Loan Data Dynamics

Understanding Trends and Predictions

Executive Summary

Analysis of Loan Outcomes

Problem statement: Understanding the factors that predict loan defaults ('charged-off') is essential for optimizing risk management and reducing financial losses in the largest online loan marketplace.

Methodology: We will start by gathering loan data and conducting univariate analysis to understand the distribution and summary statistics of variables such as Loan Status, Home Ownership, Grades, Verification Status, etc. Next, bivariate analysis will explore relationships between these variables and loan default status ('charged-off'), identifying significant correlations and trends. These insights will guide targeted strategies for risk assessment and management based on empirical data patterns.

Tools Used:

Growth Potential & Risk Management: Loan Data Shows Solid Market Fit, Unverified Borrowers & State Variations Need Attention

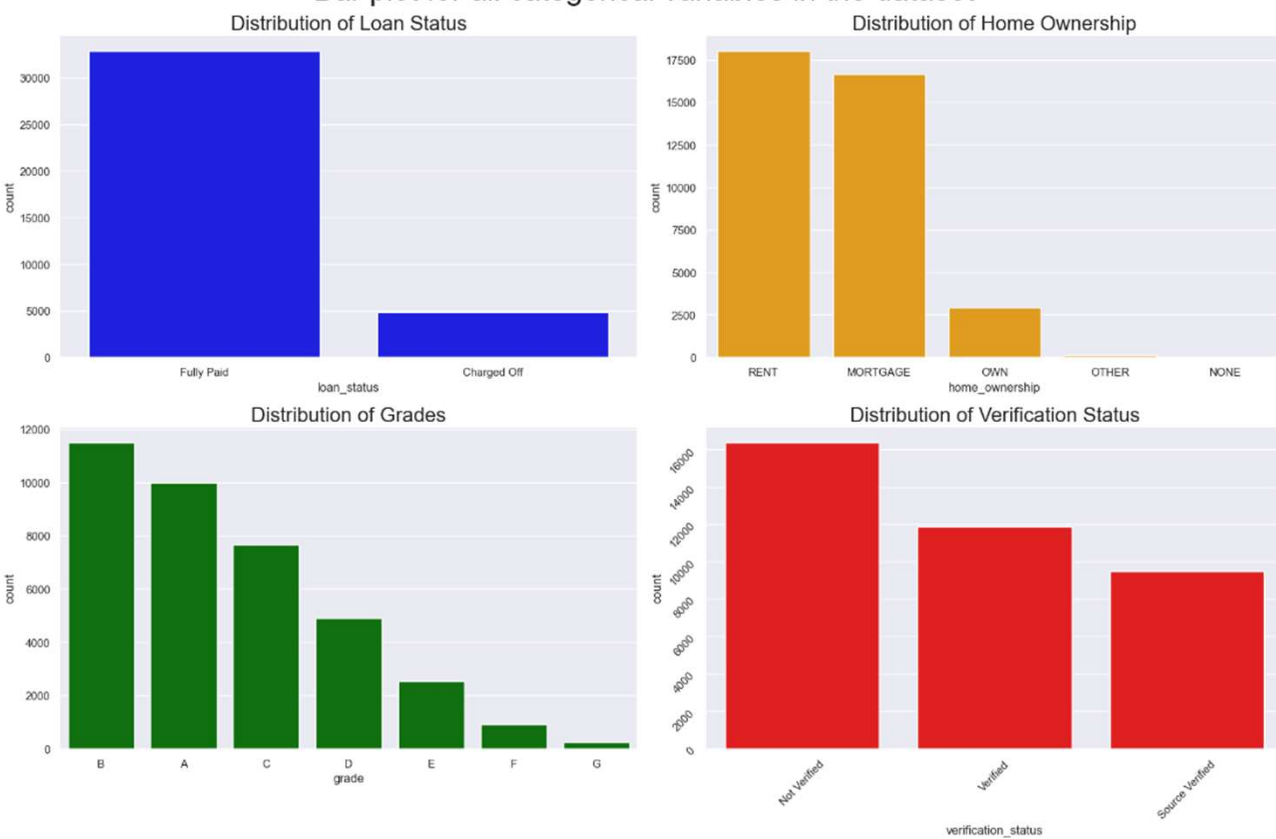
Executive Summary

- **Manageable Risk Profile:** The low default rate (14-15%) and average DTI (13.32) suggest borrowers are managing their debt responsibly.
- **Competitive Rates:** The average interest rate (12%) is attractive, potentially drawing new customers.
