*Question 4: report writing*

*Assume you have been acting as consultant to the company. Write a short report (maximum 750 words) of your findings. Since it will be considered by the board of the company, you should avoid technical details as much as possible. You need not substantially repeat any information from questions 1 to 3, but you should:*

*a) State any assumptions you have made;*

*b) Provide any advice you can on factors the company may be able to control;*

*c) Indicate any reservations you have;*

*d) Provide brief suggestions as to how your work might be extended.*

*If you wish to undertake further ‘what if’ or other analysis, you are encouraged to do so. In that case, you need not provide details of methods or coding; you may just quote the results you obtain.*

*a)*

The following assumptions were made in modelling the insurance company’s performance over a one year time period.

* Each customer pays the same premium regardless of their circumstances
* Each customer has exactly the same probability of claiming
* Each customer claim is independent. This would not be the case if it were for house insurance. A natural disaster could have an impact on a number of customers connected by a common postcode
* A customer makes a maximum of one claim per year
* Customers did not end their policy early

*Parts b), c) and d)*

**Advice on factors that the company can control**

**The Annual Premium**

This was examined in detail in 3a. The amount of money that each customer pays greatly affects the chance of the company going bankrupt after a year.

A premium of £5500 per year yields a 1 in 5 chance of the company going bust (this is clearly not a desirable risk). Increasing this premium by £1000 to £6500 reduces that chance to about 1 in 20 (this too is quite risky). An increase to £7500 will reduce that chance to approximately 1.2%.

While it is important to lower risk, it is also important to remember that customers may move to another insurance company if the premium is set at too high an amount. The effect of premium upon consumer behaviour would have to be investigated further.

**Charging extra for customers in different risk categories**

Probability of a customer making a claim was investigated in section 3b.This may initially seem like a factor that cannot be controlled. However, with strategic premium pricing and marketing for certain types of customers the average chance of a customer making a claim can be altered.

The company may wish to consider charging customers different rates depending on their circumstances (age, weight, area etc.). This would mean that the company could offer lower, more competitive premiums to customers who are not likely to make claims.

The company could charge more to customers whose circumstances give them a higher chance of making a claim. This would offset the extra risk the company are inheriting.

With clever marketing, the company could aim for a certain ‘low risk’ target market although specialising too much may impact on the overall customer base.

Once again though, the effect of premium upon consumer behaviour would have to be investigated further.

**Insurance excess**

The company may wish to consider introducing an excess that customers would have to pay when making a claim. This would be a fixed amount of money paid for each claim made. This would greatly reduce customers making small claims and would provide a little extra revenue. In addition, having fewer small claims would further reduce other admin costs.

Increasing the insurance excess for each claim may have the effect of detracting customers.

**Maximum claim that can be made**

Although a large claim is highly unlikely, it is still not impossible. The highest claim should be capped by a fixed amount to prevent any ‘freak’ accidents having a severe impact on the company’s wellbeing.

**Other factors to consider and further investigate**

In order to see the likelihood of the company surviving in the medium term, the scenario should be modelled over a longer period. It would be useful to run these simulations over 5 years or 10 years to see the cumulative effect of year on year business. If the company has had a poor (but not bankrupt) year 1, the risk of the business collapsing in the following year would be increased due to having less assets at the beginning of the year 2.

Thought should be given to customers who may make more than one claim per year. Will these customers need to have their premiums changed and will this change the customer base? The company may wish to consider investigating ‘no claims’ incentives for customers who do not claim in order to keep low risk customers.

**‘What if’ customers had to pay a fixed excess for each claim they made.**

The following results were gained by tweaking the simulation so that it would ‘refund’ the company a set amount each time a claim was made.

Excess £100

p(bankruptcy after 1 year) = 0.1848

Excess £500

p(bankruptcy after 1 year) = 0.1793

Excess £1000

p(bankruptcy after 1 year) = 0.1691

Excess £1500

p(bankruptcy after 1 year) = 0.1579

Excess £2000

p(bankruptcy after 1 year) = 0.145

It can be seen that the excess has to be greatly increased in order to have a significant impact on the probability of bankruptcy.

This crude simulation could be further improved by removing claims that are below the ‘excess’ amount (as clearly these people wouldn’t bother to claim).