

ASOC X QUANTIUM



CASE
COMPETITION



JAKE
WARBY



JACK
LIN



BLAKE
FOUFAS



PREM
PANT

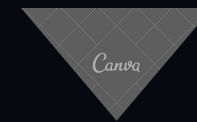
TEAM ACASO

2021



EXECUTIVE SUMMARY

Maximising profitability and ensuring business model viability in response to decrease in ConnBank broker commission rates.



Tasks

Profitability

Business model
viability

Future roadmap

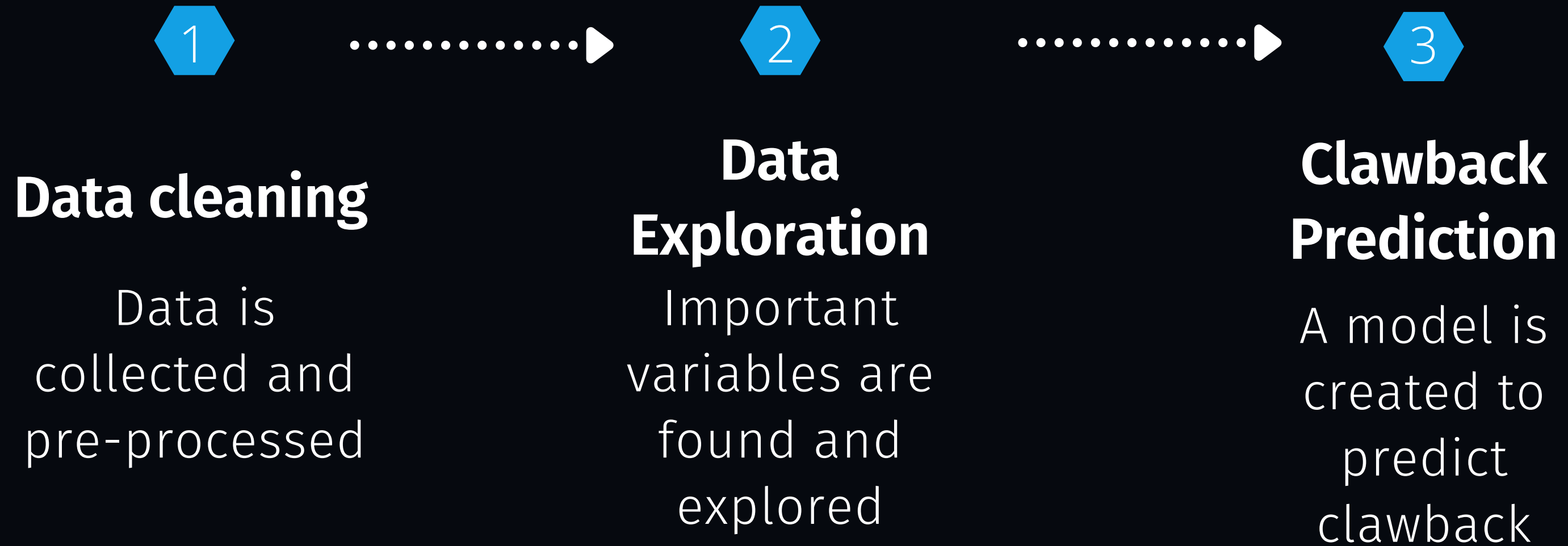
Problem
Analysis

- How can Risky Lending maintain profitability in the short term?
- Is Risky Lending's business model robust and viable in varying economic conditions?
- Long term strategy recommendations.

Strategy

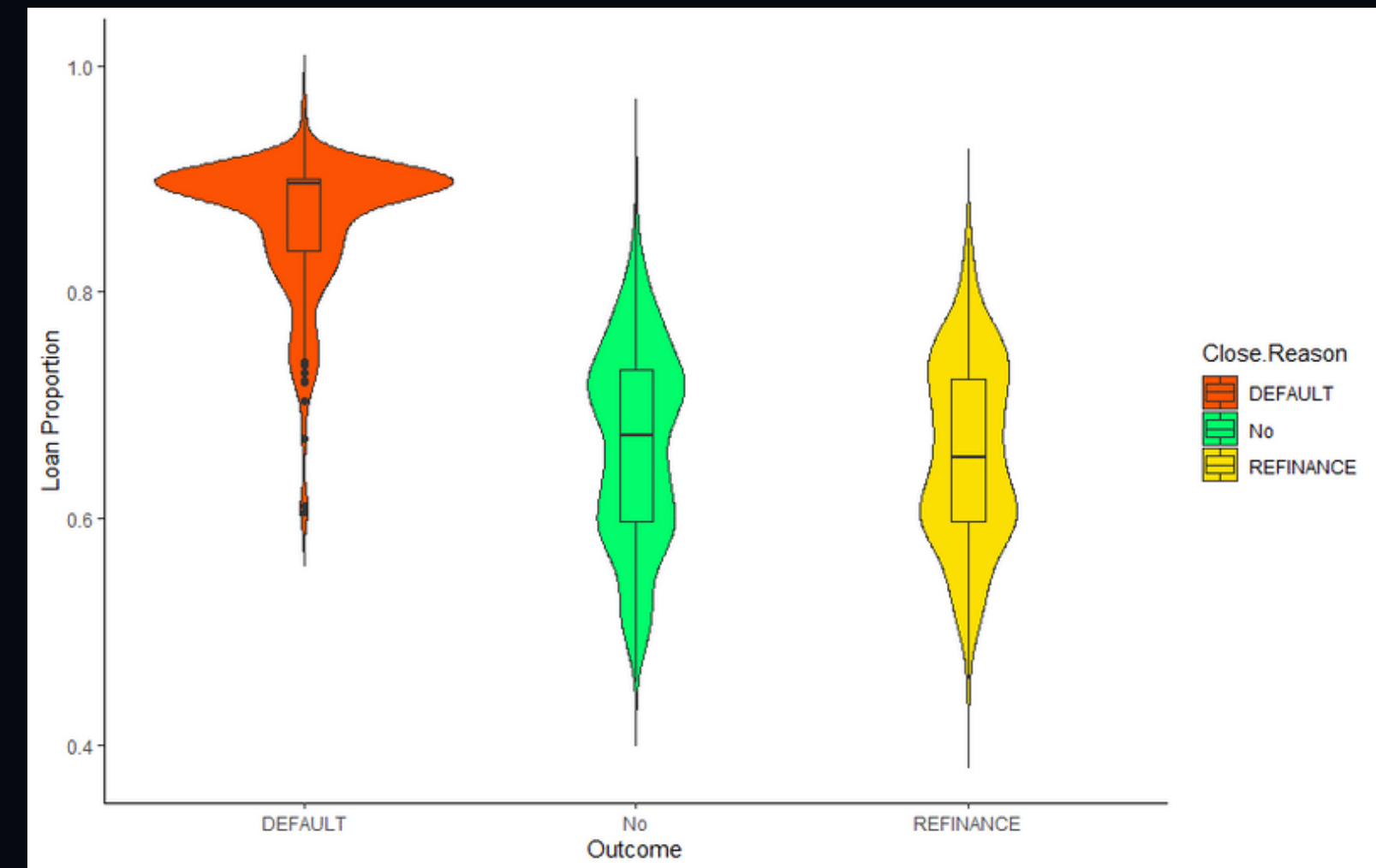
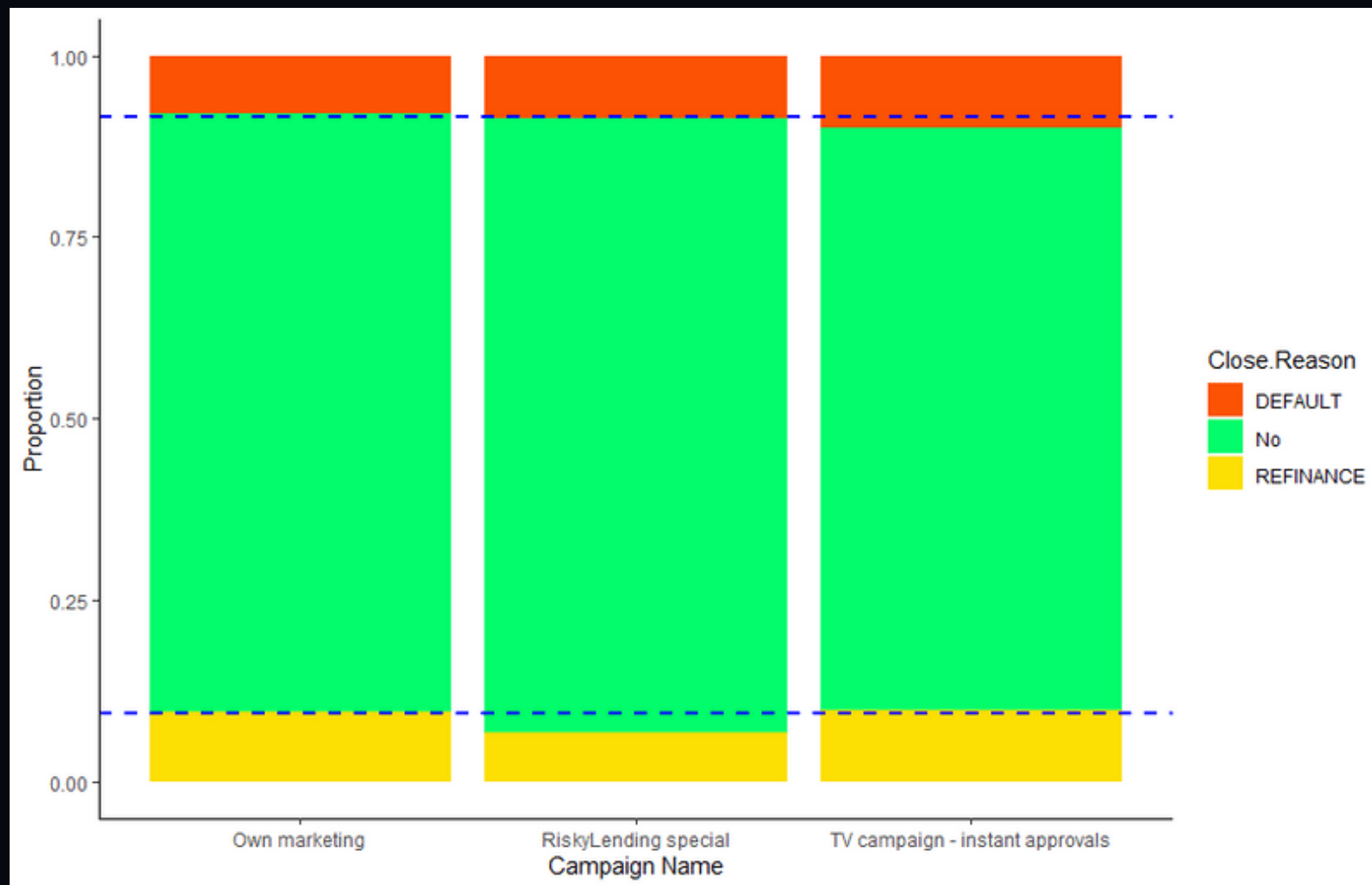
- Develop predictive model to assess current risks and evaluate future ones.
- Consolidate current customer portfolio to extract maximum value.
- Careful expansion of customer base and introduction of product possibilities.

Prior to Task 1...



Exploratory Notes

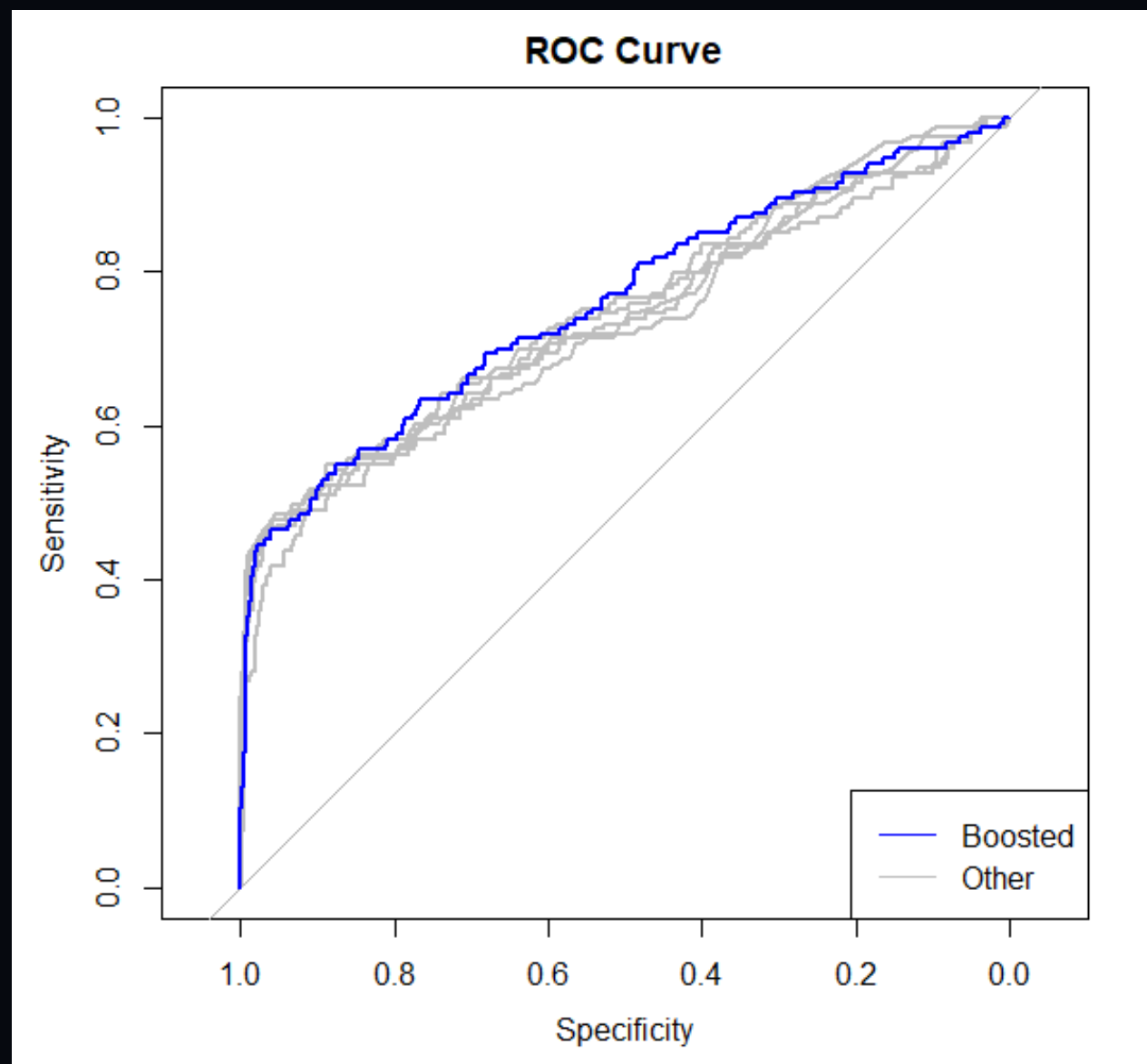
Exploratory numerical and graphical analysis was done to find interesting variable relationships.



