2. (3.75 points)

   a. (0.25 point)

      Briefly describe the cost-based condition for insurance rates to be considered equitable.

   b. (0.5 point)

      According to McCarty, briefly describe two conditions for insurance rates to be considered equitable to consumers.

   c. (1 point)

      An auto insurance company finds a significant correlation between a driver's claim frequency and the number of text messages sent. The insurance company proposes segmenting groups into low and high risk categories based on texting frequency.

      Describe whether the insurer's use of texting frequency as a rating variable would be equitable in each of the following contexts:

      - Within a risk classification system
      - From the perspective of an individual consumer

   d. (0.5 point)

      In a scenario where all auto insurance companies except Insurer X use texting frequency as a rating variable, discuss a concern that a regulator might have regarding Insurer X's financial stability.

   e. (1 point)

      Based on the concern discussed in part d. above, briefly describe two IRIS ratios that the regulator should examine and the trend that the regulator should look for in each ratio to validate the concern.

   f. (0.5 point)

      Assuming that Insurer X does not introduce texting frequency as a variable, describe one action that Insurer X could take to remain competitive.

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SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 2	
TOTAL POINT VALUE: 3.75	**LEARNING OBJECTIVE: A1, A2, C2**
SAMPLE ANSWERS	

Part a: 0.25 point

- It gives lower risks the rate they deserve based on their expected loss cost and eliminates possible subsidization
- Rate of policy should be proportional to/reflective of expected losses/expected cost. It should be 'cost-based' in that policies with higher costs have higher rates.
- Rates must vary based on differences in individual risk.
- Each individual's rate is an estimate of that individual's expected loss costs.
- Insurance rates should reflect the difference in relative risk between insureds.
- Rate differences among segments should be justified by difference in costs.
- Rates are equitable for the consumer based on relative risk, not equal cost for all.
- Price to risk, high risk → high price and vice versa

Part b: 0.5 point

Should not disproportionately impact Protected Classes:

- Rates should not be based on factors that correlate highly with race, ethnicity, religion and other protected factors.
- Should not discriminate towards certain socioeconomic groups
- Not unfairly discriminatory towards certain protected classes of people
- Rates must not correlate with social aspects such as race or religion.
- Cannot disproportionately affect a certain class of people.
- Non-discriminatory -> McCarty is very sensitive to factors that appear to be correlated with race or negatively impact certain groups of people.
- According to McCarty, one condition for rates to be considered equitable is that rates are not unfairly discriminatory towards protected classes. For example, using credit scores may end up charging higher rates for certain ethnic or religious groups if they tend to have higher credit scores.

Causal Link:

- Rating variables are characteristics that are influenced by insured.
- Factors that the insured is charged for (factors used in rate calculation) are under the insured's control.
- Proven that the rate variables are chosen because they are predictive of losses.
- Another condition is that rates actually correlate to the underlying risk. For example, McCarty expressed concerns that a downturn in the economy could cause abrupt and unjustified changes in credit-based insurance scores.
- Should be an intuitive link between the rate and the insurance risk.
- Undesirable-> McCarty does not think rates should be opaque->believes consumer should understand how their characteristics/risk factors and behavior will impact their rates.
- Rating mechanism is not opaque to consumers.
- Consumer should be able to understand rate and improve behavior, e.g., credit scores are difficult to understand/correct.

Not subject to large inaccuracies:

- Should not be subject to inaccuracies, e.g., credit scores are often wrong.
- Rates should not be based on factors/data that has frequent errors and inaccuracies (like credit score)

Part c: 1 point

Within a risk classification system:

- Using texting frequency will create a more refined classification system and make the rate more aligned with true risk condition, thus equitable.
- Is equitable as it can be given that number of texts is correlated with frequency of accidents.
- Using texting frequency would be equitable because it is significantly related to the amount of risk.
- It would be equitable as it would allow insurers to better price for differences in risk, reducing cross subsidies.
- Yes, equitable because it's under the insured's control. It's illegal to text while driving in most states and it's not unfairly discriminatory.
- Yes because each person within either group would be charged the same amount.
- Unequitable– if the texting data was self-reported it could be prone to error which would make it unreliable.

From the perspective of an individual consumer:

- Not equitable as there is no clear causation between texting and driving
- Would have privacy issues. Meanwhile, will have disparate impact on certain groups of people, e.g., those sending messages frequently while not driving. This is not equitable.
- Not equitable as texting while not driving shouldn't cause more accidents. Texting may also be a more common form of communication among a certain protected class of people.
- This may not be equitable because they may not see/agree with the link between # of texts and their insurance risk, and it may unfairly punish those that have to text a lot (e.g., for work/business).
- Not equitable since insured may be careful to never text while driving but still text heavily overall. That way he would still be classified as a high-risk driver under that system.
- No, people who text more tend to be younger.
- Not equitable. Rate should be based on the costs associated w/an individual risk transfer. An individual may text more due to requirements from his job but may not be a worse risk.
- Equitable because insureds recognize that texting while driving is dangerous so they will not be unhappy about it.
- Yes, they should be aware that it's being used as a variable and it's in their control so it should be equitable.
- Equitable from the individual consumer – if consumer agrees texting is a cause of accidents then they would consider using it as a rating variable fair.
- Equitable because people would understand why they have higher rates since they know their texting behavior is a risky driving habit.

