# LENDING CLUB CASE STUDY

**Solution By**

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# Outline

- Introduction
- Analysis Methods
- Univariate Analysis
- Bivariate Analysis
- Recommendation/Observations
- Lending Performance Summary

# Introduction

- Lending Club specializes in lending various loan types to urban customers, these loans can vary across different areas of people's personal life (i.e. medical emergency to weddings).
- Two of the biggest risk faced by the company includes
    1. Rejection of loan when the customer is less risky of defaulting
    2. Approval of loan when the customer is highly likely to defaulting
- **Aim of this data analysis is to understand customer and loan attributes defaulting to avoid rejecting less risky customer and approving high risk customers.**

# Analysis Methods

- Following analysis methods are used to analyze the Lending Case Study Dataset

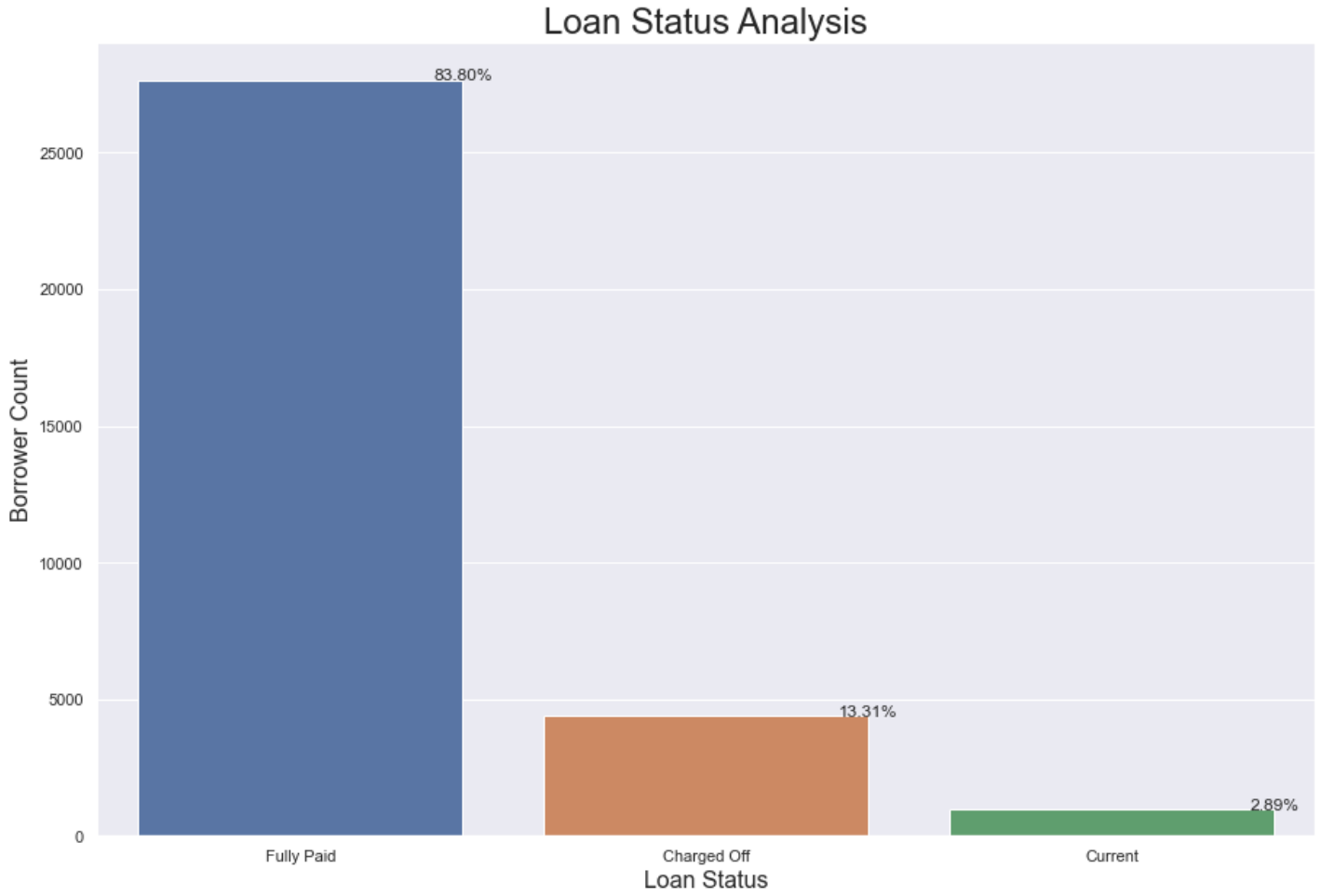
    1. Univariate Analysis – Analyzing of one variable at a time

    2. Bivariate Analysis – Analyzing of two variable against each other

# Univariate Analysis

- Following Univariate Analysis performed on Lending Case Study Dataset
  - Loan Status Analysis
  - Interest Rate Distribution Analysis
  - Loan Amount Distribution Analysis
  - Annual Income Distribution Analysis
  - Loan Term Analysis
  - Home Ownership Analysis
  - Employment Length Analysis
  - Application Type Analysis
  - State Analysis
  - Loan Issued Year Analysis

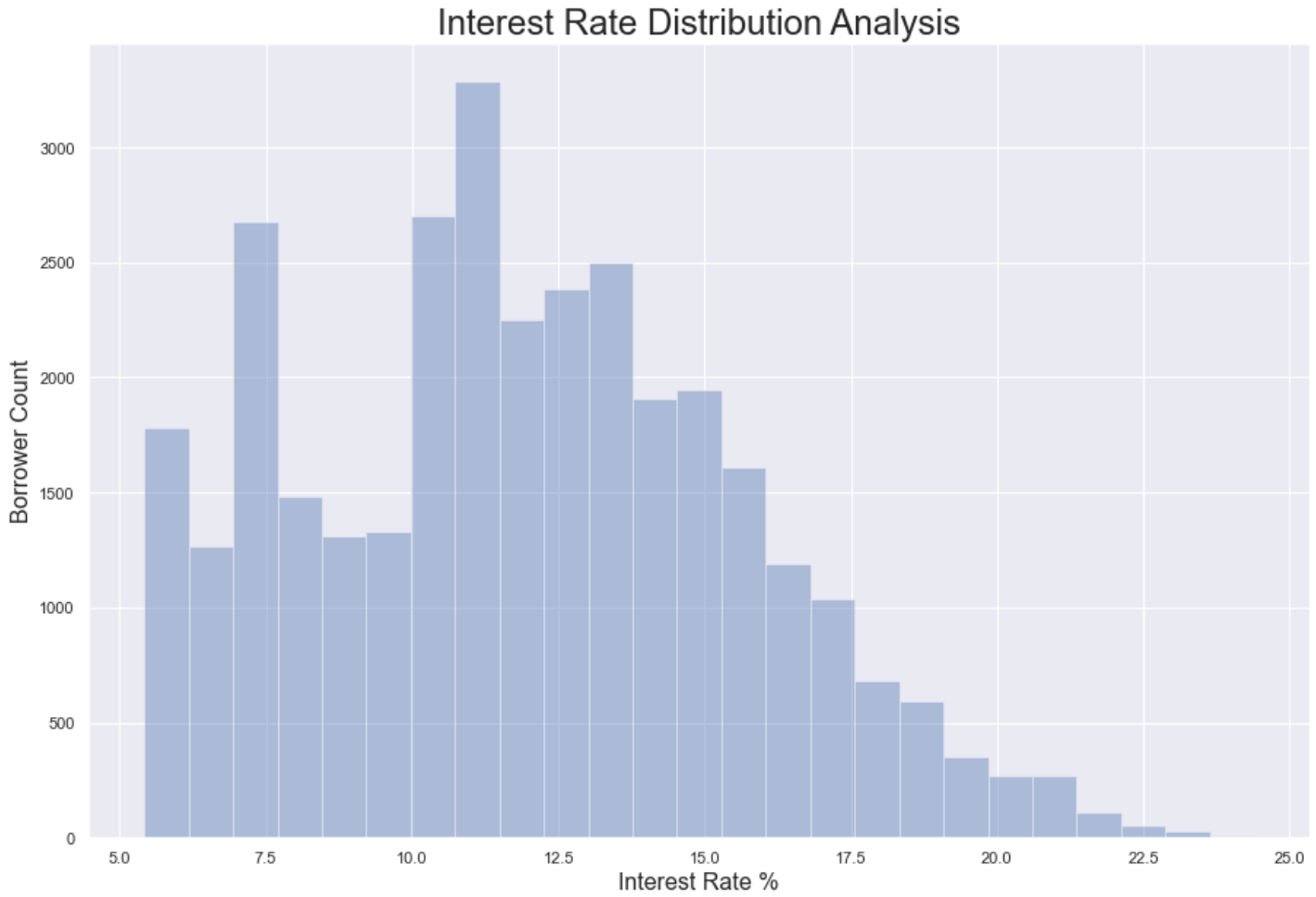
# Loan Status Analysis




According to the **Loan Status Analysis**, we can conclude the following,

- **83.80%** of the borrowers **Fully Paid** the loan
- **13.31%** of the borrowers **Charged Off** (which means defaulted)
- **2.89%** of the borrowers are **Current** (which means in the process of paying the installments)

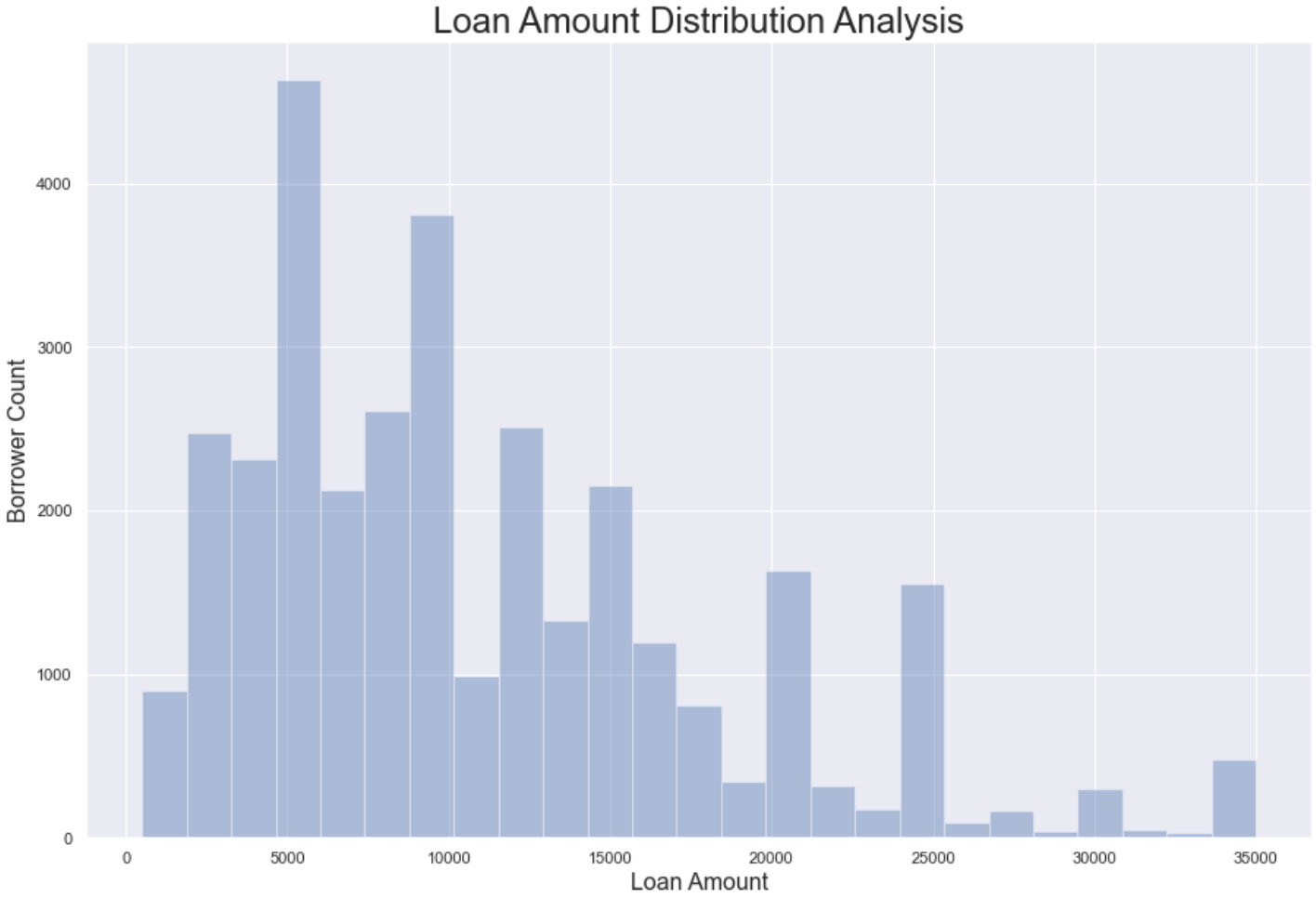
# Interest Rate Distribution Analysis




According to the **Interest Rate Distribution Analysis**, we can conclude the following,