See Appendix 1 for remaining variable graphs

Model Selection

After 100 repeats of 10 fold cross-validation over a range of models, the boosted model was determined to be the best.



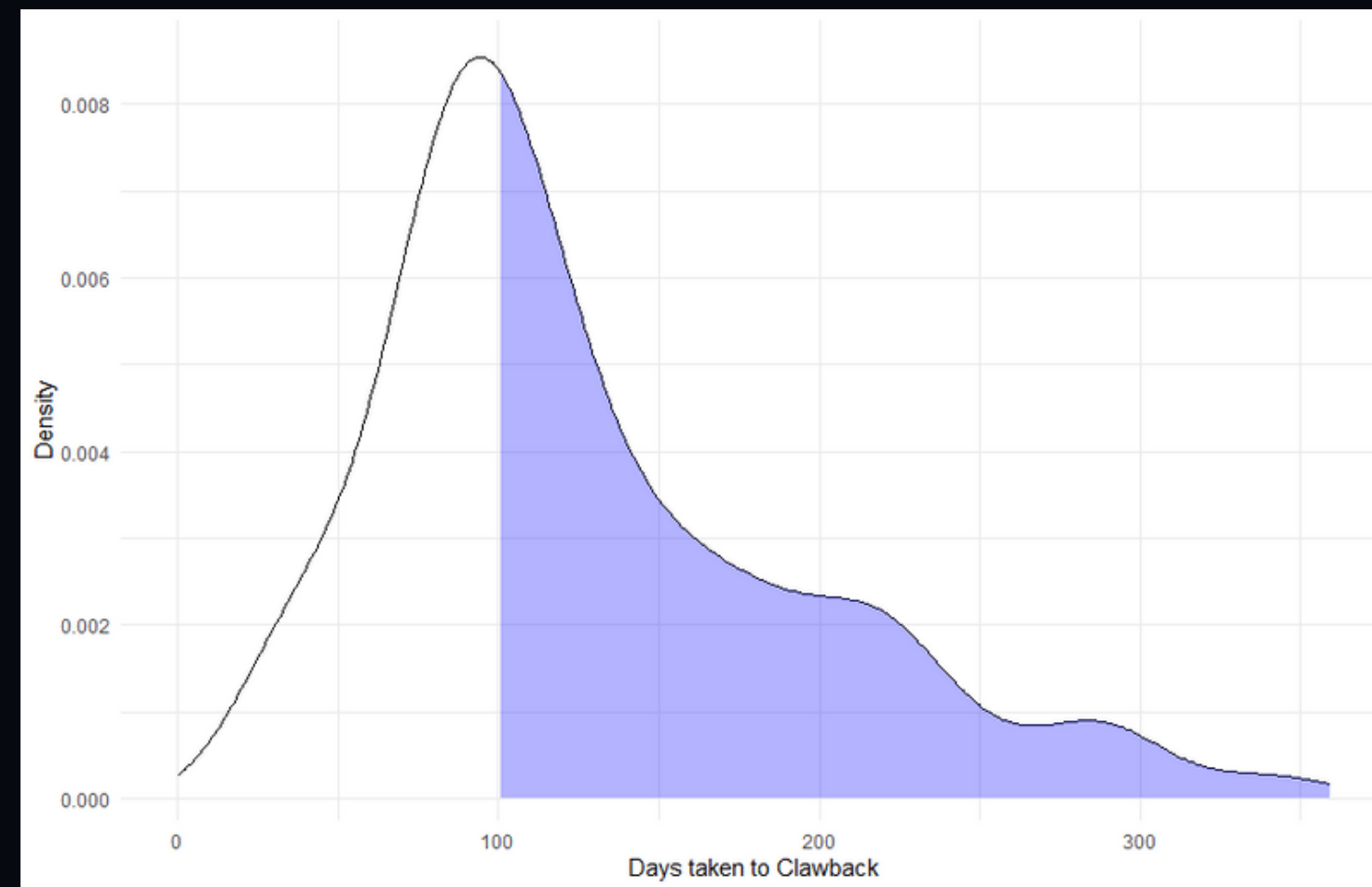
METRIC	VALUE
Number of Trees	600
Interaction Depth	4
Log - Loss	0.343
AUC	0.753
Accuracy	0.901

TASK 1 - PROFITABILITY PROJECTIONS



Estimation of Expected Profits

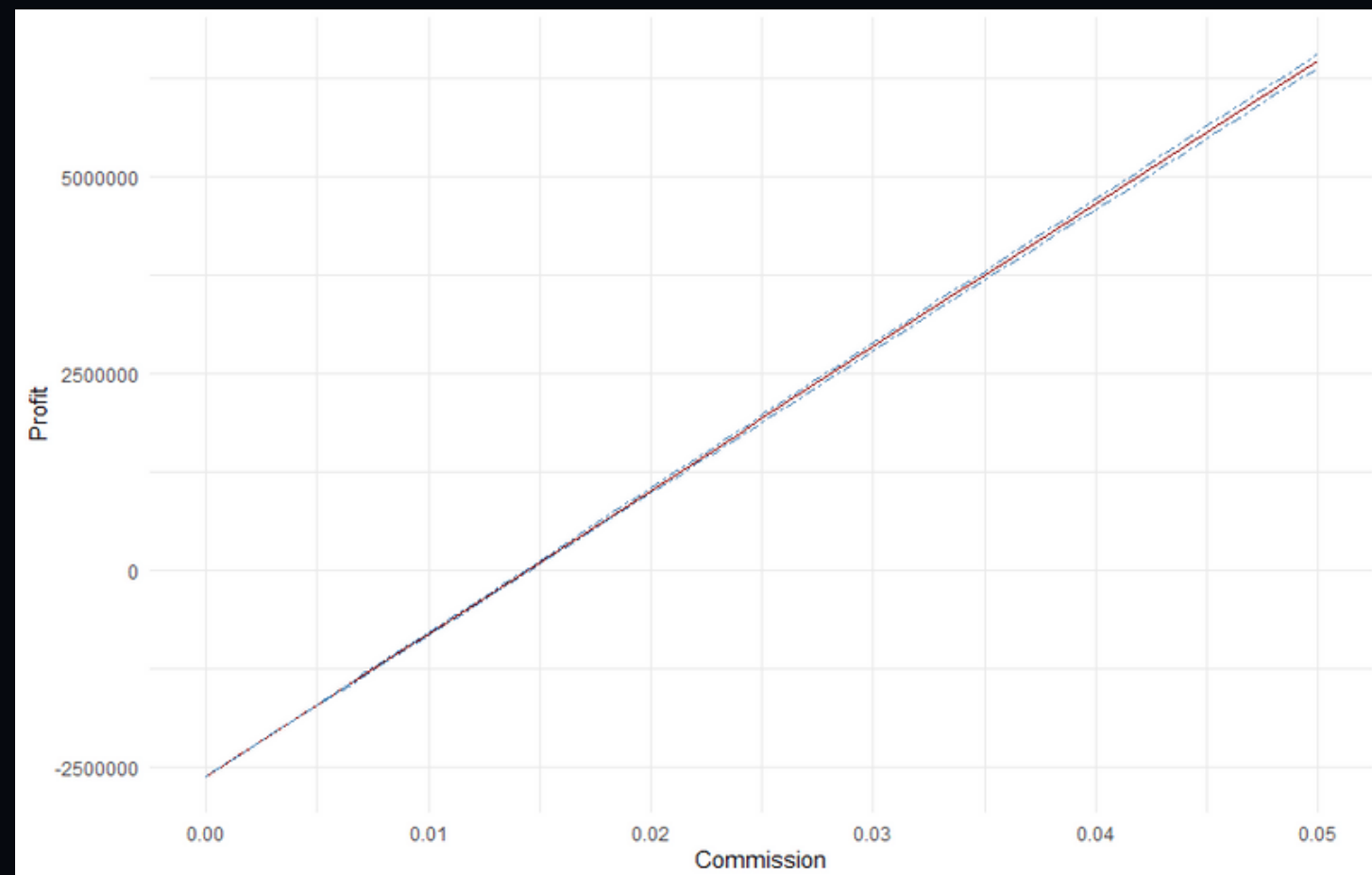
For loans that haven't been active for one year, we have generated expected commission profits based on clawback probabilities and elapsed time.



$$\mathbb{E}[P] = p_{\text{claw}} * \text{Cost} + (1 - p_{\text{claw}}) * (\text{Comm} + \text{Cost})$$

Profit Testing - Results

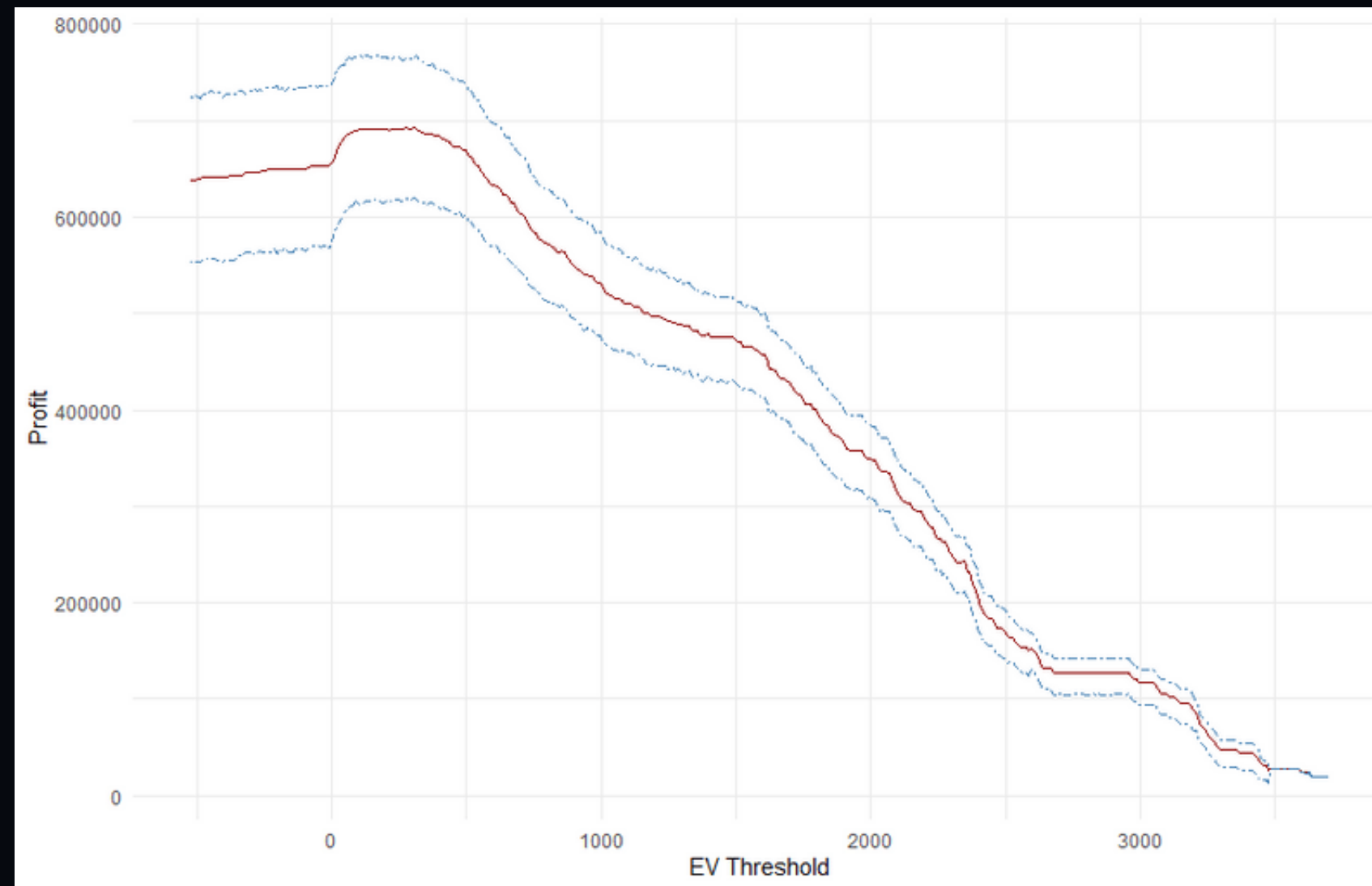
Utilising the expected profits we can calculate the profitability at different commission levels.



