

11th Capacity Building Seminar on Retirement Benefits (11th CBRB) Gurgaon

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**Pension Plan Assumption Experience Studies (US):
Insights and Best Practices**

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Presentation Disclaimer

This presentation has been prepared for educational purposes only. Some of the methodologies we share here are based on our understanding of relevant US standard guidance for the topic and practices followed by actuaries. There could be multiple different scenarios that are possible in reality and this presentation do not cover all. Our intent is to introduce you to principles and advise you to apply your independent professional judgement.

Agenda

- Introduction to Assumption Experience Studies
- Key Assumptions in Pension Valuation
- Insights & Case Study: Turnover/Withdrawal Assumption
- Insights & Case Study: Compensation Growth Rate
- Challenges
- Open the floor for questions and discussion

Introduction to Assumption Experience Studies

Introduction to Assumption Experience Studies

WHAT is an Assumption Experience Study?



- Review the assumptions to better estimate the liabilities of a defined benefit plan.
- Compares actual plan experience with the assumptions made.
- To assess whether the actuarial assumptions used are still valid or needs to be updated.
- Helps identify trends, discrepancies and areas of adjustments.



Introduction to Assumption Experience Studies

WHY is it important?



Improved Financial Stability:

- More accurate liability estimates.
- Reduces the risk of plan underfunding or overfunding
- Lower experience gain/loss.



Better Decision-Making:

Helps plan sponsors adjust contributions or benefit structures based on more realistic assumptions



Enhanced Stakeholder Confidence:

Provides transparency and builds trust with auditors, plan participants, and regulators



Long-Term Plan Sustainability:

More likely, the pension plan will be able to meet future obligations in an efficient and sustainable way

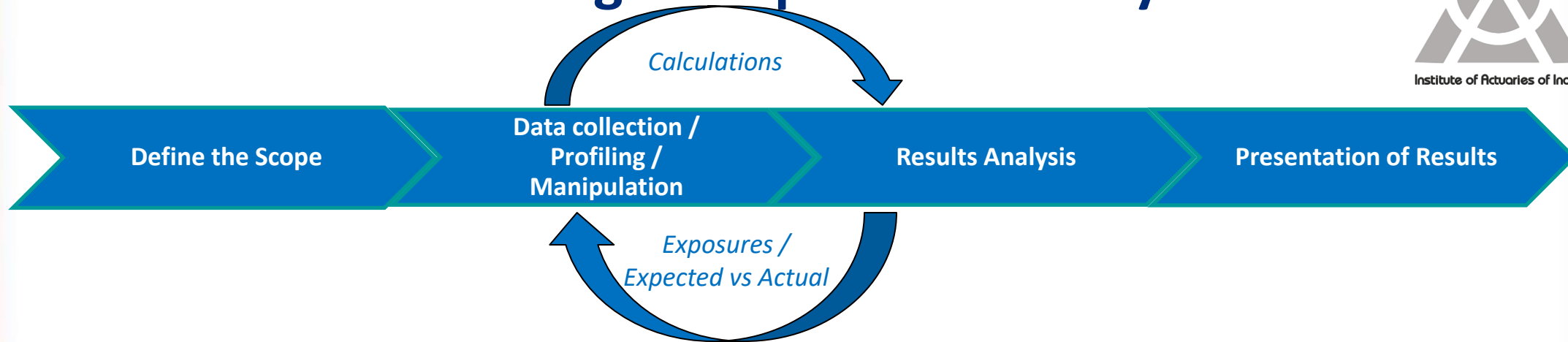


Regulatory Requirement:

Provide rationales for all significant assumptions used in the valuations



Process of Conducting an Experience Study



- Select assumptions that needs to be reviewed
- Assumptions that may be significant for one population may not be significant for another.
- Define Study Period - Depends on the availability of data & level of analysis required

- Gather historical plan data (e.g., member demographics, financial performance, retirement statistics)
- Ensure data accuracy and consistency across reporting periods.
- Use statistical models to analyze the collected data.
- Calculate exposures, expected & actual experience.

