERRIES	52	\$4,417	\$5,156	\$738	16.7%
PERS1: CORRECTIONS	93	\$4,017	\$4,693	\$676	16.8%
PERS2: CORRECTIONS	324	\$3,522	\$4,157	\$635	18.0%

WSIPP analysis of DRS data (see Appendix E)

Note: Reference periods vary by plan.

Plans 1: AFC periods include the 24 months prior to retirement (12 months prior for LEOFF1). Pre-AFC periods can include up to 96 months.

Plans 2/3: The AFC and Pre-AFC periods include up to 60 months for the open plans.

Exhibit 21
Average Monthly Hours Before and During AFC Period
Retirements from January 2009 to June 2012

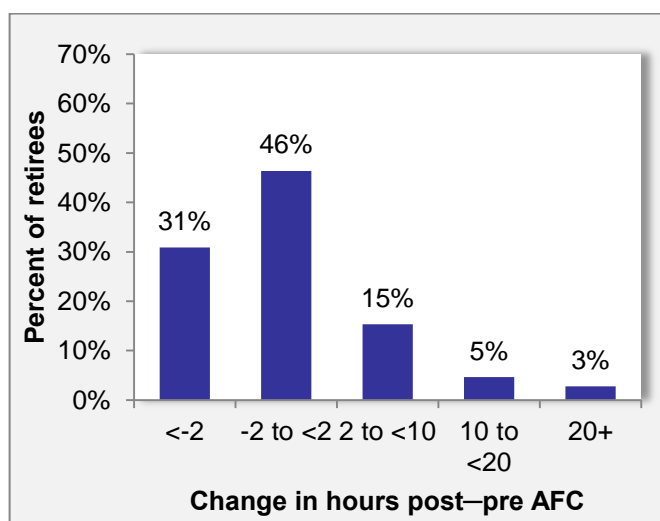
Plan/System	N	Avg. Hrs Pre-AFC	Avg. Hours AFC	Difference	Std Dev AFC Avg.
LEOFF1	109	186.3	182.9	-3.40	21.8
LEOFF2	731	195.4	194.9	-0.50	26.1
PERS1	3,577	170.2	169.3	-0.90	18.8
PERS2	6,182	173.0	172.1	-0.90	17.8
PERS3	158	171.1	169.0	-2.10	20.1
SERS2	1,115	147.2	146.1	-1.10	28.0
SERS3	251	143.0	140.8	-2.20	26.9
TRS1	1,968	153.1	154.1	1.00	18.7
TRS2	558	143.6	141.3	-2.30	14.1
TRS3	258	141.0	139.1	-1.90	18.3
WSPRS1	99	180.3	177.2	-3.10	9.7
PERS2: FERRIES	52	178.5	179.5	1.00	13.6
PERS1: CORRECTIONS	93	179.0	176.3	-2.70	10.2
PERS2: CORRECTIONS	324	180.0	179.1	-0.90	16.7
Total	15,475	167.3	166.5	-0.79	19.2

WSIPP analysis of DRS data (see Appendix E)

Variation in AFC Hours Gains

Although we do not observe systematic increases in average hours during AFC periods, there are exceptions. As demonstrated in Exhibit 22, some employees (8%) work substantially more hours during AFC periods, in comparison with the pre-AFC period. Three percent work more than 20 additional hours per month. Most (77%) work less or the same amount during the AFC period as the pre-AFC period.

Exhibit 22
Difference in Average Monthly Hours in AFC and Pre-AFC Periods
All Washington Systems & Plans,
Retirements from January 2009 to June 2012



WSIPP analysis of DRS data (see Appendix E)

Exhibit 23 shows how many retirees worked more, less, or the same amount of hours before and during the AFC period. The shaded squares indicate the number of people who worked about the same amount of hours during the AFC as before.

For example, 7,151 recent retirees worked a typical 40-hour week before and during the AFC period. Among those who worked a typical 40-hour week prior to the AFC period, 413 worked marginally less (35-38 hours) and 357 worked marginally more (42-45 hours) during the AFC period.

Exhibit 23 illustrates some important points. First, most members tend to work roughly the same number of hours before and during the AFC period. Those who work overtime during the end of their career tended to also do so earlier in their career (like Stylized Example 2). Second, there are exceptions—hours increased substantially for some members, and extreme increases are rare. Third, hours decline for some members. See Appendix E for detailed analyses by plan and employer groups.

Exhibit 23
Number of Retirees by Average Hours Before and During the AFC Period

Average Hours: Pre-AFC	Average Monthly Hours: AFC Period							Total
	(1) <128 (15-29/wk)	(2) 128-149 (30-34/wk)	(3) 150-166 (35-38/wk)	(4) 167-179 (39-41/wk)	(5) 180-192 (42-45/wk)	(6) 193-214 (45-49/wk)	(7) 215+ (50+/wk)	
(1) <128 (15-29/wk)	699	131	35	20	3	0	1	889
(2) 128-149 (30-34/wk)	240	1153	382	65	11	7	2	1860
(3) 150-166 (35-38/wk)	47	470	1189	369	32	5	9	2121
(4) 167-179 (39-41/wk)	29	107	413	7151	357	34	13	8104
(5) 180-192 (42-45/wk)	0	6	37	543	577	134	16	1313
(6) 193-214 (45-49/wk)	1	2	4	59	137	236	50	489
(7) 215+ (50+/wk)	0	0	0	14	15	36	165	230
Total	1016	1869	2060	8221	1132	452	256	15006

WSIPP analysis of DRS data (see Appendix E)

Hours Worked and Pension Rule Incentives

Some employees do increase hours worked during AFC periods. It is not clear whether this is due to increased job responsibilities versus behavior intended to increase pensions. The following statistical regression analysis attempts to gauge the extent to which pension plan rules—the time periods included in AFC calculations—affect hours worked.

We take advantage of the 'natural experiment' that arises from differences in AFC periods across PERS 1 (two years) and PERS 2 and 3 (five years). PERS 1 members have an incentive to increase hours worked during the last 24 months years prior to retirement. PERS 2 and 3 members have an incentive to increase hours during the last 60 months prior to retirement. Importantly, from 24 to 60 months prior to retirement, the incentives operate only on PERS 2 and 3 members.

We estimated the extent to which hours deviate from trend during the 60 to 24 month period prior to retirement for PERS 1 versus PERS 2 and 3 members. We would expect the increase in hours to be higher during this period for PERS 2 and 3 members, since they have the greater incentive for working more. Each additional hour worked increases their AFC and results in relatively large increases in lifetime pension benefits.

We estimated 'fixed effects' regressions, which examine changes in hours from month to month for individual members. The method effectively controls for observed and unobserved member characteristics that do not change over time. We estimated several different models using different functional forms (see Appendix E for results).

We first estimated the regressions using data for all recent PERS retirees. These estimates suggest that members do respond to retirement incentives, but the overall impact on hours is modest. PERS 2 and 3 members tended to work marginally more hours during the 60 to 24 month test period. PERS 1 members, after controlling for time trend and

member characteristics, worked 0.6 additional hours per month, whereas PERS 2 and 3 members worked an additional 0.8 hours per month.

The larger increase in hours among PERS 2 and 3 members provides some evidence for an incentive effect. On average, however, the effect was small. Across *all* recent PERS 2 and 3 retirees, the pension incentive appears to have increased hours worked by 0.20 hours per month. This is an overall average; some members increased hours substantially, others not at all.

We would expect the incentive effect to be greater among employers where overtime is more prevalent. We did not, however, find this to be the case (calling into question the robustness of our test).

We identified two groups of PERS employers with higher than average rates of overtime. Among non-state agencies, public utility districts (PUD) and ports report high monthly hours. Overtime also appears to be more prevalent among some state agencies (such as the Department of Corrections and Department of Transportation). We estimated the regression tests for these employer groups (see Appendix E).

The estimates for PUD and Port employees were sensitive to the functional form of the regression—the results varied across different models. All estimates suggest that PERS 1, 2, and 3 members worked more hours during the incentive period, with estimates ranging from 1 to 2 hours more per month. According to some models, PERS 2 and 3 workers increased hours by more than did PERS 1 members, providing evidence of an incentive effect. However, in other models, PERS 1, 2, and 3 members increased hours by similar amounts (about an hour per month).

Estimates for the selected state agencies tell a similar story. All PERS members increase monthly hours during the AFC period by roughly an hour per month on average.

Overtime Compensation for State Agency Retirees

Human Resource Management System (HRMS) data provide information on earnings components, including overtime, for state agency employees. The Washington State Office of Financial Management extracted HRMS data for retirees in our analysis.

The following section summarizes earnings information for recent state agency retirees from PERS 1, 2, and 3 who are matched with the HRMS data. The earnings data run from the second half of 2006 through the first half of 2012. For this analysis, we excluded the partial years and focus on the 2007 to 2011 data to obtain estimates of annual overtime compensation. We also excluded annual earnings observations for cases where the worker retires during that year. After these restrictions, we were left with 5,764 annual earnings observations for 1,811 state agency retirees. For each retiree in the sample, we calculate total annual compensation and total annual overtime compensation.

The HRMS data are largely confined to the AFC periods for these retirees. We cannot examine differences in the importance of overtime before and during AFC periods. However, we use the data to examine the contribution of overtime to total annual earnings for this sample of state agency retirees.

Among the state agency retirees included in these data, 28% had overtime compensation at some time in the five-year period. Across all workers, including those with no overtime in the five-year period, annual overtime compensation averaged \$735 (accounting for 1.26% of total compensation; see Exhibit 24). Among the subset of employees who did work overtime in the five-year period, annual overtime compensation averaged \$2,670 (accounting for 4.6% of total compensation).

Exhibit 24
Average Annual Overtime (OT) Compensation and Share of Total Compensation

Sample of State Agency Retirees	Average OT pay	OT Share of Annual Compensation
All Retirees, including OT=0	\$735	1.26%
Retirees with OT>0	\$2,670	4.6%

WSIPP analysis of HRMS data (see Appendix E)

Note: State agency retirees from January 2009 to June 2012. Compensation data from 2007 to 2011. Data include 5,764 annual earnings records for 1,811 retirees. 28% of annual earnings records include some overtime compensation.

Overtime compensation is substantial for some retirees. When overtime compensation is received, it exceeds \$5,000 per year in 13.4% of cases; it exceeds \$10,000 in 5.2% of cases (Exhibit 25).

Exhibit 25
Overtime (OT) Compensation
(Among cases where OT > 0)

OT Range		Annual earnings	
from	to	observations	%
\$1	<\$100	168	10.6%
\$100	<\$500	330	20.8%
\$500	<\$1000	209	13.2%
\$1,000	<\$2500	395	24.9%
\$2,500	<\$5000	273	17.2%
\$5,000	<\$10,000	130	8.2%
\$10,000+		83	5.2%
Total		1,588	100.0%

WSIPP analysis of HRMS data (see Appendix E)

Note: Data include 1,588 annual earnings records for cases where OT compensation is included.

The following table summarizes overtime compensation among the larger agencies in our sample. By agency, the sample sizes are relatively small. We suggest that future analyses examine compensation among all

employees (not only recent retirees) in the agencies where overtime appears to be more prevalent.

Exhibit 26
Overtime (OT) Compensation by Agency
Sample of Retirees (January 2009 - June 2012)

Agency	Retirees in sample	Annual earnings observations	% observations with OT>0	Avg. OT comp, where OT>0	OT share of total comp, where OT>0	OT share of total comp, where OT>0
Department of Transportation	185	593	55.1%	\$2,065	\$3,744	5.5%
Department of Corrections	206	667	52.2%	\$1,937	\$3,712	6.5%
Dept. of Natural Resources	40	126	34.1%	\$1,636	\$4,795	9.7%
Department of Licensing	39	124	32.3%	\$319	\$989	2.0%
Dept of Social & Health Serv.	623	1959	26.3%	\$516	\$1,961	3.6%
Department of Fish & Wildlife	46	159	20.8%	\$472	\$2,277	3.8%
Dept of Labor & Industries	87	269	13.8%	\$154	\$1,123	2.1%
Employment Security Dept	74	239	11.7%	\$242	\$2,064	3.4%

WSIPP analysis of HRMS (see Appendix E)

CONCLUSION

The 2012 Legislature directed the Institute to evaluate Washington's and other state and local public retirement systems.

We found that, compared with other state plans, Washington's state pensions provide income replacement at or below the average levels.

In Washington State, most local governments participate in the state retirement systems. Washington has portability laws that decrease, but do not eliminate, the reduction in benefits for workers who move between state employment and local governments that opt out of the state systems.

We examined whether members of Washington's state pension plans significantly increase their hours worked late in their careers (when compensation is counted in pension calculations). We did not find systematic increases in hours worked in the years just prior to retirement, although there are some exceptions.

Acknowledgements

The authors gratefully acknowledge the helpful assistance from the Office of the State Actuary (Matt Smith and Darren Painter) and the provision of data and review by the Department of Retirement Systems (Dave Nelsen and Chris Carson) as we conducted this study. We would also like to thank the Office of Financial Management for supplying payroll system data, Mark Olleman for his expert review, Laura Harmon for data support, and Steve Aos for consultation on statistical methods.

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*Washington State
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RETIREE BENEFITS IN PUBLIC PENSION SYSTEMS

APPENDICES

APPENDIX A: LEGISLATIVE STUDY DIRECTION

The Washington State Institute for Public Policy was directed to “conduct an evaluation of the benefits provided in the pension plans offered by public employers in the state” including an examination of:

- (i) “The level of benefits offered by the state retirement plans and retirement plans sponsored by local government employers relative to the benefits provided in other states;
- (ii) The adequacy of pension benefits provided to public employees, including barriers to retirement;
- (iii) Barriers to the portability of retirement benefits between public employers in the state, including opportunities to improve benefit portability and compatibility; and
- (iv) The treatment of overtime earnings in public employee retirement plans relative to the treatment of earnings in other states, including the impact of excess compensation on state retirement system contribution rates with a particular emphasis on agencies that operate on a 24-hour basis, such as the state patrol, ferry system, and state prisons.”

Supplemental Operating Budget § 606 (13), 2012 Wash. Sess. Laws 2225

APPENDIX B: FEATURES OF STATE PUBLIC PENSION PLANS

Washington's retirement systems are structured similar to many public pension plans in the United States. This appendix provides details on other states plans, including:

- Benefit type (DB, DC, or Hybrid)
- Vesting rules
- Retirement ages
- Experience requirements
- Contribution rates
- Benefit calculation factors
- Cost of living adjustments (COLAs)
- Rules related to overtime and "excess compensation"

How were plans selected for comparison? The design of public retirement systems is complex. Each plan has its own eligibility criteria, retirement ages, contribution rates, benefit calculation factors, and distribution methods. To compare like-plans to like, we limit our review to open state public pension plans that:

- cover general state employees, teachers, and/or law enforcement and fire fighters;
- are the most recently opened plan in the state; and
- allow members to pay into Social Security in addition to state retirement plans (as Washington State employees do).¹

We selected general state employees and teachers because they represent two of the largest systems (PERS and TRS). We examined law enforcement and firefighter plans separately because they tend to have lower retirement ages. We did not collect comparative information for other retirement systems in WA because we had a short time frame for the study.

- Exhibit B1 lists the general state employee and teacher plans and provides details on the pension benefit structure for each plan.
- Exhibit B2 provides the same information for firefighters and law enforcement.
- Exhibit B3 lists excess compensation provisions for general state employee and teacher plans.
- Exhibit B4 lists excess compensation provisions for firefighters and law enforcement.

¹ It is important to note that Washington members of LEOFF and WSPRS plans have the option to choose whether to contribute in to Social Security, and most do not. Likewise, in many state plans, such as California STRS, most employees opt out of Social Security; they are included in our analysis because individuals can choose to opt in.

Key to Exhibits

Employee type: Exhibit B1

S = State Employees
L = Local Employees
T = Teachers
SE = School Employees

Employee type: Exhibit B2

S= State Police
FF= Firefighters
L= Local Police
LE = Law Enforcement
CO = Corrections Officers

Plan type

DB = Defined benefit
DC = Defined contribution
H = Hybrid

General

COLA = Cost-of-living Adjustment
AFC = Average Final Compensation
SCY = Service Credit Years

Because many contribution rates are determined actuarially and can vary year to year, we present the most recent contribution rate for each plan.

