

# BAS 2018 Aon Case Competition

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# Background and Case Objective

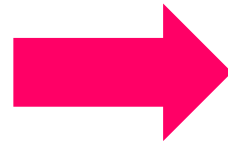
Status  
Assumptions

Social Security

Healthcare Costs

Tax Reform

Retirement Trends



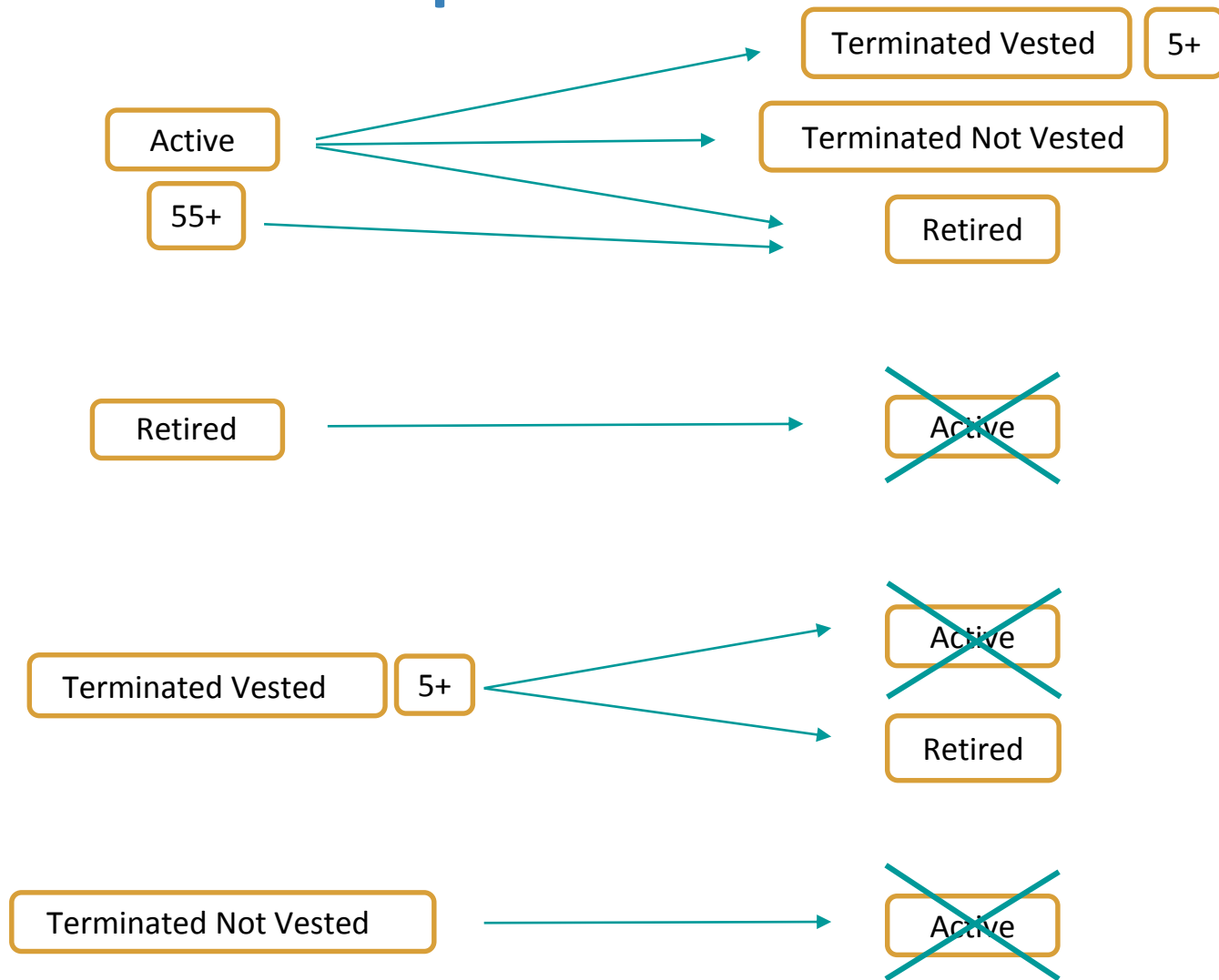
2018 Assumptions

Active Retirement  
Rate

Terminated  
Vested Retirement  
Rate

Active Termination  
