

# Lending Club Case Study

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# Problem Statement

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- ▶ Lending Club specializes in lending various types of loans to urban customers
- ▶ Lending Credit loss is a major concern for the company.
- ▶ Defaulters are the primary source of credit loss.
- ▶ Identifying risky loan applicants can significantly reduce credit loss.
- ▶ The goal of this case study is to identify the key factors that contribute to loan default.



# Problem solving approach

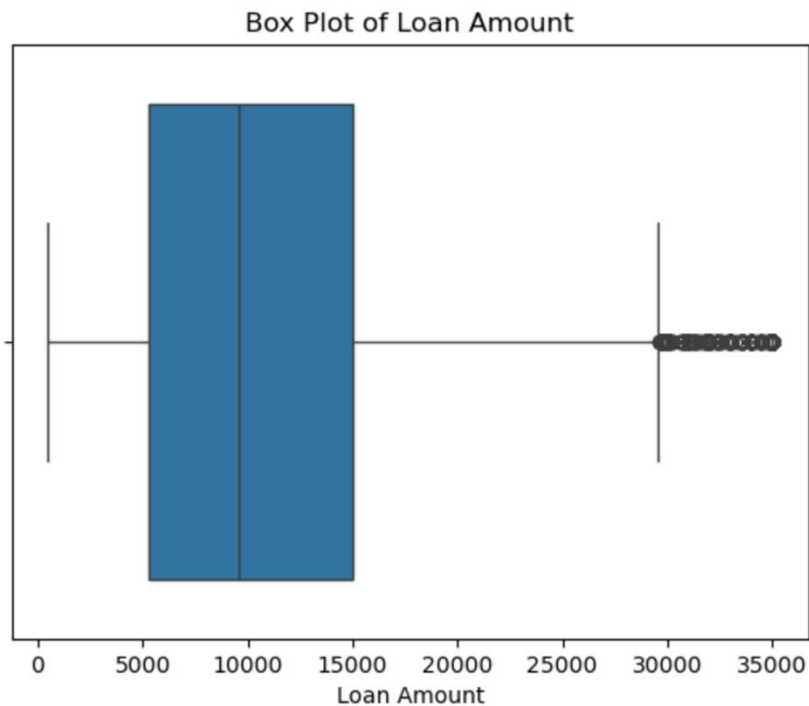
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- ❖ **Domain Understanding:** Understand the lending industry, loan types, and risk factors.
- ❖ **Data Cleansing:** Handle missing values, outliers, inconsistencies, and data normalization.
- ❖ **Univariate Analysis:** Analyze distribution, summary statistics, and visualization for loan amount, interest rate, dti , and other relevant variables.
- ❖ **Segmented Univariate Analysis:** Analyze loan performance by borrower demographics (state,annual income), loan type, and loan status.
- ❖ **Bivariate Analysis:** Explore correlations between loan amount and interest rate, purpose and default risk, and other relevant variable pairs.
- ❖ **Summary of Observations and Recommendations:** Summarize key findings, identify patterns, and provide actionable recommendations for improving loan risk assessment.

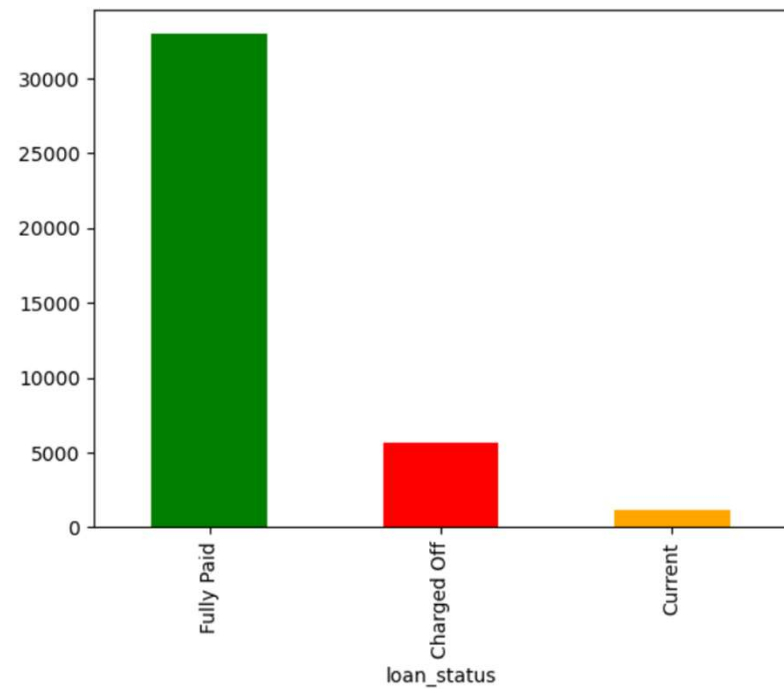


# Loan Amount & Loan Status

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The majority of loan applications were for amounts between 5k and 14k.