- **Target Market:** The data suggests loans cater to borrowers with moderate income (average Rs. 69,000) who likely rent (living situation insight) and have varying creditworthiness (wide range of interest rates).
- **Unverified Borrowers:** The lack of verification for most loan takers highlights a potential risk management gap.
- **Growth Potential:** The dominance of low-risk Grade A & B loans alongside a presence of inexperienced borrowers suggests the bank is open to attracting new customer segments.
- **Loan Purpose:** Debt consolidation is a major loan purpose. Understanding borrower motivations could inform marketing strategies.
- **Balancing Growth & Risk:** Rising non-performing loans alongside revenue growth suggest a need for careful risk management during expansion.
- **State Defaults:** The high default rates in states with low loan volume (NE, NV) warrant further investigation.

Univariate Analysis

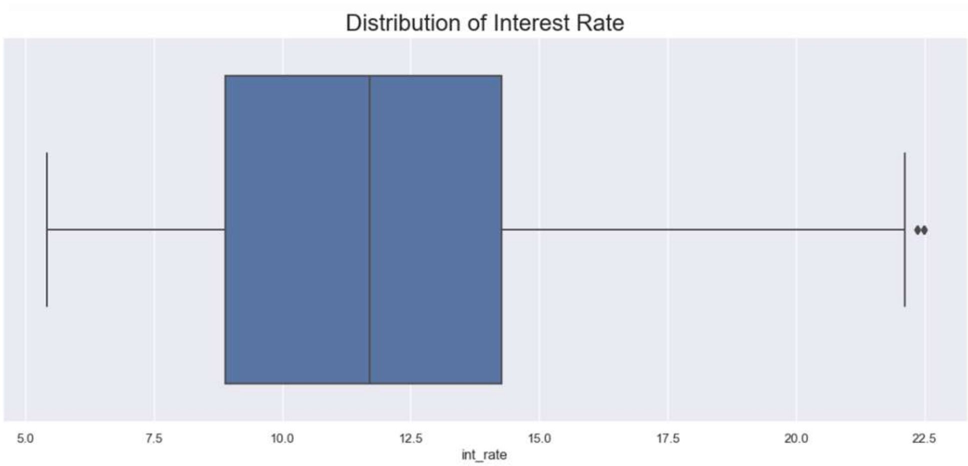
Strong Loan Repayment Rates, Focus on Creditworthy Borrowers, Potential for Improved Risk Management

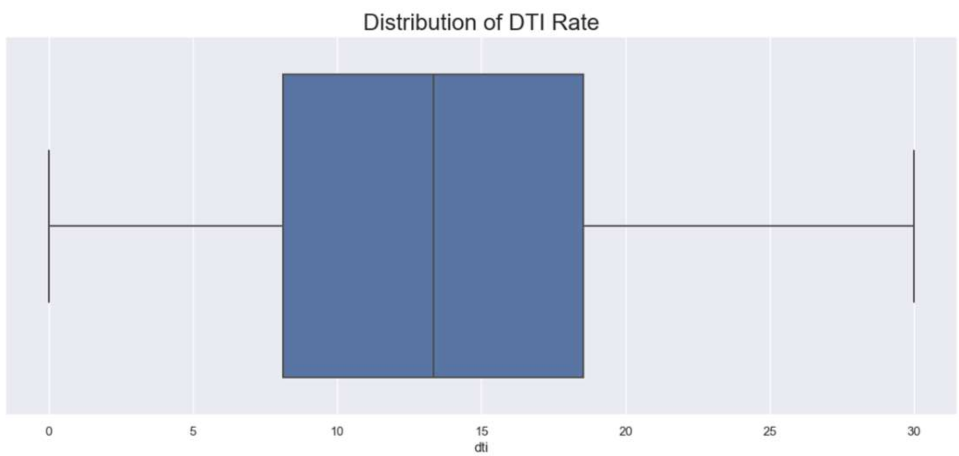
Bar plot for all categorical variables in the dataset



