



EDA CASE STUDY

RISK ASSESSMENT FOR LOAN
LENDING IN BANKING AND
FINANCIAL SECTOR

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PROBLEM STATEMENT



Case study is designed to find patterns or driving factors that dictate whether a loan default would occur.



The variables that are chosen by the end of the study should prove to be strong indicators of default.

This will ensure two things, a) consumers with a good track record, those who will be able to repay the loan are not rejected, b) narrow down probable loan defaulters and judge a loan payer in such a way that the risk is covered (in terms of loan value reduction, increased interest rate, etc.)

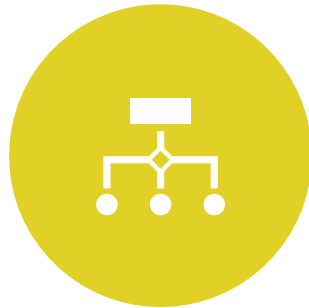


This would at the end help companies design their portfolio and for better risk assessment.

APPROACH TOWARDS SOLVING THE PROBLEM



IN THE COMING SLIDES WE WILL BE FOCUSING ON THE DIFFERENT ANALYSES PERFORMED ON THE GIVEN BANKING AND FINANCIAL SECTOR DATASETS.



THE PRE-PROCESSING AND CLEANING OF THE DATA HAS BEEN DONE PRIOR TO MOVING ON TO THE ANALYSIS PART.



INFERENCES DRAWN ON THE DIFFERENT ANALYSES WILL BE ADDED AS COMMENTS/NOTES.



THE ANALYSIS WILL BEGIN WITH THE CURRENT APPLICATION DATA DATASET. WE WILL THEN COMBINE THE GIVEN TWO DATASETS AND STUDY THAT AS WELL.

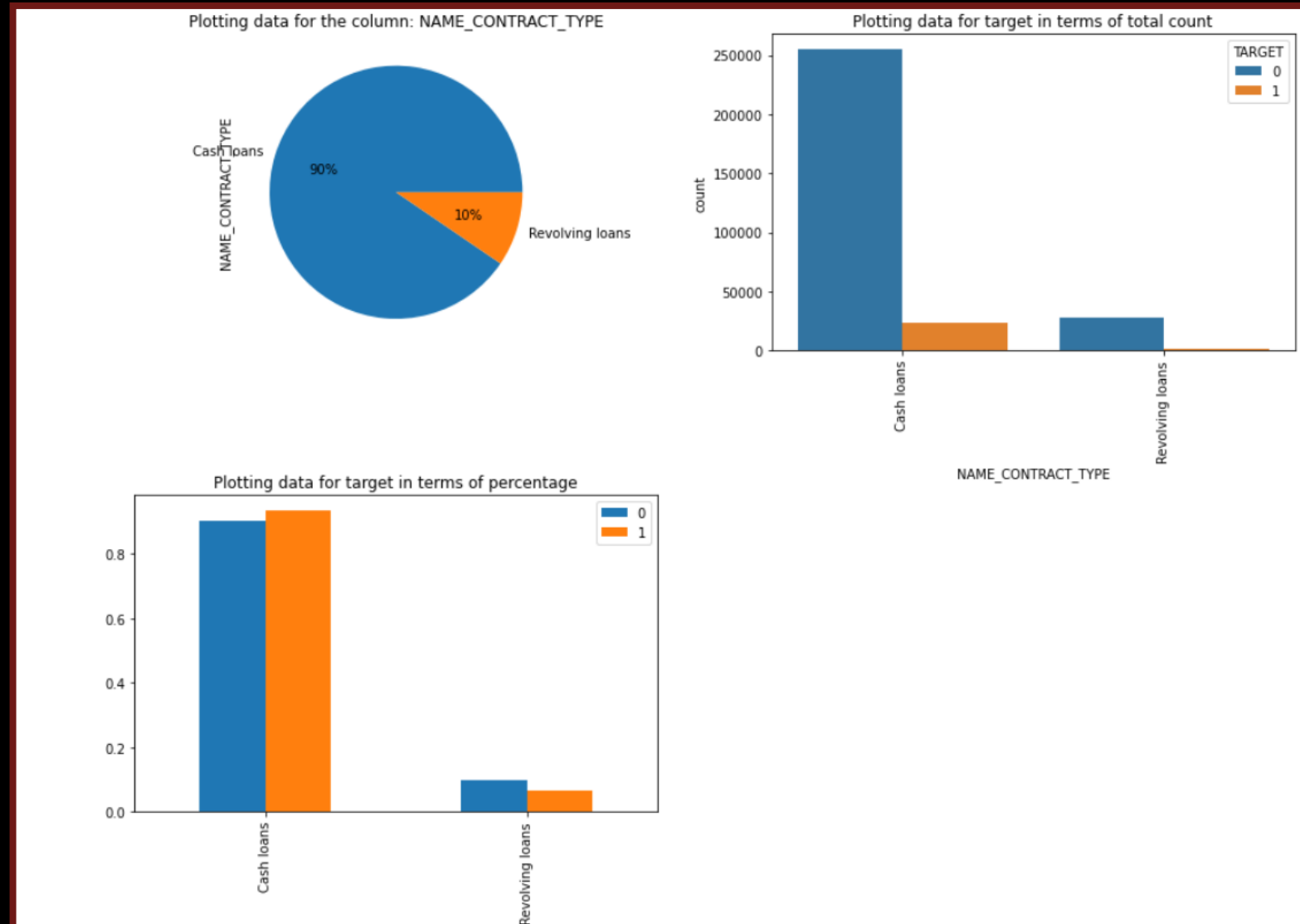
UNIVARIATE ANALYSIS

FOR DEFAULTERS (TARGET =
1) AND NON-DEFAULTERS
(TARGET = 0)

DISTRIBUTION OF LOAN BORROWERS UNDER CONTRACT TYPE

Insights from the figure:

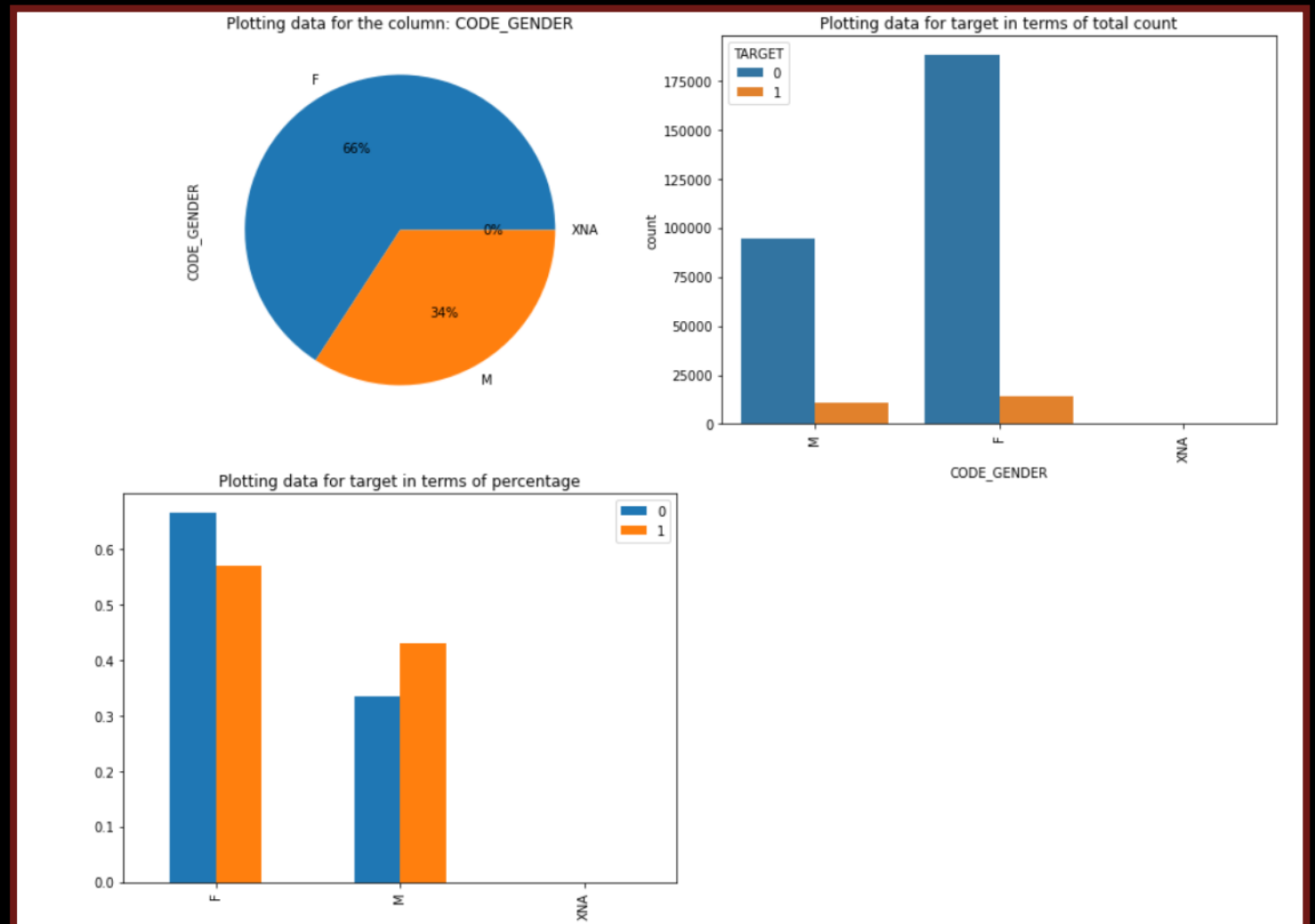
- Cash loans were sought after more over revolving loans. This disparity affects the defaulting/repaying rates as well
- Cash loans seekers default more which can be accounted for when we look at the total of cash loan seekers.



