

# Lending Club Case Study

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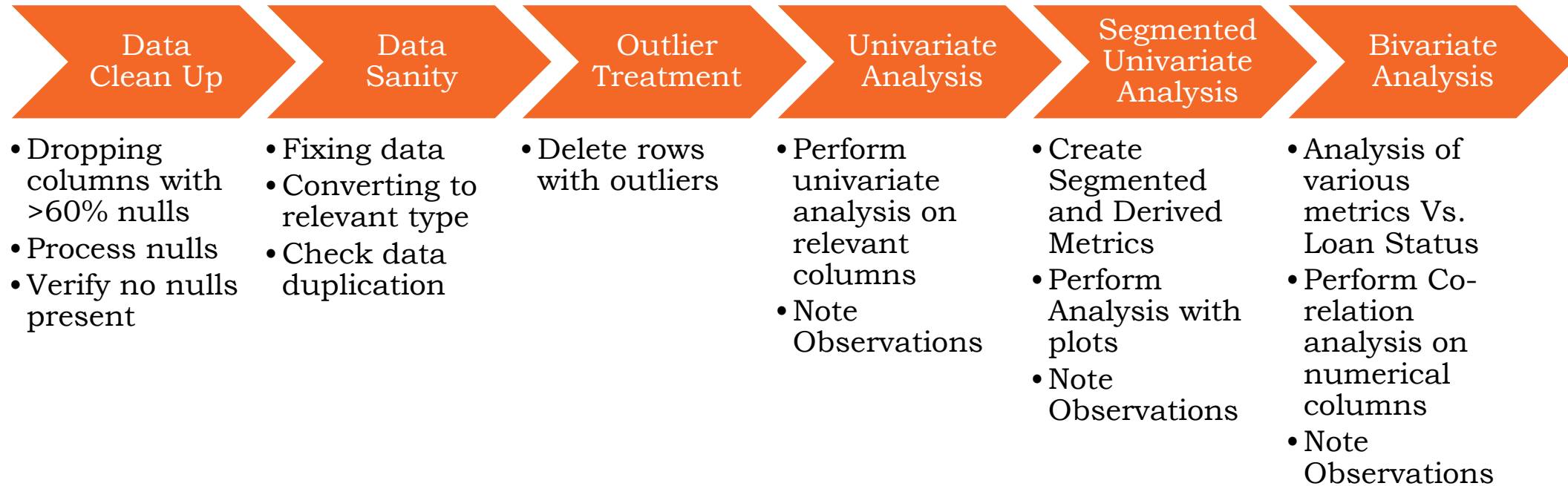
# Synopsis

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- Lending Club is the largest online loan marketplace, facilitating personal loans, business loans, and financing of medical procedures.
- Lending loans to 'risky' applicants is the largest source of financial loss (called credit loss).
- Identification 'risky' such applicants using EDA is the aim of this case study.
- The company wants to understand the driving factors (or driver variables) behind loan default, i.e. the variables which are strong indicators of default.
- The approach, findings with plots and recommendations will follow in next slides.

# Approach

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# Data Points / Metrics

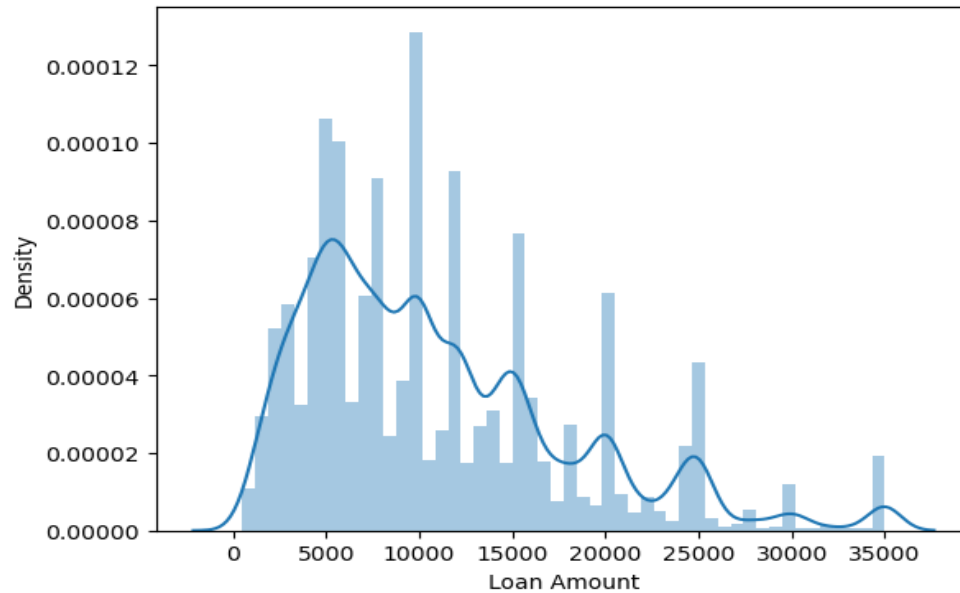
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The following data points of interest were analysed.  
Plots with analysis are present in further slides.

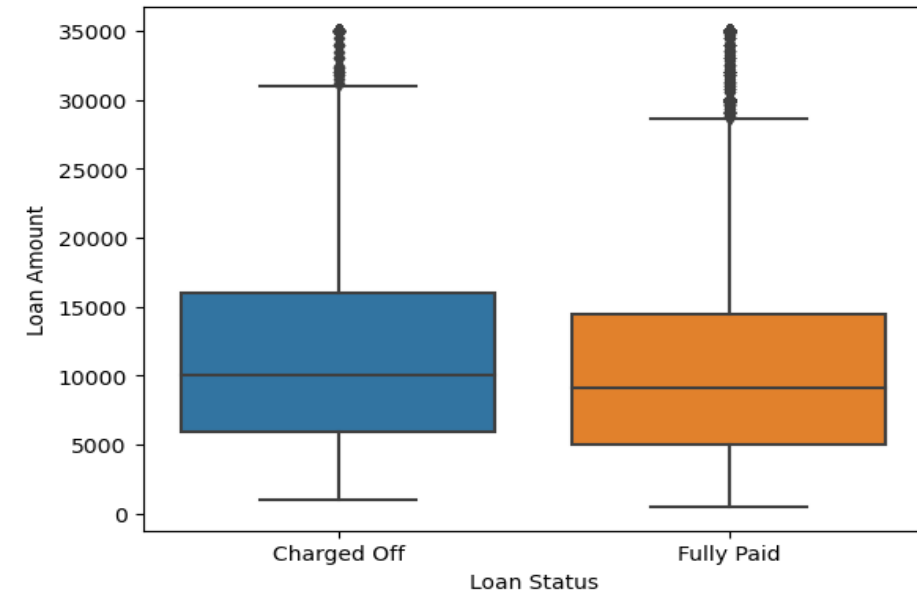
- ❑ Loan Amount
- ❑ Interest Rate
- ❑ Income Groups
- ❑ Purpose
- ❑ DTI
- ❑ Delinquency Incidents in last 2 years
- ❑ Employment Length Range
- ❑ Credit Length (in Years)
- ❑ Public Record Bankruptcies
- ❑ Loan Issued Month
- ❑ Loan Issued Year
- ❑ Home Ownership
- ❑ State
- ❑ Loan Grade
- ❑ Loan Term
- ❑ Inquiries
- ❑ Open Credit Lines
- ❑ Public Derogatory Records
- ❑ Revolving line utilization rate

# Loan Amount

Most Loans were USD 5,400 to 15,000



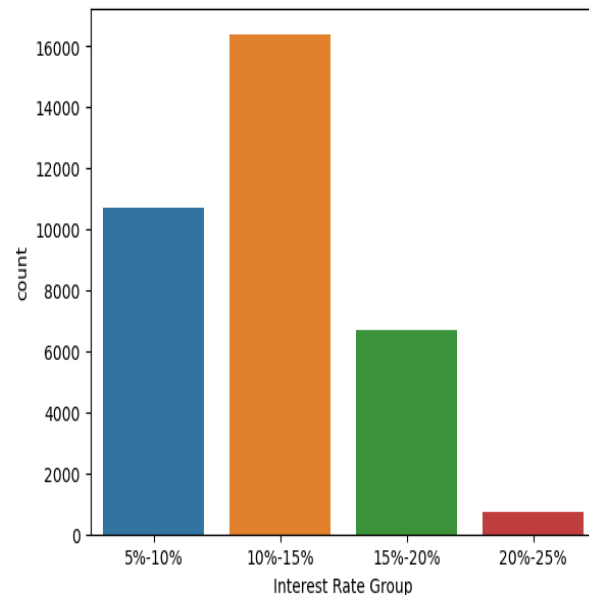
Loan Amount is generally higher for Charged Off loans



