DATA ANALYTICS

QUESTION

It is Friday 9th March 2018, and you are Anne Actuary, an FIAA working as the Analytics Director for Mega Bank, the largest retail bank in Capland. You enjoy this role as it gives you a wide variety of project work, from credit risk to marketing campaigns to customer churn. In Capland all data scientists in banks must belong to a certified professional organisation and follow that organisation's code of conduct. As a Fellow of the Institute of Actuaries of Australia, you have chosen membership of the Actuaries Institute to comply with this regulatory requirement.

Even though most citizens have credit cards, personal loans are quite popular in Capland, as they have much lower interest rates, and guaranteed 8-hour turnaround times for loan approval decisions. Even though the interest rates are very competitive compared to credit cards, some customers still want to haggle for even better interest rates on their personal loans, and ask for interest rates that are lower by 0.25%, 0.5%… etc. It is the task of each bank branch loan officer to consider these discount requests and decide whether to give the discount, with authority to discount rates by up to 1% pa. Personal loans are profitable for Mega Bank, and so there is a business goal of writing more personal loans. Mega Bank has been achieving 6% year-on-year growth in personal loans issued, versus target growth of 5%. Personal loans issued on Mega Bank's standard interest rate achieved an average return on risk adjusted capital of 8.9% pa in 2017, versus a target return of 8.8% pa.

In January 2018 Mega Bank's internal auditor released her report into the personal loans application processes. Amongst other recommendations in her report, the internal auditor wrote the following:

> *The practice of negotiating discounts for personal loans has inadequate controls. In 2015, 15% of personal loans involved a discount request, and 81% of those discount requests were approved. In 2016, 22% of personal loans involved a discount request, and 88% of those discount requests were approved. In 2017, 25% of personal loans involved a discount request and 98% of requests resulted in a discounted interest rate. There is a conflict of interest for loan officers, as their Key Performance Indicators include loan new business volumes. The subjective nature of the decision process leaves the bank exposed to reputation risk and fraud. I therefore recommend that Mega Bank:*
>
> 1. *Introduce checks and balances to limit the conflict of interest. The loan officer responsible for sales cannot be the same staff member having authority to discount interest rates; and*
> 2. *Reduce the subjectivity of the discount negotiations by standardising the negotiation decision making process.*

A month ago, Catherine Everton Overton (the CEO of Mega Bank) called both you and Percival Loh (the General Manager for Personal Lending) into a meeting to discuss the internal auditor's report. You suggested running a small-scale experiment for one month, using AB Testing, where a random sample of 25% of the personal loan discount requests (up to a maximum of 12,000 loan requests) made during February were then assigned (at random) a discount offer of:

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1. zero discount, or
2. 0.25% pa discount, or
3. 0.25% pa less than the requested discount subject to a maximum discount of 1% pa, or
4. the full discount requested by the customer subject to a maximum discount of 1% pa.

The experiment went ahead with 12,000 discount requests going through the AB testing process. The data on whether each customer accepted the discount offer is now available. Your findings and recommendations are due to be delivered to Catherine and Percival on Thursday 22nd March 2018.

On Wednesday 21st March 2018 Percival sent you 10 new personal loan discount applications and asked you to include your recommended discounts for each request in your report, accompanied by 1 or 2 sentences for each request, explaining how your recommended discount decision making process led to that recommendation.

Note to Candidates: Your report is "actuarial advice" and therefore, must comply with the Code of Professional Conduct.

Attachments

C10_DA_S1_2018_AB_Test_Data.xlsx – AB test data

END OF QUESTION