DISTRIBUTION OF LOAN BORROWERS UNDER GENDER TYPE

Insights from the figure

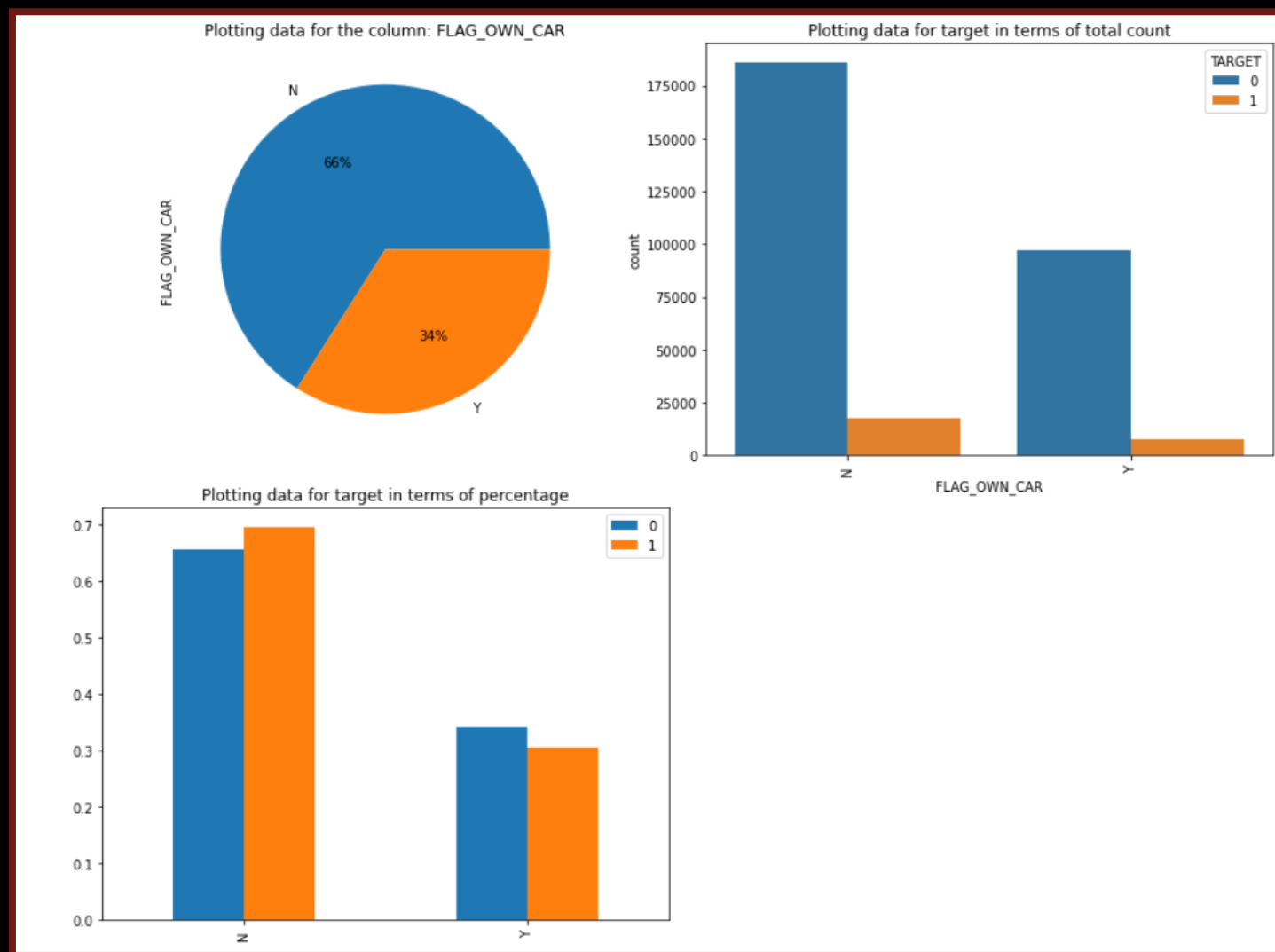
- Female clients are more than male clients when it comes to seeking loans.
- Yet, male applicants tend to default more.



DISTRIBUTION OF LOAN BORROWERS UNDER CAR OWNERSHIP TYPE

Insights from the figure:

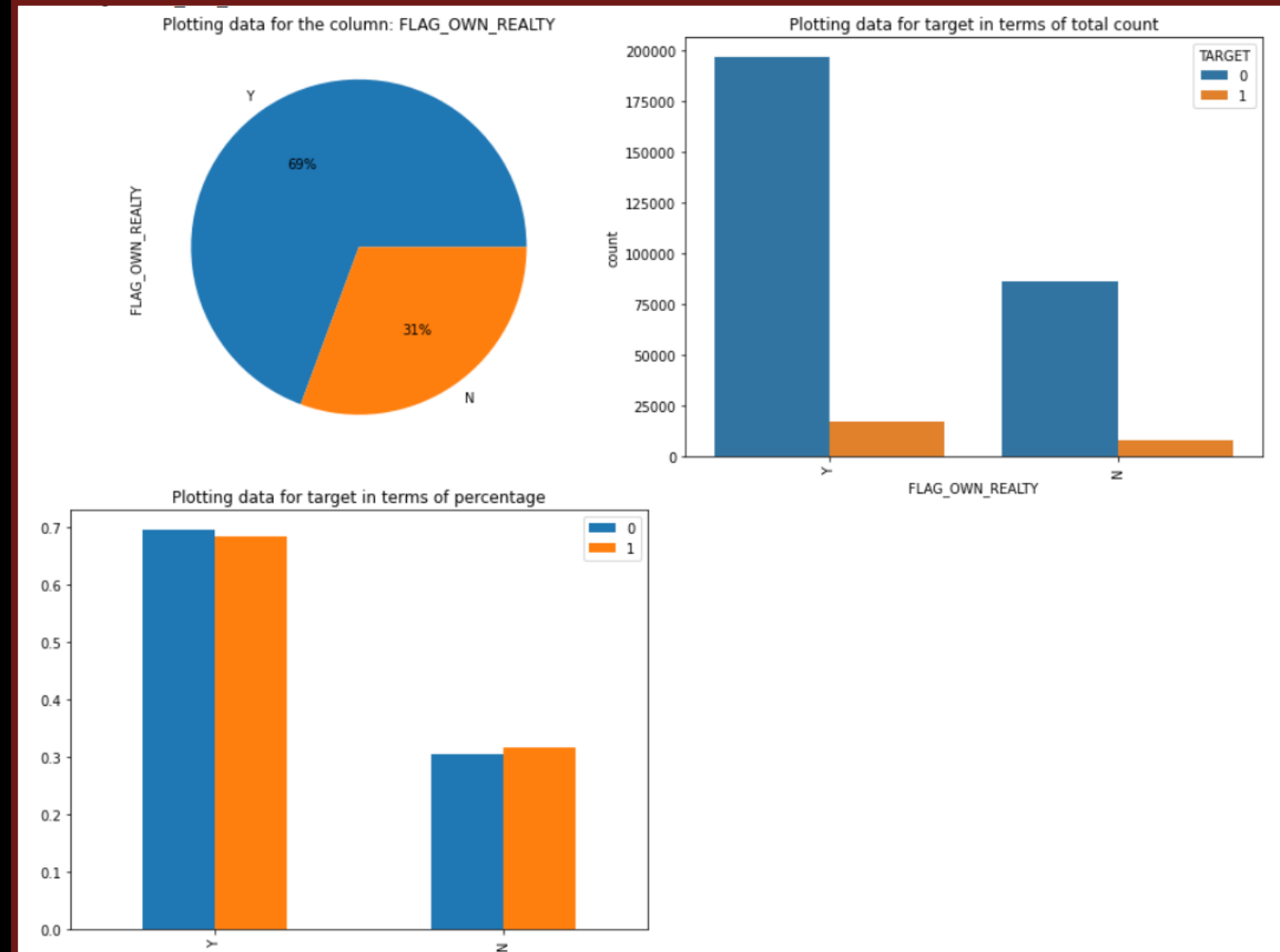
- Car owners seek loans less than non-car owners. This might be because they obviously have no requirement for a car loan. Also, they default less.



DISTRIBUTION OF LOAN BORROWERS UNDER REALTY OWNERSHIP TYPE

Insight from the figure:

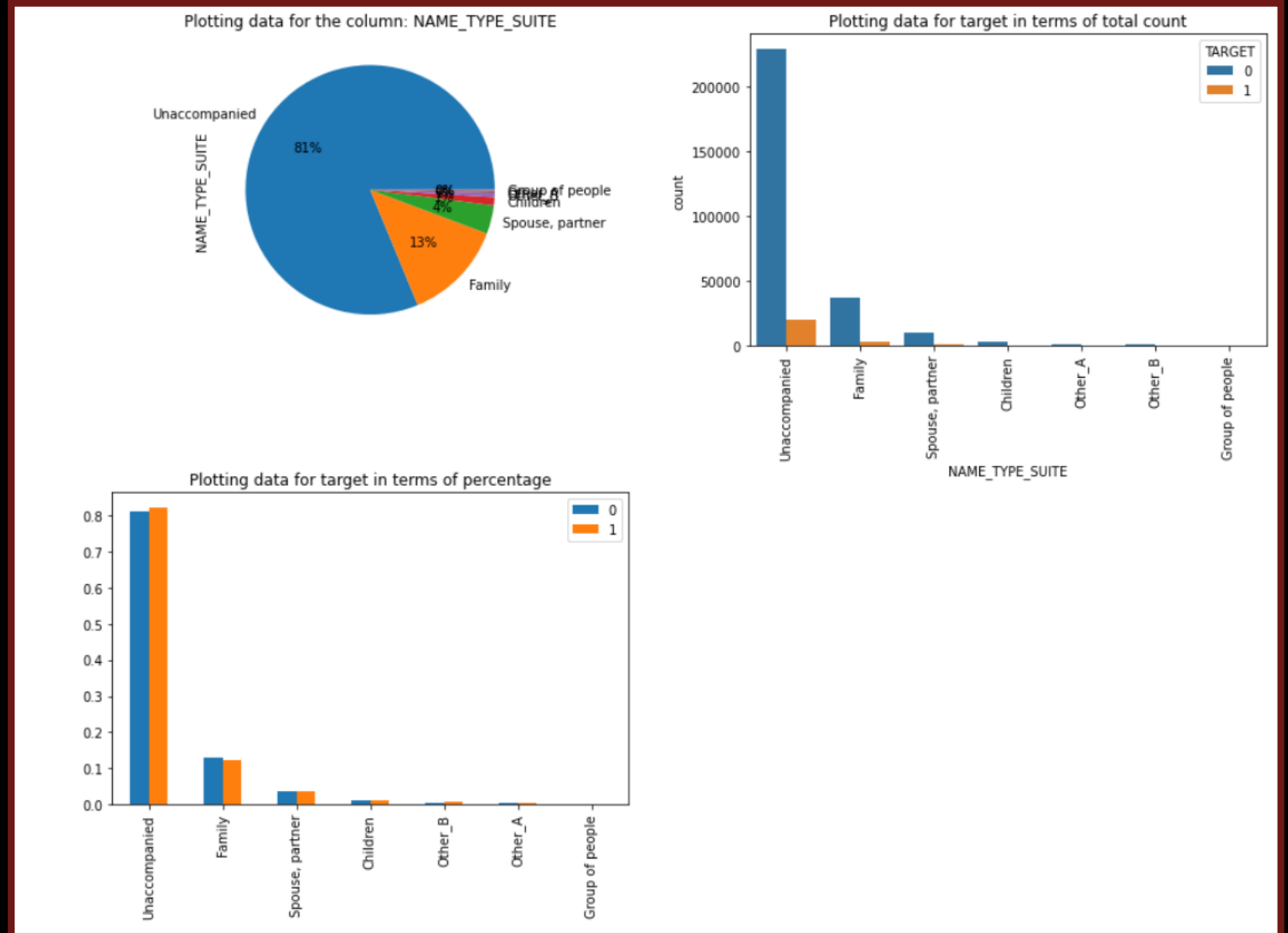
- Opposite to the car owner data, realty owners seek more loans than non-realty owners. Non-realty owners default more though.