Exhibit B1
General State Employee and Teacher Plans Provisions

Plan	Plan Name	Emp. Type	Plan Type	Age/Exp. For Norm. Ret.	Vesting Period	Age/Exp. For Early Ret.	% Reduction/ Year Early Ret.	Employee Contr.	Employer Cont.	Average Final Comp. Years	Multiplier	Automatic COLA?
Alabama - ERS	Employees' Retirement System	S, L	DB	any/25; 60/10	10	None		7.5%	11.07%	3	2.01%	No - Ad hoc
Alabama - TRS	Teachers' Retirement System	T	DB	any/25; 60/10	10	None		7.5%	11.71%	3	2.01%	No - Ad hoc
Arizona - ASRS	Arizona State Retirement System	S, L, T	DB	55/30; 60/25; 62/10; 65/any	10	50/5	5.0%	11.14%	11.14%	5	2.10%	Yes - Fixed 2.5%
Arkansas - APERS	Arkansas Public Employees' Retirement System	S, L	DB	any/28, 55/35; 65/5	5	any/25; 55/10	6.0%	5.0%	12.46%	3	2.22%	Yes - Fixed 3%
Arkansas - ATRS	Arkansas Teacher Retirement System	T	DB	any/28; 60/5	5	any/25; under age 60	5.0%	6.0%	14.00%	3	2.15%	Yes - Fixed 3%
California - CalPERS 2	California Public Employees' Retirement System - Tier 2	S, T	DB	65/5	5	50/5	1.5%	8.0%	8.00%	1	1.25%	Yes - Based on CPI. Capped at 2%
California - CalSTRS	California State Teachers' Retirement System	T	DB	60/5	5	50/30; 55/5	6.0%	8.0%	8.25%	1	2.40%	Yes -Fixed 2%
Connecticut - SERS 3	Connecticut State Employees Retirement System - Tier 3	S, T	DB	any/25; 65/10	10	58/10	6.0%	2.0%	9.00%	5	1.33%	Yes - Minimum of 2% Capped at 7.5%
Delaware - SEPP	State Employees' Pension Plan	S, T	DB	any/30; 60/15; 62/5	5	any/25; 55/15	2.4%	3.0%	8.90%	3	1.85%	No - Ad hoc

Exhibit B1
General State Employee and Teacher Plans Provisions

Plan	Plan Name	Emp. Type	Plan Type	Age/Exp. For Norm. Ret.	Vesting Period	Age/Exp. For Early Ret.	% Reduction/ Year Early Ret.	Employee Contr.	Employer Cont.	Average Final Comp. Years	Multiplier	Automatic COLA?
Florida - FRS	Florida Retirement System Pension Plan	S, L, T	DB	58/33; 65/8	8	any/below 30	5.0%	3.0%	5.18%	8	1.60%	Yes - Fixed 3%
Georgia - GSEPS	Georgia's State Employees' Pension and Savings Plan	S	H	any/30; 60/10	10	any/25	7.0%	DB: 0%, DC: 1.3%	DB: 12%, DC: 0%	2	1.00%	No - Based on investment earnings
Georgia - TRS	Teachers' Retirement System of Georgia	T	DB	any/30; 60/10	10	any/25	7.0%	6.0%	11.41%	2	2.00%	Yes - Fixed 3%
Hawaii - ERS Hybrid	Employees' Retirement System - Hybrid Plan	S, L	DB	60/30; 65/10	10	55/20	5.0%	8.0%	15.0%	5	1.75%	Yes - Fixed 1.5%
Idaho - PERSI	Public Employee Retirement System of Idaho	S, L, T	DB	65/5, R90	5	55/5	3.0%	6.45%	10.44%	3.5	2.00%	Yes - Fixed 1% with investment based increase. Capped at 6%
Illinois - SERS 2	State Employees Retirement System - Tier 2	S	DB	67/10	10	62/10	6.0%	4.00%	34.19%	8	1.67%	Yes - Lesser of 3% or half of CPI
Indiana - PERF	Public Employees' Retirement Fund	S, L	H	55/30; 60/15; 65/10	10	50/15	5.0%	DB: 0%, DC: 3%	DB: 10%, DC: 0%	5	1.10%	No - Ad hoc
Indiana - TRF	Teachers' Retirement Fund	T	H	55/30; 60/15; 65/10	10	50/15	5.0%	DB: 0%, DC: 3%	DB: 7.5%, DC: 0%	5	1.10%	No - Ad hoc

Exhibit B1
General State Employee and Teacher Plans Provisions

Plan	Plan Name	Emp. Type	Plan Type	Age/Exp. For Norm. Ret.	Vesting Period	Age/Exp. For Early Ret.	% Reduction/ Year Early Ret.	Employee Contr.	Employer Cont.	Average Final Comp. Years	Multiplier	Automatic COLA?
Iowa - IPERS	Iowa Public Employees' Retirement System	S, L, T	DB	62/20; 65/any; R88	4	55/4	6.0%	5.78%	8.67%	3	2.00%	Yes - Based on CPI. Capped at 1.5%
Kansas - KPERS 2	Kansas Public Employees' Retirement System - Tier 2	S, L, T	DB	60/30; 65/5	5	55/10	5.8%	6.0%	9.37%	5	1.75%	No COLA
Maryland - ETPS	Employees' and Teachers' Pension System - Contributory	S, L, T	DB	65/10; r90	10	55/15	6.0%	7.0%	16.92%	5	3%	Yes - Based on CPI. Capped at 2.5%
Michigan - PPRP	Pension Plus Retirement Plan	SE	H	60/10	10	55/15	5.0%	DB: 0%, DC: 2%	DB: 0%, DC: 1%	5	1.50%	Yes - Fixed 2%
Michigan - SERS	State Employees' Retirement System - 401k	S	DC	60/4	4	before 59.5/4	10.0%	3.0%	7.0%			
Minnesota - GERP	General Employees' Retirement Plan	S	DB	65/any; R90	5	55/5	4.6%	5.0%	5.0%	5	1.70%	No - Ad hoc
Minnesota - TRA 2	Teachers Retirement Association - Tier 2	T	DB	65/3	3	55/3	4.9%	6.0%	6.0%	5	1.90%	No - Ad hoc
Mississippi - PERS 4	Public Employees' Retirement System of Mississippi -Tier 4	S, L, T	DB	any/30; 60/8	8	None		9.0%	14.26%	4	2.00%	Yes - Fixed 3%

Exhibit B1
General State Employee and Teacher Plans Provisions

Plan	Plan Name	Emp. Type	Plan Type	Age/Exp. For Norm. Ret.	Vesting Period	Age/Exp. For Early Ret.	% Reduction/ Year Early Ret.	Employee Contr.	Employer Cont.	Average Final Comp. Years	Multiplier	Automatic COLA?
Missouri - MSEP 2011	Missouri State Employee's Plan 2011	S	DB	67/10; R90	10	62/10	6.0%	4.0%	14.45%	1	1.70%	Yes - Based on CPI. Capped at 5%
Montana - DCRP	Defined Contribution Retirement Plan	S, L, T	DC	59.5	Immediate			7.9%	4.19%			
Montana - PERS	Public Employees Retirement System	S, L	DB	65/5; 70/any	5	any/25; 55/5	6.0%	7.9%	7.17%	5	1.50%	Yes - Fixed 3%
Montana - TRS	Teachers' Retirement System	T	DB	any/25; 60/5	5	50/5	6.0%	7.15%	2.49%	3	1.67%	Yes - Fixed 1.5%.
Nebraska - SPP	School Pension Plan	T	DB	65/any; R85	5	any/35; 60/5	3.0%	8.28%	9.08%	3	2.00%	Yes - Based on CPI. Capped at 2.5%
New Jersey - PERS 5	Public Employees' Retirement System Tier 5	S, L, T	DB	65/any	10	any/30	3.0%	7.5%	11.2%	5	1.67%	Suspended
New Jersey - TPAF 5	Teachers Pension And Annuity Fund Tier 5	T	DB	65/10	10	any/30	3.0%	6.5%	14.1%	5	1.67%	Suspended
New Mexico - NMERB	Education Retirement Board	T	DB	any/30; 67/5; R80	5	under 60/less than 35	7.2%	9.15%	11.15%	5	2.35%	Yes - Based on CPI. Capped at 4%

Exhibit B1
General State Employee and Teacher Plans Provisions

Plan	Plan Name	Emp. Type	Plan Type	Age/Exp. For Norm. Ret.	Vesting Period	Age/Exp. For Early Ret.	% Reduction/ Year Early Ret.	Employee Contr.	Employer Cont.	Average Final Comp. Years	Multiplier	Automatic COLA?
New Mexico - PERA 3	Public Employees Retirement Association State Plan 3	S, L	DB	any/30; 67/5; R80	5	None		10.67%	13.34%	3	3.00%	Yes - Fixed 3%
New York - NYSTRS 6	New York State Teachers Retirement System - Tier 6	T	DB	63/10	10	55/10	6.5%	3.0%	11.11%	5	2.00%	Yes - Based on CPI. Capped at 3%
New York - PERS 6	Public Employees Retirement System - Tier 6	S, L	DB	63/10	10	55/10	6.5%	3.0%	9.4%	5	2.00%	Yes - Based on CPI. Capped at 3%
North Carolina - TSERS	Teachers and State Employees Retirement System	S, T	DB	any/30; 60/25; 65/10	10	50/20; 60/10	3.0%	6.0%	13.12%	4	2.00%	No - Ad hoc
North Dakota - NDPERS	North Dakota Public Employees Retirement System	S, L	H	65/3; R85	3	55/3	6.0%	DB: 0%, DC: 5%	DB: 6%, DC: 0%	3	2.00%	No - Ad hoc
North Dakota - TFFR 2	Teachers Fund for Retirement - Tier 2	T	DB	65/5; R90	5	55/5	8.0%	9.75%	10.75%	5	2.00%	No - Ad hoc
Oklahoma - PERS	Oklahoma Public Employees Retirement System	S, L	DB	62/6; R90	6	55/10	5.7%	3.5%	15.5%	3	2.00%	No - Ad hoc
Oklahoma - TRS	Oklahoma Teachers Retirement System	T	DB	62/5; R80	5	55/5	5.6%	7.0%	8.55%	5	2.00%	No - Ad hoc

Exhibit B1
General State Employee and Teacher Plans Provisions

Plan	Plan Name	Emp. Type	Plan Type	Age/Exp. For Norm. Ret.	Vesting Period	Age/Exp. For Early Ret.	% Reduction/ Year Early Ret.	Employee Contr.	Employer Cont.	Average Final Comp. Years	Multiplier	Automatic COLA?
Oregon - OPSRP	Oregon Public Service Retirement Plan	S, L	H	58/30; 65/any	5	55/5	8.0%	DB: 0%, DC: 6%	DB: 6%, DC: 0%	1 LAST	1.50%	Yes - Based on CPI. Capped at 2%
Pennsylvania - PSERS	Public School Employees Retirement System	T	DB	any/35; 60/30; 62/1	5	55/25	3.0%	7.5%	7.5%	3	2.50%	No - Ad hoc
Pennsylvania - SERS	State Employees Retirement System	S	DB	any/35; 60/3	5	any/5	4.5%	6.25%	7.29%	3	2.00%	No - Ad hoc
Rhode Island - ERSRI	Employees' Retirement System of Rhode Island	S, T	H	65/5	5	None		DB: 3.8%, DC: 5%	DB: 0%, DC: 1%	5	1.00%	Suspended
South Carolina - SCORP	South Carolina Optional Retirement Plan	S, L, T	DC	59.5	Immediate			7.0%	5.0%			
South Carolina - SCRS 3	South Carolina Retirement System - Class 3	S, L, T	DB	65/8; R90	8	60/8	5.0%	7.0%	15.0%	5	1.82%	Yes - Based on CPI. Capped at 2%
South Dakota - SDRS	South Dakota Retirement System Class A	S, L, T	DB	65/3	3	55/3	3.0%	6.0%	6.0%	3	1.70%	Yes - Based on CPI. Capped at 3.1%
Tennessee - TCRS	Tennessee Consolidated Retirement System Contributory	T	DB	any/30; 60/5	5	55/10	4.8%	5.0%	8.88%	5	1.50%	Yes - Based on CPI. Capped at 3%

Exhibit B1
General State Employee and Teacher Plans Provisions

Plan	Plan Name	Emp. Type	Plan Type	Age/Exp. For Norm. Ret.	Vesting Period	Age/Exp. For Early Ret.	% Reduction/ Year Early Ret.	Employee Contr.	Employer Cont.	Average Final Comp. Years	Multiplier	Automatic COLA?
Texas - ERS	Employees Retirement System	S	DB	60/5; 65/10; R80	5	50/12; 55/10	5.0%	6.5%	6.0%	3	2.30%	No - Ad hoc
Utah - PERS 2	Tier 2 Hybrid Retirement System	S	H	any/35; 65/4	4	62/10	7.0%	DB: 0%, DC: 0%	DB: 8%, DC: 1.59%	5	1.50%	Yes - Fixed 2.5%
Utah - PERS 2 (DC)	Tier 2 Defined Contribution Plan	S	DC	59.5/4	4			0.0%	10.0%			
Vermont - VSERS F	Vermont State Employees' Retirement System - Group F	S	DB	any/30; 62/5	5	55/5	6.0%	6.4%	17.11%	3	1.67%	Yes - Based on CPI. Capped at 5%
Vermont - VSTRS C	Vermont State Teachers' Retirement System - Group C	T	DB	any/30; 62/any	5	55/5	6.0%	5.0%		3	1.67%	Yes - Based on CPI. Capped at the lesser of 5%, or 50% of CPI
Virginia - VRS 2	Virginia Retirement System Plan 2	S, L, T	DB	65/5; R90	5	60/5	6.0%	5.0%	6.58%	5	1.70%	Yes - Based on CPI. Capped at 5%
Washington - PERS 2	Public Employees Retirement System Plan 2	S	DB	65/5	5	55/30	5.0%	4.64%	7.21%	5	2.00%	Yes - Based on CPI. Capped at 3%
Washington - PERS 3	Public Employees Retirement System Plan 3	S	H	65/5	5; 10	55/30	5.0%	DB: 0%, DC: 5%	DB: 7.21%, DC: 0%	5	1.00%	Yes - Based on CPI. Capped at 3%

Exhibit B1
General State Employee and Teacher Plans Provisions

Plan	Plan Name	Emp. Type	Plan Type	Age/Exp. For Norm. Ret.	Vesting Period	Age/Exp. For Early Ret.	% Reduction/ Year Early Ret.	Employee Contr.	Employer Cont.	Average Final Comp. Years	Multiplier	Automatic COLA?
Washington - SERS 2	School Employees' Retirement System Plan 2	SE	DB	55/20; 65/5	5	55/30	5.0%	4.09%	7.58%	5	2.00%	Yes - Based on CPI. Capped at 3%
Washington - SERS 3	School Employees' Retirement System Plan 3	SE	H	65/10	5; 10	55/30	5.0%	DB: 0%, DC: 5%	DB: 7.59%, DC: 0%	5	1.00%	Yes - Based on CPI. Capped at 3%
Washington - TRS 2	Teacher Retirement System Plan 2	T	DB	65/5; 55/20	5	55/30	5.0%	4.69%	8.04%	5	2.00%	Yes - Based on CPI. Capped at 3%
Washington - TRS 3	Teacher Retirement System 3	T	H	55/10; 65/5	5; 10	55/30	5.0%	DB: 0%, DC: 5%	DB: 8.05%, DC: 0%	5	1.00%	Yes - Based on CPI. Capped at 3%
West Virginia - PERS	Public Employees Retirement System	S, L	DB	60/5; R80	5	55/10		4.5%	14.0%	3	2.00%	No - Ad hoc
West Virginia - TRS	Teachers Retirement System	T	DB	any/35; 60/5	5	before 55/between 30-35		6.0%	15.0%	5	2.00%	No - Ad hoc
Wisconsin - WRS	Wisconsin Retirement System Defined Benefit Plan	S, L, T	DB	65/any; R87	5	55/5	4.8%	6.0%	11.3%	3	1.60%	No - Ad hoc
Wyoming - PEPP 2	Public Employee Retirement Plan 2	S, L, T	DB	65/4; R85	4	55/4	5.0%	7.0%	7.12%	5	2.00%	Suspended