- The data shows a strong repayment record, with a significant majority (around 85-90%) of customers successfully repaying their loans in full.
- A default rate of approximately 1 in 7 (14-15%) indicates a manageable level of risk.
- The data suggests the loans cater to a customer segment that primarily living in a rented house. This could be valuable for targeting marketing efforts.Most of the loan takers were not verified.
- The fact that most loan takers were not verified highlights a potential area for improvement in risk management.
- The dominance of Grade A and B loans indicates the bank prioritizes lending to creditworthy borrowers with a lower risk of default.

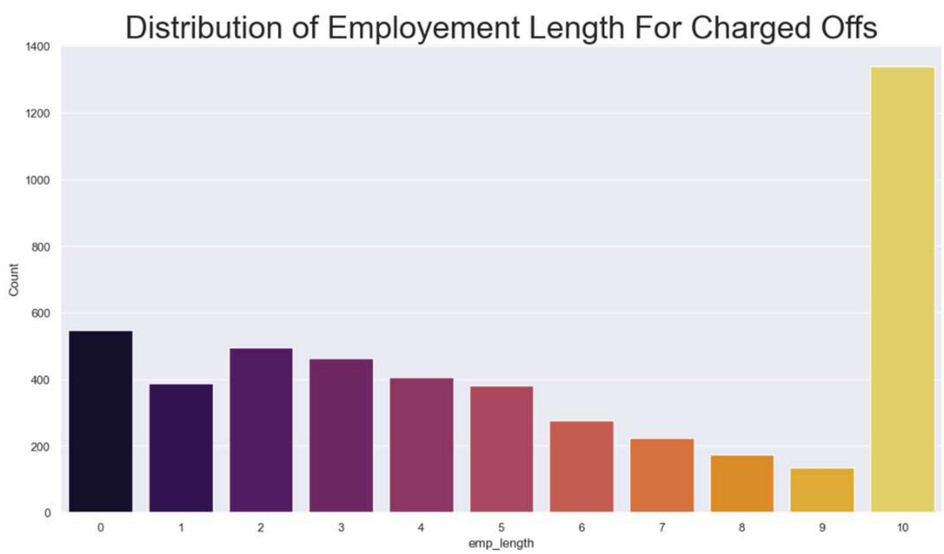
Competitive Rates Meet Flexible Terms: Loans Cater to Borrowers with Manageable Debt

