BAS 2019 Case Competition

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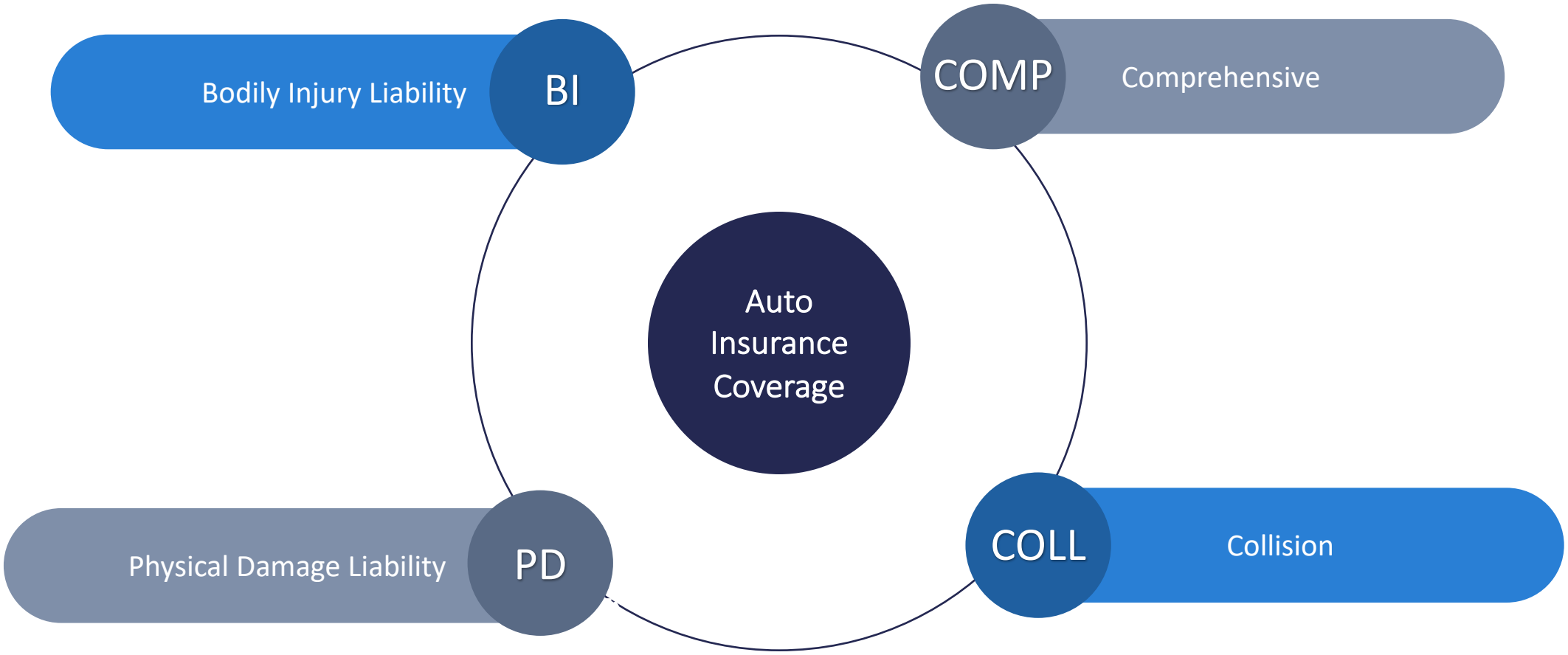
Agenda

