EDA:LENDING CLUB CASE STUDY

Just my interpretation

Total Number of Recoveries: total recoveries of the loan handed out without any exceptions

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In [62]: print("The number of recoveries based on total loan",len(loan_df[loan_df["loan_status"]=="Fully Paid"])/len(loan_df))
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```
The number of recoveries based on total loan 0.8541358840760038
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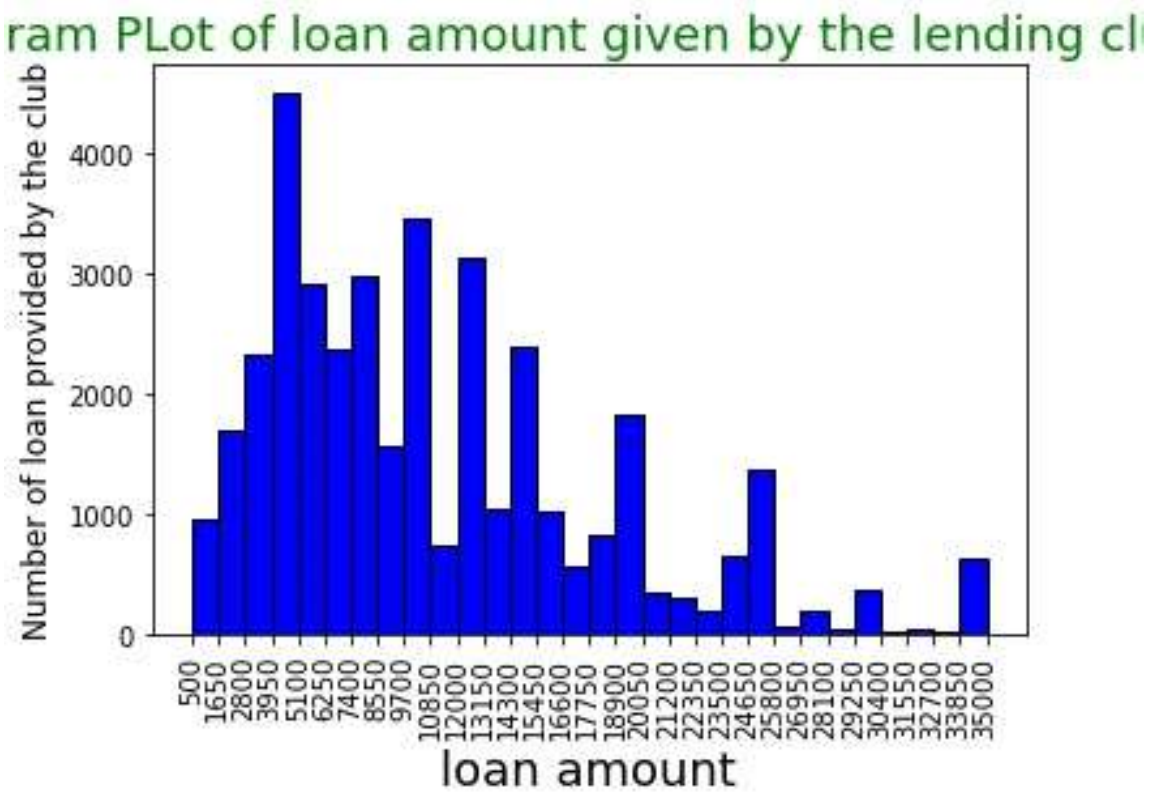
So the normal output is 85.4 percent