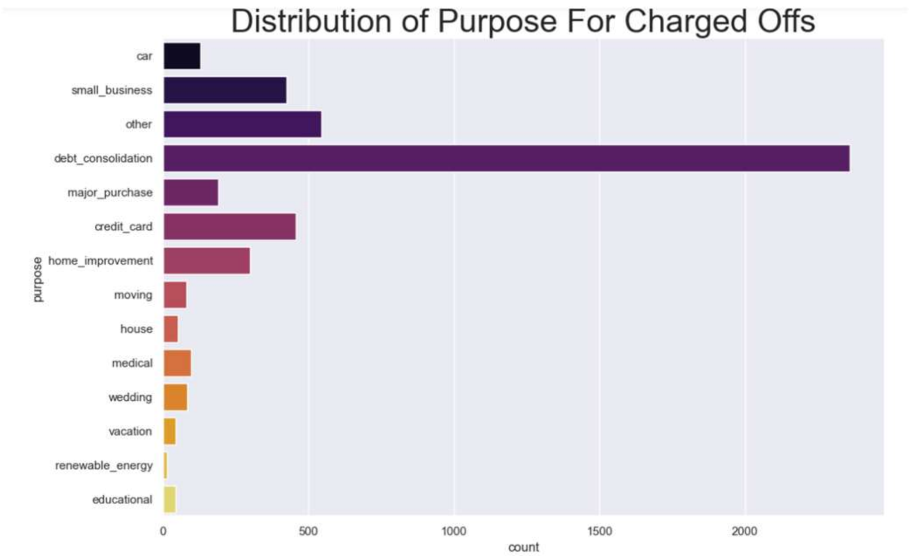




- The average interest rate of 12% suggests the loans are offered at competitive rates in the market. This could be a selling point for attracting new borrowers.
- The significant spread between the minimum (5.42%) and maximum (22.4%) interest rates indicates the bank caters to borrowers with varying creditworthiness.
- Debt Obligations Managed Well: Average DTI of 14%, Ranging from 0% to 30%