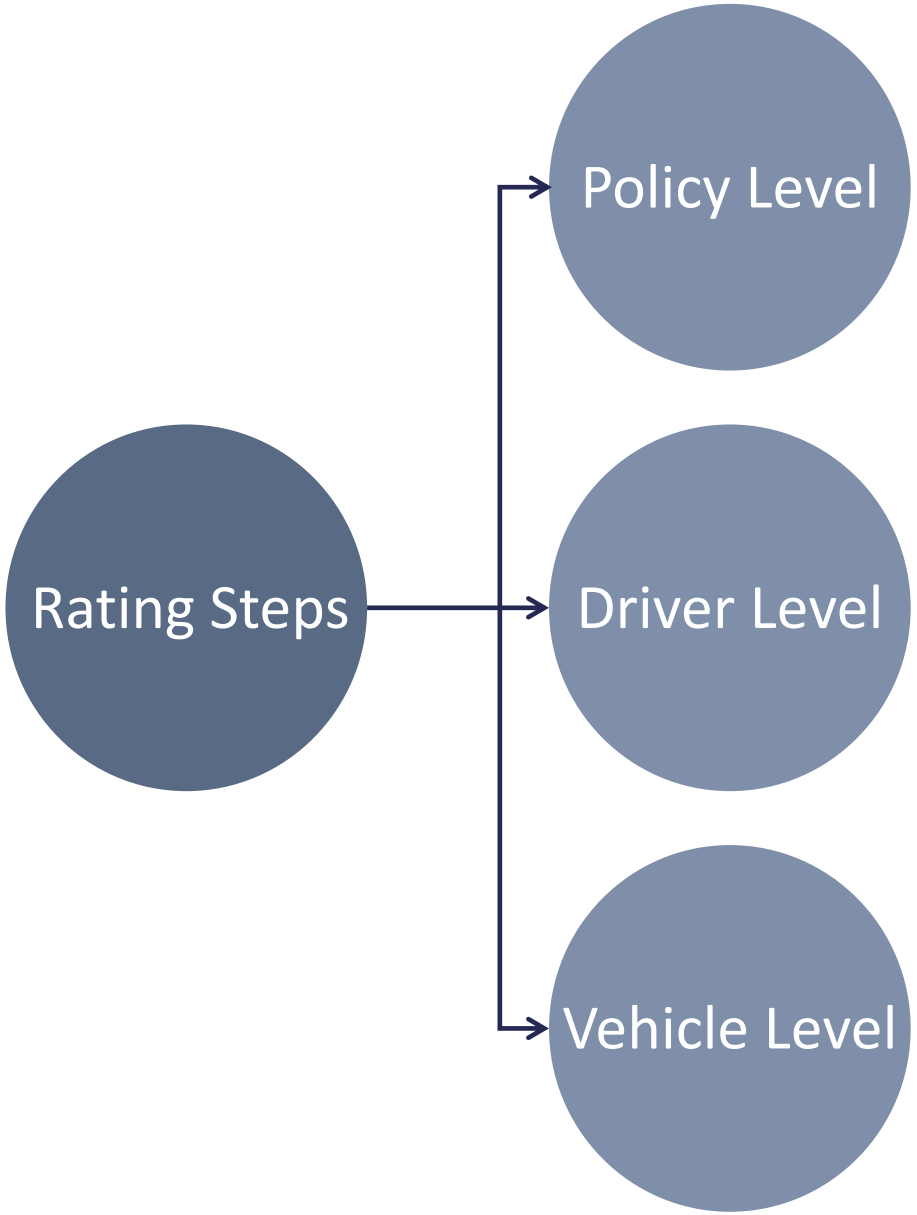

Background
&
Case Objective
TECHNICAL
ANALYSIS
FINANCIAL
ANALYSIS
&
Business
Consideration
Proposed
Adjustment