DISTRIBUTION OF LOAN BORROWERS UNDER REPRESENTATION/NAME TYPE

Insight from the figure:

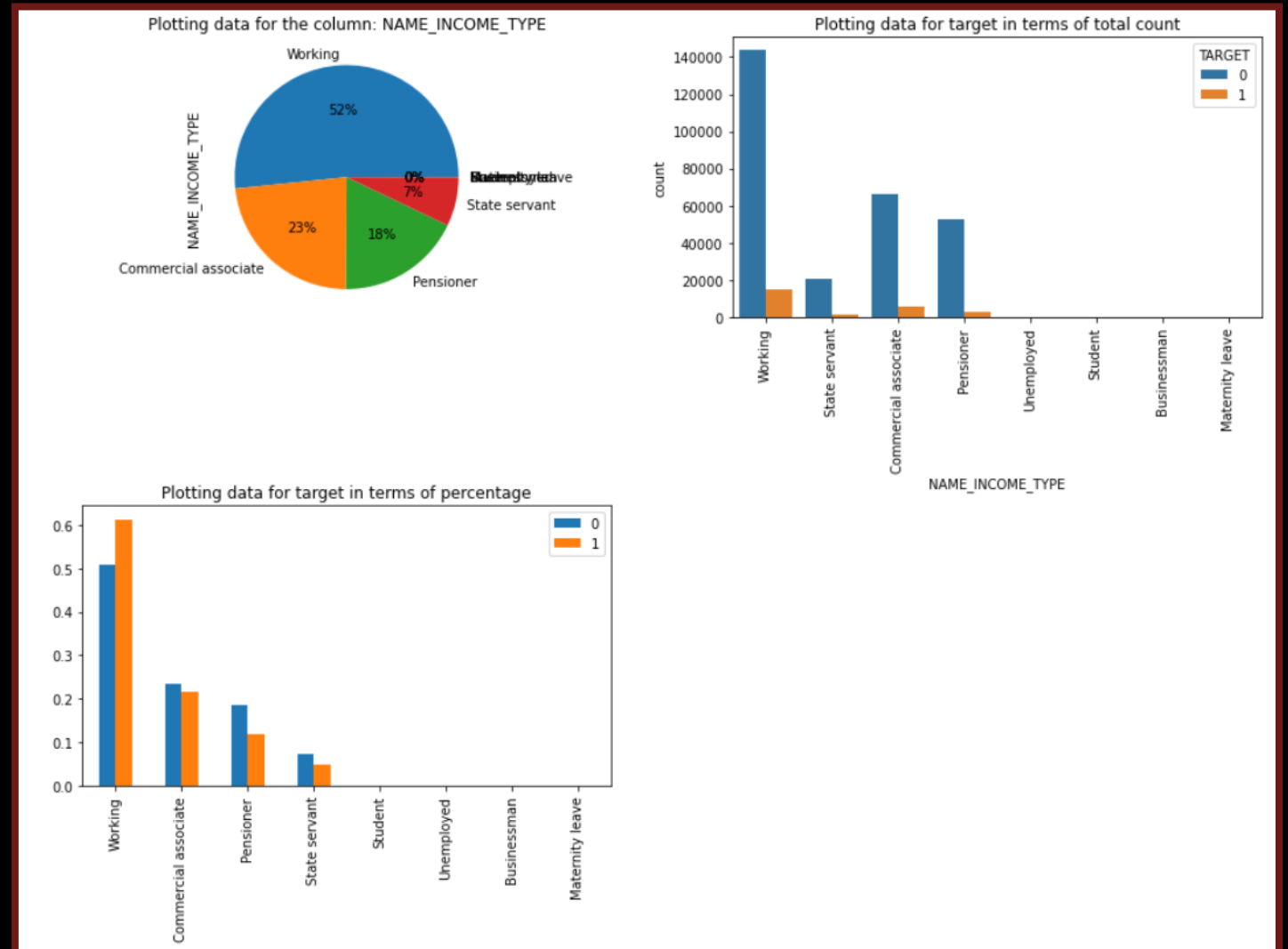
- Unaccompanied loan applicant's category has the most applications and what is more, show a higher rate of defaulting.
- Next to this category, is the family category which boasts of the second highest number of loan seekers.



DISTRIBUTION OF LOAN BORROWERS UNDER INCOME TYPE

Insights from the figure:

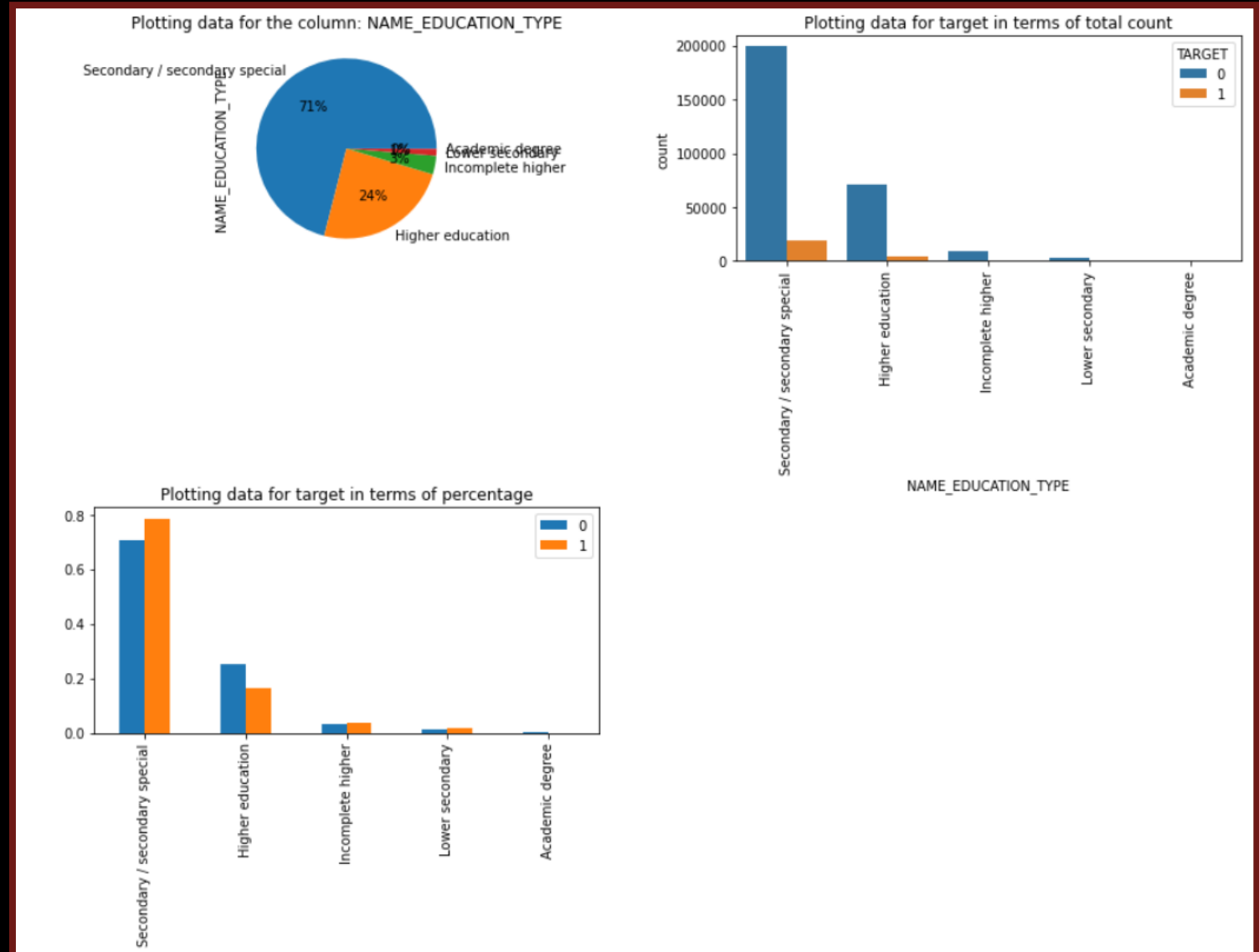
- Working class loan seekers are more over other categories. they also show a significantly high rate of defaulting.
- Next in line is the category of commercial associates.
 - Their defaulting rate is lower than their amount of repayment.



DISTRIBUTION OF LOAN BORROWERS UNDER EDUCATION TYPE

Insights from the figure:

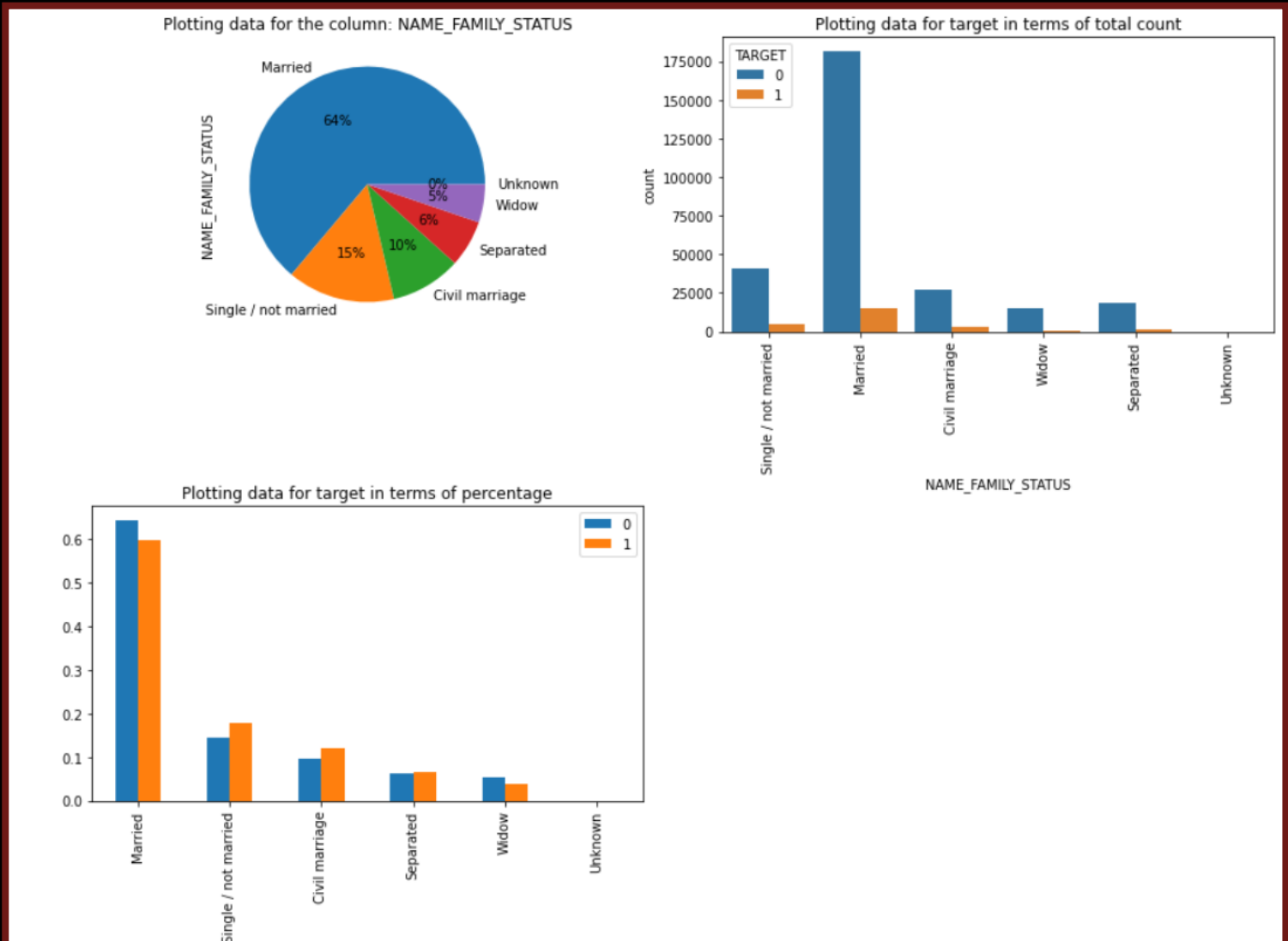
- Secondary/secondary special education level clients seek the most loans when it comes to education type
 - they also default more.
- Second to this category is the higher education type clients.



