# Lending Club Case Study

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# Observation

Data analysis and clean up

- Loan data of 39717 members of lending club analysed

- After removing outliers in the annual income group (Outliers are values > 1,20,000 annual income based on IQR of 40k and Q3 being 80k), total records remains at 35k

- Total columns without any value is 67, removed for analysis

Common observation

- Majority take loan during months __

- Majority take loan for *debt consolidation & 10+ years employment length*

- Majority take loan for a term of *30 months*

- Loan default% has high correlation with interest rates and loan amount

- Loan default % also increases from Loan Grade A to G

- Loan applications and default % increases towards end of the year (maybe due to offers on various purchases)

# Highest default %

- Highest default % is among applicants with 10+ years employment

- 60 months term applicants have the worst default %

- Maximum Loan applications are for Debt consolidation

- Small Business & renewable energy related loans have the highest default %

| | member_id | | | default% |
|---|---|---|---|---|
| loan_status | Charged Off | Current | Fully Paid | |
| emp_length | | | | |
| 1 year | 435 | 66 | 2522 | 0.143897 |
| 10+ years | 1228 | 333 | 6262 | 0.156973 |
| 2 years | 536 | 86 | 3458 | 0.131373 |
| 3 years | 526 | 72 | 3176 | 0.139375 |
| 4 years | 433 | 90 | 2678 | 0.135270 |
| 5 years | 427 | 78 | 2530 | 0.140692 |
| 6 years | 288 | 57 | 1720 | 0.139467 |
| 7 years | 245 | 57 | 1355 | 0.147858 |
| 8 years | 185 | 40 | 1109 | 0.138681 |
| 9 years | 145 | 28 | 964 | 0.127529 |
| < 1 year | 606 | 67 | 3589 | 0.142187 |

| | member_id | | | default% |
|---|---|---|---|---|
| loan_status | Charged Off | Current | Fully Paid | |
| term | | | | |
| 36 months | 2891.0 | 0.0 | 23173.0 | 0.110919 |
| 60 months | 2163.0 | 974.0 | 6190.0 | 0.231907 |

| | member_id | | | default% |
|---|---|---|---|---|
| loan_status | Charged Off | Current | Fully Paid | |
| purpose | | | | |
| car | 152.0 | 49.0 | 1210.0 | 0.107725 |
| credit_card | 478.0 | 91.0 | 4005.0 | 0.104504 |
| debt_consolidation | 2524.0 | 507.0 | 13863.0 | 0.149402 |
| educational | 50.0 | 0.0 | 252.0 | 0.165563 |
| home_improvement | 290.0 | 71.0 | 2019.0 | 0.121849 |
| house | 52.0 | 12.0 | 259.0 | 0.160991 |
| major_purchase | 200.0 | 33.0 | 1712.0 | 0.102828 |
| medical | 95.0 | 6.0 | 506.0 | 0.156507 |
| moving | 81.0 | 7.0 | 422.0 | 0.158824 |
| other | 554.0 | 106.0 | 2918.0 | 0.154835 |
| renewable_energy | 17.0 | 1.0 | 67.0 | 0.200000 |
| small_business | 427.0 | 69.0 | 1087.0 | 0.269741 |
| vacation | 48.0 | 3.0 | 283.0 | 0.143713 |
| wedding | 86.0 | 19.0 | 760.0 | 0.099422 |

