Lending Club Case Study

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BATCH – C69

Objective & Business Problem

- Learning Objective:
  - Learn how EDA techniques and risk analytics are applied to solve real-world business problems faced by LendingClub to minimize financial risks in money lending decisions.
- Problem Statement:
  - A major consumer finance company looking for ways to minimize financial risks.
  - Using exploratory data analysis (EDA), analyze loan data to identify key risk factors.
  - Predict and minimize loan defaults by identifying and managing risky loan applicants effectively.
  - Reduce credit losses and improve portfolio quality through data-driven risk assessment.

Solution Approach

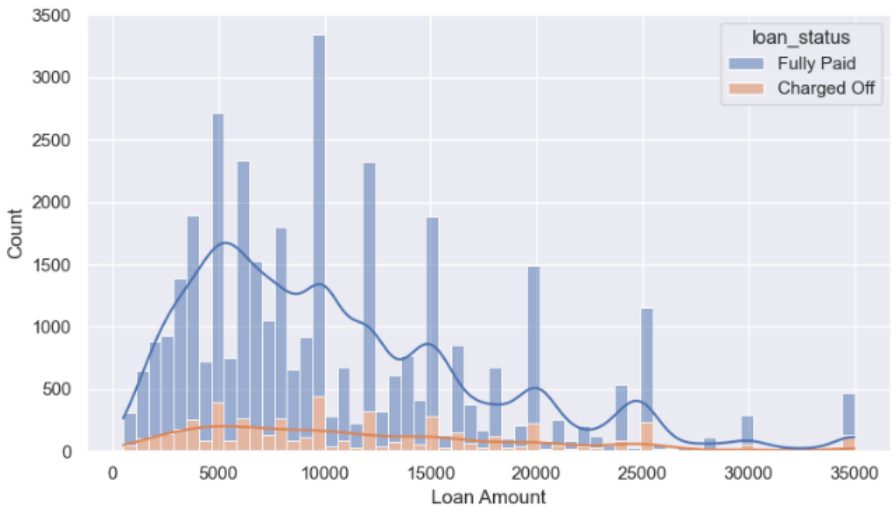
- Given the data, it needs to be put through the various stages of cleanup and analysis

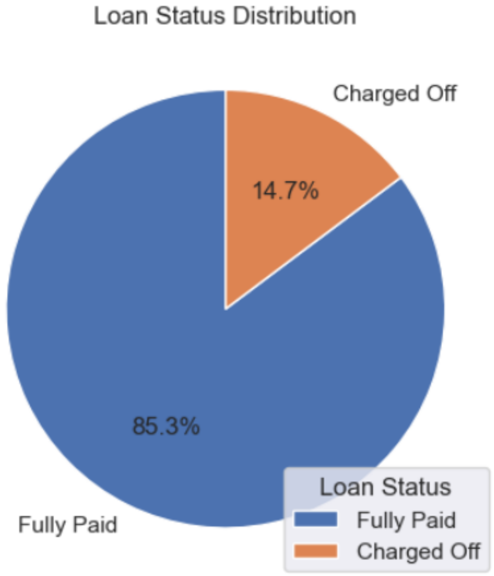
Source Data

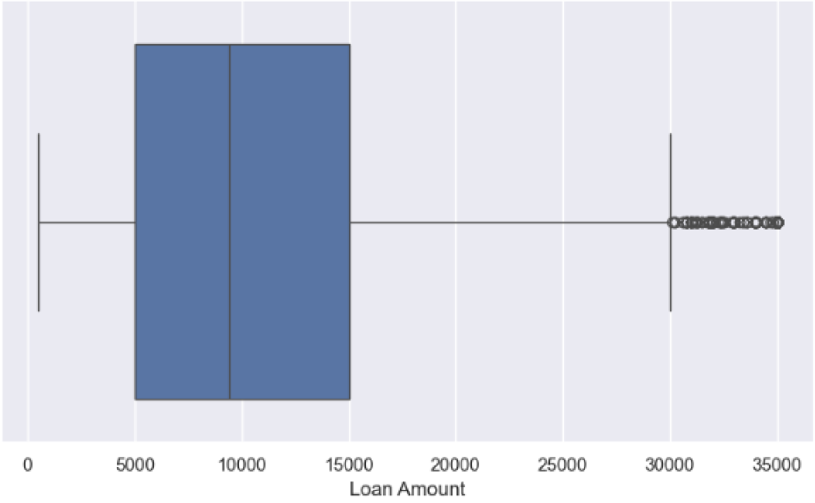
- Given dataset contains details of approved loans with repayment statuses: Fully Paid, Current, or Charged Off.
- Dataset Summary:
  - Number of records: 38,577 loans.
  - Key variables: `loan_amnt`, `int_rate`, `dti`, `revol_util`, `grade`, `loan_status`.
- Target Variable:
  - `loan_status`: Fully Paid vs. Charged Off.