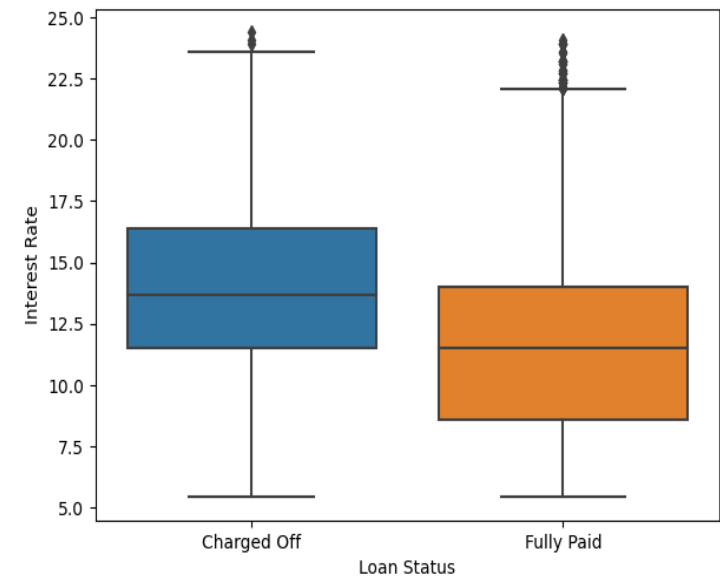
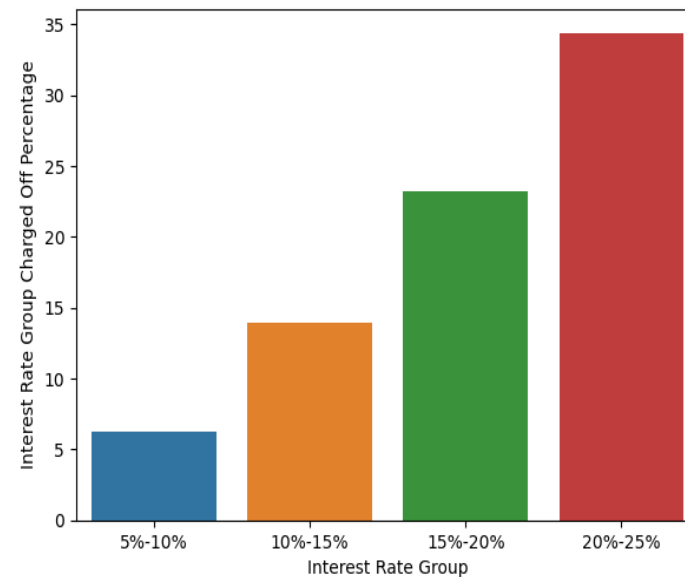
# Interest Rate

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Most loans have Interest Rate of 10%-15%

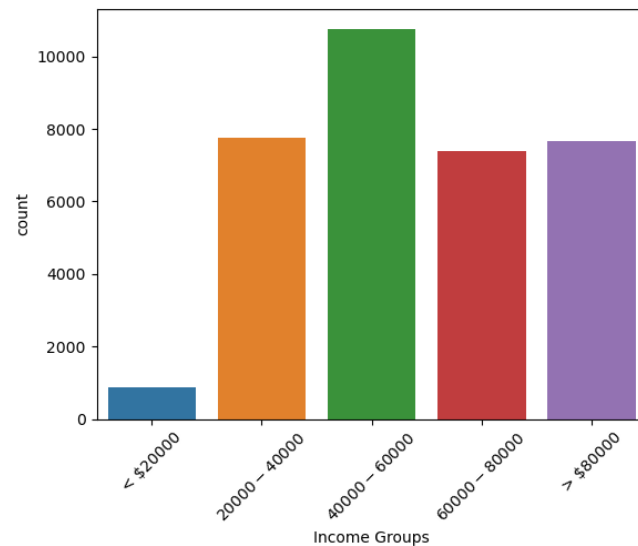


The higher the Interest Rate, the higher the chances of Charge Off

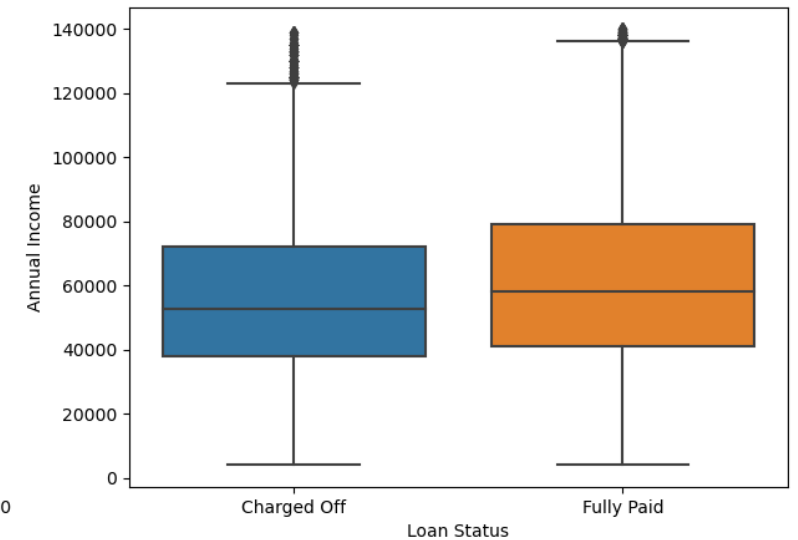
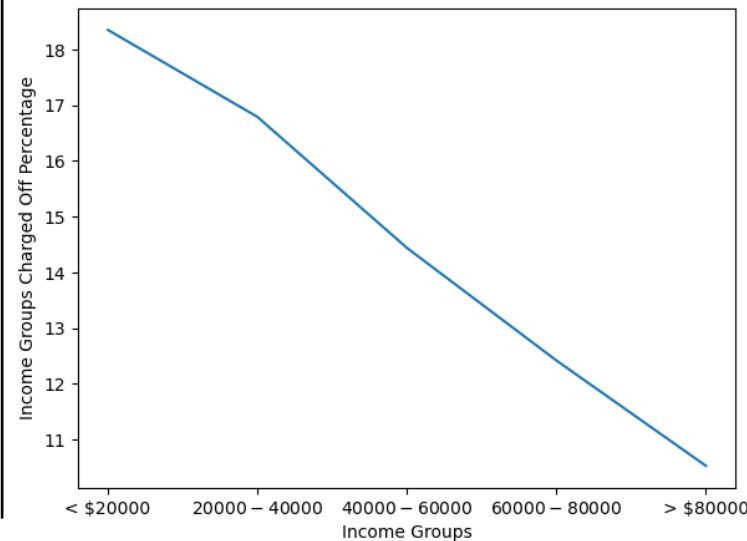


# Income Groups

Number of borrowers in Income Group USD 40,000-USD 60,000 borrow most whereas < USD 20,000 borrow least.

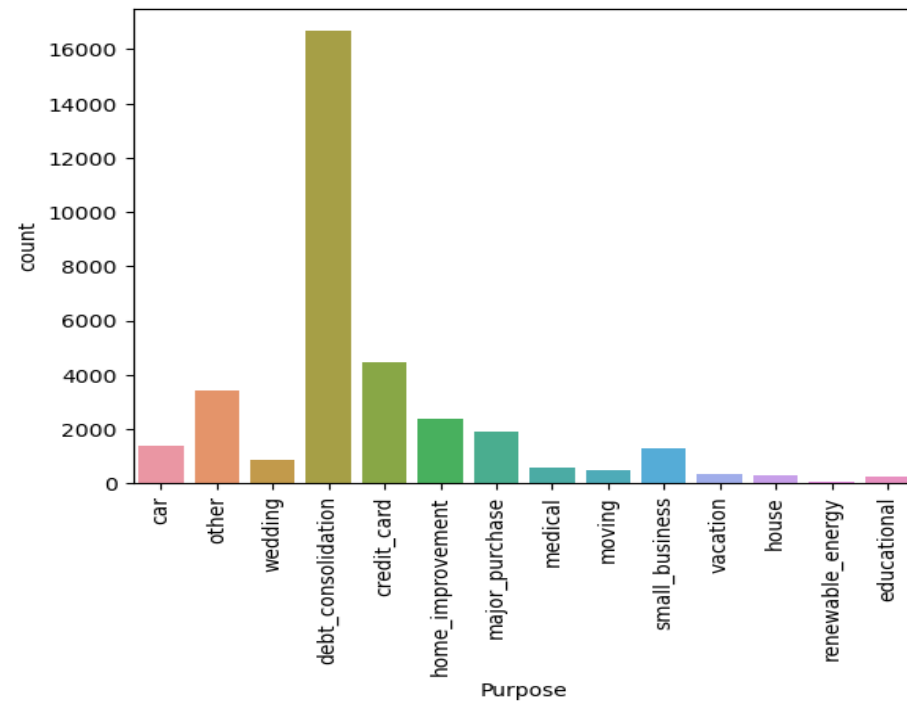


- As income increases, percentage of Charge Off decreases.
- In comparison, Annual Income of Charged Off applicants is lower.