COMM	0.5%	$E[P]$	99.5%
3.5%	\$3,693,388	\$3,749,447	\$3,796,523
5%	\$6,381,150	\$6,477,361	\$6,561,614

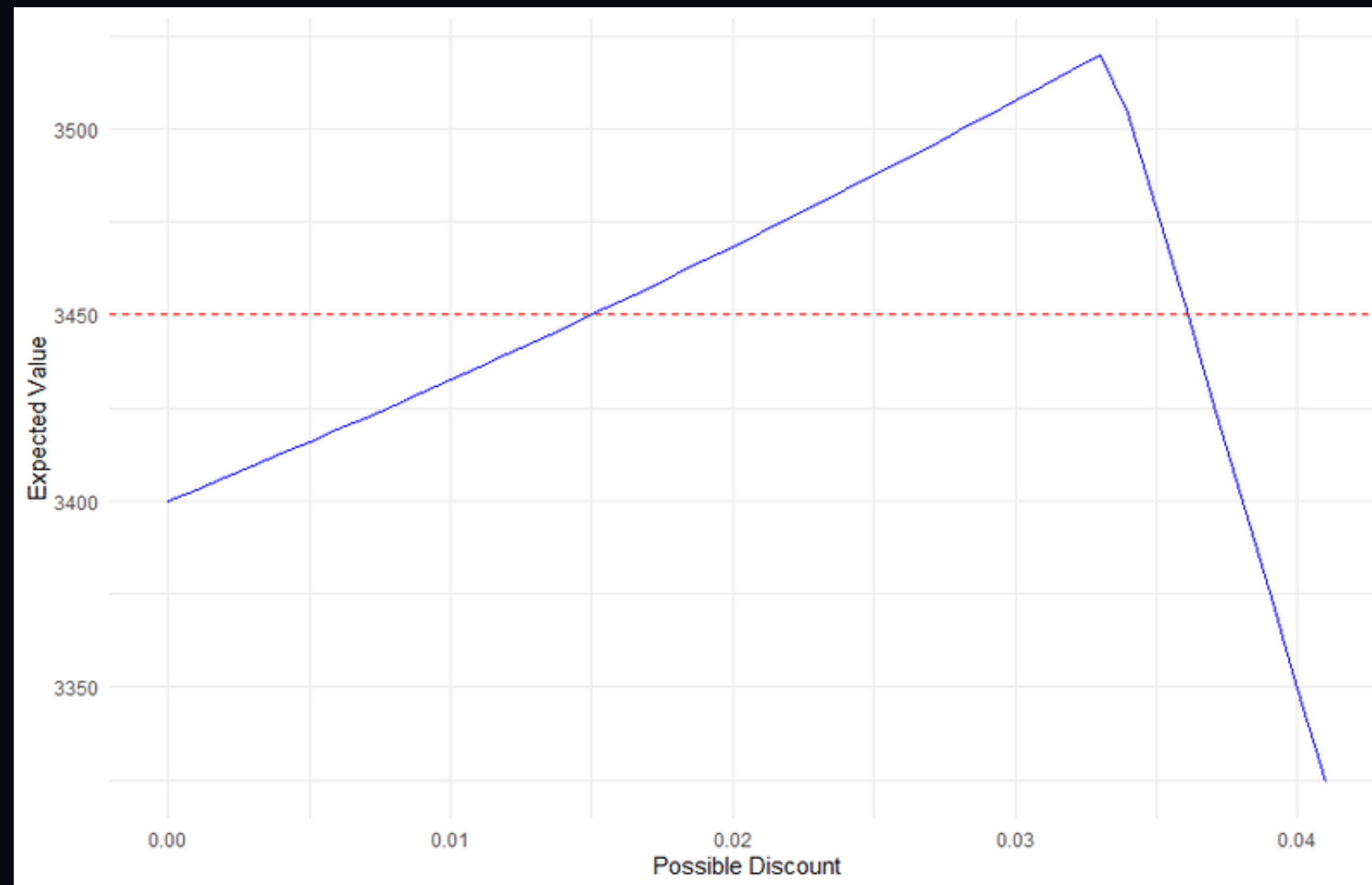
Short Term Strategy - 1

Into the future only positive expected value contracts should be taken. In the short term to mitigate risk from economic factors, a higher threshold than 0 should be put in place.



Short Term Strategy - 2

To make the most of existing contracts, discounts can be offered to those with high refinance risk to increase expected profit.



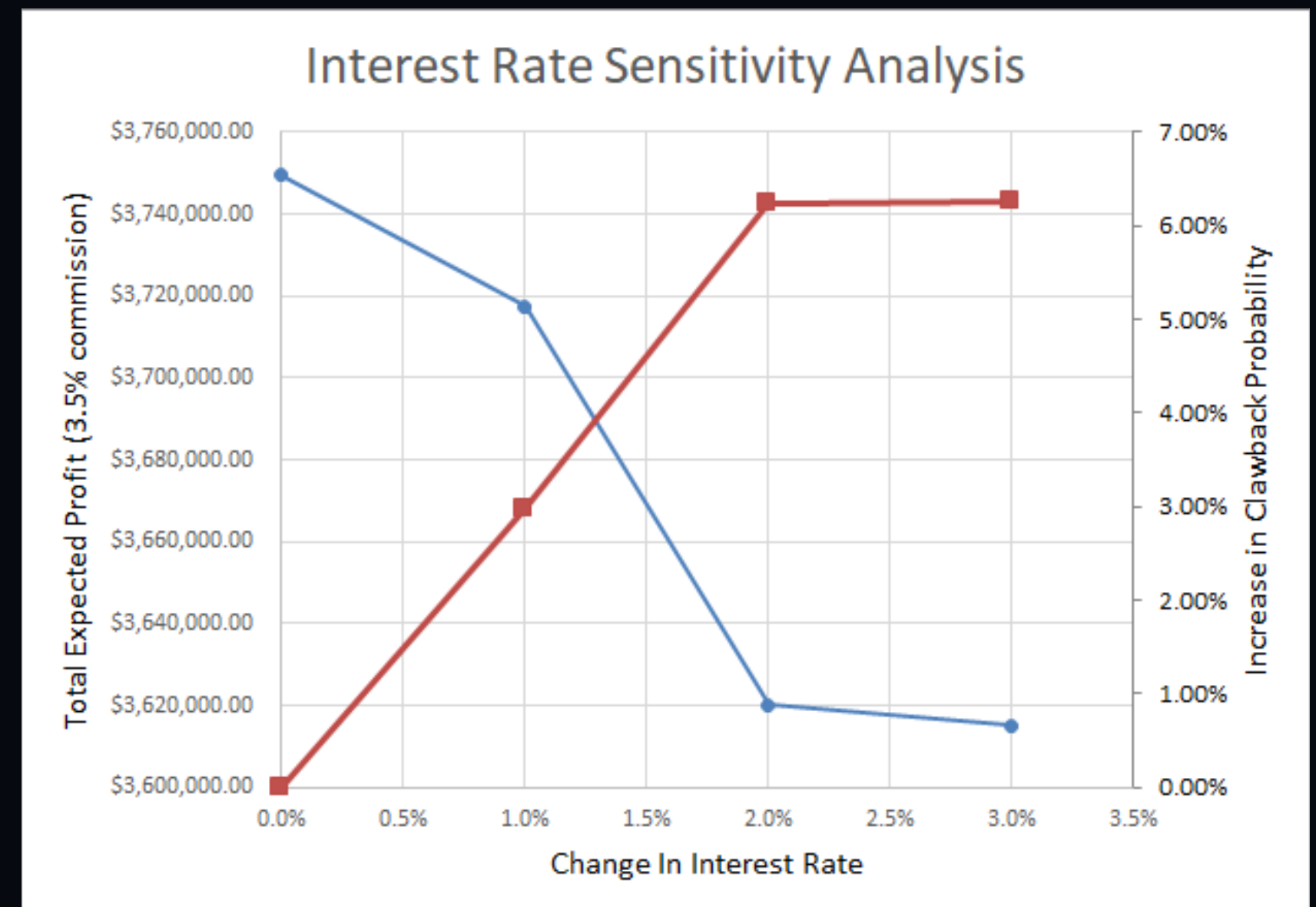
TASK 2 - BUSINESS MODEL VIABILITY



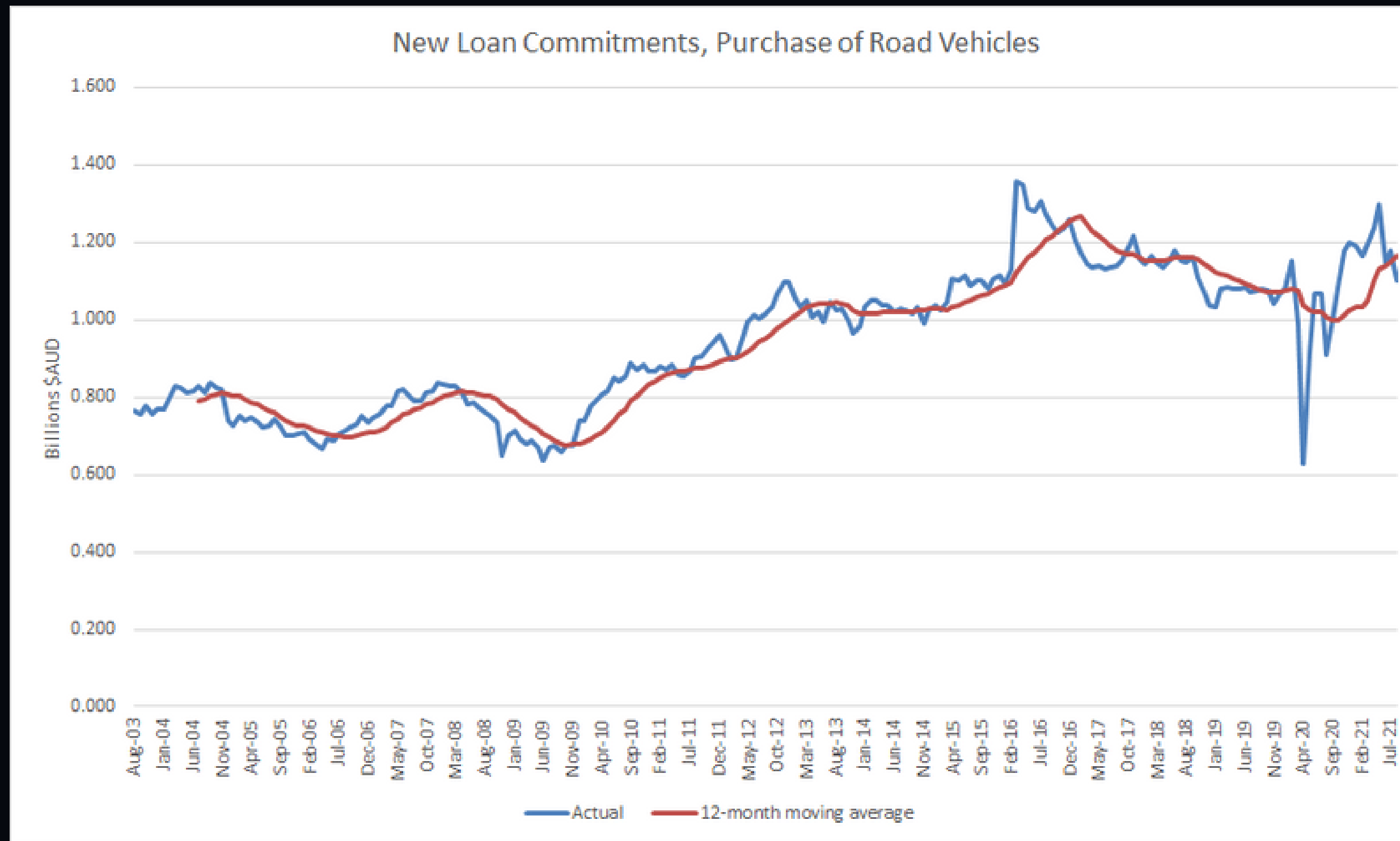
Interest Rate Sensitivity Analysis

An increase in interest rates exogenously results in a negative impact on Risky Lending profitability

RATE CHANGE	Clawback Change	$\mathbb{E}[P]$
Base Case	0.00%	\$3,749,447
1.0%	2.98%	\$3,719,494
2.0%	6.23%	\$3,620,141
3.0%	6.25%	\$3,615,181



New loan commitments show steady growth...



Source: Australian Bureau of Statistics, Lending Indicators, August 2021

COVID crash consistent with Risky Lending data

During the COVID market downturn...

7.6% decrease in profit per day compared to pre-COVID

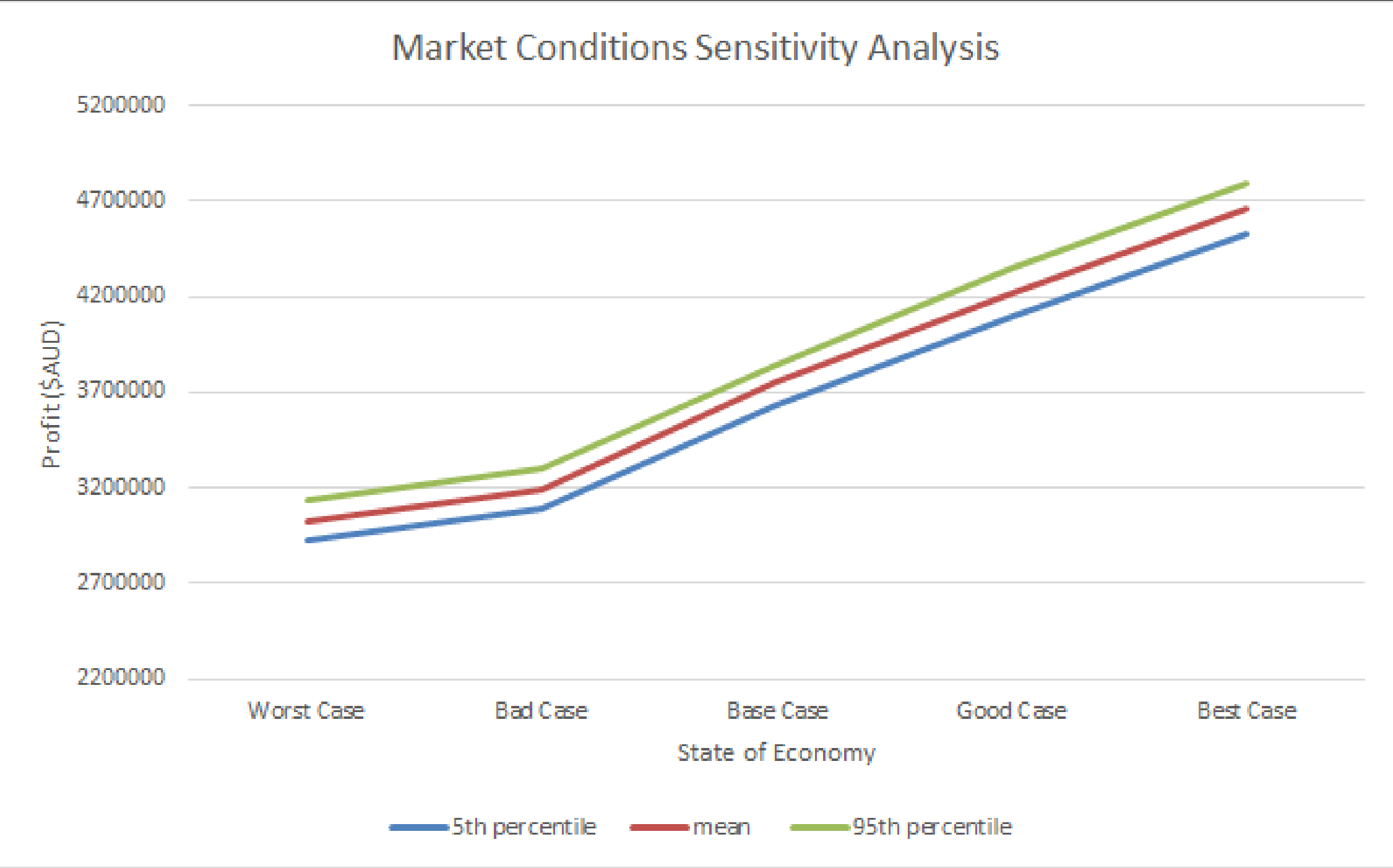
155.4% increase in default rate

After the initial downturn...

