

FINANCIAL PROGRAMMING

Financial Data Analysis

GROUP 04:
ELEDU Favour
JAYANARASIMHAN Venkat
LAGO Jenie Marie

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Professor Minh Phan

1. OVERVIEW

This document aims to describe the process of capturing valuable business insights from a set of data coming from a bank offering services to private individuals, with services including managing of accounts, offering loans and others.

A Datamart containing raw and aggregated information of each client was created and used as basis of the analysis. Data cleaning and data type conversion techniques learned in class were applied to make sure proper and relevant data was used in the analysis.

Pandas Data Manipulation techniques were extensively used to process and extract the valuable features from all the available tables. Insights were generated using several highly powerful Data Visualization Packages like Plotly, Seaborn & Matplotlib's Pyplot.

2. DATAMART

The table below shows the different variables – raw and aggregated, used in the analysis. Some variables that are already in the original dataset are not listed on the table below but are available on the datamart.

#	VARIABLES	DESCRIPTION
1	client_id	Client identification ID
2	client_district	Client residence
3	birth_year	Birth year: YYYY
4	age	Age in years
5	gender	Gender – F or M
6	card_type	Type of credit card
7	account_id	Account iD
8	account_district	District of bank branch
9	account_date	Account opening date, transformed to datetime format for easier manipulation
10	loan_date	Date when the loan was issued, transformed to datetime format for easier manipulation
11	loan_amount	Amount of loan
12	loan_duration	Duration of loan payment
13	loan_status	Status of loan
14	Loan_Good_Bad	"Good" if loan_status = A or C "Bad" if loan_status = B or D
15	tenure_before_loan	Loan Date – Account Date in days. The number of days between loan was issued and the opening date of the account

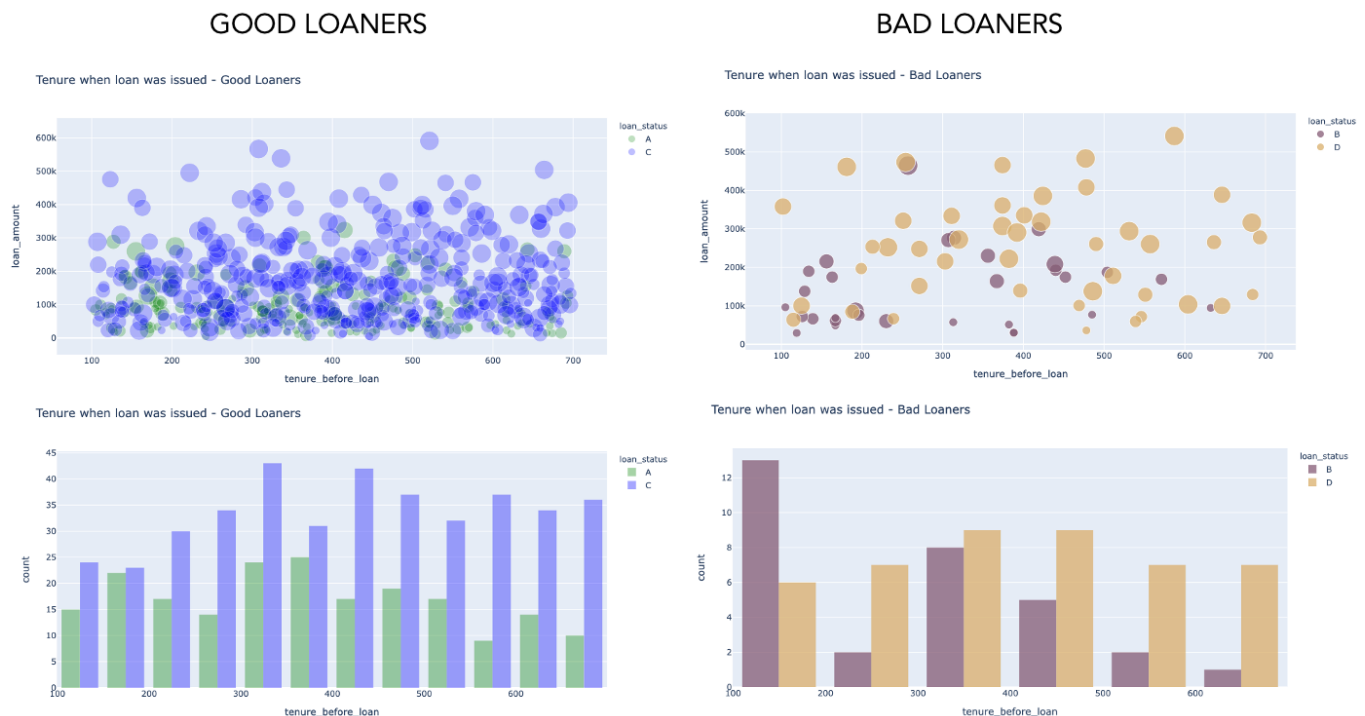
16	same_district	1 if client residence and bank branch is the same district, 0 otherwise
17	order_Ksymbol_POJISTNE	Insurance Payment
18	order_Ksymbol_SIPO	Household Payment
19	order_Ksymbol_UVER	Loan Payment
20	trans_Op_VYBER_KARTOU	Credit Card Withdrawal
21	trans_Op_VYBER	Cash Withdrawal
22	trans_Op_PREVOD_Z_UCTU	Credit received from another Bank
23	trans_Op_VKLAD	Cash Credited in the Bank
24	trans_Op_PREVOD_NA_UCET	Amount Transfer to another Bank
25	trans_Ksymbol_SANKC. UROK	Penalty Amount for maintaining Negative Balance