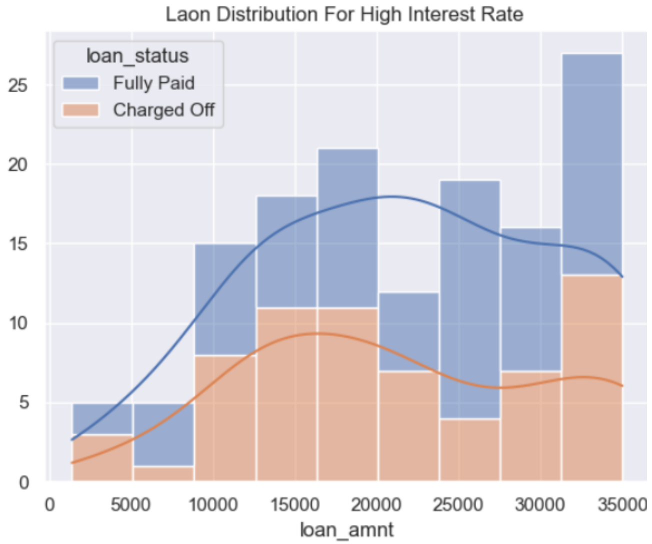
Loan Amount Distribution

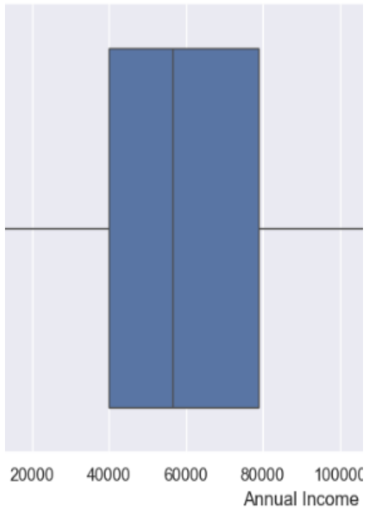
- Loan Status:
  - 85.3% loans are fully paid, 14.7% loan are charged Off
- Loan amounts range between 5000 to 15000