Exhibit B2
Police and Firefighter Plans Provisions

Plan	Plan Name	Emp. Type	Plan Type	Age/Exp. For Norm. Ret	Vesting Period	Age/Exp. For Early Ret.	% Reduction/Year Early Ret.	Employee. Cont.	Employer Cont.	Average Final Comp. Years	Multiplier	Automatic COLA?
Alabama - AERS	Alabama Employees' Retirement System	S	DB	any/25; 52/10	10	None		10.0%	29.92%	3	2.88%	No - Ad hoc
Alabama - AERS	Alabama Employees' Retirement System	CO, LE, FF	DB	any/25; 60/10	10	None		8.5%	9.42%	3	2.50%	No - Ad hoc
Arizona - PSPRS 2	Public Safety Personnel Retirement System	S, L, FF	DB	52.5/25; any/25	5	any/less than 25	4.0%	7.65%	20.89%	5	2.50%	No - Contingent on investment earnings.
Arkansas - ASPRS 2	Arkansas State Police Retirement System - Tier II Non-Contributory	S	DB	any/30; 65/5	5	55/less than 30	6.0%	non-contributory	22.0%	4	2.48%	Yes - Fixed 3%
California - CalPERS 2	Public Employees Retirement System - Tier 2	S, FF, LE	DB	65/10	10	55/10	6.0%	non-contributory	10.82%	3	2.50%	Yes - Based on CPI. Capped at 2%
Connecticut - HDP 2A	Hazardous Duty Plan - Tier 2A	S, L, FF	DB	any/20	5	55/10	3.0%	4.0%	6.89%	3	2.00%	Yes - Minimum of 2% Capped at 7.5%
Florida - FRS	Florida Retirement System - Special Risk Class	S, L, FF	DB	60/8; any/30	8	less than 60/8	5.0%	3.0%	17.0%	8	3.00%	Yes - Fixed 3%
Georgia - GERS	Georgia Employees' Retirement System	S	H	55/10; any/30	10	any/25	7.0%	DB: 0%; DC: 1.3%	DB: 8.07%; DC: 1.25%	2	1.00%	No - Ad hoc
Hawaii - ERS	Employees' Retirement System - Contributory Plan	S, FF	DB	60/10	10	55/25	1.7%	14.2%	19.7%	5	2.25%	Yes - Fixed 1.5%
Idaho - IPERS	Idaho Public Employees' Retirement System	S, FF	DB	60; R80	5	50/5	3.0%	7.7%	10.44%	3.5	2.30%	Yes - Fixed 1%

Exhibit B2
Police and Firefighter Plans Provisions

Plan	Plan Name	Emp. Type	Plan Type	Age/Exp. For Norm. Ret	Vesting Period	Age/Exp. For Early Ret.	% Reduction/Year Early Ret.	Employee. Cont.	Employer Cont.	Average Final Comp. Years	Multiplier	Automatic COLA?
Illinois - SERS 2	State Employees' Retirement System - Tier 2	S, FF	DB	60/20	10	None		12.5%	27.98%	8	2.50%	Yes - Lesser of 3% or half of CPI
Indiana - POFP	Police Officers & Firefighters' Pension	S, FF	DB	52/20	20	50/20	7.0%	6.0%	19.7%	1	1.00%	No - Ad hoc, based on investment returns
Iowa - PERS	Public Employee Retirement System - Special Service Class	L, FF	DB	55/any; any/4	4	None		6.84%	10.27%	3	2.73%	No - Ad hoc, based on reserves from a separate account
Kansas - KPF 2	Kansas Police & Fire Fighters - Tier 2	S, FF	DB	50/25; 55/20; 60/15	15	50/20	4.8%	7.0%	16.43%	3	2.50%	No COLA
Kentucky - SPRS	State Police Retirement System	S	DB	any/20; 55/5	5	50/15	6.50%	8.0%	30.07%	5	2.50%	Yes - Based on CPI. Capped at 5%
Maryland - LEOPS	Law Enforcement Officers Pension System	LE	DB	50/any; any/25	10	None		7.0%	46.81%	5	2.00%	Yes - Based on CPI. Capped at 5%
Maryland - SPRS	State Police Retirement System	S	DB	50/any; any/25	10	None		8.0%	61.21%	3	2.55%	Yes - Based on CPI. Capped at 2.5%
Minnesota - CERP	Correctional Employees' Retirement Plan	CO	DB	55/5	5	50/5	2.4%	6.0%	8.5%	5	2.40%	Yes - Fixed 3%

Exhibit B2
Police and Firefighter Plans Provisions

Plan	Plan Name	Emp. Type	Plan Type	Age/Exp. For Norm. Ret	Vesting Period	Age/Exp. For Early Ret.	% Reduction/Year Early Ret.	Employee. Cont.	Employer Cont.	Average Final Comp. Years	Multiplier	Automatic COLA?
Minnesota - PERA	Public Employee Retirement Association, Police and Fire Fund	L, FF	DB	55/10; 65/1	10	50/10; any/30	6.0%	9.75%	14.0%	5	3.00%	Yes - Fixed 1%
New Mexico - SPAC	State Police and Correctional	S, CO	DB	any/20	5	None		10.85%	21.85%	3	3.00%	Yes - Fixed 2%. Capped at 4%
New York - PFRS 5	Police and Firemen's Retirement System - Tier 5	S, FF	DB	62/10; any/20	10	55/10	3.0%	4.5%	21.6%	5	2.22%	Yes - Based on CPI. Capped at 3%.
New York - SRS 5	State and Local Retirement System: State Police Tier 5	S	DB	62/10; any/20	10	55/10	50% of AFC	3.0%	22.0%	3	2.50%	Yes - Fixed 2%
North Carolina - SLEO	State Law Enforcement Officers	LE	DB	55/10; any/30	10	50/15	other	6.0%	13.12%	4	1.85%	Yes - Fixed 1%
North Dakota - NDPERS	ND National Guard, Police and FF Retirement System	S, L, FF	H	55/3	3	50/3	6.0%	DB: 0%; DC: 4%	DB: 7.64%; DC: 0%	3	2.00%	No - Ad hoc
Ohio - PERS	Public Employees' Retirement System: Law Enforcement Division	S, L, FF	DB	48/25; 62/15	5	52/15	Reduced benefit factor of 1.5%	12.1%	17.4%	3	2.50%	Yes - fixed 3%
Oklahoma - PPRS	Police Pension and Retirement System	L	DB	50/any; any/20	10	None		8.0%	13.0%	1.5	2.50%	Yes - Based on CPI. Capped at 2%

Exhibit B2
Police and Firefighter Plans Provisions

Plan	Plan Name	Emp. Type	Plan Type	Age/Exp. For Norm. Ret	Vesting Period	Age/Exp. For Early Ret.	% Reduction/Year Early Ret.	Employee. Cont.	Employer Cont.	Average Final Comp. Years	Multiplier	Automatic COLA?
Oregon - PSRP	Public Service Retirement Plan	S, L, FF	H	60/5	5	50/5	8.0%	DB: 0%; DC: 6%	DB: 8.52%; DC: 0%	3	1.35%	Yes - Based on CPI. Capped at 2%
Pennsylvania - SERS	State Employees' Retirement System: Classes A-3, A-4	S	DB	60	10	any	50% AFC	5.0%	8.43%	1	2.50%	No - Ad hoc
Rhode Island - SPRBT	State Police Retirement Benefit Trust	S	DB	55/5	5	52/5	50% AFC	8.75%	14.45%	5	2.00%	Yes - Fixed 2%. Capped at 2%
South Carolina - PORS	Police Officers Retirement System	S	DB	55/8; any/27	8	None		7.3%	10.0%	3	2.14%	Yes - Based on CPI. Capped at 2%
South Dakota	Class B - Public Safety	LE	DB	55/3	3	45/3	3.0%	8.0%	8.0%	3	2.00%	Yes - Based on CPI. Capped at 3.1%
Tennessee - TCRS	Tennessee Consolidated Retirement System Non-Contributory	LE	DB	60/5; any/30	5	55/10	4.0%	non-contributory	5.0%	5	1.50%	Yes - Based on CPI. Capped at 3%
Texas - LECOS	Law Enforcement & Custodial Officers' Supplemental Plan	LE	DB	50/20; R80		any/20	3.0%	7.0%	5.5%	3	2.80%	No - Ad hoc
Utah - PSFRS 2	Tier 2 Hybrid Retirement System	S, FF	H	65/4; 62/10; 60/20; any/25	4	60/<25	7.0%	non-contributory	DB: 1.59%; DC: 8.41%	5	1.50%	Yes - Fixed 1.5%

Exhibit B2
Police and Firefighter Plans Provisions

Plan	Plan Name	Emp. Type	Plan Type	Age/Exp. For Norm. Ret	Vesting Period	Age/Exp. For Early Ret.	% Reduction/ Year Early Ret.	Employee. Cont.	Employer Cont.	Average Final Comp. Years	Multiplier	Automatic COLA?
Utah - PSFRS 2 DC	Tier 2 Defined Contribution Plan	S, FF	DC	59.5	4	None		non-contributory	12.0%			
Vermont - VSERS C	Vermont State Employees' Retirement System - Group C	S, LE	DB	55/5	5	50/20	No reduction	8.28%	17.11%	2	2.50%	Yes - Based on CPI. Capped at 5%
Virginia - SPORS 2	State Police Officers' Retirement System 2	S	DB	60/5; 50/25	5	50/5	6.0%	5.0%	21.16%	5	1.85%	Yes - Fixed 3%
Virginia - VaLORS 2	Virginia Law Officers' Retirement System 2	LE	DB	60/5; 50/25	5	50/5	6.0%	5.0%	13.09%	5	2.00%	No - Based on investment returns
Washington - LEOFF 2	Law Enforcement Officers & Fire Fighters Plan 2	S, FF	DB	53/5	5	50/20	5.0%	8.46%	5.24%	5	2.00%	Yes - Based on CPI. Capped at 3%
Washington - PSERS 2	Public Safety Employees Retirement System Plan 2	S, FF	DB	65/5; 60/10	5	53/20	5.0%	6.36%	8.87%	5	2.00%	Yes - Based on CPI. Capped at 3%
Washington - WSPRS 2	Washington State Patrol Retirement Services 2	S	DB	55/any; any/25	0 (active); 5 (inactive)	55/5; 60/5	5.0%	6.59%	8.07%	5	2.00%	Yes - Based on CPI. Capped at 3%
Wisconsin - WRS	Protective Employees' in SS	S, L FF	DB	53/25; 54/<25;	5	50/5	4.8%	6.65%	9.75%	3	2.00%	No - Ad hoc
Wyoming - LEP	Law Enforcement Plan	LE	DB	60/4; any/20	4	None		8.6%	8.6%	3 HC	2.50%	No - Ad hoc. Capped at 2%

Exhibit B3
General State Employee and Teacher Plans' Excess Compensation Provisions

Plan	Plan Name	Overtime included in AFC?	% benefit cannot exceed AFC	Monetary cap on AFC (if lower than \$250,000)	Other benefit level provisions
Alabama - ERS	Employees' Retirement System	No	100%		
Alabama - TRS	Teacher's Retirement System		60%		
Arizona - ASRS	Arizona State Retirement System	Yes - under strict conditions			Pensionable salary changes are capped at 10%+CPI
Arkansas - APERS	Arkansas Public Employees' Retirement System	No	80%		
California - CalPERS 2	California Public Employees' Retirement System - Tier 2	No	100%		
California - CalSTRS	California State Teachers' Retirement System	Yes	60%		
Delaware - SEPP	State Employees' Pension Plan	No	100%		Paid time off not included in AFC
Florida - FRS	Florida Retirement System Pension Plan	No	80%		
Georgia - TRS	Teacher's Retirement System of Georgia	No	80%		AFC cannot include compensation that exceeds the average of the two preceding years by more than 10%, with exceptions (changes in position, number of hours worked). Pensionable salary growth capped at 10%.
Georgia - GSEPS	Georgia's State Employee's Pension and Savings Plan	No	70%	\$200,000	AFC includes sick leave payout
Hawaii - ERS Hybrid	Employees' Retirement System - Hybrid Plan	Yes			Pensionable salary growth capped at 10%
Illinois - SERS 2	State Employees Retirement System - Tier 2	No	100%	\$106,800	AFC does not include severance pay, or lump sum payments for unused sick leave or vacation

Exhibit B3
General State Employee and Teacher Plans' Excess Compensation Provisions

Plan	Plan Name	Overtime included in AFC?	% benefit cannot exceed AFC	Monetary cap on AFC (if lower than \$250,000)	Other benefit level provisions
Indiana - PERF	Public Employees' Retirement Fund				Unused paid leave is included in AFC, with a maximum of \$2,000 given for unused sick leave and paid time off
Indiana - TRF	Teachers' Retirement Fund	No			Unused sick leave is included in AFC
Iowa - IPERS	Iowa Public Employees' Retirement System	No	100%		
Kansas - KPERS 2	Kansas Public Employees' Retirement System - Tier 2	No	100%		260 days of unused sick leave converts to 1 SCY, and counts towards a member's AFC
Maryland - ETPS	Employees' and Teachers' Pension System - Contributory	Yes	60%		
Michigan - SERS	State Employee's Retirement System - 401k Defined Contribution	Yes	60%		
Michigan - PPRP	Pension Plus Retirement Plan				Includes unused sick leave in AFC
Mississippi - PERS 4	Public Employees' Retirement System of Mississippi - Tier 4	Yes	80%		
Missouri - MSEP 2011	Missouri State Employee's Plan 2011	No			Includes unused sick leave in AFC
Montana - PERS	Public Employees Retirement System	Yes	120%	\$22,000	
Montana - TRS	Teachers' Retirement System	No	80%		No unused sick leave or vacation is included in AFC
Nebraska - SPP	School Pension Plan	No	75%		
New Jersey - PERS 5	Public Employees' Retirement System Tier 5	Yes			10% salary growth cap in AFC calculation

Exhibit B3
General State Employee and Teacher Plans' Excess Compensation Provisions

Plan	Plan Name	Overtime included in AFC?	% benefit cannot exceed AFC	Monetary cap on AFC (if lower than \$250,000)	Other benefit level provisions
New Jersey - TPAF 5	Teachers Pension And Annuity Fund Tier 5	No		\$40,000	
New Mexico - PERA 3	Public Employees Retirement Association State Plan 3	No	100%		
New Mexico - NMERB	Education Retirement Board				Unused sick leave contributes to AFC 10 days of sick leave counts as 1 SCY
New York - PERS 6	Public Employees Retirement System - Tier 6	No			AFC cannot exceed a member's highest 3 years' average salary
New York - NYSTRS 6	New York State Teachers Retirement System - Tier 6	Yes			OT is counted in AFC as the average of OT a member does across 6 years.
North Carolina - TSERS	Teachers and State Employees Retirement System	No			Unused sick leave is calculated in AFC, with a maximum of up to 240 hours
North Dakota - NDPERS	North Dakota Public Employees Retirement System		100%		
Rhode Island - ERSRI	Employees' Retirement System of Rhode Island	No	94.5%		
South Carolina - SCORP	South Carolina Optional Retirement Plan	No		\$110,100	
South Dakota - SDRS	South Dakota Retirement System Class A	No			Paid vacation, sick leave, and holidays are counted towards AFC
Texas - ERS	Employees Retirement System	No			AFC does not include severance pay, or lump sum payment for unused sick leave or vacation
Utah - PERS 2 (DC)	Tier 2 Defined Contribution Plan	No		\$110,100	
Utah - PERS 2	Tier 2 Hybrid Retirement System	Yes			AFC is 90% of highest monthly salary. 5% salary growth cap in AFC calculation. If it is higher, the employee will be charged for compensation. Members make contributions on overtime.