Experienced Borrowers Lead, Newcomers Welcomed: Loans Target Debt Consolidation

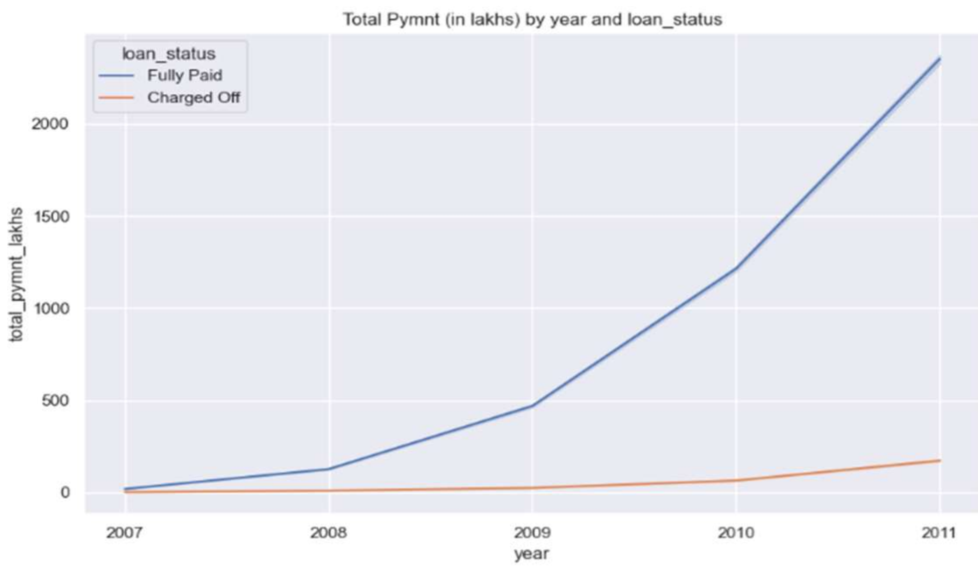


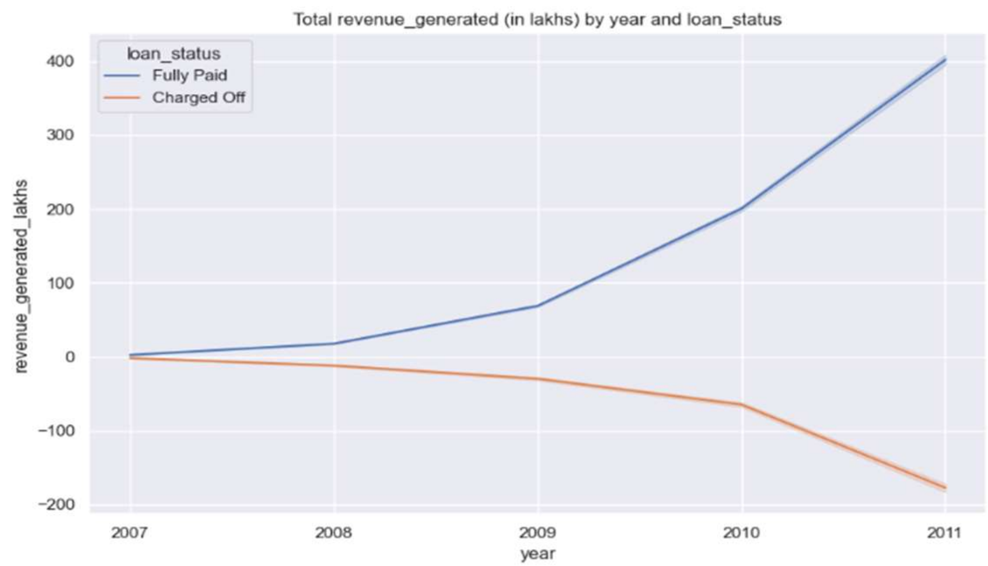


- The data shows a preference for lending to experienced borrowers (10+ years of employment) who likely represent a lower risk profile.
- The presence of a significant number of inexperienced/fresh borrowers suggests the bank is open to attracting a new customer segment. This could be a potential growth area.
- Loans are Utilized for Debt Consolidation by a majority of Borrowers.

Bivariate Analysis

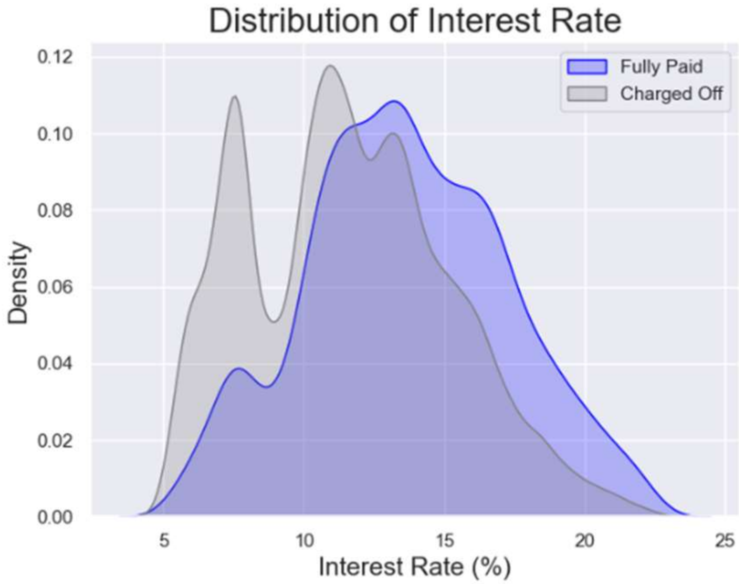
Strong Interest Income, Rising Defaults: Bank Must Address Risk Management