79.7% increase in daily loan volume

165.3% increase in profit per day

Profitability during a extended market downturn key to business model viability

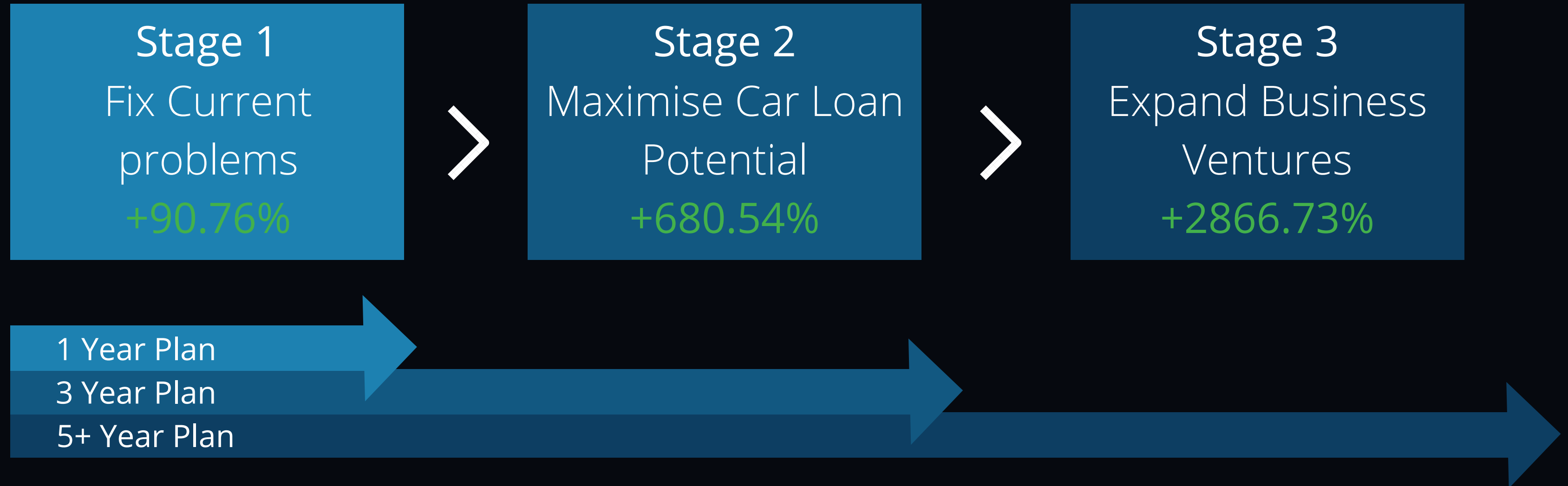


Multifactorial analysis suggests Risky Lending's business model is resilient to market downturns ... but also has the ability to scale up in a market boom.

TASK 3 - FUTURE ROAD MAP



Long Term Timeline



Our long term strategy consists of tasks to be completed within certain time intervals and profit projections given these goals are reached.

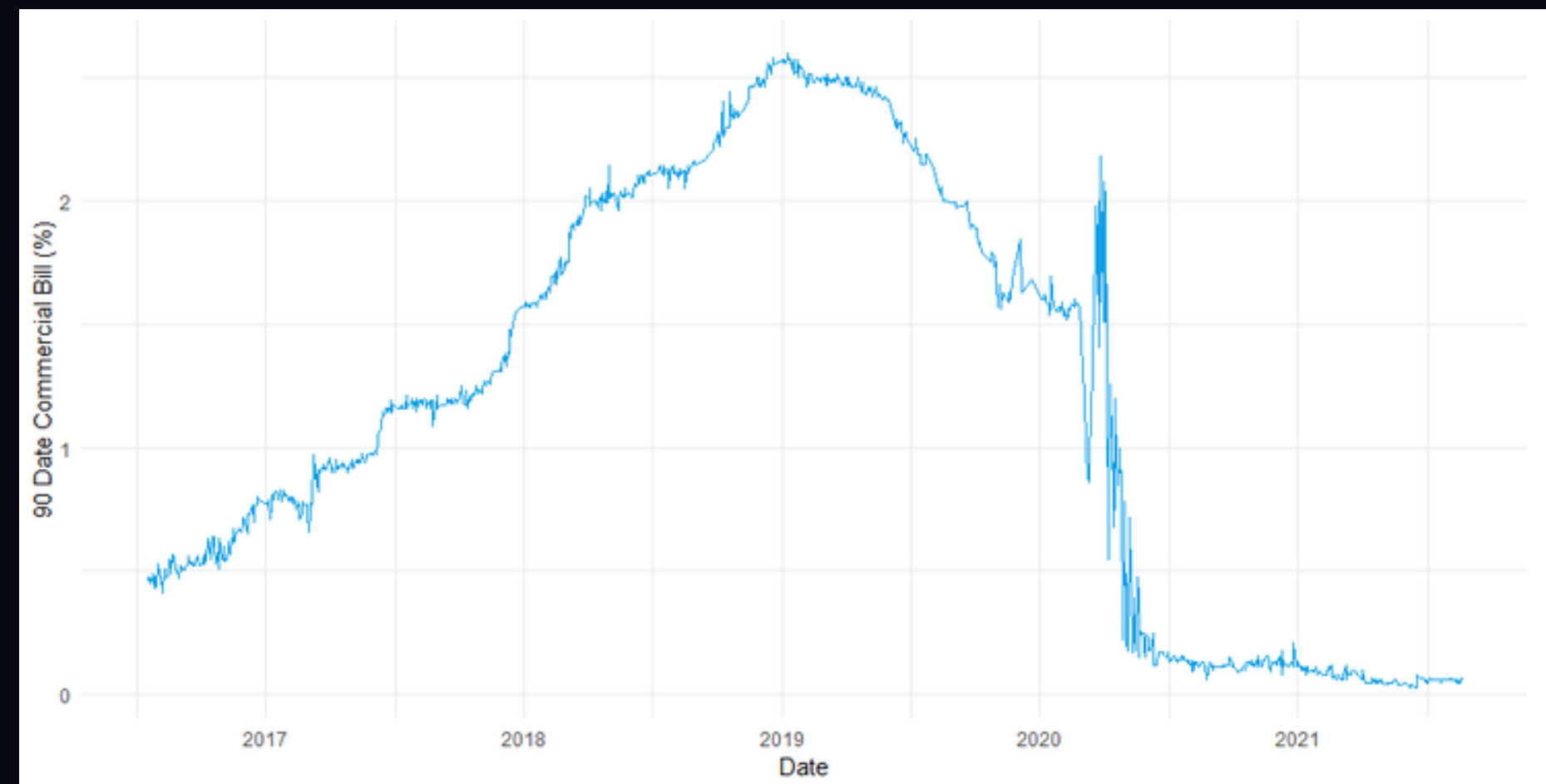
1 Year - Part 1

1

Take only positive expected value contracts

2

Begin investing in short-term, low risk securities



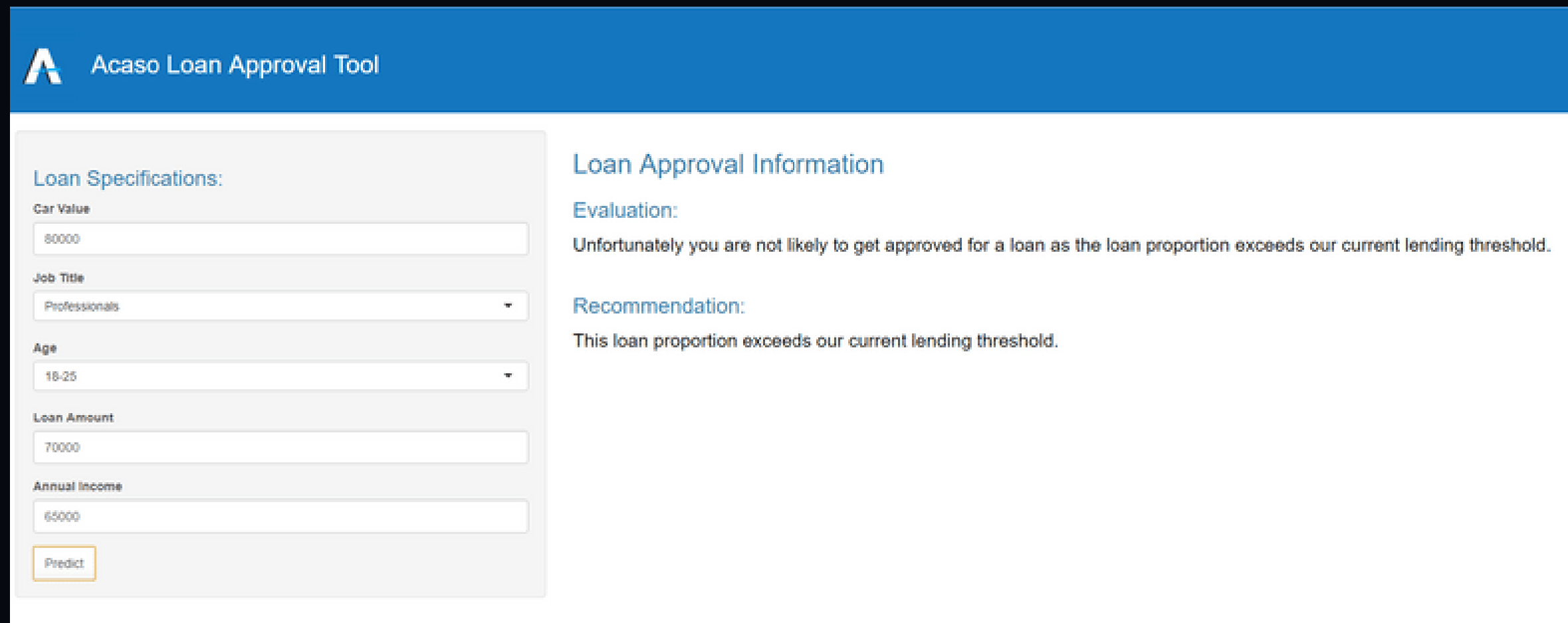
1 Year - Part 2

3

Improve data collection methodology

4

Implement Acaso© Loan Recommendation software



The screenshot displays the 'Acaso Loan Approval Tool' interface. On the left, under 'Loan Specifications:', there are input fields for 'Car Value' (80000), 'Job Title' (Professionals), 'Age' (18-25), 'Loan Amount' (70000), and 'Annual Income' (65000). A 'Predict' button is at the bottom of this section. On the right, under 'Loan Approval Information', the 'Evaluation:' section states: 'Unfortunately you are not likely to get approved for a loan as the loan proportion exceeds our current lending threshold.' The 'Recommendation:' section states: 'This loan proportion exceeds our current lending threshold.'

3 Years

1	Diversification through other loan providers
2	Partnership with car insurance companies
3	Targeted Ad Campaigns



Targeted Ad Example

LinkedIn ad targeting those who take more expensive loans and are also more likely to refinance



Own Your Dream Car

With a **1% discount** for 6 months on our financing rates!



