

Introduction to Actuarial Models -Assignment 1

Question 1

Key steps required in the making of this model go as follows:

1. Firstly, go through the regulatory requirements to understand the objectives to create this model
2. Plan the modelling process and how the model will be validated.
3. Collect and analyze necessary data required from valid sources
4. Decide the parameters required for modelling
5. Decide on the software to be used for the model.(Excel, R, Python, Other Models)
6. Input the correct values. Write the programme
7. Debug the program, for example by checking the model behaviour as expected for simple, defined scenarios.
8. Test the sensitivity of the model to small changes in parameters.
9. Calculate the capital requirement.
10. Communicate findings to management and document them in a form of presentation or any other suitable which makes it easy for management to understand the result.

Question 2

There can be various factors affecting the probability estimated to be inaccurate

1. Model will be chosen to give the simulation real world circumstances in the best possible way but this is not 100% accurate because getting 100% accuracy to the real world is myth.
2. The model may be very sensitive to parameters chosen, and the parameters are estimates because the true underlying parameters cannot be observed.
3. Sampling error may result from running insufficient/inaccurate simulations in comparison to the real world workings. In order to improve this we should conduct a Turing test involving a real world expert
4. Economic Factors
5. Actions of management assumed now may not match in the future
6. Policyholder behaviour, such as take-up rates for options, may differ in practice.

7. There may be future events, such as changes in regulations or a pandemic (pandemic only has short term-effects) which affect the interpretation of the policy conditions, which have not been anticipated in the modelling.
8. There may be errors in the programming of the model.

Question 3

1. The process for identifying an appropriate model will go as follows
2. Define the objective of creating the model in this case forecasting the mortality
3. Consult the existing literature on models for forecasting mortality, and consult to experts in this field of application (Turing test).
4. Establish the data available (e.g. on past mortality trends in the country, age group mortality rate, gender mortality rate).
5. After collecting and analysing the data, define the model you propose to use.
6. Write the programme after selecting appropriate software for modelling
7. Debug the program
8. Test the sensitivity of the results to changes in the input parameters.
9. Analyse the results.
10. Write a report documenting the results and the model and communicate the results to the government of country in a simpler format

Question 4

The key items I would include in the documentation on the model to communicate to the client are as follows:

1. Objectives of the model.
2. Parameters of the model
3. Assumptions underlying the model.
4. Validity of the input data
5. Simulations performed to validate the results of the model.
6. References to any research papers or discussions of the model with appropriate experts (Turing Test).
7. Summary of model results in a format the client can easily understand.

Question 5

Advantages of this strategy -

1. The model takes account of one of the major source of variation in consumption rates, specifically age.
2. Data collection is very easy
3. The past data on consumption rates by age are likely to be fairly accurate.
4. The model is easy to implement.
5. The model is simple to understand and to communicate.

Disadvantages of this strategy:

1. Past trends in consumption by age may not be a good guide to future trends.
2. Consumption may be sensitive to pricing, which may change in the future.
3. A rapid increase in consumption rates is unlikely to be sustained for a long period as there is likely to be an upper limit to the amount of Scrummy Bars a person can eat.

Question 6

The possible reasons for such differences might be:

1. The difference between the two runs may not have only been the parameter change.
2. Sensitivity test was not performed during the original model
3. The run was carried out incorrectly

Question 7

The appropriateness of the proposed modelling approach depends on the following -

1. The model should be easy to apply.
2. The data collected should be collected from viable sources.
3. Unpredictable events may take place such as a worldwide pandemic which can change the population.
4. The model is relatively straightforward to explain it to the developers.
5. Refer to the experience of similar new towns this can count as a Turing test as real world example is used.
6. This approach does not take account of home-schooling.

Question 8

The factors which the company should take into consideration when developing the model are as follows:

1. Data collection accuracy of the data collected
2. Were there any attempts in the past to model sickness rates
3. Times of the year employees are prone to sickness For example: Flu is common in winters