Loan Amount : the stats and graph about the loan amount taken from the club



Information about loan amount

the lowest amount of loan provided is : 500

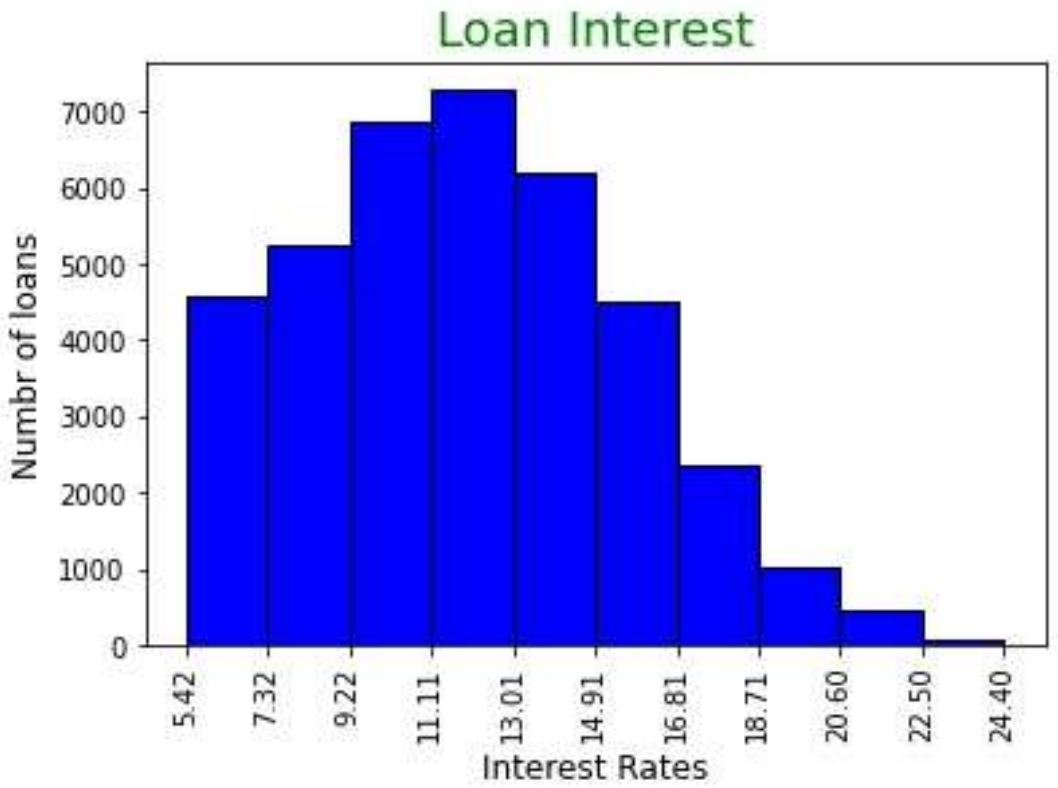
the highest amount of loan provided is : 35000

the median amount of the loan provided is : 9600.0

the 25% amount of the loan provided is : 5300.0

the 75% amount of the loan provided is : 15000.0

Interest Rates: some idea about interest rates



Information about Interest Rate

the lowest interest rate is : 5.42

the highes interest rate is : 24.4

the median amount of the loan provided is : 11.71

the 25 percentile of the loan provided is : 8.94

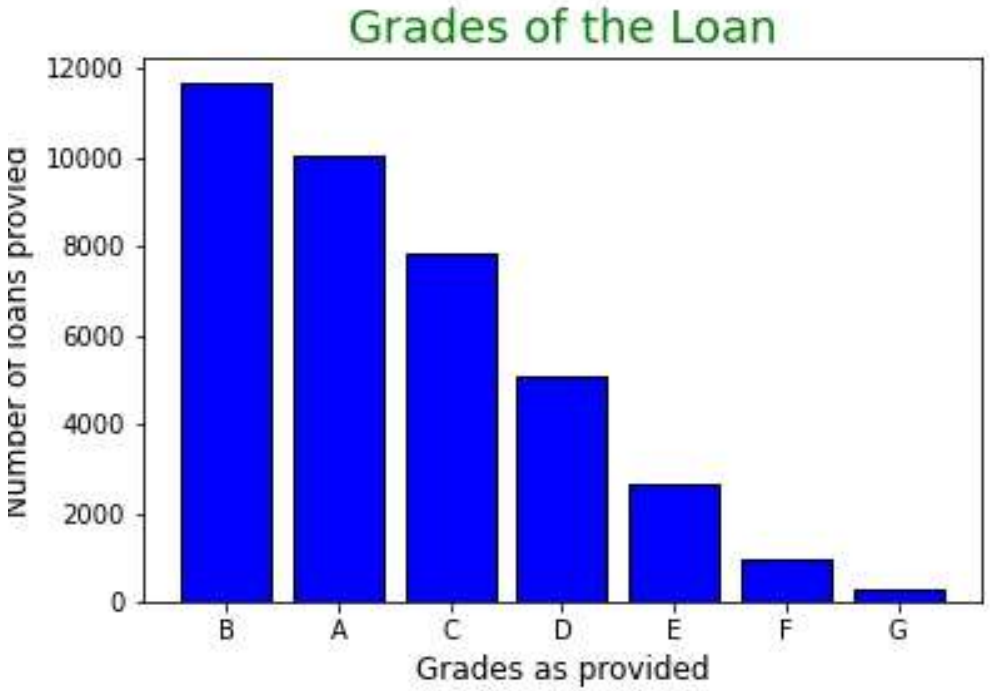
the 75 percemntile of the interest rate : 14.38