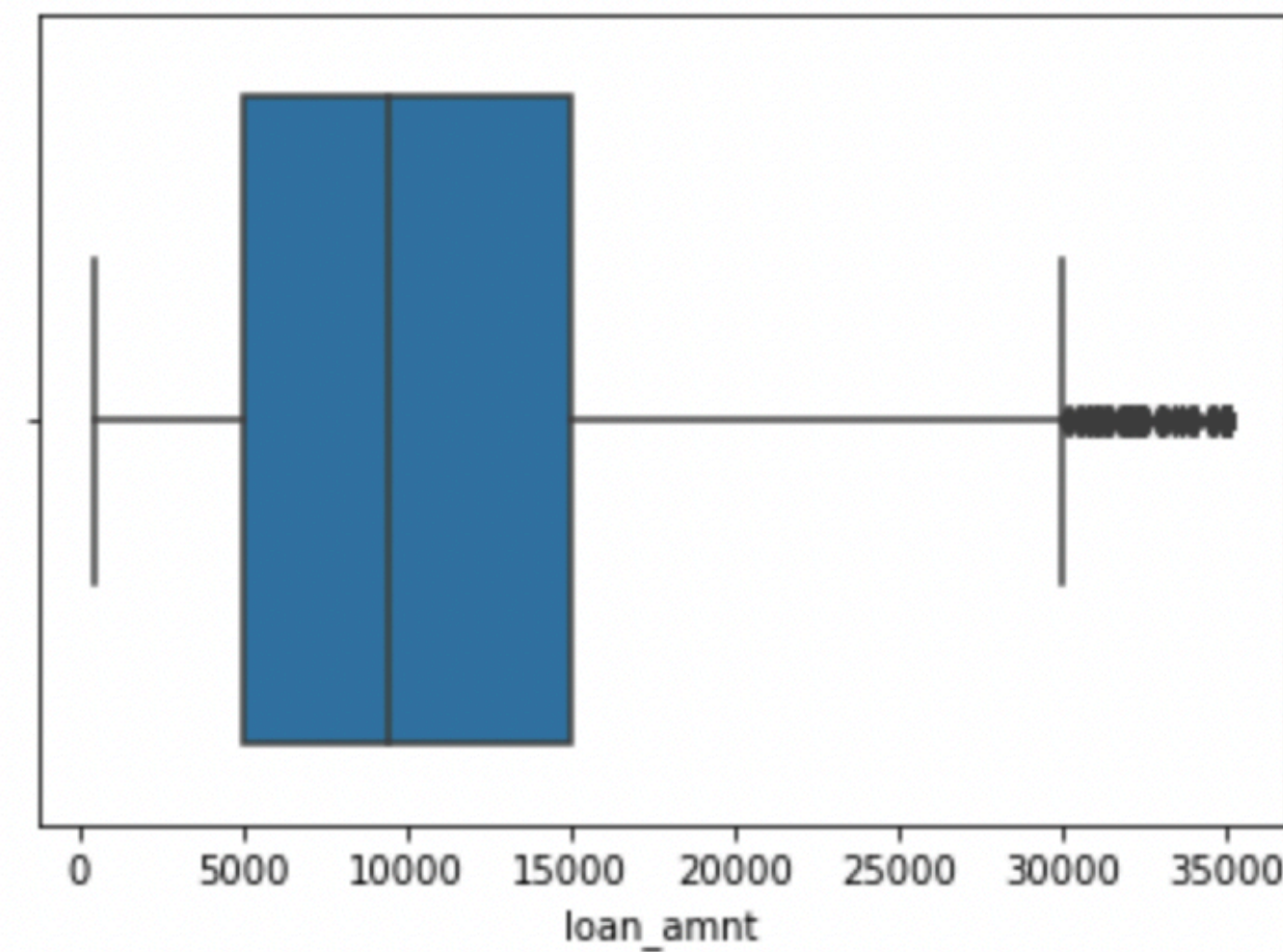- Majority take loan for a term of 36 months