Exhibit B3
General State Employee and Teacher Plans' Excess Compensation Provisions

Plan	Plan Name	Overtime included in AFC?	% benefit cannot exceed AFC	Monetary cap on AFC (if lower than \$250,000)	Other benefit level provisions
Vermont - VSTRS C	Vermont State Teachers' Retirement System - Group C		75%	\$106,800	AFC includes unused sick leave; employer pays any salary increase that exceeds 6% of AFC. Employers pay for additional sick days granted within last 4 yrs of SCY that increases service credit
Washington - SERS 2	School Employees' Retirement System Plan 2	Yes			If AFC is more than 200% of the last year's salary, employers must make increased contributions (determined by state actuary). Unused sick leave not calculated in AFC. Members make contributions on OT.
Washington - PERS 2	Public Employees Retirement System Plan 2	Yes			If AFC is more than 200% of the last year's salary, employers must make increased contributions (determined by state actuary). Employer is liable for any extra retirement costs in lieu of excess compensation. Members make contributions on OT.
Washington - TRS 2	Teacher Retirement System Plan 2	No			If AFC is more than 200% of the last year's salary, employers must make increased contributions (determined by state actuary). Members make contributions on OT.
Washington - SERS 3	School Employees' Retirement System Plan 3	Yes			If AFC is more than 200% of the last year's salary, employers must make increased contributions (determined by state actuary).
Washington - PERS 3	Public Employees Retirement System Plan 3	Yes			If AFC is more than 200% of the last year's salary, employers must make increased contributions (determined by state actuary). Employer is liable for any extra retirement costs in lieu of excess compensation.
Washington - TRS 3	Teacher Retirement System 3	No			If AFC is more than 200% of the last year's salary, employers must make increased contributions (determined by state actuary). A cash out of any form of leave other than annual is excess compensation to the extent they are included in the calculation of the member's retirement benefit.
West Virginia - PERS	Public Employees Retirement System		100%	\$50,000	

Exhibit B3
General State Employee and Teacher Plans' Excess Compensation Provisions

Plan	Plan Name	Overtime included in AFC?	% benefit cannot exceed AFC	Monetary cap on AFC (if lower than \$250,000)	Other benefit level provisions
West Virginia - TRS	Teachers Retirement System	No			AFC does not include vacation payouts
Wisconsin - WRS	Wisconsin Retirement System Defined Benefit Plan	No			Pensionable salary growth capped at 7.5%.
Wyoming - PEPP 2	Public Employee Retirement Plan 2				Unused sick leave is included in AFC

Exhibit B4
Law Enforcement and Firefighter Plans Excess Compensation Provisions

State	Plan name	Overtime included in AFC?	% not allowed to exceed AFC	Monetary cap on AFC (if lower than \$250,000)	Other benefit level provisions
Alabama - AERS	Alabama Employees' Retirement System (State Police)		97%		
Alabama - AERS	Alabama Employees' Retirement System (CO, LE, FF)	No			Pensionable salary increases capped at 15%. Members are paid for up to 300 hours of annual leave upon retirement
Arizona - PSPRS 2	Public Safety Personnel Retirement System	Yes	80%		Pensionable salary increases capped at 15%.
Arkansas - ASPRS 2	Arkansas State Police Retirement System - Tier II Non-Contributory		85%		
California - CalPERS 2	Public Employees Retirement System - Tier 2	Yes	90%		Unused sick leave and vacation are not included in AFC
Connecticut - HDP 2A	Hazardous Duty Plan - Tier 2A	Yes	80%		
Florida - FRS	Florida Retirement System - Special Risk Class	No			Pensionable salary changes are capped at 10%+CPI
Georgia - GERS	Georgia Employees' Retirement System	No	95%		
Hawaii - ERS	Employees' Retirement System - Contributory Plan	No	94.50%		
Illinois - SERS 2	State Employees' Retirement System - Tier 2	No	80%	\$106,800	Unused sick leave and vacation are included in AFC
Indiana - POFP	Police Officers & Firefighters' Pension	No	70%		
Iowa - PERS	Public Employee Retirement System		82%		
Kentucky - SPRS	State Police Retirement System	Yes			
Maryland - LEOPS	Law Enforcement Officers Pension System		60%		
Maryland - SPRS	State Police Retirement System		50%		Unused sick leave is included in AFC. 22 days converts to 1 month of service credit
Minnesota - CERP	Correctional Employees' Retirement Plan	No	80%		

Exhibit B4
Law Enforcement and Firefighter Plans Excess Compensation Provisions

State	Plan name	Overtime included in AFC?	% not allowed to exceed AFC	Monetary cap on AFC (if lower than \$250,000)	Other benefit level provisions
New Mexico - SPAC	State Police and Correctional	Yes	80%	\$106,800	Unused sick leave and vacation are not included in AFC
New York - PFRS 5	Police and Firemen's Retirement System - Tier 5	Yes	80%	\$62,000	The maximum pension payable to Tier 2, 3, 5 and 6 members is the benefit payable on completion of 32 years of service
New York - SRS 5	State and Local Retirement System: State Police Tier 5	Yes			
Ohio - PERS	Public Employees' Retirement System: Law Enforcement Division		90%		
Oklahoma - PPRS	Police Pension and Retirement System	No		\$179,000	
Oregon - PSRP	Public Service Retirement Plan	No			Salary changes are capped at 10%+CPI
Rhode Island - SPRBT	State Police Retirement Benefit Trust	Yes	65%		
South Carolina - PORS	Police Officers Retirement System	No	60%		
South Dakota - Class B - Public Safety	Class B - Public Safety	Yes			
Tennessee - TCRS	Tennessee Consolidated Retirement System Non-Contributory	No	50%	\$110,000	Unused sick leave and vacation are not included in AFC
Texas - LECOS	Law Enforcement & Custodial Officers' Supplemental Plan	No	50%	\$110,000	AFC limit is based on the annual maximum wage for Social Security deductions, \$110,000. Base salary does not include fringe benefits, OT, or severance pay. Employers are charged for excess compensation over the annual limit
Utah - PSFRS 2	Tier 2 Hybrid Retirement System	No			Unused sick leave is included in AFC to a limit of 1 service credit year maximum
Virginia - VaLORS 2	Virginia Law Officers' Retirement System 2	Yes			
Washington - LEOFF 2	Law Enforcement Officers & Fire Fighters Plan 2	Yes			If AFC is more than 200% of the last year's salary, employers must make increased contributions (determined by state actuary).

Exhibit B4**Law Enforcement and Firefighter Plans Excess Compensation Provisions**

State	Plan name	Overtime included in AFC?	% not allowed to exceed AFC	Monetary cap on AFC (if lower than \$250,000)	Other benefit level provisions
Washington - PSERS 2	Public Safety Employees Retirement System Plan 2				If AFC is more than 200% of the last year's salary, employers must make increased contributions (determined by state actuary).
Washington - WSPRS 2	Washington State Patrol Retirement Services 2	No	75%		If AFC is more than 200% of the last year's salary, employers must make increased contributions (determined by state actuary).
Wisconsin - WRS	Protective Employees' in SS	Yes	65%		Does not include severance pay, separation bonuses, expense allowances or fringe benefits
Wyoming - PFP Plan B	Paid Firefighters Plan B		75%		

APPENDIX C: COMPARATIVE BENEFIT LEVELS BY PUBLIC PENSION PLAN

To conduct an “apples-to-apples” comparison of benefit levels across public pension plans, we constructed long-term earnings histories for two hypothetical public employees, one age 65 at retirement, with 30 years of service, and one age 55, also with 30 years of service. Assumptions about earnings levels for these two employees were based on data from Washington State’s Department of Retirement Systems (DRS). The structure of this dataset is described in Appendix E.

Our measure for comparability of benefits across plans was a basic measure of “income replacement.” That is, of the final salary earned by the employee, what percentage will be earned by the employee from their public pension plan in the first year after retirement? It is crucial to note that in our computations of income replacement, we did *not* factor in income from Social Security, savings, or private investments, nor did we include estimations of taxes that may need to be paid on retirement income or the provision of health benefits.

We used the DRS data to compute the median final salary for all retirees in the dataset who retired from Washington State service at age 65 between January 1, 2009 and June 30, 2012. The median final salary was \$55,075. We also had data on individuals’ salaries covering the 10 years before retirement. We selected all employees for whom salary data from their retirement year and for 10 years prior were available (n=2,045). From that group, we identified all those workers whose final salaries fell between the 40th percentile and the 60th percentile (n=409), and computed mean nominal earnings at each year to approximate salary growth for employees earning around the median Washington State salaries. We then imputed a linear annualized growth rate (2.99%) and assumed the same growth rate back to when our hypothetical employees began working, 30 years prior to their retirement.

As DRS data did not have a sufficient sample of retirees at age 55 to conduct a parallel analysis for age 55 retirees in Washington, we assumed the same salary level for our age 55 hypothetical retiree as our 65-year-old retiree. The resulting stream of nominal wages (annual salary) is represented in Exhibit C1.

Exhibit C1
Projected Annual Salaries for Retiree Profiles

Years experience	Age (retire at 65)	Age (retire at 55)	Annual salary
0	35	25	\$22,750
1	36	26	\$23,430
2	37	27	\$24,131
3	38	28	\$24,853
4	39	29	\$25,596
5	40	30	\$26,362
6	41	31	\$27,150
7	42	32	\$27,962
8	43	33	\$28,798
9	44	34	\$29,660
10	45	35	\$30,547
11	46	36	\$31,461
12	47	37	\$32,402
13	48	38	\$33,371
14	49	39	\$34,369
15	50	40	\$35,397
16	51	41	\$36,456
17	52	42	\$37,546
18	53	43	\$38,669
19	54	44	\$39,825
20	55	45	\$41,017
21	56	46	\$42,243
22	57	47	\$43,507
23	58	48	\$44,808
24	59	49	\$46,148
25	60	50	\$47,529
26	61	51	\$48,950
27	62	52	\$50,414
28	63	53	\$51,922
29	64	54	\$53,475
30	65	55	\$55,075

To compare benefit levels across public pension plans we made a number of key assumptions regarding annuity purchases, fund growth rates, and life expectancy.

Fund Growth Rates. For DC and Hybrid plans we also had to assume a rate of growth for plan funds. We set that rate at 7.9% based on assumptions adopted by the Washington State Pension Funding Council.² To compute an income replacement rate in the year after retirement, we converted the DC portion of benefits (in DC or Hybrid plans) into an annual payout to the employee in the form of a single-life annuity.

Annuity Purchases. We assumed that employees participating in defined contribution (DC) or Hybrid plans would purchase an increasing, single-life annuity with their accumulated investments. This is an assumption that may not accurately represent the behavior of most retirees,³ but was necessary in order to compare these plans to the traditional defined benefit (DB) plan.

Life Expectancy. We used the state actuary's projection⁴ of an 84-year life expectancy for 65-year old retirees and assumed these retirees would purchase an annuity with a 4.76% growth rate⁵ at the time of their retirement. This annuity would continue paying out until age 84. The annuity would guarantee income for the 19-year term, and we used the first-year payout to determine income replacement in the year following retirement. Likewise, we anticipated an 82-year life expectancy for the 55-year old retiree, and assumed that these retirees would purchase an annuity that would pay out for 27 years.

Exhibit C2
Assumptions on Pension Benefit Payouts for DC and Hybrid Plans

Benefit factor	Assumption
Nominal growth of pension plan funds	7.9% per year
Method of disbursement for DC plans	Increasing, single-life annuity purchased at retirement
Term of annuity (for age 65 retiree)	19 years, based on actuarial life expectancy of age 84.
Term of annuity (for age 55 retiree)	27 years, based on actuarial life expectancy of age 82.
Nominal growth of annuity	4.76% per year

To determine income replacement for DB retirement benefits, the computation is:

$$\begin{aligned} &\text{Average final compensation (AFC) *} \\ &\quad \text{Service credit years (SCY) *} \\ &\quad \text{Benefit multiplier} \end{aligned}$$

² http://osa.leg.wa.gov/Actuarial_Services/Actuarial_Information/assumptions.htm

³ Available evidence suggests that DC plan retirees often choose lump-sum distribution of their accumulated benefits rather than purchasing annuities. See, for example, Beshears, J., Choi, J. J., Laibson, D., Madrian, B. C., & Zeldes, S. P. (2012). What Makes Annuitization More Appealing?. *Update*, 10, 17; Clark, S., Morrill, M., & Vanderweide, D. (2012). Defined benefit pension plan distribution decisions by public sector employees. Previous version circulated under the title "The Reverse Annuity Puzzle: The Choice of Lump Sum Distributions among Separating Public Sector Workers." (Working Paper No. 18488). Retrieved from National Bureau of Economic Research website: <http://www.nber.org/papers/w18488>.

⁴ http://osa.leg.wa.gov/Actuarial_Services/Actuarial_Information/Life_Expect_tables.htm

⁵ Plan 3 retirees in Washington have the option to purchase a Total Allocation Portfolio (TAP) Annuity, authorized by RCW 41.34.060, with funds managed by the Washington State Investment Board. This annuity product offers an automatic 3% annual cost of living adjustment, and currently is assumed to grow at the Pension Funding Council rate of 7.9%. Therefore, to approximate the first annual payout, we have computed the annual growth rate as: $(1.079 / 1.03) - 1$, or approximately 4.76%.

For DC benefits, we used the assumptions described above to estimate the total accumulated benefit by age of retirement. We assumed the employee would purchase an annuity for remaining years of life expectancy and draw down increasing, regular benefits on that purchase. In the hypothetical situation illustrated in Exhibit C4, an annuity purchased for \$170,679 with a fixed rate of 4.76% and a 19-year term (age 65 retiree) would provide an initial annual benefit of \$13,845. The same annuity purchased for a 27-year term (age 55 retiree) would provide an initial annual benefit of \$11,358.

Assumptions about annuity growth rates strongly impact estimated income replacement in retirement. The Total Allocation Portfolio (TAP) annuity product available to Washington State Plan 3 retirees provides 7.9% growth and an automatic 3% COLA.⁶ Retirees electing to purchase annuities in the private market may not receive COLAs and might expect lower rates of growth in their accumulated contributions⁷. An Institute synthesis of current (11/30/12) annuity quotes⁸ for age 65 retirees in Washington State with \$170,679 in accumulated value yielded a mean rate of 1.89% growth with a fixed payment (no COLA) (Exhibit C4).

⁶ The Plan 3 Annuity Guide is available online at: <http://www5.icmarc.org/xp/pubs/code/processRequest.jsp?RFID=C1108>

⁷ The TAP annuity investments are managed by the Washington State Investment Board, which has access to investments in private equity that are not available to a typical investor or mutual fund. Other DC and Hybrid plans may not offer options with this type of professional investment management, and may experience lower fund growth rates.

⁸ We obtained quotes from <http://www.immediateannuities.com/> for men and women aged 65 in Washington State for a single life annuity. Monthly payments were converted to an annual sum. We used the life expectancies of men and women in WA (83 and 85 respectively) to estimate an annuity term, and imputed a growth rate for each quote. We then computed the mean growth rate.

Exhibit C3
Projected Accumulation of DC Plan Benefits
for Hypothetical PERS 3 Retiree

Years experience	Annual salary	Accumulated plan worth ⁹
0	\$22,750	\$0
1	\$23,430	\$1,137
2	\$24,131	\$2,399
3	\$24,853	\$3,795
4	\$25,596	\$5,337
5	\$26,362	\$7,039
6	\$27,150	\$8,913
7	\$27,962	\$10,975
8	\$28,798	\$13,240
9	\$29,660	\$15,725
10	\$30,547	\$18,451
11	\$31,461	\$21,436
12	\$32,402	\$24,702
13	\$33,371	\$28,274
14	\$34,369	\$32,176
15	\$35,397	\$36,436
16	\$36,456	\$41,085
17	\$37,546	\$46,153
18	\$38,669	\$51,676
19	\$39,825	\$57,692
20	\$41,017	\$64,241
21	\$42,243	\$71,367
22	\$43,507	\$79,117
23	\$44,808	\$87,543
24	\$46,148	\$96,699
25	\$47,529	\$106,646
26	\$48,950	\$117,447
27	\$50,414	\$129,173
28	\$51,922	\$141,899
29	\$53,475	\$155,705
30	\$55,075	\$170,679

⁹ PERS 3 is a Hybrid plan, so these DC benefits make up only a portion of the total retirement benefits. This hypothetical employee contributed 5% toward his or her DC plan at the end of each year in a single annual contribution. Five percent is the mandatory default contribution rate for PERS 3.