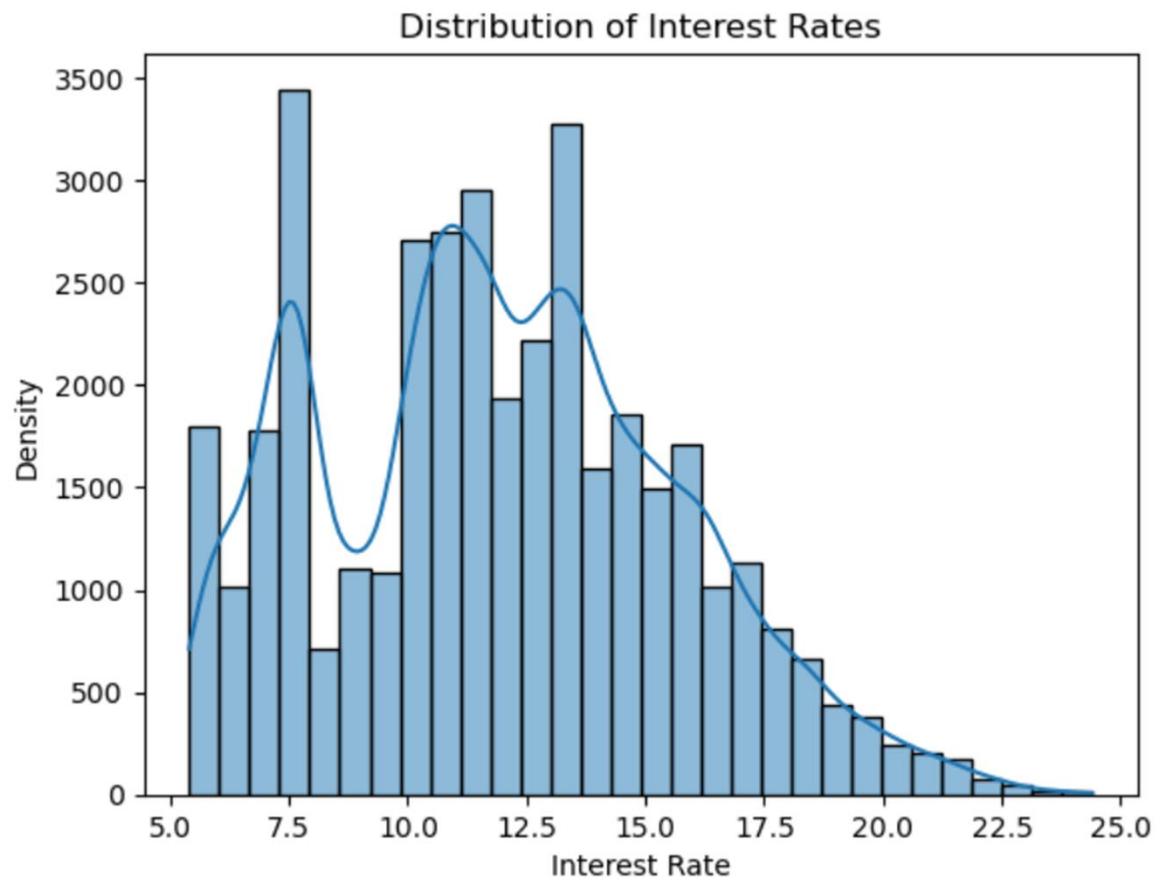


Current loan default rate is 14.16%



# Interest Rate

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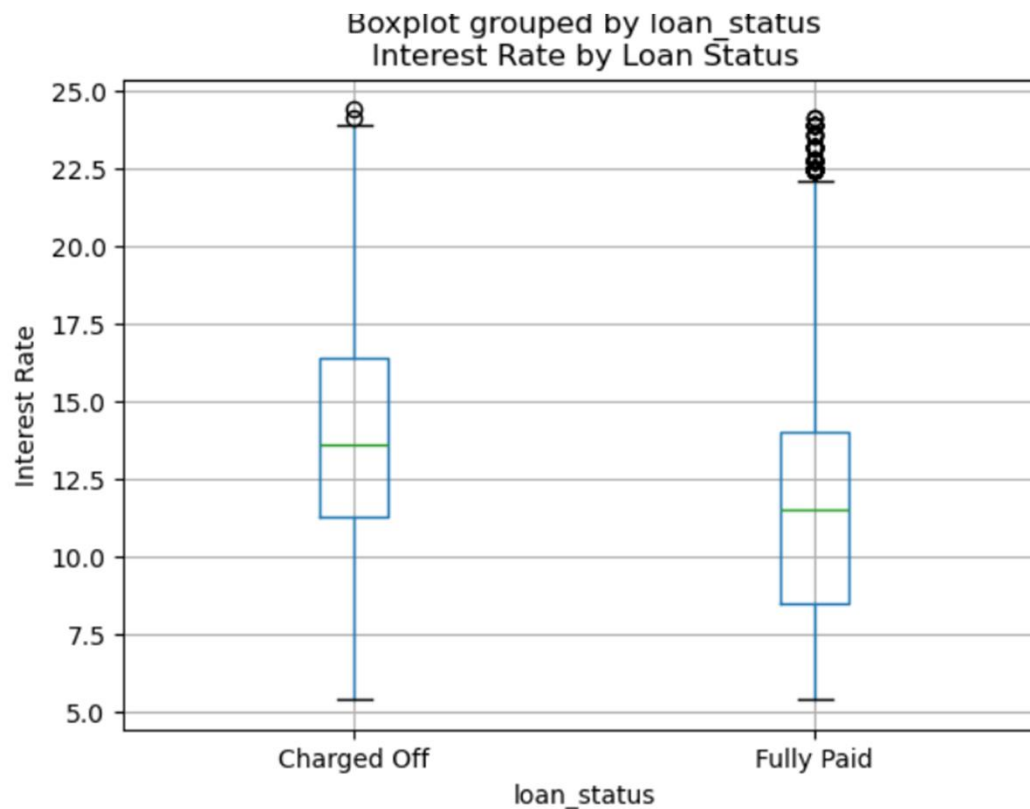


Interest rates in the dataset are moderately spread out, with a standard deviation of 3.69%. The majority of loans have interest rates between 8.9% and 14.4%.