DISTRIBUTION OF LOAN BORROWERS UNDER FAMILY STATUS

Insights from the figure:

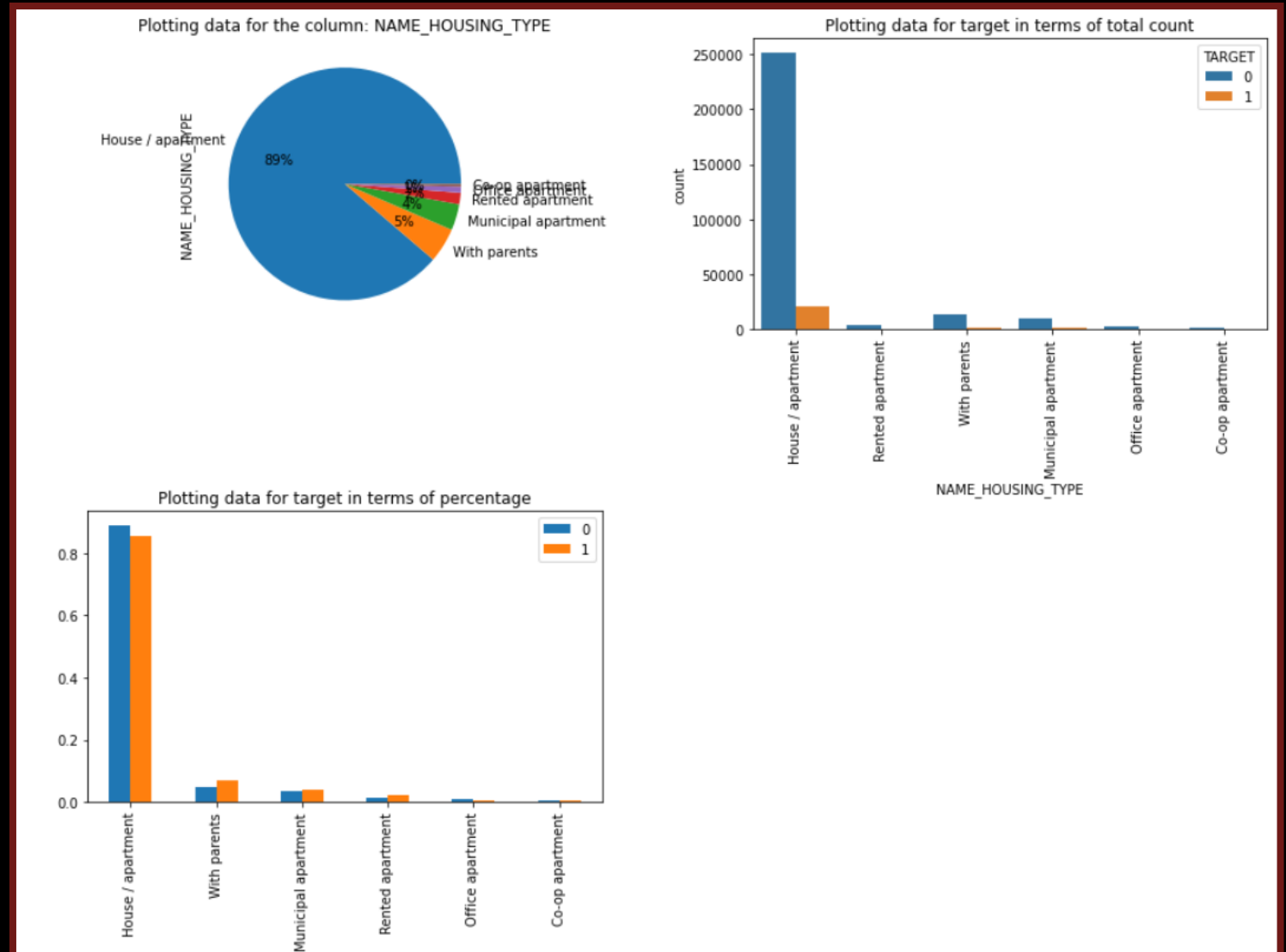
- Married applicants seek the most loans, followed by single applicants.
- Single/unmarried category applicants form the second highest loan seeking strata.
 - Although the rate of defaulting is more in this category.



DISTRIBUTION OF LOAN BORROWERS UNDER HOUSING TYPE

Insights from the figure

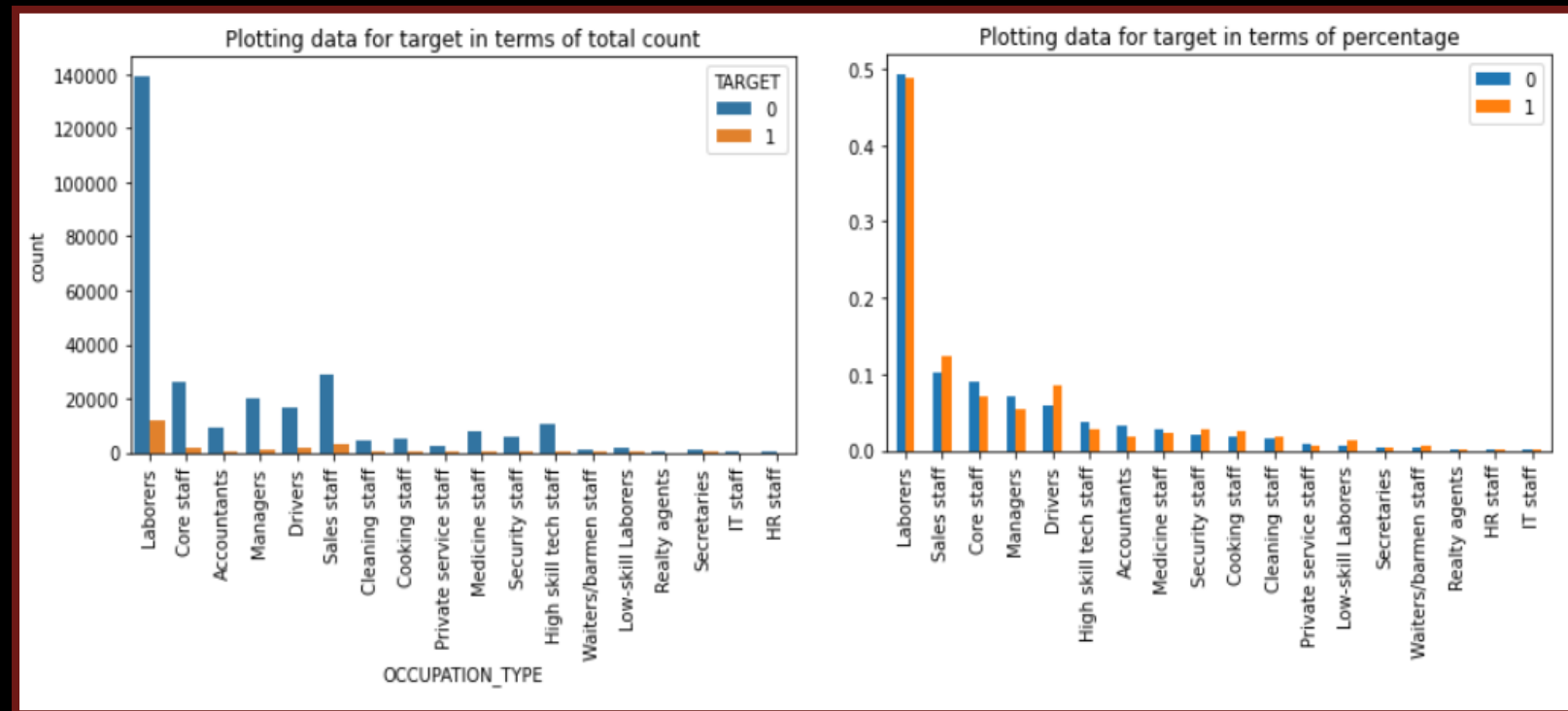
- Renting applicants are less prevalent, while those that own a house/apartment clients seek loans more.
- For categories Rented apartments, with parents, and municipal apartments, the defaulting rate is more than repayment.



DISTRIBUTION OF LOAN BORROWERS UNDER OCCUPATION TYPE

Insights from the figure:

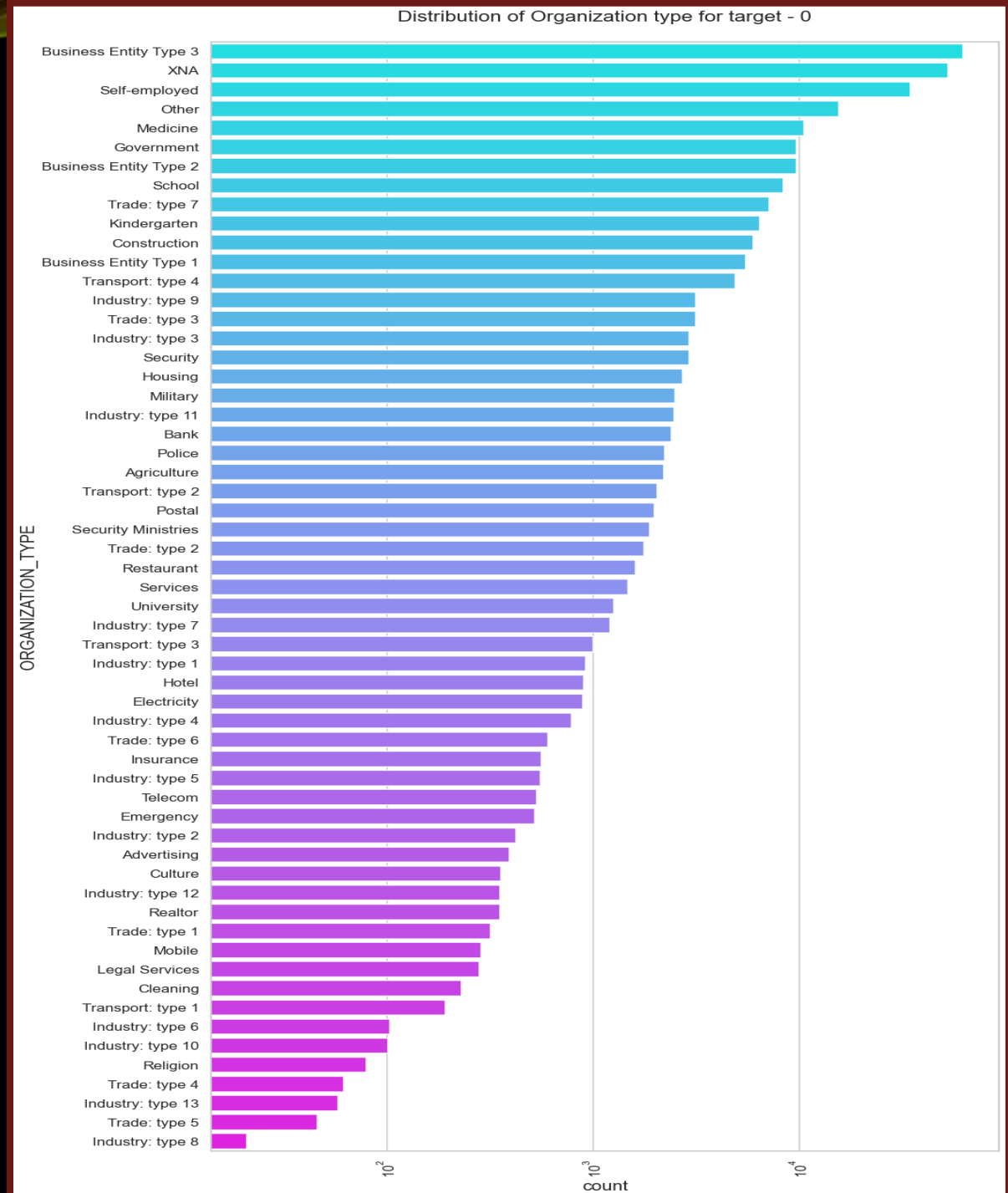
- Laborer class clients seek loans more.
- The second most category that seeks more loans is Sales staff.
 - Curiously, the defaulting rate for the same class is higher than repayment