Exhibit C4
Comparison of DC Plan Benefits under Different Assumptions (Age 65 Retiree)

	TAP	Private market
Accumulated DC benefits (time of retirement)	\$170,679	\$170,679
Annuity annual growth rate	7.9%	1.89%
COLA	3% per year	0%
Annual payout in first year after retirement	\$13,845	\$10,776

TAP is an optional annuity product provided by the Washington State Department of Retirement Systems.

The following tables display the results for the state pension plans reviewed.

Exhibit C5
Income Replacement for General State Employee and Teacher Plans

Plan	Type of employees covered	Type of plan	Income replacement: Age 65	Income replacement: Age 55
Alabama ERS	State, Local, and Police	DB	59%	59%
Alabama TRS	Teachers	DB	59%	59%
Arizona ASRS	State, Local and Teachers	DB	59%	59%
Arkansas APERS	State and Local	DB	65%	65%
Arkansas ATRS	Teachers	DB	63%	47%
California CalPERS 2	State, Teachers, Public Agency	DB	38%	32%
California CalSTRS	Teachers	DB	72%	36%
Connecticut SERS 3	State, Teachers	DB	38%	38%
Delaware SEPP	State and Teachers	DB	54%	54%
Florida FRS	State, Local and Teachers	DB	43%	37%
Georgia GSEPS	State	Hybrid	42%	40%
Georgia TRS	Teachers	DB	59%	59%
Hawaii ERS Hybrid	State, Local, Police, Firefighters	DB	50%	37%
Idaho PERSI	State, Local and Teachers	DB	58%	27%
Illinois SERS 2	State	DB	45%	0%
Indiana PERF	State and Local	Hybrid	46%	44%
Indiana TRF	Teachers	Hybrid	46%	44%
Iowa IPERS	State, Local and Teachers	DB	58%	23%
Kansas KPERS 2	State, Local and Teachers	DB	50%	35%
Maryland ETPS	State, Local and Teachers	DB	42%	17%
Michigan PPRP	School Employees	Hybrid	58%	44%
Michigan SERS	State	DC	50%	41%
Minnesota GERP	State and Local	DB	48%	26%
Minnesota TRA 2	Teachers	DB	54%	27%
Mississippi PERS 4	State, Local and Teachers	DB	57%	57%
Missouri MSEP 2011	State	DB	45%	51%
Montana DCRP	State, Local and Teachers	DC	62%	51%
Montana PERS	State and Local	DB	42%	42%
Montana TRS	Teachers	DB	49%	49%

Exhibit C5
Income Replacement for General State Employee and Teacher Plans

Plan	Type of employees covered	Type of plan	Income replacement: Age 65	Income replacement: Age 55
Nebraska SPP	Teachers	DB	58%	58%
New Jersey PERS 5	State, Local, Teachers	DB	47%	33%
New Jersey TPAF 5	Teachers	DB	47%	33%
New Mexico NMERB	Teachers	DB	67%	67%
New Mexico PERA 3	State and Local	DB	87%	87%
New York NYSTRS 6	Teachers	DB	57%	27%
New York PERS 6	State and Local	DB	57%	27%
North Carolina TSERS	State and Teachers	DB	57%	57%
North Dakota NDPERS	State and Local	Hybrid	83%	79%
North Dakota TFFR 2	Teachers	DB	57%	11%
Oklahoma PERS	State and Local	DB	58%	35%
Oklahoma TRS	Teachers	DB	57%	35%
Oregon OPSRP	State, Local	Hybrid	74%	58%
Pennsylvania PSERS	Teachers	DB	73%	62%
Pennsylvania SERS	State Employees, Police, Judicial	DB	58%	45%
Rhode Island ERSRI	State and Teachers	Hybrid	58%	25%
South Carolina SCORP	State, Local and Teachers	DC	60%	49%
South Carolina SCRS 3	State, Local and Teachers	DB	52%	0%
South Dakota SDRS	State, Local and Teachers	DB	50%	50%
Tennessee TCRS	Teachers	DB	42%	42%
Texas ERS	State	DB	67%	67%
Utah PERS 2	Public Employees	Hybrid	50%	7%
Utah PERS 2 - DC	Public Employees	DC	50%	41%
Vermont VSERS F	State	DB	49%	49%
Vermont VSTRS C	Teachers	DB	49%	49%
Virginia VRS 2	State, Local and Teachers	DB	48%	0%
Washington PERS 2	State	DB	57%	28%
Washington PERS 3	State	Hybrid	53%	35%
Washington SERS 3	School Employees	Hybrid	53%	35%
Washington SERS2	School Employees	DB	57%	28%
Washington TRS 3	Teachers	Hybrid	53%	35%
Washington TRS2	Teachers	DB	57%	28%
West Virginia PERS	State and Local	DB	58%	58%
West Virginia TRS	Teachers	DB	57%	57%
Wisconsin WRS	State, Local and Teachers	DB	47%	42%
Wyoming PEPP 2	State, Local and Teachers	DB	57%	57%

Exhibit C6
Income Replacement for Law Enforcement and Firefighter Plans

Plan	Type of employees covered	Type of plan	Income replacement: Age 65	Income replacement: Age 55
Alabama AERS	State, Local Police & Firefighters	DB	59%	59%
Alabama AERS	State Police	DB	84%	84%
Arizona PSPRS 2	State and Local Police & Firef.	DB	71%	71%
Arkansas ASPRS 2	State Police	DB	71%	71%
California CalPERS 2	Law Enforcement, Firefighters	DB	73%	73%
Connecticut HDP 2A	State, Local Police, Firefighters	DB	58%	58%
Florida FRS	State, Local Police, Firefighters	DB	81%	81%
Georgia GERS	Public Safety	Hybrid	42%	40%
Hawaii ERS	Police and Firefighters	DB	64%	64%
Idaho IPERS	Police & Firefighters	DB	67%	67%
Illinois SERS 2	Police & Firefighters	DB	68%	0%
Indiana POFP	Police & Firefighters	DB	70%	70%
Iowa PERS	Local Police, Firefighters & others	DB	80%	80%
Kansas KPF 2	Police and Firefighters	DB	73%	73%
Kentucky SPRS	State Police	DB	71%	71%
Maryland LEOPS	State Law Enforcement	DB	57%	57%
Maryland SPRS	State Police	DB	74%	74%
Minnesota CERP	Correctional officers	DB	68%	68%
Minnesota PERA	Local Police, Firefighters & others	DB	85%	85%
New Mexico PERF	State Police, Correctional Officers	DB	87%	87%
New York PFRS 6	State Police & Firefighters	DB	63%	63%
New York SRS 5	Correctional Officers	DB	73%	73%
North Carolina SLEO	State Law Enforcement	DB	53%	53%
North Dakota NDPERS	National Guard, Police, FF	Hybrid	78%	75%
Ohio PERS	State, Local Police, Firefighters	DB	73%	73%
Oklahoma PPRS	Municipal Police	DB	74%	74%
Oregon PSRP	State, Local Police, Firefighters	Hybrid	70%	64%
Pennsylvania SERS	State Police - Class AA	DB	75%	38%
Rhode Island SPRBT	State Police	DB	57%	57%
South Carolina PORS	State Police	DB	61%	61%
South Dakota Class B	State Law Enforcement	DB	58%	58%
Tennessee TCRS	Law Enforcement	DB	42%	42%
Texas LECOS	Law Enforcement	DB	82%	82%
Utah PSFRS 2	Police and Firefighters	Hybrid	85%	77%
Utah PSFRS 2 DC	Police and Firefighters	DC	42%	35%
Vermont VSERS C	State Police & Law Enforcement	DB	74%	74%
Virginia SPORS 2	State Police	DB	52%	52%
Virginia VaLORS 2	State Law Enforcement	DB	57%	57%
Washington LEOFF 2	Law enforcement/fire fighters	DB	57%	57%
Washington PSERS 2	Public safety officers	DB	57%	48%
Washington WSPRS 2	State Patrol	DB	57%	57%
Wisconsin WRS	State & Local Police, Safety	DB	58%	58%
Wyoming WRS	Firefighters	DB	82%	82%

APPENDIX D: BENEFIT PORTABILITY ANALYSIS

To illustrate how retirement benefits are impacted by job mobility, we estimated benefit levels comparing two hypothetical workers with similar earnings profiles: one who stays in the same job (Employee A) and the other who is mobile (Employee B). Employee A stays in the same job for 30 years, whereas Employee B changes jobs over the course of their career. We compare pension benefits at the time of retirement for each of these workers.

We compare four types of plans:

- Defined Benefit (DB)
- Defined Contribution (DC)
- Hybrid (half DB/half DC)
- Defined Benefit with portability provisions (described below)

We use the income replacement for our metric using the same methods described in Appendix C.

Assumptions:

- **Employee A** stays in the same job for 30 years
- **Employee B** changes jobs at years 7, 10, and 22
- Both employees' salaries grow at approximately 3% per year (based on the salary profiles in Appendix C)
- For each job change, Employee B's salary increases by an additional five percent, and they cash out and spent their contributions if they change jobs before the vesting period ends
- Public employers in all the jobs have the same pension rules:
 - For our defined benefit examples:
 - **Average final salary** period of three years;
 - **Benefit multiplier** of 2% for defined benefit plans and 1% for Hybrid plans;
 - **Vest** at five years (for DB and Hybrid plans).
 - For our defined contribution plans:
 - The **nominal growth** is assumed to be 7.9%;
 - **Contribution rates:** 8% from the employer (goes to the DB portion only in the Hybrid plan) and 5% from the employee (goes to DC portion only in the Hybrid plan).
 - **Annuitization assumptions:** retirees purchase a TAP annuity (see Appendix C for details) with a 7.9% growth rate and automatic 3% COLA.

Portability Provisions

- Employees are eligible to retire if the years of service combined across jobs meets the minimum (e.g., age 60 with 30 years of experience)
- The highest average final salary across jobs can be used to calculate benefits for each pension plan (up to 65% salary replacement).

Exhibit D1 summarizes our findings. Exhibits D2 through D5 provide details on how these estimates were developed.

Exhibit D1
Summary of Annual Pension Benefits for a
Hypothetical Stable vs. Mobile Employee

	Employee A (stable)	Employee B (mobile)
Defined Benefit Plan		
Estimated annual benefit	\$32,094	\$25,232
% salary replacement	58%	38%
Defined Contribution Plan		
Estimated annual benefit	\$11,888	\$14,006
% salary replacement	22%	21%
Hybrid Plan		
Estimated annual benefit	\$20,619	\$18,003
% salary replacement	37%	27%
Defined Benefit Plan with portability		
Estimated annual benefit	\$32,094	\$33,854
% salary replacement	58%	51%

To test how sensitive these estimates are to some of our assumptions, we ran the same analysis for ten different scenarios using various combinations of assumptions about vesting periods, investment returns, and years of service at each job for employee B (the mobile worker). Varying the assumptions changes the relative magnitude of benefits but not the overall findings:

- mobile workers have lower income replacement than stable workers
- DC plans (including the DC portion of Hybrid plans) have smaller differences in income replacement for mobile vs. stable workers
- Washington State's portability rules reduce the differences in come replacement in mobile vs. stable workers

The largest impacts on income replacement for mobile employees are longer vesting periods in defined benefit and Hybrid plans. Assumptions around contribution rates and investment returns impact DC and Hybrid plan income replacement.

Exhibit D2
Pension Benefits for Stable (“A”) versus Mobile (“B”) Employee:
Defined Benefit Plan

Age	Year Working	Annual Salary		Average Final Salary		Years of Service		Annual Pension Benefits		Increment per year of service		DC Contributions (cumulative)	
		A	B	A	B	A	B	A	B	A	B	A	B
30	1	\$19,430	\$19,430									\$19,430	\$19,430
31	2	\$24,131	\$24,131									\$24,131	\$24,131
32	3	\$24,853	\$24,853									\$24,853	\$24,853
33	4	\$25,596	\$25,596									\$25,596	\$25,596
34	5	\$26,362	\$26,362									\$26,362	\$26,362
35	6	\$27,150	\$27,150									\$27,150	\$27,150
36	7	\$27,962	\$29,320		\$27,611		7		\$3,865		\$552	\$27,962	\$29,320
37	8	\$28,798	\$30,196									\$28,798	\$30,196
38	9	\$29,660	\$31,100									\$29,660	\$31,100
39	10	\$30,547	\$33,585		\$31,627		3		No benefit (not vested)			\$30,547	\$33,585
40	11	\$31,461	\$34,590									\$31,461	\$34,590
41	12	\$32,402	\$35,624									\$32,402	\$35,624
42	13	\$33,371	\$36,690									\$33,371	\$36,690
43	14	\$34,369	\$37,787									\$34,369	\$37,787
44	15	\$35,397	\$38,917									\$35,397	\$38,917
45	16	\$36,456	\$40,082									\$36,456	\$40,082
46	17	\$37,546	\$41,280									\$37,546	\$41,280
47	18	\$38,669	\$42,515									\$38,669	\$42,515
48	19	\$39,825	\$43,786									\$39,825	\$43,786
49	20	\$41,017	\$45,096									\$41,017	\$45,096
50	21	\$42,243	\$46,444									\$42,243	\$46,444
51	22	\$43,507	\$50,156		\$47,232		12		\$11,336		\$945	\$43,507	\$50,156
52	23	\$44,808	\$51,656									\$44,808	\$51,656
53	24	\$46,148	\$53,201									\$46,148	\$53,201
54	25	\$47,529	\$54,793									\$47,529	\$54,793
55	26	\$48,950	\$56,431									\$48,950	\$56,431
56	27	\$50,414	\$58,119									\$50,414	\$58,119
57	28	\$51,922	\$59,857									\$51,922	\$59,857
58	29	\$53,475	\$61,648									\$53,475	\$61,648
59	30	\$55,075	\$66,574	\$53,491	\$62,693	30	8	\$32,094	\$10,031	\$1,070	\$1,254	\$55,075	\$66,574

Exhibit D3
Pension Benefits for Stable (“A”) versus Mobile (“B”) Employee:
Defined Contribution Plan

Age	Year Working	Annual Salary		Average Final Salary		Years of Service		Annual Pension Benefits		Increment per year of service		DC Contributions (cumulative)	
		A	B	A	B	A	B	A	B	A	B	A	B
30	1	\$23,430	\$23,430									\$3,287	\$3,287
31	2	\$24,131	\$24,131									\$6,671	\$6,671
32	3	\$24,853	\$24,853									\$10,158	\$10,158
33	4	\$25,596	\$25,596									\$13,748	\$13,748
34	5	\$26,362	\$26,362									\$17,446	\$17,446
35	6	\$27,150	\$27,150									\$21,254	\$21,254
36	7	\$27,962	\$29,320									\$25,176	\$25,367
37	8	\$28,798	\$30,196									\$29,216	\$29,602
38	9	\$29,660	\$31,100									\$33,376	\$33,965
39	10	\$30,547	\$33,585									\$37,661	\$38,676
40	11	\$31,461	\$34,590									\$42,074	\$43,528
41	12	\$32,402	\$35,624									\$46,619	\$48,525
42	13	\$33,371	\$36,690									\$51,300	\$53,671
43	14	\$34,369	\$37,787									\$56,121	\$58,971
44	15	\$35,397	\$38,917									\$61,086	\$64,430
45	16	\$36,456	\$40,082									\$66,200	\$70,053
46	17	\$37,546	\$41,280									\$71,466	\$75,843
47	18	\$38,669	\$42,515									\$76,890	\$81,807
48	19	\$39,825	\$43,786									\$82,477	\$87,948
49	20	\$41,017	\$45,096									\$88,230	\$94,274
50	21	\$42,243	\$46,444									\$94,156	\$100,789
51	22	\$43,507	\$50,156									\$100,258	\$107,824
52	23	\$44,808	\$51,656									\$106,543	\$115,070
53	24	\$46,148	\$53,201									\$113,017	\$122,532
54	25	\$47,529	\$54,793									\$119,684	\$130,218
55	26	\$48,950	\$56,431									\$126,550	\$138,134
56	27	\$50,414	\$58,119									\$133,621	\$146,286
57	28	\$51,922	\$59,857									\$140,904	\$154,682
58	29	\$53,475	\$61,648									\$148,405	\$163,330
59	30	\$55,075	\$66,574									\$156,131	\$172,668

Exhibit D4
Pension Benefits for Stable (“A”) versus Mobile (“B”) Employee:
Hybrid Plan