Background & Case Objective

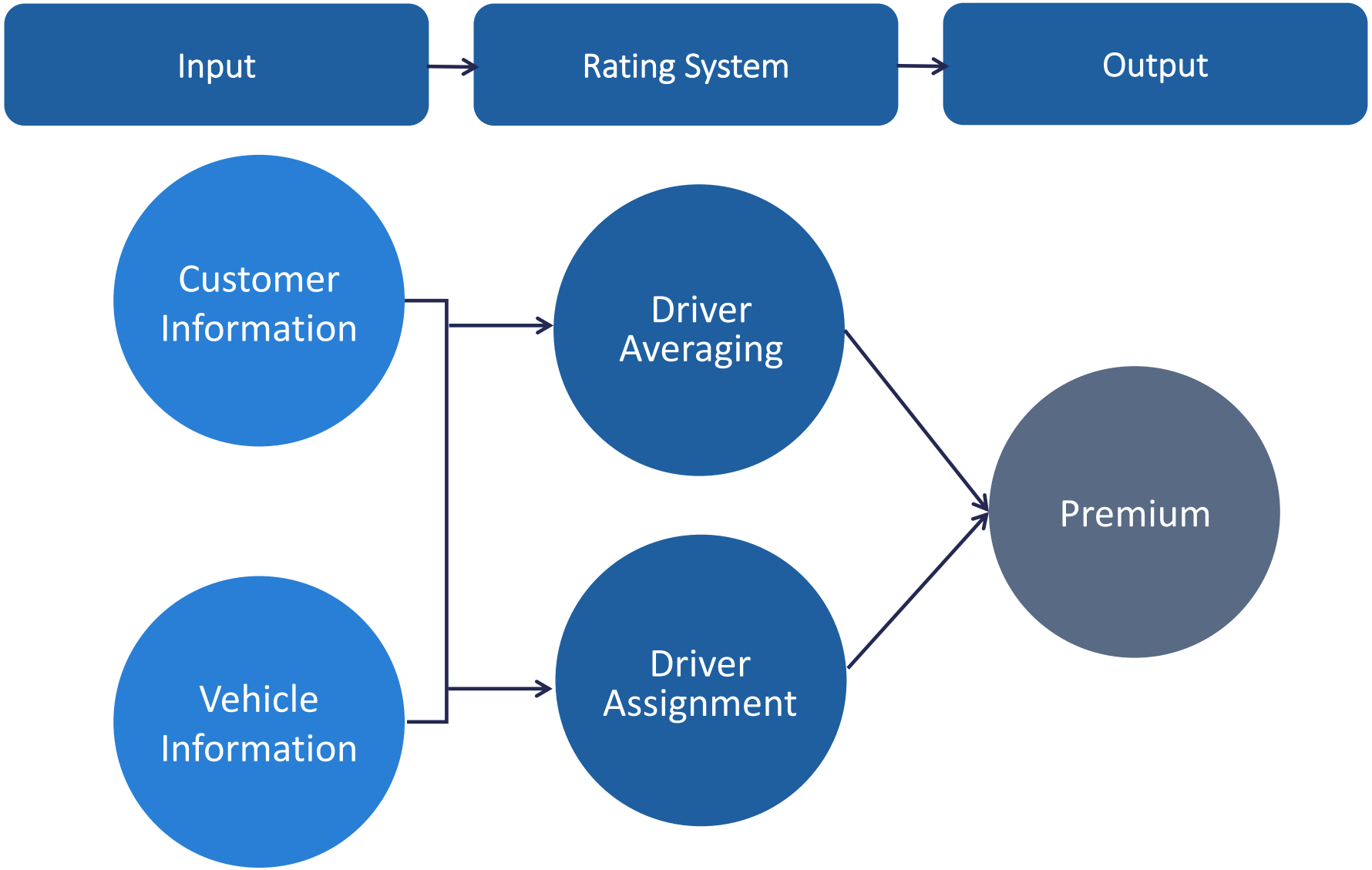
Background


Bodily Injury Liability
BI
COMP
Comprehensive
Auto Insurance Coverage
Physical Damage Liability
PD
COLL
Collision