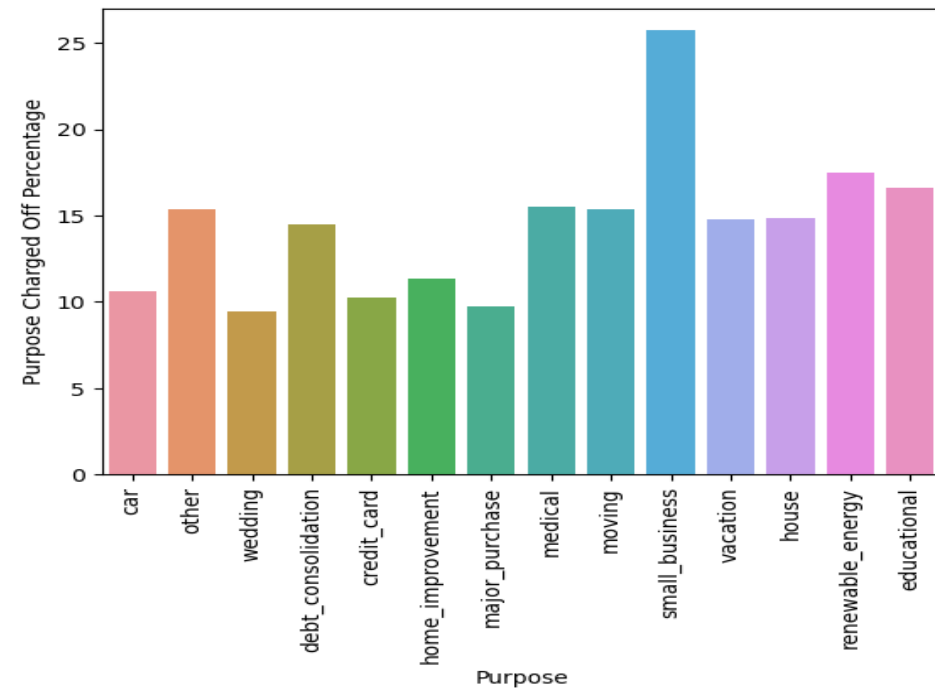


# Purpose

Most Loans were taken with the Purpose of **Debt Consolidation**



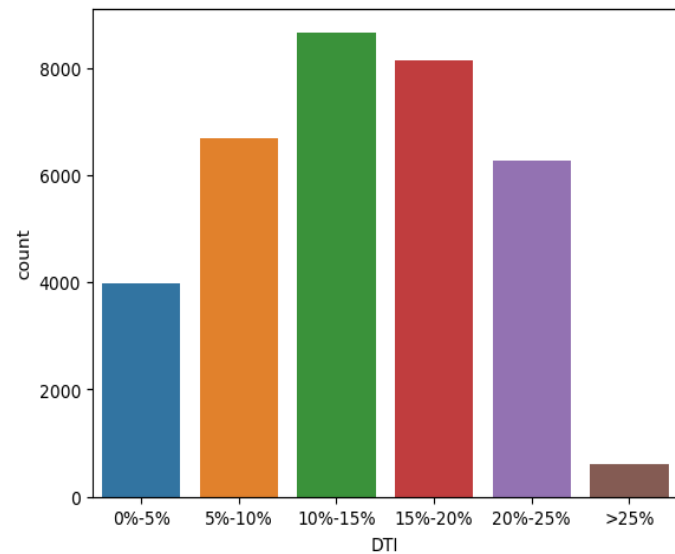
Majority of the loans which are Charged Off were taken for **Small Business**



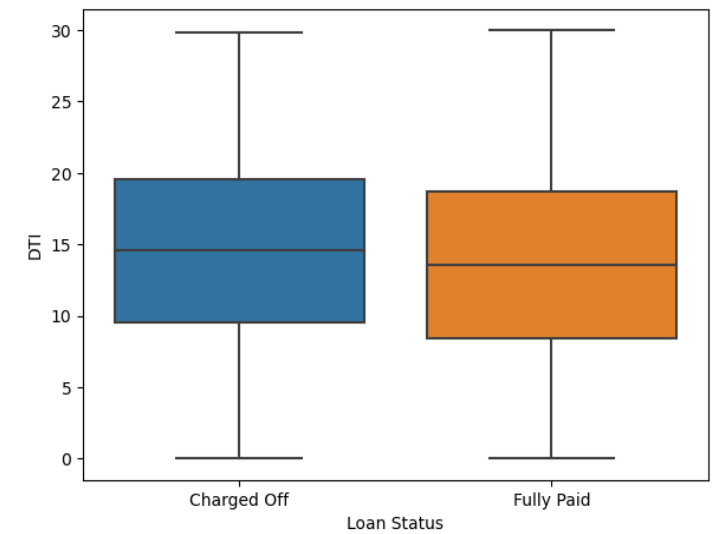
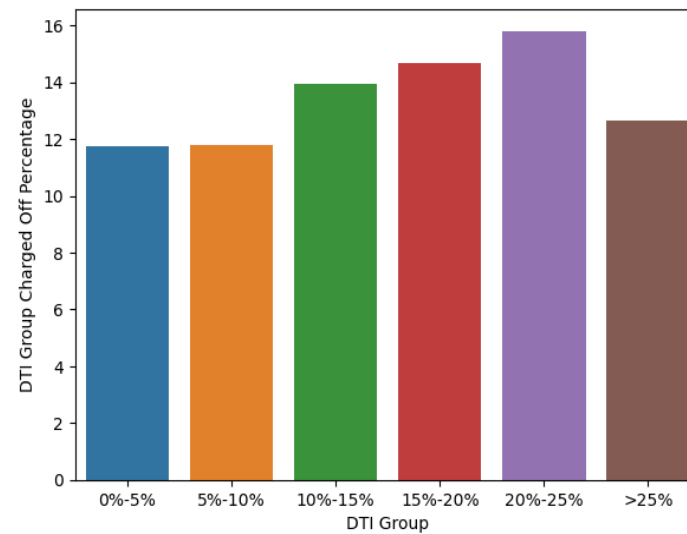


# DTI

Most borrowers have DTI in the range of 10%-15%.

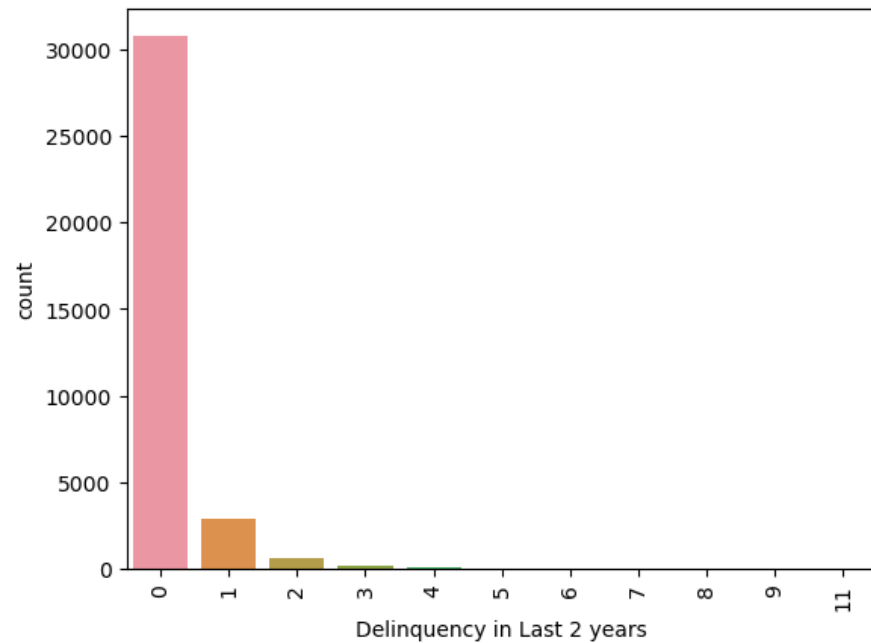


- In the Line Plot, If DTI > 10%, chances of charge off increase.
- In the box plot, we can observe that DTI is higher in general for Charged Off Loans