- Higher number of loans falling under interest rates between **10%** to **15%**
- **Number of borrowers gradually getting reduced when the interest rate is higher than 15%**

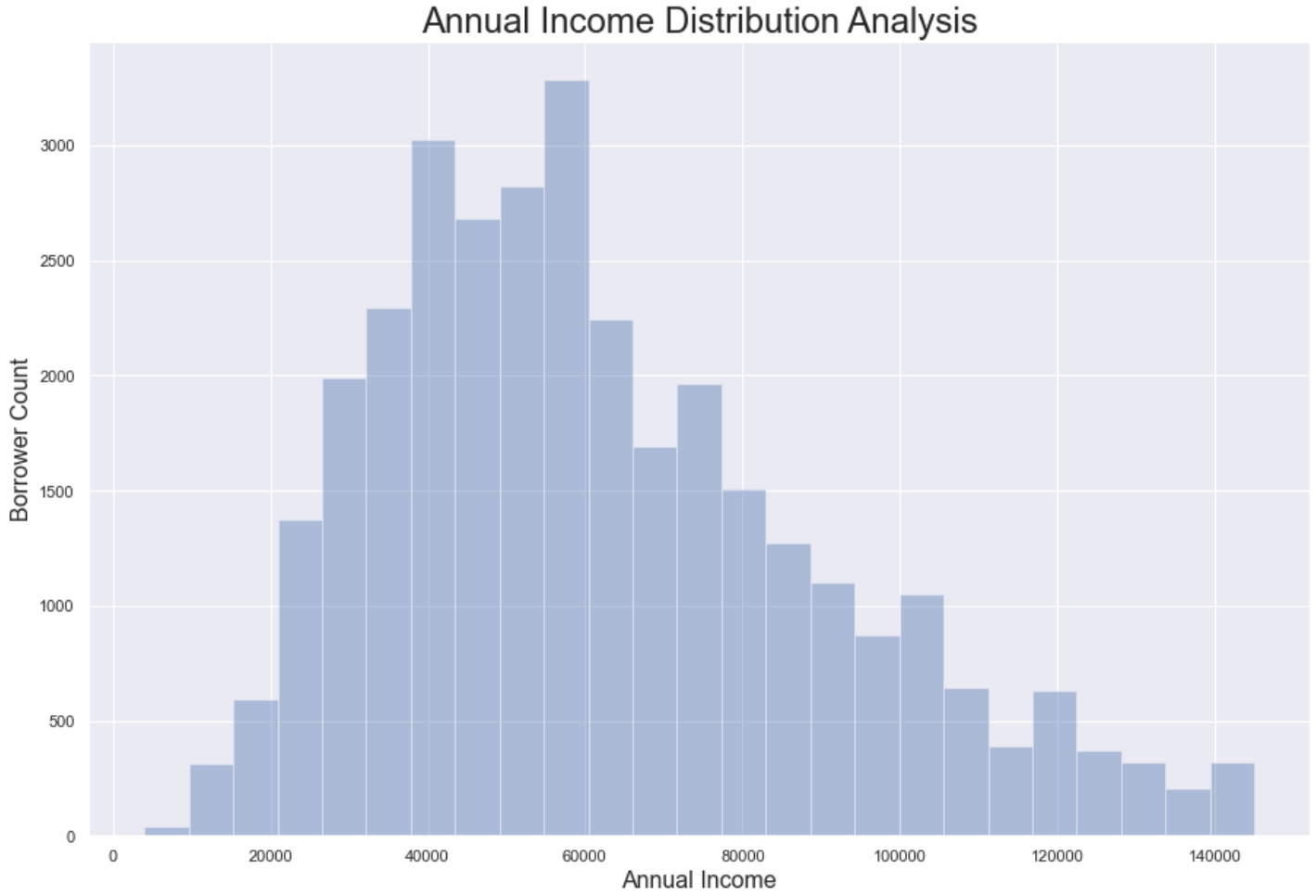
# Loan Amount Distribution Analysis




According to the **Loan Amount Distribution Analysis**, we can conclude the following,

- Most of the loan amount falls between **5000** to **10000**

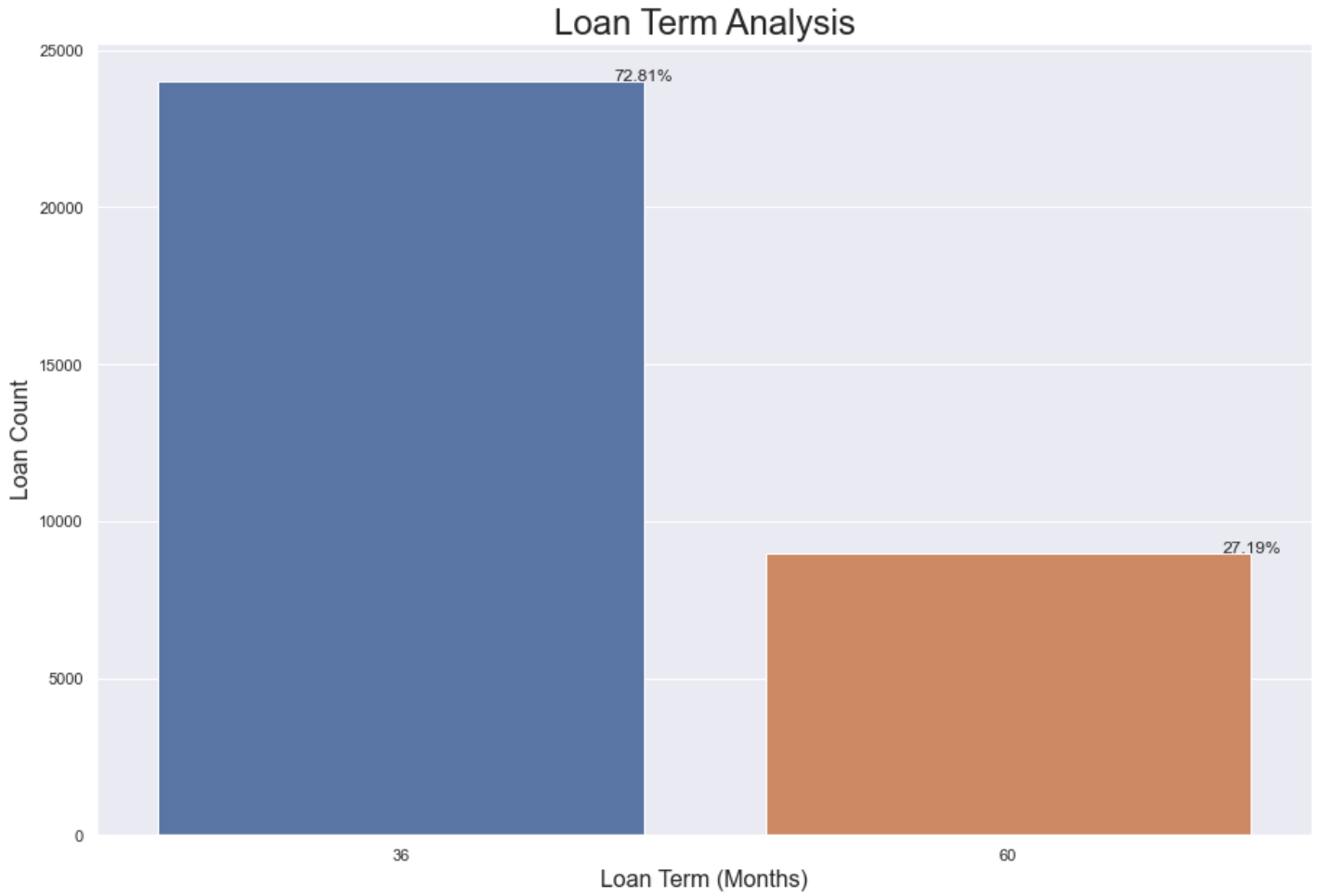
# Annual Income Distribution Analysis




According to the **Annual Income Distribution Analysis**, we can conclude the following,

- Most of the borrowers annual income falls between **40000** to **60000**
- **Borrower count gradually increases for annual income between 5000** to **50000** and decreases for annual income between **60000** to **145000**