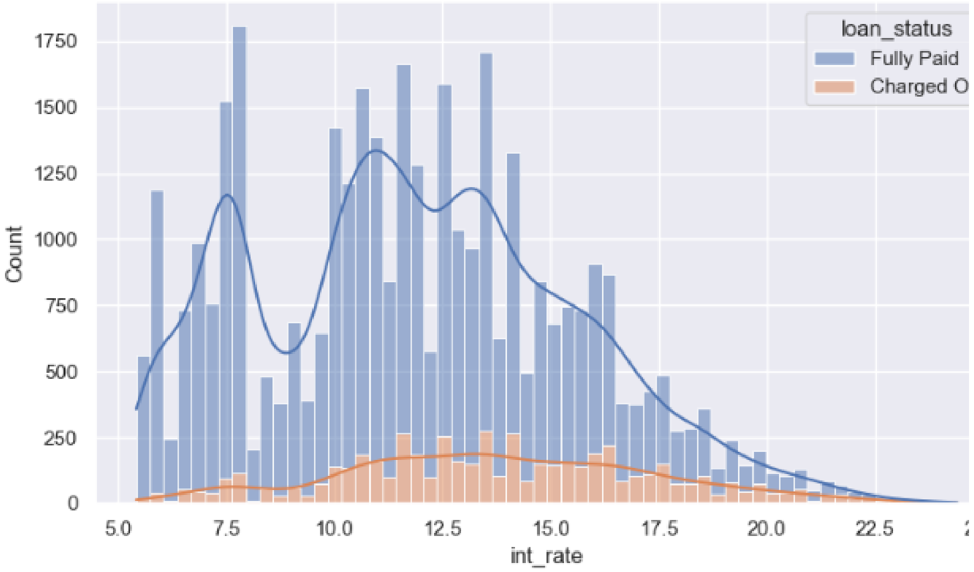






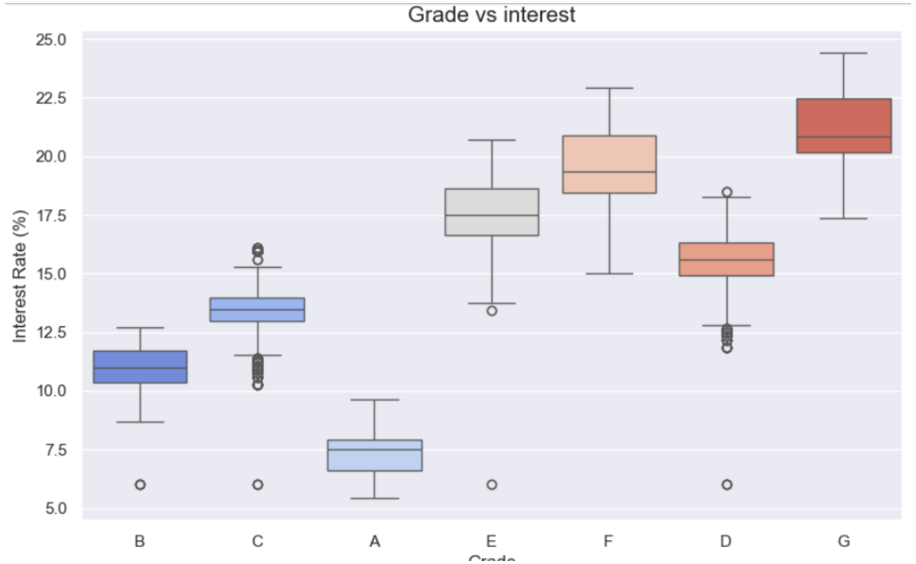


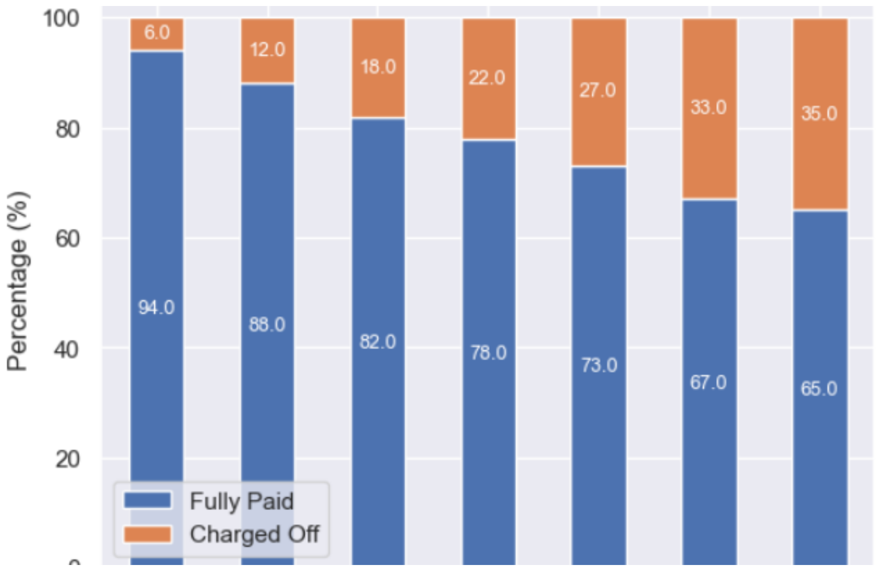




Annual Income and Interst Rate

- Annual income of most of the borrowers range between 40000 to 80000
- Interst rates largely vary between 8.5-14% with
- Loans having higher interest > 11% are at higher risk of default.
- Risk of defualt goes up to 47% with interest rate >22%