Rate

# Status Assumptions



# Overview

## Data

- Membership records (2012-17)
- Retirement and Termination Data

## Calculations

- Actual Retirement and Termination Rates
- Actuarial Gains and Losses

## Projections

- Retirement Trends
- 2018 Assumptions
- Cost Implications

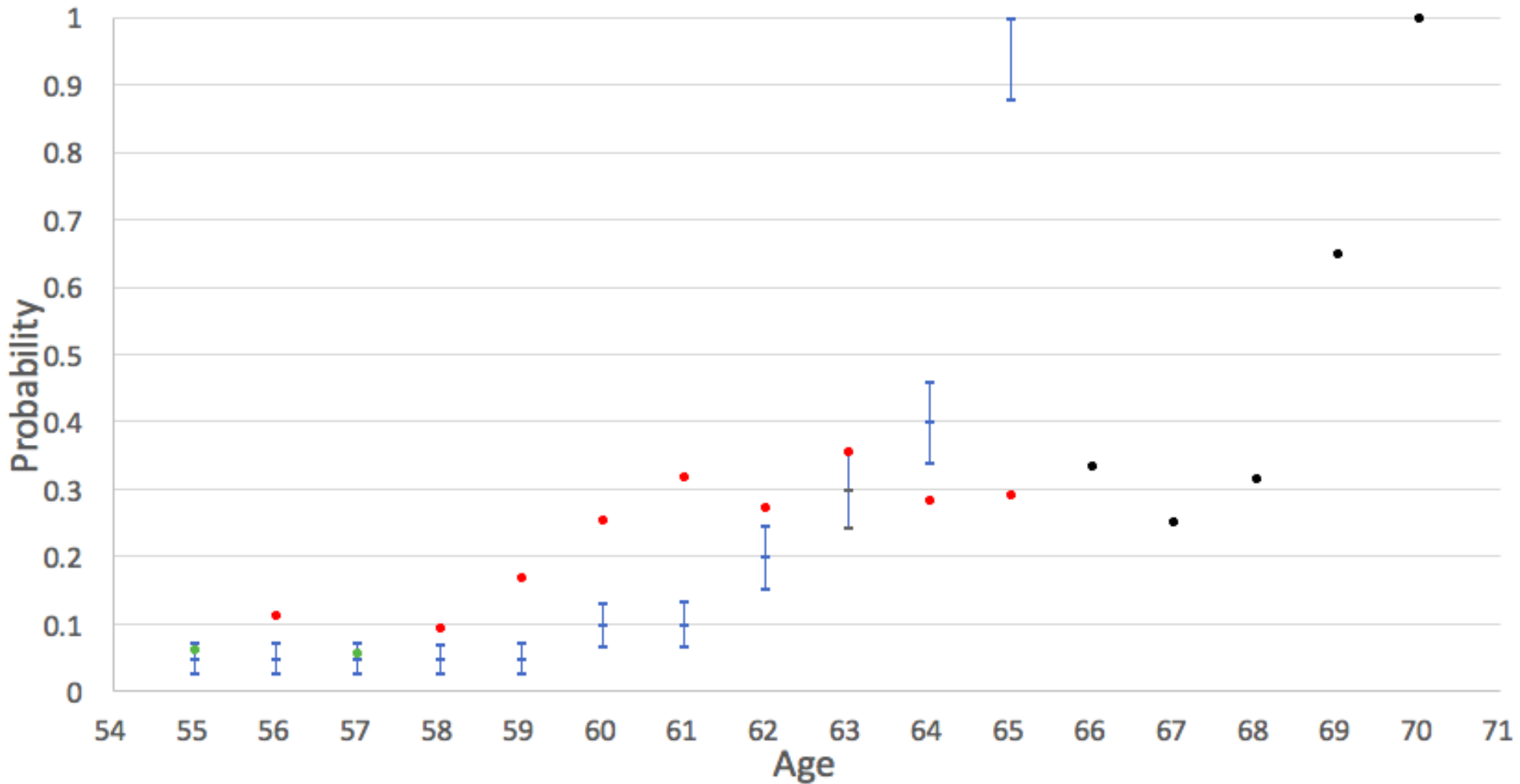
# Methodology in Calculations

$$\text{Rate} = \frac{\text{Decrement}}{\text{Exposure}}$$