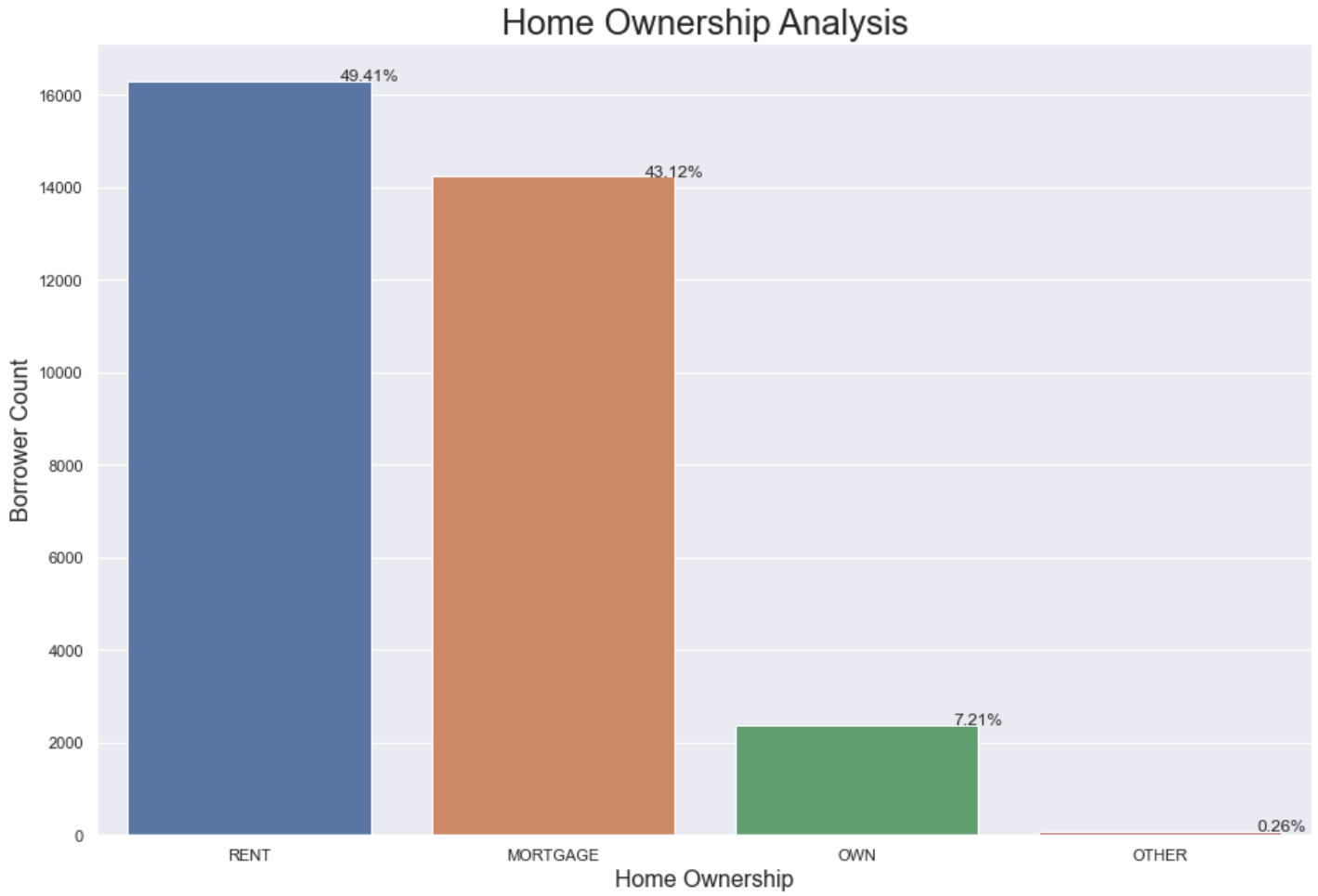
# Loan Term Analysis




According to the **Loan Term Analysis**, we can conclude the following,

- **72.81%** loans are termed for 36 months
- **27.19%** loans are termed for 60 months

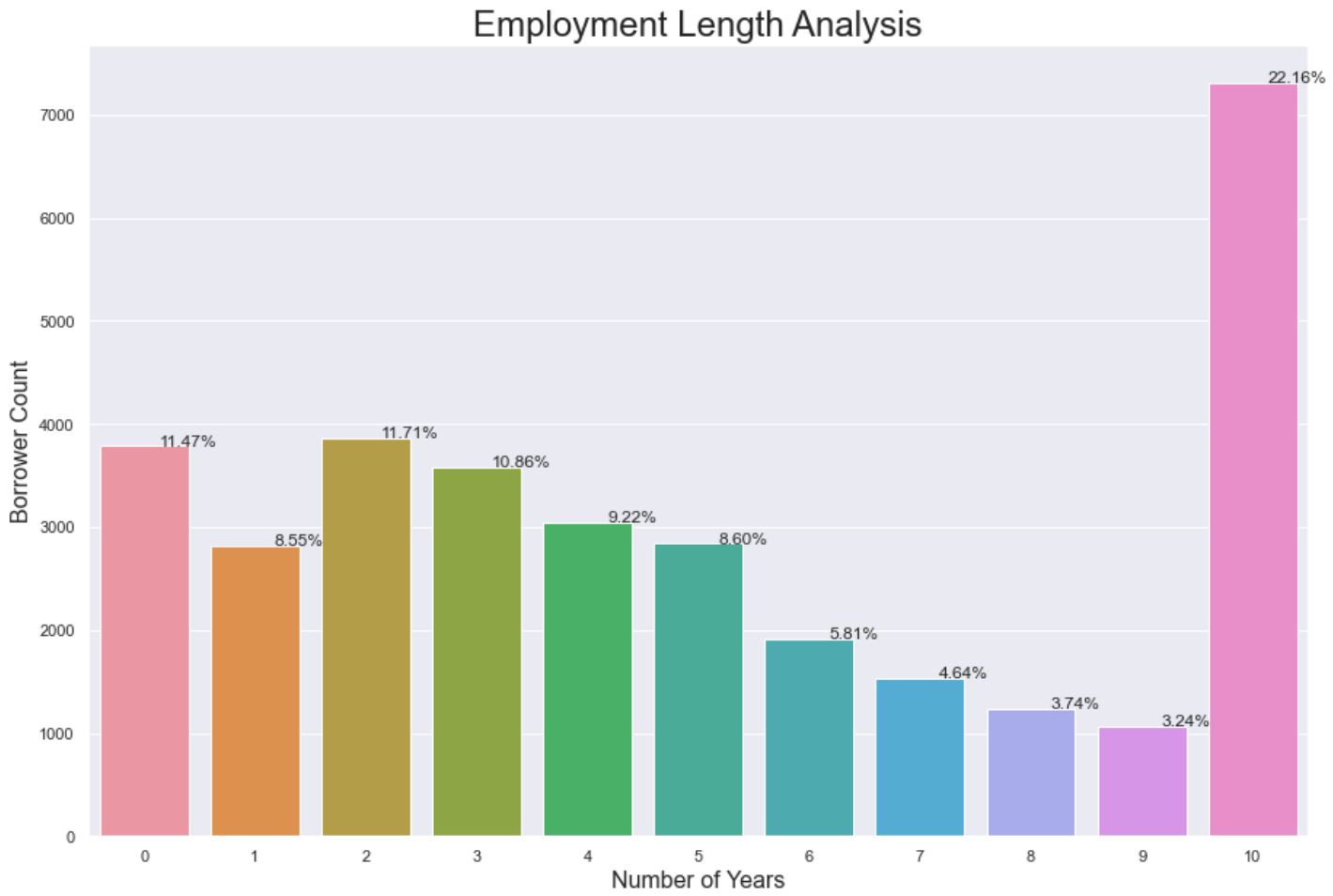
# Home Ownership Analysis




According to the **Home Ownership Analysis**, we can conclude the following,

- **49.41%** of the borrowers have **rent** house
- **43.12%** of the borrowers have **mortgage** house
- **7.21%** of the borrowers have **own** house