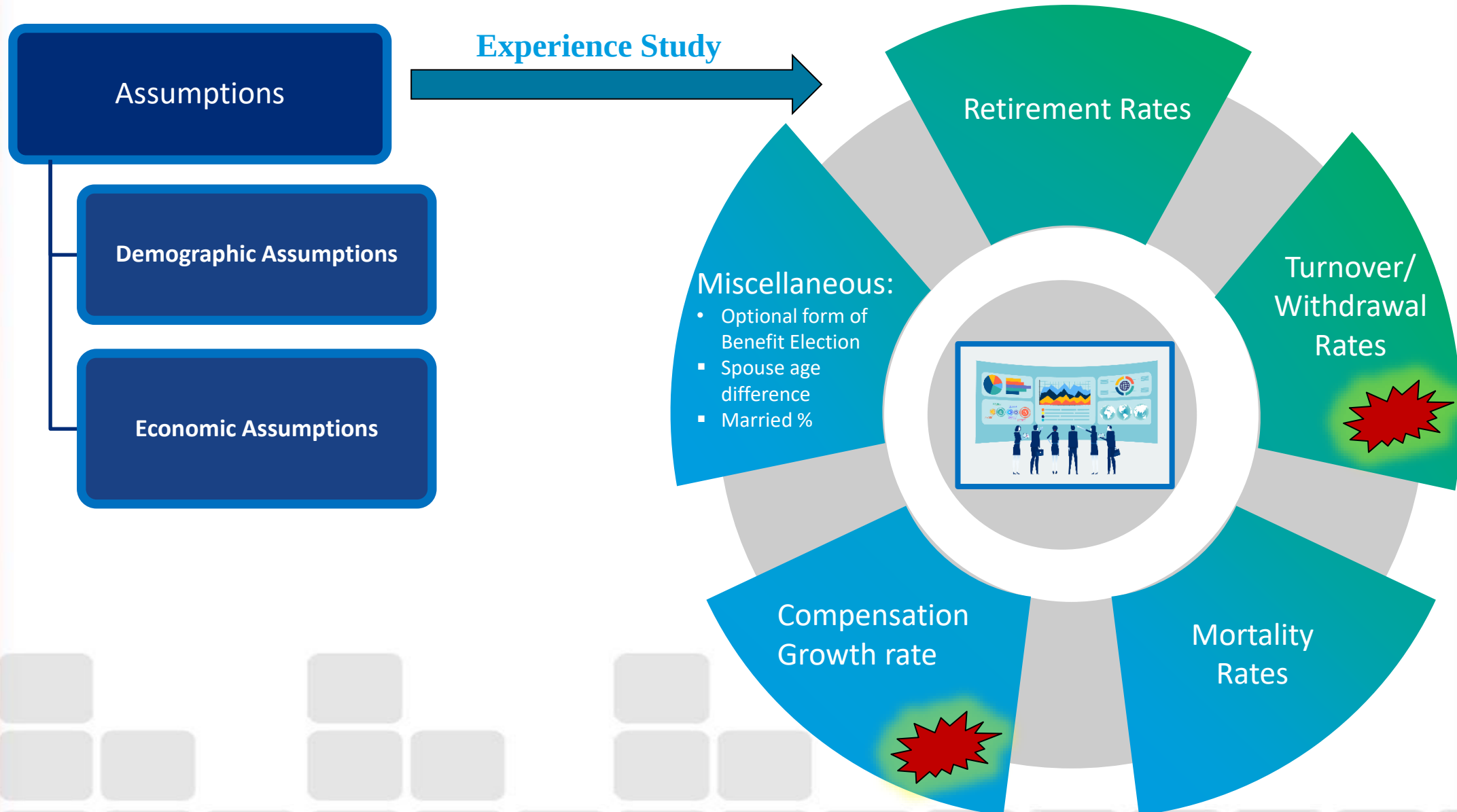
- Calculate deviations between expected and actual experience.
- Identify key discrepancies or trends
- Propose new assumptions & determine expected impact on obligation & pension cost

- Prepare a detailed report that outlines the study's findings and recommendations.
- Visual displays of quantitative data/effective presentation methods.
- Provide actionable insights for pension plan trustees or sponsors

Actuary may consider whether the full process is necessary for a given plan and for a given assumption

Key Assumptions in Pension Valuation

Key Assumption in Pension Valuations



Turnover/Withdrawal Assumption: Insights & Case Study



Turnover (Withdrawal) Assumption

Rate at which employees will leave the company; depends on various factors.

Employer specific or job-related factors such as:



Location of Employment:

Lower rates for well-paid factory workers in a rural area (with few job alternatives) than for comparable workers in a city

Occupation/Industry:

Higher rates for store clerks than for factory workers

Employment Policies:

Lower rates for employers with high standards and careful screening than for less-selective employers

Work Environment:

Higher rates in a high-pressure environment. Nowadays, hybrid working and remote working is preferred choice.

Termination rates may also consider Plan Provisions such as:

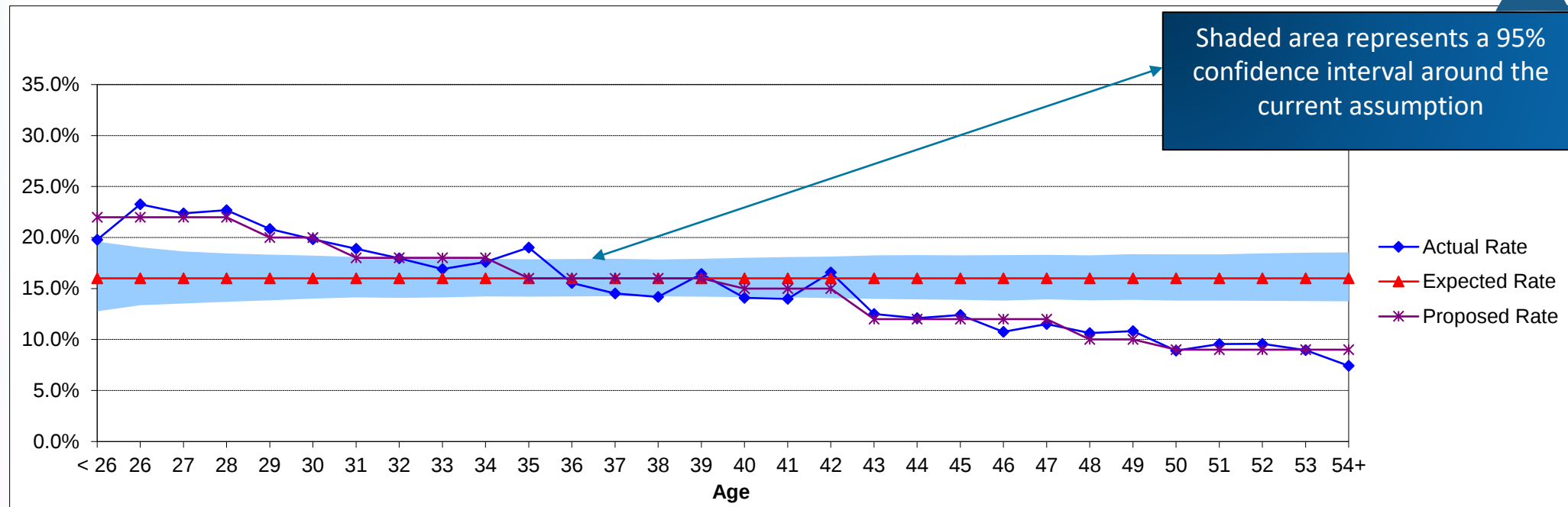
Early retirement benefits – Lower rates – at least in the five-to-ten years before retirement – for plans with a high subsidy that takes effect only after age 55 than for plans with an actuarial reduction.

Vesting schedule – Higher rates in the first few years of employment for plans with immediate vesting than for plans with five-year cliff vesting.

Payout options – Higher rates for plans with an immediate lump sum option than for plans with a deferred annuity at age 55.



Turnover (Withdrawal) Assumption – Case Study

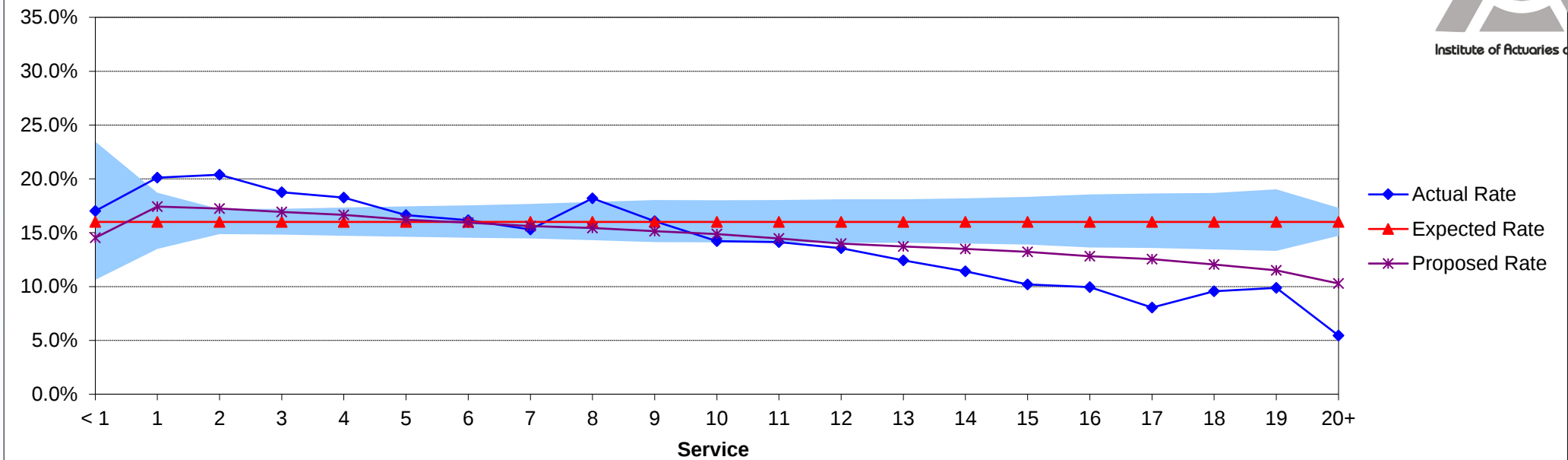


Age	Exposure	Expected Terminations	Actual Terminations	Proposed Terminations
25-29	3,998	640	875	858
30-34	7,025	1,124	1,276	1,289
35-39	7,911	1,266	1,260	1,266
40-44	6,421	1,027	893	893
45-49	5,508	881	619	617
50-54	4,997	800	445	450
Total		5,738	5,368	5,373