Minimizing The Risk : now let us see what have maximum amount of recoveries

- Let’s look at the grade and their recoveries rate obviously it is at grade a and grade b
- And from the graph below we know that grade b made the most of the loan and if we can improve the recovery rate from 87.7 % to 95 percent like reducing the rates a bit if they are for specific purposes which also have high recoveries rate.
- And attracting more grade a persons to the lending club by restructuring the payment and giving incentives on retaking loan so we could improve on the safe loans and earn more from them and not so much from the other grades
- All other grades are below the overall recovery rate and if we want to minimize the damage and improve the profits then we have to focus on these recoveries and regular follow up.

Grade Frequency Chart: the frequency of the grade chart

- Here we can clearly see that grade b procure more loan than b this means grade a doesn't need loan because they are financially stable
- Hence, we need to lure them attractive packages tailor made for them



Grade A & Grade B and their subgrades recovery rate

The recovery for Grade B is : 0.8779443254817987

the recovery for **subgrade B1** is : 0.9048414023372288
the recovery for **subgrade B2** is : 0.8860569715142429
the recovery for **subgrade B3** is : 0.8792920353982301
the recovery for **subgrade B4** is : 0.8649979482970865
the recovery for **subgrade B5** is : 0.8638623326959847

The recovery for Grade A is : 0.9400696864111499

the recovery for **subgrade A1** is : 0.9736611062335382
the recovery for **subgrade A2** is : 0.9509283819628647
the recovery for **subgrade A3** is : 0.9430939226519337
the recovery for **subgrade A4** is : 0.9380438565958928
the recovery for **subgrade A5** is : 0.920073664825046

Bivariate analysis of grades

grade	int_rate	loan_amnt	installment	annual_inc	dti
A	7.330979	8618.758089	256.950083	66681.565741	12.045246
B	11.007782	10934.783726	319.610696	67561.088141	13.384532
C	13.533565	10815.518892	317.681621	67731.499824	13.852776
D	15.661282	12137.767945	363.333337	68283.875176	13.923591
E	17.630364	15680.116410	426.914855	77791.061491	14.035208
F	19.643494	18095.235656	493.663514	83482.034457	14.207848
G	21.312308	20253.010033	576.277592	94273.316087	14.034615