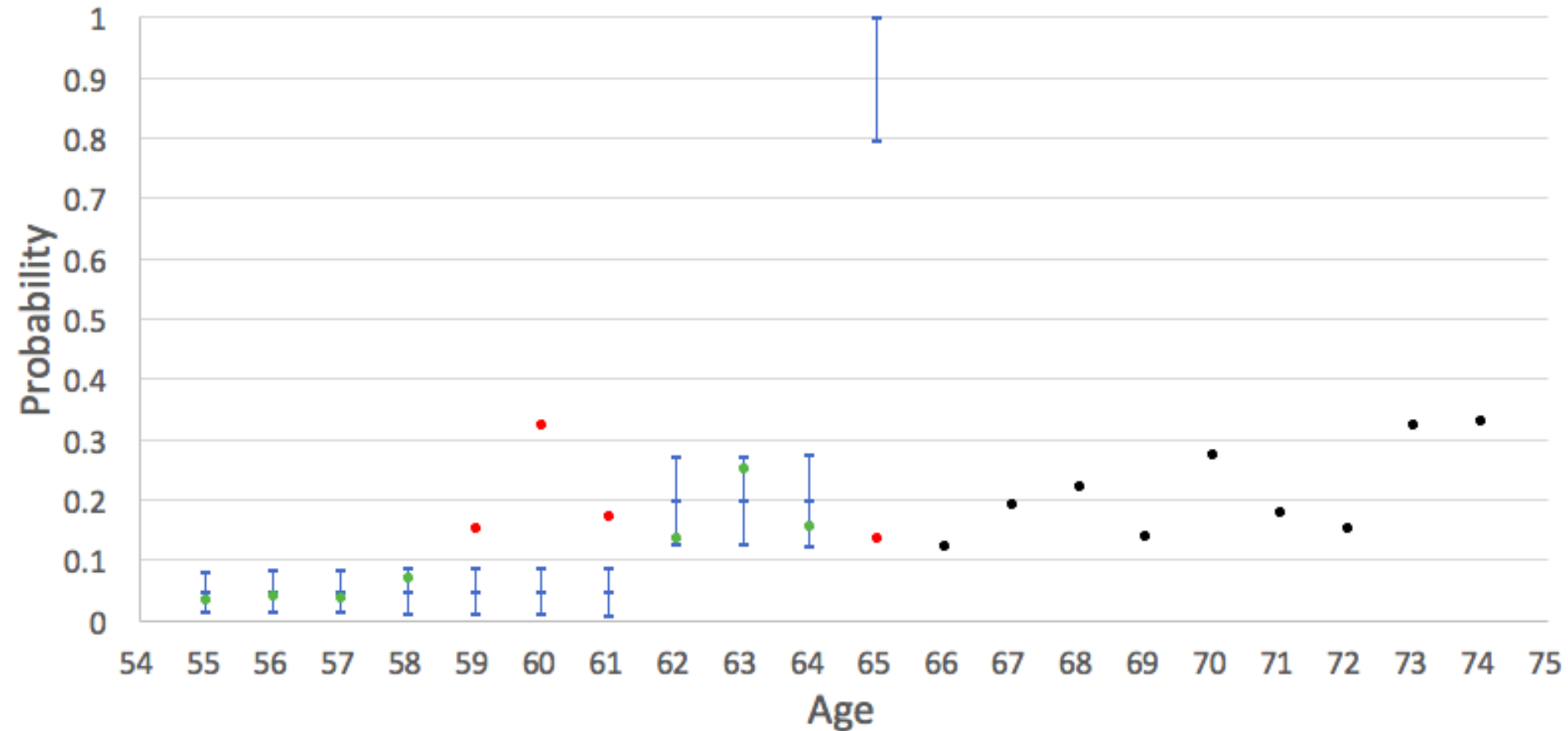
# Experience Study

# Total Active Retirement Experience



- Green = Actual in CI
- Red = Actual outside CI
- Black = Actual with no assumption

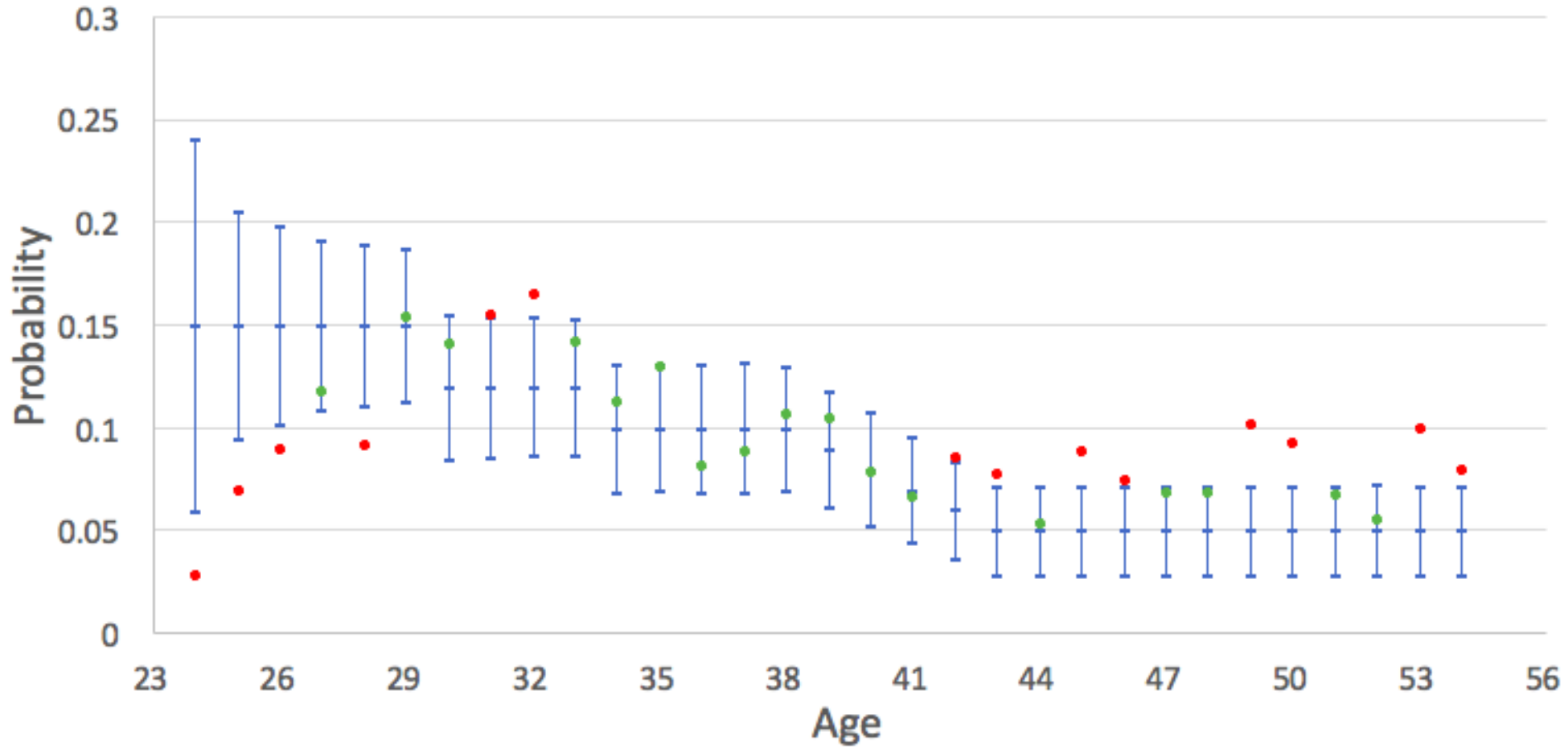
# Total Terminated Vested Retirement Experience



- Green = Actual in CI
- Red = Actual outside CI
- Black = Actual with no assumption