- Study period: 5 years
- Assumed rate of 16% for expected terminations.
- Lower turnover experience compared to expected ~ **5,368 vs 5,738**
- Under the proposed assumption, 5,373 terminations would have occurred during the study period, very close to actual experience



Turnover (Withdrawal) Assumption – Case Study

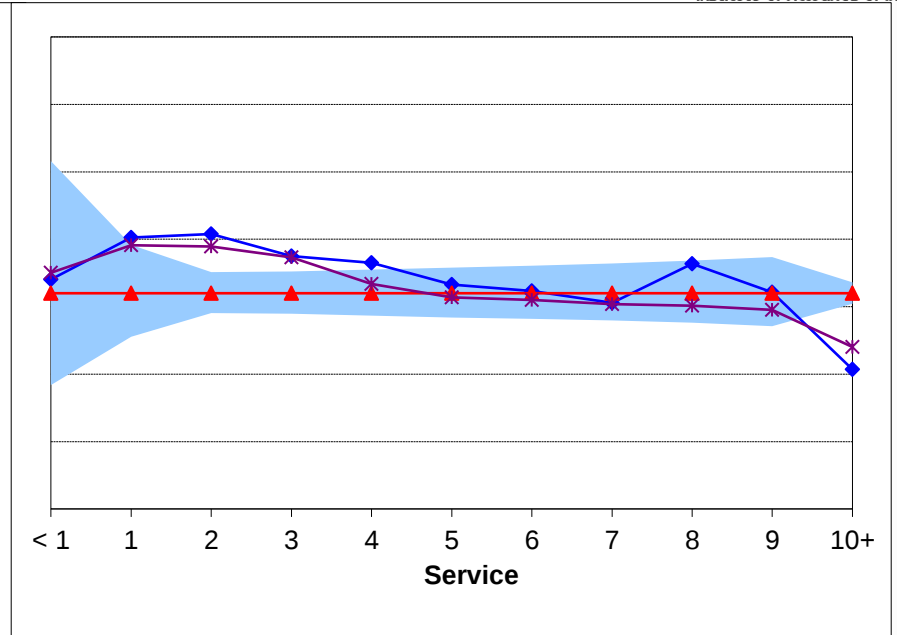
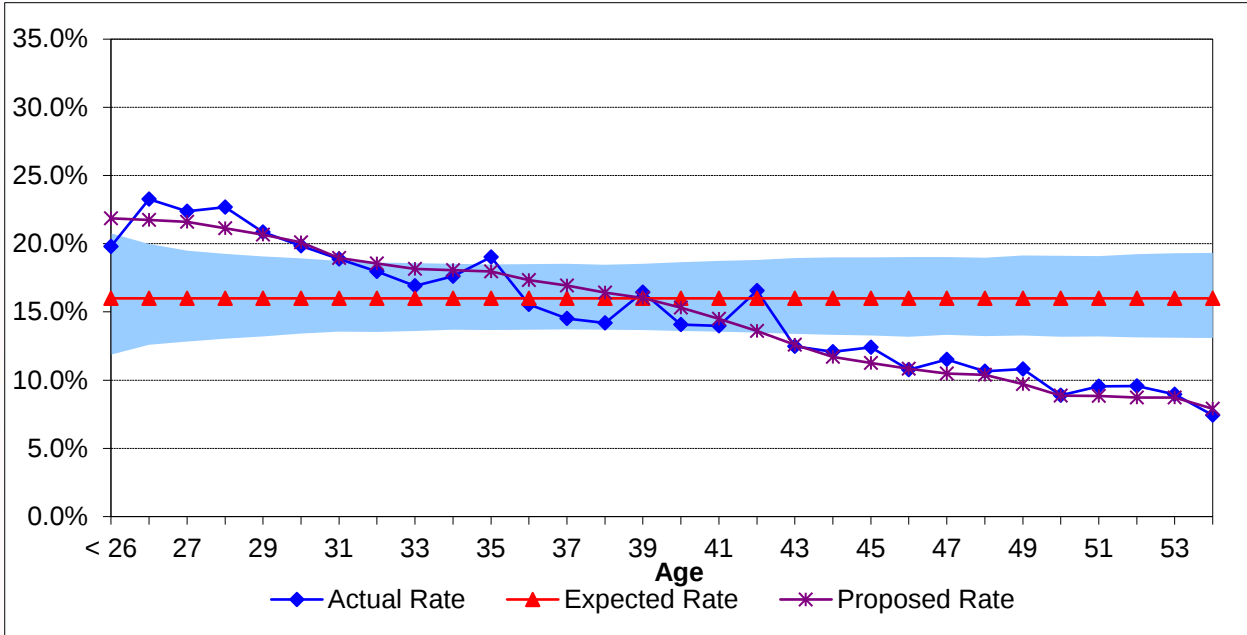