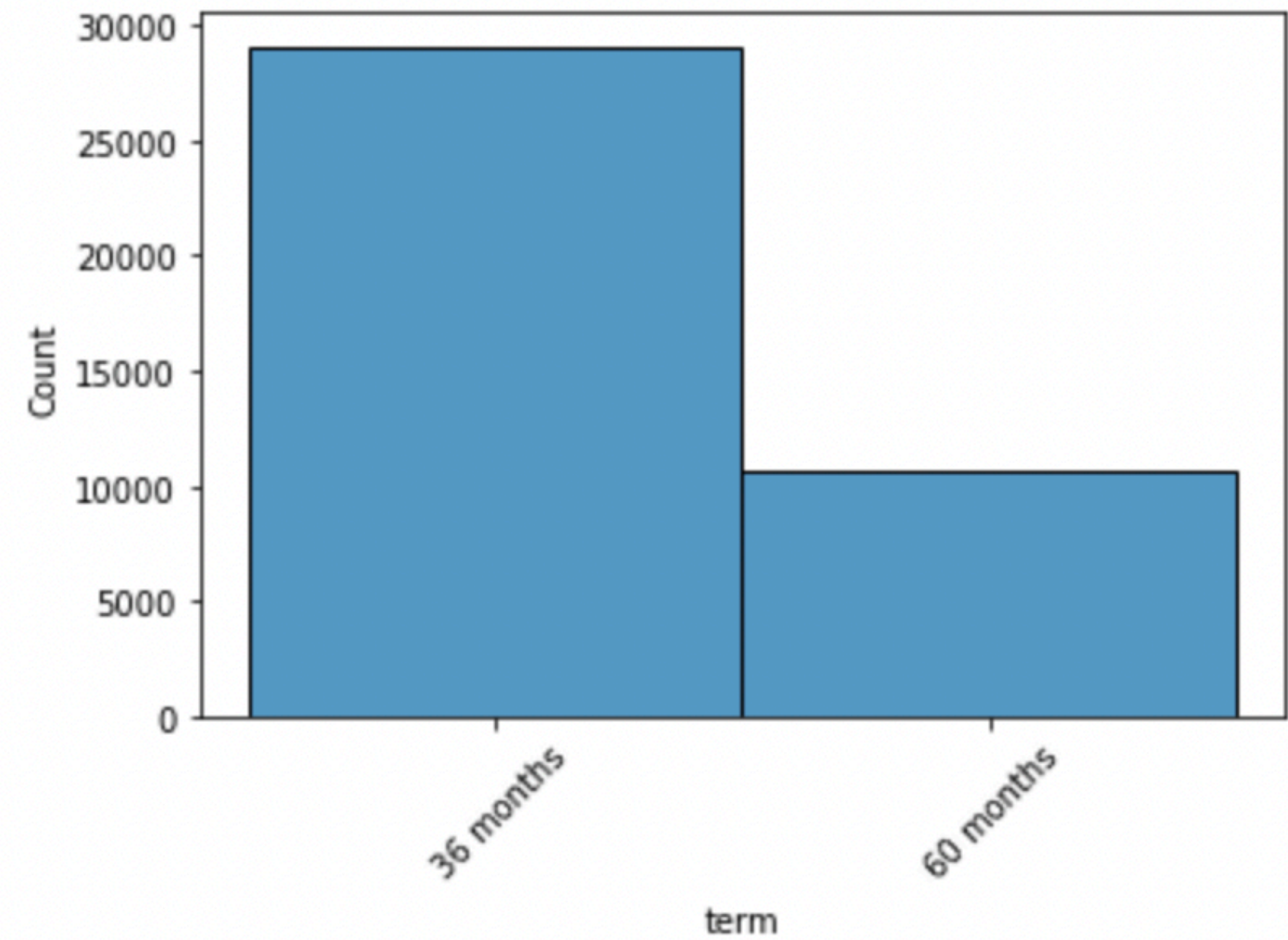
- Maximum applicants for the loans are with employment