

Lending Club Case Study

AKSHAY

SAGAR

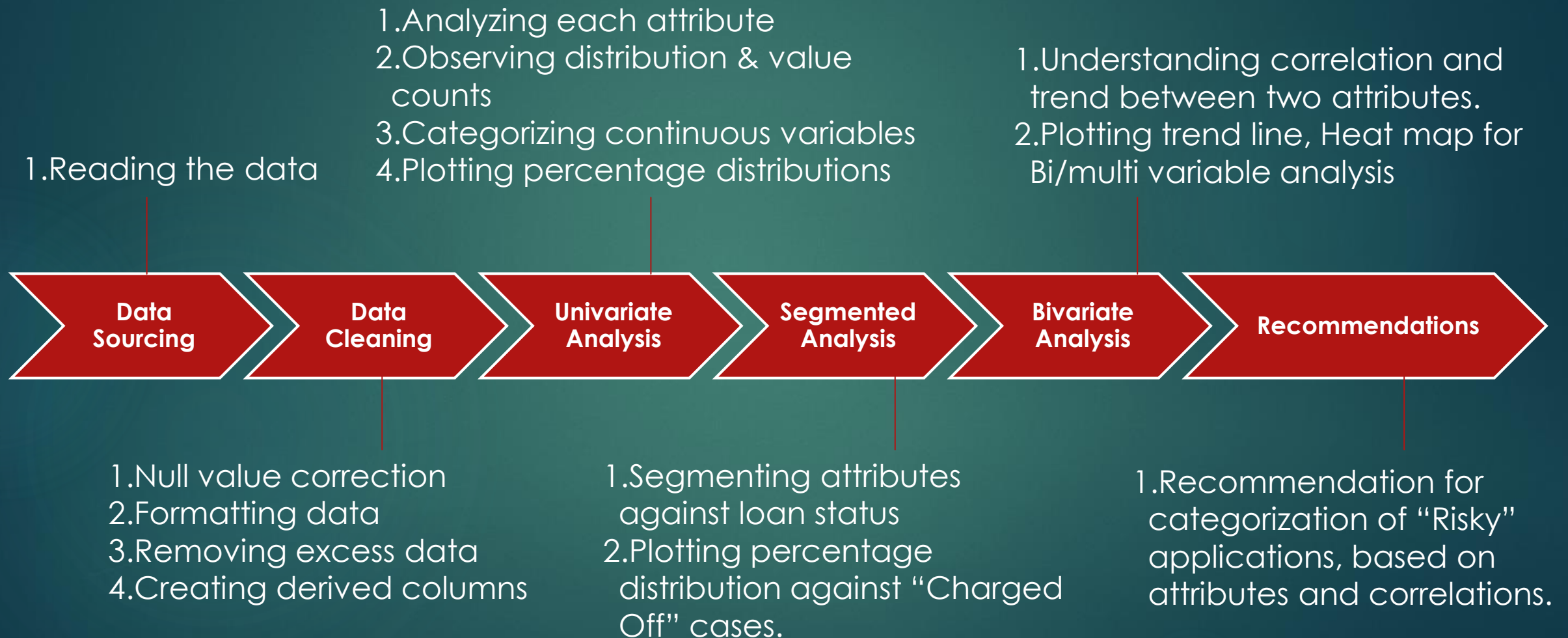
Problem Definition

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- ▶ Lending company is the largest online loan marketplace, facilitating personal loans, business loans, and financing of medical procedures. Borrowers can easily access lower interest rate loans through a fast-online interface.
- ▶ Lending loans to 'risky' applicants is the largest source of financial loss (called credit loss). If one can identify these risky loan applicants, then such loans can be reduced thereby cutting down the amount of credit loss.
- ▶ The company wants to understand the **driving factors (or driver variables)** behind loan default, i.e. the variables which are strong indicators of default.
- ▶ Identification of such applicants using EDA is the aim of this case study.

Approach

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- ▶ Data loss incurred after data cleaning accounts to 8 ~ 8.5%.
- ▶ Applications with loan status “Current” are ignored, as it will not add value to decision making for default candidate.
- ▶ All the analysis is performed against the “loan status” attribute to understand the trend for risky applicants.
- ▶ Available Attributes can be classified as –
 - ▶ Significant Attributes
 - ▶ Information available at application screening stage.
 - ▶ Will contribute to make decision, risky/not risky profile.
 - ▶ Other (less-significant) Attributes
 - ▶ Information which do not impact on decision making during screening.
 - ▶ Variables which are generated after screening is done.

Attributes

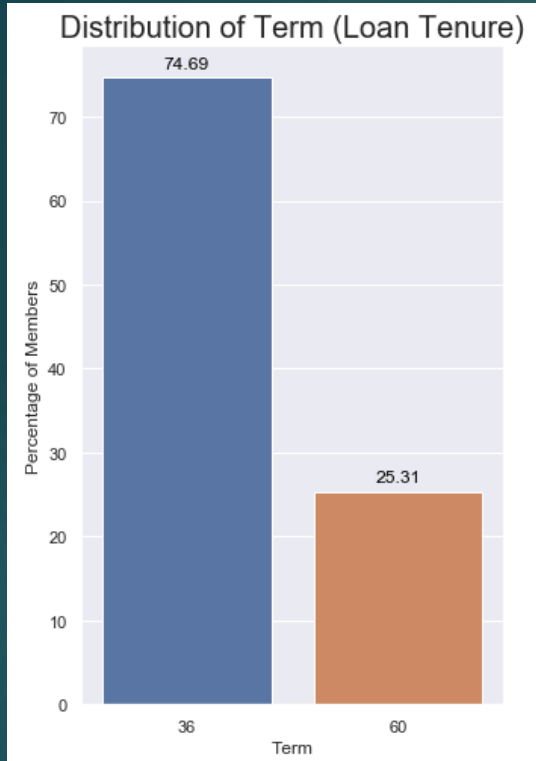
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| Sr. No. | Significant Attributes |
|---------|--------------------------------------|
| 1 | Term |
| 2 | Number of Public Record Bankruptcies |
| 3 | Funded amount |
| 4 | Inquiry Count |
| 5 | Total Credit Lines |
| 6 | DTI |
| 7 | Employee Length |
| 8 | Home Ownership |
| 9 | Annual Income |
| 10 | Income Verification Status |
| 11 | Number of Credit Lines Available |
| 12 | Purpose |
| 13 | State |
| 14 | Earliest Credit Line Date |
| 15 | Employee Title |
| 16 | Derogatory Public Records |