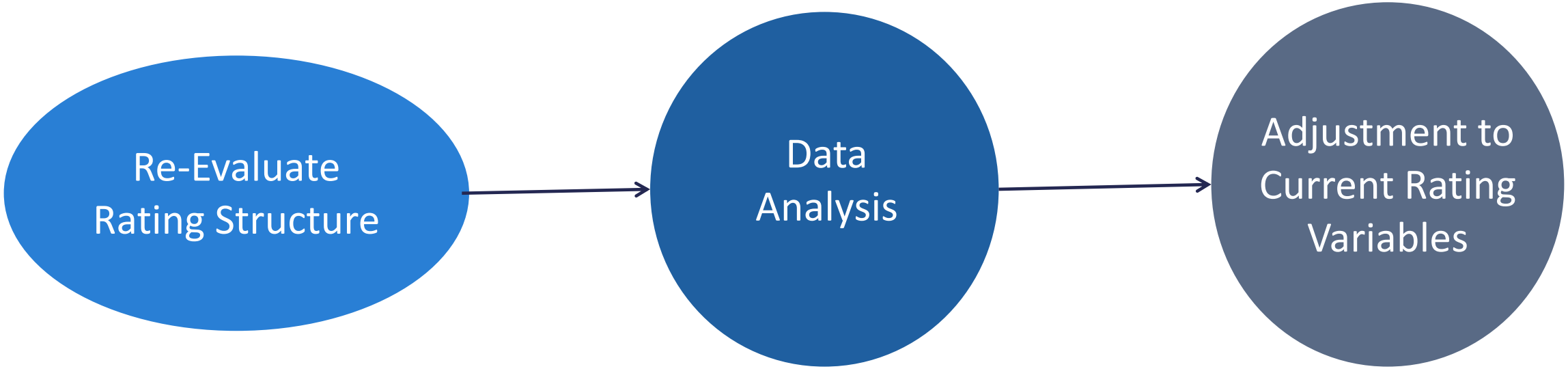
Background



Case Objectives



Case Objectives



Technical Analysis

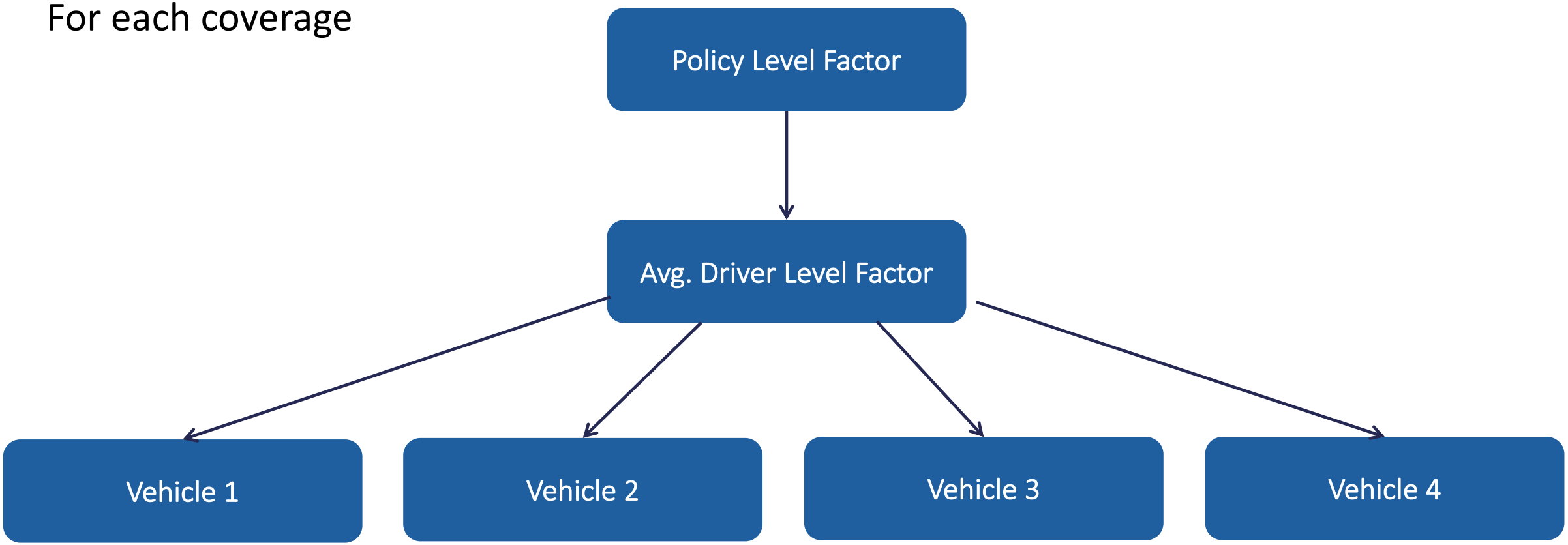
Methodology
Driver Averaging