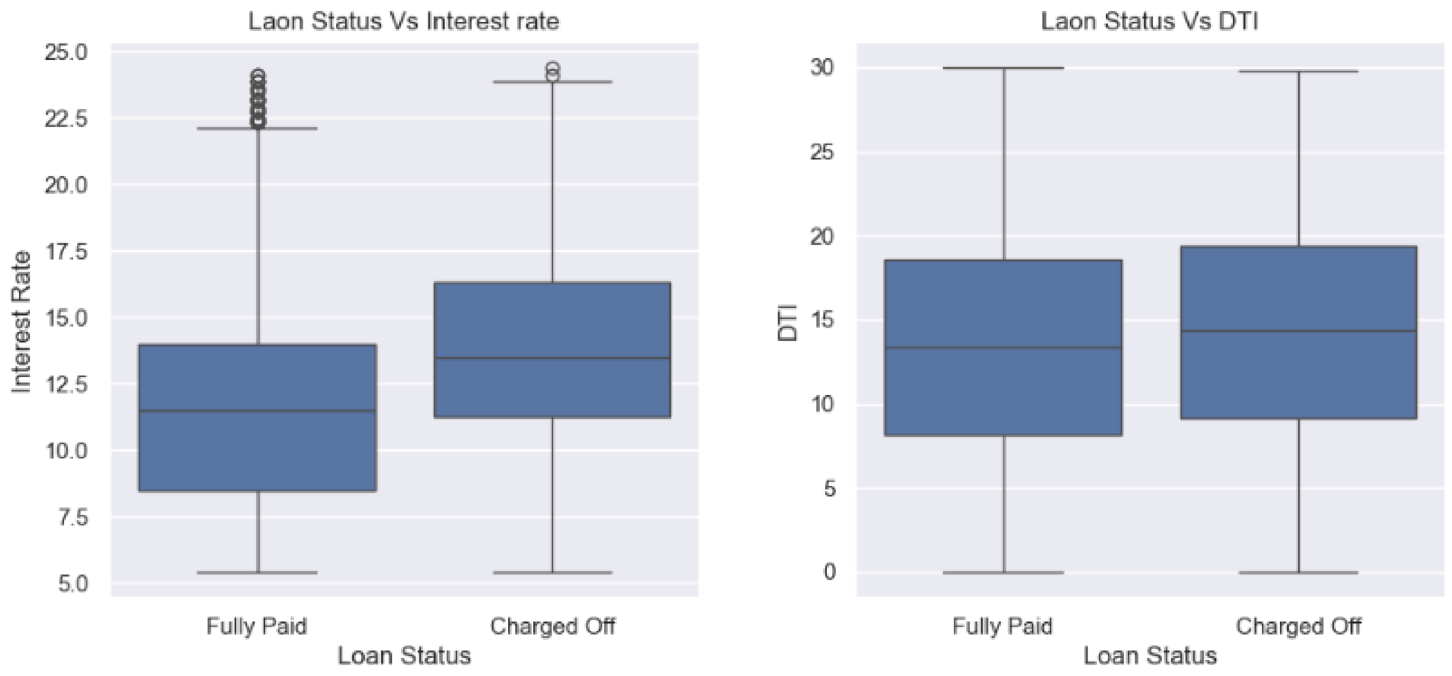


Impact of Grade

- Borrower’s grade had sigficant impact of loan status
- Borrowers with grades A and B had low defaults
- Borrowers with E, F, G grades had significant loan defaults >**25**%
- Grade have significant impact on the interest rates
- For refernce, grade A borrower has median interest rate of ~**7.5%** where as grade G borrower has a median rate of ~**21**%