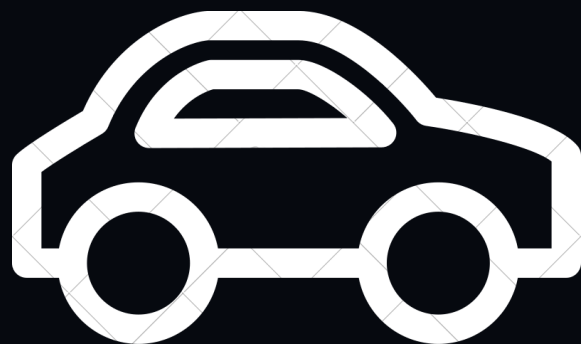
RL
car loans

Contact Us :
+123-456-7890
riskylending.com

Promotion Average rate:	Industry Average rate:
3.5%	4.5%

5 Years and Onwards..

1	Diversify into Other Loan Divisions
2	Long Term Investments
3	Offer Loans rather than Seeking Commission



THANK YOU

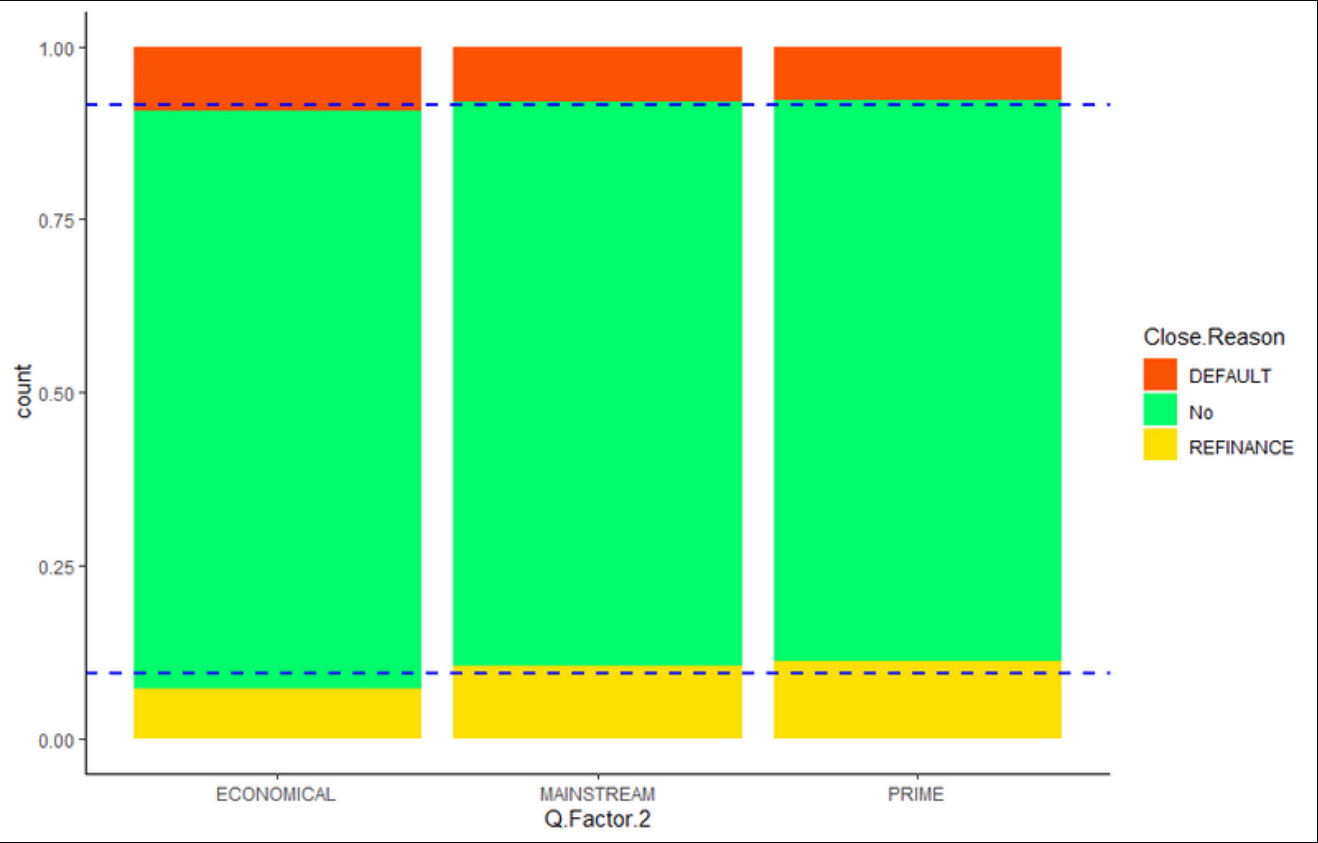
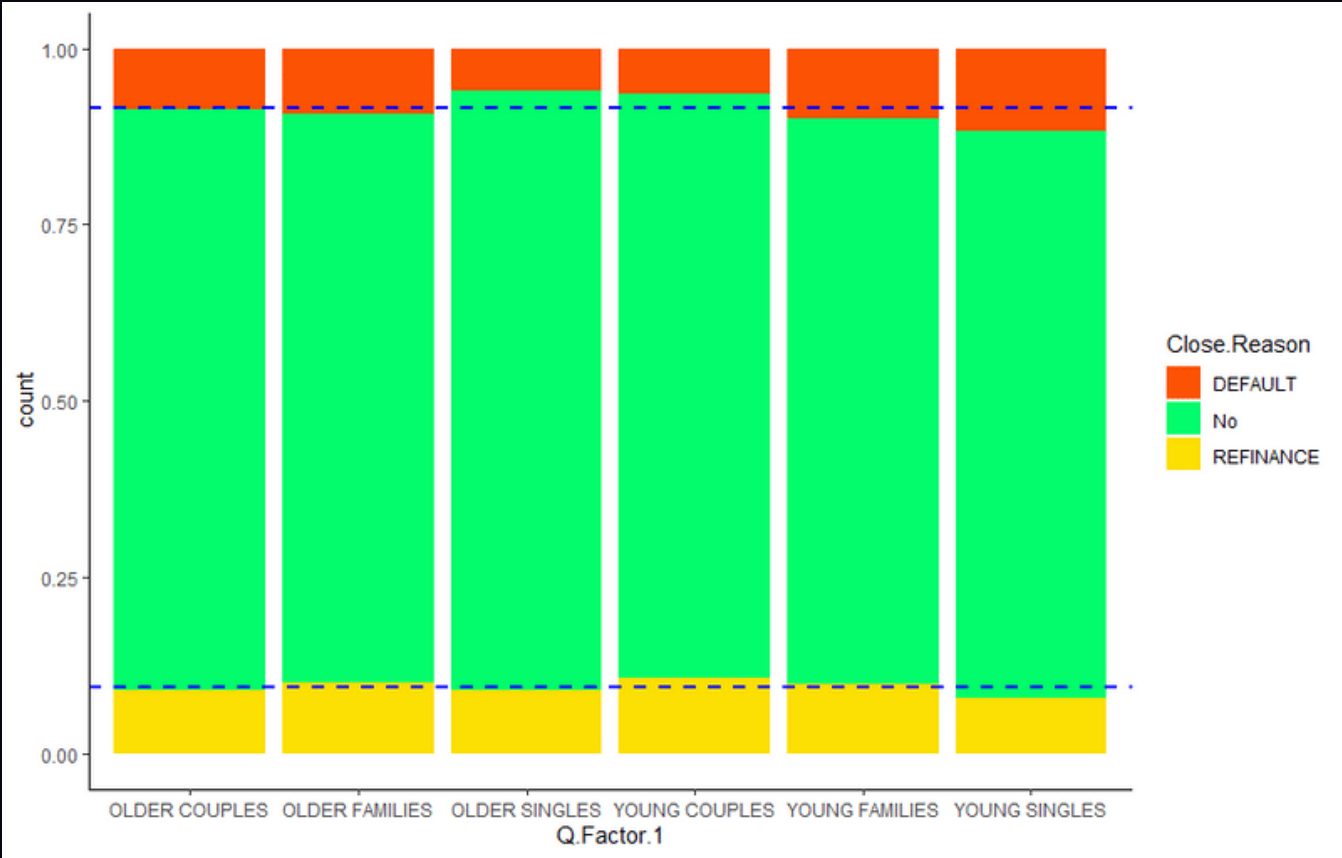
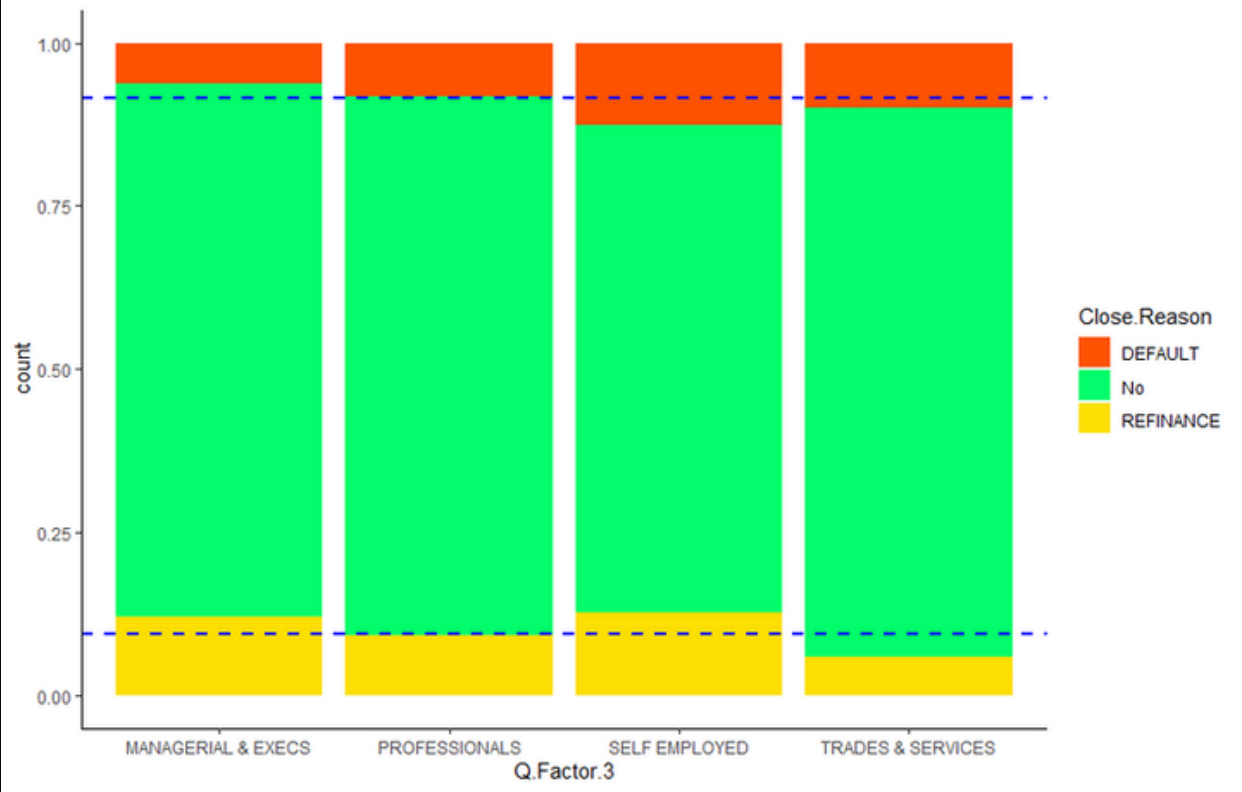
FOR WATCHING