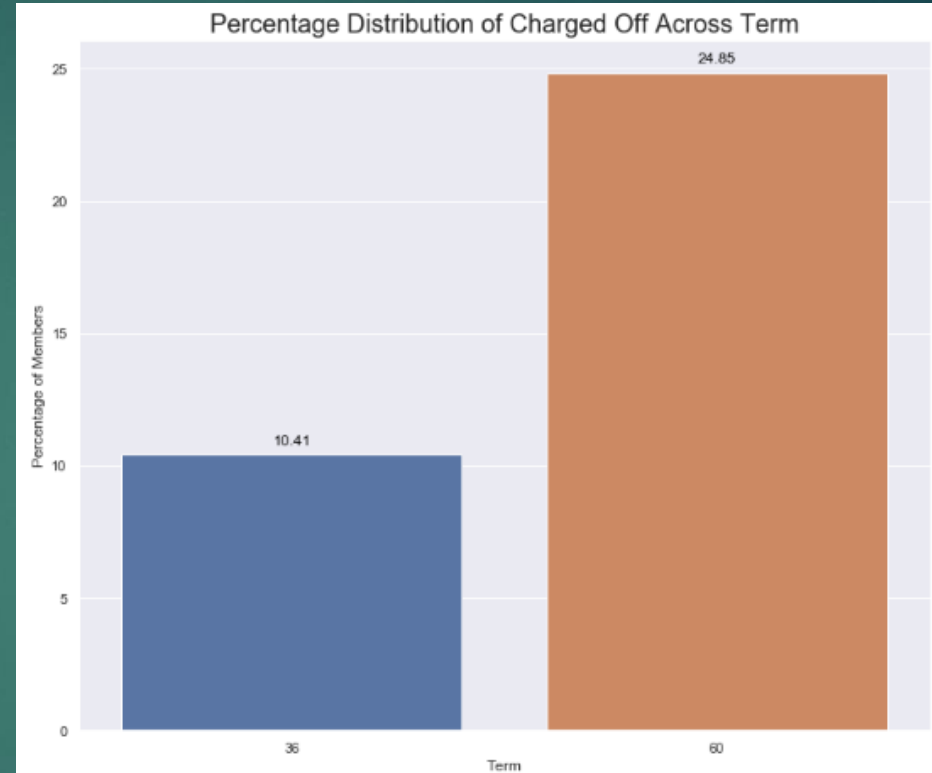
| Sr. No. | Other Attributes |
|---------|-------------------------------------|
| 1 | Issue Date |
| 2 | Sub-Grade |
| 3 | Grade |
| 4 | Delinquency Count (in Last 2 Years) |
| 5 | Interest Rate |
| 6 | Revolving Balance |
| 7 | Revolving Utilization Rate |

Significant Attribute Analysis - Term

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Population distribution



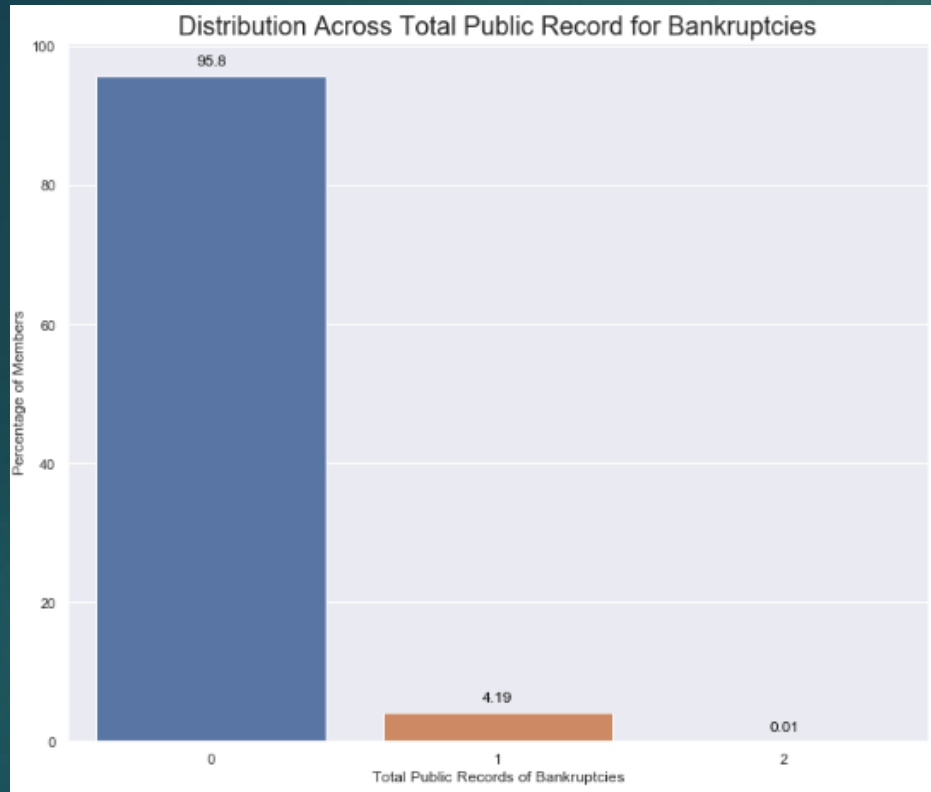
Percentage charged off in each bin

- ~75% of population have 36 months term
- ~25% applicants have defaulted in 60 months term and ~10% in 36 months term.

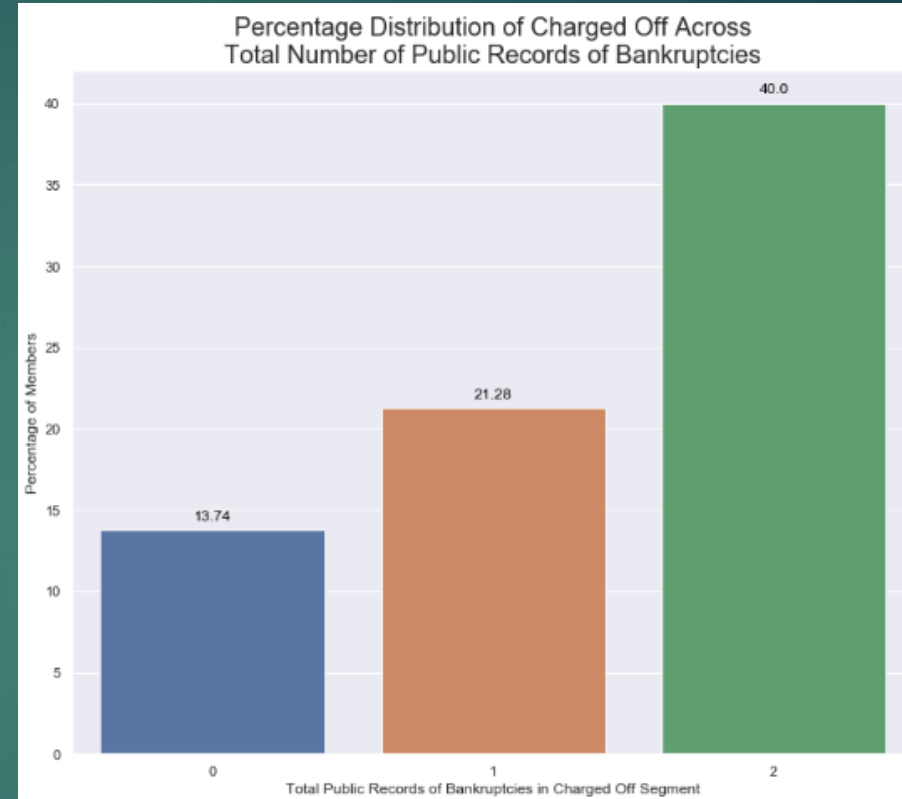
Recommendation – Do not Lend or Charge higher interest rate (considering other attributes) for applicants with 60 months term.