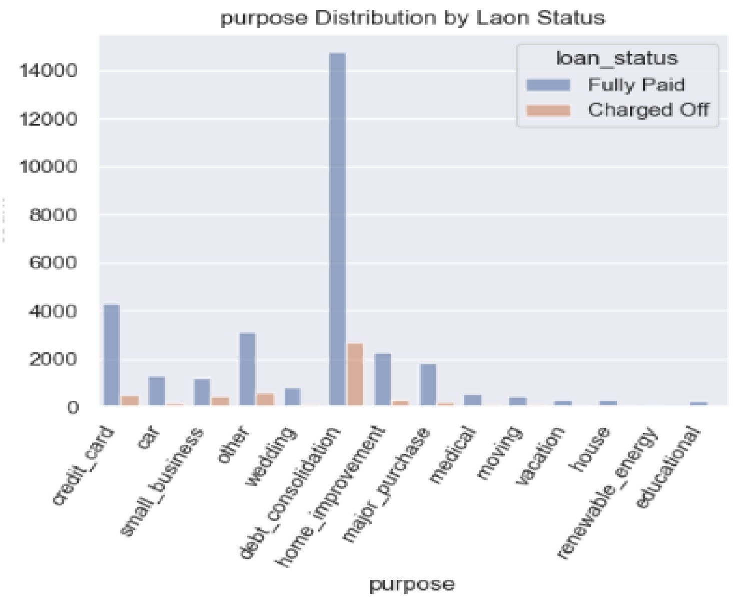
Impact of DTI and Interest Rate

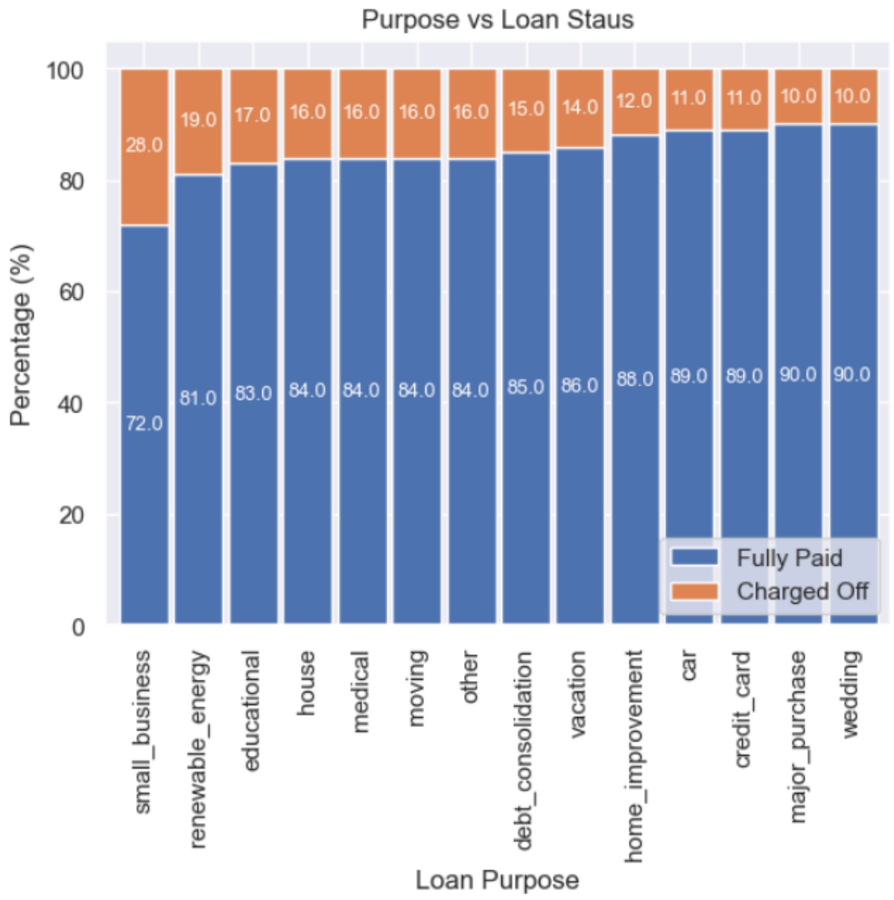
- Default loans increase with increase in DTI and interest rate
  - DTI: Debt to income ratio - percentage of a borrower's monthly gross income that goes toward paying debts
  - Higher DTI indicates financial stress