# Total Active Termination Experience



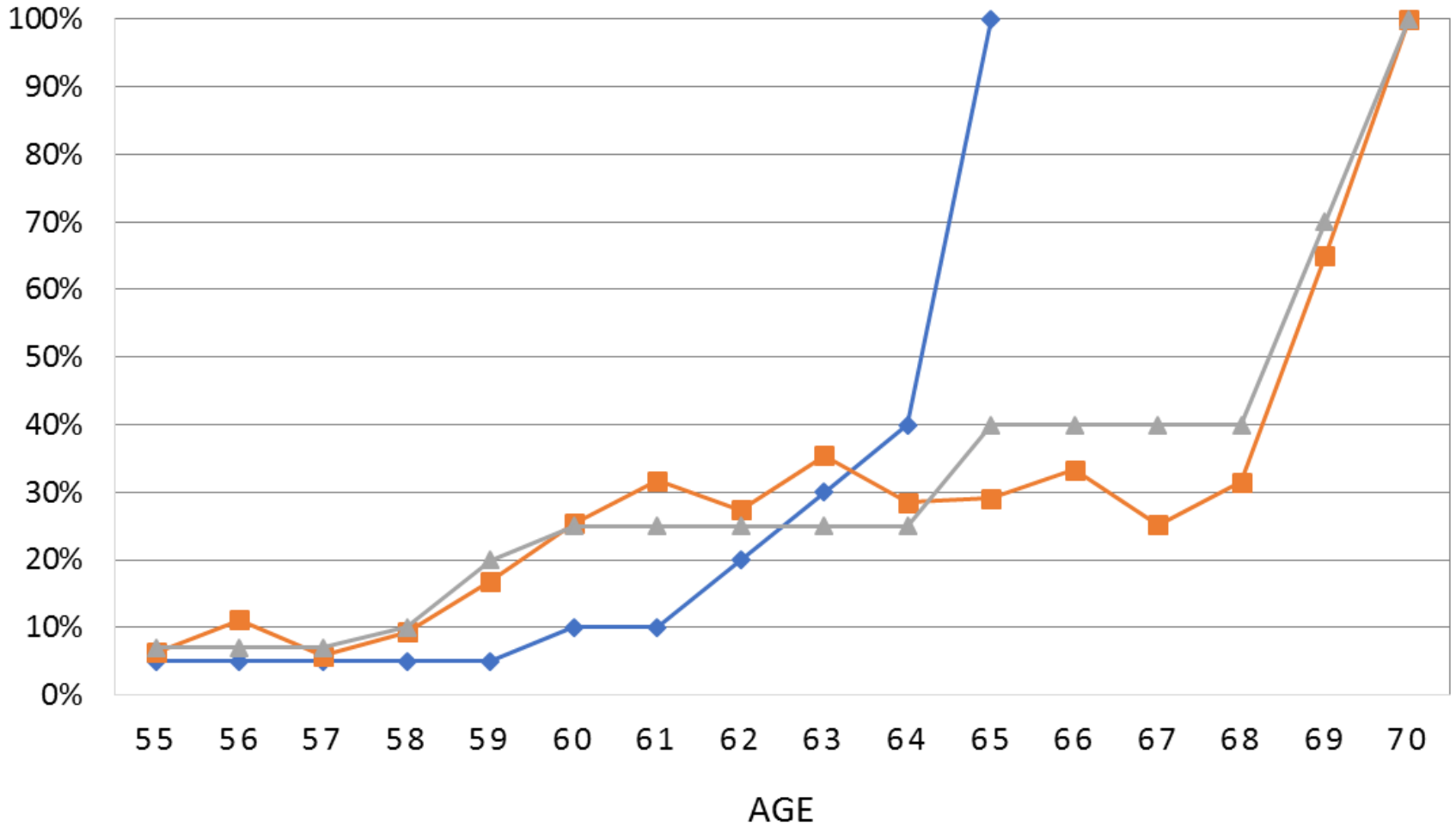
- Green = Actual in CI
- Red = Actual outside CI
- Black = Actual with no assumption