Significant Attribute Analysis - Public Records of Bankruptcies

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Population distribution



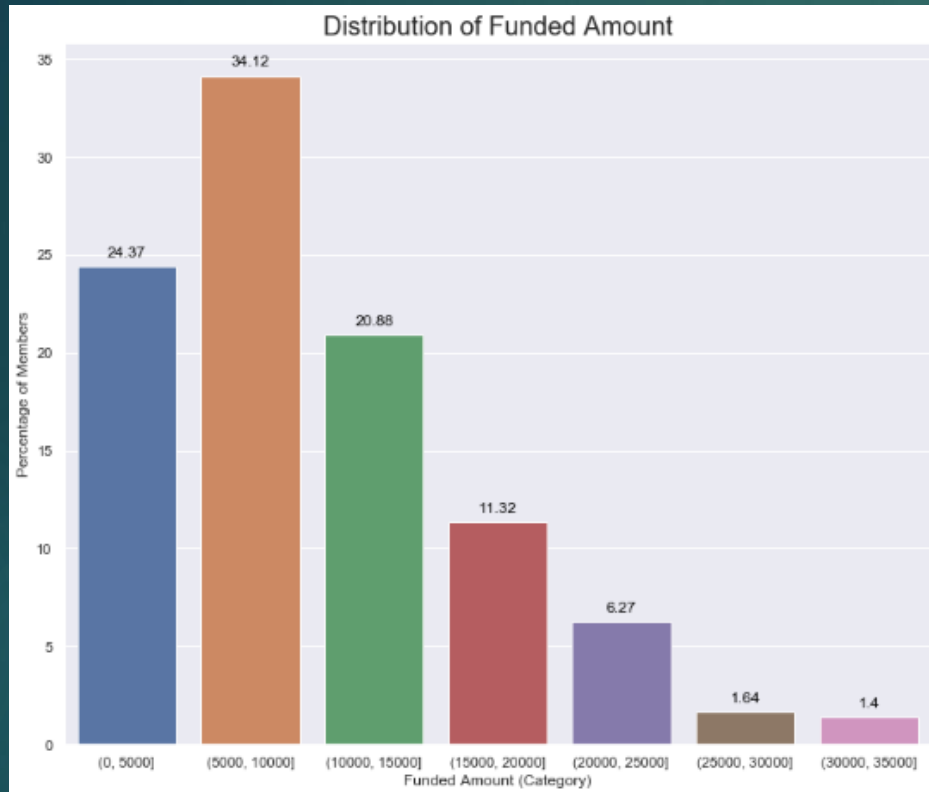
Percentage charged off in each bin

- Most applicants, ~96%, have no Public Records of Bankruptcies
- Percentage charged off graph shows even single record of Public Bankruptcies increases the chances of default significantly. Trend is 0.97.

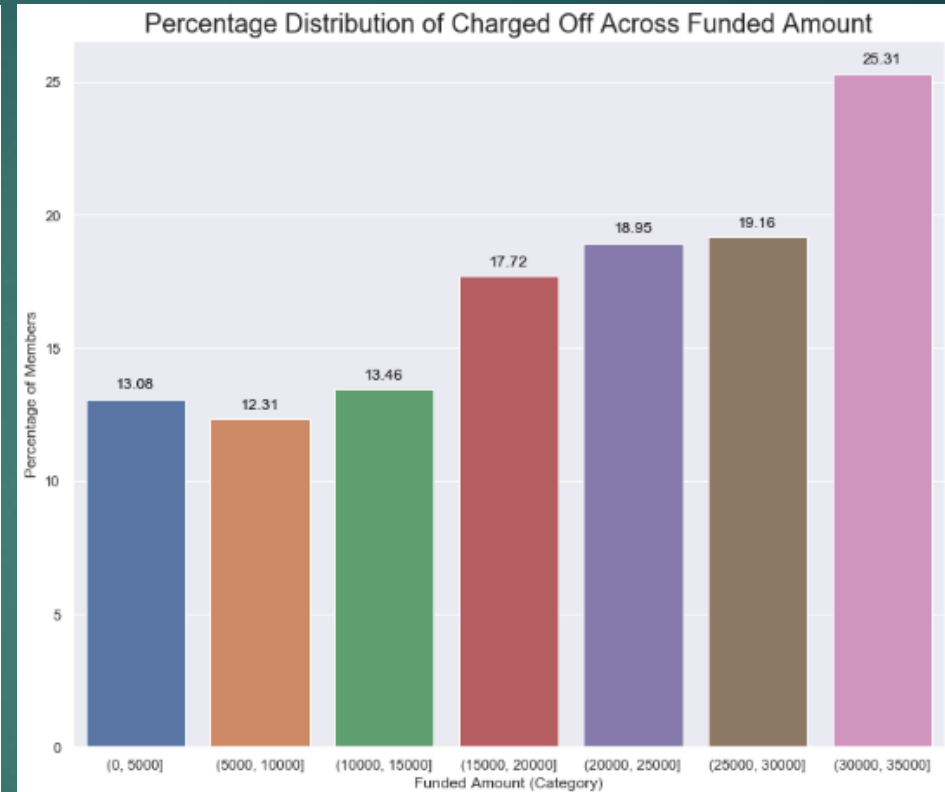
Recommendation – Do not Lend or Charge higher interest rate (considering other attributes) for applicants who have even single Public Record of Bankruptcies.