Calculation

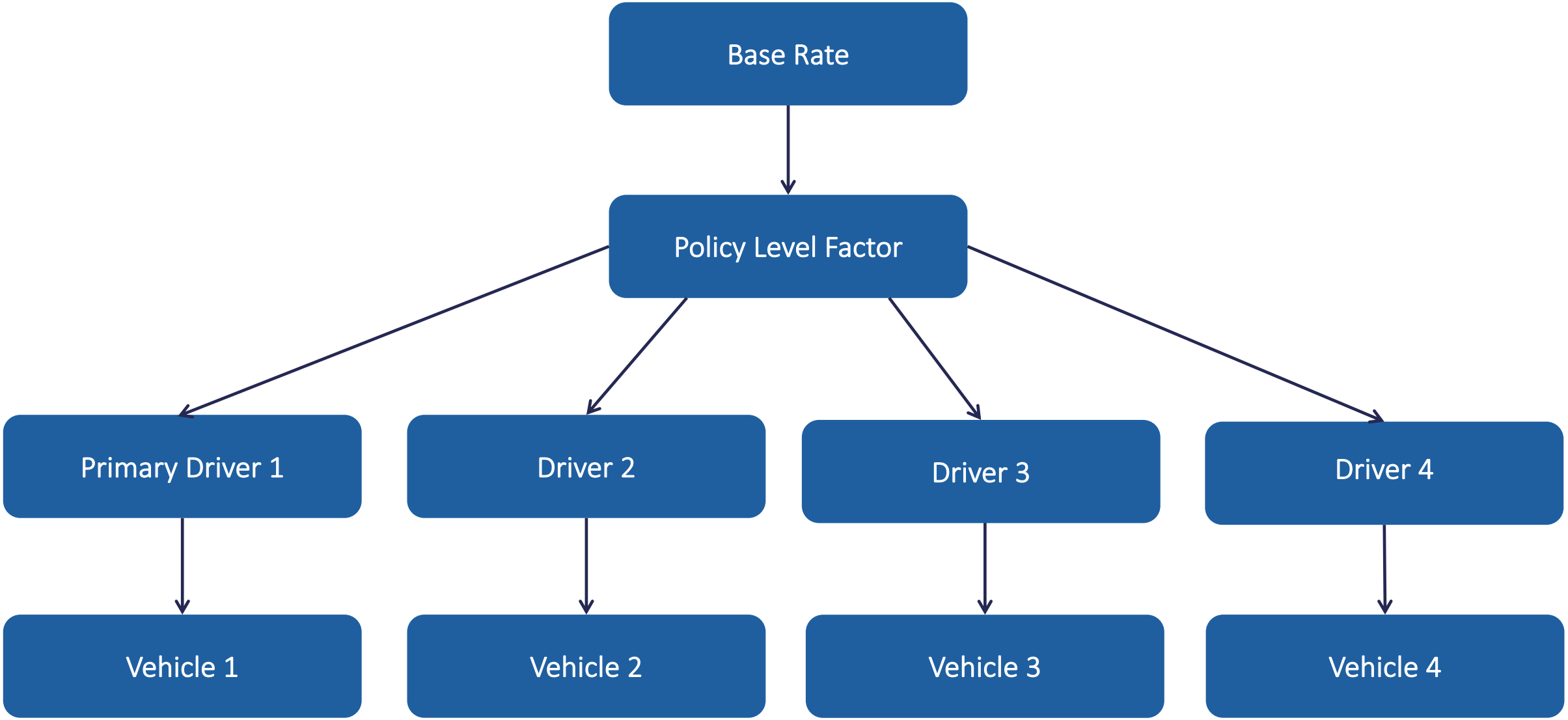
$$Average\ Driver\ Age\ factor = \frac{Driverage(age\ of\ driver\ 1) + \cdots + Driverage(age\ of\ driver\ N)}{N}$$