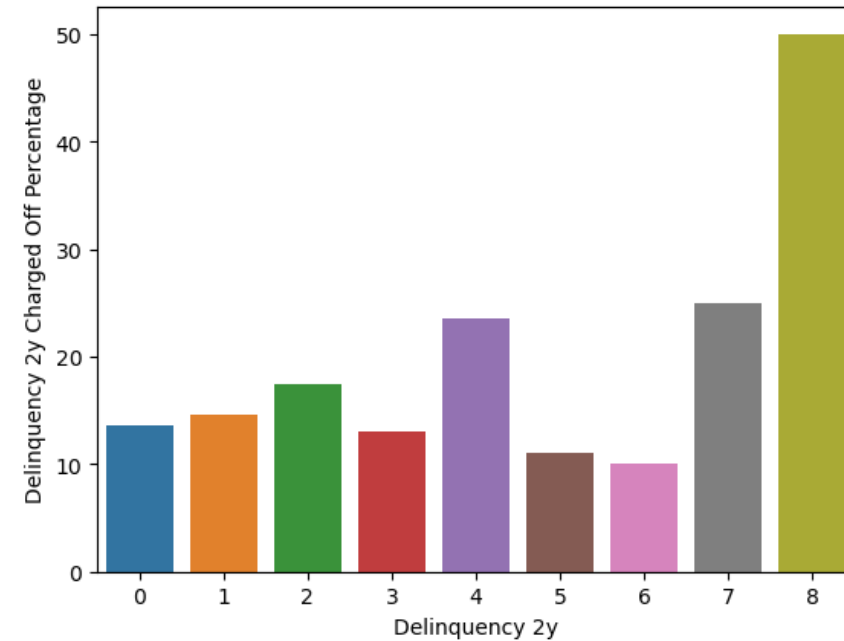


# Delinquency Incidents in last 2 years

Most borrowers seem to have lesser than 2 delinquency records in the past 2 years with the vast majority of them having none.



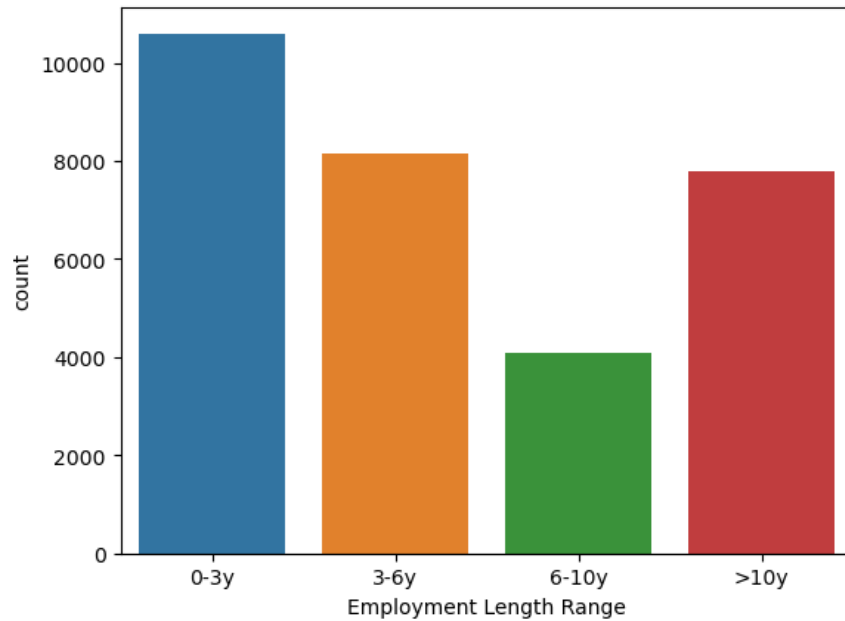
Although there is no upward line, with the exception of 5 and 6 records, there is a clear increasing trend. So, we can conclude that number of delinquency records, higher the chances of Charge Off.



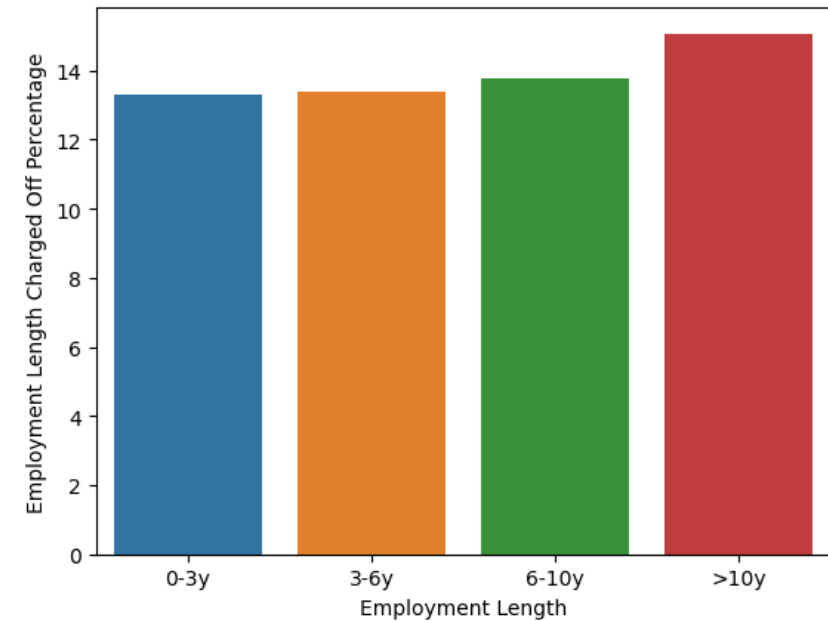
# Employment Length Range

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Most borrowers are have an employment range of 0-3 years.

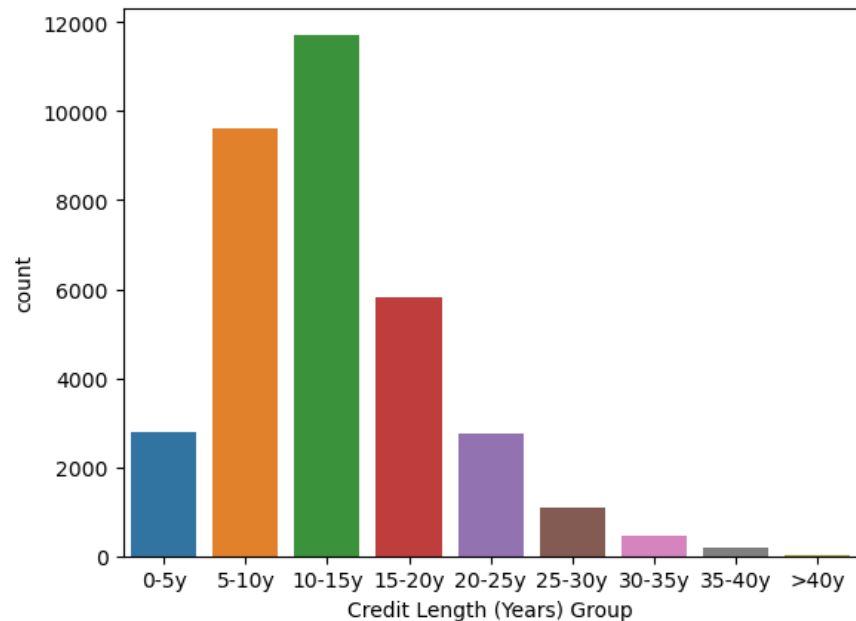


Chances of Charge Off increases as Employment Length increases.