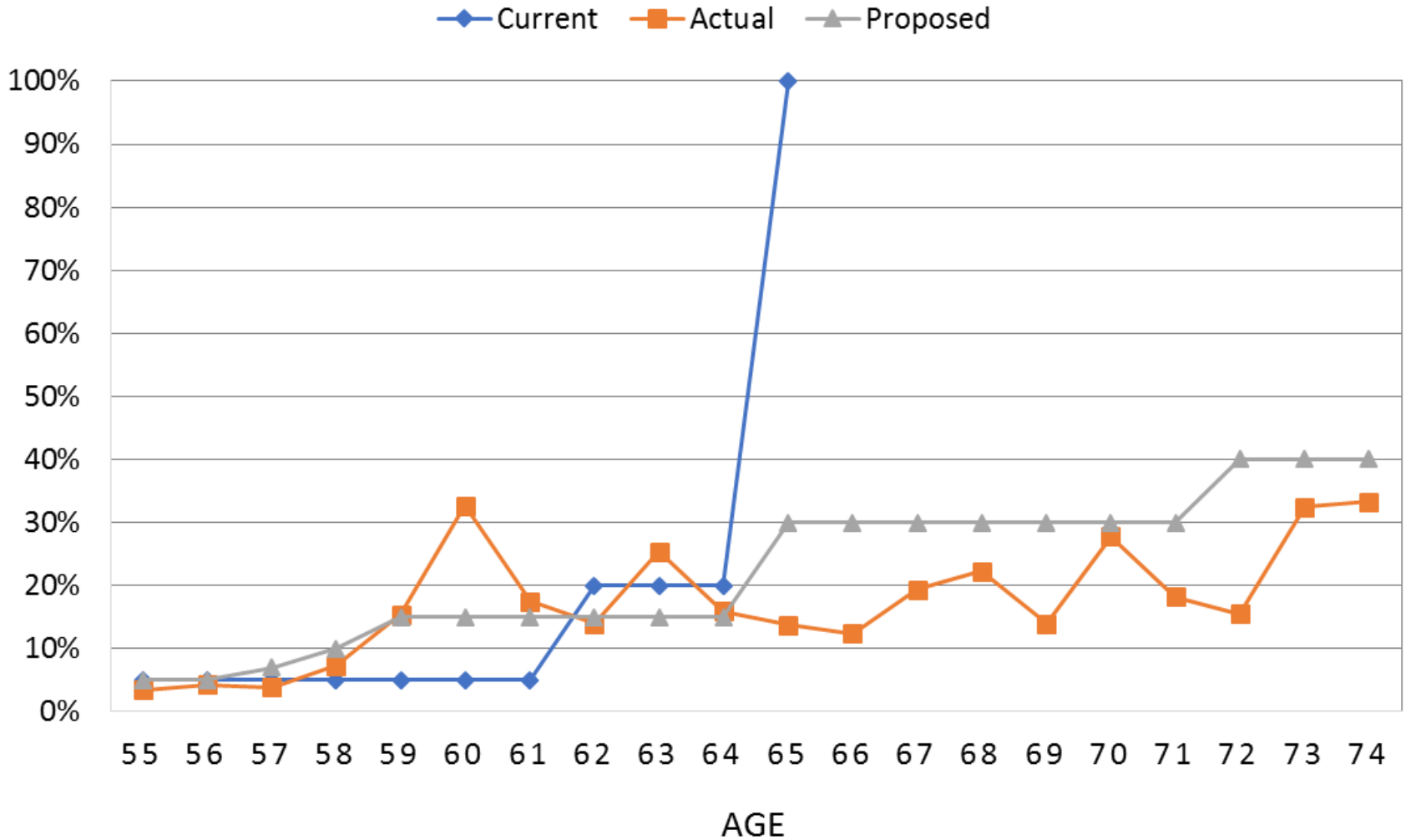
# Proposed Assumptions

# ACTIVE RETIREMENT RATES

◆ Current    ■ Actual    ▲ Proposed

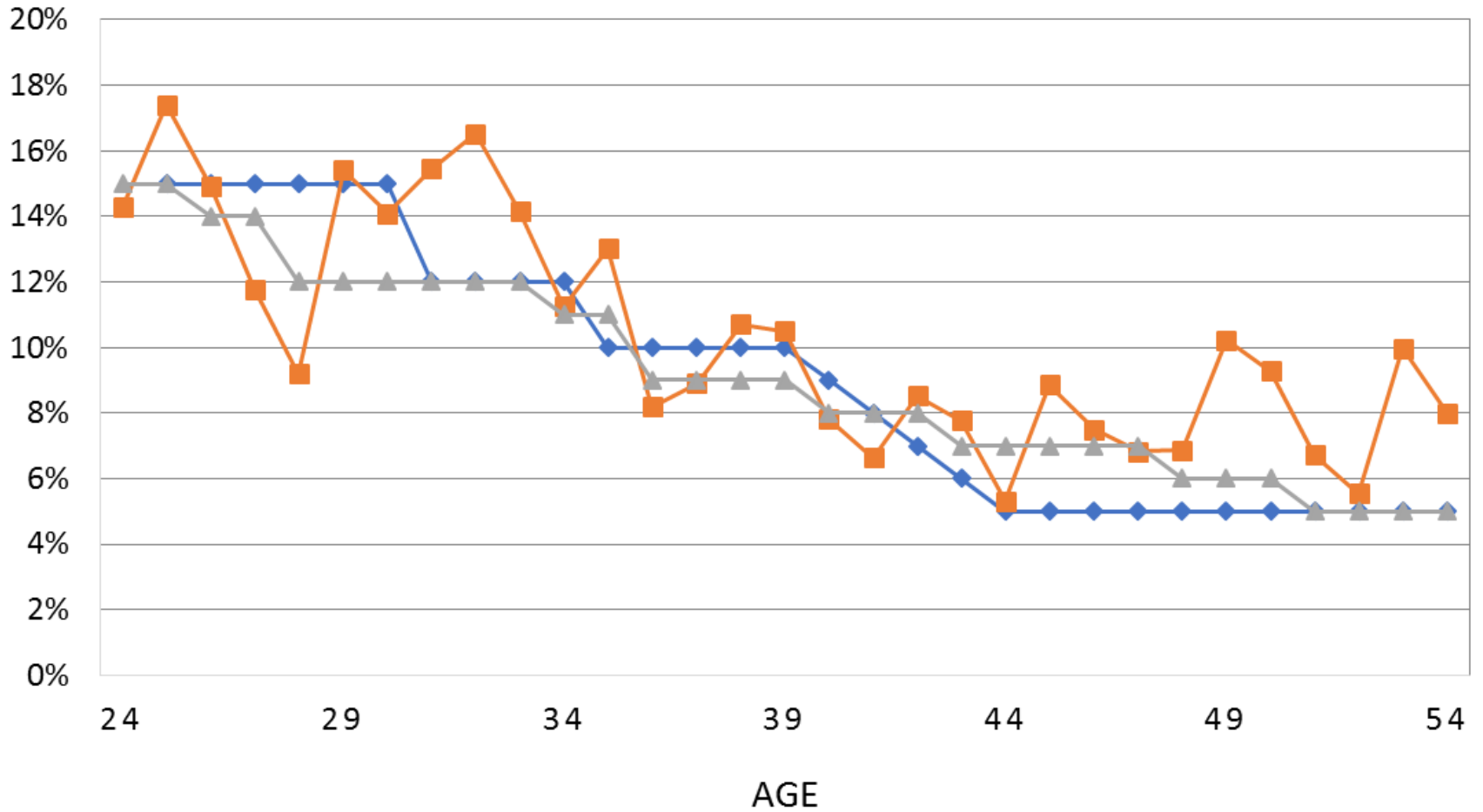


# TERMINATED VESTED RETIREMENT RATES



# ACTIVE TERMINATION RATES

◆ Current    ■ Actual    ▲ Proposed





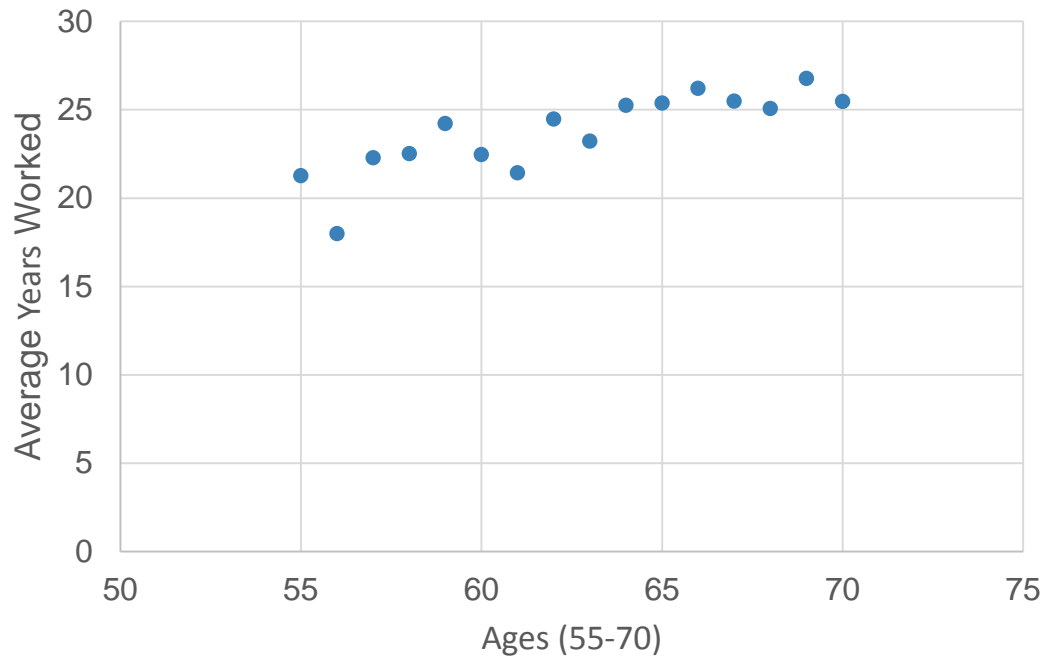
# Preliminary Data Analysis for Cost Implications

# Early Retirement Benefit

Age	Benefit (YOS = Years of Service)