► Average interest rate is 11.8%

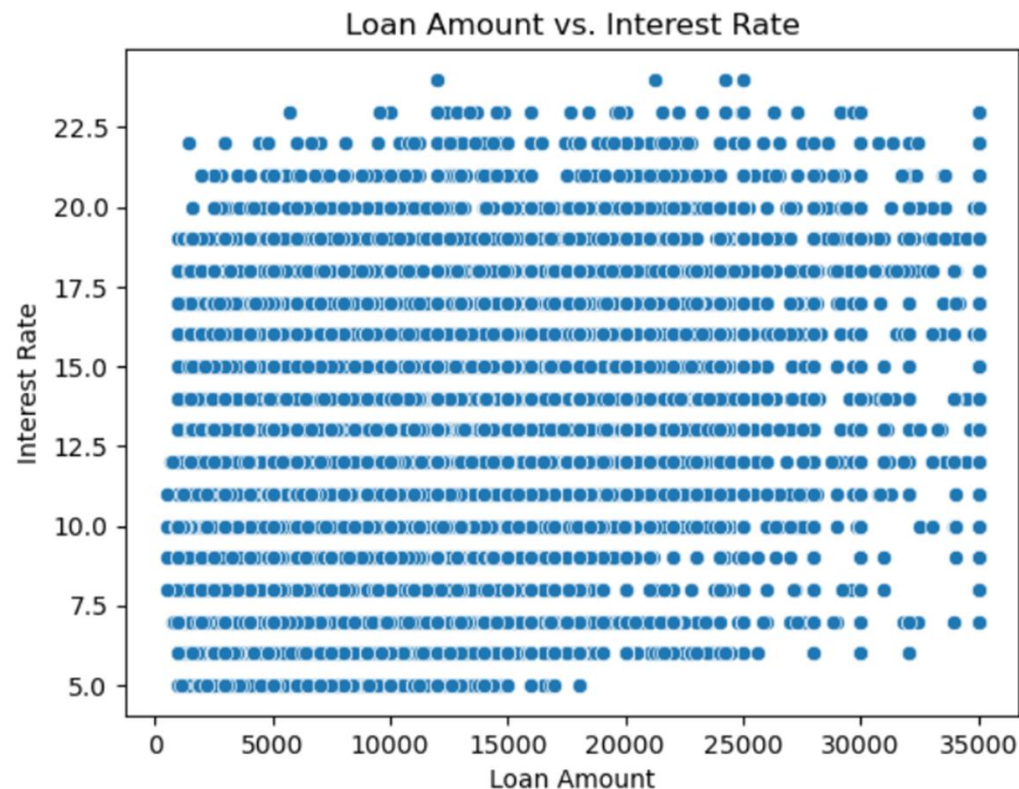
# Interest Rate vs Loan Status

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Loans with interest rates exceeding 13.8% have a higher likelihood of default compared to those with lower rates. The average interest rate for non-default loans is 11.6%.