* DriverAge( ) is a function

For each coverage



Methodology
Driver Assignment



Financial Analysis
&
Business Consideration

Graphs (Premium Comparison)

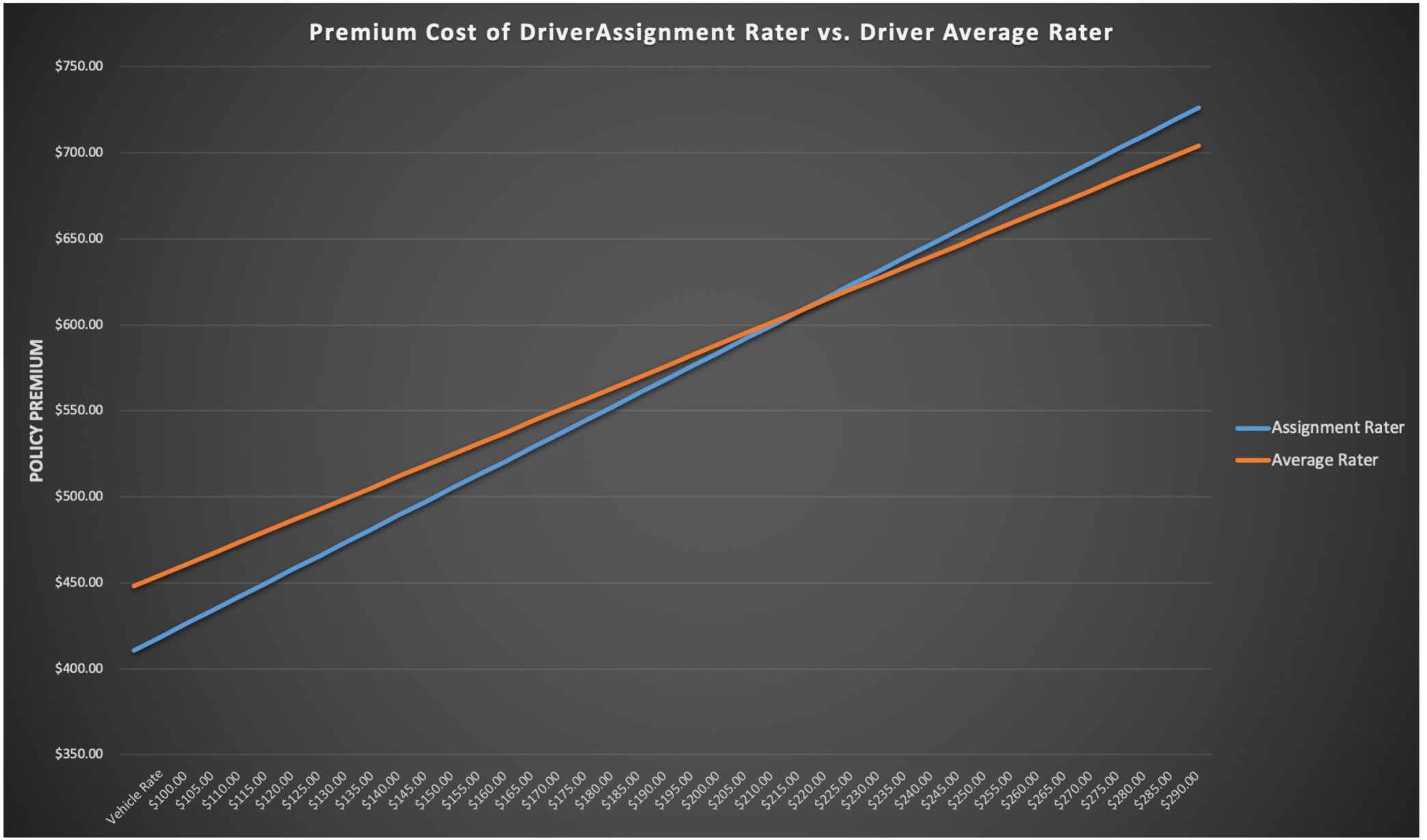
Situation 1

		Assignment		
	Vehicle Rate	Primary Driver	Class Factor	Avg Class Factor
Vehicle 1	$ 110.00	Driver 1	1.011	1.280
Vehicle 2	$ 100.00	Driver 2	1.578	1.280
Vehicle 3	$ 140.00	Driver 1	1.011	1.280
			$ 410.58	$ 448.11

Situation 2

		Assignment		
	Vehicle Rate	Primary Driver	Class Factor	Avg Class Factor
Vehicle 1	$ 110.00	Driver 1	1.011	1.280
Vehicle 2	$ 250.00	Driver 2	1.578	1.280
Vehicle 3	$ 140.00	Driver 1	1.011	1.280
			$ 647.33	$ 640.15

Graphs (Premium Comparison)