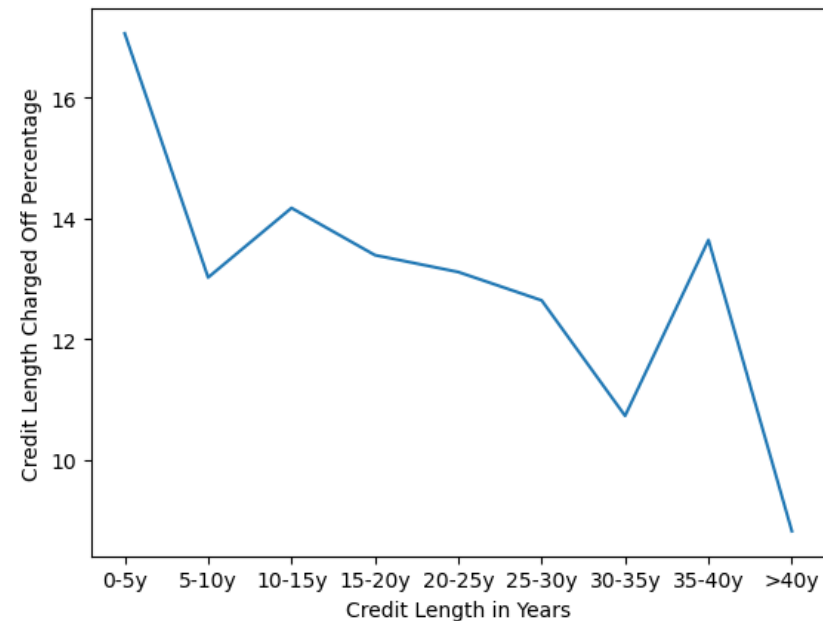


# Credit Length (in Years)

Most borrowers have a Credit Length of 10-15 years



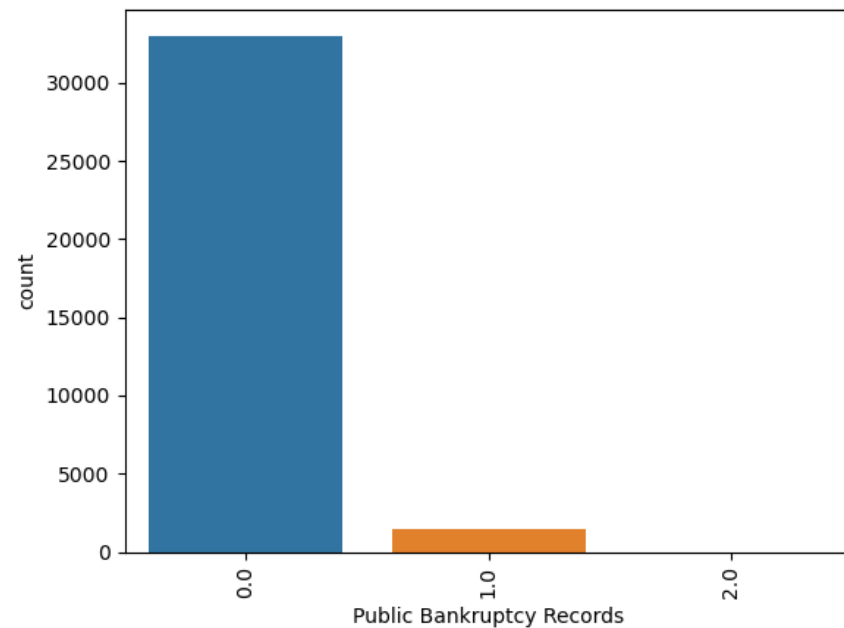
There is a strong trend where borrowers who have higher Credit Length have lower chances of Charge Off.



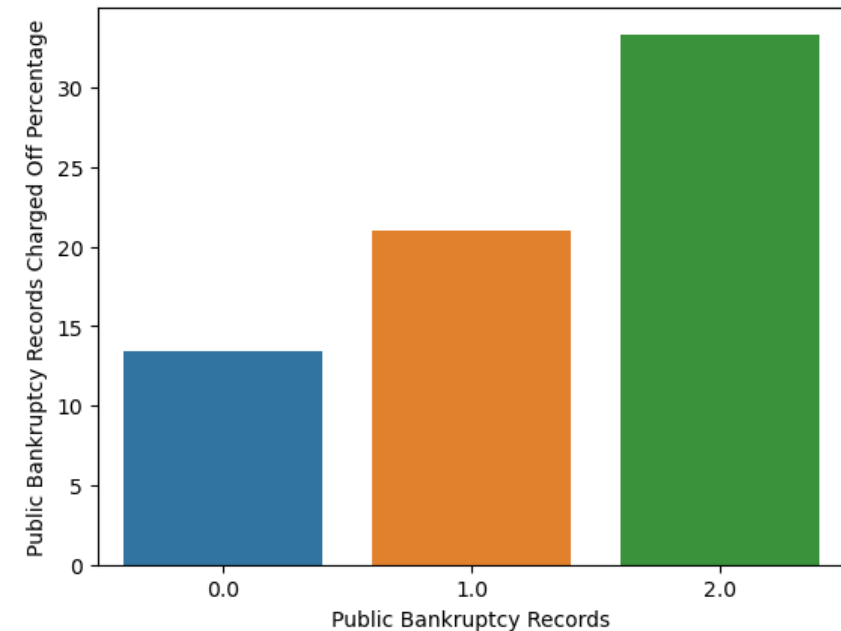
# Public Record Bankruptcies

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Most borrowers have no public bankruptcy records



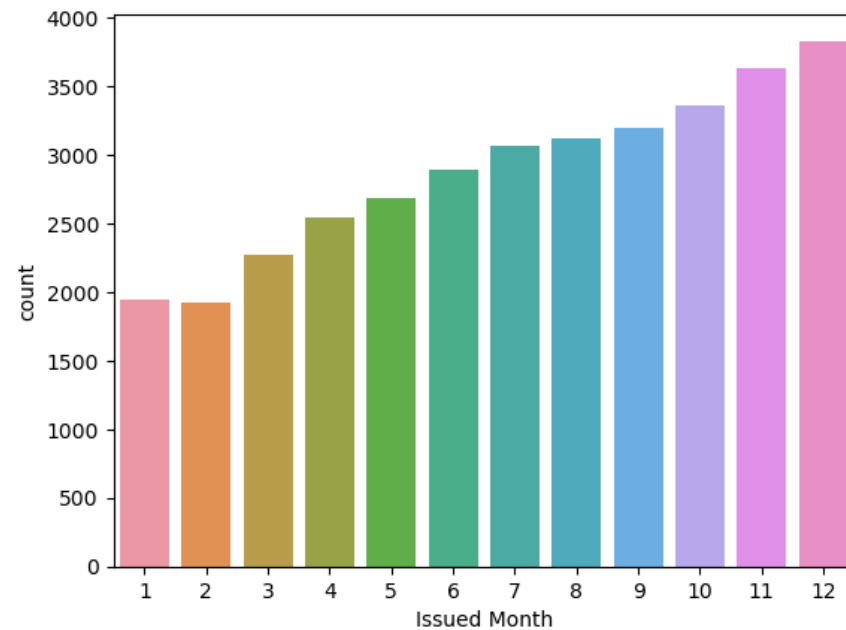
Higher the Public Bankruptcy Records, higher the chances of Charge Off.



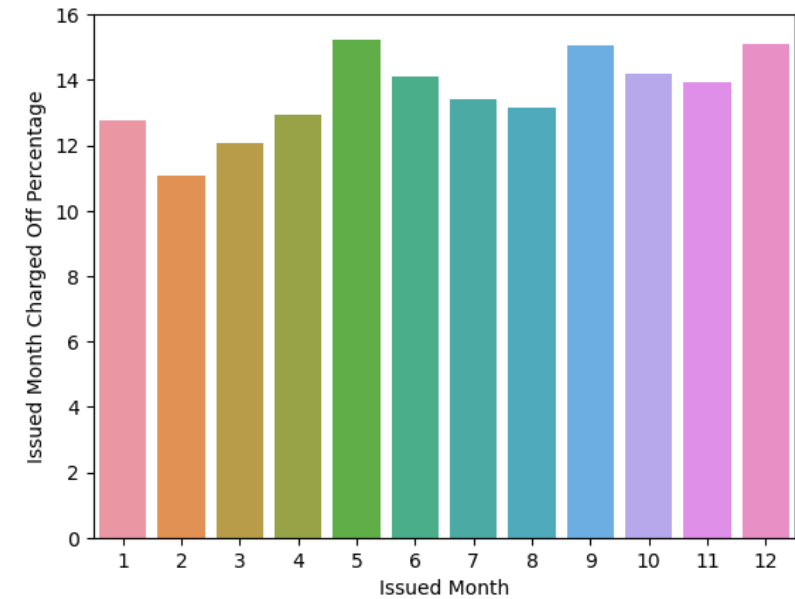
# Loan Issued Month

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The number of loans issued increases as the year goes on.