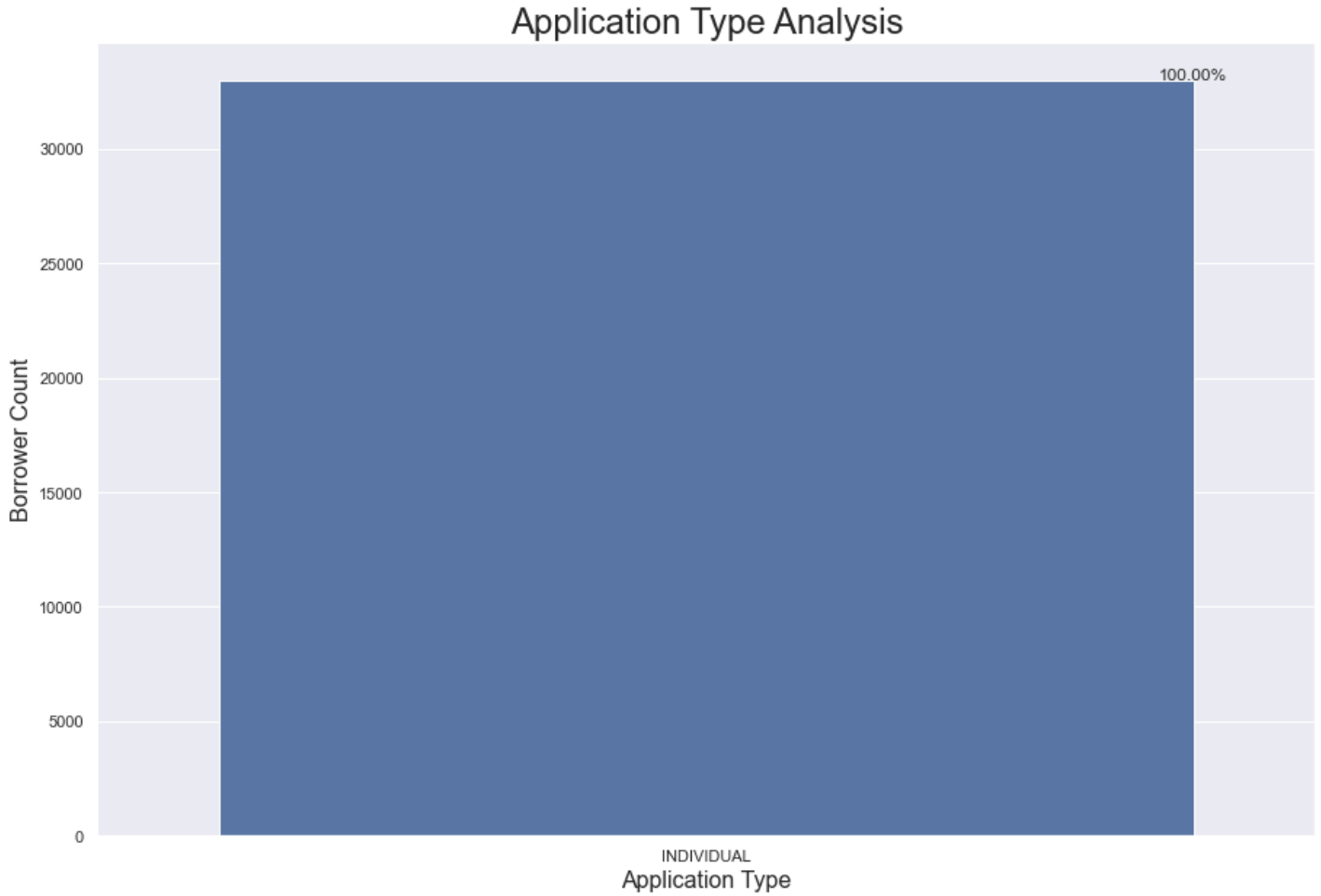
# Employment Length Analysis




According to the **Employment Length Analysis**, we can conclude the following,

- Most of the borrowers are employed for **10 or more** years

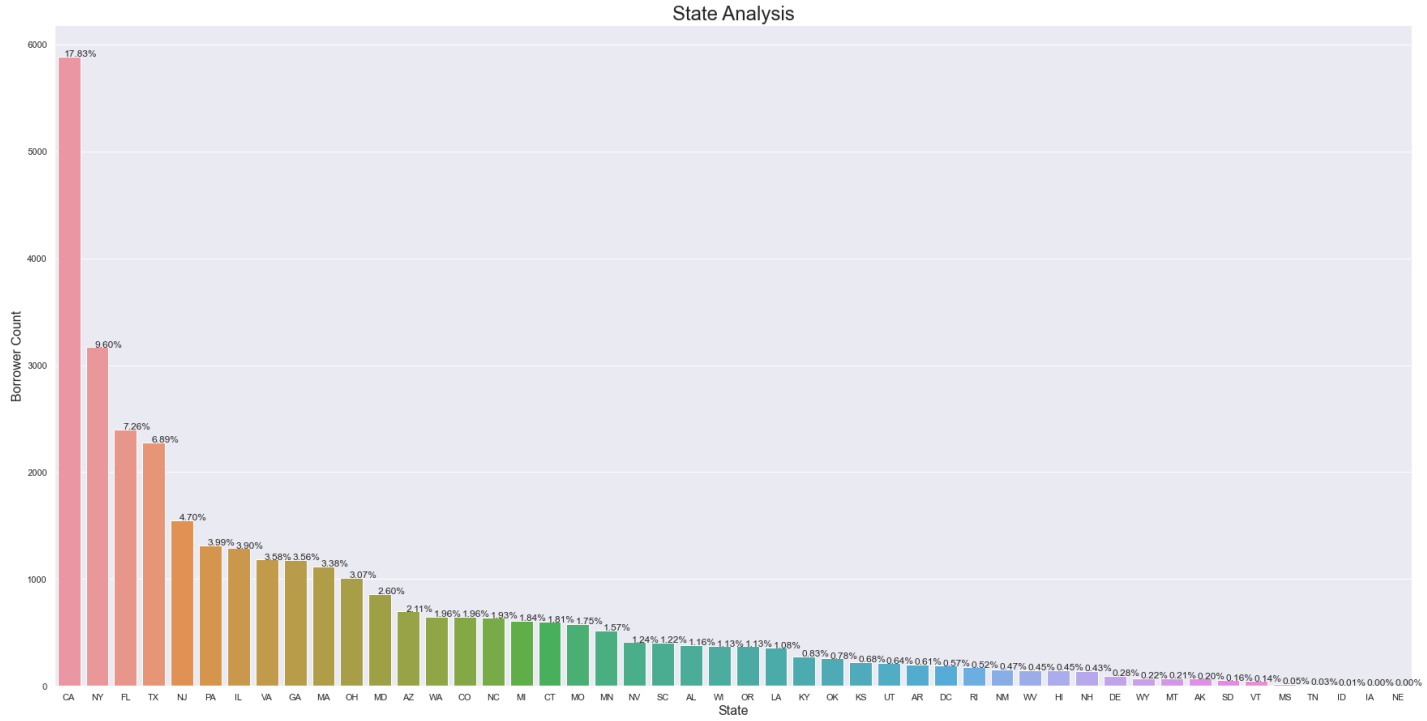
# Application Type Analysis




According to the **Application Type Analysis**, we can conclude the following,

- **100%** of the borrowers are **individual** applicants

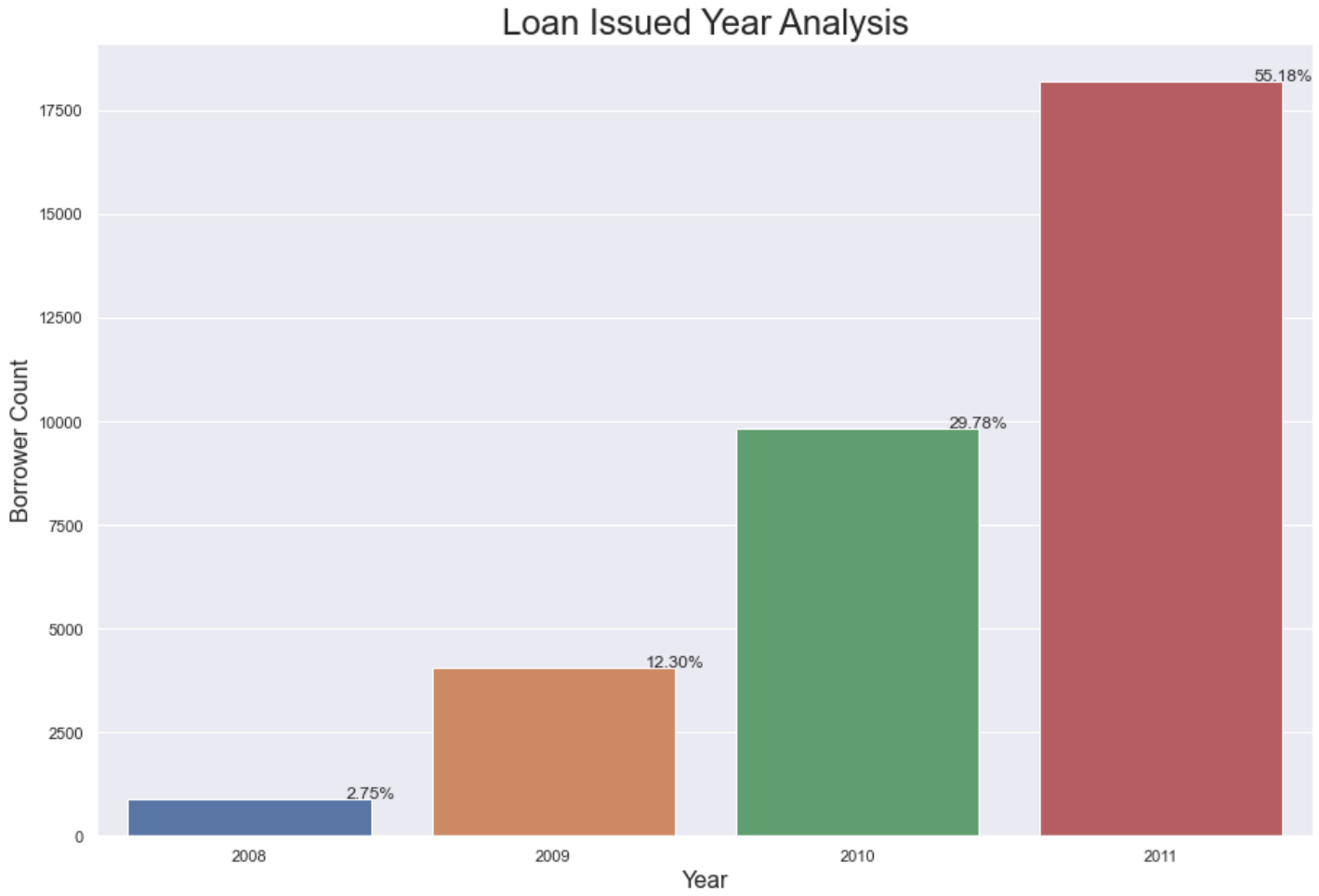
# State Analysis




According to the **State Analysis**, we can conclude the following,

- The state **CA** has the highest number of borrowers and the state **NE** has the least number of borrowers

# Loan Issued Year Analysis




According to the **Loan Issued Year Analysis**, we can conclude the following,

- Least number of loans issued in **2008** which is **2.75%** and the highest number of loans issued in **2011** which is **55.18%**
- **From 2008** to **2011** number of issued loans gradually getting **increased**

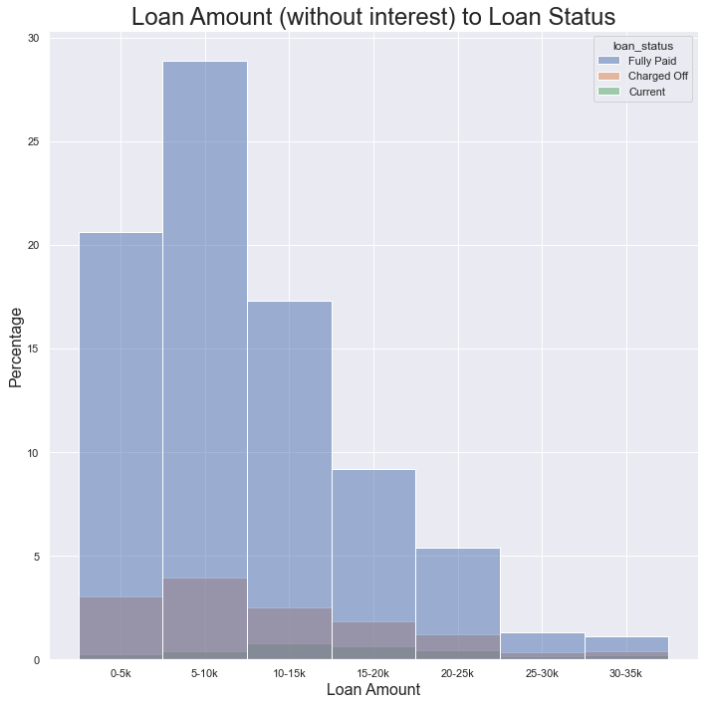
# Bivariate Analysis

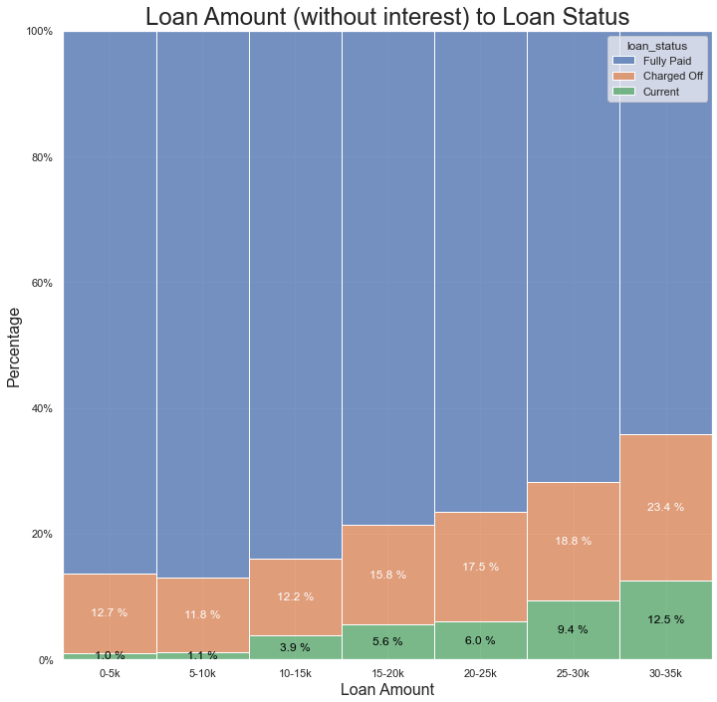
- Following Bivariate Analysis performed on Lending Case Study Dataset
    - Analyzing Interest Rate to Loan Status
    - Analyzing Loan Amount to Loan Status
    - Analyzing Annual Income to Loan Status
    - Analyzing Loan Term to Loan Status
    - Analyzing Home Ownership to Loan Status
    - Analyzing Employment Length to Loan Status
    - Analyzing Loan Issued Year to Loan Status
    - Analyzing Open Credit Lines to Loan Status

# Bivariate Analysis (Continued.)

- Following Bivariate Analysis performed on Lending Case Study Dataset
    - Analyzing Monthly Installment to Loan Status
    - Analyzing Loan Grade to Loan Status
    - Analyzing Payback to Loan Status
    - Analyzing Loan Purpose to Loan Status
    - Analyzing Revolving Line Utilization Rate to Loan Status
    - Loan State Wise Distribution