Service	Exposure	Expected Terminations	Actual Terminations	Proposed Terminations
< 1	141	23	24	21
1	795	127	160	139
2	3,905	625	796	674
3	3,731	597	700	632
4	3,088	494	564	514
5-8	8,747	1,400	1,443	1,386
9-12	5,507	881	799	806
13-16	4,523	724	503	604
17-20+	5,423	868	379	598
Total		5,738	5,368	5,373

- Same data is being used as previous slide
- Experience has been lower than expected
- The rates proposed based on age doesn't provide a good fit with the tenure
- More termination experienced in the first few years of employment



Turnover (Withdrawal) Assumption – Case Study (Select and Ultimate Rates)



Age	Exposure	Expected Terminations	Actual Terminations	Proposed Terminations
25-29	3,998	640	875	851
30-34	7,025	1,124	1,276	1,314
35-39	7,911	1,266	1,260	1,340
40-44	6,421	1,027	893	876
45-49	5,508	881	619	580
50-54	4,997	800	445	431
Total		5,738	5,368	5,393

Sample Rates								
Age	Expected Rate	Actual Experience	Proposed Rates					
			Select 0	Select 1	Select 2	Select 3	Select 4	Ultimate
25	16.0%	19.8%	22.0%	22.0%	22.0%	22.0%	21.0%	21.0%
30	16.0%	19.8%	22.0%	22.0%	22.0%	21.0%	19.5%	19.0%
35	16.0%	19.0%	20.0%	20.0%	20.0%	18.5%	18.0%	17.5%
40	16.0%	14.1%	17.0%	17.0%	17.0%	16.0%	15.5%	15.0%
45	16.0%	12.4%	16.0%	16.0%	16.0%	16.0%	11.0%	10.5%
50	16.0%	8.9%	15.0%	15.0%	15.0%	15.0%	8.0%	8.0%



Turnover (Withdrawal) Assumption

- Cover four or more years of experience to diminish the effect of the business cycle
- Specific years with unusual experience should be excluded from the study, like COVID or The Great Resignation or shut down of plant etc



Service based Rates

- Termination patterns are more a function of length of service.
- If data suggests, during first few years of employment, the experience seems to be more a function of service rather age, then better to adopt “**Age and Service Select & Ultimate**” rates.
- Not appropriate if average service of the plan is high, plan is closed or plan population is too small.
- Short-service employees may account for a significant portion of an employer’s overall turnover, but contribute little to pension liabilities

Age based Rates

- With increase in age, employees have better stability and less tendency to leave.
- Appropriate when service is not an important driver of turnover for the plan, plan closed for new entrants, etc.

Standard Rates

- Insufficient historical experience or the plan population is too small
- **Five** basic tables provided by SOA
 - ✓ Age only
 - ✓ Service only
 - ✓ Age and service select and ultimate
 - ✓ Small plan age-based table
 - ✓ Small plan service-based table
- Mercer developed modified versions of these tables to get smoother progression of rates.
- Flexibility to apply an appropriate adjustment factors on standard rates based on plan experience

Select Termination



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Compensation Growth Rate: Insights & Case Study



Compensation Growth (Salary Scale) Assumption

Used to project increases in salary to the expected date of termination or retirement

*Ultimate responsibility lies with the management of the company to determine this assumption.
An Actuary may advise the management based on past experience and client's strategy.*



Past Experience

- Understand trend by looking at experience
- Year-wise study to identify one-off instance of greater deviation from expected.
- Separate salary scale analysis for employees in different categories like job classifications, geographic locations, industries.
- Remove outliers to get a true picture of experience.
- Flat rate vs age-based rate vs year-based assumption.
- Younger employees tend to receive larger increases than older employees.