- Yes this variable could also be seen as equitable from customer's perspective as there is a lot of attention to texting as a cause of accidents. Customer could understand why this variable differentiates.
- Individual consumer can make effort to reduce texting frequency therefore equitable.

Part d: 0.5 point

- Due to anti-selection, high risk insured tend to purchase insurance from insurer X, thus may result in insolvency issue for insurer X.
- Insurer X may be adversely selected against as its rates are relatively low for high-volume texters who are more risky. Rates may be inadequate.
- Regulator may be concerned that insurer X will face adverse selection in that high texting/high risk insured will flock to them as their prices are lower, whereas lower risk insureds will leave to get better rates elsewhere.
- Insurer X might be adversely selected against since its prices will be too high for the low risks and too low for the high risks. High risks will migrate to Insurer X and may cause insolvency.

Part e: 1 point

Generally any IRIS ratio with the proper description and trend identification would be acceptable if related back to the issue of adverse development. Below are examples of accepted IRIS ratios. Each sub-bullet under the ratios is meant to indicate an acceptable response to support the usage of that particular ratio by a regulator.

- 2 year operating ratio:
  - Is the insurer's profitability decreasing due to adverse selection?
    - Regulator should look for increasing trend and ratio > 100% to identify unprofitability
  - Expect loss ratio component (and thus the overall ratio) will have increased since frequency increases and rate adequacy (and thus premium adequacy) has deteriorated as X has attracted higher risks.
  - Regulator should look for the underwriting result to become unprofitable, i.e., ratio increasing above 100%
- NWP to Surplus:
  - Insurer X may see premium growth with smaller surplus increase (or even decrease), with ratio becoming higher over time.
- Change in NWP:
  - See if it's grown in the last year. It's an indicator if insurer did not take steps to actively grow business that it's being adversely selected against.
- Gross Δ PHS
  - As the increase high risk insureds will raise liabilities and therefore decrease PHS, should look for negative trends.
  - Look for a downward trend to see if the overall profitability is changing
- 1 year loss development to surplus:
  - See if there's adverse development showing that insurer X is getting more high risk insureds (all else equal, assuming ins x hasn't changed its growth strategy)
  - Is the insurer having to increase its reserves as it recognizes loss emergence from high texters?
  - Losses may start to develop unfavorably due to poor risks, thus driving ratio up

over time.

- 2 year loss development to PHS:
  - Would expect to see worsening since you expect loss reserves experience to be worse as low risks leave and high risks added.
- Change in Adjusted PHS:
  - Adverse selection will lead to unprofitability which will flow through to income. Ratio will capture PHS change due to operations only. Regulator should look for negative trends.
- Estimate Reserve Deficiency to PHS:
  - The mix of business will have changed and if insurer X does not adjust their reserving practices they may experience increasing deficiencies.
  - Expect ratio to decrease since X's loss experience is deteriorating and the reserve: EP ratios calculated from prior 2 years are likely understated since X has been attracting worse risks over time and thus its current level of reserves will now be higher (due to increased frequency → expect more individual reserves put up)
  - Regulator should check to see if the change in mix of business is leading to reserve deficiencies which would be evident if this ratio increases, especially above 25%
  - If this starts increasing because reserves are developing more than expected they should be concerned that they are receiving worse risks and haven't been accounting for it in their reserves.

Part f: 0.5 point

Find a proxy variable for texting:

- Insurer X could refine its rating based on other rating variables to avoid adverse selection by picking up texting variable with something correlated but more reliable.
- Find other rating variables that are more predictive of loss.
- Work on data to find out the relationship between texting frequency and age of driver, then adjust the factors accordingly. Usually young drivers text more than mature drivers so this way they could still differentiate risks.
- It could use other variables like # of calls while in car as a proxy for texting.
- It can use other rating variables as a proxy for texting frequency such as insured's data/texting plan with his/her cell phone.
- Insurer X could introduce a variable that's similar to text frequency which would capture the same correlation.
- Insurer X could use another variable that is related to texting and also predicts claim frequency (a proxy variable).
- Use proxy of text frequency as a variable such as amount of data used on each insured's cell phone.

Implement a brand new variable:

- X could identify another rating variable, such as years of driving experience, to segment risk between insureds and skim the cream from other insurers.
- Insurer could instead incorporate a variable that it prices based on whether the insured talks and drives – this is also very dangerous.
- Find a new variable that others aren't using to segment risks for rating and skim the cream.