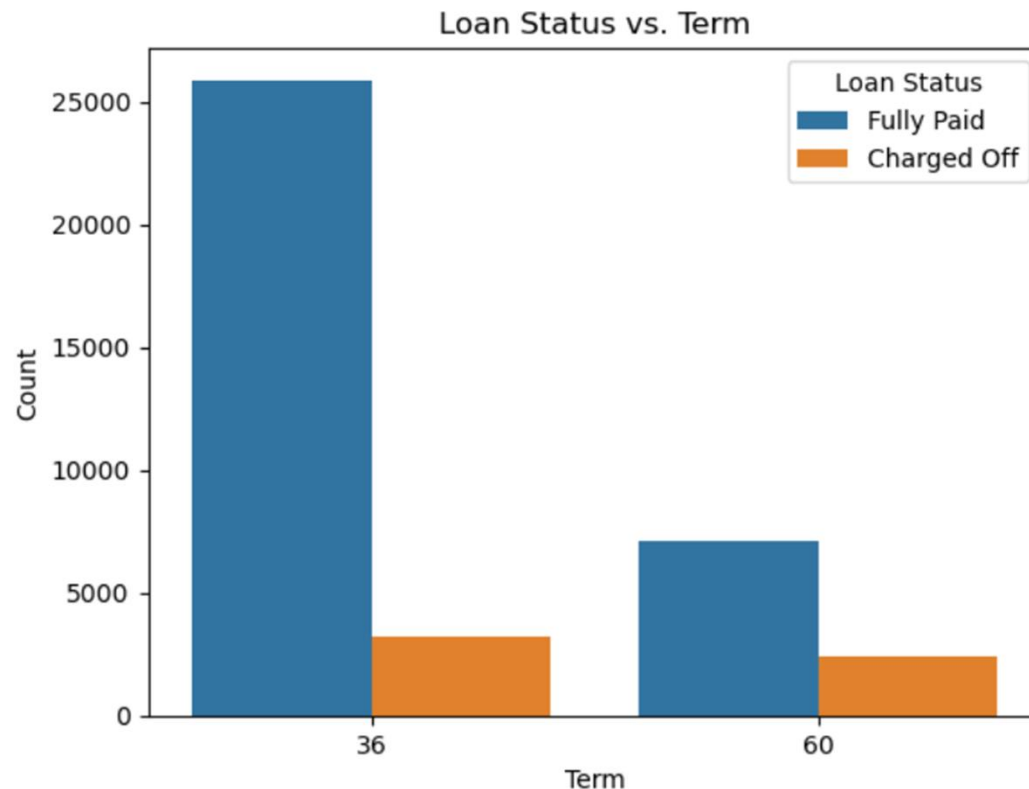
# Loan Amount vs. Interest Rate



Correlation coefficient: 0.2980857005767569

0.298 indicates a weak positive correlation between loan amount and interest rate. This means that there's a slight tendency for larger loan amounts to be associated with higher interest rates, but the relationship is not strong.

# Term vs Loan status



	term	loan_status	count_x	count_y	pct
0	36 months	Charged Off	3227	29096	11.090872
1	36 months	Fully Paid	25869	29096	88.909128
2	60 months	Charged Off	2400	9481	25.313785
3	60 months	Fully Paid	7081	9481	74.686215