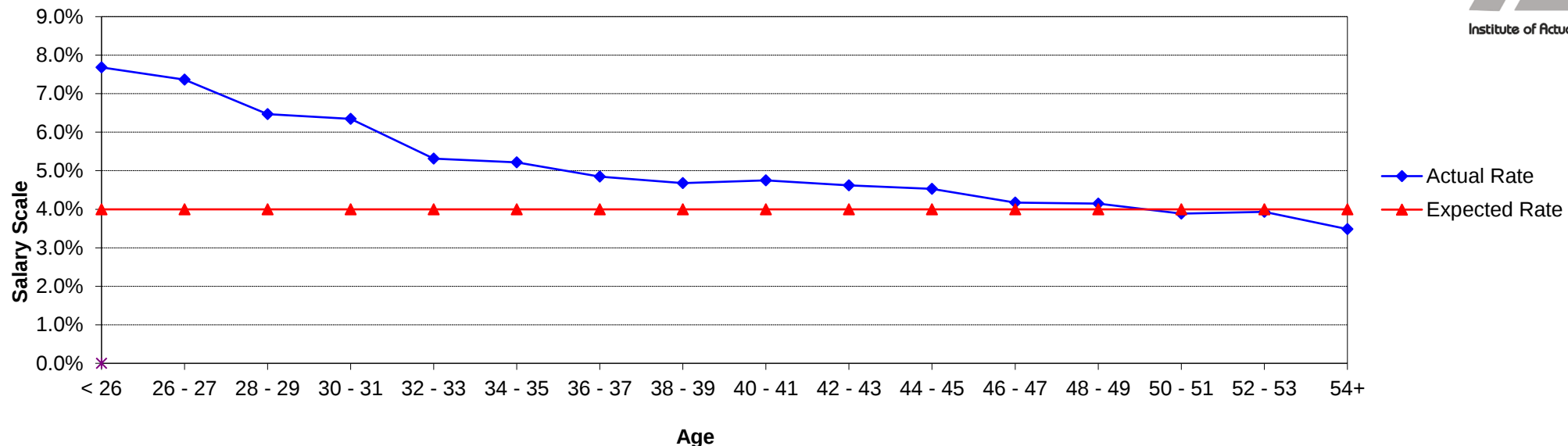
Selection Process

Future Expectation

- Understand Company short/long-term strategy
- Reflect ALL types of salary increments: Promotions, performance, inflation, real wage growth and any other ad-hoc increments expected to be paid
- Different salary growth rate based on "Years"
- Does client expect to change the rate of salary growth in the near future relative to the period studied?



Compensation Growth (Salary Scale) Assumption Case Study



Age	Exposures	Expected Rate	Actual Rate
25 - 29	2,238	4.00%	6.93%
30 - 34	4,328	4.00%	5.71%
35 - 39	5,022	4.00%	4.81%
40 - 44	4,319	4.00%	4.68%
45 - 49	3,895	4.00%	4.21%
50 - 54	3,734	4.00%	3.83%
Total	23,536		

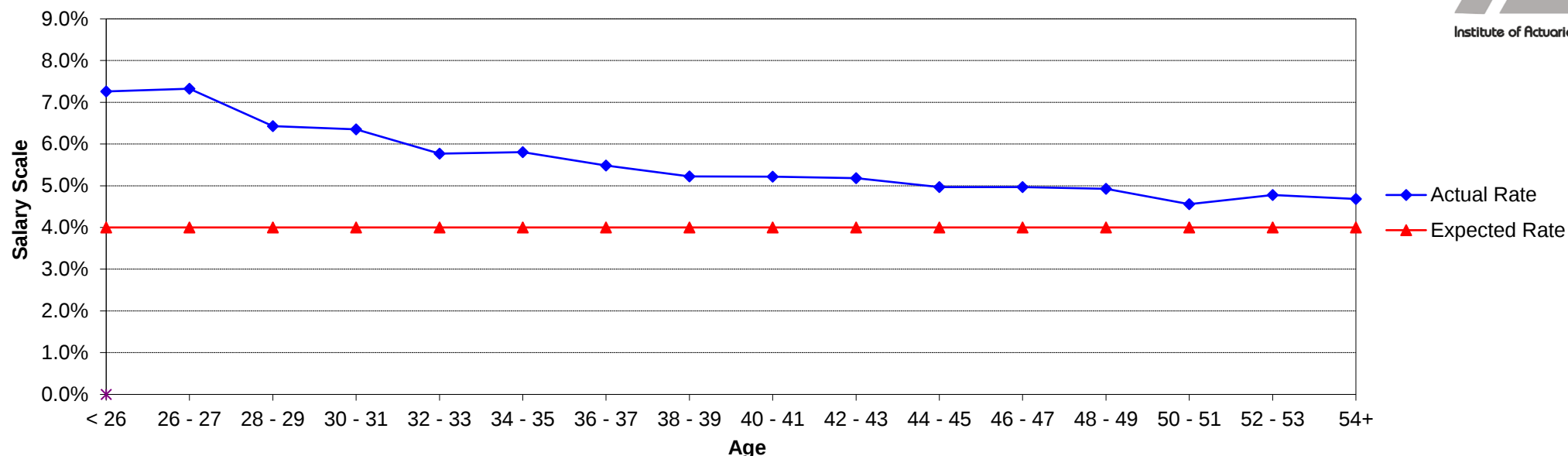
- Study Period – 5-Yrs
- Only Continuing actives are included

Additional Data stats calculated:

- Minimum Increase – (24.82%)
- Maximum Increase – 24.98%
- Average Increase – 4.90%
- Upper 5% threshold – 17.48%