SAMPLE ANSWERS AND EXAMINER'S REPORT

Become a high-risk only company:

- It could raise its rates to the level needed for the high-texting drivers and become a non-standard company. This will protect its financial condition because it will collect enough premium to compensate for the extra losses.
- Instead of using it as a rating variable, use it as a classification variable to put risks into appropriate company for tier pricing.
- It could raise rates and specialize in high risk drivers.
- Decrease underwriting standards, market to higher risk classification and charge an aggregate rate level commensurate with the higher expected losses of those who are frequent texters.
- Address via underwriting guidelines → may use texting frequency in risk selection and company placement.
- X could increase its rates to reflect appropriate amount for high risk drivers only. Then write only high risk drivers but could be profitable.
- Could decide to target consumers who text a lot directly and become a company that takes on a lot of non-standard business but makes sure to charge rates that are appropriate for the loss costs of these high-risk insureds.
- Could use texting frequency as an UW guideline and tiering criteria to place risks.
- It can use it in the underwriting guideline to allocate risks into two companies which can have different overall rate levels.

EXAMINER'S REPORT

Generally candidates scored well on parts c-e with the interpretive responses, but many failed to provide adequate action in part f, and some struggled with the specific recall required on parts a & b, often citing concepts related to rating variables from the ASOP on ratemaking, but not explicitly related to the cost-based condition or McCarty paper.

Part a

The cost-based condition for insurance rates to be considered equitable is discussed in the Kucera paper. Some candidates missed this distinction and instead answered with the SOP on ratemaking providing the definition of an actuarially sound rate. However, an actuarially sound rate does not hit upon the cost-based condition that differences in rates within a risk classification system reflect differences in expected cost based on particular risk characteristics.

Part b

Part b explicitly asked for conditions for insurance rates to be considered equitable according to the McCarty paper. Most candidates were able to come up with 1 consideration discussed in this particular paper but either failed to list a 2nd condition or instead wrote down an idea that was not tied to McCarty.

Common errors included mentioning limiting premiums for affordability reasons or ensuring premiums are not excessive. Those considerations are reasons for government insurance programs (Government Insurer's Study Note or AAA Flood Insurance Program) and ensure social equity but are not the concepts of equity discussed in McCarty. His concern was to avoid unfair discrimination against protected classes, maintain a causal link between the rating variable and loss, ensure the variable can be impacted by sound decisions of the insured, and avoid variables that are subject to inaccuracies/errors or otherwise opaque.

Part c

Candidates performed well on this part, and most argued that texting was equitable from the perspective of the risk-classification system and not equitable from the perspective of an individual consumer. Alternative arguments were also accepted if proper justification was provided (see sample answers above). Common errors were related to discussing why texting might not be a good rating variable (e.g., costly to collect data); however these reasons do not comment on whether it is in fact equitable.

Part d

Candidates performed well on this part and correctly identified that Insurer X may be subject to adverse selection. Incorrect answers appeared to be misinterpreting the question, as the answers reflected conclusions that would follow if Insurer X had in fact implemented the rating variable.

Part e

The majority of candidates scored well on this part and correctly identified 2 IRIS ratios and how they might trend to address the concern of adverse selection identified in part d. Common errors were identifying an IRIS ratio, but not stating how it may trend to indicate concerns to the regulator.

Part f

Many candidates struggled with this part. Some offered actions that would not ultimately allow the insurer to remain competitive.

Common errors included:

- Increase rates alone (without elaboration regarding raising rates and then specifically targeting the high-risks to become a specialty carrier).
    - Raising rates alone will just further drive the good risks in the market away from the company and likely cause any current good risks on the book to leave.
- Suggesting Insurer X purchase reinsurance to improve IRIS ratio.
    - This does not fix the underlying issue of adverse selection and would be a costly temporary fix to mask profitability issues.
- Using texting as an UW variable for risk selection and only select the good risks (without elaboration regarding using UW criteria to select risks and place them in a company tiering program with higher/lower rates).
    - Only selecting the good risks is likely not possible unless the rate itself is fixed to appropriately reflect the risk. If Insurer X charges an average rate of Y, but the good risks can get a rate of .8Y from competitors, X will not be able to write any new business. Furthermore the good risks currently insured will likely again leave to find that lower rate and the adverse selection will continue.
- Marketing to specific segments identified to be good risks and writing them such as elderly, non-texters, etc.
    - This would be similar to using texting as an UW variable. Unless the actual rate structure is adjusted to reflect the price differentiation in the rest of the market, good risks will not be willing to pay more and buy from Insurer X.
- Lowering expenses, controlling claim costs, selling customers on higher levels of service to attract the good risks to buy policies or stay with the Insurer.
    - Although value-selling may work for some consumers, any gain would likely not be sufficient to offset the adverse selection that the company would still be subject to by charging a single average rate.

- Not writing any high risk consumers would ultimately lead to minimal new business and a loss of the renewal book.