Loan Purpose

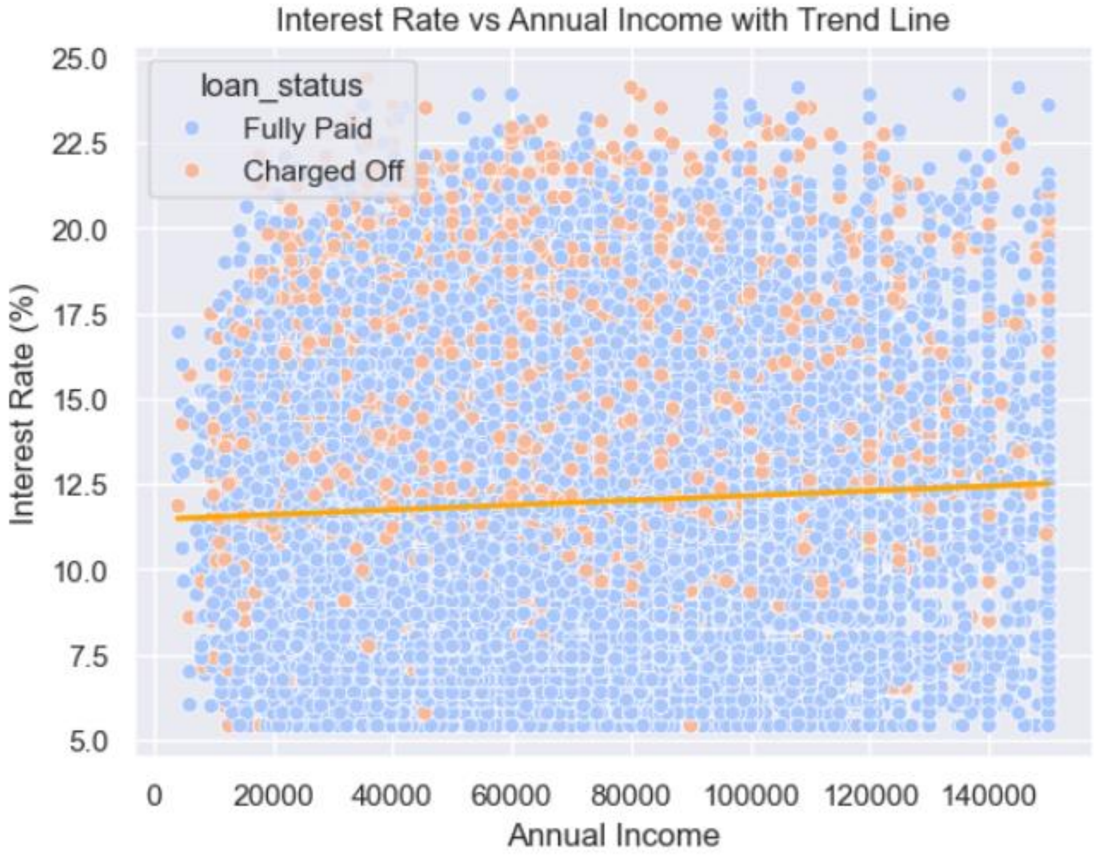
- Majority of the loans were taken for debt consolidation and had high number of defaults.
- Small Busineses had the highest default rate reflecting the volatilty in the nature of the business.





Income vs Interest Rate

- Dafault loan rate seemed to be higher with increasing interest rates and with lower income
- Note: The line seperator is added for visual reference