Age	Year Working	Annual Salary		Average Final Salary		Years of Service		Annual Pension Benefits		Increment per year of service		DC Contributions (cumulative)	
		A	B	A	B	A	B	A	B	A	B	A	B
30	1	\$23,430	\$23,430									\$1,264	\$1,264
31	2	\$24,131	\$24,131									\$2,566	\$2,566
32	3	\$24,853	\$24,853									\$3,907	\$3,907
33	4	\$25,596	\$25,596									\$5,288	\$5,288
34	5	\$26,362	\$26,362									\$6,710	\$6,710
35	6	\$27,150	\$27,150									\$8,175	\$8,175
36	7	\$27,962	\$29,320		\$27,611		7		\$1,933		\$276	\$9,683	\$9,756
37	8	\$28,798	\$30,196									\$11,237	\$11,385
38	9	\$29,660	\$31,100									\$12,837	\$13,063
39	10	\$30,547	\$33,585		\$31,627		3		No benefit (not vested)			\$14,485	\$14,875
40	11	\$31,461	\$34,590									\$16,182	\$16,741
41	12	\$32,402	\$35,624									\$17,930	\$18,663
42	13	\$33,371	\$36,690									\$19,731	\$20,643
43	14	\$34,369	\$37,787									\$21,585	\$22,681
44	15	\$35,397	\$38,917									\$23,495	\$24,781
45	16	\$36,456	\$40,082									\$25,461	\$26,943
46	17	\$37,546	\$41,280									\$27,487	\$29,170
47	18	\$38,669	\$42,515									\$29,573	\$31,464
48	19	\$39,825	\$43,786									\$31,722	\$33,826
49	20	\$41,017	\$45,096									\$33,935	\$36,259
50	21	\$42,243	\$46,444									\$36,214	\$38,765
51	22	\$43,507	\$50,156		\$47,232		12		\$5,668		\$472	\$38,561	\$41,471
52	23	\$44,808	\$51,656									\$40,978	\$44,258
53	24	\$46,148	\$53,201									\$43,468	\$47,128
54	25	\$47,529	\$54,793									\$46,032	\$50,084
55	26	\$48,950	\$56,431									\$48,673	\$53,128
56	27	\$50,414	\$58,119									\$51,393	\$56,264
57	28	\$51,922	\$59,857									\$54,194	\$59,493
58	29	\$53,475	\$61,648									\$57,079	\$62,819
59	30	\$55,075	\$66,574	\$53,491	\$62,693	30	8	\$16,047	\$5,015	\$535	\$627	\$60,050	\$66,411

Exhibit D5
Pension Benefits for Stable (“A”) versus Mobile (“B”) Employee:
Defined Benefit Plan with Portability Provisions Applied

Age	Year Working	Annual Salary		Average Final Salary		Years of Service		Annual Pension Benefits		Increment per year of service		DC Contributions (cumulative)	
		A	B	A	B	A	B	A	B	A	B	A	B
30	1	\$23,430	\$23,430										
31	2	\$24,131	\$24,131										
32	3	\$24,853	\$24,853										
33	4	\$25,596	\$25,596										
34	5	\$26,362	\$26,362										
35	6	\$27,150	\$27,150										
36	7	\$27,962	\$29,320		\$27,611		7		\$8,777		\$1,254		
37	8	\$28,798	\$30,196										
38	9	\$29,660	\$31,100										
39	10	\$30,547	\$33,585		\$31,627		3		No benefit (not vested)				
40	11	\$31,461	\$34,590										
41	12	\$32,402	\$35,624										
42	13	\$33,371	\$36,690										
43	14	\$34,369	\$37,787										
44	15	\$35,397	\$38,917										
45	16	\$36,456	\$40,082										
46	17	\$37,546	\$41,280										
47	18	\$38,669	\$42,515										
48	19	\$39,825	\$43,786										
49	20	\$41,017	\$45,096										
50	21	\$42,243	\$46,444										
51	22	\$43,507	\$50,156		\$47,232		12		\$15,046		\$1,254		
52	23	\$44,808	\$51,656										
53	24	\$46,148	\$53,201										
54	25	\$47,529	\$54,793										
55	26	\$48,950	\$56,431										
56	27	\$50,414	\$58,119										
57	28	\$51,922	\$59,857										
58	29	\$53,475	\$61,648										
59	30	\$55,075	\$66,574	\$53,491	\$62,693	30	8	\$32,094	\$10,031	\$1,070	\$1,254		

APPENDIX E: OVERTIME AND EXCESS COMPENSATION— ANALYSIS OF WASHINGTON DATA

Organization of this Appendix

This appendix begins with a description of the data used in our analyses. We then show information about Washington State public retirees between 2009 and June 2012, including the number of retirees, which state pension plan they retired from, as well as their average AFC, retirement age, cash-outs, excess compensation, and overtime hours.

We use two stylized examples to illustrate how overtime hours concentrated at the end of a career impact pensions differently than persistently high overtime.

Finally, this appendix includes details about our multivariate regression test, using individual-level Washington State data, of the extent to which end-of-career increases in hours among recent Washington retirees are related to pension benefit incentives.

E1. Data Sources

E2. Washington State Retiree Information

E3. Stylized Examples

E4. Test for Hours Increases Related to Pension Rule Incentives

E1. DATA SOURCES

Department of Retirement Systems Data

The Washington State Department of Retirement Systems (DRS) provided data for all individuals retiring from one of the state plans during a three and a half year period: January 1, 2009 to June 30, 2012. The DRS data include information on 26,799 pension system members. Two types of DRS data are provided: retiree summary and earnings history.

Retiree Summary Data. The retiree summary data include the following information about each retiree:

- demographics (gender, date of birth, age at retirement)
- employer
- pension system and plan
- retirement date
- average final compensation (AFC)
- cash-out portion of AFC
- excess compensation portion of AFC

Earnings History Data. The earnings history data include compensation and hours worked histories for about 20,500 retirees for up to ten years prior to retirement. These data are monthly and span the period from January 1999 to June 2012. Monthly compensation includes earnings, lump sum payments and cash-outs.

The main limitation with these data is that overtime earnings are not reported separately. Job classification and title are also not reported.

Human Resource Management System (HRMS) Data

The HRMS provides information on earnings components, including overtime. These data are available only since July of 2006. The Office of Financial Management (OFM) extracted HRMS data for the retirees in our analysis of DRS data (members who retired from January 2009 to June 2012). HRMS only includes data for state agency employees.

Data Exclusions and Restrictions

Since the month prior to retirement is often atypical, it is excluded in the analysis of earnings and hours trends. The analysis relies on hours as reported to the DRS. Members with no earnings during the 6 months prior to retirement are excluded from the analysis.

The following hours exclusions were imposed in the analysis. Monthly observations were excluded if:

- hours = 0
- hours < 60 per month (less than 15 hours per week)
- hours > 640 (excludes only 20 monthly observations)

The analysis was limited to those members with sufficient AFC and pre-AFC monthly observations.

- Plan 1 members with fewer than 18 observed AFC months were excluded.
- Plan 2/3 members with fewer than 36 observed AFC months were excluded.
- Members with fewer than 36 observed pre-AFC months were excluded.
- LEOFF1 members with fewer than 10 observed AFC months were excluded (LEOFF1 AFC is determined by final salary)

The results are not overly sensitive to these restrictions.

The regression analysis further restricted observations to normal retirements, excluding disability and other types. Normal retirement accounts for 94 percent of all retirements. Note that earnings typically decline in cases of disability.

E2. WASHINGTON STATE RETIREE INFORMATION

Exhibit E1

Retirees, Average Final Compensation and Age at Retirement by System and Plan

Retirements from January 2009 to June 2012

System & Plan	Retirees	Average AFC	Average Retirement Age
LEOFF1	229	\$8,543	61
LEOFF2	1,161	\$7,388	56
PERS1	4,868	\$5,108	62
PERS2	10,152	\$4,467	64
PERS3	984	\$4,829	63
SERS2	1,802	\$2,476	65
SERS3	1,710	\$2,564	64
TRS1	2,596	\$5,993	62
TRS2	1,055	\$5,148	64
TRS3	2,123	\$5,473	63
WSPRS1	119	\$7,725	53
Total	26,799	\$4,771	63

Notes: Data did not include WSPRS2 retirees. There were very few retirees from JRS1 and PSERS2. Plans 1 are closed.

Exhibit E2

Cash-Out Compensation Included in AFC

Retirements from January 2009 to June 2012

System & Plan	Retirees	# with cash-outs > 0	% receiving cash-outs	Avg where cash-outs > 0	Avg across all retirees	Total Payments
PERS1	4,868	2,691	55.3%	\$318	\$176	\$856,439
TRS1	2,596	465	17.9%	\$266	\$48	\$123,812
WSPRS1	119	88	73.9%	\$554	\$410	\$48,751

Notes: Cash-outs include leave balances. Leave cash-outs are excluded from plans 2/3. No cash-out compensation was reported for LEOFF.

Exhibit E3
Excess Compensation
Retirements from January 2009 to June 2011

System & Plan	Retirees	# with amount > 0	% having excess comp	Avg where excess comp > 0	Avg across all retirees
PERS1	4,868	885	18.2%	\$324	\$59
PERS2	10,152	7	0.1%	\$551	\$0
PERS3	984	3	0.3%	\$133	\$0
SERS2	1,802	2	0.1%	\$894	\$1
TRS1	2,596	284	10.9%	\$28	\$3
Total	20,402	1,181	5.8%	\$255	\$15

Notes: Employers are charged the present value of the benefit stream generated by these amounts. No excess compensation was reported for LEOFF1, LEOFF2, SERS3, TRS2, TRS3, and WSPRS1. Many (88%) of the PERS1 retirees with excess compensation are employed by cities, counties and utility districts. The N is lower than in Exhibit E1 because LEOFF plans are excluded.

The degree to which earnings increase with tenure varies across systems and plans (Exhibits E4 and E6). Note that earnings vary dramatically by month for SERS and TRS members, so the chart uses 12-month moving averages (MA) for these members.

Exhibit E4
Average Earnings Profiles for Open Plans with Recent Retirees
(Earnings per month)
Retirements from January 2009 to June 2012

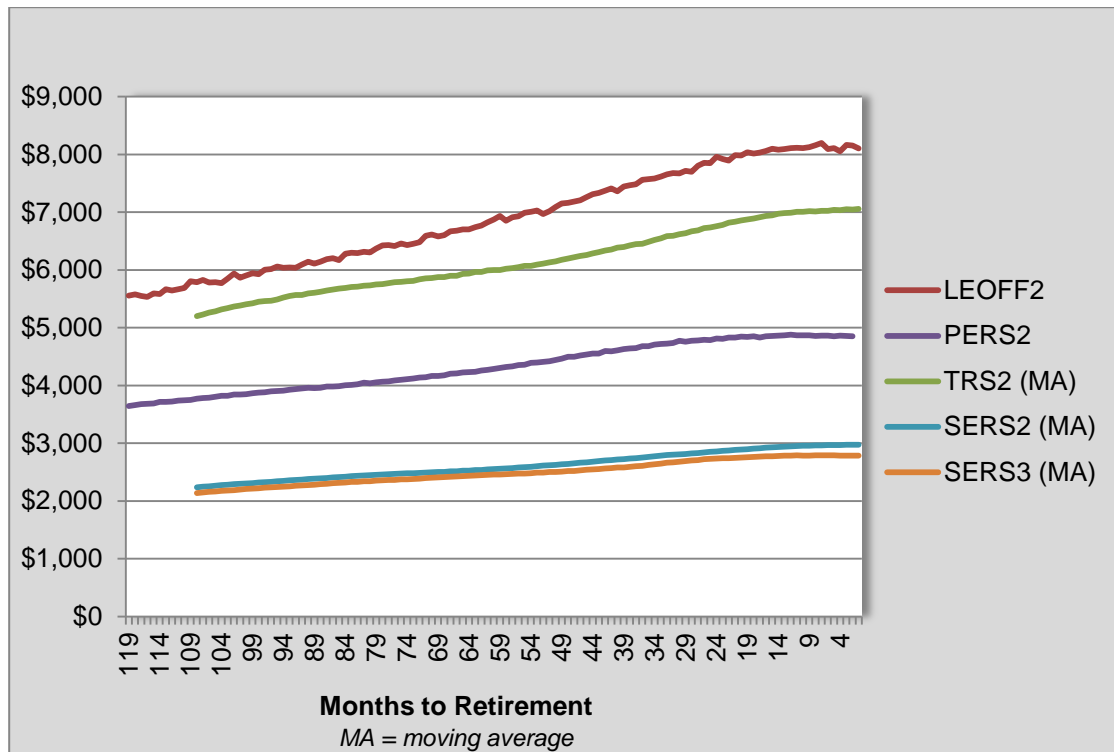
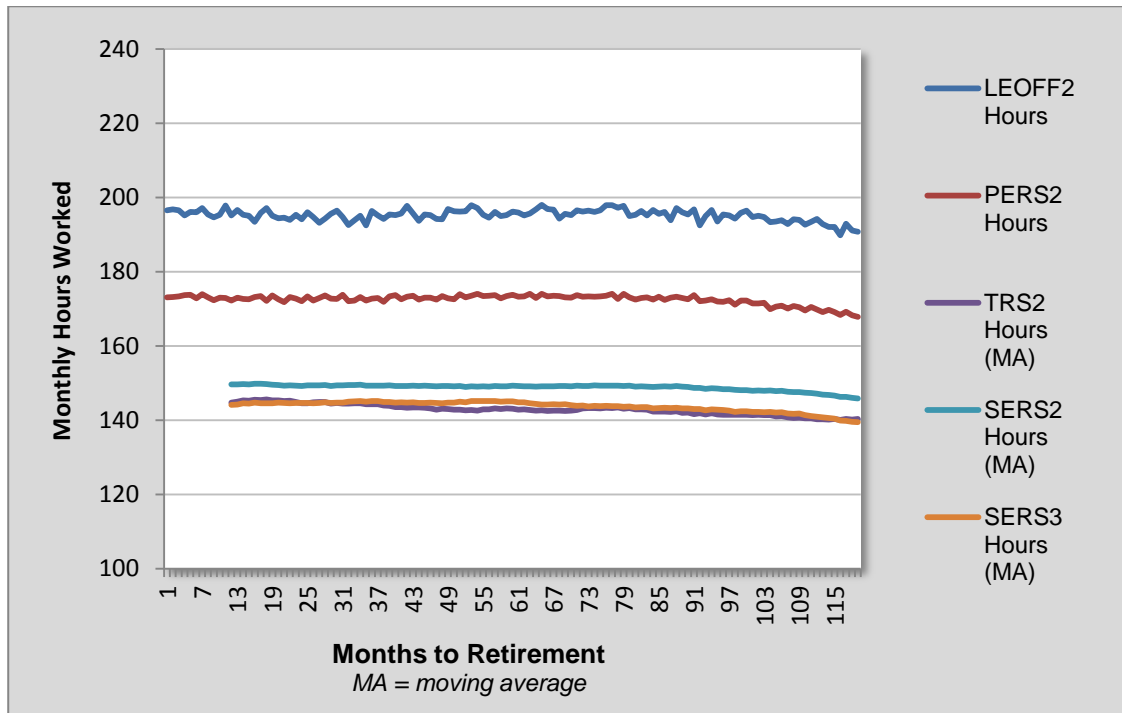


Exhibit E5
Average Hours Profiles for Open Plans with Recent Retirees
(Hours per month)
Retirements from January 2009 to June 2012



We do not observe systematic increases in average hours worked, as reported to DRS, in AFC periods (Exhibits E5 and E7). Increases in average earnings per hour largely drive the overall increases in earnings with tenure. However, the number of average hours worked varies across plans, and this variation contributes to differences in the overall level of earnings.