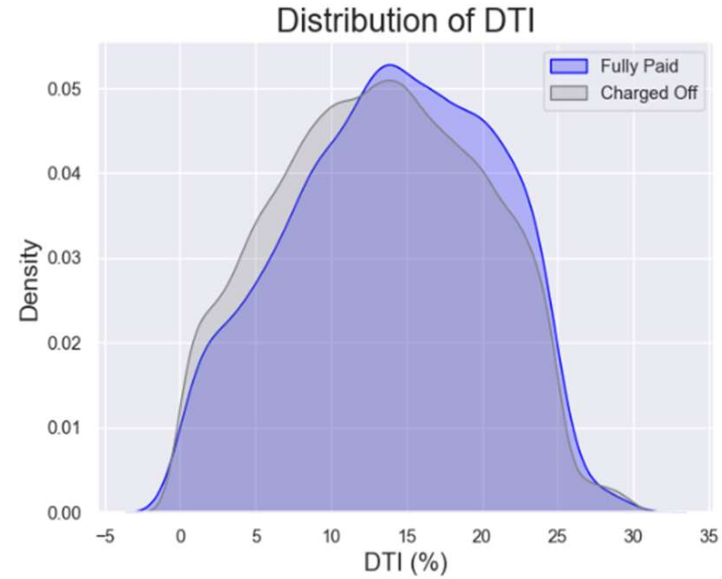




- The bank's revenue is increasing year-on-year, but so are the loan amounts that are not being fully repaid (non-performing loans). This suggests a potential need to balance growth with risk management.
- In 2011, borrowers who fully repaid their loans generated interest revenue of approximately 400 lakhs for the bank. This suggests a healthy level of interest income from performing loans.
- Charged-Off Loans: In 2011, borrowers who were charged off (loans deemed uncollectible) were able to repay approximately 200 lakhs, resulting in a net loss of around 180 lakhs. This translates to a default rate of approximately 47% (180 lakhs loss / 380 lakhs total loan amount).

Votes & Usefulness Drops: Unpacking the Decline in 2024





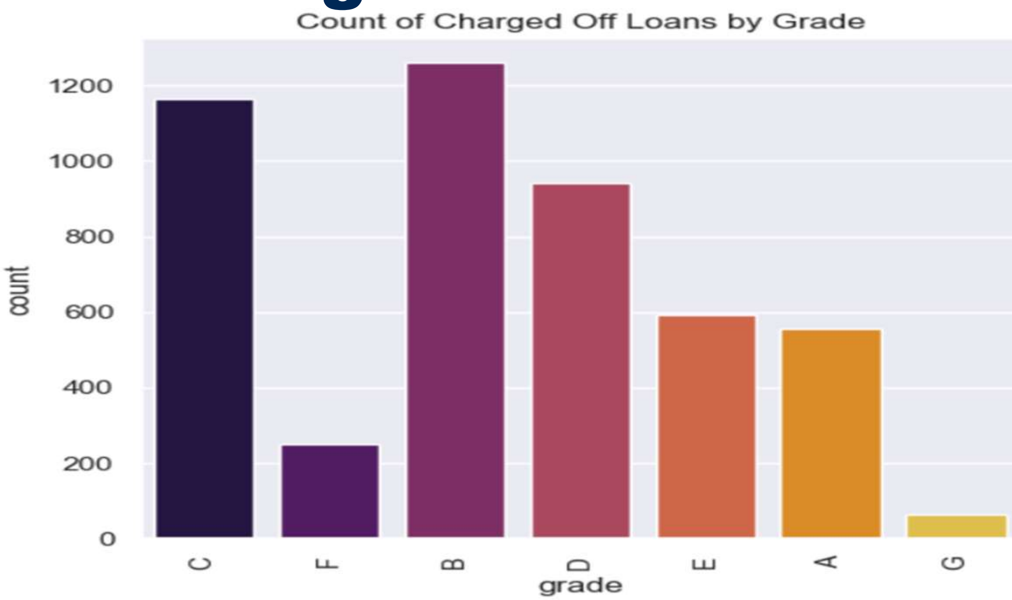
Fully Paid Loans:

- **Interest Rates:** The data shows a clear average interest rate of 11% for fully repaid loans.
- **Debt-to-Income Ratio (DTI):** Fully repaid loans are also associated with an average DTI of 14%. This suggests borrowers with moderate debt obligations were able to successfully repay their loans at this interest rate.

Charged Off Loans:

- **Interest Rates and DTI:** Interestingly, charged-off loans (loans deemed uncollectible) also exhibit an average interest rate and DTI of 14% each. This unexpected similarity warrants further investigation to understand why these borrowers defaulted despite having seemingly similar profiles to those who fully repaid their loans.