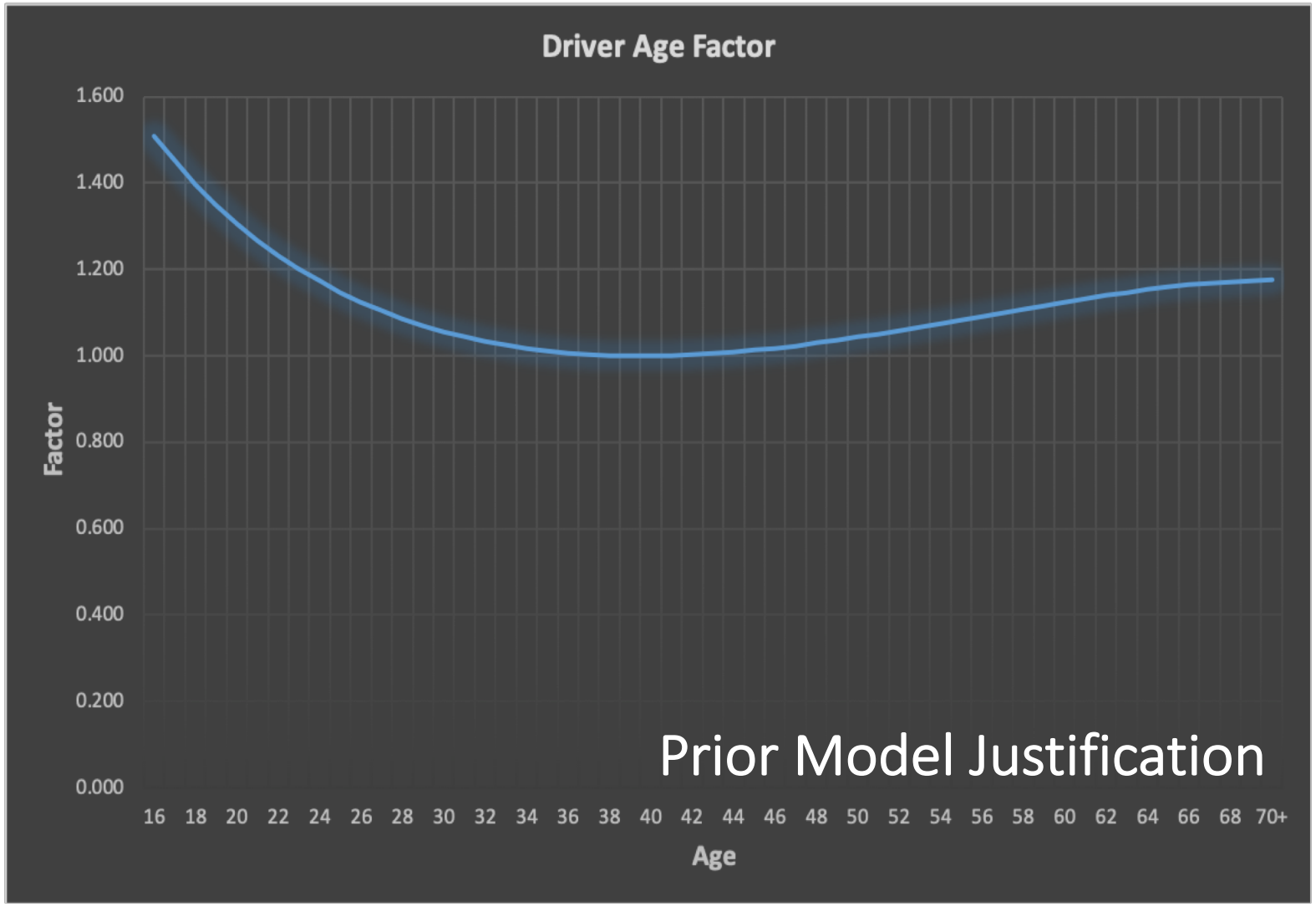


Consideration

	Driver Averaging	Driver Assignment
Pros	• Easier Algorithm • Expedited policy quoting	• Already widely implemented by many companies
Cons	• Exposure split amongst the vehicle	• Complex Algorithm • Unwanted Assignment

GLM

- Generalized Linear Model



	Parameter	Value
Linear term	b1	-0.0883500
Quadratic term	b2	0.0017400
Cubic term	b3	-0.0000105

$$y = b_1 x + b_2 x^2 + b_3 x^3 + \varepsilon$$

Target Variable

Error/Randomness

Model Output

Calculation

$$Standard\ Error, SE = \frac{Upper\ bound - Lower\ bound}{3.92}$$

* 3.92 is the z-value for 95% confidence interval

$$SE\% = \frac{SE}{Indicating\ Factor}$$

SE% < 20% → Significant

SE% > 20% → Insignificant

Proposed Adjustment

Variable		Earned Exposure%	Lower Bound of 95% Confidence Interval	Indicated Factor	Upper Bound of 95% Confidence Interval	SE	SE%	is significant?
Years of Driving Experience	0	0.8%	0.713	1.235	1.757	0.266327	0.215649	0
	1	2.1%	0.645	1.013	1.381	0.187755	0.185346	1
	2	2.5%	0.683	1.021	1.359	0.172449	0.168902	1
	3+	94.6%	0.943	1.000	1.057	0.029082	0.029082	1

- **Consider grouping variables for 0-year and 1-year driving experience**

Consideration

	One Countrywide Model	Different Models for each state
Pros	• Efficiency • Equalization	• Flexibility • Customer's Trust • Specialization
Cons	• Non-Representative • Less accurate rating model • Some losses may go unaccounted for	• Complexity • Training

Non-Rating Suggestions

- Student discount
- Work with the schools
- Family multi-car discounts
- Young driver education program

Thank You

- https://handbook-5-1.cochrane.org/chapter_7/7_7_7_2_obtaining_standard_errors_from_confidence_intervals_and.htm
- https://www.casact.org/community/affiliates/MAF/0310/Cooksey.pdf
- http://www.ibexi.com/papers/earning.pdf
- https://www.casact.org/education/annual/2007/handouts/gannon.pdf
- https://www.valuepenguin.com/student-car-insurance