# Analyzing Loan Amount to Loan Status

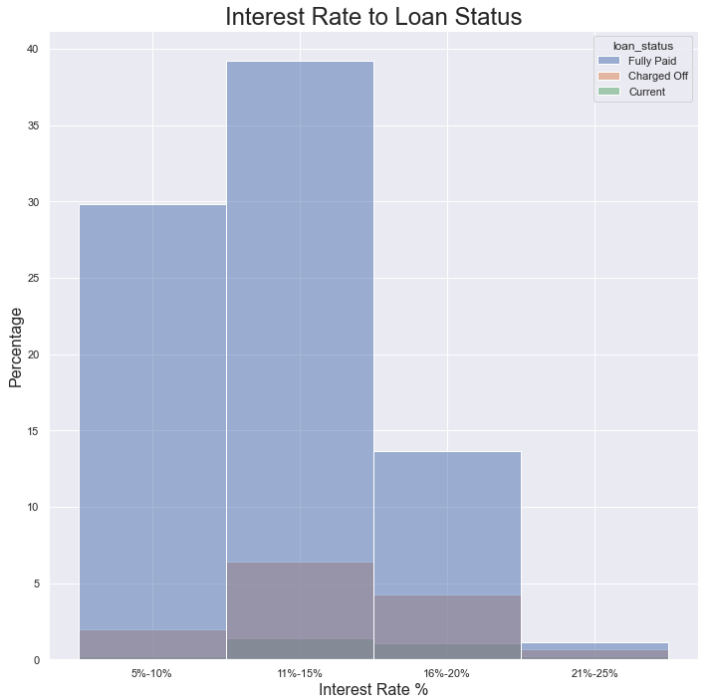


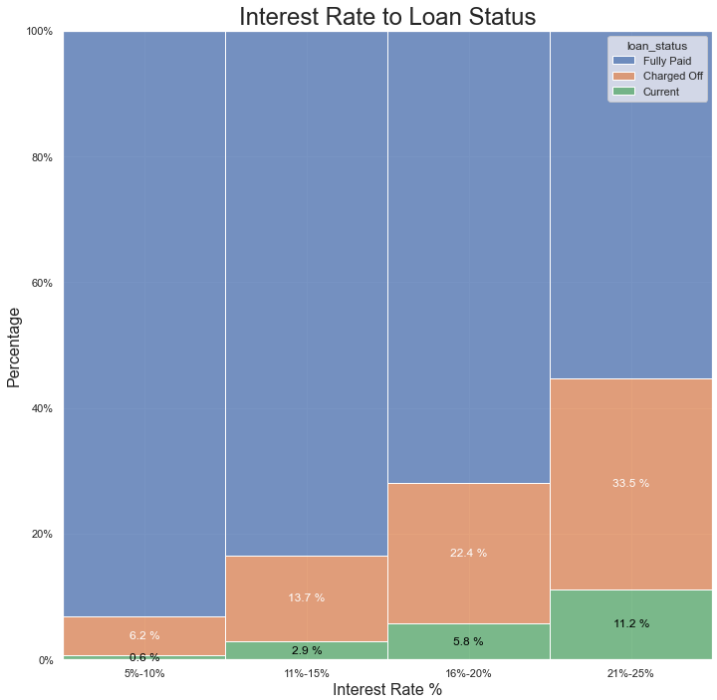




According to the **Loan Amount to Loan Status Analysis**, we can conclude the following,

- When the **Loan Amount** is increasing, loan **Charged Off** percentage get increases

# Analyzing Interest Rate to Loan Status

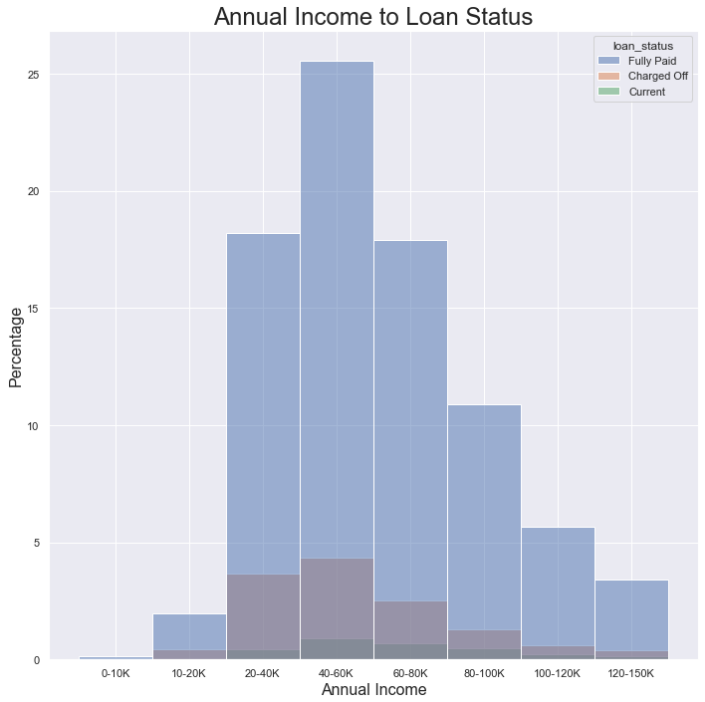


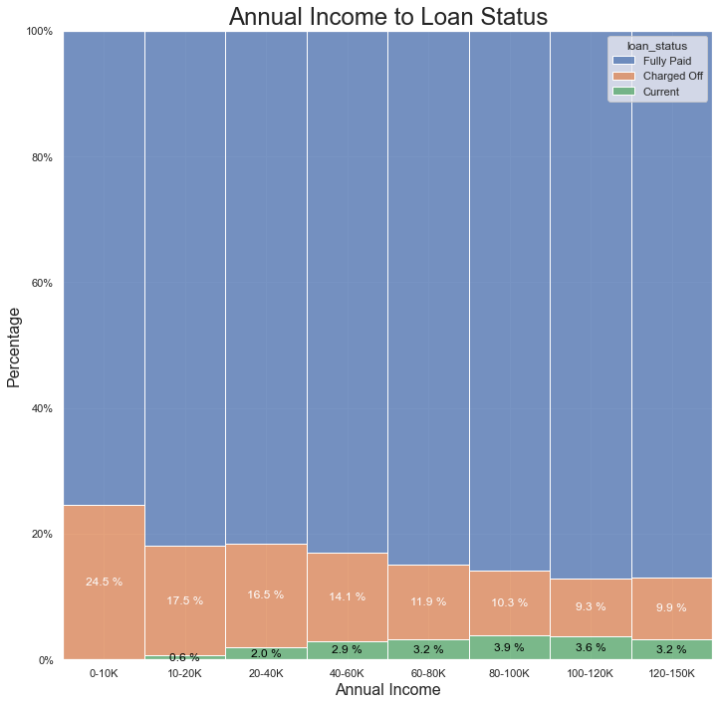




According to the **Interest Rate to Loan Status Analysis**, we can conclude the following,

- When the loan **Interest Rate** is increasing, loan **Charged Off** percentage get increases

# Analyzing Annual Income to Loan Status

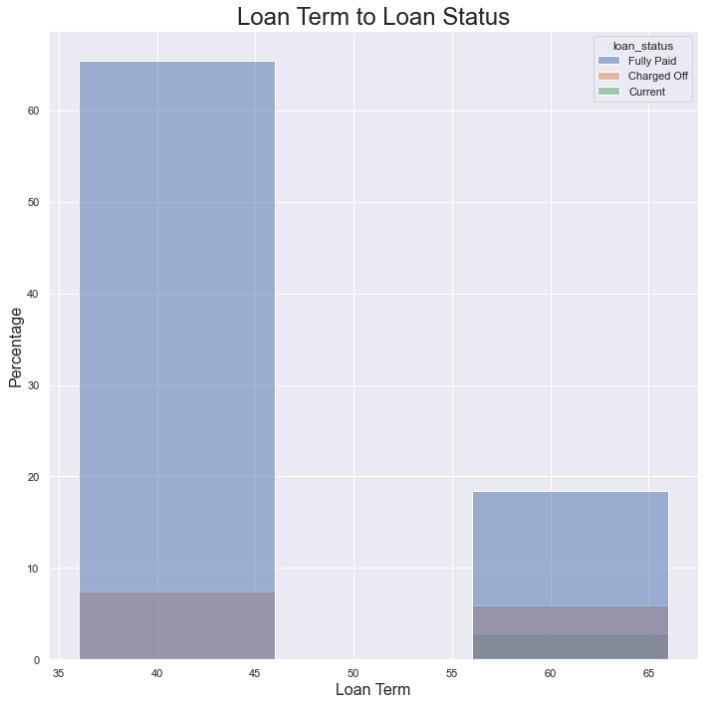


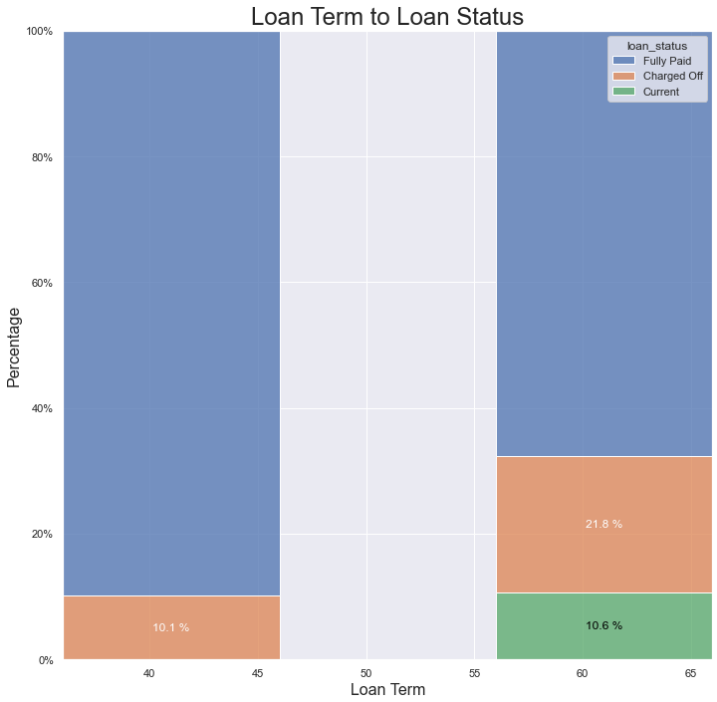




According to the **Annual Income to Loan Status Analysis**, we can conclude the following,

- When the **Annual Income** is increasing, loan **Charged Off** percentage get decreases

# Analyzing Loan Term to Loan Status

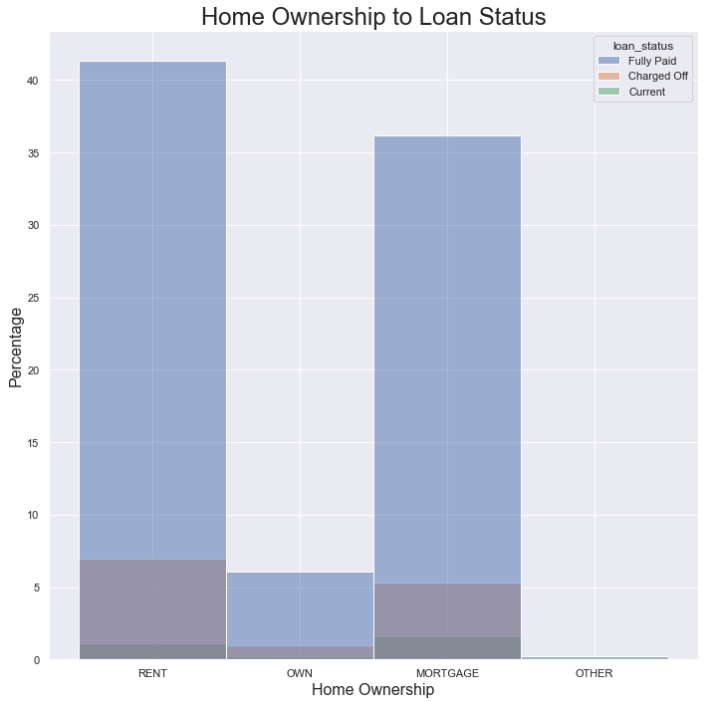


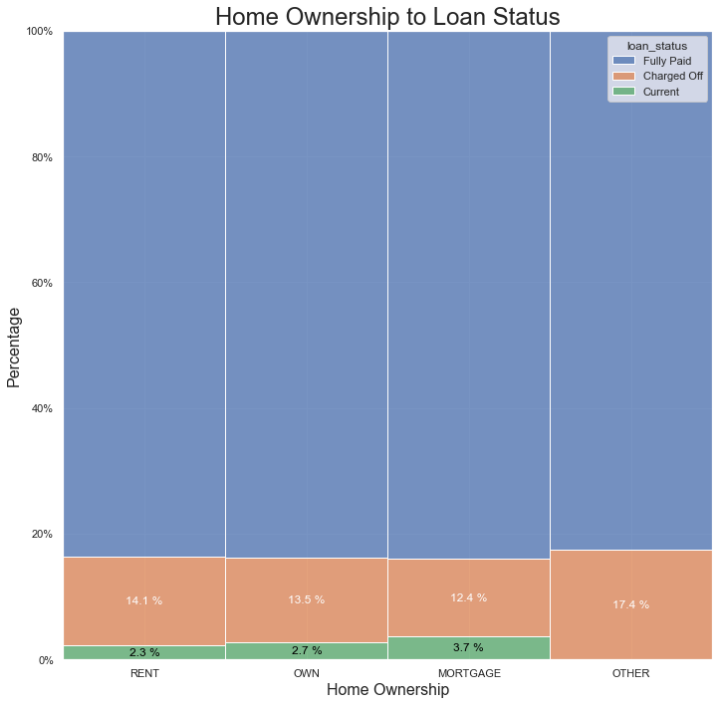




According to the **Loan Term to Loan Status Analysis**, we can conclude the following,