Deceptive Defaults: Grade A Shines, Deeper Look Reveals High Rates in Lower Grades



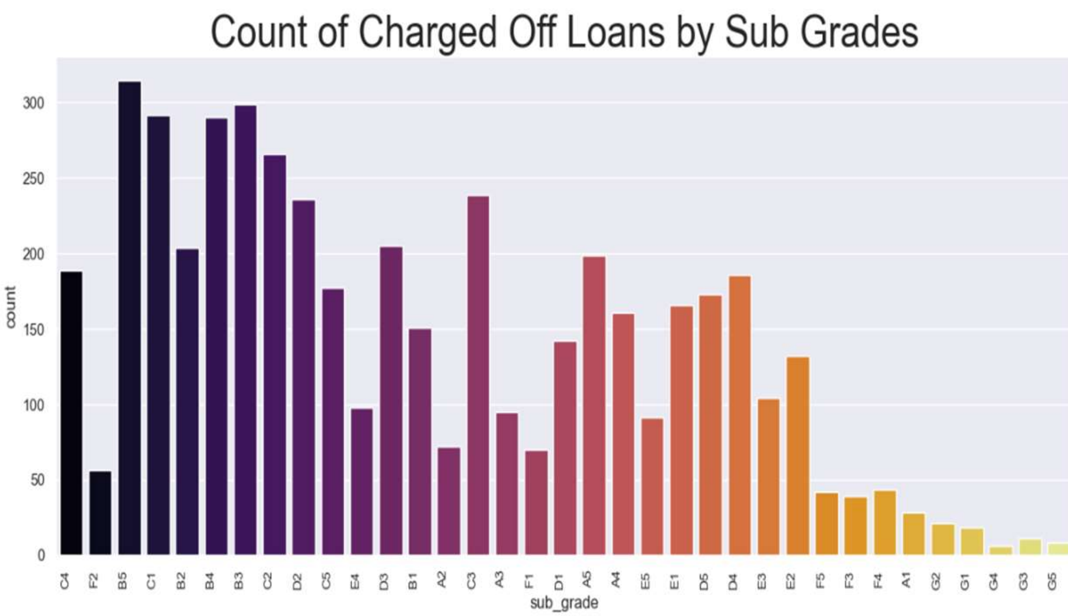
Pivot View

	percentage_Fully Paid	percentage_Charged Off	Total Count
G	71.81	28.19	227.0
F	72.35	27.65	904.0
E	76.66	23.34	2532.0
D	80.76	19.24	4896.0
C	84.78	15.22	7640.0
B	89.06	10.94	11508.0
A	94.45	5.55	9998.0

<u>Charged Off:</u>

- While a visual analysis suggests Grade B has the most loan defaults, followed by Grade C, a deeper dive reveals a different story.
- Grade G borrowers have the highest percentage of defaults at 28% compared to the total loans issued in that grade. Similarly, Grade F has a high default percentage of 27%.
- Grade A loans show the best performance with only 5.5% of borrowers defaulting on a total of approximately 10,000 loans issued.
- Grade B loans have a higher default rate of 10% compared to Grade A, with a total of roughly 11,500 loans issued.

A1 Aces Repayment: Deeper Look Uncovers Hidden Defaults in Subprime Territory.