## Higher Default Rate for Longer Terms:

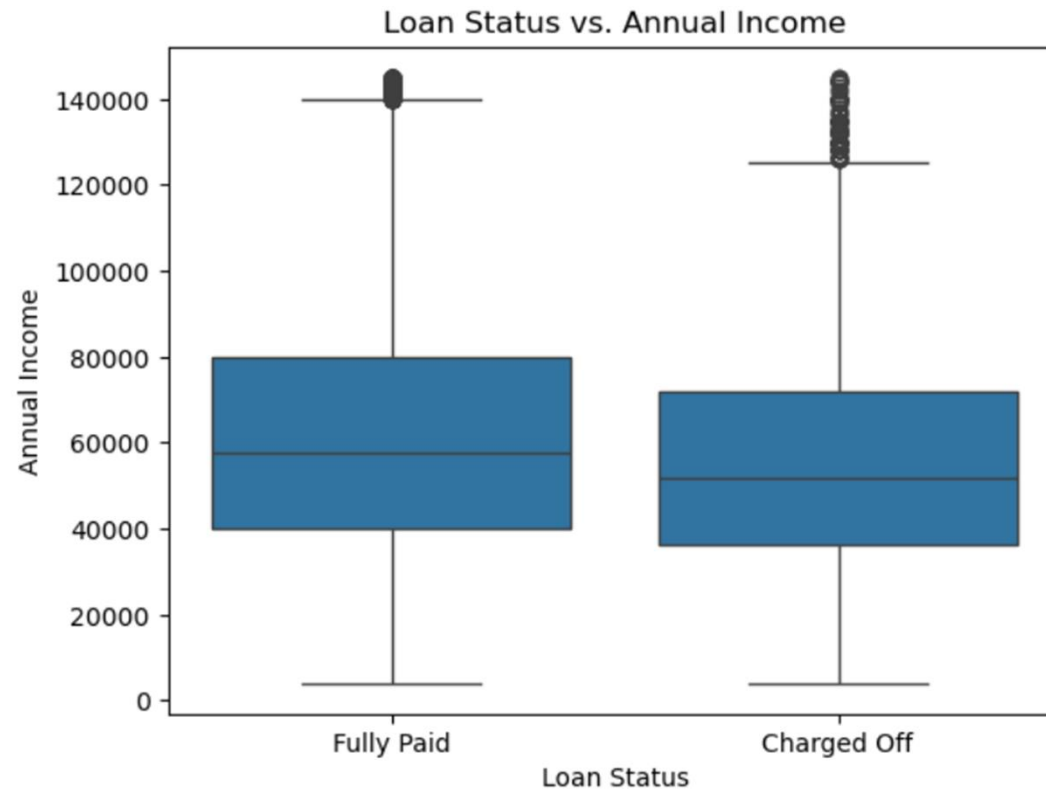
Loans with a 60-month term have a significantly higher default rate (25.31%) compared to those with a 36-month term (11.09%).

► This suggests that longer-term loans are more likely to result in default



# Loan Status vs. Annual Income

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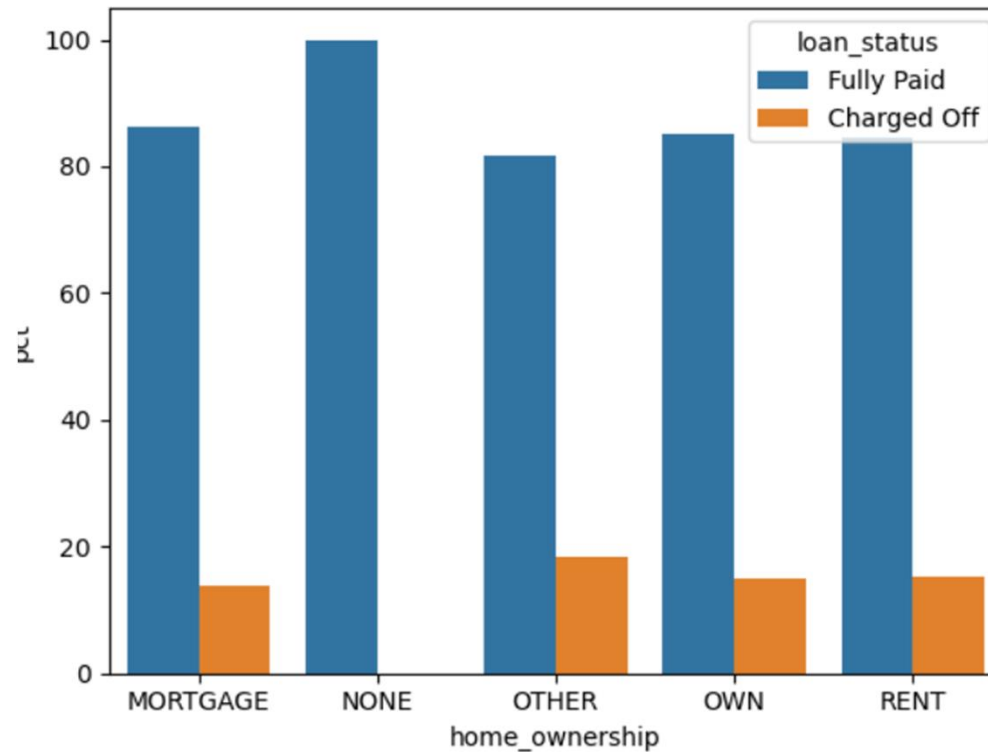


There is a slightly higher risk of default among customers with lower annual incomes compared to those with higher annual incomes.



