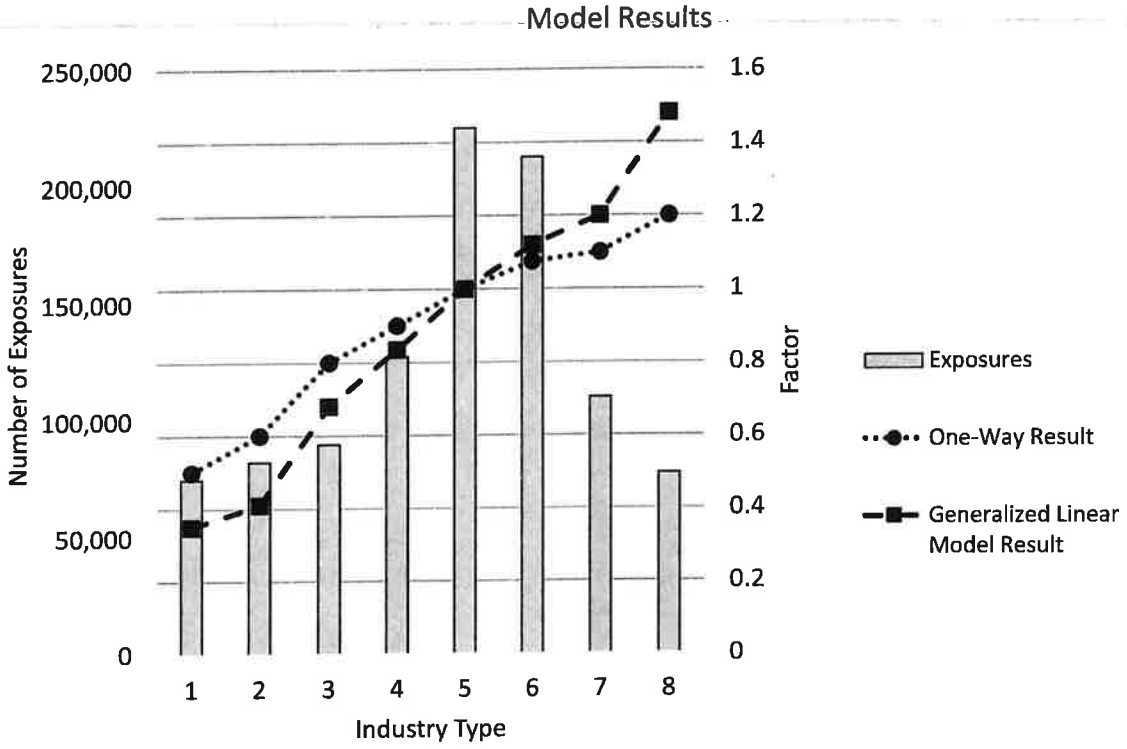
11. (1.25 points)

The graph below shows frequency model results for industry types. The same data and assumptions are used in both models.



a. (0.25 point)

Briefly discuss why the relativity for both line graphs match for industry 5.

b. (0.5 point)

Explain why the models in part a. above produce different results.

c. (0.5 point)

Describe how the use of one-way results might impact profitability for an insurance company.

CONTINUED ON NEXT PAGE

QUESTION 11

TOTAL POINT VALUE: 1.25	**LEARNING OBJECTIVE(S): A8**

SAMPLE ANSWERS

Part a: 0.25 point

- This is the base level for industry type and thus both relativities equal 1.0
- Since industry 5 has the most exposures, it is the base level for the variable
- Because industry 5 level is the base level of relativities

Part b: 0.5 point

- The GLM would account for correlation between variables (distributional bias) while the one-way approach (univariate) would not
- A one-way result does not acknowledge correlations between rating variables whereas a GLM does
- There could be exposure distribution bias that is corrected for in the GLM but not in the one-way result model
- GLM account for interaction, one way do not
- one way does not correct for exposure correlation

Part c: 0.5 point

- One way results can lose profit for factors below the base. Industry 1-4 are given lower factors than the GLM. They can also lose profit from charging too high a factor above the base and losing renewals and new customers from this.
- If the GLM results produce a more accurate estimate of expected losses at an individual insured level, and competitors are using these rating variables, then using one-way results could cause the insurer to be adversely selected against, and profitability would diminish over time.
- They may lead to excessive or inadequate rates for some segments due to double counting effect in the presence of exposure correlation. This can lead to adverse selection, which will decrease profit.
- Assuming the GLM result is more accurate, using the one-way result will hurt the profitability because of overcharging from some industries and undercharging for others. This will result in anti-selection

EXAMINER'S REPORT

Candidates were expected to understand the differences between GLM and one-way models and explain how using less sophisticated models could produce inaccurate pricing which could lead to adverse selection and ultimately deteriorating profitability.

Part a

Candidates were expected to know that both the one-way model and the GLM set Industry 5 as the base level.

Common mistakes Included:

- Not indicating that Industry 5 was set as the base level.
- Only stating that the industry 5 had the most exposures and therefore the most credibility, but not indicating it was the base level.

Part b

Candidates were expected to explain the main differences between one-way and GLMs, i.e. that GLMs consider all variables and account for exposure correlation and variable interactions; and the one-way models do not.

A common mistake was stating that the results were different because of exposure correlations, but not explaining how the models treat them differently.

Part c

Candidates were expected to understand that the one-way model would produce less accurate results which would lead to adverse selection and deteriorating profitability.

Common mistakes included:

- Failing to explain that inaccurate pricing could lead to adverse selection.
- Only stating that it would result in overcharging/undercharging risks without explaining how it would impact the profitability of company.
- Failing to state that it would negatively impact profitability.
- Indicating that one-way is always higher or lower than GLM.
- Comparing one-way analysis to not doing anything at all rather than comparing to the GLM.