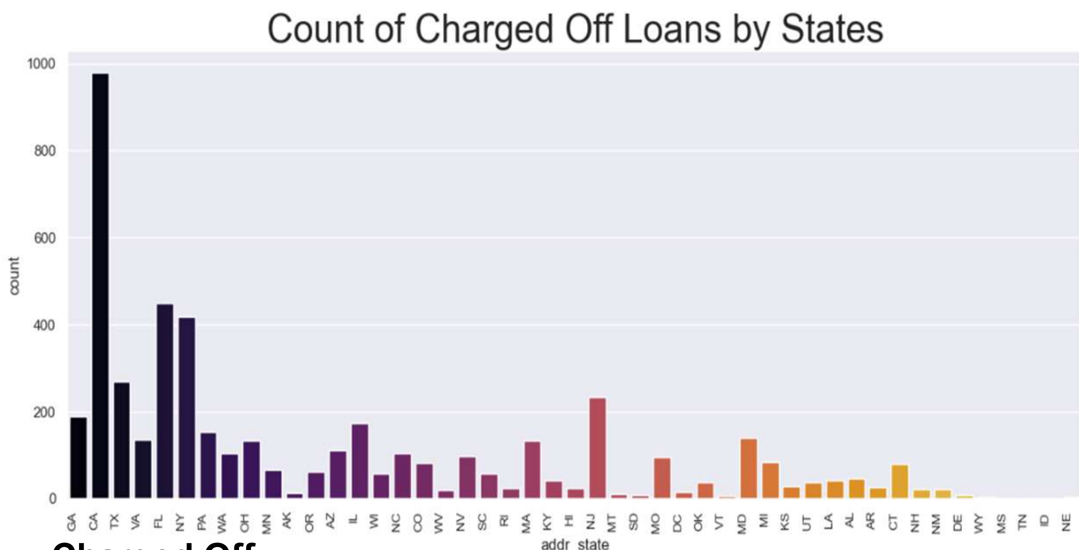
Pivot View

	percentage_Fully Paid	percentage_Charged Off	Total Count
F5	58.42	41.58	101.0
G5	63.64	36.36	22.0
G3	64.52	35.48	31.0
G2	68.66	31.34	67.0
F4	69.06	30.94	139.0
F2	74.43	25.57	219.0
E5	75.07	24.93	365.0
B2	89.68	10.32	1977.0
B1	91.5	8.5	1777.0
A5	92.62	7.38	2697.0
A4	94.36	5.64	2856.0
A3	94.73	5.27	1802.0
A2	95.22	4.78	1506.0
A1	97.54	2.46	1137.0

Charged Off:

- While a visual analysis suggests Sub Grade B5 has the most loan defaults, followed by Sub Grade B3 & B4, a deeper dive reveals a different story.
- Sub Grade F5 borrowers have the highest percentage of defaults at 41.5% compared to the total loans issued in that sub grade. Similarly, Sub Grade G5 & G3 has a high default percentage of 36% & 35%.
- Sub Grade A1 loans show the best performance with only 2.5% of borrowers defaulting on a total of 1137 loans issued.
- Sub Grade A2, A3, A4 & A5 loans have a higher default rate of 4.78%, 5.27%, 5.64% & 7.38% compared to Sub Grade A1, with a total of roughly 1500, 1800, 2850 & 2697 loans issued. But they still outperform other Sub Grades

Deceptive Defaults: CA Leads Initially, Deep Dive Reveals High Rates in NE, NV (60%, 20.65%)



Pivot View

	percentage_Fully Paid	percentage_Charged Off	Total Count
NE	40.0	60.0	5.0
NV	79.35	20.65	465.0
ID	83.33	16.67	6.0
FL	83.49	16.51	2725.0
AK	83.78	16.22	74.0
MO	85.36	14.64	649.0
OR	85.45	14.55	426.0
UT	85.48	14.52	248.0
DE	91.82	8.18	110.0
DC	93.27	6.73	208.0
TN	93.75	6.25	16.0
WY	96.15	3.85	78.0
ME	100.0	0.0	3.0
IN	100.0	0.0	9.0
IA	100.0	0.0	5.0

Charged Off:

- While a visual analysis suggests State CA has the most loan defaults, followed by FL & NY, a deeper dive reveals a different story.
- State NE borrowers have the highest percentage of defaults at 60% compared to the total loans issued in all the states but the number of total loan issued were only 5. Similarly, state NV has a high default percentage of 20.65% with a total of 465 loans issued.
- States IA, IN & ME haven't seen a single defaulting borrower over the period of 5 years on a total of 5, 9 & 3 loans issued.
- States WY, TN & DC loans have a higher default rate of 3.85%,6.25% & 6.73% compared to above States, with a total of roughly 78, 16 & 208 loans issued. But they still outperform other States.

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