APPENDIX

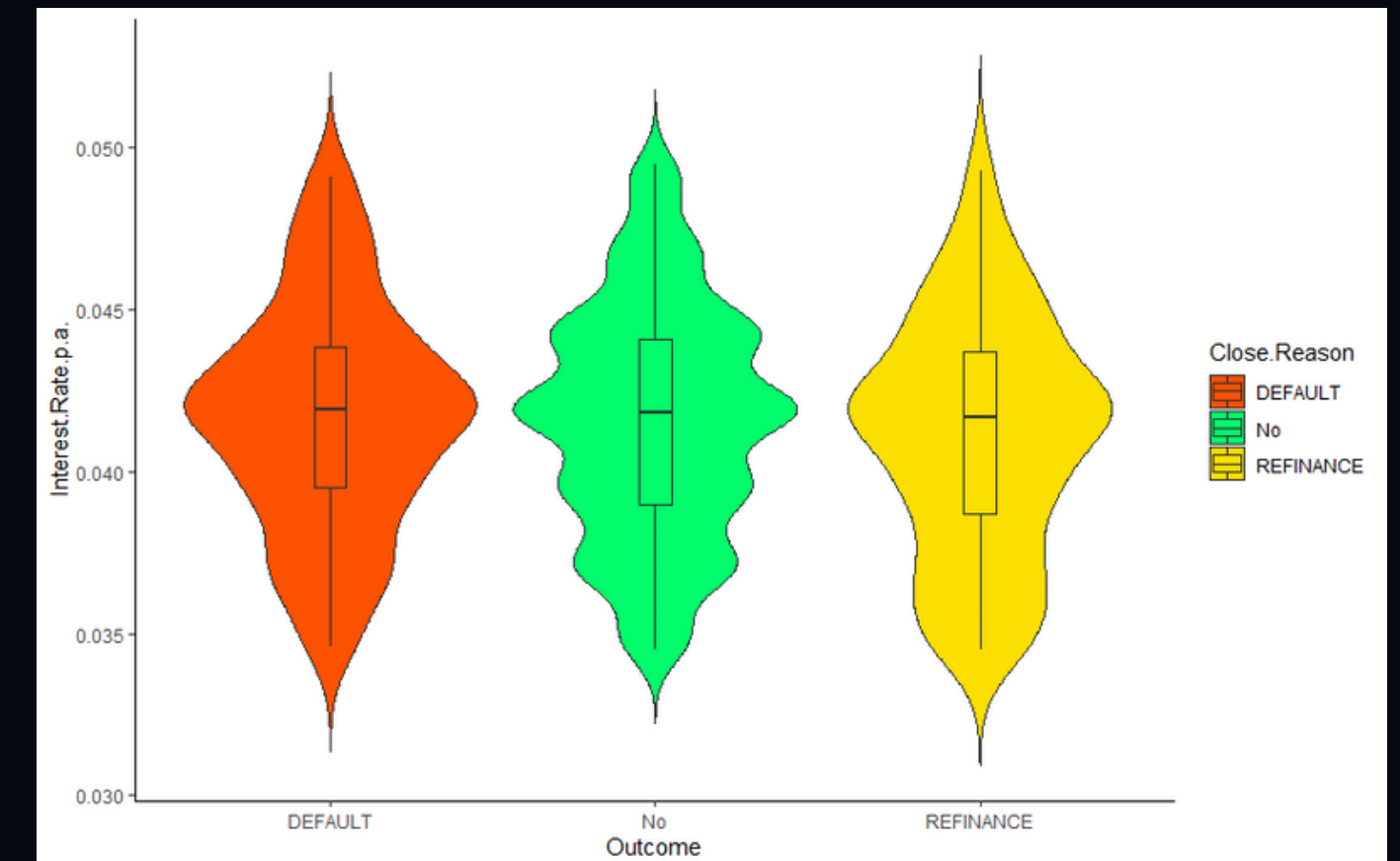
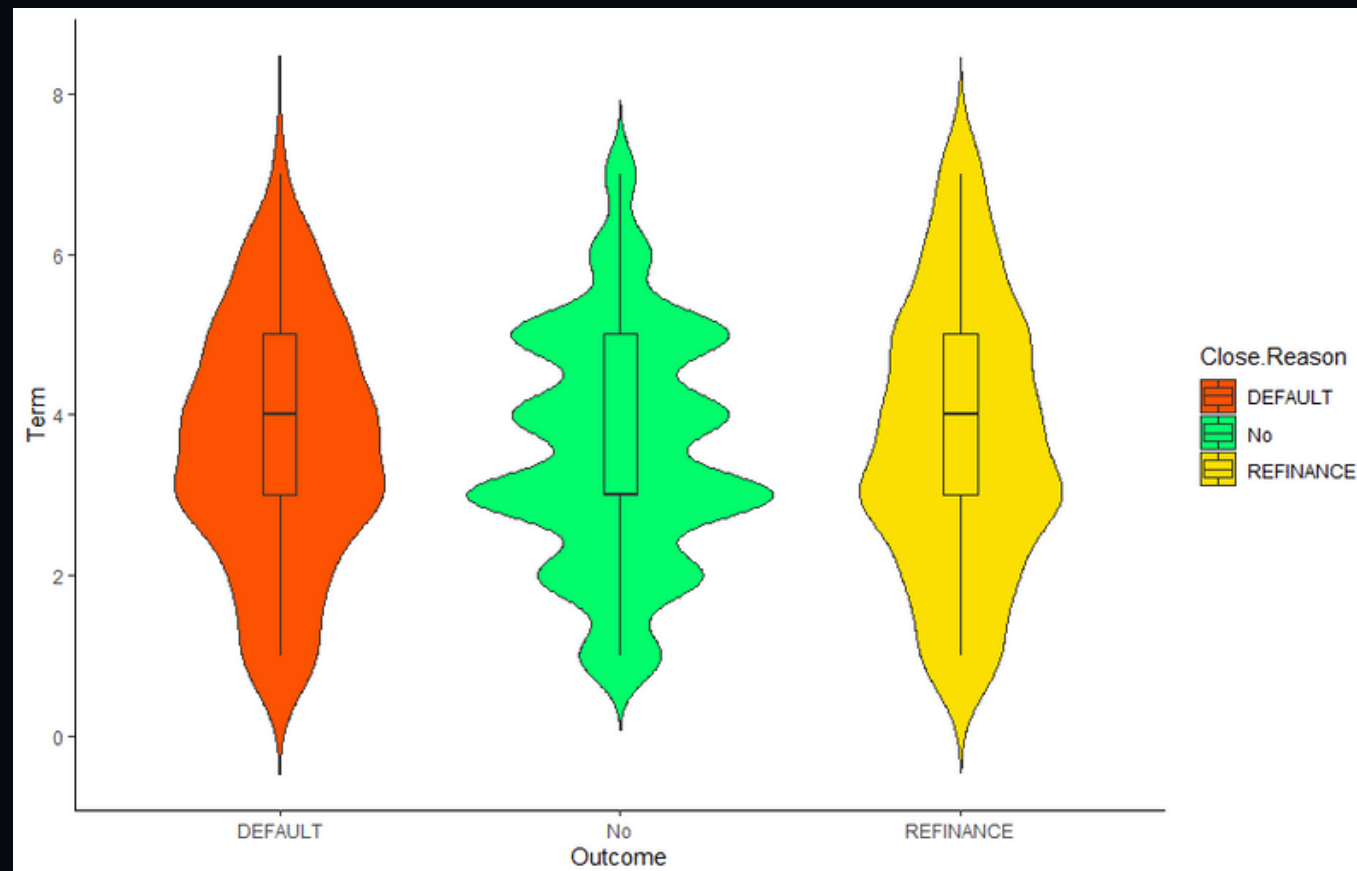
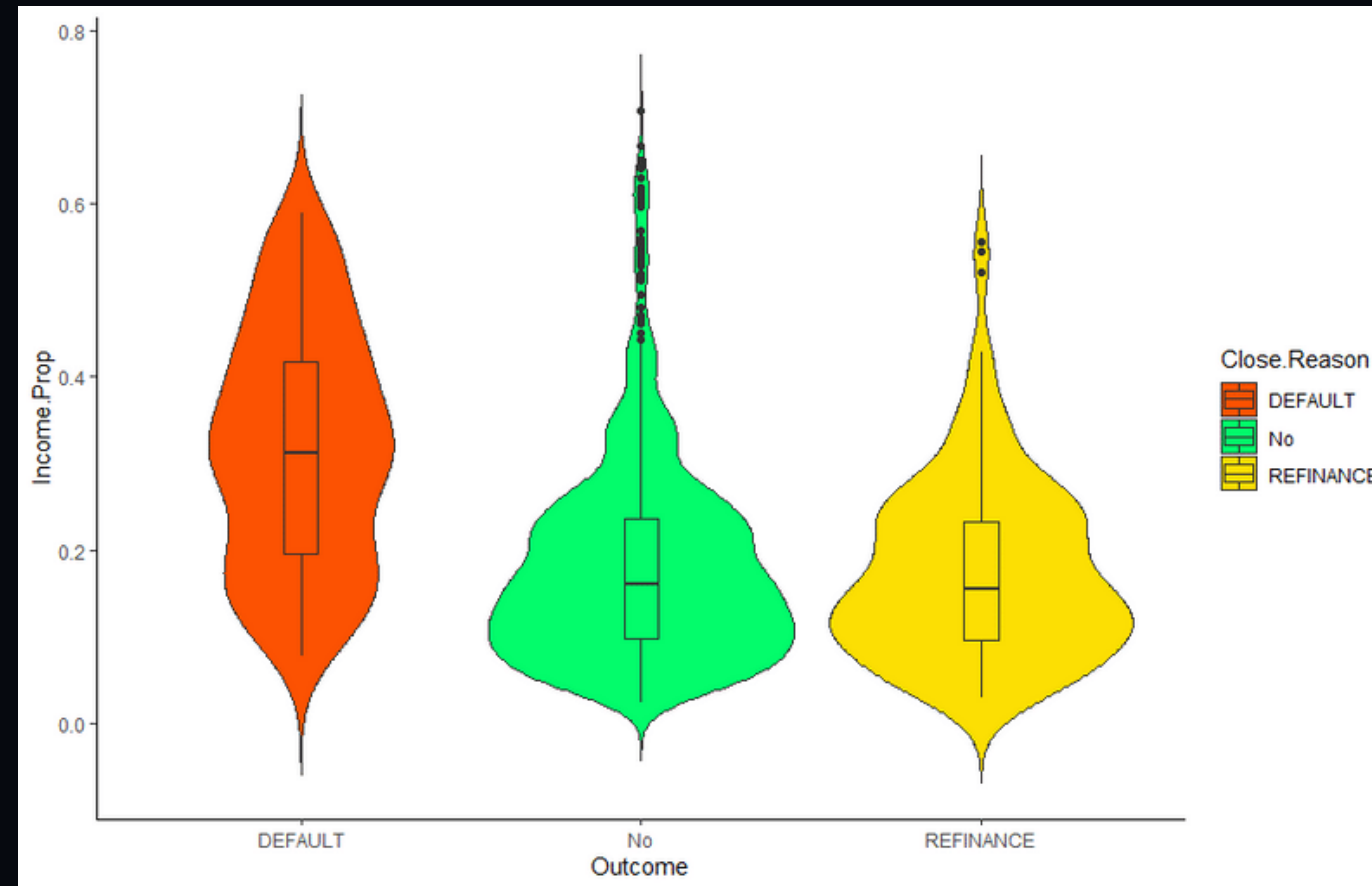


CATEGORICAL VARIABLES

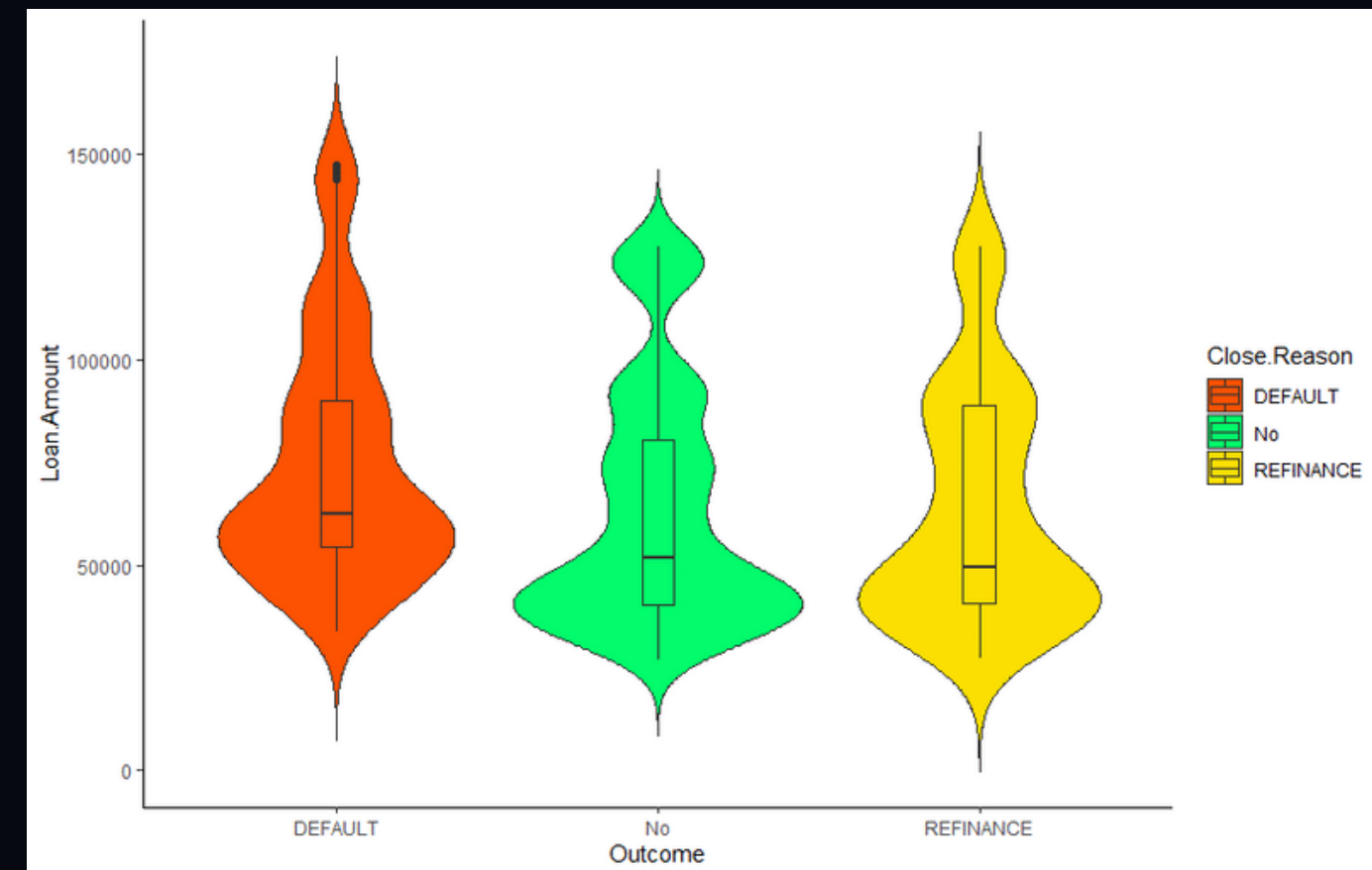
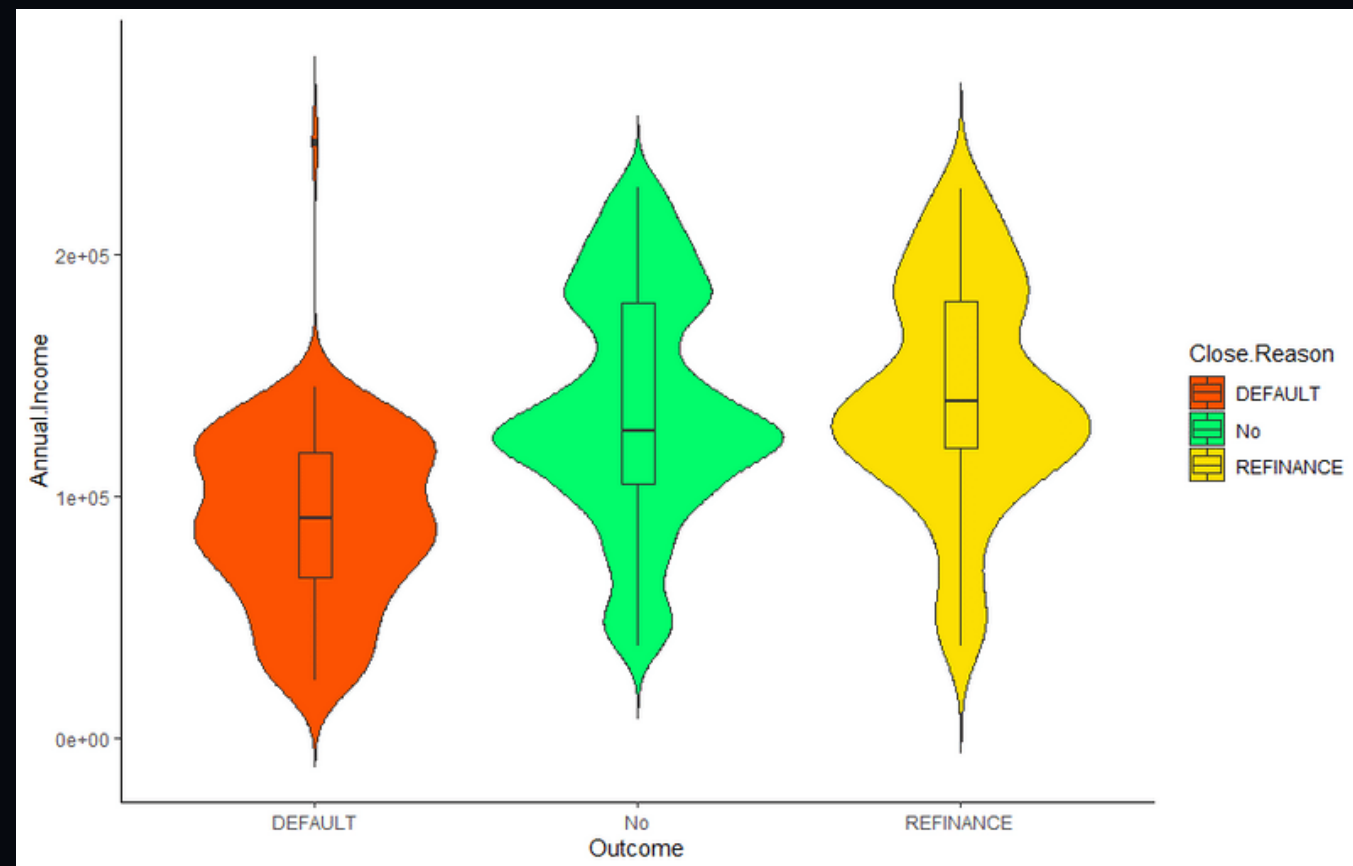
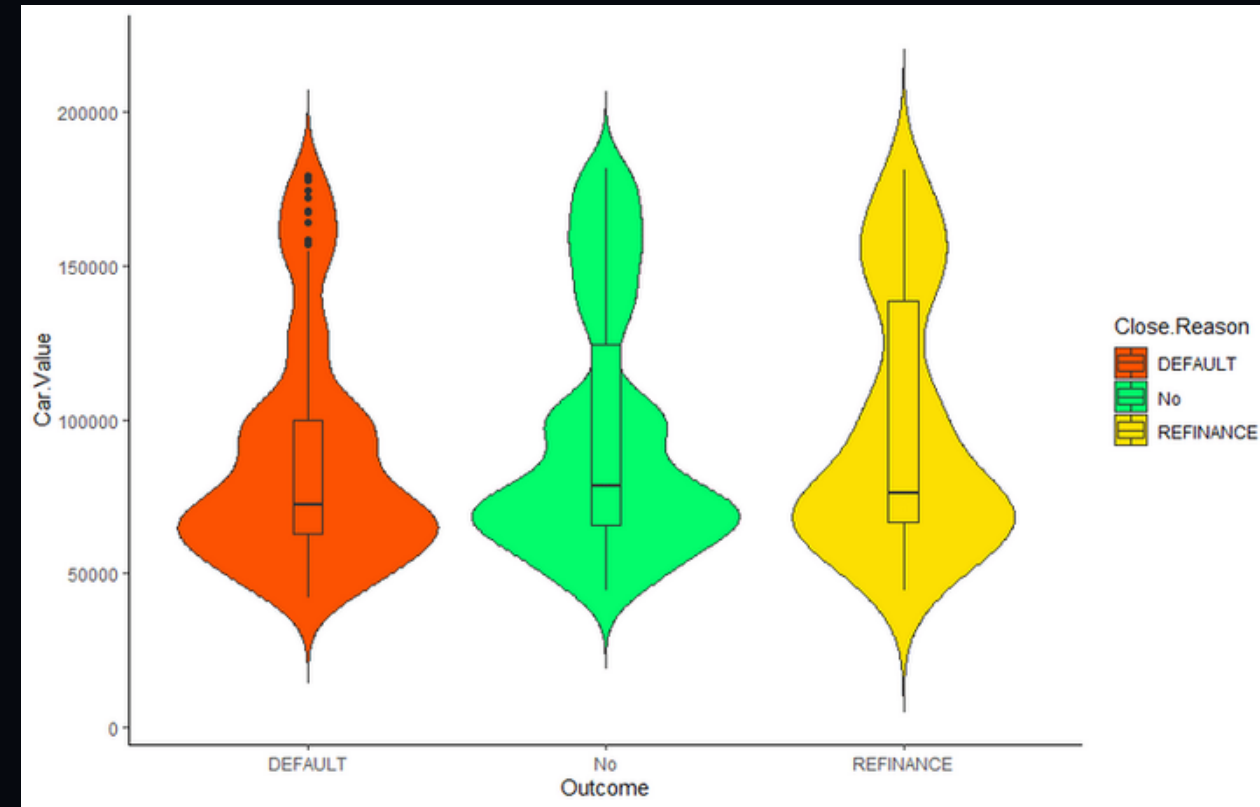
APPENDIX 1a