# Loan Status vs Home Ownership

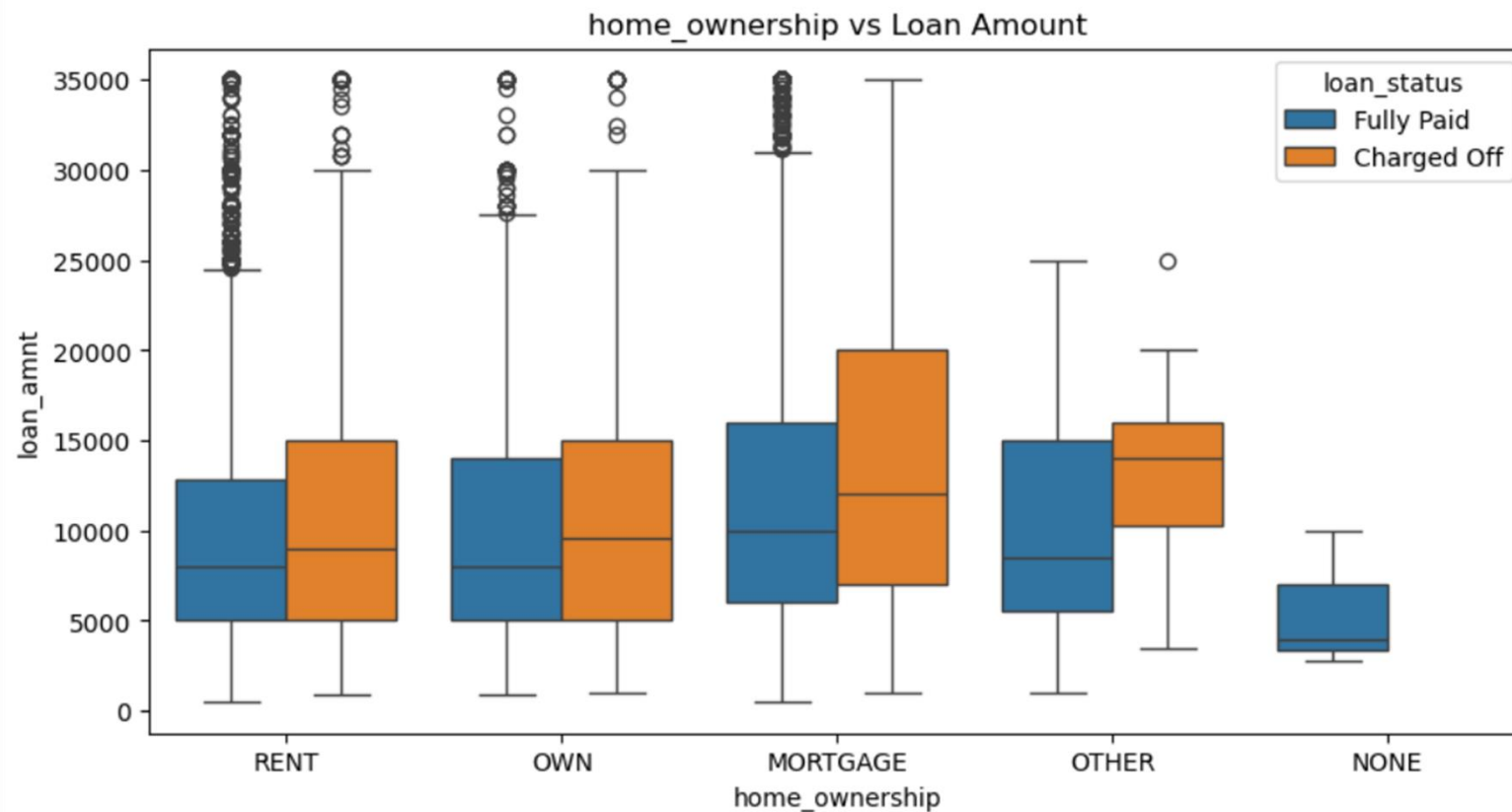
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The default rate is lowest for mortgages, at 13.7%, while the highest default rate is seen in the "Other" home ownership category, reaching 18.4%.