DISTRIBUTION OF LOAN BORROWERS UNDER ORGANIZATION TYPE (TARGET=0)

Insights from the graph:

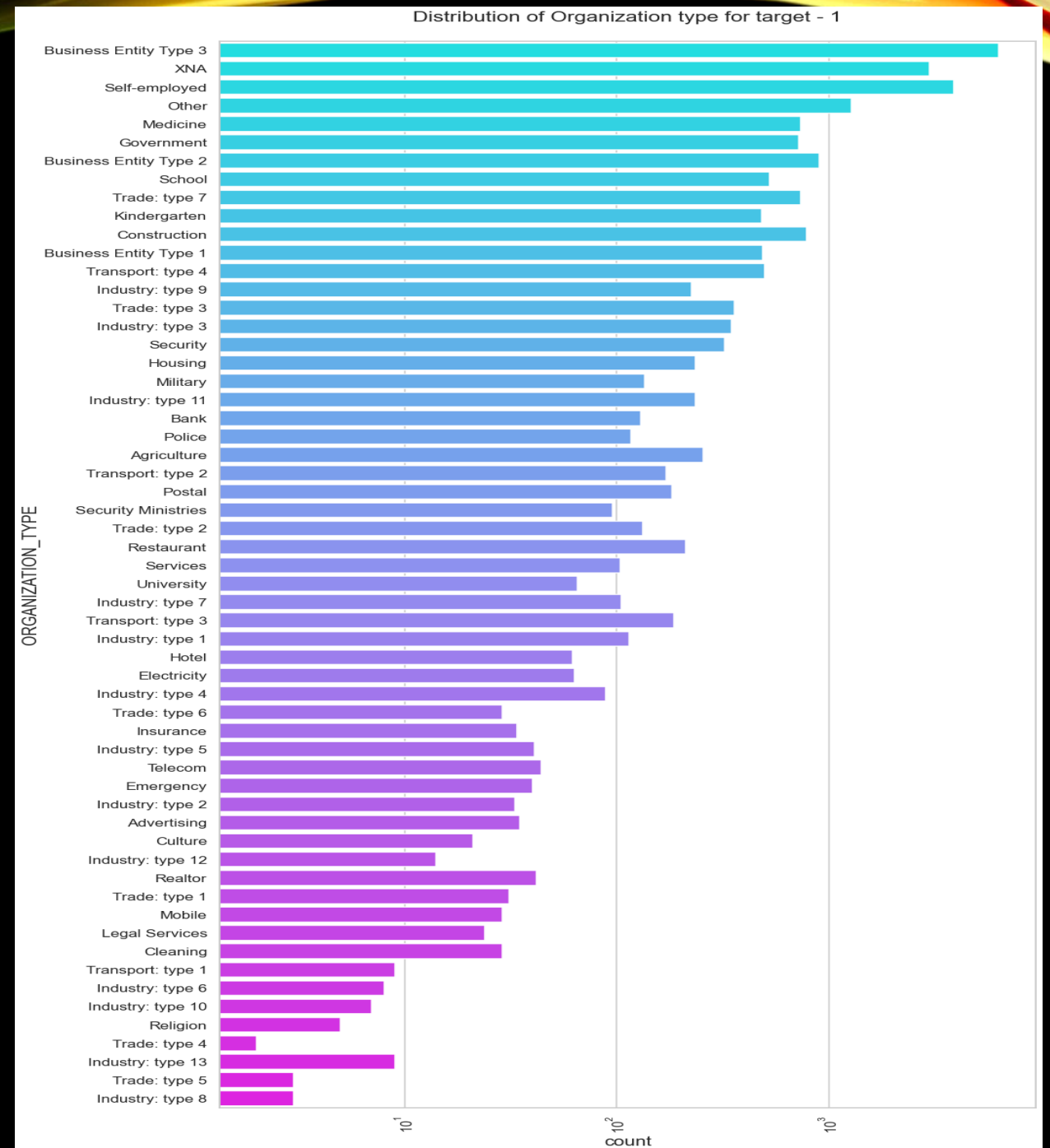
- Organization type does have an impact on the amount of loan borrowers that end up repaying their loans
 - A contrast with the defaulting rate will be explained in the following slide
- Business entity type 3 category of organization type proves to have the greatest number of loan repayors
 - The lowest can be seen in the industry type 8 category



DISTRIBUTION OF LOAN BORROWERS UNDER ORGANIZATION TYPE (TARGET=1)

Insights from the graph

- There is a slight shift in loan defaulters when compared to non-defaulters shown in the previous graph
- Whereas the spread of loan repayors was distributed in a decreasing gradient in the previous figure, the same can't be said for the data over here.
- Some examples could be the categories like University, Industry type 1, Hotel, electricity, transport type 3, Industry type 12, trade type 4, and so on
- This could potentially show that though loan repayment rates can be tied to the organization type, defaulting rate doesn't play by the same rules.



BIVARIATE ANALYSIS

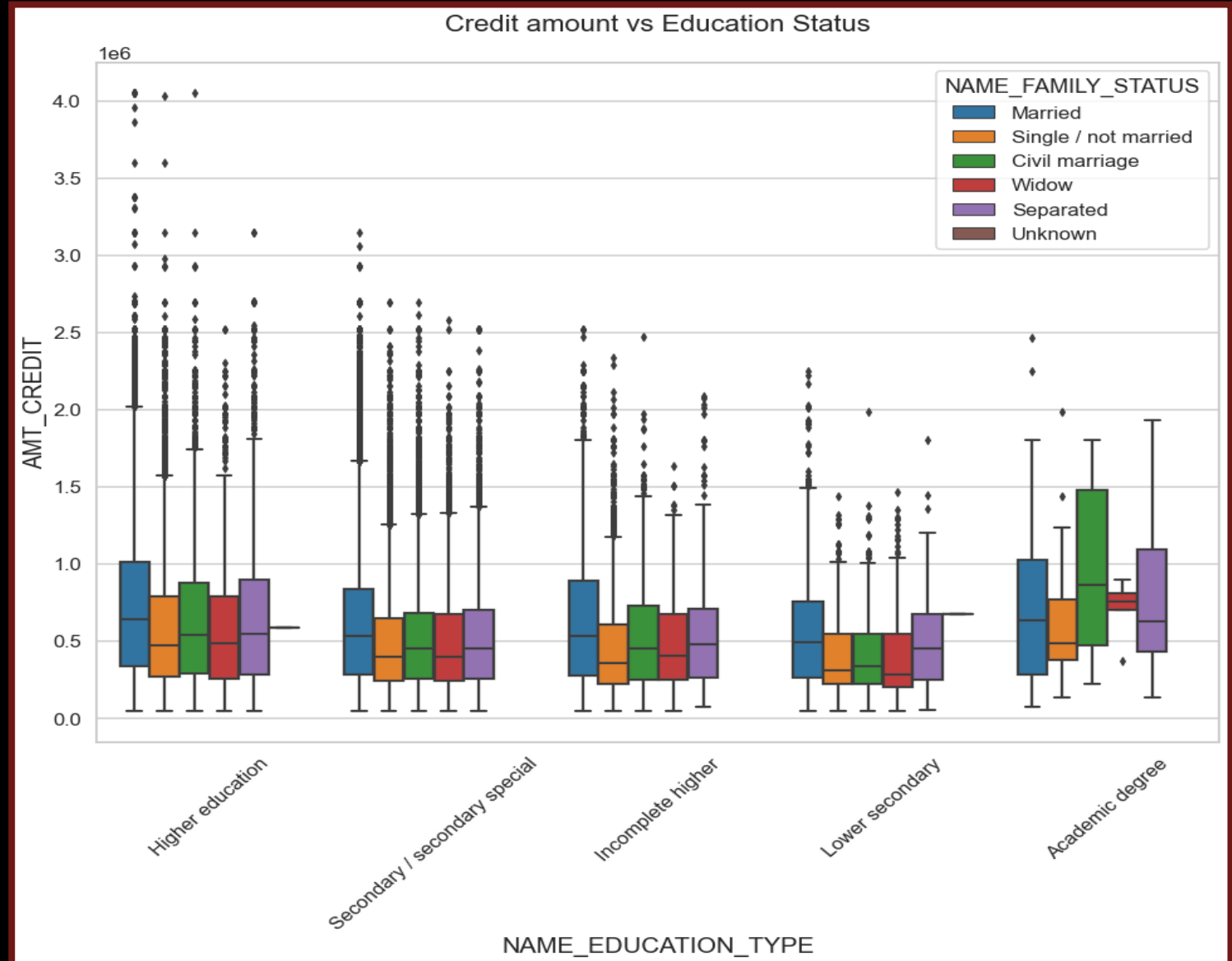
FOR DEFAULTERS (TARGET =
1) AND NON-DEFAULTERS
(TARGET = 0)

DISTRIBUTION OF LOAN BORROWERS PLOTTED AGAINST CREDIT ISSUED VS EDUCATION TYPE (TARGET=0)

Insights from the figure :

All these insights are being postulated keeping loan payers/non-defaulters in mind only.

1. when it comes to anomalies/outliers in given credit amount, people with higher education come out to be the topmost.
2. People in civil marriage who also hold an academic degree are often given much more credit amount
3. Overall, people under married category are offered more credit than all the other categories (except Academic degree holders)
4. Widowed borrowers are offered less credit usually.
5. single/unmarried clients are given an almost consistent range/distribution of credit amount, which is slightly higher when the borrower has an academic degree or higher education.
6. When looked at the overall distribution of all family statuses in different education categories, people with only lower secondary degree are offered low credit amounts. The highest distribution can be seen in borrowers with an academic degree.