Significant Attribute Analysis - Funding Amount

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Population distribution



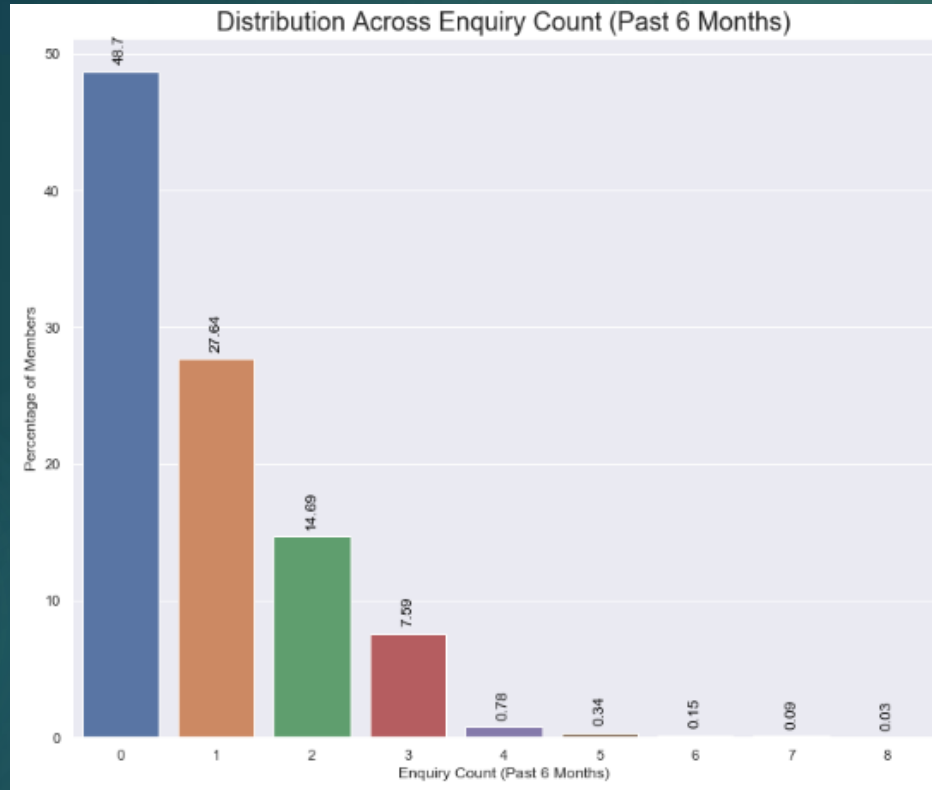
Percentage charged off in each bin

- Percentage charged off graph shows as Funding Amount increases chances of default increases significantly, trend is 0.93.

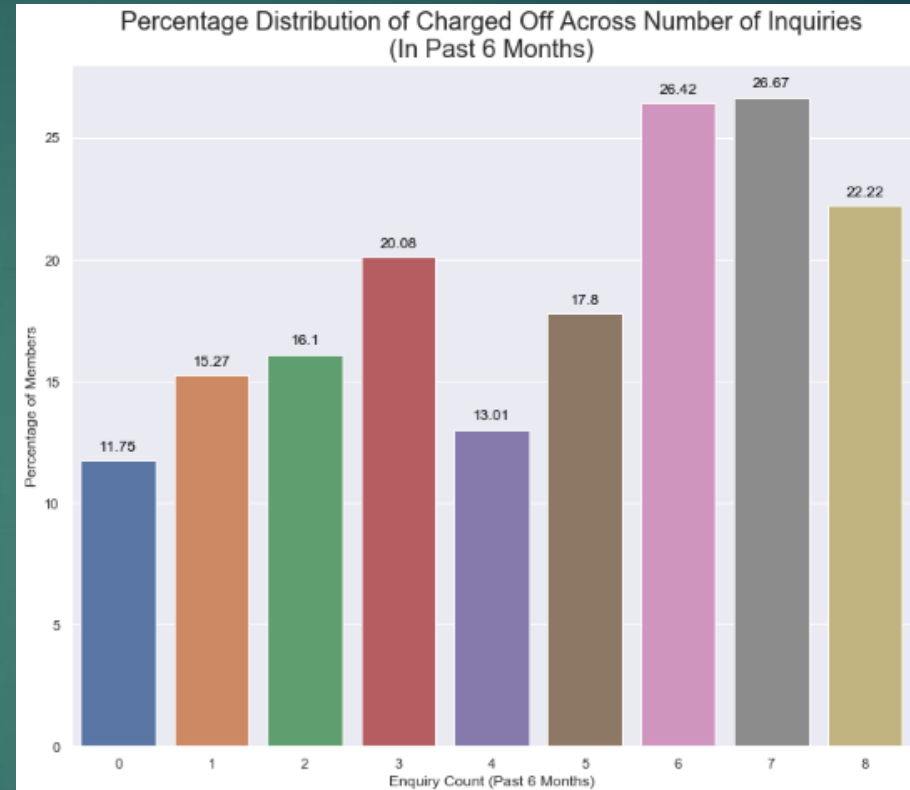
Recommendation – Do not Lend or Charge higher interest rate (considering other attributes) for applicants who have applied for loan amount more than 15000.

Significant Attribute Analysis - Inquiry Count (In Last 6 Months)

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Population distribution



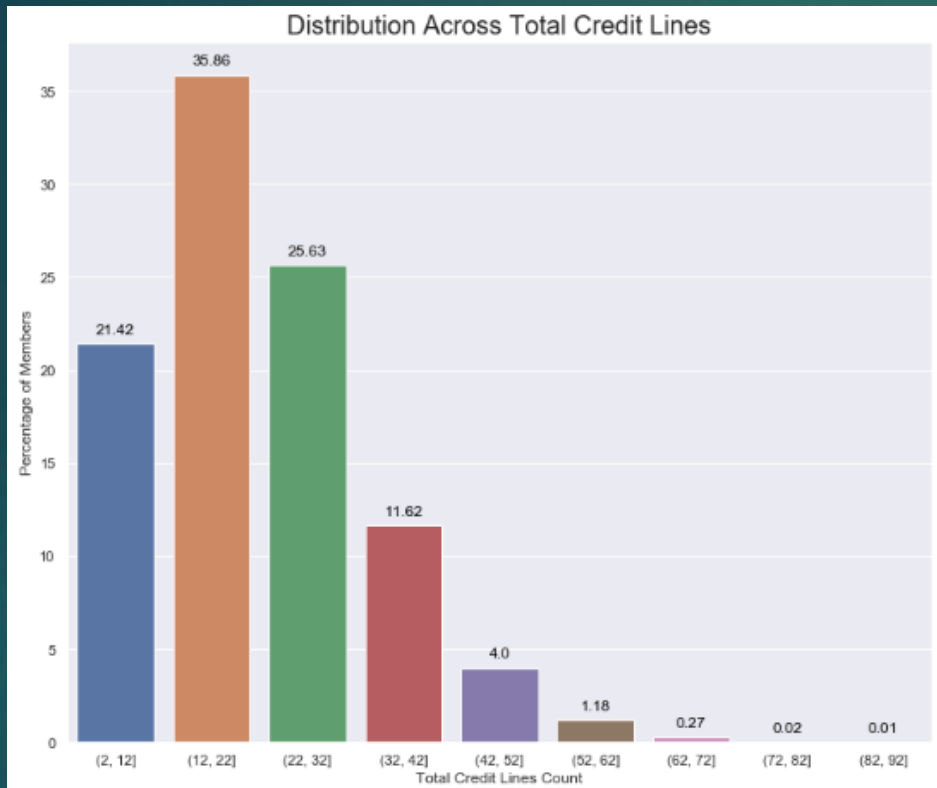
Percentage charged off in each bin

- Most applicants, ~49%, have no Inquiry count (In Last 6 Months)
- Percentage charged off graph shows as Inquiry count (in last 6 months) increases chances of default increases significantly, trend is 0.79.