length over 10 years
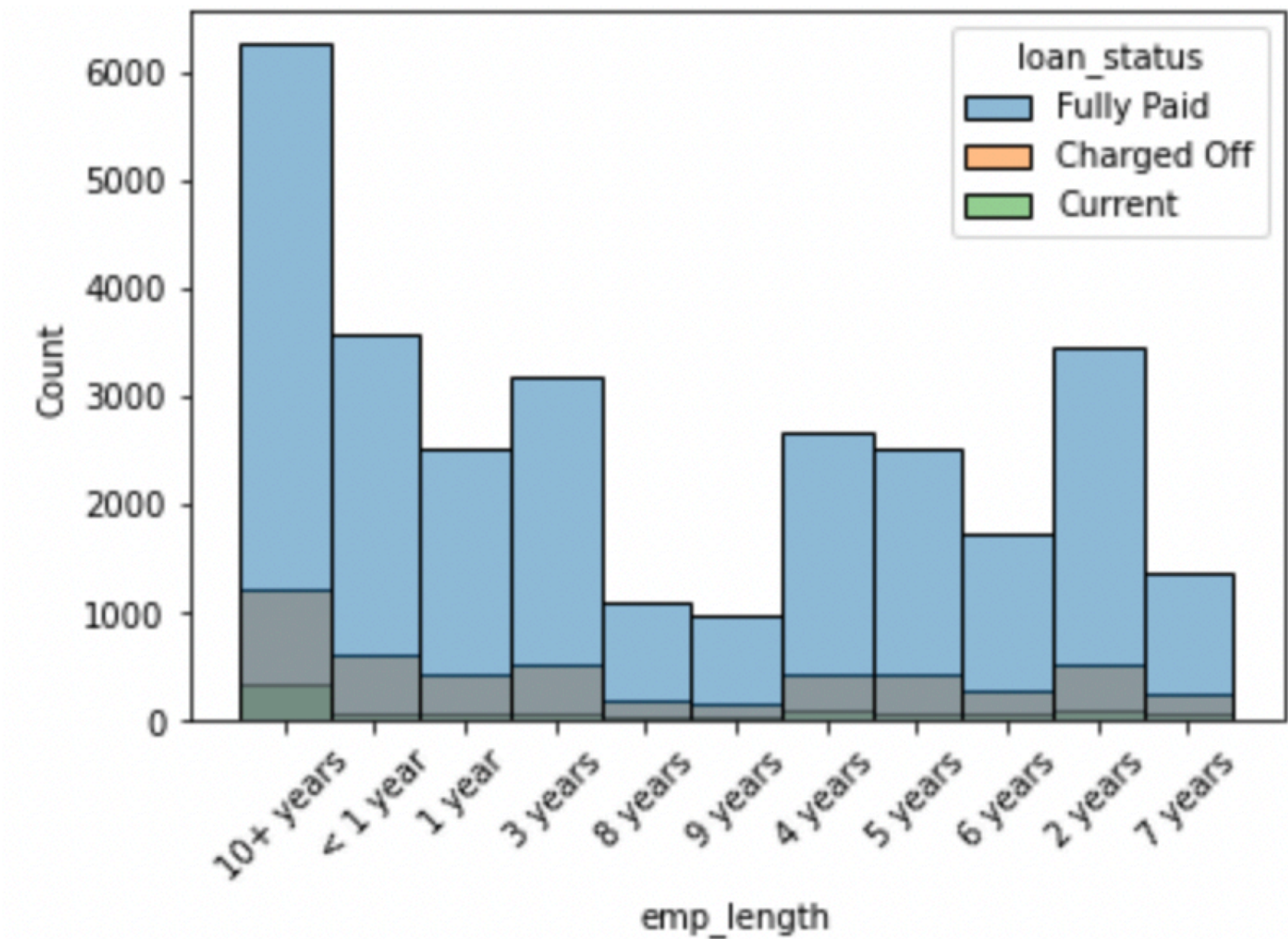
- Majority of applicants who take