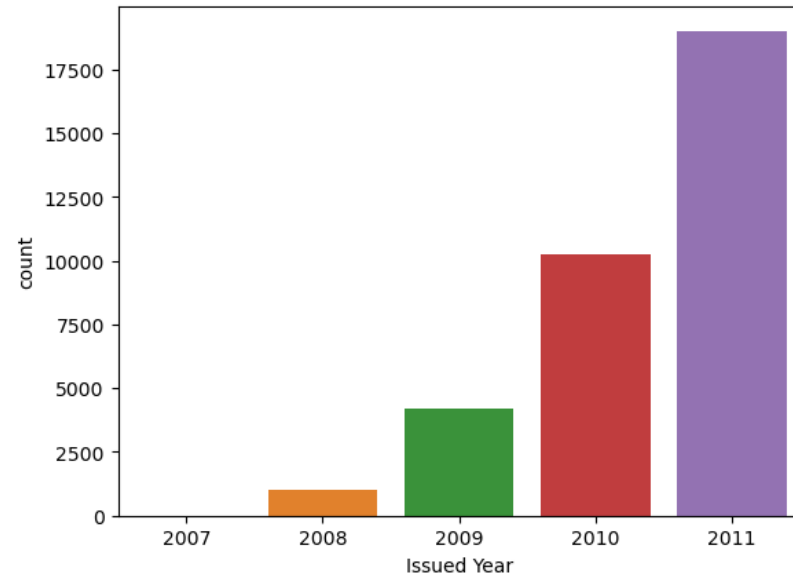
Loans issued in February have lowest chances of charge off whereas loans approved in May, September and December have highest chances of charge off



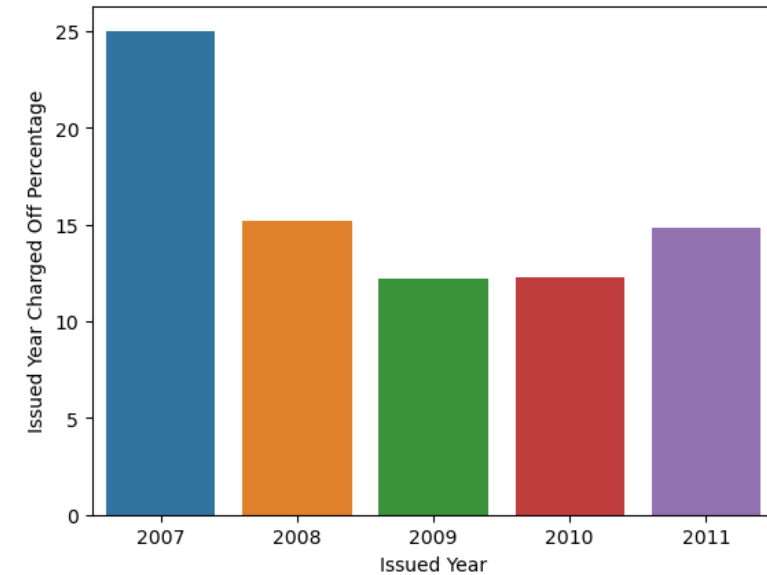
# Loan Issued Year

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More loans are approved every year.



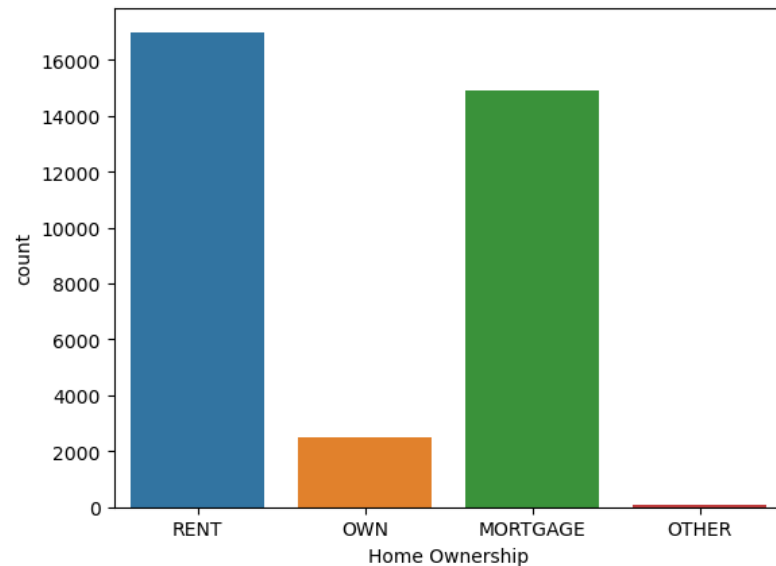
- Loans issues in 2008 and 2011 have higher Charge Off chances (2007 data is limited)
- No clear trend.



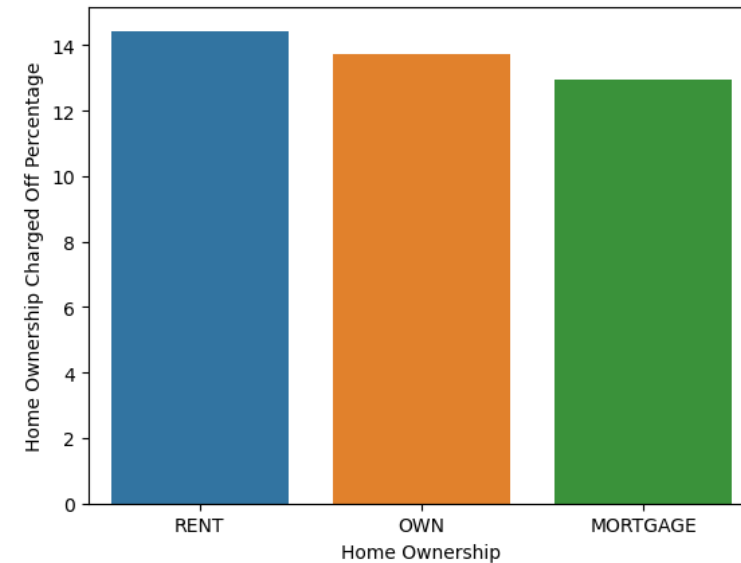
# Home Ownership

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People who live in Rented Homes and Mortgaged homes seem borrow more



- There is very little difference between Charge Off rates among Rented, Mortgage and Own residences.
- However, those who rent seem to Charge Off slightly more

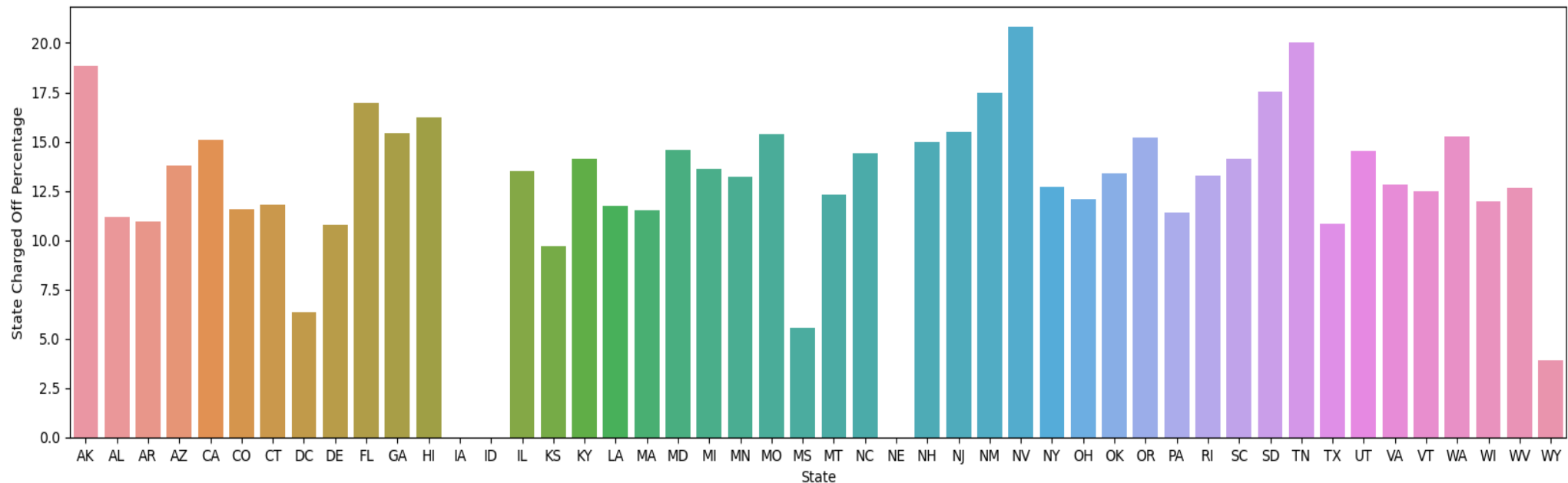




# State

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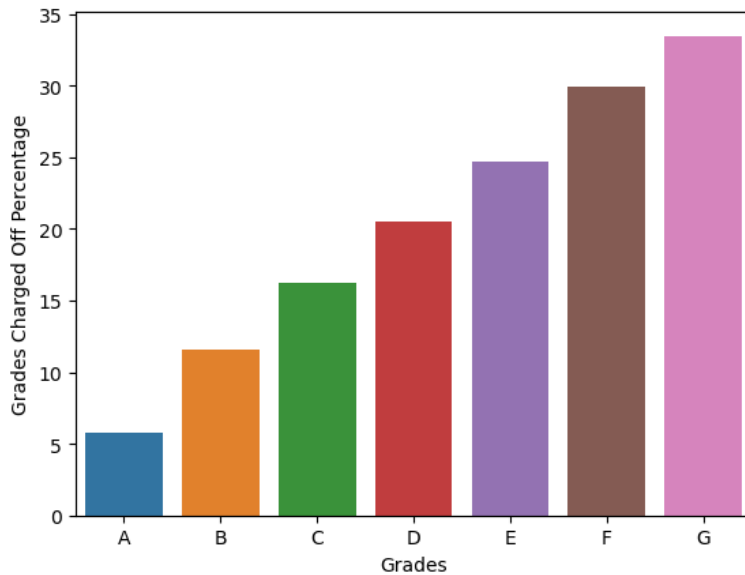
States like Nevada, Tennessee, Arkansas, New Jersey, South Dakota, New Mexico, Florida, Washington have highest percentage of Charge Off. States like Wyoming, Massachusetts, District of Columbia have lowest percentage of Charge Off.