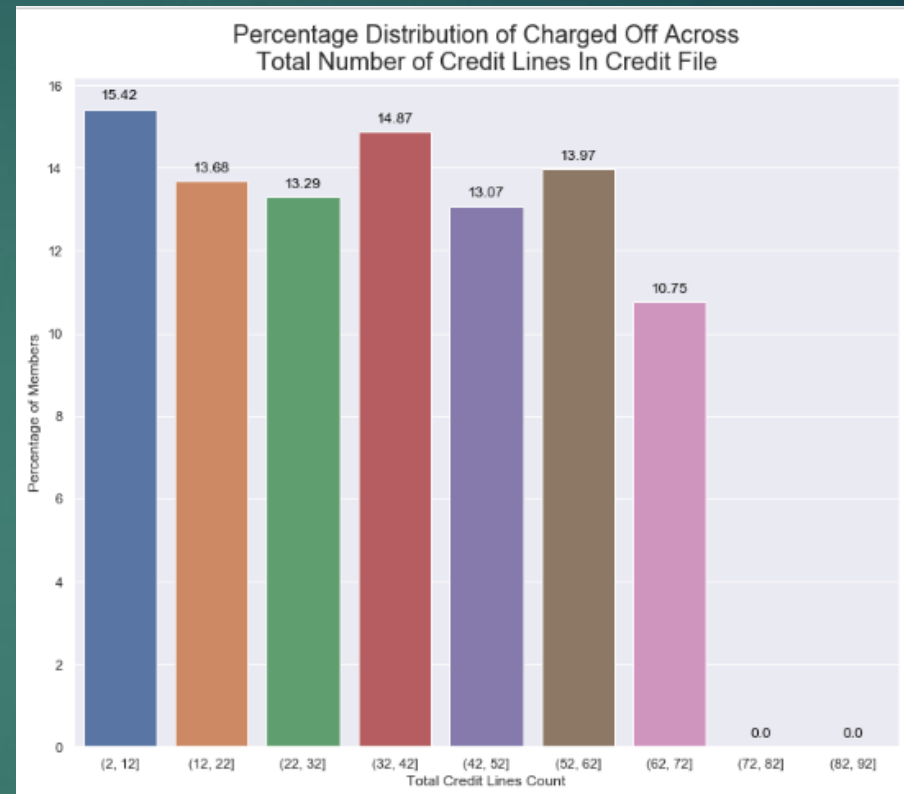
Recommendation – Do not Lend or Charge higher interest rate (considering other attributes) for applicants who have 6 or more inquiry count (in last 6 months).

Significant Attribute Analysis - Total Credit Lines

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Population distribution



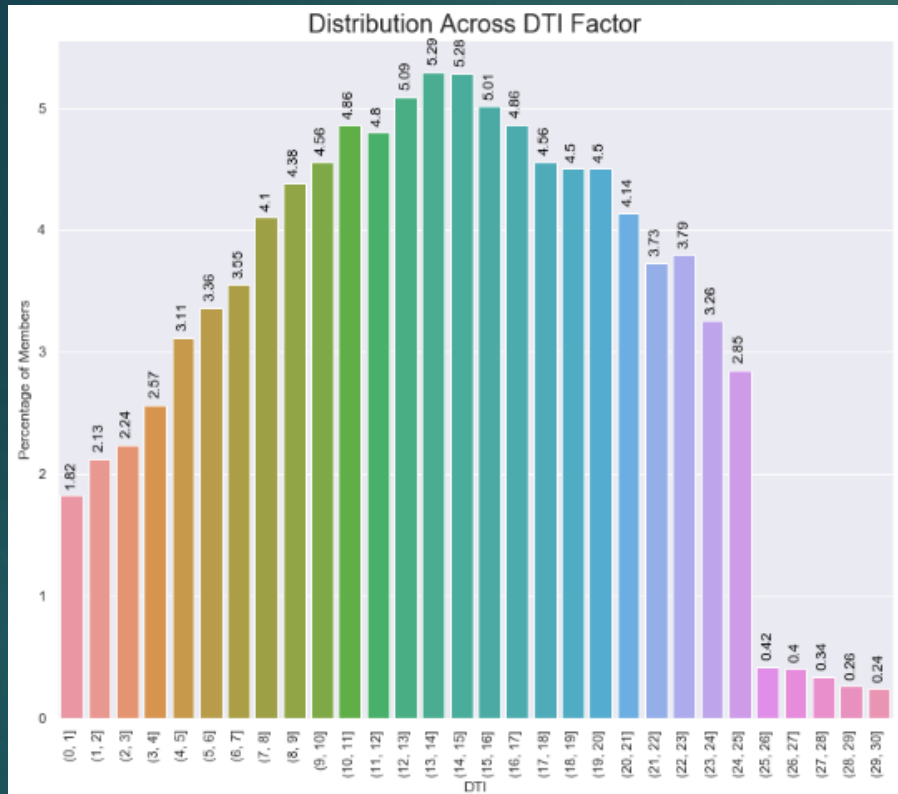
Percentage charged off in each bin

- Percentage charged off graph shows as Total Credit Lines increases chances of default decreases, trend is -0.70. after ignoring (72-82] and (82-92] bins.

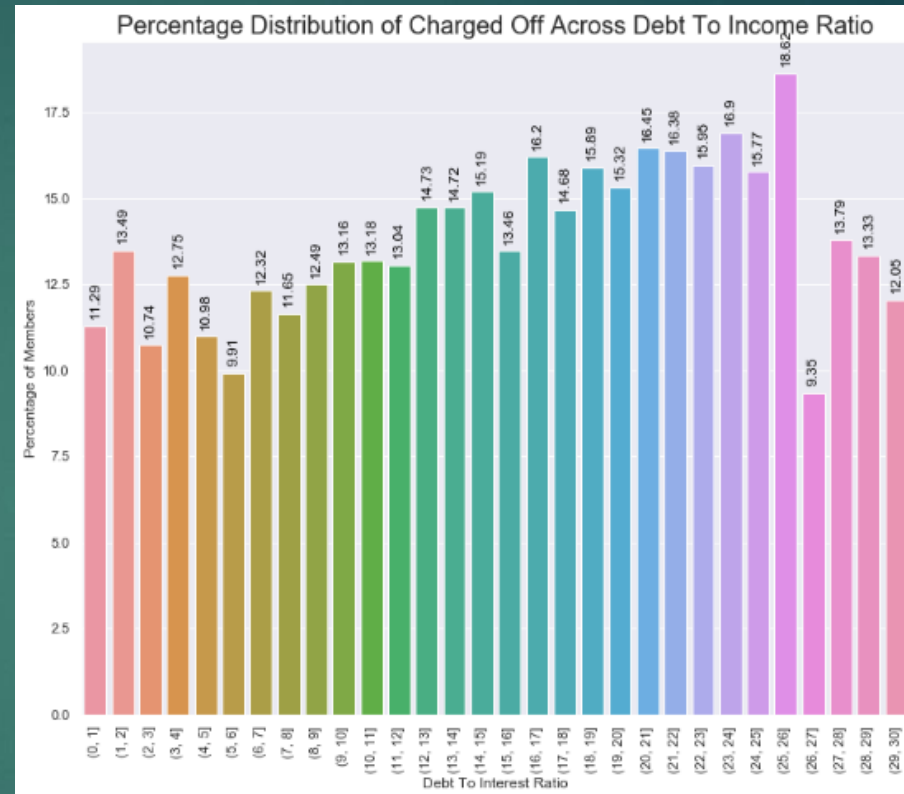
Recommendation – Do not Lend or Charge higher interest rate (considering other attributes) for applicants who have a smaller number of Total Credit Lines available.