Exhibit E6
Average Monthly Earnings Before and During AFC Period
Retirements from January 2009 to June 2012

Plan/System	N	Avg. Earnings Pre-AFC	Avg. Earnings AFC	Avg. Increase	% Increase
LEOFF1	109	\$6,811	\$8,458	\$1,647	24.2%
LEOFF2	731	\$6,149	\$7,633	\$1,484	24.1%
PERS1	3577	\$4,287	\$5,088	\$801	18.7%
PERS2	6182	\$3,946	\$4,672	\$726	18.4%
PERS3	158	\$4,201	\$4,991	\$789	18.8%
SERS2	1115	\$2,345	\$2,756	\$411	17.5%
SERS3	251	\$2,254	\$2,616	\$362	16.1%
TRS1	1968	\$6,031	\$7,142	\$1,111	18.4%
TRS2	558	\$5,631	\$6,674	\$1,043	18.5%
TRS3	258	\$5,276	\$6,282	\$1,006	19.1%
WSPRS1	99	\$6,190	\$7,348	\$1,158	18.7%
PERS2: FERRIES	52	\$4,417	\$5,156	\$738	16.7%
PERS1: CORRECTIONS	93	\$4,017	\$4,693	\$676	16.8%
PERS2: CORRECTIONS	324	\$3,522	\$4,157	\$635	18.0%

Note: Reference periods vary by plan. Plans 1: AFC periods include the 24 months prior to retirement (12 months prior for LEOFF1). Pre-AFC periods can include up to 96 months. Plans 2/3: Pre-AFC and AFC periods both include up to 60 months for the open plans.

Exhibit E7
Average Monthly Hours Before and During AFC Period
Retirements from January 2009 to June 2012

Plan/System	N	Avg. Hours Pre-AFC	Avg. Hours AFC	Difference	Std Dev AFC Avg.
LEOFF1	109	186.3	182.9	-3.40	21.8
LEOFF2	731	195.4	194.9	-0.50	26.1
PERS1	3,577	170.2	169.3	-0.90	18.8
PERS2	6,182	173.0	172.1	-0.90	17.8
PERS3	158	171.1	169.0	-2.10	20.1
SERS2	1,115	147.2	146.1	-1.10	28.0
SERS3	251	143.0	140.8	-2.20	26.9
TRS1	1,968	153.1	154.1	1.00	18.7
TRS2	558	143.6	141.3	-2.30	14.1
TRS3	258	141.0	139.1	-1.90	18.3
WSPRS1	99	180.3	177.2	-3.10	9.7
PERS2: FERRIES	52	178.5	179.5	1.00	13.6
PERS1: CORRECTIONS	93	179.0	176.3	-2.70	10.2
PERS2: CORRECTIONS	324	180.0	179.1	-0.90	16.7
Total	15,475	167.3	166.5	-0.79	19.2

Exhibits E8 and E9 provide additional detail for employer types within PERS 2.

Exhibit E8
PERS2: Average Monthly Earnings Before and During AFC Period

Employer Type	N	Avg. Earnings Pre-AFC	Avg. Earnings AFC	Avg. Increase	% Increase
City	506	\$4,272	\$5,144	\$873	20.4%
County	1,806	\$4,056	\$4,847	\$785	19.4%
State	2,593	\$3,864	\$4,517	\$653	16.9%
State Ed	906	\$3,263	\$3,847	\$584	17.9%
Utility	218	\$5,776	\$6,997	\$1221	21.1%

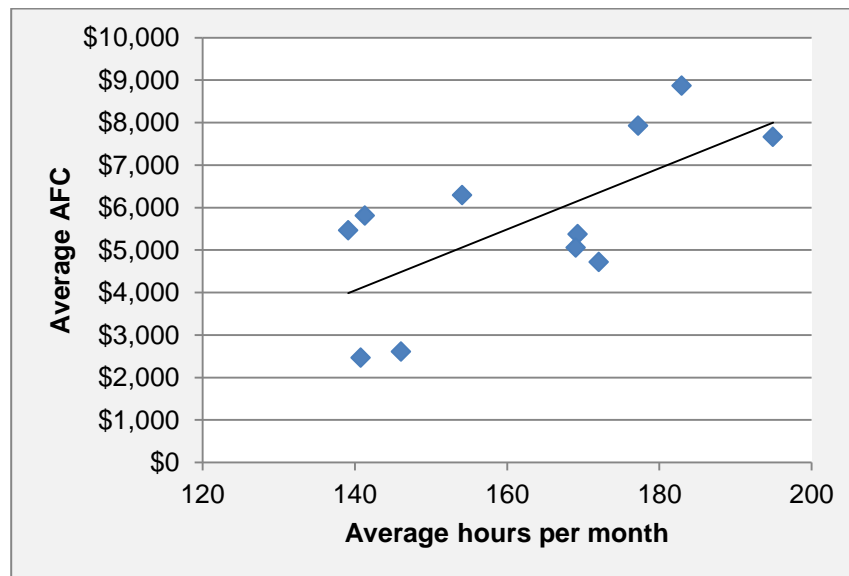
Exhibit E9
PERS2: Average Monthly Hours Before and During AFC Period

Employer Type	N	Avg. Hrs Pre-AFC	Avg. Hours AFC	Std Dev AFC Avg.
City	506	173.3	172.6	15.9
County	1,806	172.1	171.4	20.3
State	2,593	174.4	173.2	13.2
State Ed	906	168.8	167.4	20.8
Utility	218	181.9	182.1	15.9

Notes: City includes Cities and First Class Cities. County includes Counties and County Subdivisions. State includes non-education state agencies. State Ed includes state colleges and universities. Utilities include Public Utility Districts and WA Public Utility Districts

Although AFC hours are not substantially higher than in pre-AFC periods, some groups of employees do work consistently higher hours throughout their careers. Average hours worked is relatively high, for example, among LEOFF and WSP members, and these higher hours contribute to higher AFCs. Exhibit E10 summarizes the relationship between average monthly hours worked and average monthly AFC levels across systems and plans. Each point in the exhibit represents average values for a plan.

Exhibit E10
Average Monthly Hours by Average Monthly AFC



Plan	Average Hours	AFC
LEOFF1	183	\$8,867
WSPRS1	177	\$7,928
LEOFF2	195	\$7,664
TRS1	154	\$6,294
TRS2	141	\$5,814
TRS3	139	\$5,468
PERS1	169	\$5,379
PERS3	169	\$5,059
PERS2	172	\$4,719
SERS2	146	\$2,611
SERS3	141	\$2,464

Overall average hours worked does not tend to increase during AFC periods. Some members, however, do work longer hours toward the end of their careers; and there are cases where the increases are substantial. Across all plans, roughly 23 percent of retirees had some gain in average AFC hours. Note that 31 percent, on the other hand, worked fewer hours (Exhibit E11). The distribution of gains varies across plans (Exhibit E12).

Exhibit E11
Difference in average monthly hours in AFC and Pre-AFC Periods
All Systems & Plans January 2009-June 2012

Average Hours Worked Gain/Loss Pre- and Post-AFC	Retirees	Percent	Avg. hours Difference
Less by > 2 hours	4631	30.9%	-10.2
Near, -2 to <2 hours	6957	46.4%	-0.2
More, 2 to <10	2305	15.4%	5.0
More10 to <20	698	4.7%	13.9
More, 20+	415	2.8%	36.2

Exhibit E12
Hour Gain/Loss across Systems & Plans
Gain/Loss in Average Hours per Month

Plan	(1) <-2	(2) -2 to <2	(3) 2 to <10	(4) 10+
WSPRS1	52.53	40.4	5.05	2.02
PERS3	32.28	50.63	13.92	3.17
PERS2	26.79	56.83	10.79	5.59
PERS1	29.13	53.45	11.46	5.96
SERS3	39.84	31.87	21.51	6.78
TRS2	44.8	22.22	25.45	7.53
TRS3	41.09	24.42	25.19	9.3
SERS2	38.12	34.17	18.3	9.41
LEOFF2	36.39	31.46	20.52	11.63
TRS1	32.88	24.49	28.91	13.72

Exhibit E13 shows how many recent retirees worked more, less, or the same amount of hours before and during the AFC period, by plan. The shaded squares indicate the number of people who worked about the same amount of hours during the AFC as before. Below and to the left of the shaded squares are people who worked less during the AFC period, and above and to the right, those who worked more during the AFC period. For example, across all plans 7,151 worked a typical 40-hour week before and during the AFC period. Among those who worked about 40 hours a week before the AFC period, 413 worked a few hours less (35-38), and 357 worked a few hours more (42-45) during the AFC period.

Exhibit E13

Number of Retirees by Average Hours before and During the AFC Period

All Systems & Plans

	Average Monthly Hours: AFC Period							Total
	(1) <128 (15-29/wk)	(2) 128-149 (30-34/wk)	(3) 150-166 (35-38/wk)	(4) 167-179 (39-41/wk)	(5) 180-192 (42-45/wk)	(6) 193-214 (45-49/wk)	(7) 215+ (50+/wk)	
Average Hours: Pre-AFC								
(1) <128 (15-29/wk)	699	131	35	20	3	0	1	889
(2) 128-149 (30-34/wk)	240	1153	382	65	11	7	2	1860
(3) 150-166 (35-38/wk)	47	470	1189	369	32	5	9	2121
(4) 167-179 (39-41/wk)	29	107	413	7151	357	34	13	8104
(5) 180-192 (42-45/wk)	0	6	37	543	577	134	16	1313
(6) 193-214 (45-49/wk)	1	2	4	59	137	236	50	489
(7) 215+ (50+/wk)	0	0	0	14	15	36	165	230
Total	1016	1869	2060	8221	1132	452	256	15006

LEOFF2

	Average Monthly Hours: AFC Period							Total
	(1) <128 (15-29/wk)	(2) 128-149 (30-34/wk)	(3) 150-166 (35-38/wk)	(4) 167-179 (39-41/wk)	(5) 180-192 (42-45/wk)	(6) 193-214 (45-49/wk)	(7) 215+ (50+/wk)	
Average Hours: Pre-AFC								
(1) <128 (15-29/wk)	0	0	0	0	0	0	0	0
(2) 128-149 (30-34/wk)	0	0	0	0	0	0	0	0
(3) 150-<167 (35-38/wk)	0	0	9	4	2	2	1	18
(4) 167-<180 (39-41/wk)	0	0	2	180	40	2	1	225
(5) 180-<193 (42-45/wk)	0	1	0	53	126	28	4	212
(6) 193-<215 (45-49/wk)	0	0	0	11	24	93	23	151
(7) 215+ (50+/wk)	0	0	0	4	3	14	104	125
Total	0	1	11	252	195	139	133	731

PERS1

	Average Monthly Hours: AFC Period							Total
	(1) <128 (15-29/wk)	(2) 128-149 (30-34/wk)	(3) 150-166 (35-38/wk)	(4) 167-179 (39-41/wk)	(5) 180-192 (42-45/wk)	(6) 193-214 (45-49/wk)	(7) 215+ (50+/wk)	
Average Hours: Pre-AFC								
(1) <128 (15-29/wk)	125	22	8	8	1	0	0	164
(2) 128-149 (30-34/wk)	37	110	23	17	3	0	0	190
(3) 150-166 (35-38/wk)	9	35	161	95	7	0	2	309
(4) 167-179 (39-41/wk)	7	28	104	2275	81	6	3	2504
(5) 180-192 (42-45/wk)	0	1	6	127	117	36	4	291
(6) 193-214 (45-49/wk)	0	0	2	12	31	43	8	96
(7) 215+ (50+/wk)	0	0	0	3	2	7	11	23
Total	178	196	304	2537	242	92	28	3577

Exhibit E13, continued

PERS2

Average Monthly Hours: AFC Period

	(1) <128 (15-29/wk)	(2) 128-149 (30-34/wk)	(3) 150-166 (35-38/wk)	(4) 167-179 (39-41/wk)	(5) 180-192 (42-45/wk)	(6) 193-214 (45-49/wk)	(7) 215+ (50+/wk)	Total
Average Hours: Pre-AFC								
(1) <128 (15-29/wk)	147	20	13	11	2	0	0	193
(2) 128-149 (30-34/wk)	22	48	22	27	3	2	0	124
(3) 150-166 (35-38/wk)	9	36	260	146	8	0	1	460
(4) 167-179 (39-41/wk)	16	53	217	3983	195	20	3	4487
(5) 180-192 (42-45/wk)	0	3	15	295	279	54	5	651
(6) 193-214 (45-49/wk)	0	1	2	26	71	85	17	202
(7) 215+ (50+/wk)	0	0	0	5	10	12	38	65
Total	194	161	529	4493	568	173	64	6182

SERS2

Average Monthly Hours: AFC Period

	(1) <128 (15-29/wk)	(2) 128-149 (30-34/wk)	(3) 150-166 (35-38/wk)	(4) 167-179 (39-41/wk)	(5) 180-192 (42-45/wk)	(6) 193-214 (45-49/wk)	(7) 215+ (50+/wk)	Total
Average Hours: Pre-AFC								
(1) <128 (15-29/wk)	262	35	5	1	0	0	0	303
(2) 128-149 (30-34/wk)	81	132	33	7	1	0	0	254
(3) 150-166 (35-38/wk)	3	26	108	17	0	0	0	154
(4) 167-179 (39-41/wk)	1	4	18	305	17	1	1	347
(5) 180-192 (42-45/wk)	0	1	2	24	20	4	0	51
(6) 193-214 (45-49/wk)	1	0	0	3	1	1	0	6
(7) 215+ (50+/wk)	0	0	0	0	0	0	0	0
Total	348	198	166	357	39	6	1	1115

TRS1

Average Monthly Hours: AFC Period

	(1) <128 (15-29/wk)	(2) 128-149 (30-34/wk)	(3) 150-166 (35-38/wk)	(4) 167-179 (39-41/wk)	(5) 180-192 (42-45/wk)	(6) 193-214 (45-49/wk)	(7) 215+ (50+/wk)	Total
Average Hours: Pre-AFC								
(1) <128 (15-29/wk)	42	15	6	0	0	0	1	64
(2) 128-149 (30-34/wk)	40	386	263	9	3	4	2	707
(3) 150-166 (35-38/wk)	21	272	541	93	14	2	5	948
(4) 167-179 (39-41/wk)	0	11	46	113	20	3	5	198
(5) 180-192 (42-45/wk)	0	0	8	13	16	5	3	45
(6) 193-214 (45-49/wk)	0	0	0	3	0	2	0	5
(7) 215+ (50+/wk)	0	0	0	0	0	0	1	1
Total	103	684	864	231	53	16	17	1968

Exhibit E13, continued

TRS2

Average Monthly Hours: AFC Period

	(1) <128 (15-29/wk)	(2) 128-149 (30-34/wk)	(3) 150-166 (35-38/wk)	(4) 167-179 (39-41/wk)	(5) 180-192 (42-45/wk)	(6) 193-214 (45-49/wk)	(7) 215+ (50+/wk)	Total
Average Hours: Pre-AFC								
(1) <128 (15-29/wk)	29	20	1	0	0	0	0	50
(2) 128-149 (30-34/wk)	28	302	20	2	0	1	0	353
(3) 150-166 (35-38/wk)	1	68	54	5	0	0	0	128
(4) 167-179 (39-41/wk)	0	5	5	12	1	1	0	24
(5) 180-192 (42-45/wk)	0	0	1	0	0	0	0	1
(6) 193-214 (45-49/wk)	0	1	0	0	0	0	0	1
(7) 215+ (50+/wk)	0	0	0	1	0	0	0	1
Total	58	396	81	20	1	2	0	558

LEOFF2 Retiree Detail

This section provides additional detail for LEOFF2 retirees. Exhibit E14 summarizes variation in hours across OSA categories (law enforcement and firefighter classifications).

Exhibit E14

LEOFF2 Retirees: Average Monthly Hours Before and During AFC Period

Retirements from January 2009 to June 2011

	N	Avg Hrs Pre-AFC	Avg Hours AFC	Std Dev AFC Avg
All LEOFF2	731	195.4	194.9	26.1
OSA Category				
Law Enforcement Officer 1st Class City	125	184.90	183.46	13.24
Law Enforcement Officer Other City	174	185.50	184.30	13.98
Sheriff or Deputy Sheriff	136	184.28	183.84	17.13
Fire Fighter 1st Class City	102	209.26	208.08	20.95
Fire Fighter Other City	171	213.15	214.38	34.39

Note: AFC period includes the 60 months prior to retirement. Other OSA categories (not reported here due to small n) include fire fighter other (Port Authority), university police officer, port police officer, fish and wildlife enforcement officer.

We typically do not observe increases in overall average hours, as reported to DRS, during the AFC period. Some members, however, do increase hours significantly (Exhibit E15, next page).