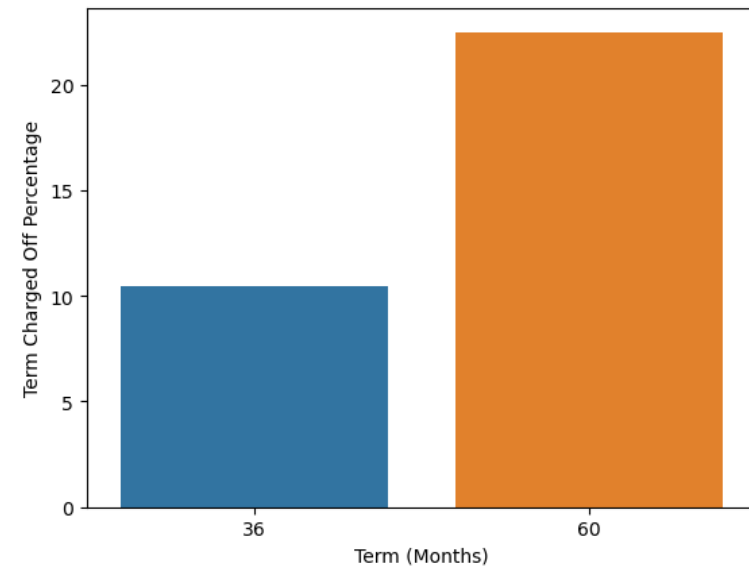
# Loan Grade and Term

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Better the loan grade, lower chances of charge off.

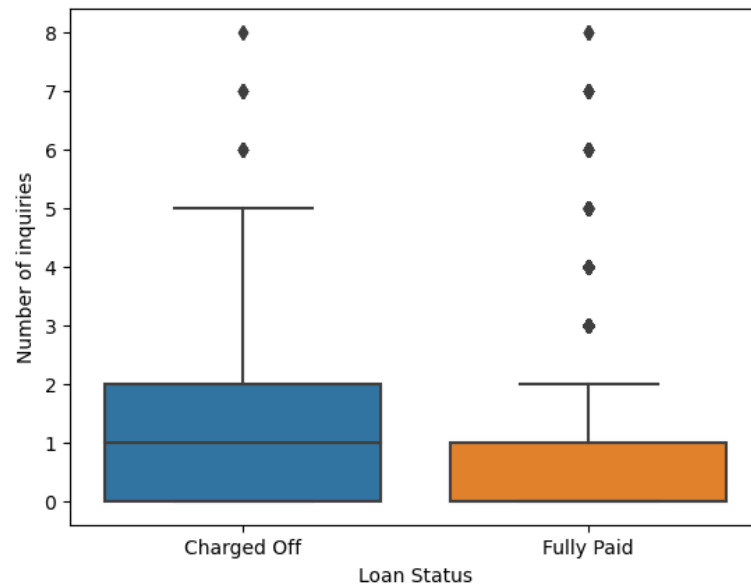


Higher the Term, higher the chances of Charge Off

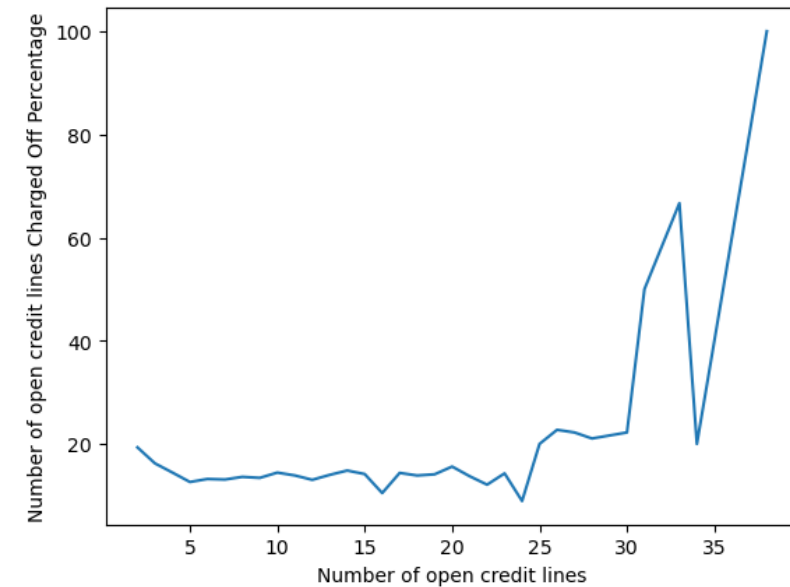


# Inquiries and Open Credit Lines

Number of Inquiries in the past 6 months are higher for Charged Off Loans

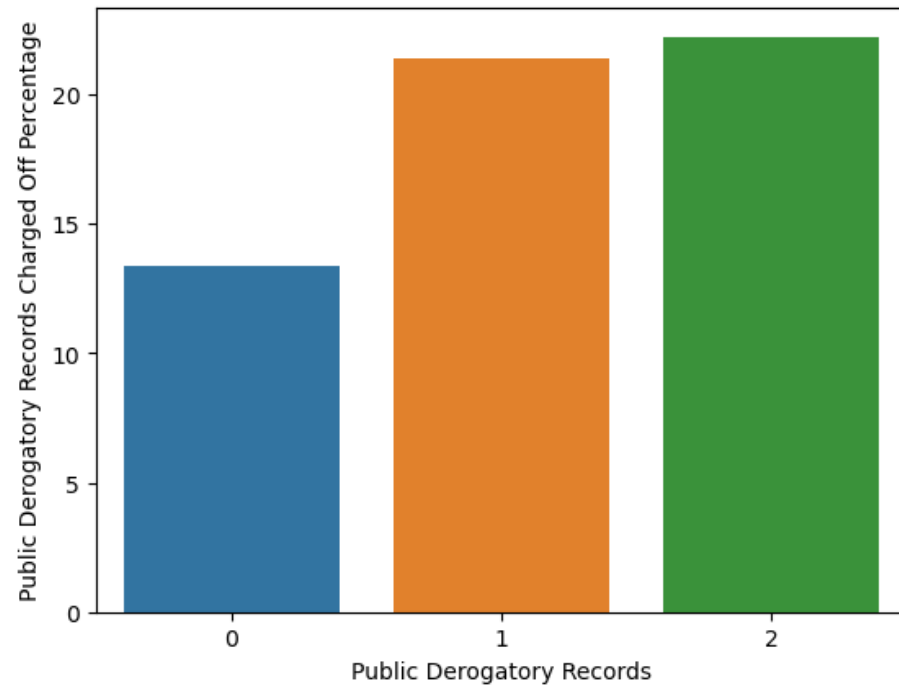


Higher the Number of open credit lines, higher the chances of Charge Off.



# Public Derogatory Records

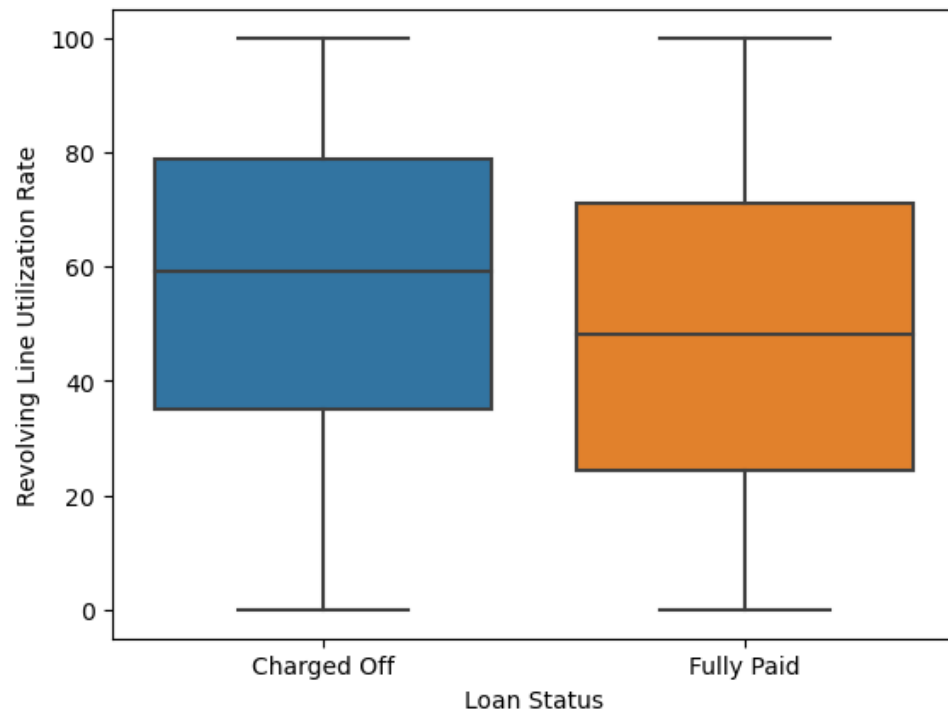
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Higher the Public Derogatory Records, higher the chances of Charge Off.