Compensation Growth (Salary Scale) Assumption Case Study



Age	Exposures	Expected Rate	Actual Rate
25 – 29	1,818	4.00%	6.84%
30 – 34	3,585	4.00%	5.97%
35 – 39	4,231	4.00%	5.46%
40 – 44	3,664	4.00%	5.16%
45 – 49	3,323	4.00%	4.95%
50 - 54	3,159	4.00%	4.67%
Total	19,780		

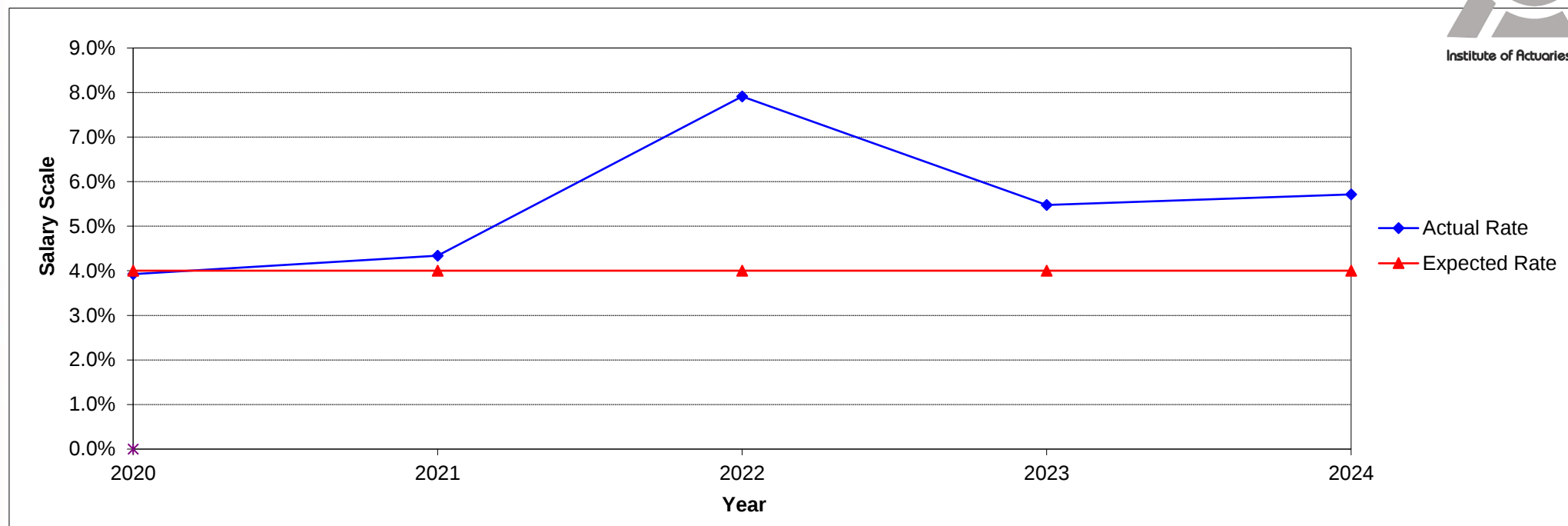
- Data cleaned to remove anyone with decrease in salary as well as salary rate higher than 95 percentile

Additional Data stats calculated:

- Minimum Increase – 0.00%
- Maximum Increase – 17.48%
- Average Increase – 5.41%