Significant Attribute Analysis - Debt to Income Ratio

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Population distribution



Percentage charged off in each bin

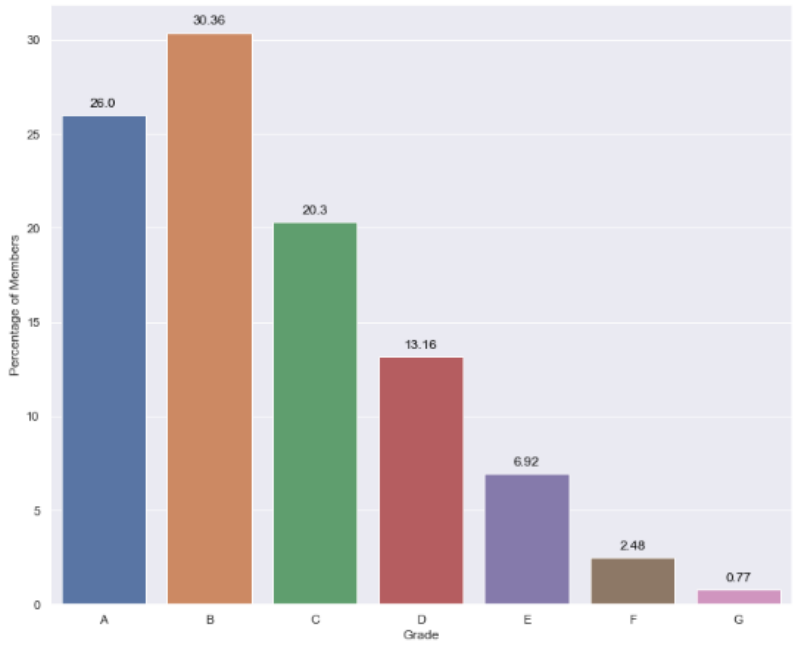
- Percentage charged off graph shows as Debt to Income Ratio increases chances of default increases, trend is 0.49.

Recommendation – Do not Lend or Charge higher interest rate (considering other attributes) for applicants who have more DTI.

Other Attribute Analysis - Grade

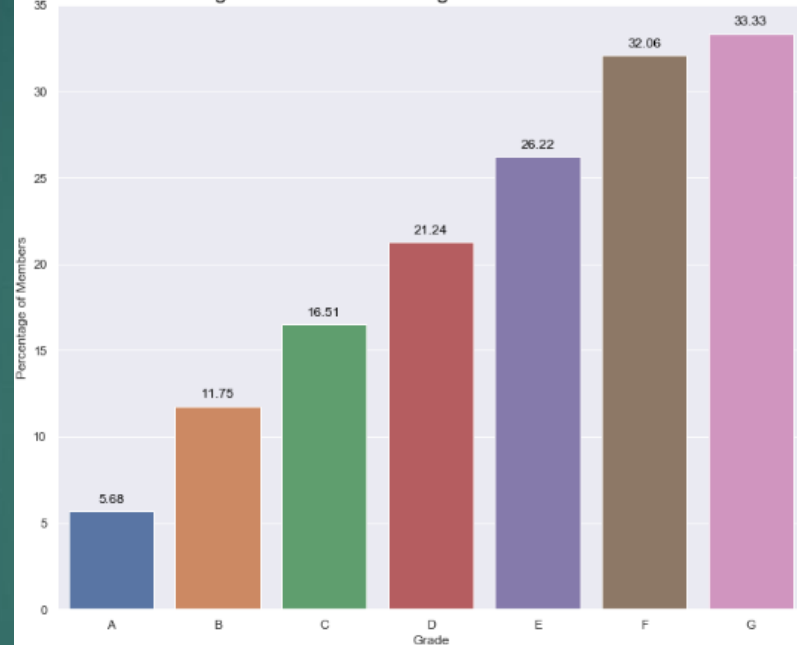
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Distribution of Grade