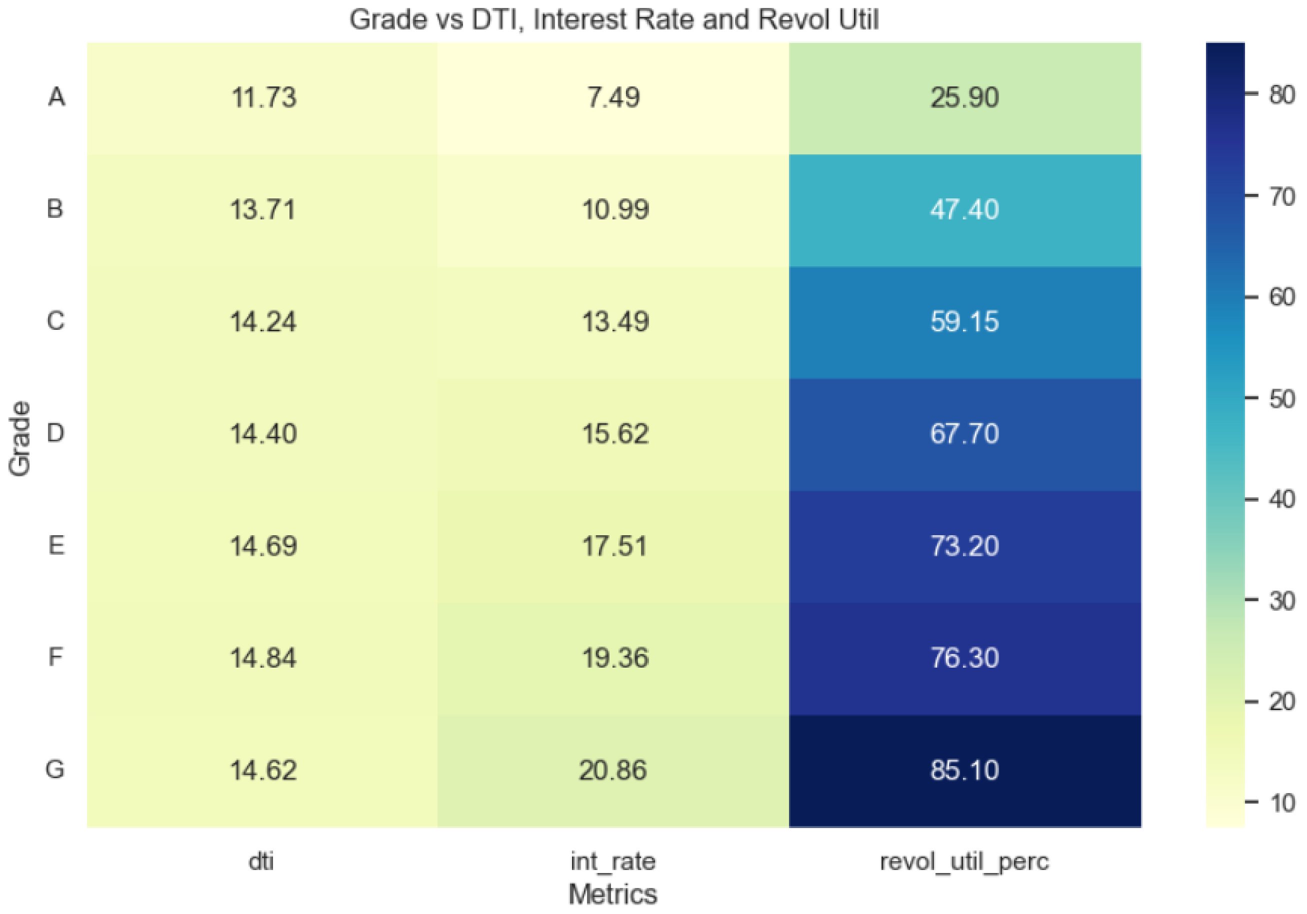


Impact Of DTI, Interest Rate and Revol Util

- Revol Util: Revolving Line Utilization
  - The percentage of available revolving credit (e.g., credit cards, credit lines) that a borrower is using.
  - Utilization >50% indicates financial stress

- Grades worsened with increase in DTI, interest rate and revolving line utilization

- Indicates higher risk of defaulting



Final Observation

- Major influencing factors in predicting defaults:
  - High `dti` and `revol_util`: Borrowers relying heavily on credit are more likely to default.
    - dti (>14%%) and revolving utilization (> 60%)
  - Loans with interest rates >15% are strongly associated with defaults.
  - Lower Grades (D, E, F): Significantly higher default rates compared to higher grades at 22-35%
  - Borrowers with lower annual income (40000-80000) coupled with high interest rates >15% have a high probability of defaulting
  - Higher tenure loans (60 months) are 25% at risk of defaulting
  - Number of open credit lines has negative impact on dti and thus may impact grades resulting in higher rate of interests

Recommendations

- Recommendations to Reduce Defaults
  - Set stricter thresholds for `dti` (e.g., <30%) and `revol_util` (e.g., <50%).
  - Increase interest rates further for lower grades (D, E, F) to account for higher risks.
  - Offer incentives (lower rates) for borrowers with lower `dti` and `revol_util`.
  - Focus on thorough income verification, especially for renters and lower-income borrowers.
  - Regularly monitor borrowers with high revolving utilization for signs of distress.
  - Reduce exposure to high-risk purposes such as small business loans.
  - Limit loan amounts for low-income borrowers in high-risk grades.