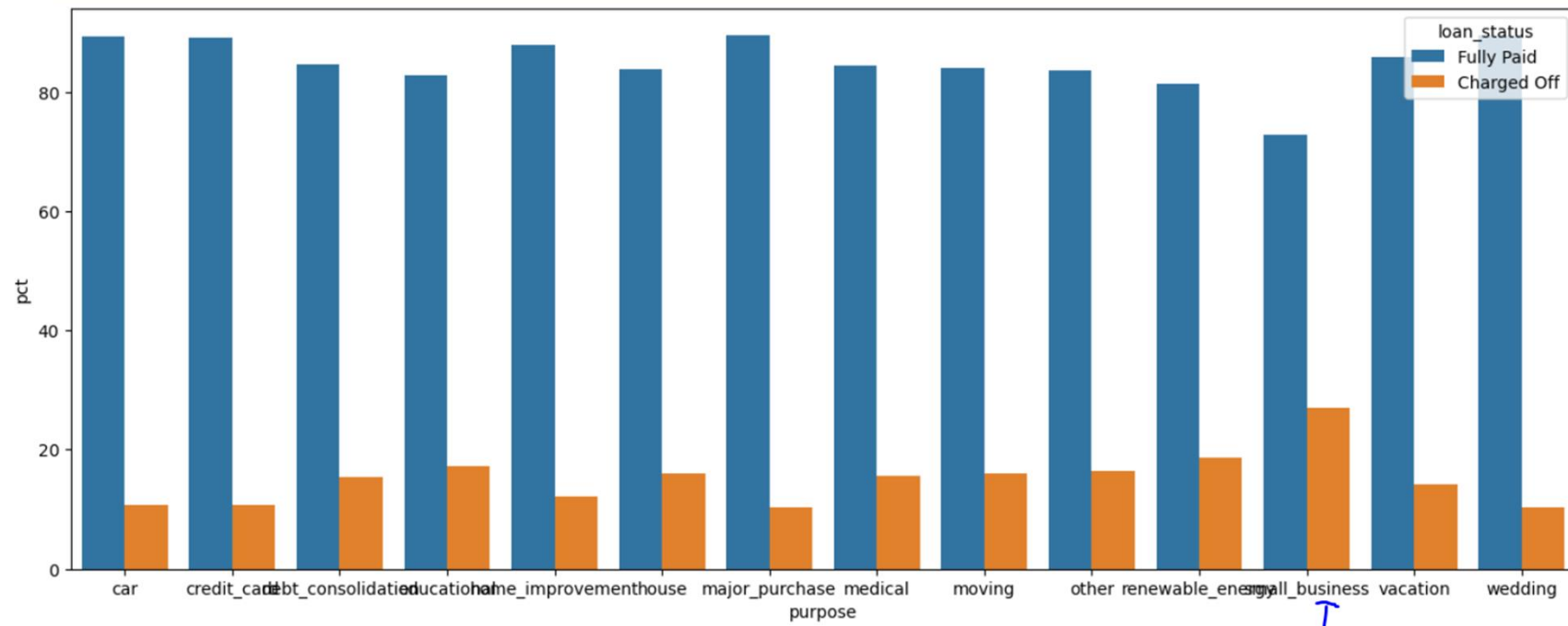


# Home Ownership vs Loan Amount



Customers with a home ownership status of MORTGAGE who borrowed larger amounts are at a higher risk of default.

# Purpose vs Loan Status

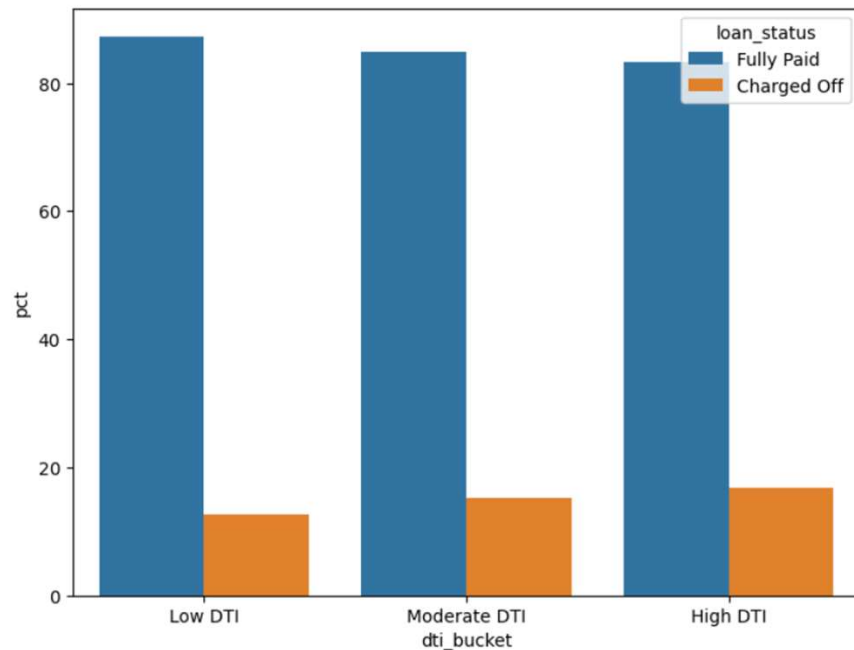


	purpose	loan_status	count_x	count_y	pct
22	small_business	Charged Off	475	1754	27.080958
23	small_business	Fully Paid	1279	1754	72.919042

**High default rates:** Loans for **small business**, **debt consolidation**, and **other** purposes have the highest default rates, ranging from 15% to 27%.