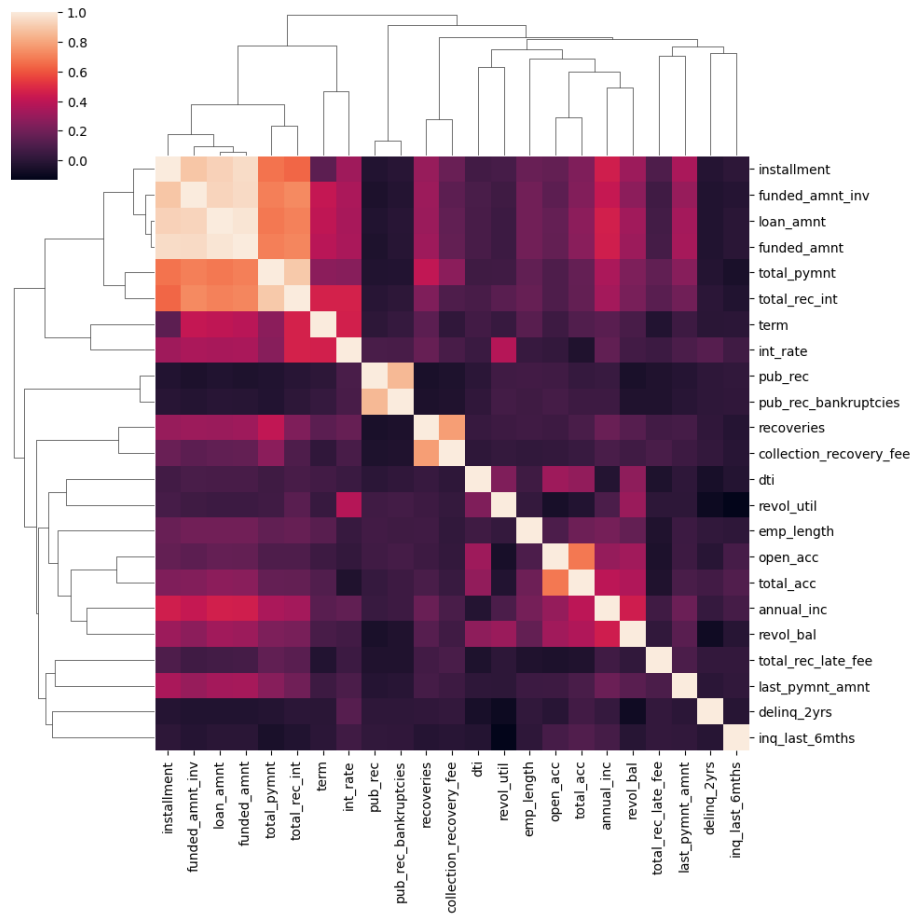
# Revolving line utilization rate

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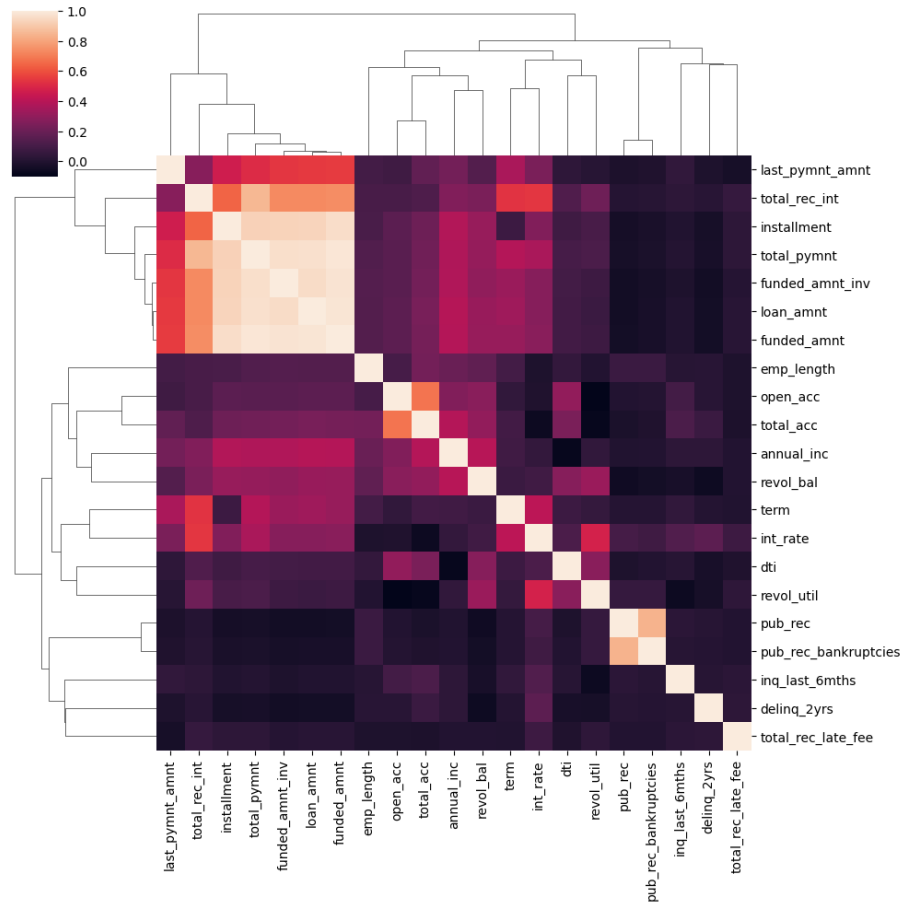
Revolving Line Utilization Rate is higher in Charged Off Loans

# Co-relation between numerical attributes (Charged Off Data)



1. Installment, Funded Amount By Investors, Loan Amount, Funded Amount, Total Payment, Total Interest Received have a very good co-relation.
2. Term also follows Installment, Funded Amount By Investors, Loan Amount, Funded Amount, Total Interest Received.
3. Annual Income follows Installment, Funded Amount By Investors, Loan Amount, Funded Amount.
4. Annual Income and Total Credit Revolving Balance have a good co-relation.
5. Revolving line utilization rate and Interest Rate have a good co-relation.
6. Total Interest received follows Term and Interest Rate

# Co-relation between numerical attributes (Fully Paid Data)



1. Installment, Total Payment, Funded Amount By Investors, Loan Amount, Funded Amount have an excellent co-relation.
2. Total Received Interest very closely follows Installment, Total Payment, Funded Amount By Investors, Loan Amount, Funded Amount
3. Term also follows Installment, Funded Amount By Investors, Loan Amount, Funded Amount, Total Interest Received.
4. Annual Income follows Installment, Total Payment, Funded Amount By Investors, Loan Amount, Funded Amount.
5. Annual Income and Total Credit Revolving Balance have a good co-relation.
6. Annual Income and Total Accounts have a good co-relation.

# Recommendations & Conclusions

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- Lending to lower **income groups**, especially < \$20K increases chances of Charge Off.
- Lending with Higher **Interest Rate** will lead to more Charge Off.
- Higher **Loan Amount** increases chances of Charge Off.
- **36 month** loans fare much better in terms of Completion in comparison with 60 months.
- Loans with '**Small Business**' as **purpose** has increased chances of Charge Off.
- Loans with applicants having **Debt-to-Income** ratio of more than 10% has increased chances of Charge Off.
- Applicants from Nevada, Tennessee, Arkansas, New Jersey, South Dakota, New Mexico, Florida, Washington **states** have increased chances of Charge Off.
- Loans for people with **higher employment** (> 10 Years) have increased chances of Charge Off.
- Applications with high **number of inquiries** in the last 6 months have increased chances of Charge Off.
- Applications with high **Public Derogatory Records, High Public Bankruptcy Records, High Delinquency Records, High Revolving Line Utilization Rate** have increased chances of Charge Off.
- Applications with High Number of **Open Credit Lines** have increased chances of Charge Off.
- Applicants with Lower number of **Credit Length** (Number of years between first credit and current application date) have increased chances of Charge Off.
- Higher **Loan Grade** should be avoided for 'risky' applicants.



Thank You!