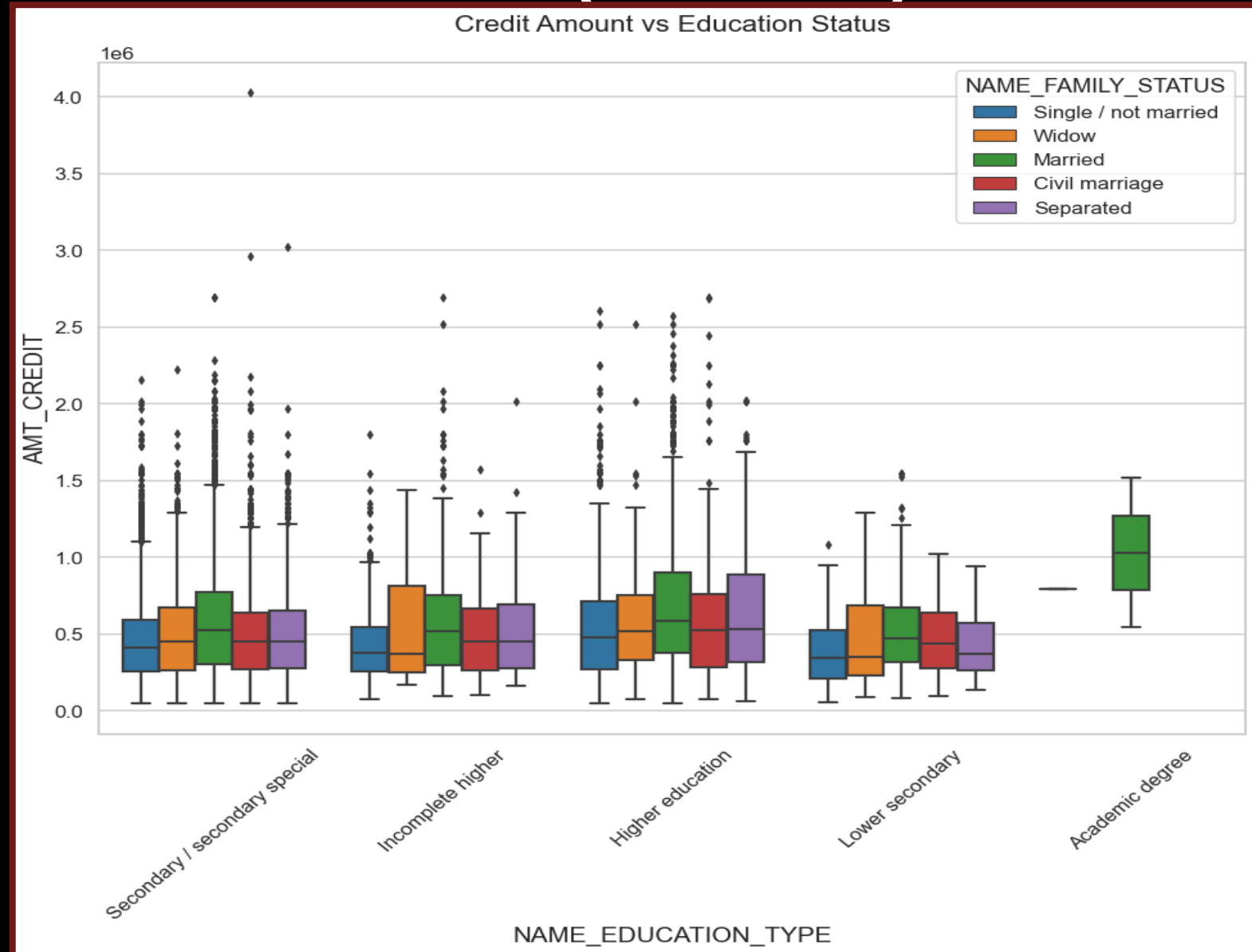


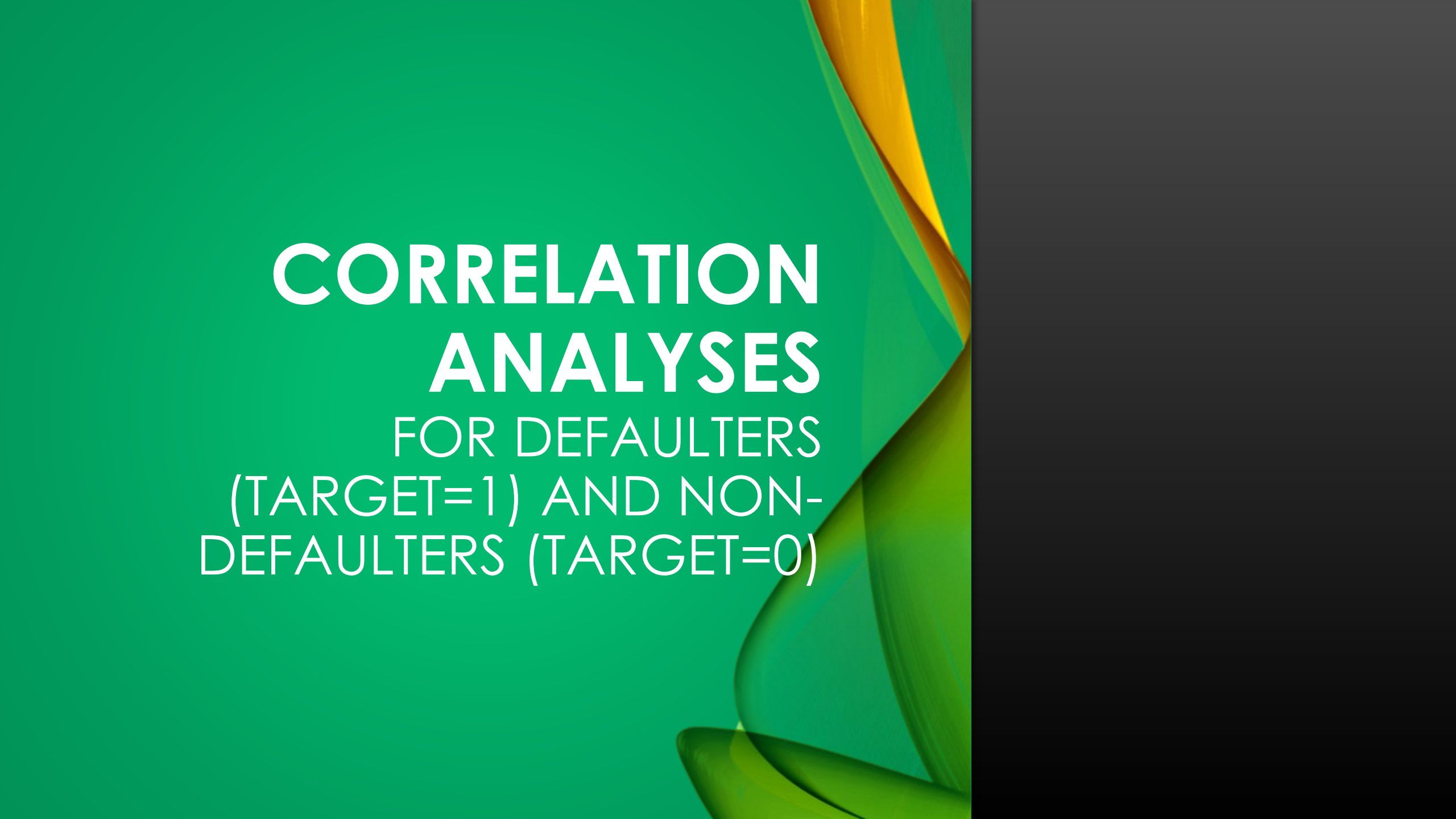
DISTRIBUTION OF LOAN BORROWERS PLOTTED AGAINST CREDIT ISSUED VS EDUCATION TYPE (TARGET=1)

Insights from the figure :

These insights are formed after keeping defaulters in mind:

1. Since the more credits are offered to academic degree holder, it makes sense that the data will show a greater number of defaulters in the same category.
2. Single/unmarried category has the lowest number of defaulters, credit offered to them is also low.
3. Married, widowed borrowers are offered more credit in all categories except the academic degree holders. In higher education category separated individuals are offered more credit, and they also default more.