55	550 x YOS
56	575 x YOS
57	600 x YOS
58	625 x YOS
59	650 x YOS
60	675 x YOS
61	700 x YOS
62	725 x YOS
63	750 x YOS
64	775 x YOS

# Years of Service: Active to Retired

Active to Retired:  
Overall Average Years Worked

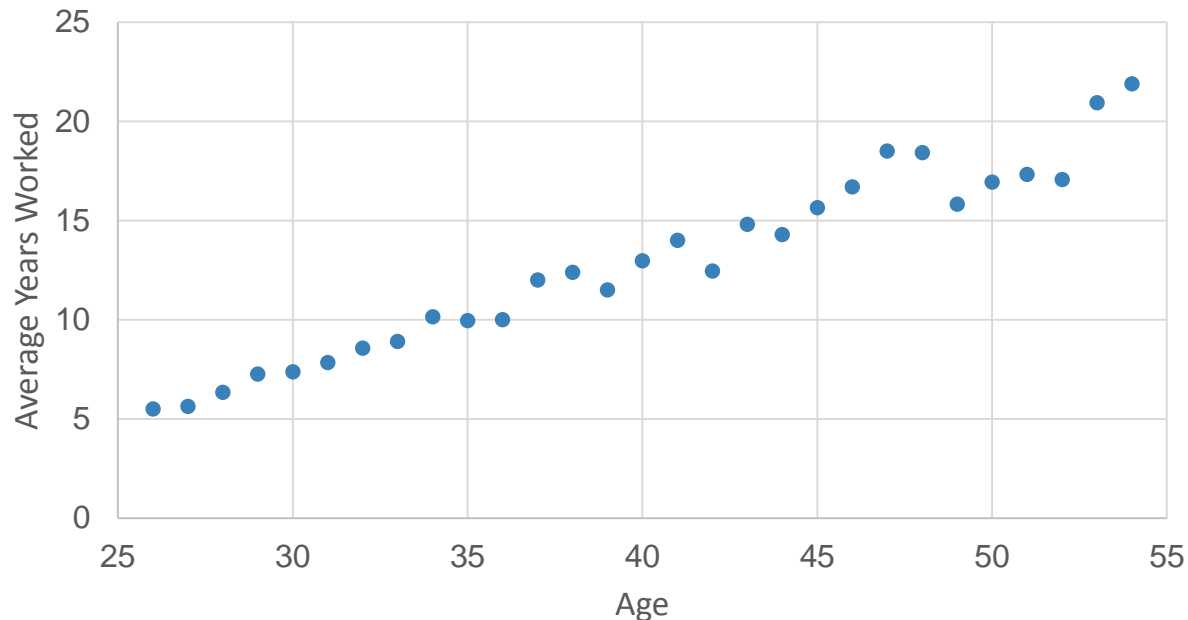


Age	Estimated YOS
55	19
56	20
57	21
58	21
59	22
60	22
61	22
62	23
63	23
64	24
65	24
66	25
67	25
68	26
69	26
70	27