Subgrade bivariate analysis

sub_grade	int_rate	loan_amnt	installment	annual_inc	dti
A1	5.805224	7261.040386	219.862256	67066.392318	10.753064
A2	6.378733	7361.306366	220.458521	66229.615458	11.537076
A3	7.164552	7886.698895	234.946746	66362.417182	12.014050
A4	7.660428	9319.822485	277.932001	66092.153432	12.385778
A5	8.262302	9632.955801	285.243746	67607.629834	12.530048
B1	10.004925	9700.820812	298.162632	64158.371681	12.793105
B2	10.486097	10396.226887	313.512234	67673.528221	13.044323
B3	10.981062	11392.716814	330.224722	70465.774673	13.408064
B4	11.392548	11199.446040	318.931707	67717.901432	13.669159
B5	11.766421	11453.499044	328.182501	66529.269954	13.760608
C1	12.835839	10970.559611	315.613538	70069.118467	13.775343
C2	13.328498	11191.261005	322.088954	67305.552284	13.783149
C3	13.638320	10719.321237	316.030585	67244.733024	13.637077
C4	14.026086	10420.936982	318.687222	65545.877446	14.205688
C5	14.469402	10447.097054	315.067530	67193.257166	14.016490
D1	14.853169	10008.404941	342.353963	64944.735865	13.826219
D2	15.300202	11410.419907	340.717037	68560.118281	14.013849
D3	15.714937	12488.642473	365.976711	67388.896532	13.967742
D4	16.086536	13288.044662	385.962821	70072.856874	13.908671
D5	16.580276	13900.689448	393.180444	70813.852434	13.850456
E1	16.943199	14628.774238	408.567036	73123.241316	13.916066
E2	17.356889	14976.750814	408.119104	75313.801645	14.244495
E3	17.722965	15456.395349	418.928101	77025.252907	13.677558
E4	18.182358	16549.941038	441.619198	76852.545000	14.161486
E5	18.618010	18102.777778	485.504625	92479.154341	14.263953

* Note grades f and g have been skipped

Effect of Terms on Recovery rate : the term for which the loan was provided

the recovery rate for 3 years is : 0.8890912840252956

the recovery rate for 5 yeas is : 0.7468621453433182

As you can see the recovery rate for 3 years is 88.9%
Because short term loans people have better financial stabilities

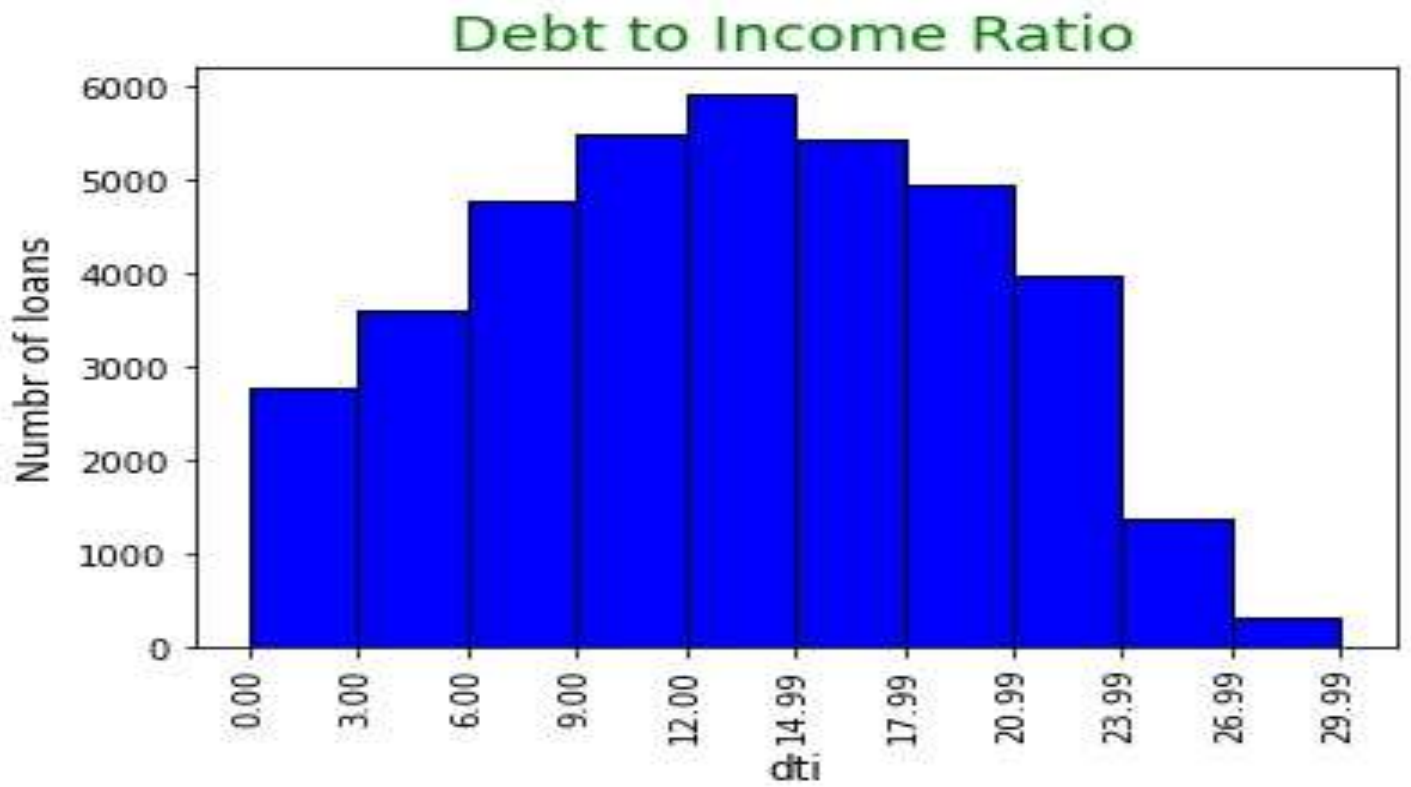
More loans on shorter terms even if you reduce the interest rate by a bit