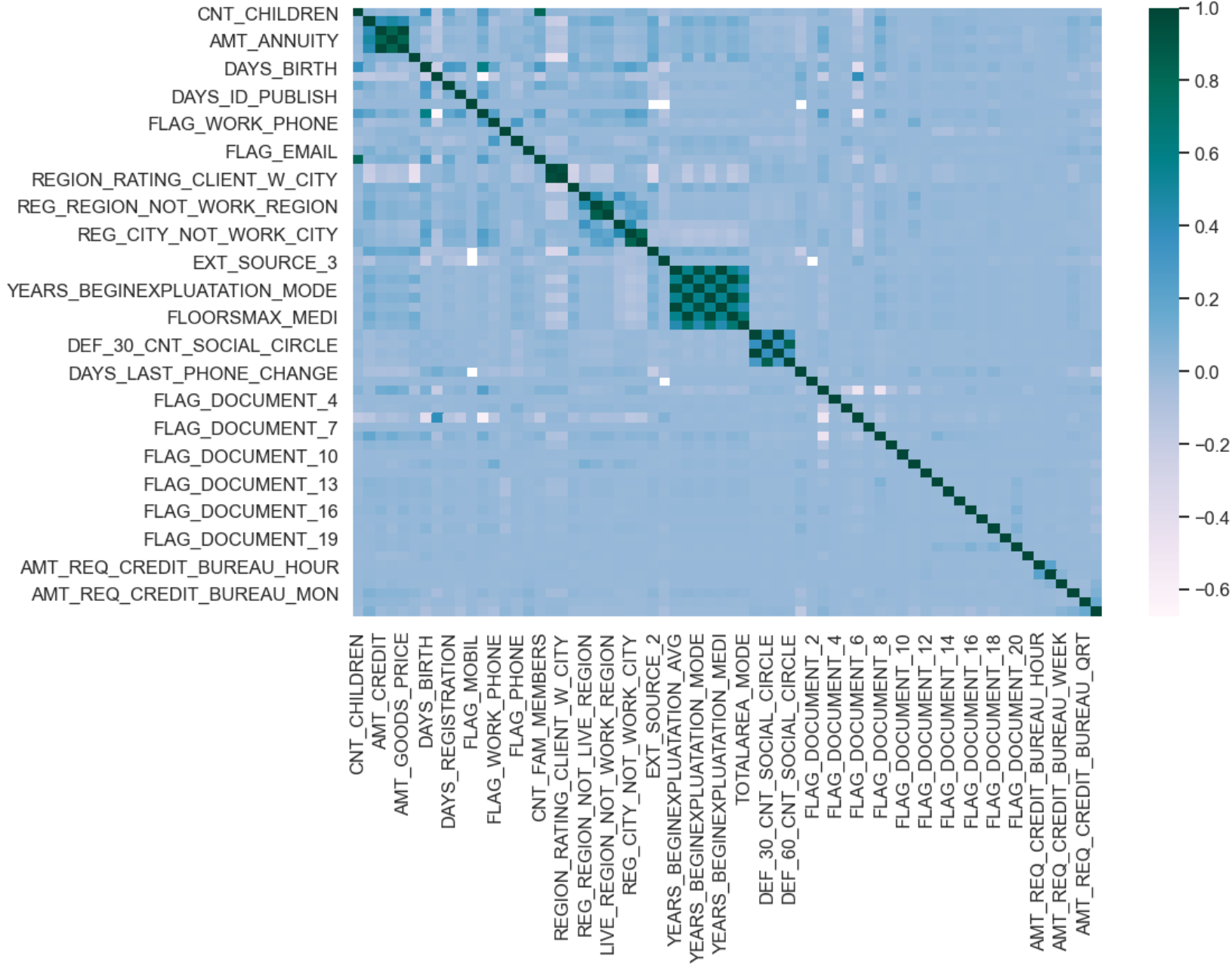




CORRELATION ANALYSES

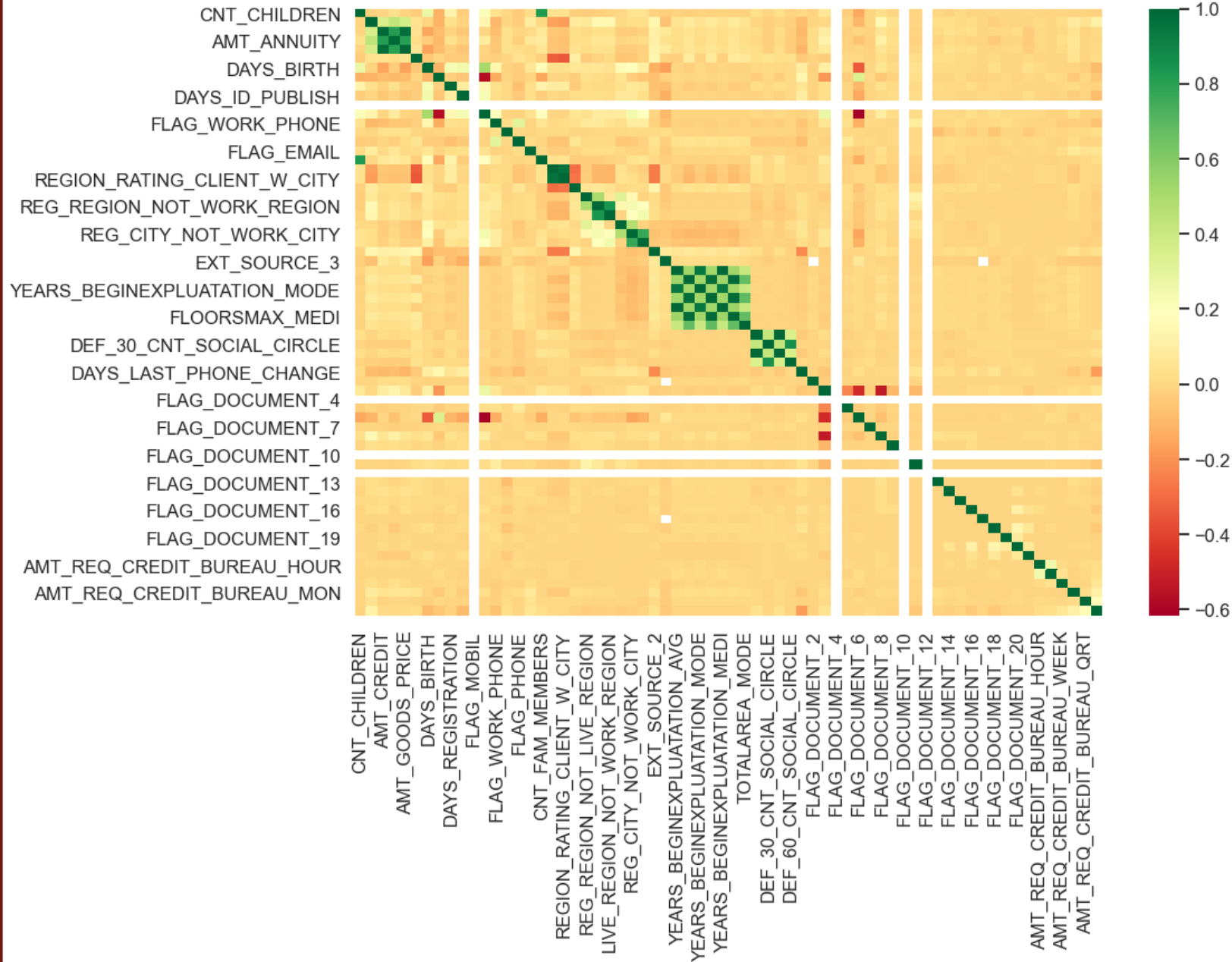
FOR DEFAULTERS
(TARGET=1) AND NON-
DEFAULTERS (TARGET=0)

Correlation for target = 0



**CORRELATION FOR
NON-DEFAULTERS**

Correlation for target = 1



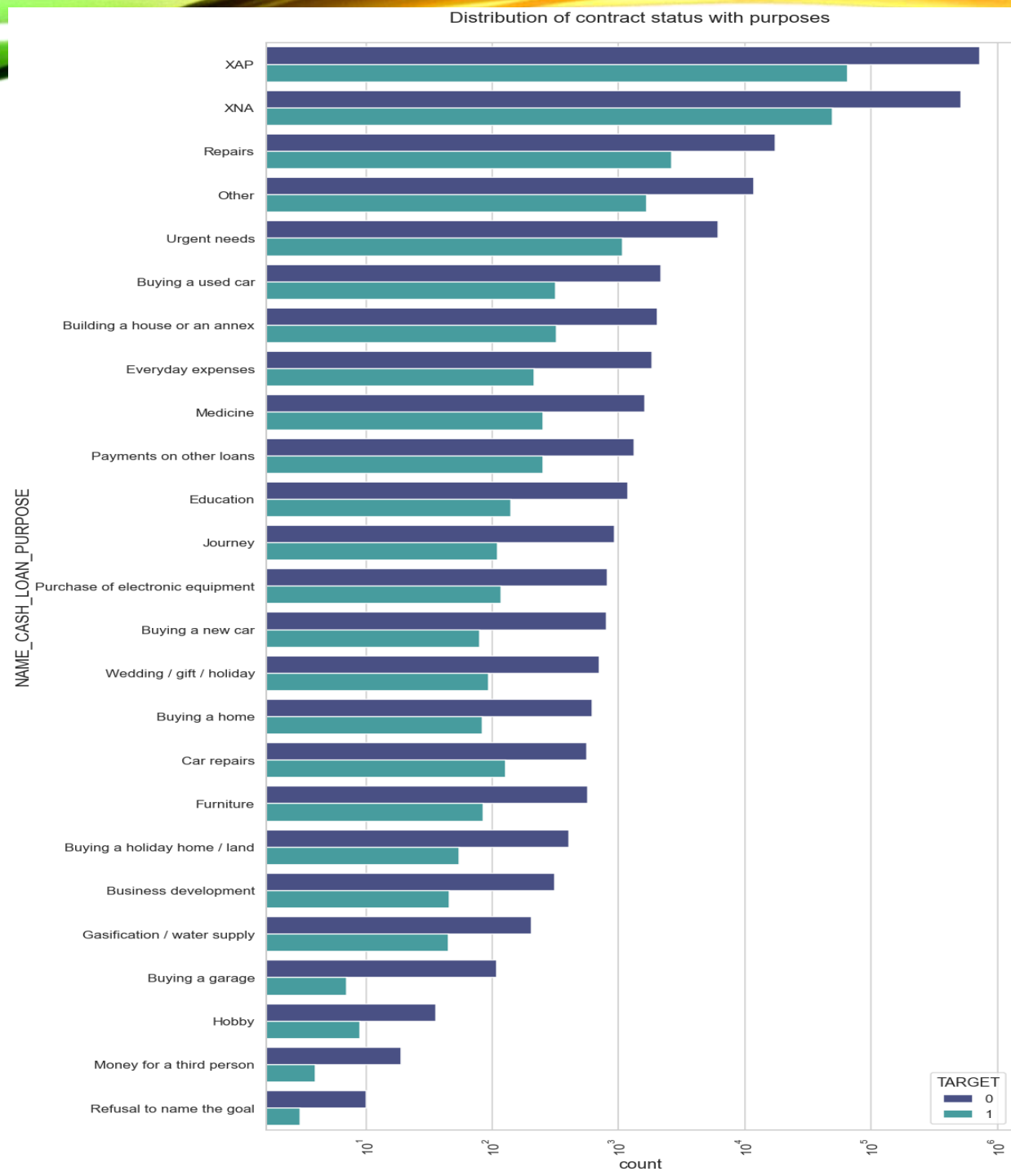
CORRELATION
FOR DEFAULTERS

UNIVARIATE ANALYSIS ON COMBINED DATASET

DISTRIBUTION OF LOAN BORROWERS PLOTTED AGAINST LOAN PURPOSE AND PROBABILITY OF DEFAULTING

Insights from the above graph

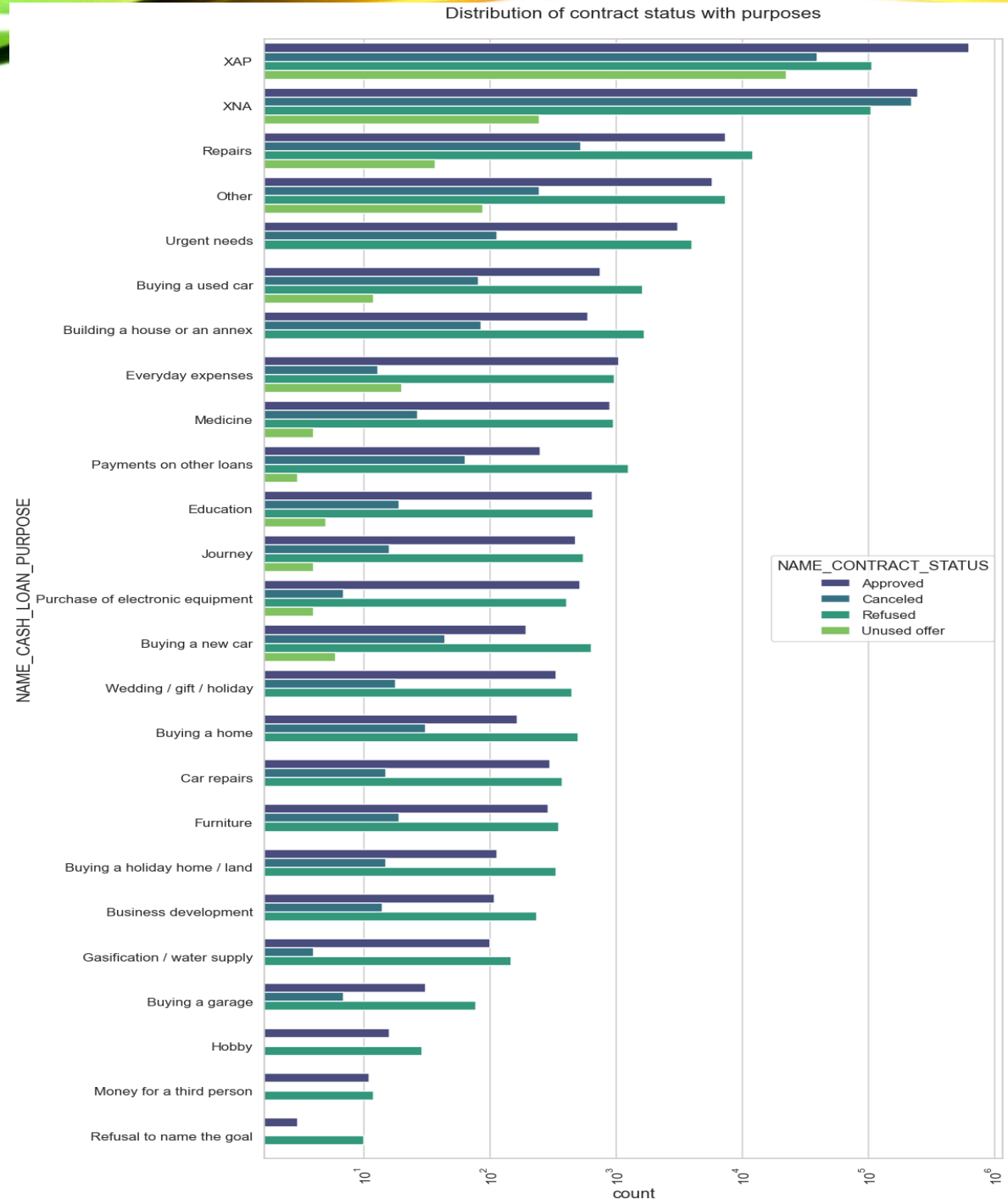
1. when we look at the purpose of borrowing loans and their impact on the defaulting/non-defaulting rates, we can see that most loan takers that get don't default, seek loan for repair and maintenance of their property.
2. The applicants that refuse to specify any sort of end goal, this also being the least loan seeking category, get the least amount of defaulters.
3. Curiously, when it comes to specific categories, ration of people that default more on loans in comparison to non-defaulters in the same category, can be seen in categories such as 'car repairs' and 'payments on other loans'.