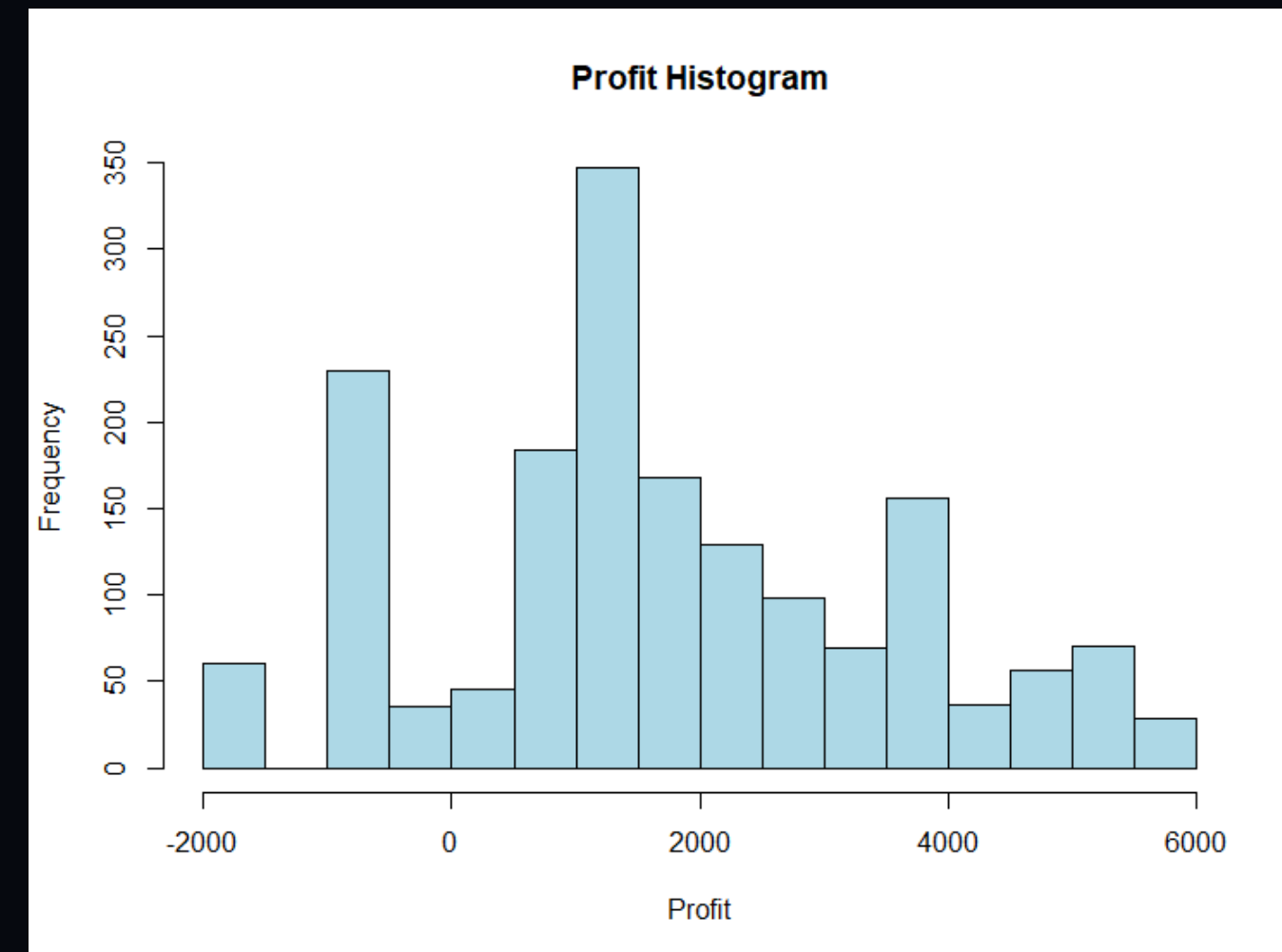
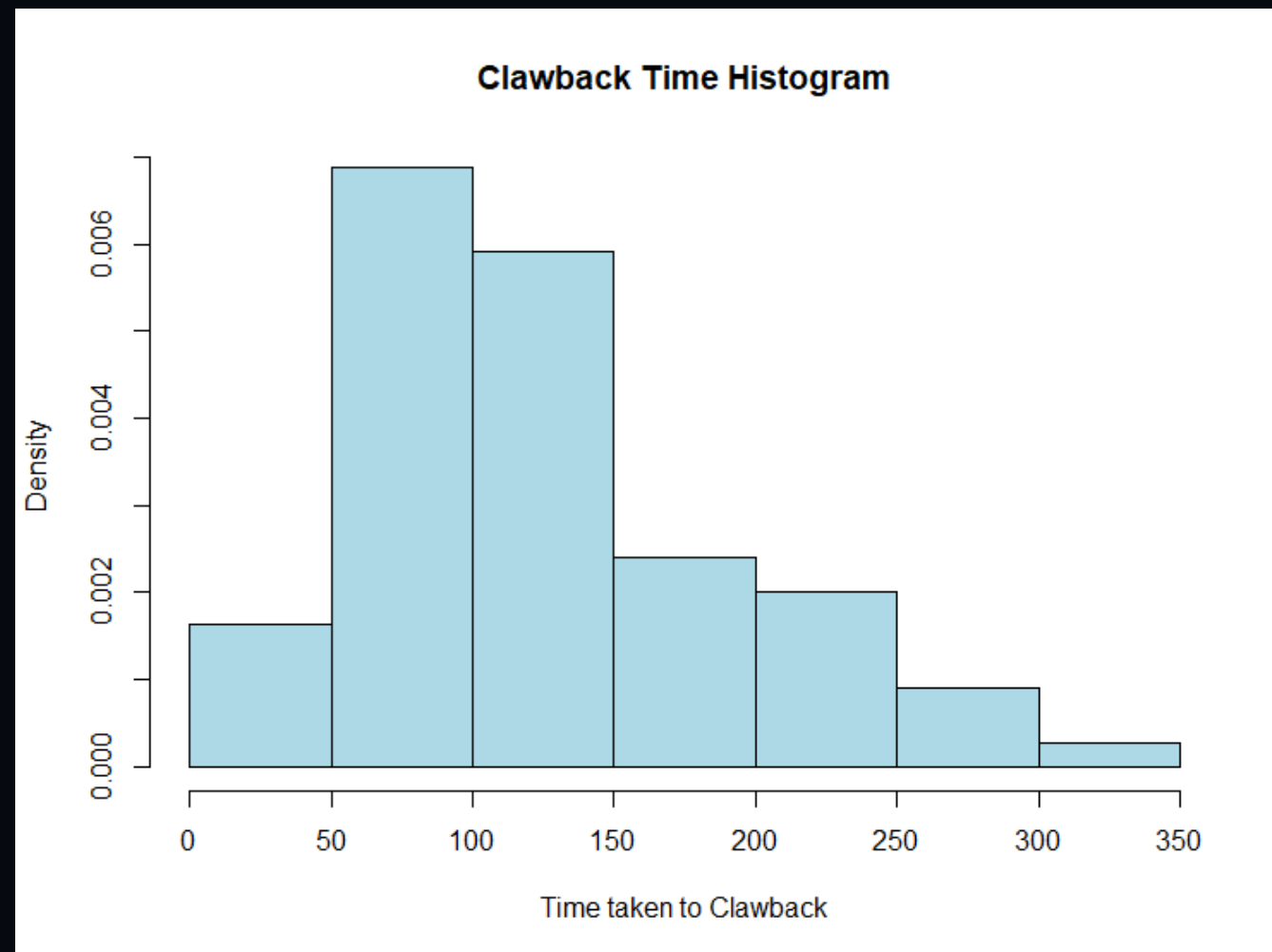
NUMERIC VARIABLES



