

Tirth Parmar

Section B

Roll No. 52

Assignment 1

Q1) The steps in developing this model will be-

- We need to define the set objectives which needs to be completed by the model, which in this case is a future cashflows model. The model should give us the condition under which the chances of liabilities exceeding the assets is less than 0.5% given the new changes in capital requirements.
- Next, we will have to plan the modelling process and validate our model. This can be done in reference with the worst-case scenario.
- Then we will have to collect data from the appropriate sources. The data regarding the liabilities could be predicted by data taken from the insurance company itself.
- We will have to define the parameters of model next. This would include future possible positive and negative cashflows and their discount rate.
- We can even consult real world experts regarding the possible future cashflows and discount rates that we have decided.

Q2) The different factors that could affect the probability to be inaccurate are-

- The number predicted policies which will be sold.
- The amount of premiums earned from these policies.
- The number of claims that will have to be paid by the company.
- The regulatory changes, if any happen.
- The interest rates and inflations.
- The projects in which the money earned in premiums is invested.
- Certain unforeseen calamities like a natural disaster or a pandemic.
- If the company has any major contingent liabilities.

Q3) Steps involved in identifying the appropriate model will be –

- First one will be to identify the objectives of the model which are to forecast future mortality.
- Then collect all the appropriate data from suitable sources and list out the parameters.
- Then determine the relations between the different parameters given a few assumptions.
- Then try and tweak the model to bring it as close to a real-world scenario.
- We will also have to validate our model along the way with constant checks and peer reviews.
- Then we will have to estimate and output based on our input.
- We can also change our inputs and identify the best and worst-case scenarios.

Q4) The key items that need to be included in the documentation process are –

- The original data source and the original data itself.
- The overall objectives of the model and its parameters.
- The computer code used in the model.
- The range of outcomes from received from the model.
- The assumptions taken into consideration in this model.

Q5) Advantages of such a model will be –

- It will help us study and predict age-specific consumption rates over large period of time.
- We can also try the same thing with different consumption rates to get an overview of our future possible sales in best to worst case scenarios.
- The predictions about the future sales might also help us take key decisions regarding expanding the product range or focusing on our existing product.
- Also, this will be complex system with a lot of different parameters that just can't be represented by a mathematical or logical model and will require a simulation modelling.

Disadvantages of such a model will be –

- Such a model will require a huge investment of time, money, expertise not just to create it but also to validate it.
- Several independent runs will have to be done to get a rough estimate value of the outputs.
- Such a model might look impressive but we would have to constantly validate and peer review to get accurate results and not get distracted by its complexity.
- Such a model highly depends on its data input and given that the life span of this product is very short we won't have enough data to get an accurate estimate.
- A major change could also not be accounted for in this model.

Q6) It could happen because of the lack of reproducibility in the model when it was designed. It could also happen if the original data and the computer code was not saved properly. This could also happen if the correlation of the parameter in the model is not taken correctly. Also, the change of parameter could have been wrong. They should also check the other parameters for some errors and their correlation factor.

Q7) The main objective of this model is to determine the number and size of schools required in a village. The different factors or parameters affecting this could be the population distribution of the village. There is no need for the future mortality predictions as to obtain our objective we will require the distribution of school going children. Then according to that we can forecast the future population and estimate the number of schools required in that particular area.

Q8) There are several factors the company should take into consideration which are –

- They should look at their working hours to better understand the employee routine.
- They should take the pandemic into consideration and whether all the mandatory rules are being followed.
- They should look at the past medical history of its employees.
- Whether the employees lie about their sick leaves.
- Are they up to date on all vaccines?
- What kind of food is being served in their offices and places near by.

- Does the employee smoke?