Effects of loan term on other variables

term	int_rate	loan_amnt	installment	annual_inc	dti
36 months	11.004656	9592.936314	311.693307	67169.950441	12.982538
60 months	14.778791	15509.442569	355.527338	73712.795344	14.163281

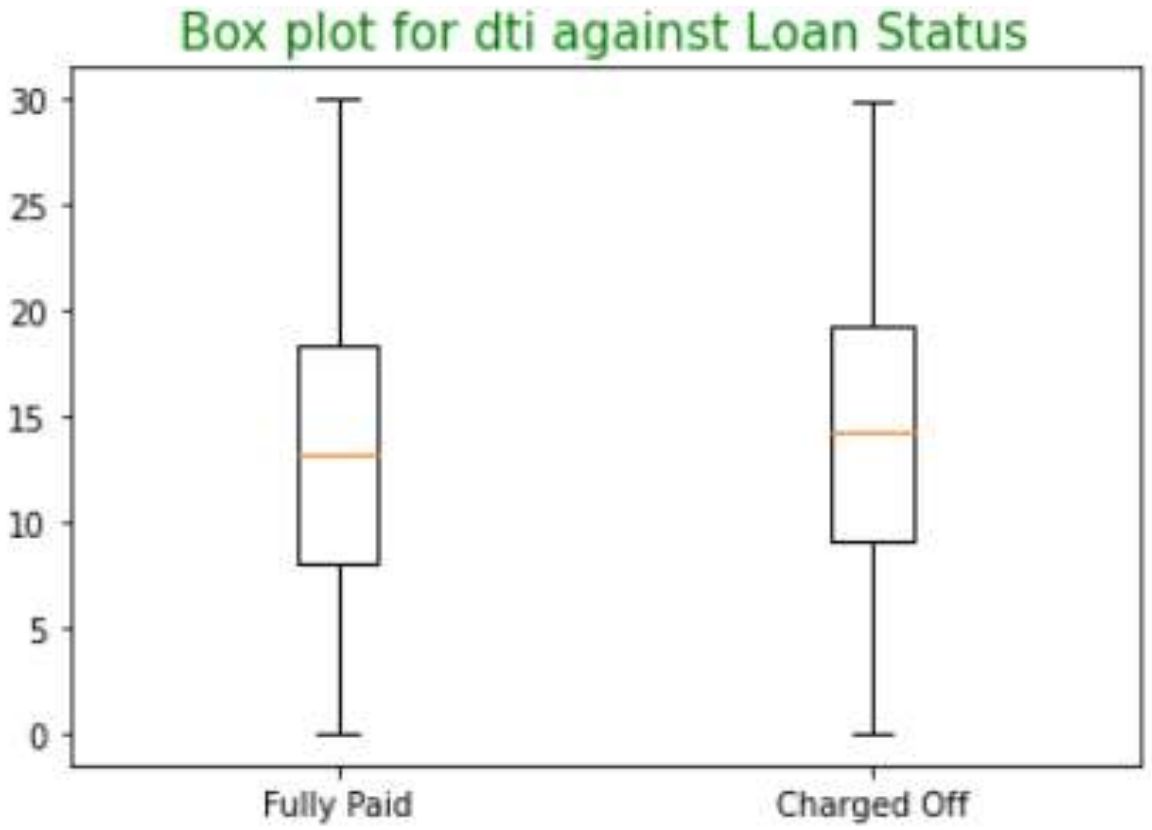
- Hence shorter loan term is favorable for the company, and we must try to sell the shorter loan as much as possible

