Loan Club Lending Strategy

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Our objective is to maximize profit. Then, we want to issue loans if and only if the expected net profit from that loan is positive. That is, issue a loan for applicant i if and only if, $\hat{E}[\pi \mid X_i] > 0$.

$$
\begin{aligned}
E[\pi \mid X] &= E[rev \mid X] - E[loss \mid X] \\
\hat{E}[\pi \mid X_i] &= (1 - \hat{p}(def \mid X_i)) \times prop\_profit - \hat{p}(def \mid X_i)(1 - 0.7 \times \hat{E}[recov \mid X_i]) \times amt \\
&= (1 - \hat{p}(def \mid X_i)) \times 0.15 \times amt - \hat{p}(def \mid X_i)(1 - 0.7 \times \hat{E}[recov \mid X_i]) \times amt
\end{aligned}
$$

In plain language, our expected revenue is the probability that an applicant does not default times the interest they will pay if they do not default. Our expected loss is the probability of default times the amount of the principal we will fail to recover.

In order to estimate expected profit, we must first estimate $\hat{p}(def \mid X_i)$ (the probability that a given applicant defaults) and $\hat{E}[recov \mid X_i]$ (the expected fraction of the principle we will recover if a given applicant defaults). I recommend that we use the logistic regression and random forest models that I have trained and discussed in my simulation report. Armed with these estimates, we then calculate the expected net profit for every application using the formula above. If an application has a positive expected profit, we ought to issue the loan.