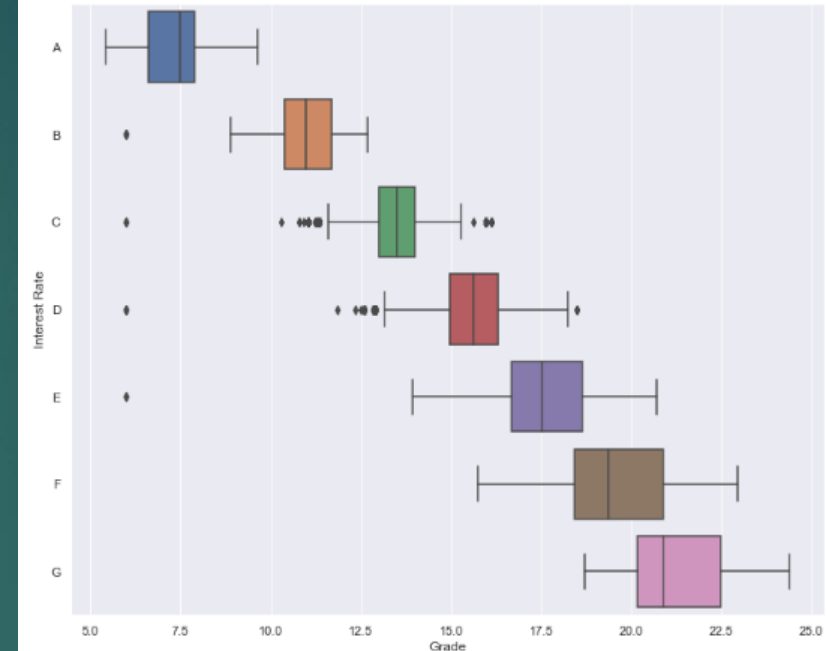
Population distribution

Percentage Distribution of Charged Off Across Grade Column



Percentage charged off in each bin

Distribution of Interest Rate Across Different Grade

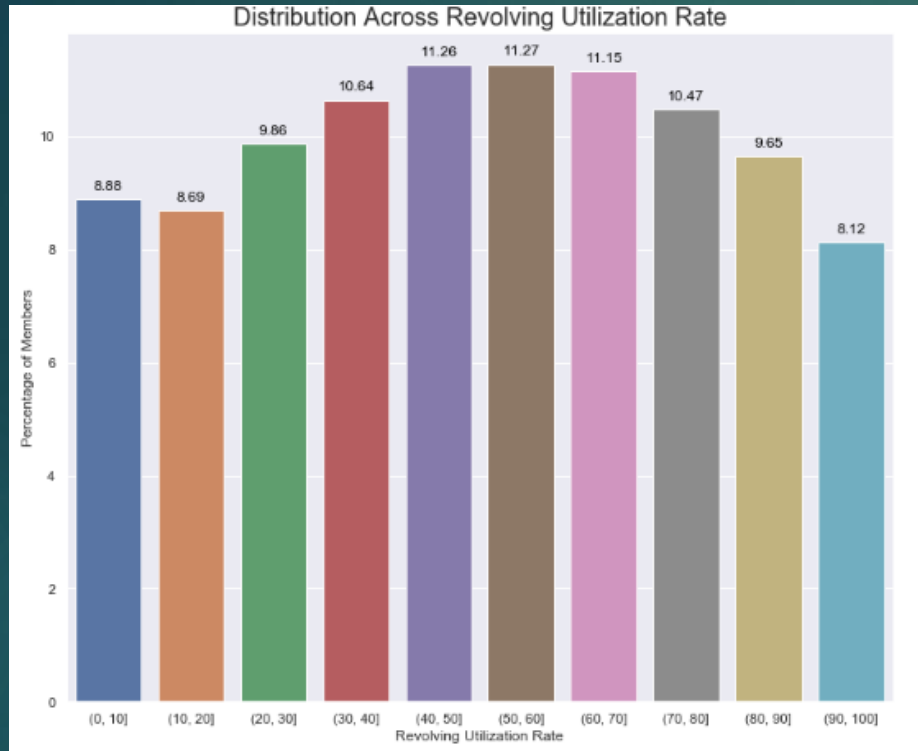


Grade VS Interest Rate

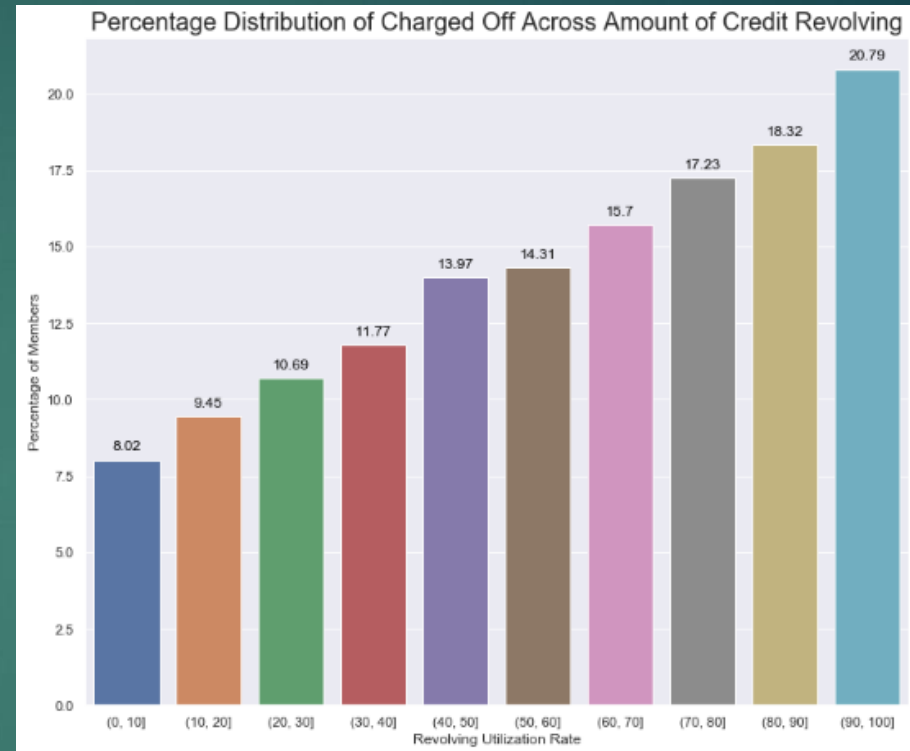
- Grade, LC's methodology to segregate the applicants with respect to risk associated, from A-G.
- From Grade vs Interest rate graph it is evident that as grade increases from A-G, interest rate charged also increases.
- Percentage charged off graph shows increase in default rate as grade moves from A-G, this implies that LCs grading methodology is working well to segregate the risky candidates.
- **Do not Lend or Charge higher interest rate (considering other attributes) for applicants who are categorized D and above.**