loan are in the 40k to 80 annual income bucket
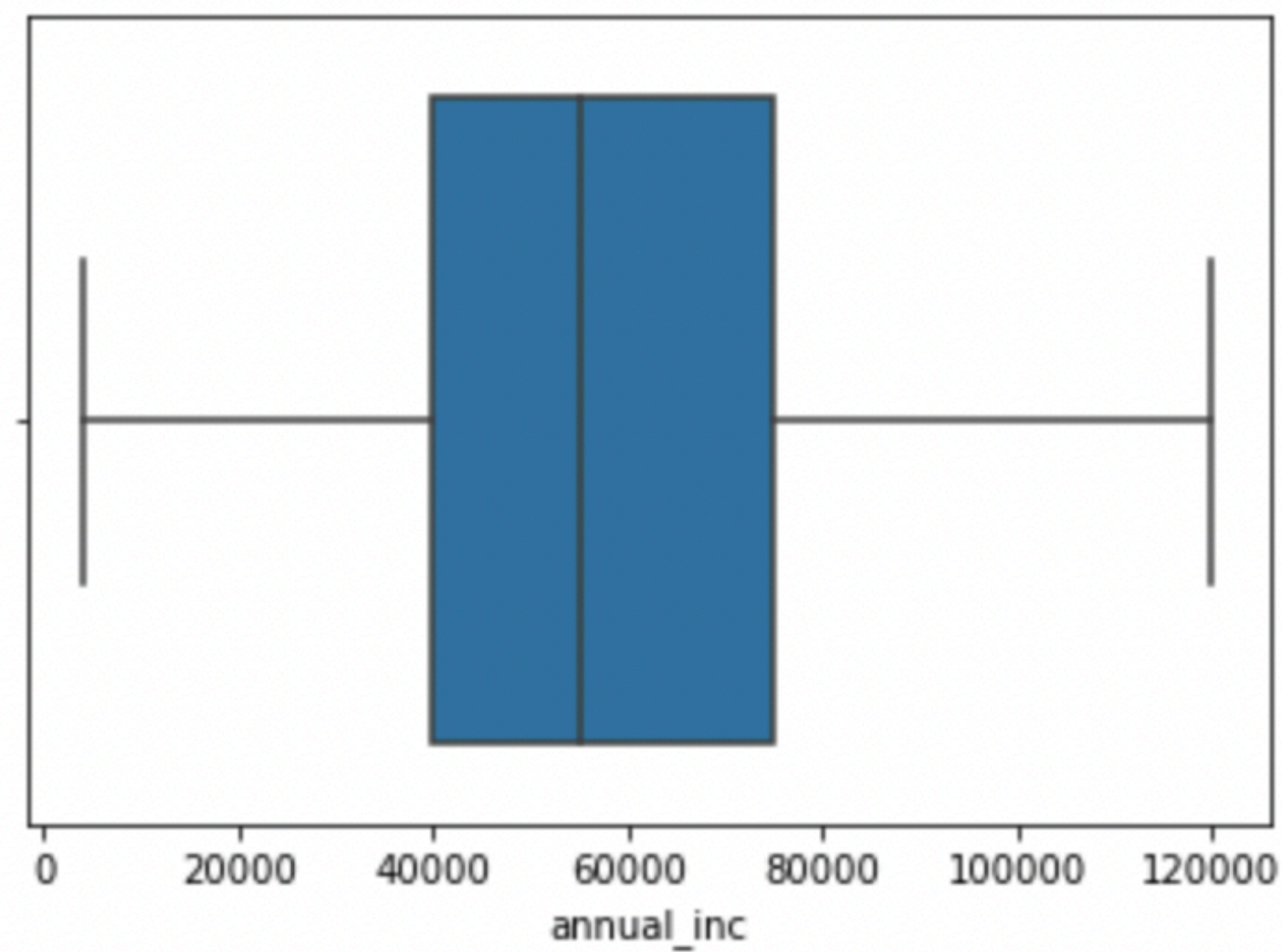