# Years of Service: Active to Terminated Vested

Active to TV:  
Overall Average Years Worked

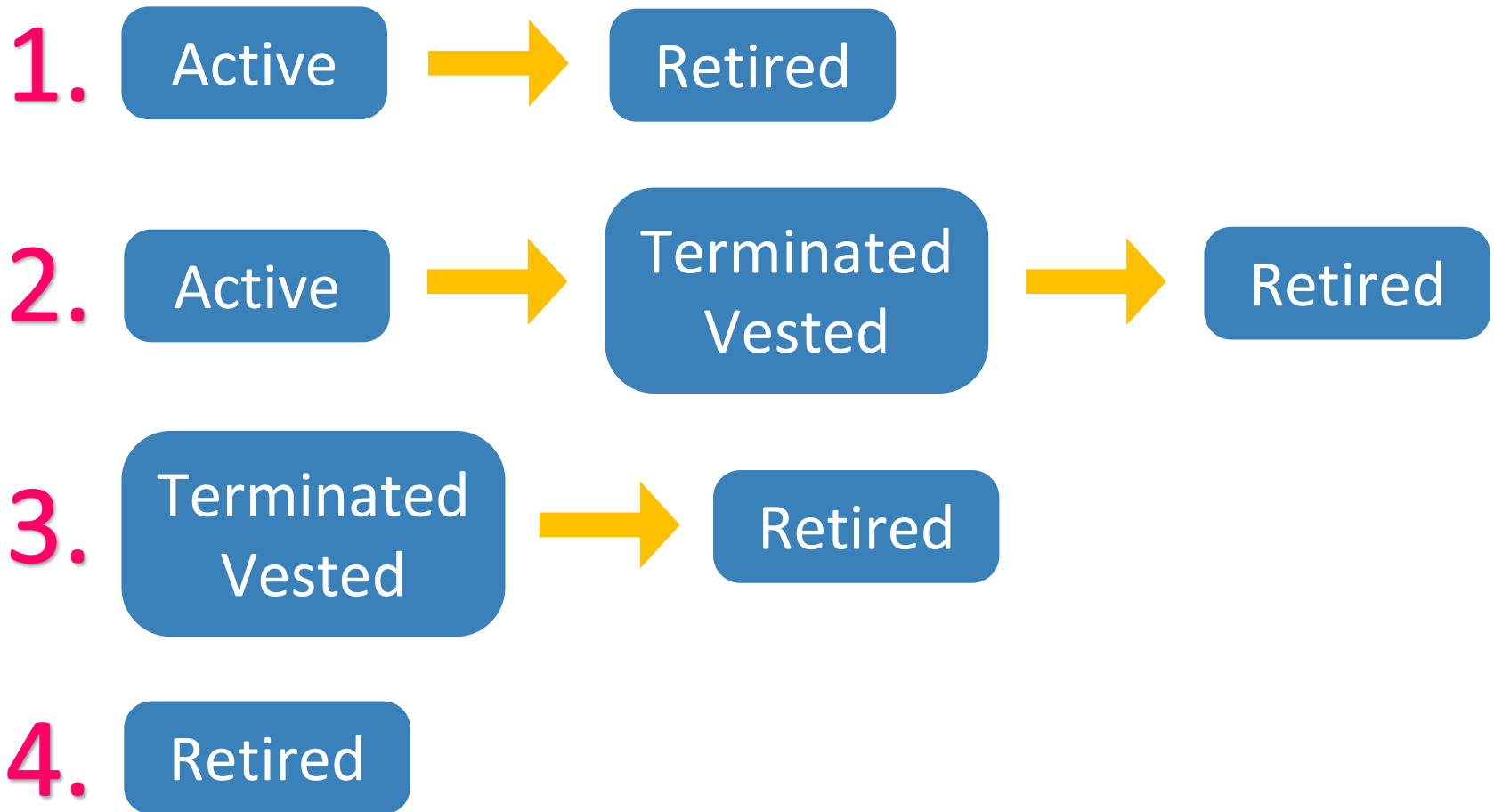


Age	Estimated YOS
25	5
26	5
27	5
28	6
29	7
30	7
31	8
32	8
33	9
34	10
35	10
36	11
37	12
38	12
39	12
40	13
41	13
42	13
43	14
44	14
45	15
46	16
47	17
48	17
49	17
50	17
51	18
52	19
53	20
54	21