Other Attribute Analysis - Revolving Utilization Rate

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Population distribution

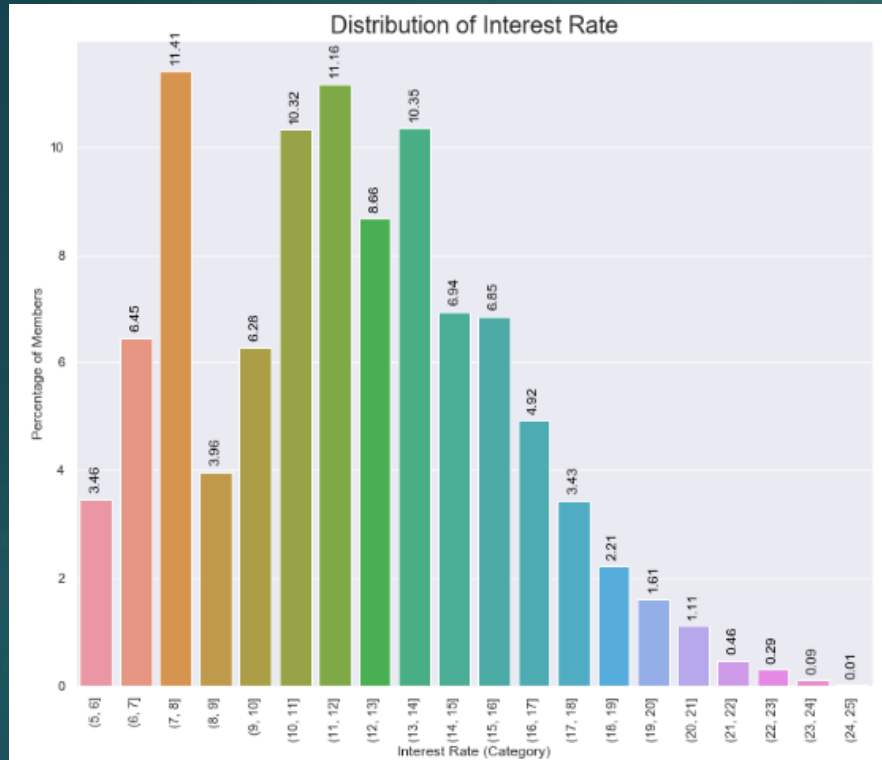


Percentage charged off in each bin

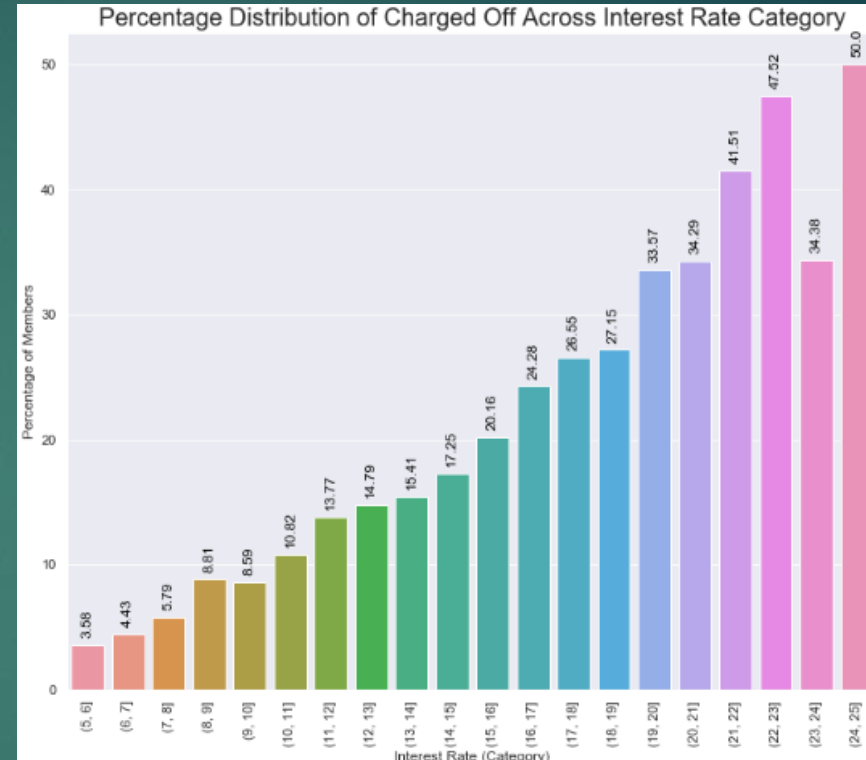
- Population distribution shows most distribution in bins 40-50, 50-60, 60-70.
- Percentage charged off in each bin graph shows as Revolving Utilization Rate increases chances of default increases significantly.
- ***Do not Lend or Charge higher interest rate (considering other attributes) for applicants having higher Revolving Utilization Rate.***

Other Attribute Analysis - Interest Rate

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Population distribution

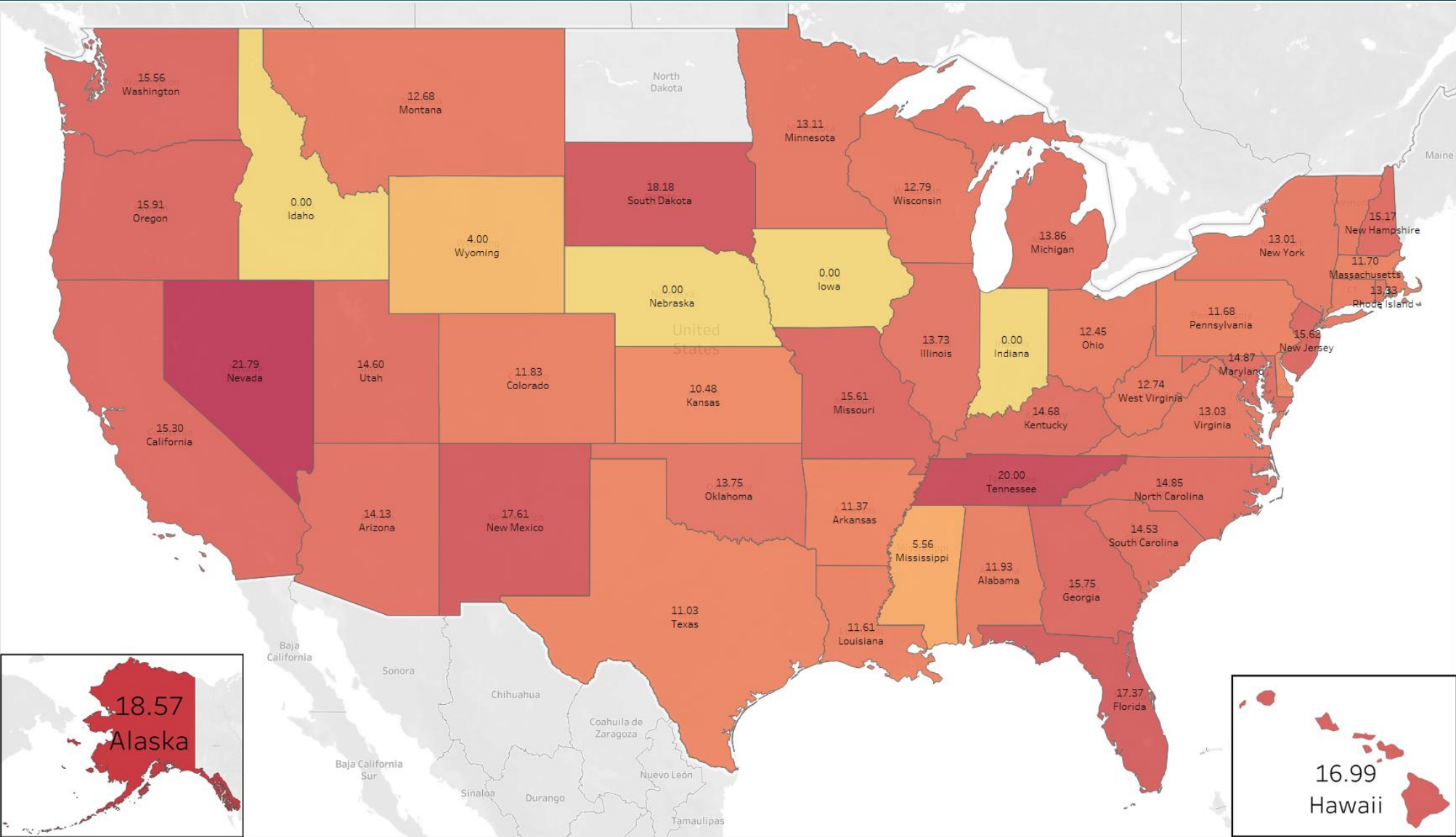


Percentage charged off in each bin

- As the risk on application increases LC charges more interest rate to give benefits to investors.
- Same could be inferred from percentage charged off graph, as interest rate increases percentage of default increases, as risk associated with application increases.
- **Charge higher interest rate (considering other attributes) for applicants who have more risk associated.**

State-Wise Percent Distribution of Charged Off

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Recommendations

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| Sr. No. | Significant Attributes | Trend | Recommendation [Do not Lend or Charge higher interest rate (considering other attributes) for applicants who have mentioned] |
|---------|--------------------------------------|-------|---|
| 1 | Term | NA | 60 months term |
| 2 | Number of Public Record Bankruptcies | 0.97 | Even single record |
| 3 | Derogatory Public Records | 0.94 | Even single record |
| 4 | Funded amount | 0.93 | Applied for loan amount more than 15000 |
| 5 | Inquiry Count | 0.79 | 6 or more inquiry count (in last 6 months) |
| 6 | Total Credit Lines | -0.70 | Less number of Total Credit Lines available |
| 7 | DTI | 0.49 | More DTI |
| 8 | Earliest Credit Line Date | 0.46 | Recent Earliest Credit Line Date |
| 9 | Employee Length | 0.41 | Employee length on higher side |
| 10 | Annual Income | -0.39 | Annual Income on lower side |
| 11 | Open Credit Line Count | 0.29 | Open Credit Line Count on lower side |
| 12 | Purpose | NA | Purpose as Small Business, Renewable Energy, Educational |
| 13 | State | NA | State as Nevada, Tennessee, Alaska |
| 14 | Employee Title | NA | Employee title as Marriott International, USMC, Macys |
| 15 | Home Ownership | NA | Home ownership status Other |

Thank you!