Lending Insights

Ankit Dsouza

Executive Summary

- Dataset contains all approved customers with mostly Good to Excellent credit rating (>=0.7), but still 17% people defaulted and we saw net Loss of $8,370
- Mean Loss/customer (-$14.5) is 5-6x of mean Profit/customer ($2.8)
- I fit a Logistic Regression model on available data, which predicted whether a new user will default or not
- Assuming new users behave similarly to past ones, I identified key drivers behind loan defaults & decided on individual outcomes
- Resulted into Losses turning to Profits, with 40-50% loss of New customers
- Individual models were fitted for $10, $20 & $30 loan amounts to determine key factors in each case

Data Quality

- 66,786 newly approved customers
- Repayment Amount and Repayment Date columns had missing values, which indicate Loan Defaulters
- Some Defaulters repaid partial amount
- Loan Use Category had negligible missing values but was useful
- Some Daily Income ranges conflicted with respective Annual Income values
- Phone Ownership and New Phone fields had 1.5% missing values

Outcome 1 – Factors influencing Defaults

- <u>Default influencers</u>
- Across all loans, Business & Personal loans were highly risky
- Emergency loans are 2x as likely to default than other loans
- Self-employed persons are 40% more likely to default

- <u>Default suppressors</u>
- In contrast, higher the Credit Score lower the Default risk
- Customers with a PhD have 40% lower risk than other candidates
- Being Employed decreases risk by 40%
- Owning phone over 3 yrs., having Other loans reduce risk by 20-30%

Outcome 1 – Other Factors for $10 Loan

- Default influencers
- Self-employed persons are 50% riskier
- Persons without formal Education are 50% more likely to default

- Default suppressors
- Employed persons are 40% less risky
- Candidates with Referrals are 30% less risky

Outcome 1 – Other Factors for $20 Loan

- <u>Default influencers</u>
- Persons without formal Education are 2.4x more risky
- Students/Unemployed persons are 2x more likely to default

- <u>Default suppressors</u>
- Persons with other Outstanding loans are 40% less risky
- Phone Owners are 35% less risky

Outcome 1 – Other Factors for $30 Loan

- Default influencers
- Students/Unemployed persons are 10x riskier
- Persons with 3-6 month old National IDs are 2x riskier

- Default suppressors
- Persons with 1-3 month old National IDs are 40% less risky
- Persons with other Outstanding loans are 30% less risky

Outcome 2 – Net Profit Vs New Customers

	Initial Profit ($)	Predicted Profit ($)	Change ($)	New Customer Loss (%)
All Loans	-1,767	8,976	10,743	42
$10	-2,943	1,274	4,217	44
$20	-2,610	1,822	4,432	38
$30	-1,830	705	2,535	48
$40	Data Insufficient, results unstable			

Other Useful Data

- Currently only loan amounts \$10-\$40 can be predicted using Linear Regression
- To predict loan amounts over \$40, we need respective historical data
- Information on Cellular phone usage (call type, duration & frequency, SMS, data usage) would further assist the analysis

Thank you!

Appendix – Odds Ratio Table (All Loans)

- Business & Personal loans are 60-80x riskier
- PhDs are 0.6x or 40% less riskier candidates

Factor	Odds Ratio
Loan Use Category_travel_business	83.46
Loan Use Category_other_business_use	81.73
Loan Use Category_start_business	72.83
Loan Purpose_personal	70.70
Loan Use Category_grow_business	66.11
Loan Use Category_emergency	1.84
Employment_self_employed	1.41
Loan Use Category_medical	1.39
Loan Use Category_other	0.80
Phone Ownership_over3y	0.75
Customer Owns Phone_Yes	0.74
Outstanding_Yes	0.71
Is Employed_Yes	0.66
Highest Education_masters_phd	0.57
Credit Score	0.01

Appendix – Profit Summary (~20k rows)

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Initial profit: -1766.76
Final profit: 8975.9
Change: 10742.66
New Customer Loss (%): 42.59
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Defaulter	Profit	Prediction	Predicted Profit
1	-10.0	0	-10.0
1	-10.0	1	-0.0
1	-14.0	0	-14.0
1	-10.0	1	-0.0
1	-10.0	1	-0.0
1	-10.0	1	-0.0
1	-10.0	0	-10.0
1	-10.0	1	-0.0
1	-10.0	1	-0.0
1	-10.0	1	-0.0

Defaulter	Profit	Prediction	Predicted Profit
0	4.50	0	4.5
0	1.50	0	1.5
0	4.50	0	4.5
0	3.00	0	3.0
0	1.50	1	0.0
0	3.00	1	0.0
0	6.00	0	6.0
0	1.50	0	1.5
0	2.42	1	0.0
0	1.50	1	0.0