Compensation Growth (Salary Scale) Assumption Case Study

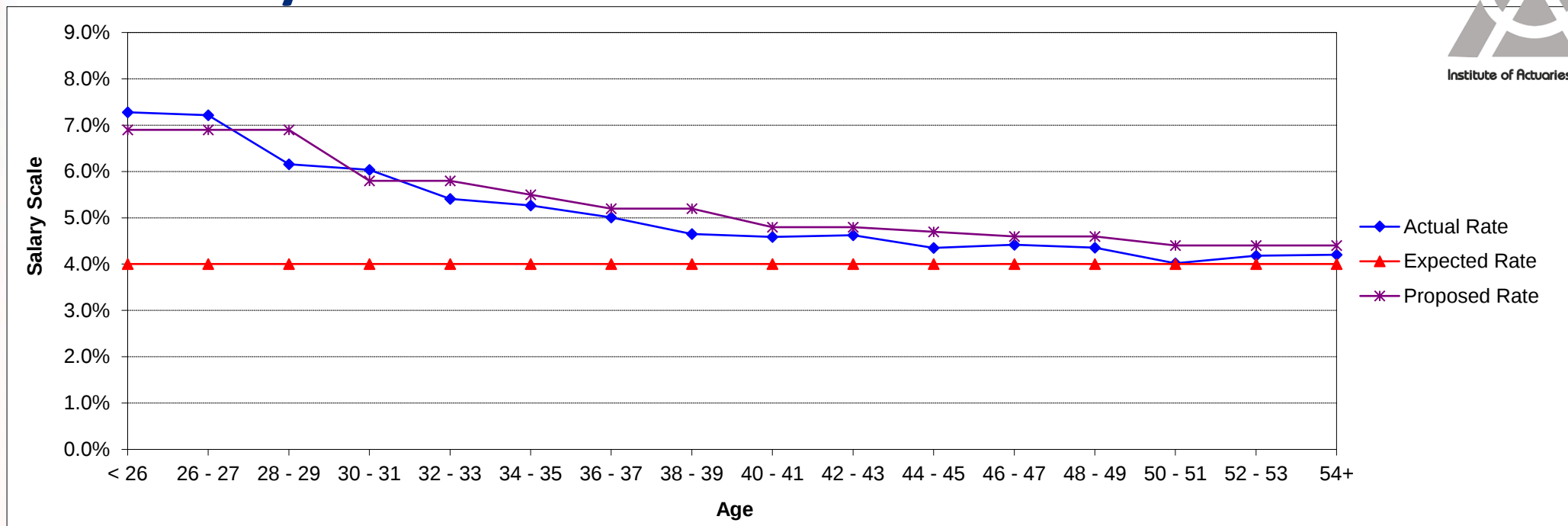


Year	Exposure	Expected Salary Increase	Actual Salary Increase
2020	3,990	4.00%	3.93%
2021	3,294	4.00%	4.34%
2022	3,093	4.00%	7.91%
2023	4,776	4.00%	5.48%
2024	4,627	4.00%	5.71%
Total	19,780		5.41%

- Checking the cleaned data for year wise discrepancy.
- Notice the higher rate of increase in year 2022.
- Discuss with client regarding the reason for this extra increase during that year.
- Analyze the data excluding that year to set long term assumption.



Compensation Growth (Salary Scale) Assumption Case Study



Age	Exposures	Expected Rate	Actual Rate	Inflation Adjustment	Proposed Rate
25 - 29	1,678	4.00%	6.66%	0.25%	6.90%
30 - 34	3,151	4.00%	5.58%	0.25%	5.80%
35 - 39	3,586	4.00%	4.93%	0.25%	5.20%
40 - 44	3,003	4.00%	4.56%	0.25%	4.80%
45 - 49	2,728	4.00%	4.38%	0.25%	4.60%
50 - 54	2,541	4.00%	4.12%	0.25%	4.40%
Total	16,687		4.95%		

- Data cleaned to remove the year 2022
- Average increase over 4-year period (excluding the year 2022) is 4.95% vs expected rate of 4.00%.
- Next step is to review the inflation during those years:
 - Long Term Inflation rate during 2020-2024 – 2.0%
 - Future Long Term inflation rate – 2.25%
- Adjust the future rate based on long term inflation.



Compensation Growth (Salary Scale) Assumption

Salary Scale Assumption

Flat Rate

- Appropriate for small plans with less historical data
- Companies usually provide flat increments across levels

Age Based

- Companies hiring freshers
- Average age is lower

Year Based

- Companies in their boom period, expecting high growth in next few years

Blended

- Companies expecting high growth for next couple of years but not certain about growth for future years

Setting up Compensation Increase assumption should consider following factors:

- ***Inflation***
- ***General Increase in Real Wages***
- ***Employer Specific Adjustment***
- ***Age/Merit Component***

Estimated Accounting Impact



Assumption	Impact on Projected December 31, <u>2025</u> Liabilities (PBO)		
	Current	Proposed	Change
Retirement	\$XX	\$XX	\$(XX)
Withdrawal	XX	XX	(XX)
Payment Form	XX	XX	XX
Total	\$XX	\$XX	\$(XX)

Assumption	Impact on Service Cost			FY26 Expense Impact
	Current	Proposed	Change	
Retirement	\$XX	\$XX	\$(XX)	\$XX
Withdrawal	XX	XX	(XX)	XX
Payment Form	XX	XX	XX	XX
Total	\$XX	\$XX	\$(XX)	\$XX

Challenges

Data Quality & Availability

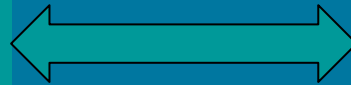
Incomplete or poor-quality data can lead to misleading conclusions



Perform reasonable checks to ensure data is consistent
Fill gaps/remove outliers

Target Assumption for Study

Determining which assumptions to test?



Significant vs insignificant assumptions
Upfront discussion with client

Time Constraints

Conducting a thorough experience study can be time-consuming, and tight deadlines may limit the depth of analysis



Proactive Planning
Set up right expectation upfront
Unlock potential challenges

Stakeholder Expectations

management expects the results to support lower obligation, but study end up higher obligation



Reconcile differing expectations
Share detail report with actual experience
Use blended approach b/w actual experience & future expectation

Small Sample Size

May not provide a reliable basis for assumptions, leading to potential biases or inaccuracies in the results



Market/Industry based assumption
Standard Table option

Open the floor for questions and discussion