Debt to Income ratio :this ratio should be under 20 and it would be helpful

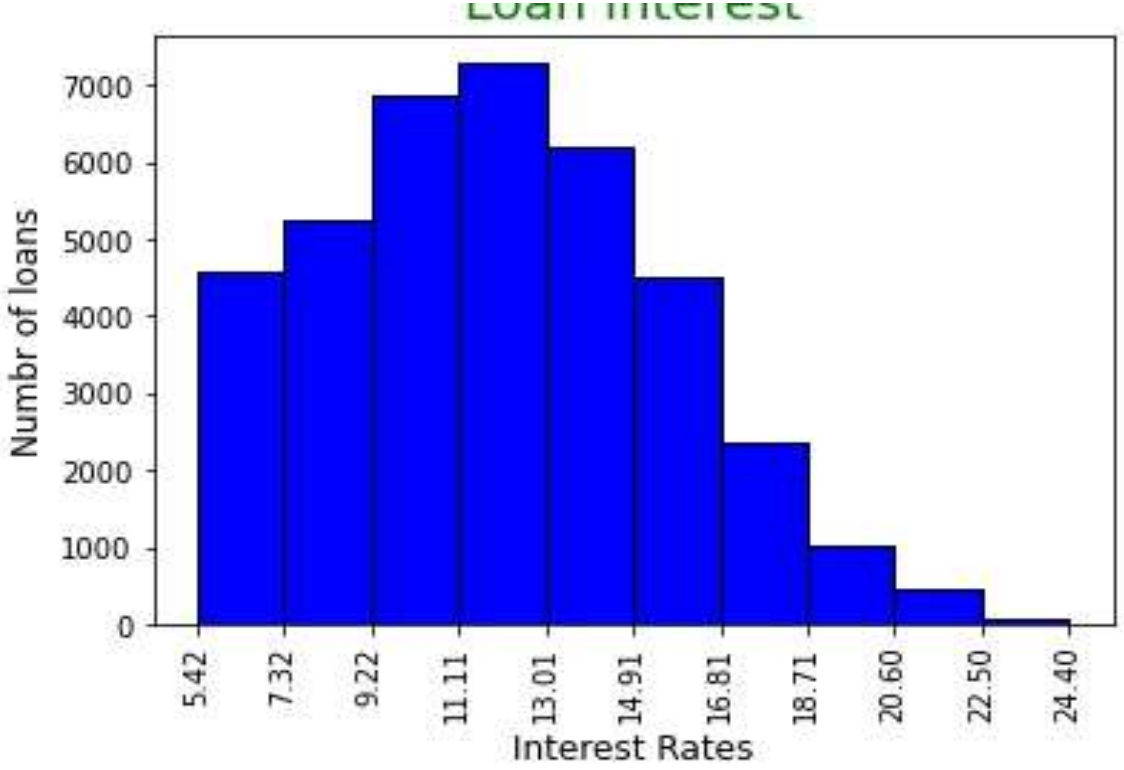


DTI impact on loan payment

- A very interesting thing about thing about this is that both the segments are spread almost identically it doesn't have that big of an impact



Interest Rate: lower the interest rate higher the recovery but interest rates are only lower for high grade people



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- Lower the interest rate higher the chance of recover but if the interest rate is low for everybody than you may risk the business going under

so, normal rates are (4 to 9]
moderate rates are (9 to 12]
high rates are (12 to 14]
hyper rates are (14 to 24]