# Cost Implications

# Routes to Retirement



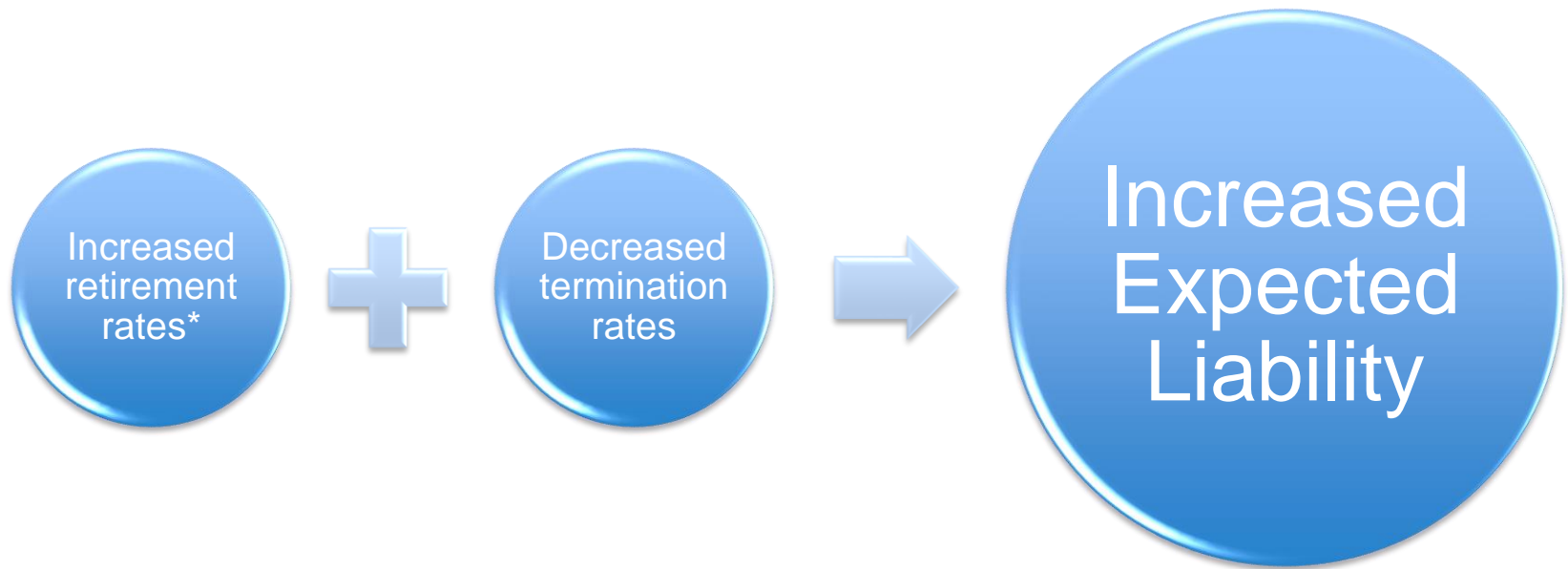
# Calculations

*Ex: Liability for active 25-year-olds who are never terminated and retire at age 65*

$y$  = number of active 25-year-old participants

$$\text{Obligation} = y \times (1-T_{25}) \times (1-T_{26}) \times \dots \times (1-T_{54}) \times (1-R_{55}) \times \dots \times (1-R_{64}) \times (R_{65}) \times YOS_{25} \times \text{benefit}_{65} \times (90-65)$$

# Qualitative Analysis



\* Assuming early retirement benefit is subsidized

# Shortcomings of Analysis

- Assumptions for age of death in determining end of benefits
- Calculated rates using same age group instead of following the same group of individuals
- Estimated reduced benefits for early retirement was not found actuarially

# Shortcomings of Analysis

- Gender and marital status was not given, so they were not considered
- Methodology in calculating cost would not have included time value of money

THANK YOU





# Appendix

# Proposed Assumptions

## Active Retirement Rates

Age	Proposed
55	7%
56	7%
57	7%
58	10%
59	20%
60	25%
61	25%
62	25%
63	25%
64	25%
65	40%
66	40%
67	40%
68	40%
69	70%
70	100%

## Terminated Vested Retirement Rates

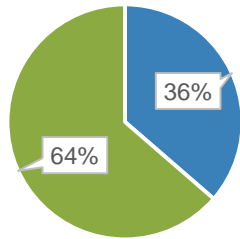
Age	Proposed
55	5%
56	5%
57	7%
58	10%
59	15%
60	15%
61	15%
62	15%
63	15%
64	15%
65	30%
66	30%
67	30%
68	30%
69	30%
70	30%
71	30%
72	40%
73	40%
74	40%

## Active Termination Rates

Age	Proposed
24	15%
25	15%
26	14%
27	14%
28	12%
29	12%
30	12%
31	12%
32	12%
33	12%
34	11%
35	11%
36	9%
37	9%
38	9%
39	9%
40	8%
41	8%
42	8%
43	7%
44	7%
45	7%
46	7%
47	7%
48	6%
49	6%
50	6%
51	5%
52	5%
53	5%
54	5%

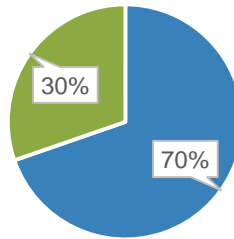
# Proportion of Vested to Not Vested Termination

Ages 25-29



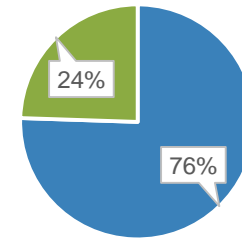
■ Vested ■ Not Vested

Ages 30-34



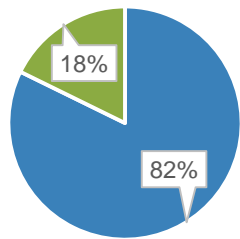
■ Vested ■ Not Vested

Ages 35-39



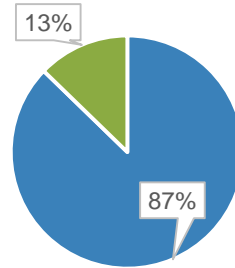
■ Vested ■ Not Vested

Ages 40-44



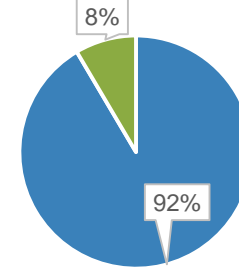
■ Vested ■ Not Vested

Ages 45-49



■ Vested ■ Not Vested

Ages 50-54



■ Vested ■ Not Vested