3. LOAN INSIGHTS

This section illustrates some business insights related to loans. Charts are provided for better illustration.

Major insights found are below:

- a) Tenure before loan measured in days (Loan Date – Account Date) shows that bad loaners, specifically those with Status B, have less tenure than good loaners. In this analysis, loans with Status B is defined as bad loaners and Status D was excluded since this is still on-going and no information is provided on how much delay on payment there is.



The average tenure before loan of bad loaners (Status B) is 296 days compared to 377 days average tenure of good loaners. This is clearly illustrated on the distribution above where tenure for loans with Status B is skewed to the right.

- b) Bad loans have higher loan amount and higher loan duration.

Status	Flag	Mean Loan Amount	Mean Loan Duration months)
A	Good	91,641	22
B	Bad	149,720	26
C	Good	171,410	43
D	Bad	249,284	46

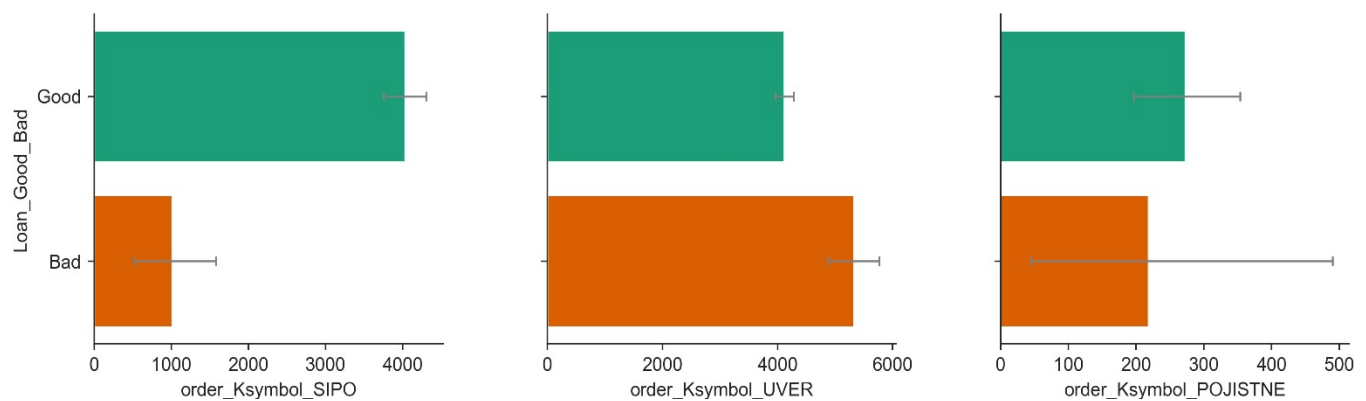
4. PERMANENT ORDER INSIGHTS

This section illustrates Client's Expenditure Behavior. Clients have been classified into Good & Bad based on their Loan Status (Good: Loan Status A&C; Bad: Loan Status C&D). Charts are provided for better illustration.