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The recovery for normal interest rate   : 0.9403548123980424
The recovery for moderate interest rate : 0.8819013566095278
The recovery for high interest rate     : 0.8400748674222731
The recovery for hyper interest rate    : 0.7530851394794151
```
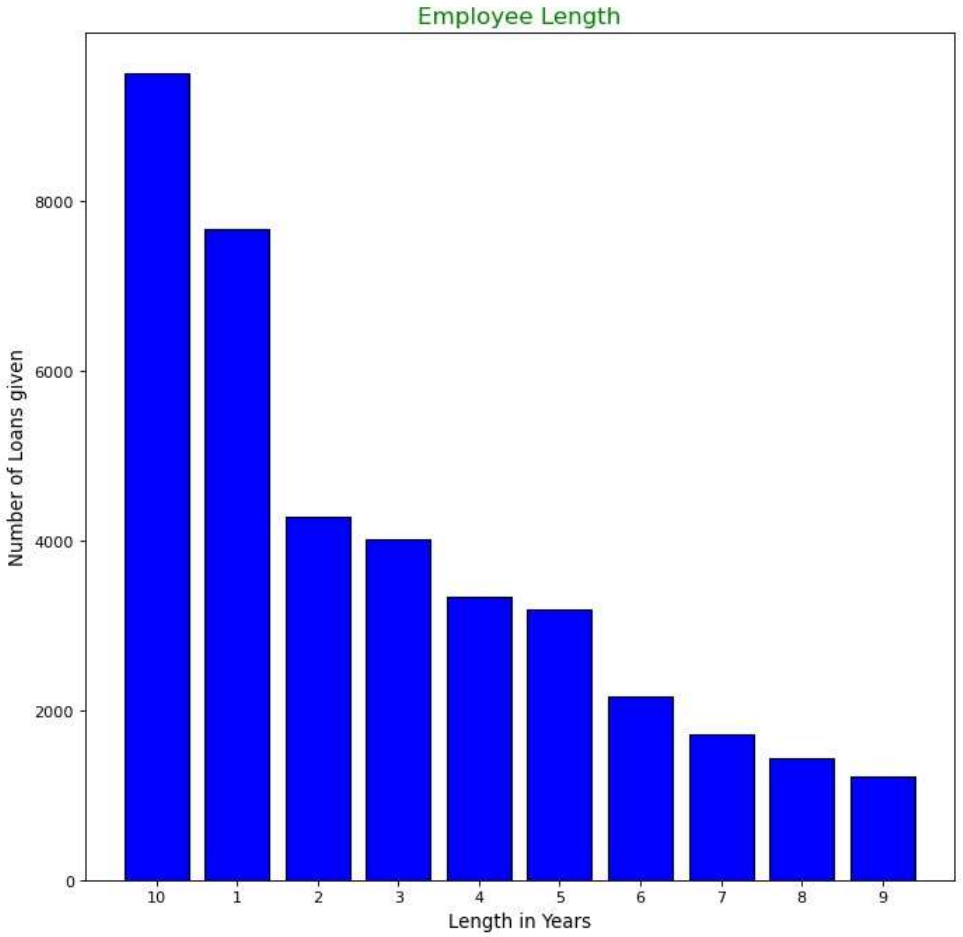

Employee Length

The recover rate of employee length **10 years** : 0.836256695725239
The recover rate of employee length **9 years** : 0.8711256117455138
The recover rate of employee length **8 years** : 0.8585365853658536
The recover rate of employee length **7 years** : 0.8462887200467563
The recover rate of employee length **6 years** : 0.8583948339483395
The recover rate of employee length **5 years** : 0.8566061365059486
The recover rate of employee length **4 years** : 0.8617594254937163
The recover rate of employee length **3 years** : 0.8616650049850448
The recover rate of employee length **2 years** : 0.867862969004894
The recover rate of employee length **1 years** : 0.8573661586557249



Very Peculiar that 10 years and above has the lowest recovery rate among others totally opposite of colliqual wisdom

Conclusion:

- so, the model here works primarily on the grades and sub grades higher the grade higher the interest rate
- this how you can reduce the risk:
- get the higher-grade people for lower rate of interset on higher loan_amount
- get attractive interest rate to higher grade and expand the base for certain purposes
- employees working for ten years and above have lower rate of recoveries(peculiar)