**Low default rates:** Loans for **credit card**, **house**, and **major\_purchase** purposes generally have lower default rates, typically below 15%.

# DTI vs Loan Status



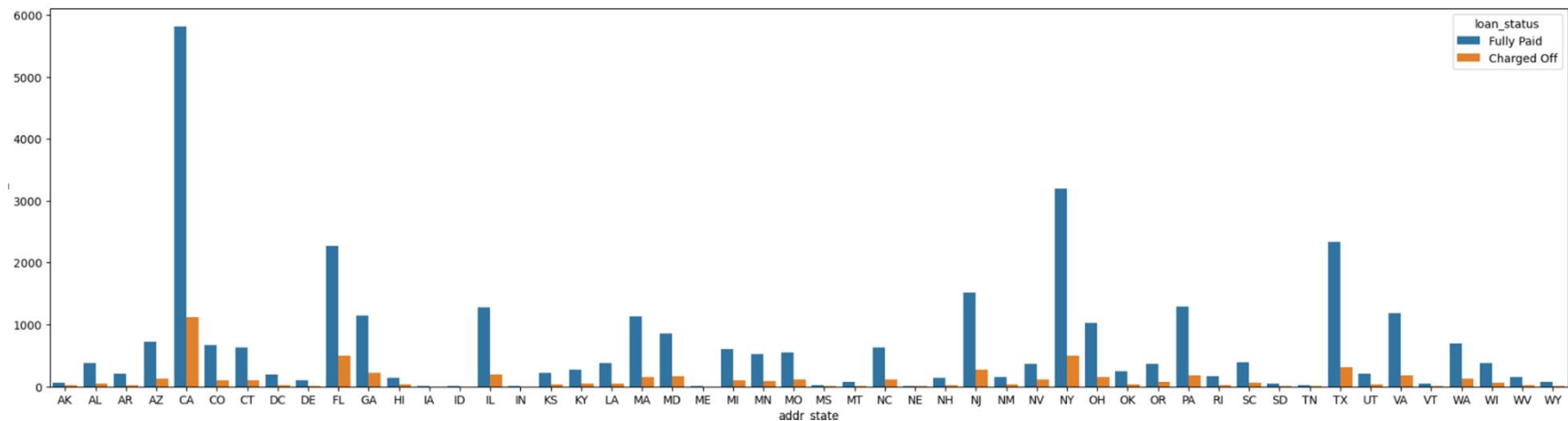
dti_bucket	loan_status	count_x	count_y	pct
Low DTI	Charged Off	1631	12935	12.609200
Low DTI	Fully Paid	11304	12935	87.390800
Moderate DTI	Charged Off	2791	18441	15.134754
Moderate DTI	Fully Paid	15650	18441	84.865246
High DTI	Charged Off	1205	7201	16.733787
High DTI	Fully Paid	5996	7201	83.266213

**Higher DTI is associated with a higher default rate:** Borrowers in the "High DTI" category have a significantly higher default rate (16.73%) compared to those in the "Low DTI" (12.61%) and "Moderate DTI" (15.13%) categories.

**Lower DTI is associated with a lower default rate:** Borrowers in the "Low DTI" category have the lowest default rate, suggesting that they are less likely to default on their loans.

# Borrower's State vs Loan Status

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Customers from CA, NY, TX, and FL are the largest borrowers of loans, but these regions also have the highest volume of defaults.



# Conclusion

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- ▶ Loans for **small business, debt consolidation**, and **other** purposes have the highest default rates, ranging from 15% to 27%.
- ▶ Borrowers in the "High DTI" category have a significantly higher default rate (16.73%) compared to those in the "Low DTI" (12.61%) and "Moderate DTI" (15.13%) categories.
- ▶ Customers from **CA, NY, TX**, and **FL** are the largest borrowers of loans, but these regions also have the highest volume of defaults.
- ▶ A strong positive correlation exists between loan amount and the number of installments, suggesting that larger loans are typically repaid over longer periods.
- ▶ Loans with **interest rates** exceeding **16%** have a significantly higher risk of default compared to loans with lower interest rates.
- ▶ Loans with a **60-month term** have a significantly **higher default** rate (25.31%) compared to those with a 36-month term (11.09%). Prefer shorter tenure loan over longer tenure loan.
- ▶ Individuals with a history of public derogatory records are more likely to file for bankruptcy. To mitigate risk, Lending Club should implement stricter criteria to ensure that borrowers do not have any public derogatory records