DISTRIBUTION OF LOAN BORROWERS PLOTTED AGAINST LOAN PURPOSE AND CONTRACT STATUS

Insights from the graph

1. 'Repairs' category shows more loan acceptance rate. Next comes loans for 'other' and 'urgent needs'. 'Buying a used car', 'building a house', 'everyday expenses', 'medicinal purpose', and 'education', show a similar profile for loan acceptance. Again, people who haven't specified their goals see the least acceptance rate.
2. Loan refusal rate is lowest in the category of 'refusal to name the goal'. That might be influenced by a lower percentage of applicants in that category to begin with. Refusal rates are usually lower than acceptance rates for some categories, except 'buying a used car', 'building a house', 'for other loan repayment', 'buying a new car', 'buying a home', 'buying a holiday home/land', 'buisness development', 'hobby', and 'buying a garage'.
3. Cancellation rates almost always follow the acceptance rate profile, apart from a few exceptions like 'everyday expenses', 'medicine', and so on.
4. Similarly, when it comes to the offer remaining unused by the applicant, 'Other' and 'Repairs' category has the most such applicants.

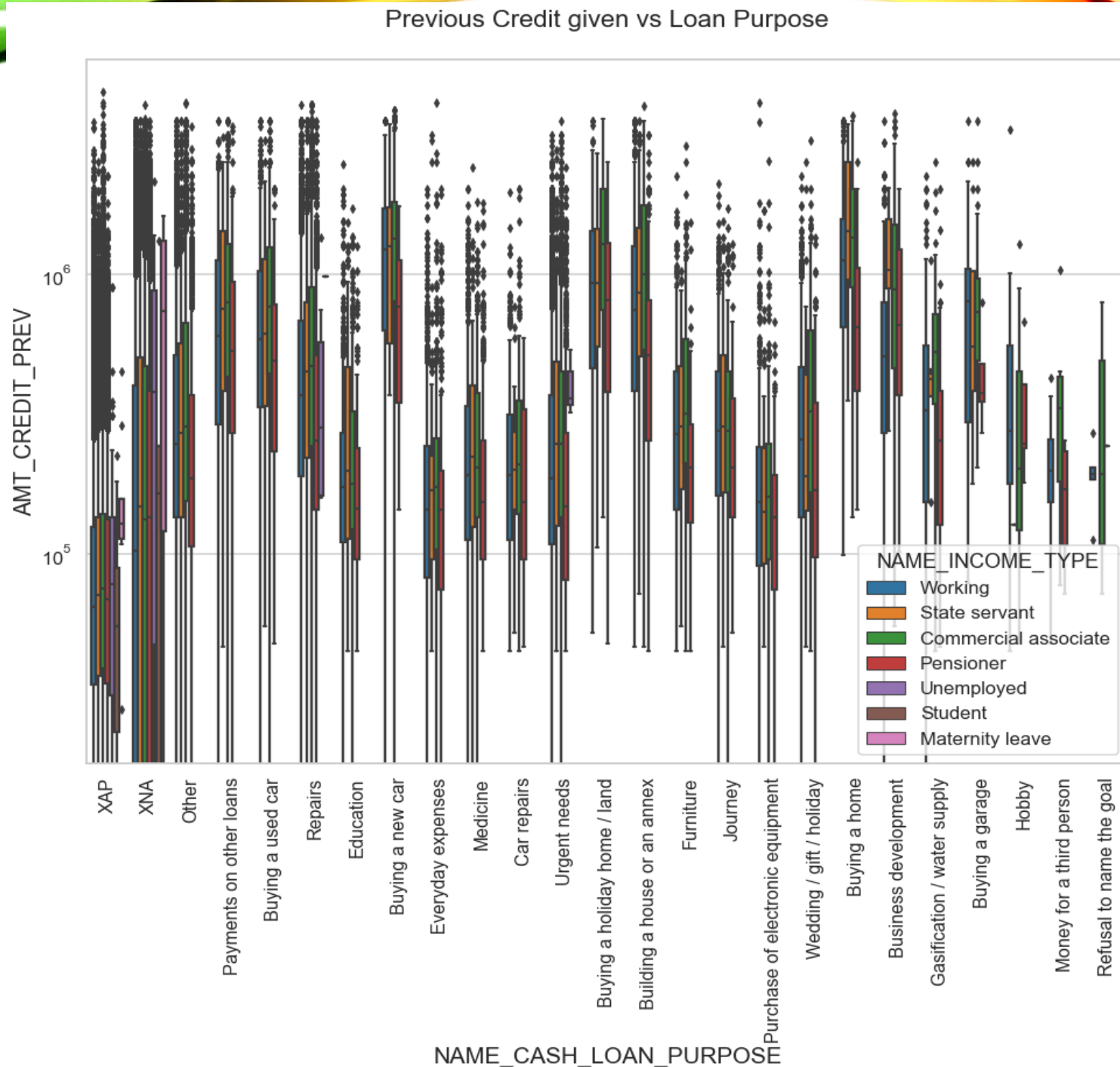


BIVARIATE ANALYSIS ON COMBINED DATASET

DISTRIBUTION OF LOAN BORROWERS PLOTTED AGAINST LOAN PURPOSE AND PREVIOUSLY GIVEN CREDIT AMOUNT

Insights from the graph

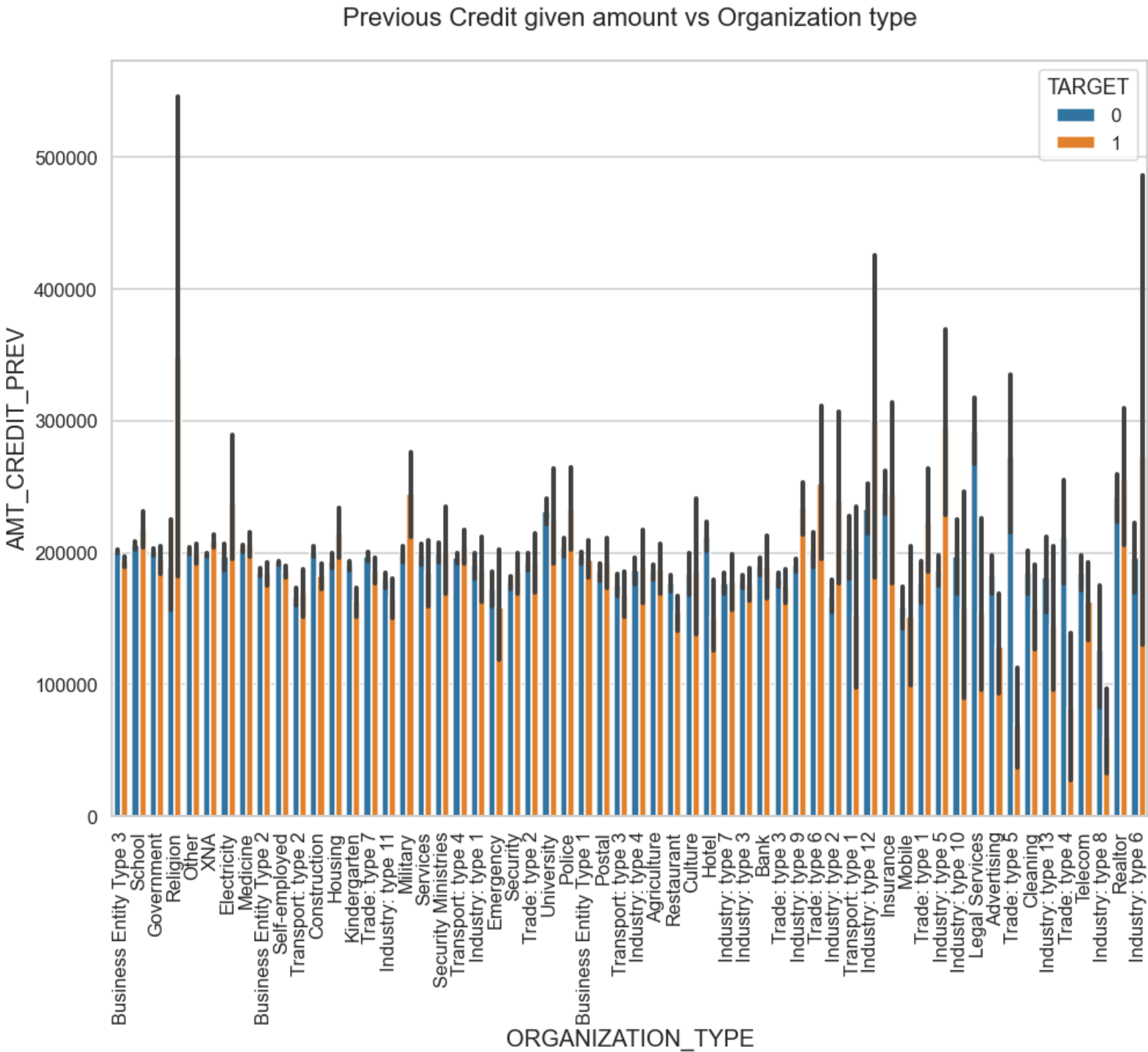
1. The starting bracket of credit offered previously to all income type categories is high for purposes like 'car repairs', 'buying a holiday home', 'building a house/annex', 'furniture', 'buying a home', 'buying a garage', 'hobby', and 'money for a third person'.
2. Highest amount of anomalies/outliers in the terms of credit amount paid previously lies in 'urgent needs', and 'everyday expenses'.
3. State servants were offered more credits for the purpose of buying a home.
4. Pensioners and students are offered less credit amounts overall.



DISTRIBUTION OF LOAN BORROWERS PLOTTED AGAINST LOAN PURPOSE AND PREVIOUSLY GIVEN CREDIT AMOUNT

Insights from the graph

- 1. Most credit amount offered to non-defaulters (blue) is for the organization type 'legal services'
- 2. If we look for a similar profile for defaulters (orange), it is in the organization type 'industry: type 5'
- 3. Lowest credit amount offered to defaulters is in the category 'trade: type 4'
- 4. Similar profile for non-defaulters can be seen in category 'industry: type 8'



CONCLUSION

- Revolving loans prove to be more beneficial for the lender
- Commercial associates, pensioners, state servants, and students are some of the categories where banks should focus more, as they prove to default less
- At the same time banks should lean more towards those with a higher education, academic degree
- New portfolios can be designed for married applicants as they apply for loan more yet default loan
- New offers should be designed by keeping the laborer class in mind as they default less
- Organization type can be tied with loan repayment but not with the defaulting rate.



THANK YOU