Major insights found are below:

- a) Good Clients are spending more in Household payments and relatively less in Loan payments
- b) Bad Clients are spending more in Loan payments and very less in Household payments
- c) Both Good & Bad Clients are spending almost equally in terms of Insurance payments

Client Classification Vs Payment Behaviour Comparison



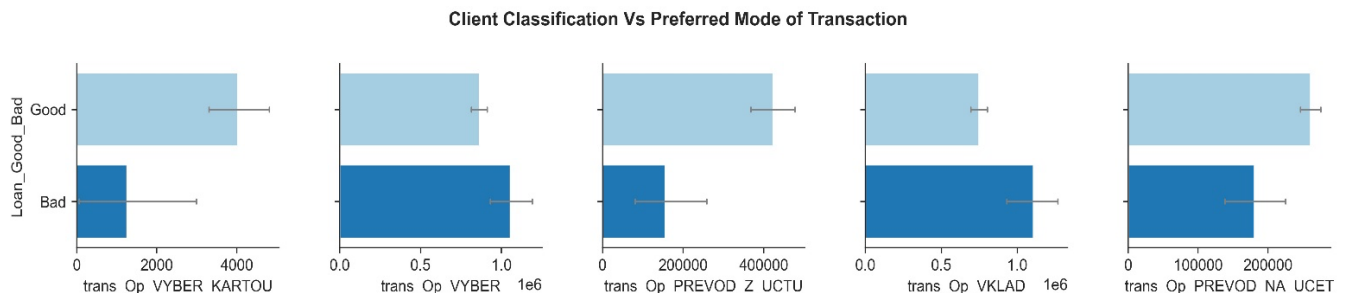
It is clearly illustrated in the above chart that the Good Clients are spending around €4000 for Household payments, whereas the Bad Clients are spending around €5500 for Loan payments.

5. TRANSACTION INSIGHTS

This section illustrates Client's Transactions Behavior. Clients have been classified into Good & Bad based on their Loan Status (Good: Loan Status A&C; Bad: Loan Status C&D). Charts are provided for better illustration.

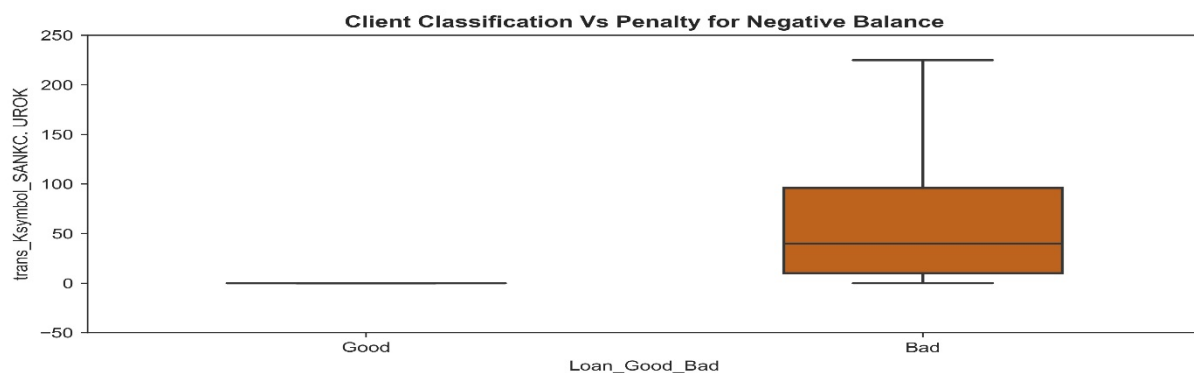
Major insights found are below:

- a) Preferred Mode of Transaction: Good Clients highly prefer Credit card withdrawal, Bank credits and Outward remittances whereas Bad Clients prefer Cash withdrawal & credits