Exhibit E15
LEOFF2 Retirees: Pre-AFC to AFC Gain/Loss in Average Hours
Retirements from January 2009 to June 2011

	Gain/Loss in Average Hours Per Month (% of Retirees)				n
	<-2	-2 to <2	2 to <10	10+	
All LEOFF2	36.39	31.46	20.52	11.63	731
OSA Category					
Law Enforcement Officer 1st Class City	40.8	37.6	16.8	4.8	125
Law Enforcement Officer Other City	35.6	36.8	23.6	4.0	174
Sheriff or Deputy Sheriff	33.8	33.1	23.5	9.6	136
Fire Fighter 1st Class City	29.4	32.4	27.5	10.8	102
Fire Fighter Other City	38.6	21.6	15.2	24.6	171

Note: Other OSA categories (not reported here due to small n) include fire fighter other (Port Authority), university police officer, port police officer, fish and wildlife enforcement officer.

E3. STYLIZED EXAMPLES OF THE IMPACT OF OVERTIME

Stylized Example (1)

This example illustrates the fiscal implications of increased hours worked during the AFC period and the strong incentives to working more at the end of a career. It also demonstrates that the costs of the resulting extra pension benefits are not fully covered by worker or employer contributions.

Exhibit E16
Stylized Example Assumptions

Growth in nominal earnings	3%
Regular hours per year	2080
Worker 1 overtime	0 hours
Worker 2 overtime	0 hours for years 1 - 25, 250 hours per year during last 5 years (roughly 5 hours OT per week)
AFC Period	5 years
Years of service	30
Years of retirement	19 (life expectancy of 84, age of retirement 65)
Pension benefit	$30 \times 0.02 \times \text{AFC}$
Contribution rates	
Member	4.6%
Employer	7.0%
Growth rate for value of contributions	7.9%
Discount rate	
Member perspective	$1\% = 1.04/1.03$
Employer perspective	$4.76\% = 1.079/1.03$
COLA	3%

Exhibit E17
Illustration of Late-career Salary Increases: Stylized Example (1)

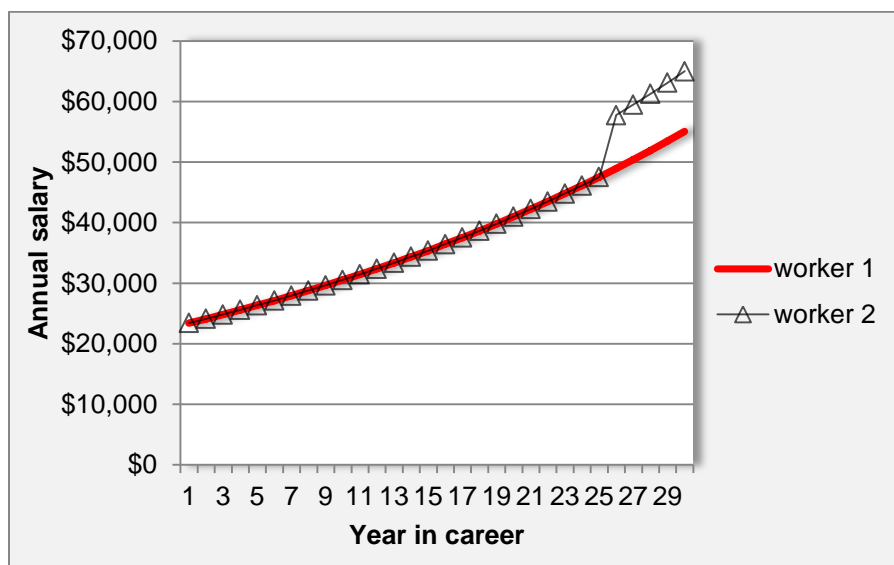


Exhibit E18
Summary of Impact of Stylized Example (1)

	Worker 1	Worker 2
AFC	\$51,967	\$61,337
Annual Pension Benefit	\$31,180	\$36,802
PDV of Pension Benefits	\$537,116	\$633,951
Value of worker contributions at retirement	\$161,721	\$164,234
Value of employer contributions	\$246,098	\$249,921
Total contribution value at retirement	\$407,819	\$414,154
Extra contribution by Worker 2		\$2,512
Extra contribution by Employer 2		\$3,823
Total extra contributions		\$6,335
PDV of extra pension benefit (gain)		\$96,836

Worker 2 contributes an extra \$2,500 to the system and gets an extra \$97,000 in expected pension benefits. The worker and employer contributions combined cover only a small portion of the gain in benefits.

Stylized Example (2)

This example demonstrates that a constant level of overtime increases pension benefit, but in this case the cost of the extra benefit is largely borne by worker and employer contributions.

All parameters are the same as in Example (1), except that Worker 2 works 250 overtime hours throughout their career.

Exhibit E19
Illustration of Career-long Salary Growth: Stylized Example (2)

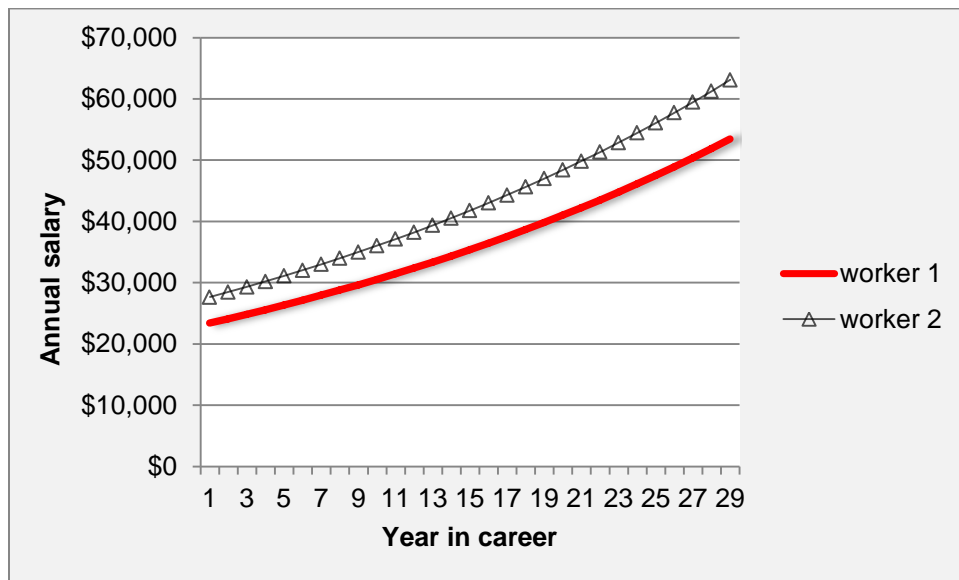


Exhibit E20
Summary of Impact of Stylized Example (2)

	Worker 1	Worker 2
AFC	\$51,967	\$61,337
Annual Pension Benefit	\$31,180	\$36,802
PDV of Pension Benefits	\$537,116	\$633,951
Value of worker contributions at retirement	\$161,721	\$190,878
Value of employer contributions	\$246,098	\$290,467
Total contribution value at retirement	\$407,819	\$481,345
Extra contribution by Worker 2		\$29,157
Extra contribution by Employer 2		\$44,369
Total extra contributions		\$73,525
PDV of extra pension benefit (gain)		\$96,836

In this case, Worker 2 still receives an additional \$97,000 in NPV of pension benefit. The worker and employer, in this example, pay for much of the cost of the benefit increase.

E4. TEST FOR HOURS INCREASES RELATED TO PENSION RULE INCENTIVES: PERS 1, 2, AND 3

Among recent retirees in Washington's state pension systems, monthly hours tend to be stable throughout a worker's tenure, although there is a tendency for them to decline closer to retirement. In all of Washington's state-administered public pension systems, average monthly hours are not systematically higher during AFC periods.

As demonstrated earlier, some employees—23%—do work longer hours during AFC periods; three percent work more than 20 additional hours per month, in comparison with the pre-AFC period. Most (77%) work less or the same amount.

We do observe substantial AFC-period hour gains among some workers. But, it is not clear whether these gains are due to increased job responsibilities versus behavior intended to increase pensions. The following regression analysis attempts to gauge the extent to which pension plan rules—the time period included in AFC calculations—affect hours worked.

We exploit the 'natural experiment' that arises from differences in AFC periods across PERS1 (2 years) and PERS2/3 (5 years) plans. PERS1 members have an incentive to increase hours worked during the last 24 months prior to retirement. PERS2 members have an incentive to increase hours during the last 60 months prior to retirement. Importantly, from 60 to 24 months prior to retirement, the incentives operate only on PERS2/3 members. The regression analyses presented below estimate the extent to which hours deviate from trend during the 60 to 24 month period prior to retirement for PERS1 versus PERS2/3 members. We would expect hours gains to be higher during this period for PERS 2/3 members. Higher gains would indicate that members were responding to pension benefit incentives.

Fixed effects models were estimated. These models derive estimates by examining changes in hours over time for individual members. The method effectively controls for observed and unobserved member characteristics that do not change over time. Models with different functional forms were examined.

We first estimated a set of fixed effect regression models for all PERS retirees. We then estimated the same models focusing on employer groups within PERS where there appears to be more opportunity for overtime.

Regressions for All PERS Members

Observations include PERS1, 2 and 3 members retiring between January 2009 and June 2012.

The dependent variable is monthly hours worked.

Independent variables include:

Time (month 1 to 120)

Time squared

D60p1 (dummy variable = 1 in months 60 to 24 prior to retirement for PERS1 retirees, 0 otherwise)

D60p23 (dummy variable = 1 in months 60 to 24 prior to retirement for PERS2/3 retirees, 0 otherwise)

The difference in the estimated coefficients for D60p23 and D60p1 provide a measure of how hours respond to pension incentives.

Five models with different functional forms are estimated.

Model 1: Includes only the test period dummies (D60pi, D60p23).

Model 2: Adds a simple time trend (Time).

Model 3: Adds a nonlinear time trend (Time and Time squared).

Model 4: Allows the time trend coefficients to differ for PERS1 versus PERS2/3 members.

Model 5: Allows all estimated coefficients to vary for PERS1 versus PERS2/3 members (by estimating separate regressions for the plans).

Exhibit E21
Regression Models for All PERS Members

	Model 1		Model 2		Model 3		Model 4	
N	1,084,566		1,084,566		1,084,566		1,084,566	
R-Square	0.528		0.529		0.529		0.530	
Independent Variables								
Parameter	Estimate	t Value	Estimate	t Value	Estimate	t Value	Estimate	t Value
Time			-0.021	-42.680	0.035	16.110	0.047	17.030
TimeSquared					0.000	-26.240	-0.001	-27.460
D60p1	0.615	11.190	1.139	20.250	0.614	10.280	0.629	9.380
D60p23	0.818	19.380	1.360	30.860	0.833	17.210	0.827	16.000
Time*PERS1							-0.031	-6.840
TimeSquared*PERS1							0.000	10.780
Estimated Incentive Effect	0.20		0.22		0.22		0.20	

Model 5 (Separate PERS1 - PERS2/3 regressions)				
N	402,514		682,052	
R-Square	0.535		0.525	
	PERS1 Only		PERS2/3 Only	
Parameter	Estimate	t Value	Estimate	t Value
Time	0.016	4.380	0.047	17.110
Time Squared	0.000	-7.410	-0.001	-27.600
D60p1	0.629	9.300		
D60p23			0.827	16.080
Estimated Incentive Effect	0.20			

Implications for PERS2/3 Costs

The difference in the estimated coefficients for D60p23 and D60p1 suggest that PERS2/3 retirees, as a whole, increased monthly hours marginally in response to pension incentives—an average increase of 0.21 hours per month.

What does this modest increase in hours imply for PERS 2/3 pension costs? By assuming a wage rate of \$28 per hour, the annual AFC increases by about \$70 and lifetime pension benefits increase by about \$520.

Impact on monthly AFC (@ \$28 per hour)	\$5.88
Impact on annual AFC	\$70.56
Impact on Annual Pension Benefit	\$42.34
NPV of Pension Benefit Stream	\$522

Assumptions: 30 years of service, discount rate of 4.76%,
19 years of retirement

We would expect the incentive effect to be greater among employers where overtime is more prevalent. We did not, however, find this to be the case; calling into question the robustness of our test.

Employer Group Analysis

We identified employer groups where there appears to be more opportunity for overtime by examining 3 factors:

- (1) 'Normal' hours
- (2) Average hours per month
- (3) Variation in hours per month

Normal Hours. First, we examined the frequency distribution of monthly hours among PERS members. Most members work between 160 and 184 hours per month; 69% of monthly hours fall in this range, which corresponds to 37 - 42 hours per week. We looked for employers where larger shares of employees worked hours outside of the normal range.

Average Hours. Second, we examined the average hours per month across employers, looking for those with relatively high average monthly hours.

Variation in Hours. Third, we looked for employers with wide variation in hours worked among their employees.

Through these criteria, we identified the following employer groups within PERS where there appears to be greater opportunity for overtime. We estimated the regression models for these groups.

- Non-state agencies
 - Public Utility Districts (PUDs)
 - Ports
- State agencies
 - Department of Corrections
 - Department of Transportation (includes ferries)
 - Department of Agriculture
 - Eastern State Hospital

Regression for Public Utility Districts and Ports Retirees

The average estimated impact incentive effect is 0.63 hours per month across PUD and Ports workers. Estimates in this case, however, are sensitive to functional form.

Exhibit E22
Regression Models for PUD and Ports in PERS

	Model 1		Model 2		Model 3		Model 4	
N	58,011		58,011		58,011		58,011	
R-Square	0.405		0.405		0.406		0.406	
Independent Variables								
Parameter	Estimate	t Value	Estimate	t Value	Estimate	t Value	Estimate	t Value
Time			-0.010	-3.580	0.102	7.980	0.136	8.900
TimeSquared					-0.001	-9.000	-0.001	-9.920
D60p1	1.037	2.850	1.303	3.510	0.240	0.620	0.936	2.100
D60p23	2.061	8.720	2.330	9.400	1.264	4.600	0.971	3.360
Time*PERS1							-0.113	-4.050
TimeSquared*PERS1							0.001	4.340
Estimated Incentive Effect								
	1.02		1.03		1.02		0.04	

Model 5 (separate PERS1 - PERS2/3 regressions)				
N	17,166		40,845	
R-Square	0.341		0.424	
	PERS1 Only		PERS2/3Only	
Parameter	Estimate	t Value	Estimate	t Value
Time	0.022	1.050	0.136	8.560
TimeSquared	-0.0002	-1.400	-0.001	-9.530
D60p1	0.936	2.340		
D60p23			0.971	3.230
Estimated Incentive Effect			0.04	

Regression for Selected State Agencies: Corrections, Transportation, Agriculture, and Eastern State Hospital

These agencies were selected because their employees appear to have more opportunity to engage in overtime. We expect hour gains to be greater for these retirees. In fact, the regression estimates suggest that PERS2/3 retirees from these agencies had relatively large hour gains during the 60 to 24 months prior to retirement. However, similar gains were also observed for the PERS1 retirees among these employers. The regressions, therefore, did not provide strong evidence of a response to pension incentives.

Exhibit E23
Regression Models for Selected State Agencies

	Model 1		Model 2		Model 3		Model 4	
N	108,217		108,217		108,217		108,217	
R-Square	0.401		0.402		0.402		0.403	
Independent Variables								
Parameter	Estimate	t Value	Estimate	t Value	Estimate	t Value	Estimate	t Value
Time			-0.021	-12.980	0.054	7.500	0.073	8.420
TimeSquared					-0.001	-10.690	-0.001	-11.770
D60p1	1.246	6.420	1.771	8.940	1.074	5.150	1.262	5.330
D60p23	1.283	9.560	1.831	13.020	1.129	7.280	1.044	6.370
Time*PERS1							-0.060	-3.880
TimeSquared*PERS1							0.001	5.170
Estimated Incentive Effect	0.04		0.06		0.05		-0.22	

Model 5 (separate PERS1- PERS2/3 regressions)				
N	34,975		73,242	
R-Square	0.338		0.428	
	PERS1 Only		PERS2/3 Only	
Parameter	Estimate	t Value	Estimate	t Value
Time	0.014	1.090	0.073	8.350
TimeSquared	-0.0002	-1.870	-0.001	-11.680
D60p1	1.262	5.420		
D60p23			1.044	6.320
Estimated Incentive Effect			-0.22	

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