

Assignment - 1

Q.1.)

- Ans. • Review the regulatory guidance.
- Define the scope of the model, for example which factors need to be modelled stochastically.
 - Plan the development of the model, including how the model will be tested and validated.
 - Consider alternative forms of model, and decide and document the chosen approach. Where appropriate, this may involve discussion with experts on the underlying stochastic processes.
 - Collect any data required, for example historic losses or policy data.
 - Choose parameters. For economic factors should be able to calibrate to market data. For other factors, eg. expenses, claim distributions need to discuss with staff.
 - Existing "worst case" scenarios. Discuss with staff who made the estimates, especially to gauge views on the probability of events occurring.
 - Decide on the software to be used for the model.
 - Write the computer programs.
 - Debug the program, for example by checking the model behaves as expected for simple, defined scenarios.
 - Review the reasonableness of the output. May include:
 - medium outcomes (how do these compare with business plans)
 - what probability is assigned to "worst case" scenarios.
 - Test the sensitivity of the model to small changes in parameters.
 - Calculate the capital requirement.
 - Communicate findings to management. Document.

Q4.)

Ans. Instructions

- (a) Perform tests to validate the output of the model.
- (b) Definition of input data.
- (c) Any limitations of the model identified (eg. potential unreliability) - unreliability.)
- (d) Basis on which the form of the model chosen (eg. deterministic or stochastic.)
- (e) References to any research papers or discussions with appropriate experts.
- (f) Summary of model results.
- (g) Name and Professional Qualification.
- (h) Purpose or objective of model.
- (i) Assumptions underlying the model.
- (j) How to model might be adapted or extended.

Q5.)

Ans. Advantages:

- The model is simple to understand.
- The model takes account of one major source of variation in consumption rates, specifically age.
- The model is easy and cheap to implement.
- The past data on consumption rates by age are likely to be fairly accurate.

- The model can be adapted easily to different projected populations OR takes into account future changes in the population.

Disadvantages:

- Past trends in consumption by age may not be a good guide to future trends.
- Extrapolation of past age-specific consumption rates may be complex or difficult and can be done in different ways.
- Consumption of chocolate may be affected by the state of the economy, eg. whether there is a recession.
- Factors other than the age may be important in determining consumption, eg. expenditure on advertising.
- Consumption may be sensitive to pricing, which may change in future.
- 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.
- The projections of the future population by age may not be accurate, as they depend on future fertility, mortality & migration rates.
- The proposed strategy does not include any testing of the sensitivity of total demand to changes in the projected population, or variations in future consumption trends from that used in the model.
- Unforeseen events.
- The consumption of Scrummy bars may vary with cohort rather than age, and the model does not capture cohort effects.

Q6.)

- Ans. (a) One or both of the runs (the original or the new) may have been incorrect as, for example, the second trainee may not have been fully aware of the set up.
- (b) The difference between the two runs may not have only been the parameter change, for example the two runs may have used different random seeds or the second run may have had fewer simulations.
- (c) The expectation that the model was not sensitive to this parameter could have been incorrect.

Q7.)

- Ans. • The model should be simple to apply.
- The data specified are likely to be available from reliable resources.
 - Although it is possible that the starting point for the planned population may be wrong.
 - Unforeseen events may take place such as a national epidemic which change the rates.
 - The model is relatively straightforward to explain to the planners/developers.
 - Should consider whether there are trends in fertility rates, rather than simply using current rates.
 - Mortality rates unlikely to be significant relative to the uncertainty of the projection, because rates at ages with non zero fertility rates should be small and child mortality rates should be low.
 - Current age distribution for the area may not be representative of that for the new town.

Q8.)

- Ans. • The nature of the existing sickness data the company possesses. The model can only be as complex as the data will allow it to be.
- Whether the company has made any previous attempts to model sickness rates amongst its employees, and how successful they were.
 - The complexity of the model.
 - General trends in sickness at the national level may need to be built in.
 - The definition of sickness and level of benefits under the scheme.
 - The ease of communication of the model.
 - The budget and resources available for the construction of the model.
 - Capability of staff.
 - Does the model need to interface with model of other aspects of the company's business.
 - The independence of sickness rates should be taken into account.