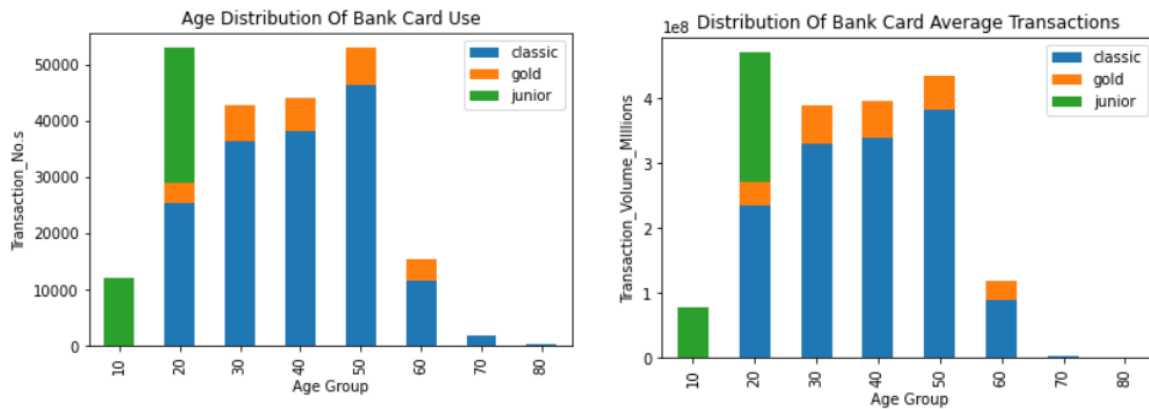
In general, Good Clients prefer Digital Banking, whereas Bad Clients are inclined to Traditional Banking

- b) Penalty for Negative Balance: As Bad Clients are maintaining High Negative Balance record, they are subjected to penalty or negative interests

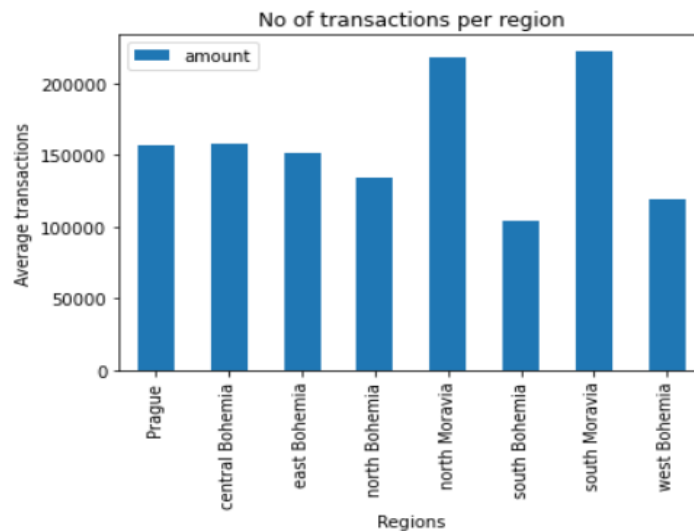


It is clear from the above Boxplot that the Bad Clients are accruing a median penalty of around €50 and the penalty majorly varies from €5 to €100.

6. CREDIT CARD INSIGHTS



- Correlation exists between the number of cards issued and the average spending per card amongst the age groups.
- Customers in the 50's age bracket carry out the most transactions



- Customers in the Northern and Southern regions of Moravia carry out the most transactions in the bank.

7. SUMMARY AND CONCLUSION

Some valuable business insights from the different aspects of the services provided by the bank were captured in the execution of this group project.

For the loans, data shows that tenure defined as the time from account creation from the loan date is a good indicator if a user will be a bad or good loaner. The longer the user has been with the bank, the less likely for that user to be a bad loaner.

The spending habits was also analyzed and it was found that good clients are spending. More on household payments and highly prefer digital banking. On the other hand, bad clients are spending more on loan payments and highly prefer traditional banking. With this finding, a challenge to the bank to minimize loss is to change the mindset of bad clients.

Lastly, credit card behavior was also analyzed. More customers prefer the classic cards however much older customers in the 70's and 80's tend not to transact with the bank cards at all. Key marketing focus for card use should be to prioritise targeting at customers within the 30's - 50's group, while optimising in-banking services for customers in the older age bracket.