- When the **Loan Term** is increasing, loan **Charged Off** percentage get increases

# Analyzing Home Ownership to Loan Status

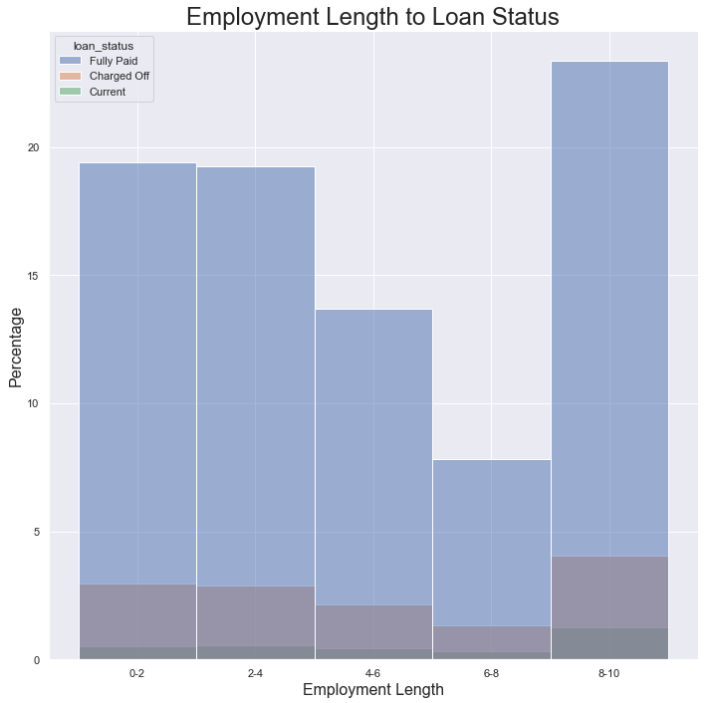


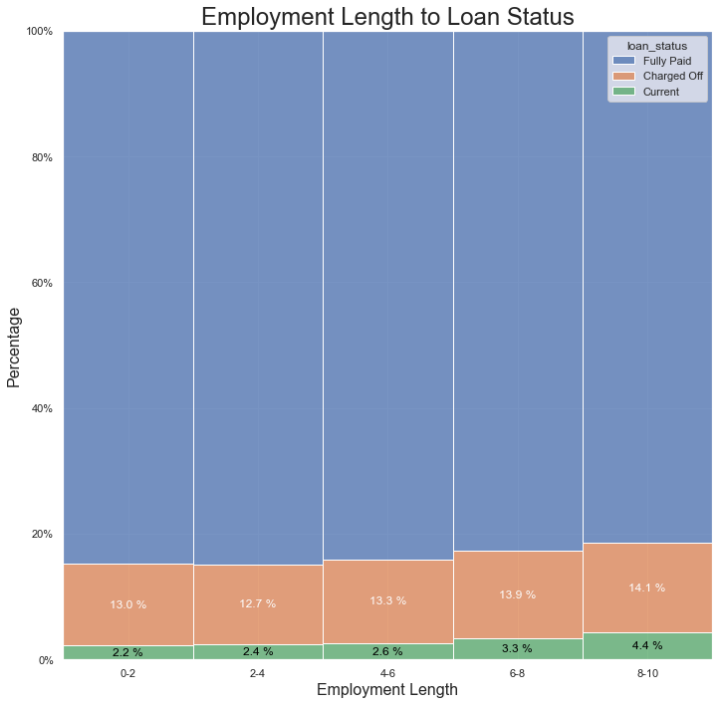




According to the **Home Ownership to Loan Status Analysis**, we can conclude the following,

- When the borrower **Home Ownership** is other than **Rent, Mortgage or Own**, loan **Charged Off** percentage get increases

# Analyzing Employment Length to Loan Status

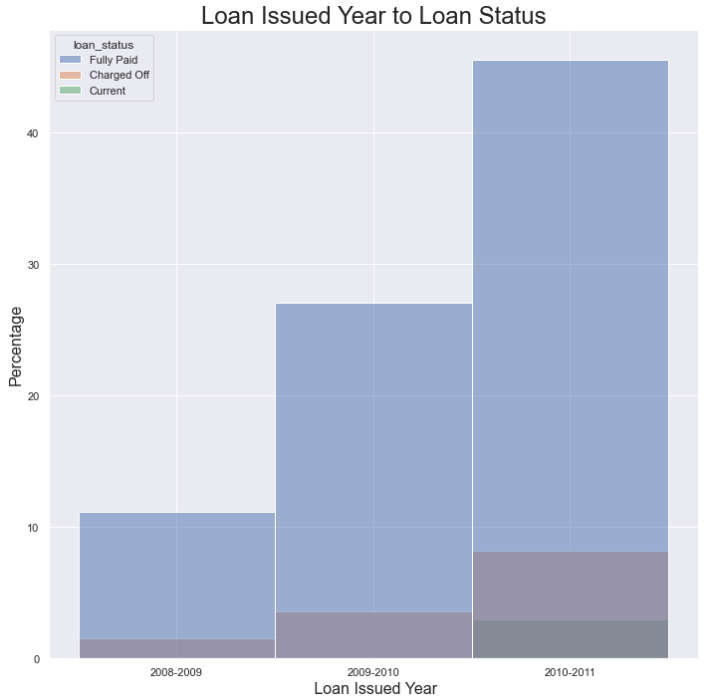


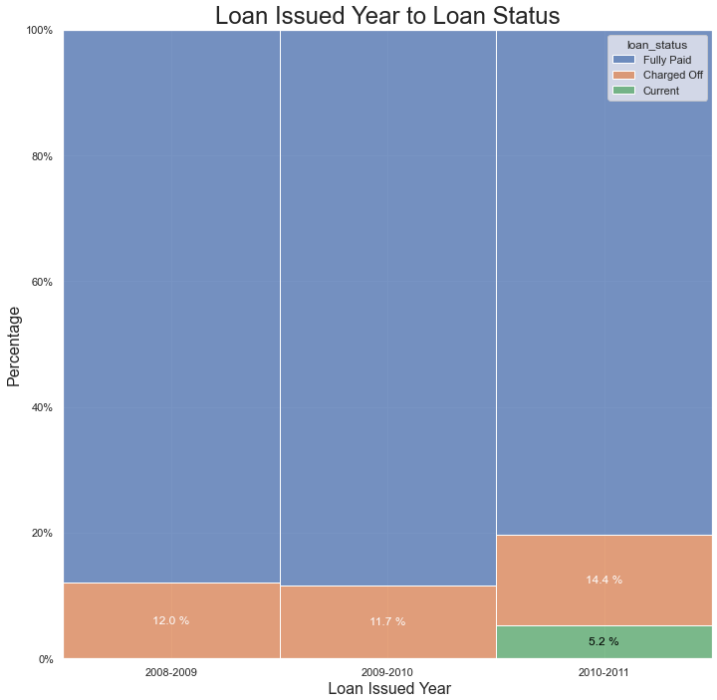




According to the **Employment Length to Loan Status Analysis**, we can conclude the following,

- When the **Employment Length** is increasing, loan **Charged Off** percentage get increases

# Analyzing Loan Issued Year to Loan Status

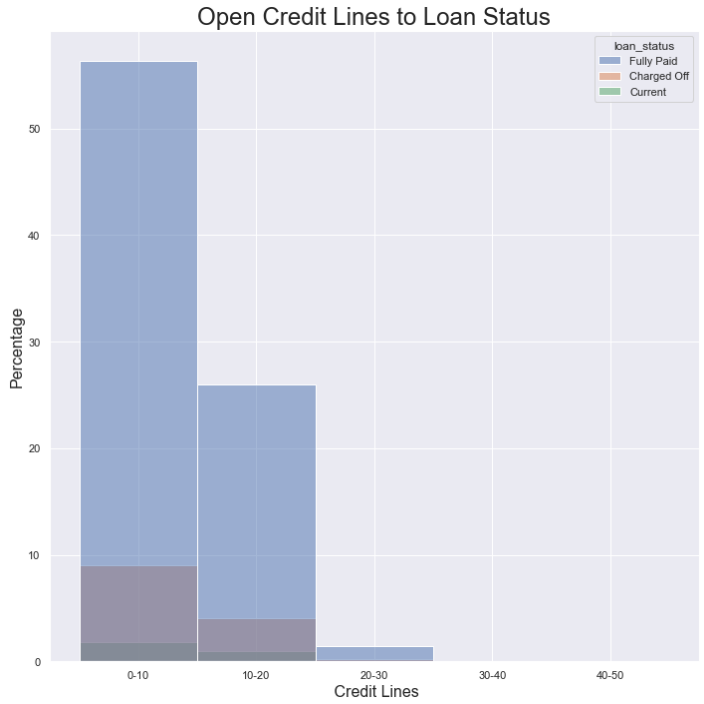


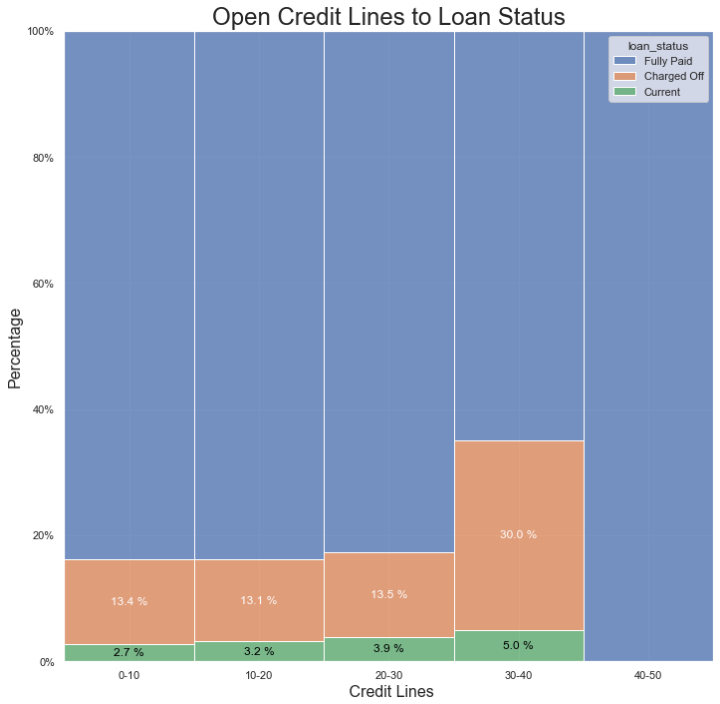




According to the **Loan Issued Year to Loan Status Analysis**, we can conclude the following,