- Majority of the applicants take loan for amount between 5k to 15k

# Trends in default %

- Loan Default chances decreases with increase in income. >75k per annum

- 30 months term bucket has the best payment %

- Loans issued from Jan - Apr have higher chances of repayment. Possible hypothesis - this could be due to closure of financial year.

- Avoid any application with public derogatory records

- Understand why the default% improves as no.of open credit lines increases from 2

# Data Spread

-Spread of loan funded amount among applicants with 10+
years of employment length shown by loan purpose.
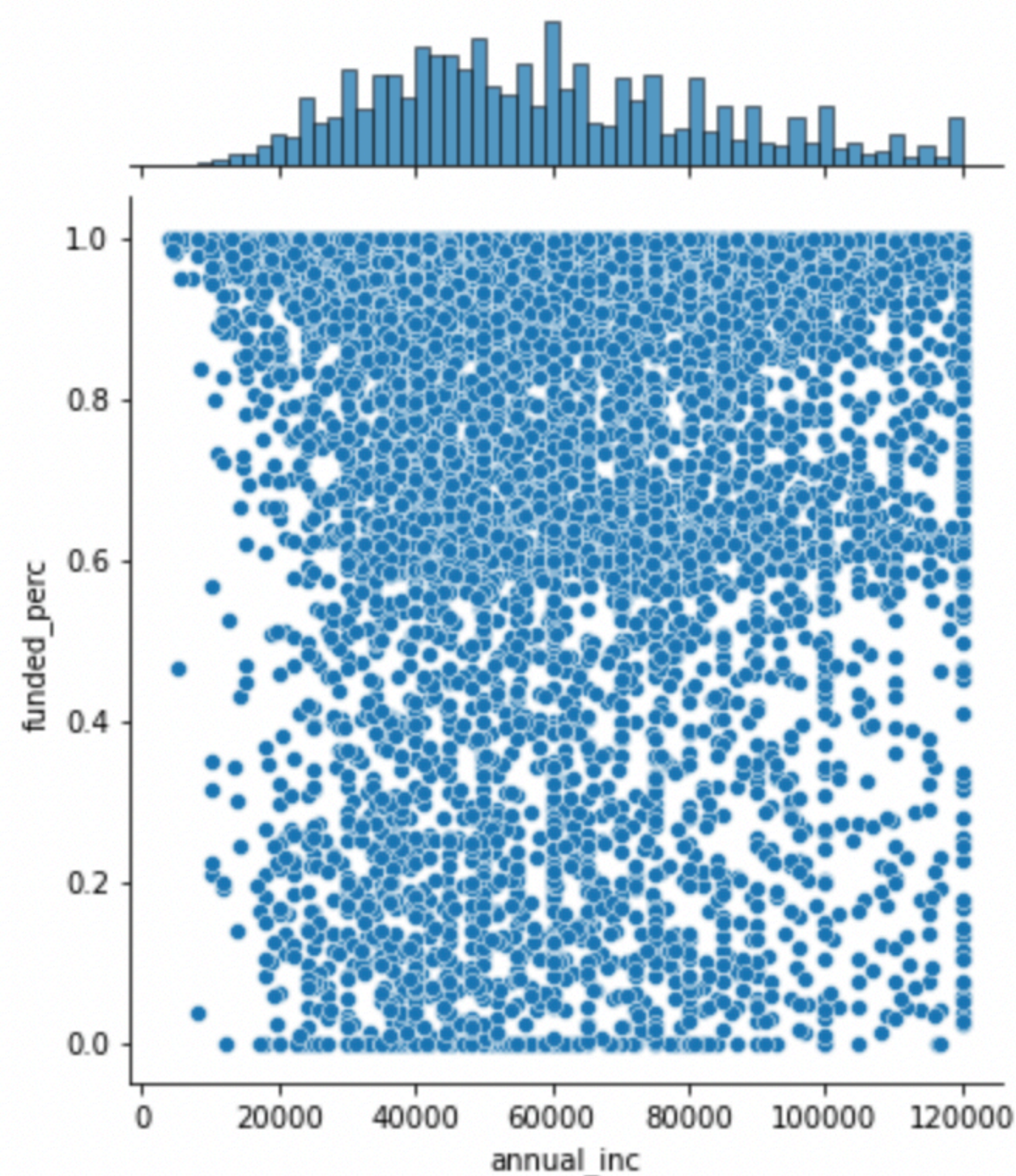-Small business which has the highest default % as previously
discussed has wider spread
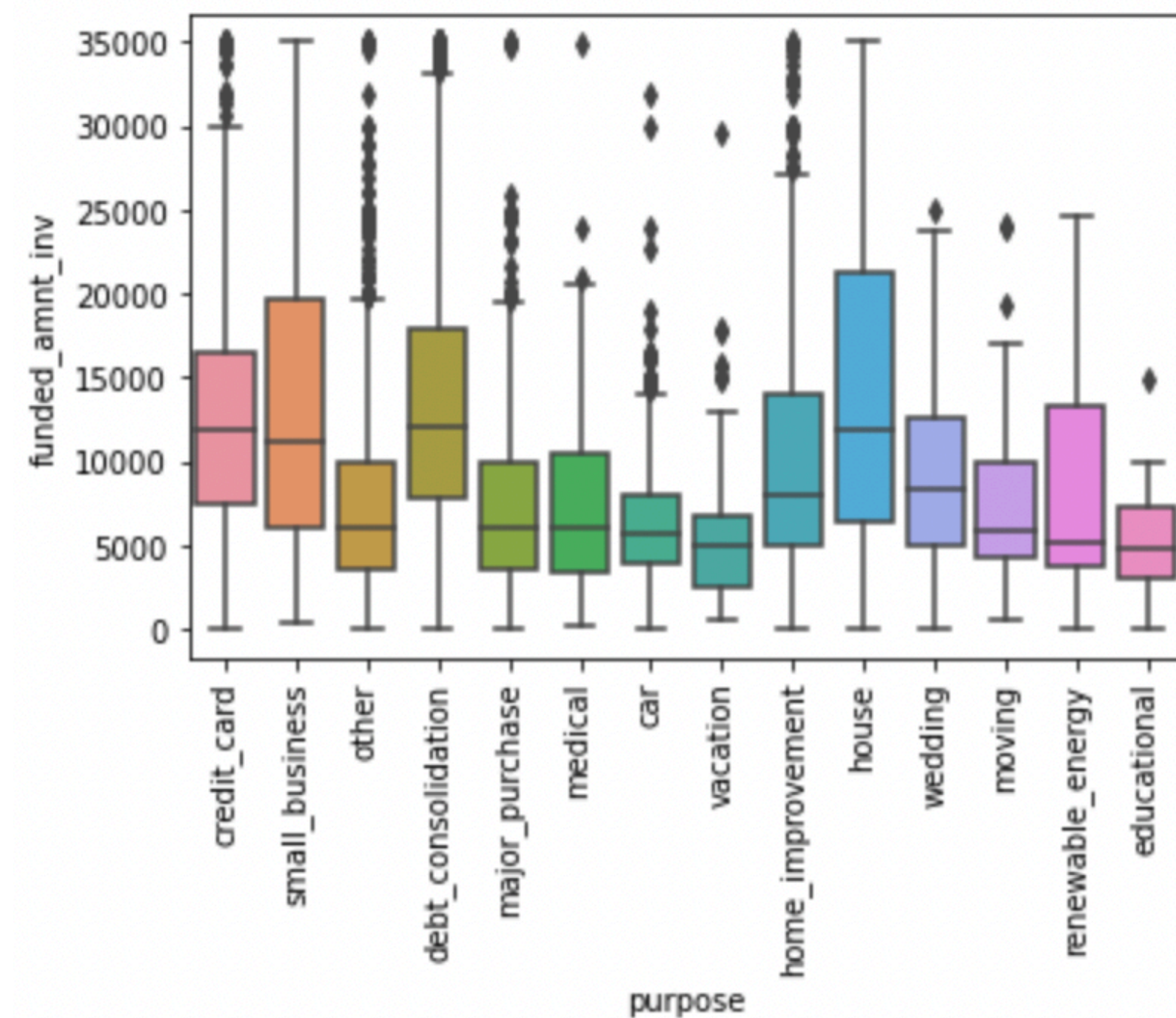