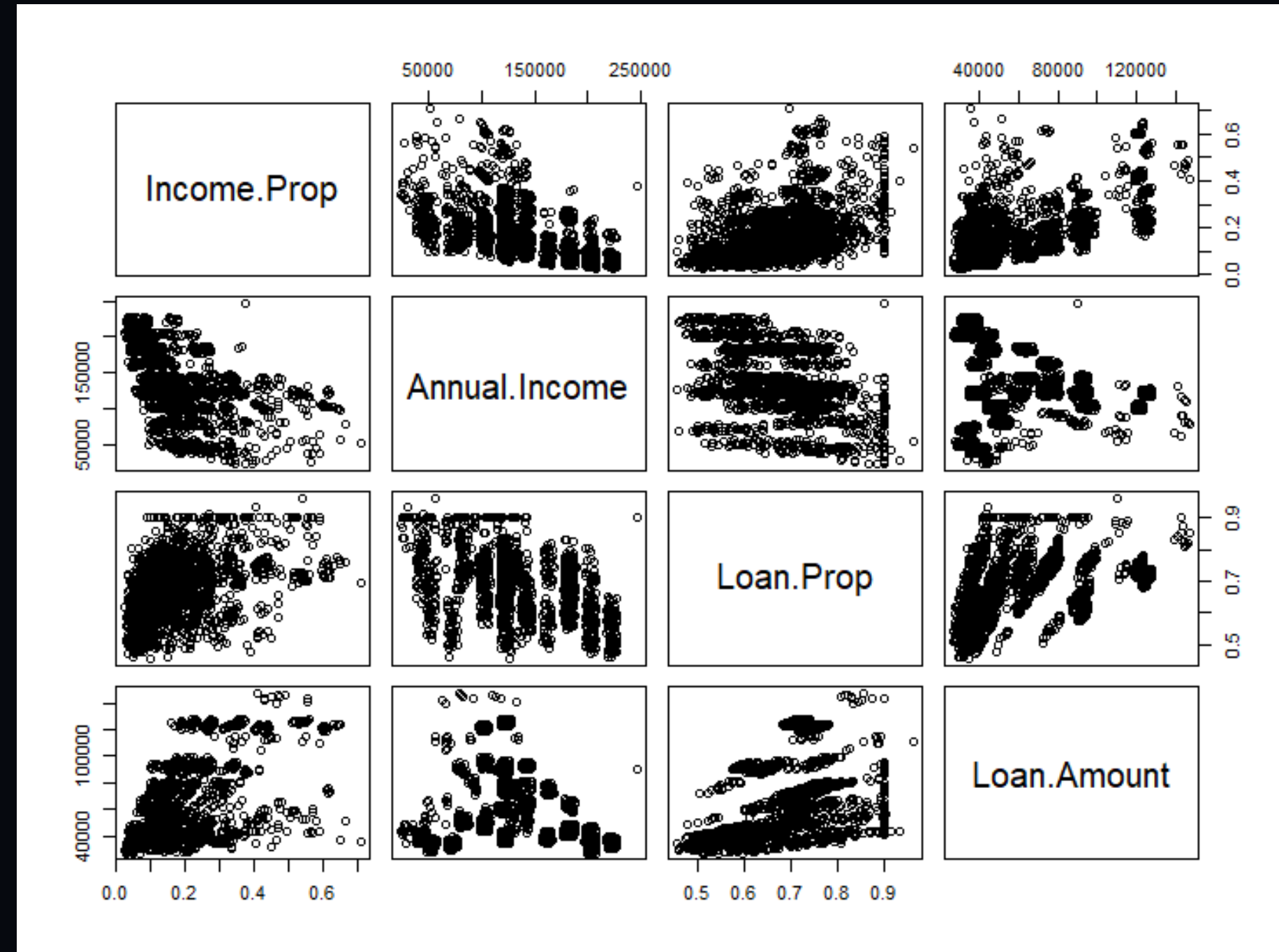
NUMERIC VARIABLES



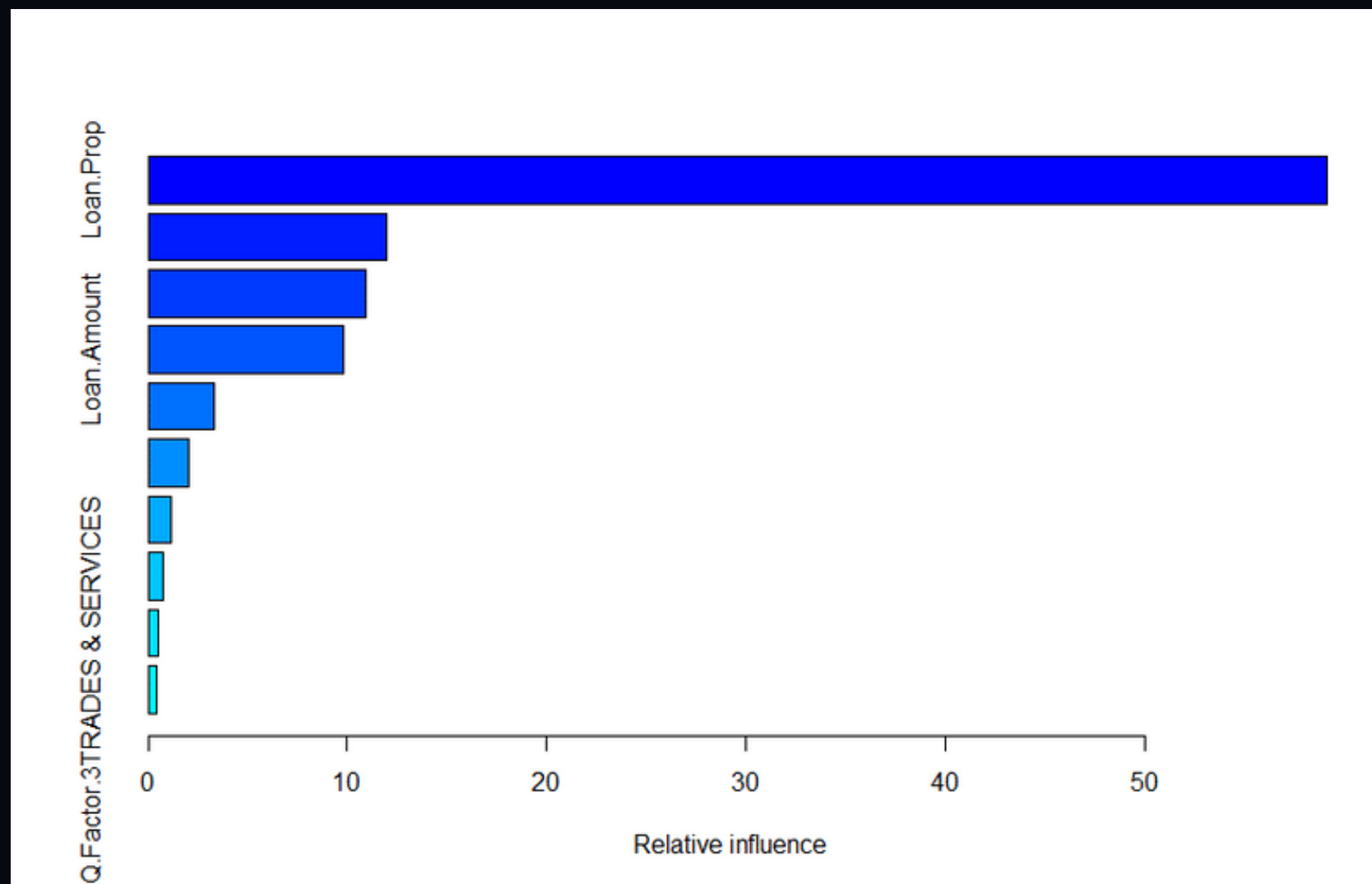
HISTOGRAMS



PAIRS PLOT



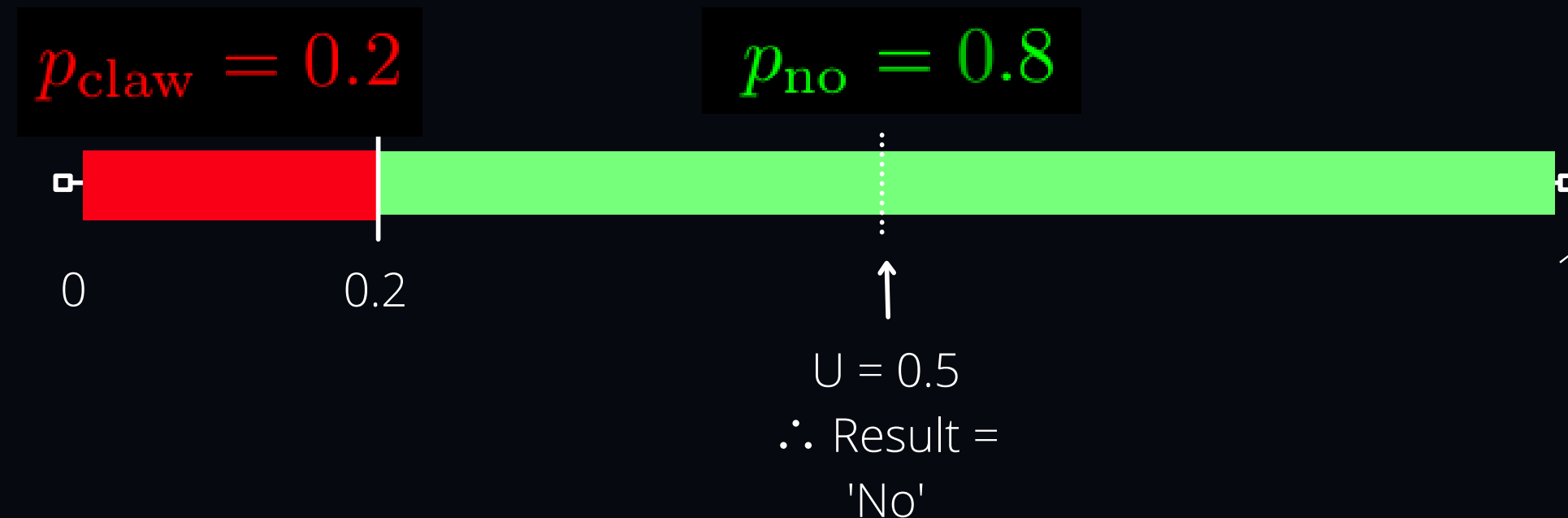
VARIABLE IMPORTANCES



var	rel.inf
Loan.Prop	59.1509910
Income.Prop	11.9702148
Annual.Income	10.9232663
Loan.Amount	9.7677056
Q.Factor.2PRIME	3.3035873
Term	2.0071343
Q.Factor.2MAINSTREAM	1.1298719
Q.Factor.3PROFESSIONALS	0.7913327
Q.Factor.3SELF EMPLOYED	0.5286116
Q.Factor.3TRADES & SERVICES	0.4272844

SIMULATIONS

Confidence intervals are calculated through simulations of possible clawback outcomes



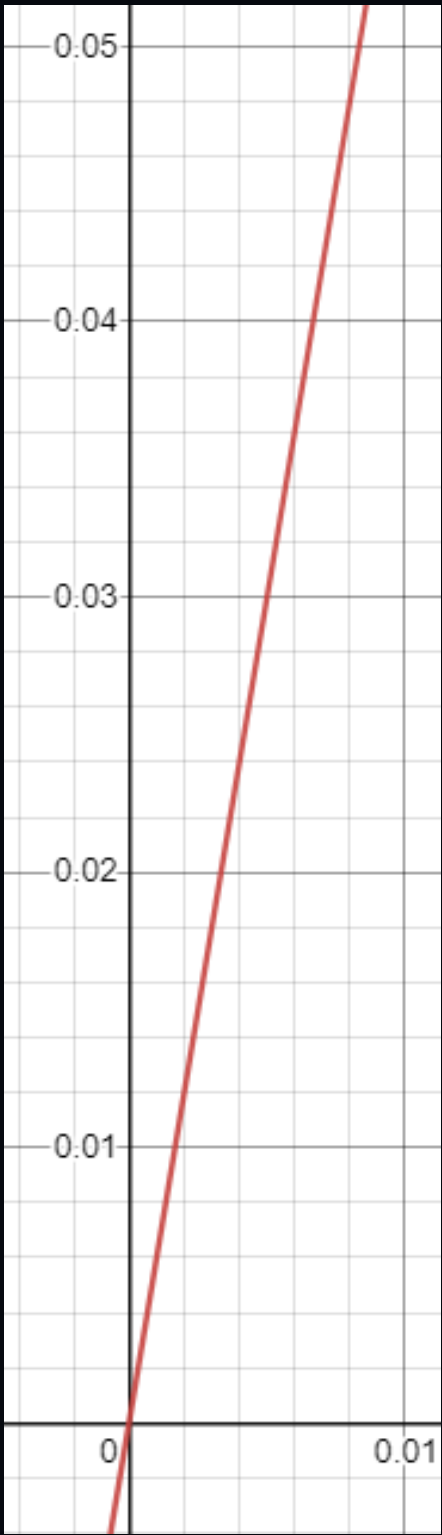
$$\therefore P_i = \text{Comm} * \text{Loan}_i - \text{Total Costs}_i$$

PROBABILITY

$$\begin{aligned} &P(\text{Days to Clawback} > \text{Current Days Elapsed} \cap \text{Outcome} = \text{Clawback}) \\ &= P(\text{Days to Clawback} > \text{Current Days Elapsed}) * P(\text{Outcome} = \text{Clawback}) \end{aligned}$$

REFINANCE VS DISCOUNT ESTIMATION

Refinance Decrease



Discount

RISKYLENDING COVID NUMBERS

	Pre-Covid	Covid Downturn	Recovery	
Date Start	Earliest Date	2020-3-1	2020-04-30	
Date End	2020-3-1	2020-04-30	2021-09-27	
Profit Per Person	1811.023	1509.826	2228.898	
Profit Per Day	5070.863	4685.666	12432.18	
Loans Per Day	2.8	3.103448	5.577726	
Clawback Prop	0.15625	0.1944444	0.09775374	
Default Rate	0.05654762	0.1444444	0.04076539	
Mean Term	3.099702	2.733333	3.78411	
Mean Loan Amount	62235.5	60841.79	67622.2	
Mean Annual Income	135518.7	140252	132825.9	
Mean Car Value	93110.12	90089.44	92554.58	
Mean Interest Rate	0.04141771	0.04146111	0.0422688	
Mean Loan Proportion	0.6672873	0.6713708	0.7257773	
Mean Income Proportion	0.2023206	0.230358	0.1857419	
Note that we know the actual numbers for these as they are fully elapsed.				

SENSITIVITY ANALYSIS RESULTS AND ASSUMPTIONS

Results

	5th percentile	Mean	95th percentile
Worst Case	\$2,921,064.34	\$3,027,105.00	\$3,133,606.56
Bad Case	\$3,085,914.39	\$3,191,489.65	\$3,297,457.00
Base Case	\$3,629,910.00	\$3,749,447.00	\$3,837,375.28
Good Case	\$4,091,718.74	\$4,218,596.21	\$4,346,202.26
Best Case	\$4,531,573.25	\$4,665,052.05	\$4,799,215.65

Assumptions

	Change in Income	Change in number of new loans	Refinance %	Default %
Worst Case	-10%	-20%	10%	10%
Bad Case	-5%	-10%	5%	5%
Base Case	0%	0%	0%	0%
Good Case	5%	10%	-5%	-5%
Best Case	10%	20%	-10%	-10%

PROFIT TESTING ASSUMPTIONS

A
P
P
E
N
D
I
X

1
0

Profit Projecting	% Change	Assumptions
Increase P/Y Prior	68%	Covid Up/Downs average out
Stage 1		Changes occur at the start of the stage
Positive-EV Contracts	7.70%	Model Probabilities are correct
Short-Term Investments	0.10%	Commercial Paper Rates as of 09/2021
Loan Recommendation	5.75%	Assuming average saving of \$100 in service cost and 1% default reduction, 3.5% commission
Total Change (w/o yearly)	13.55%	
Stage 2		Changes occur midway through the stage on average
Car Insurance Company	1.20%	78% of loans get car insurance, 30% conversion at a 10% commission rate. Average of 1056\$ expenditure for car insure
Targeted Ad Campaign	4.20%	\$25 data increase data cost, 6% decrease refinance rate, 1% increase in promo rate for promos
Diversification	21%	0.5% Increase in commission, 1% decrease in refinance
Total Change (w/o yearly)	26.40%	
Stage 3		Changes occur midway through the stage on average
Long Term Investment	24.25%	Last Year SnP 500 Return as proxy for long term investment
More Loan Types	25%	Assuming the portfolio grows to 80% car, 20% other.
Total Change (w/o yearly)	49.25%	

SOURCES

- <https://www.abs.gov.au/statistics/economy/finance/lending-indicators/aug-2021>
- <https://www.iii.org/fact-statistic/facts-statistics-auto-insurance>
- [https://hrmars.com/papers_submitted/2560/The_Effect_of_Business_Cycles_Fluctuations_on_Bank_Profitability_The_Case_Study_on_Iran_Melli_Bank_\(1992-2014\).pdf](https://hrmars.com/papers_submitted/2560/The_Effect_of_Business_Cycles_Fluctuations_on_Bank_Profitability_The_Case_Study_on_Iran_Melli_Bank_(1992-2014).pdf)
- https://www.ecb.europa.eu/pub/economic-bulletin/focus/2019/html/ecb.ebbox201906_05~6584f264d5.en.html
- <https://files.stlouisfed.org/files/htdocs/publications/review/2018/01/10/credit-cycles-and-business-cycles.pdf>
- https://scholar.princeton.edu/sites/default/files/SSRN-id2023516_0.pdf
- <https://www.federalreserve.gov/econresdata/feds/2014/files/201482pap.pdf>
- <https://www.nber.org/digest/dec09/refinancing-boom-and-financial-crisis>
- https://www.richmondfed.org/publications/research/coronavirus/economic_impact_covid-19_04-16-20