- Most of the loans got **Charged Off**, issued between year **2010 - 2011**

# Analyzing Open Credit Lines to Loan Status

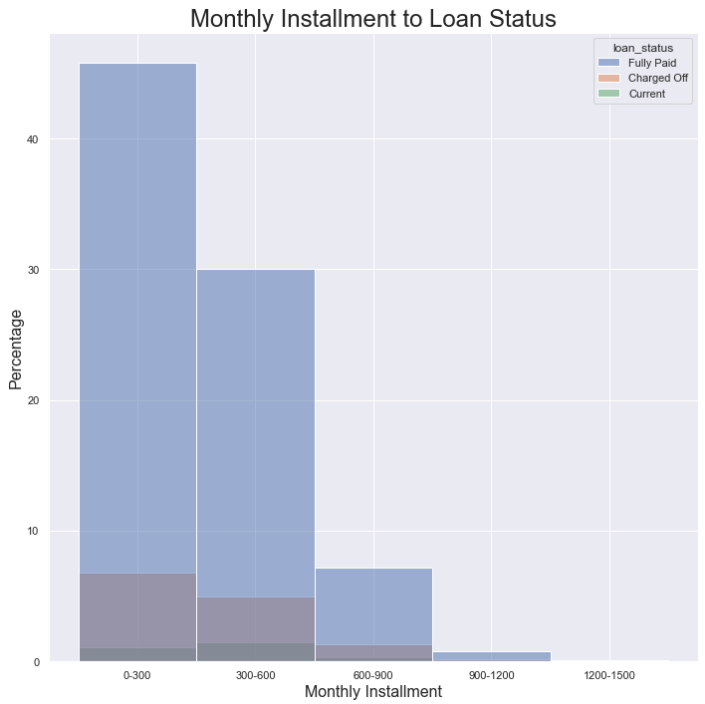


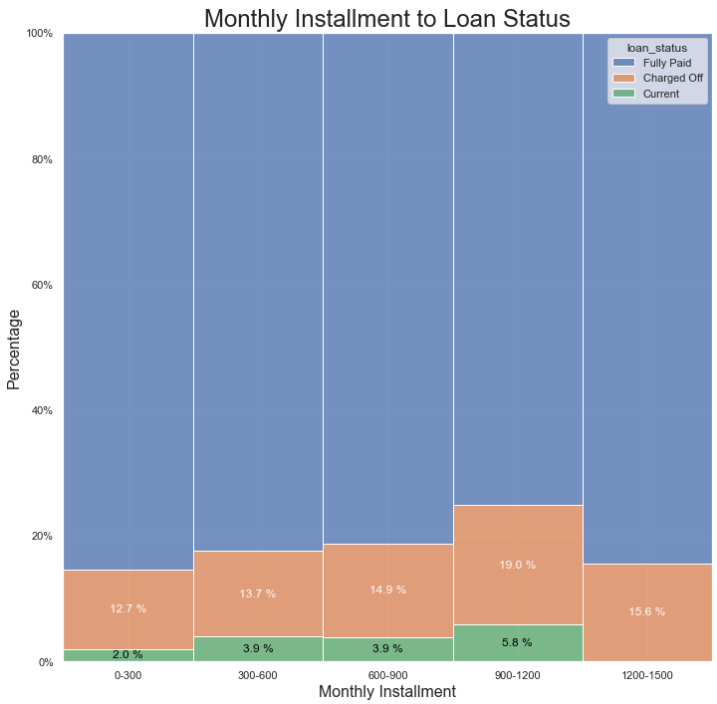




According to the **Open Credit Lines to Loan Status**, we can conclude the following,

- When the **Open Credit Lines** is increasing, loan **Charged Off** percentage get increases

# Analyzing Monthly Installment to Loan Status

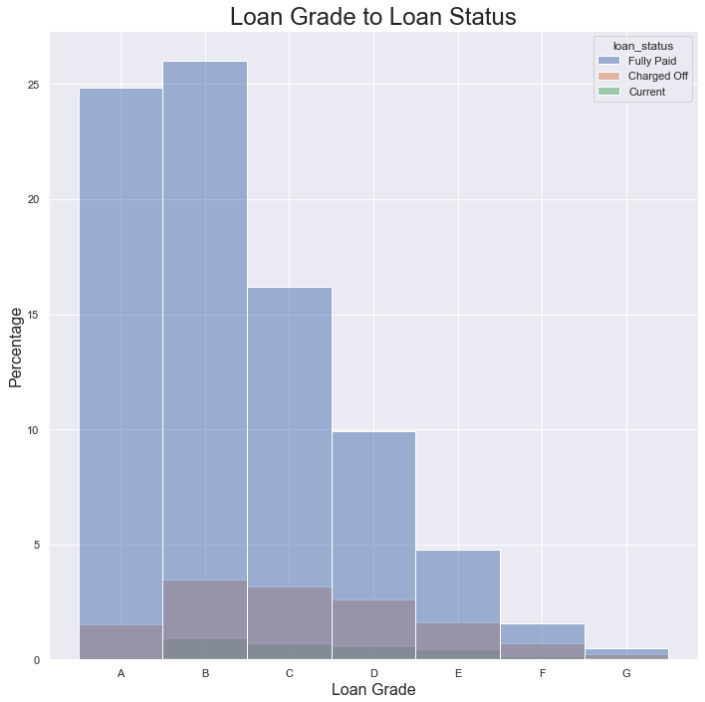


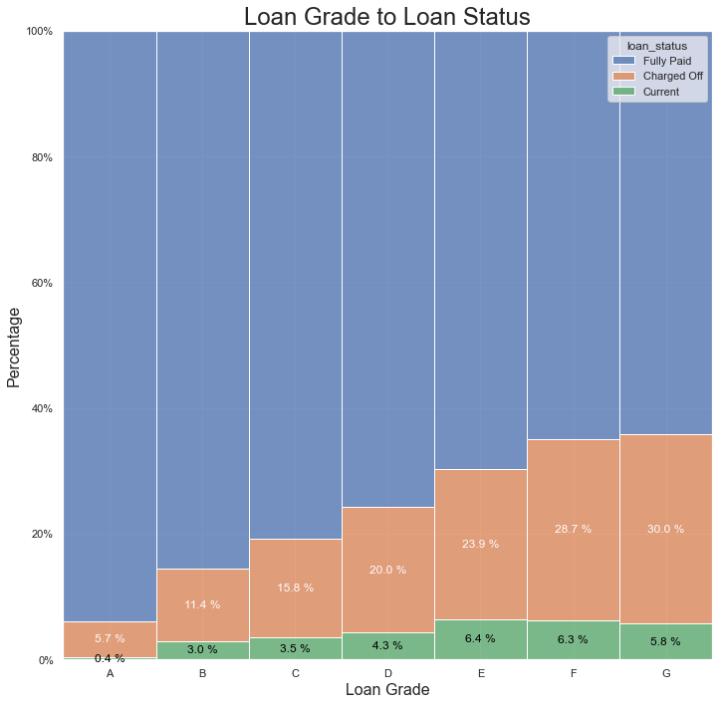




According to the **Monthly Installment to Loan Status**, we can conclude the following,

- When the **Monthly Installment** is increasing from **0** to **1200**, loan **Charged Off** percentage get increases

# Analyzing Loan Grade to Loan Status

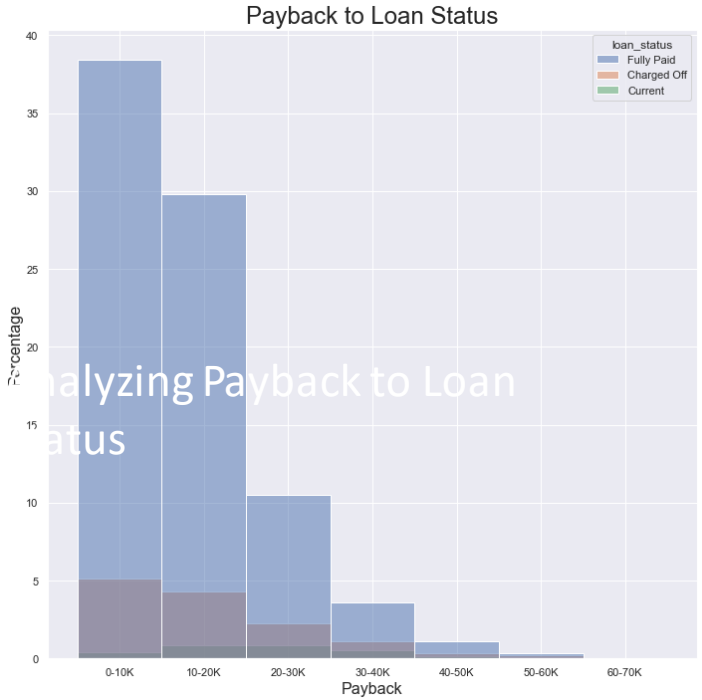


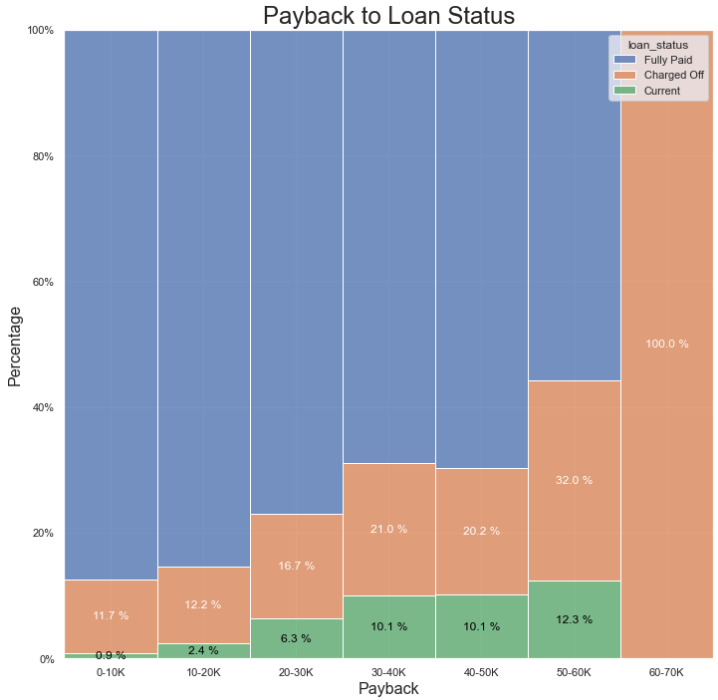




According to the **Loan Grade to Loan Status Analysis**, we can conclude the following,

- When moving from grade **A to G**, loan **Charged Off** percentage get increases