There is no significant difference in the spread of annual
income between the 2 terms offered and also by loan status
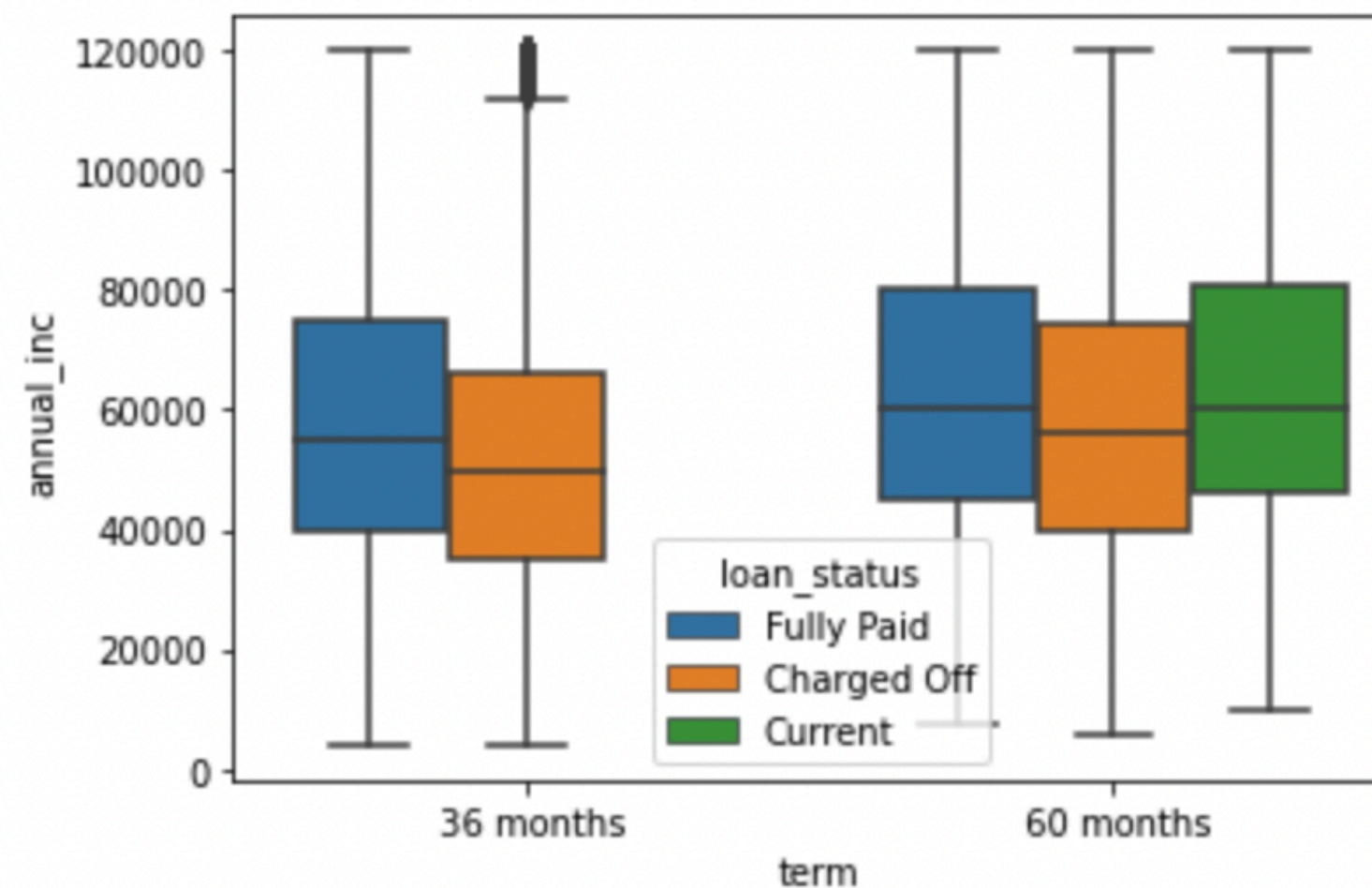
# Annual Income and default %

- No correlation between loan amount and annual income and amount funded by investors % as shown in the joint plot



- Loans have been funded across annual income

- Our analysis shows that the default % has strong -ve correlation with income.

  - Default % decreases with increasing income

  - It is the highest for applicants with annual income < 25k

# Recommedations

- For *small business & renewable energy* business **offer loan only for 36 months**. Default % drops from 35% to 22% from 60 to 36 months.

- Loan amts > 15k bucket have higher default 17% to 22% . Reduce loan funding amount for applicants with <u>employment length</u> **10+ years.** Cap it to __ amt for this segment.

- 1140 of current loans are in 60 months term plan and therefore have greater risk of default. The club may need to closely monitor and follow up to avoid defaults.

- **Interest rates to be reduced** for specific cases to improve default % as >15% have higher default %

- **Revisit the income verification process.** Surprisingly, *verified and source verified* buckets have higher default than not verified

- Reject applications if *No of times delinquent 30+ days is more than 2,* as it is only 2.5% of total population but very high default %

- Any loan amt greater than or equal to annual income has higher chance of default, to be scrutinised with other parameters like purpose and employment length