# Analyzing Payback to Loan Status

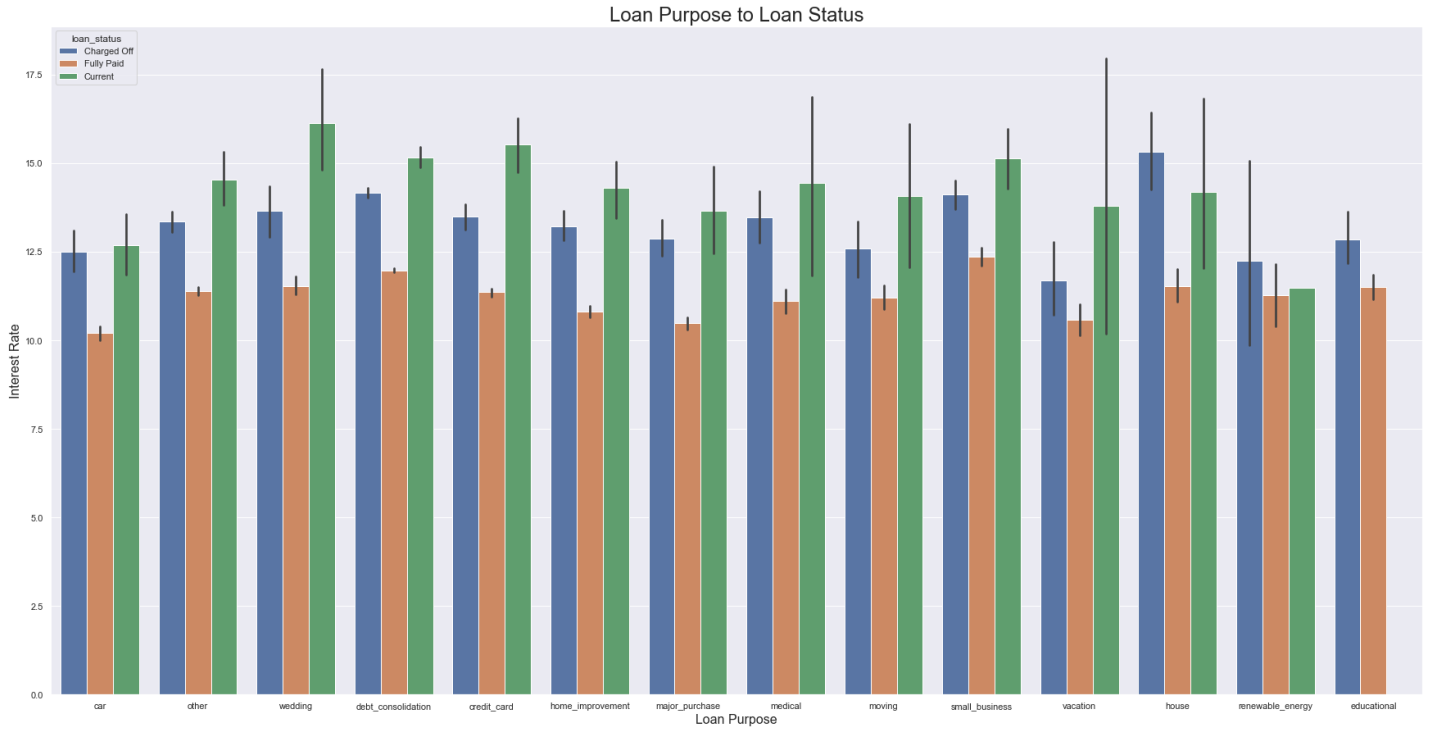



According to the **Payback to Loan Status Analysis**, we can conclude the following,

- When the **Payback** is increasing, loan **Charged Off** percentage get increases

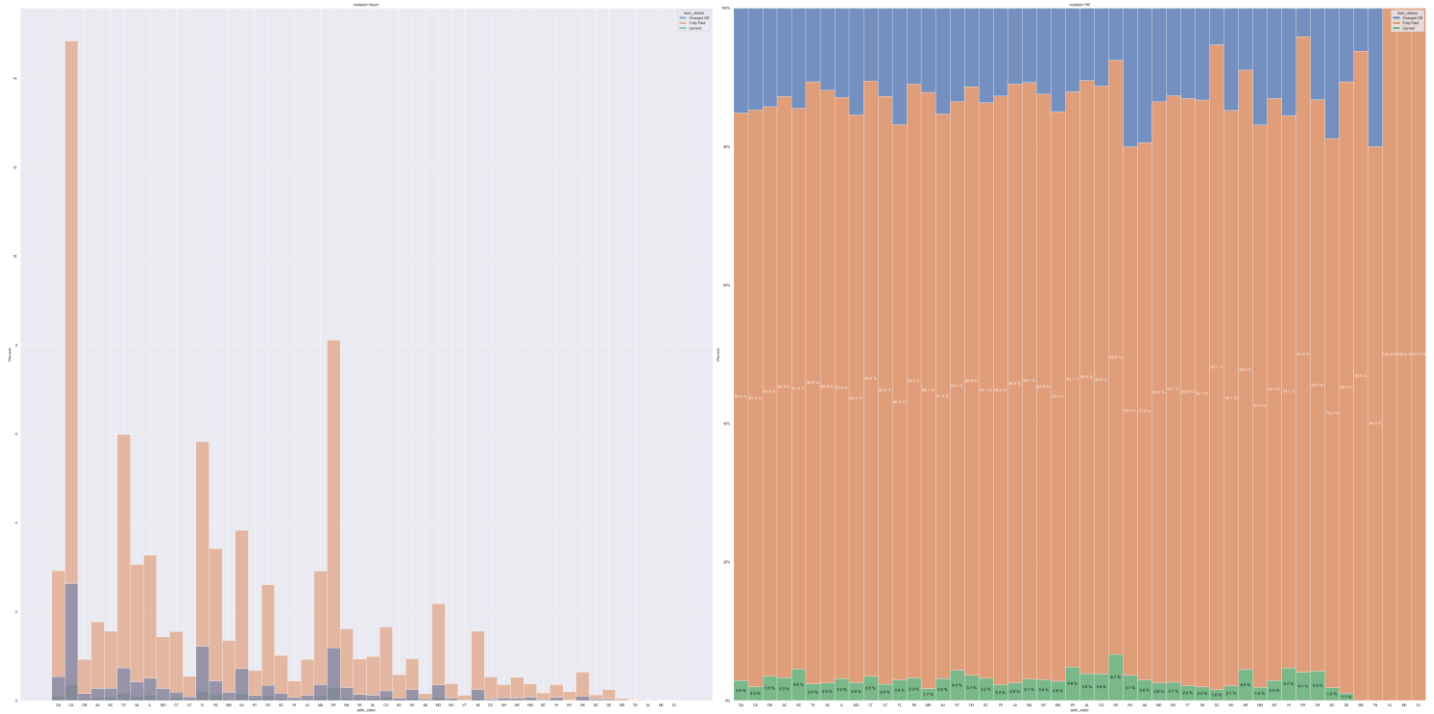
# Analyzing Loan Purpose to Loan Status




According to the **Loan Purpose to Loan Status**, we can conclude the following,

- Most of the loans **Charged Off** were borrowed for small business purposes

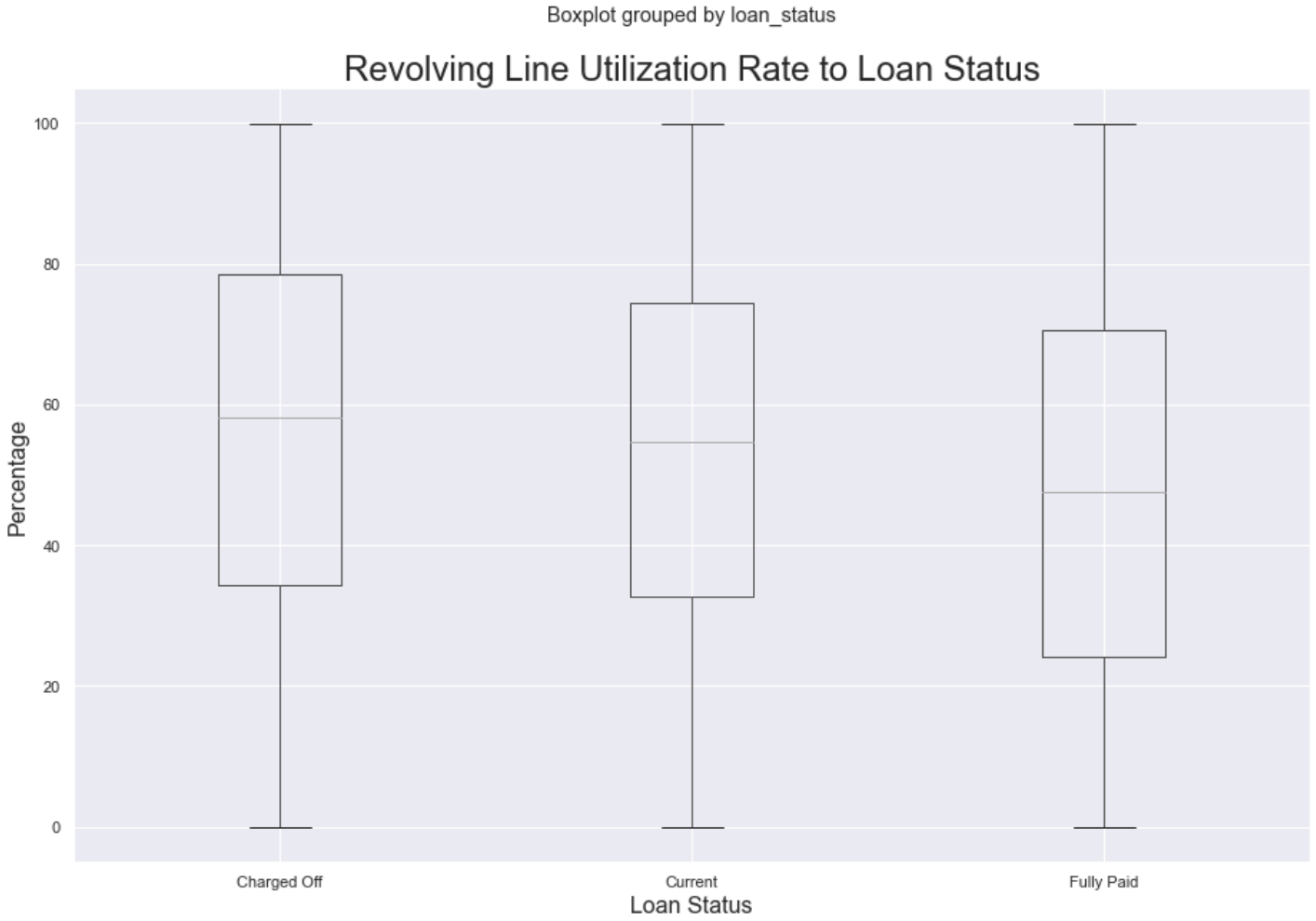
# Analyzing State to Loan Status



According to the **State to Loan Status**, we can conclude the following,

- State **TN** is the highest **Charged Off** state

# Analyzing Revolving Line Utilization Rate to Loan Status




According to the **Revolving Line Utilization Rate to Loan Status**, we can conclude the following,

- When the **Revolving Line Utilization Rate** is increasing, loan **Charged Off** percentage get increases

# Loan State Wise Distribution

# Recommendation

- Annual income less than 20K at higher risk of defaulting
- Loan amount higher than 25K at risk of defaulting
- Higher the interest rate, higher the risk of defaulting
- People who pick longer loan term is slightly higher risk than the lower term people
- People on the Home Ownership status ‘Other’ is at slightly higher risk than other
- Overall loan(including interest) : As the loan gets higher the risk increases people are higher than 50K overall payback is at high risk.

# Recommendation (Continued.)

- People with open credit lines of 30-40 are at higher risk
- Smaller business is at higher risk of defaulting
- As the revolving line utilization increases the risk of defaulting increases
- As the ratio of income to debt gets closer the risk of defaulting gets higher.
- It's recommended to introduce an point based system to assess the risk of being defaulted (since multiple risk factors are associated with getting defaulted, point based system will be an ideal solution)

# Lending Performance Summary

Payment Expected with Interest: **454,362,431.76**

Payment Expected without Interest: **364,618,850.00**

Payment Received: **396,578,430.16**

Expected Profit: **89,743,581.76**

Loss Due to Defaulting: **57,784,001.60**

Actual profit: **31,959,580.16**

Profit Achieved to Expected: **35.61%**

Company Profit to investment: **8.77%**

Expected Company Profit to investment: **24.61%**

# Thank You