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WHAT AFFECTS INTEREST RATES ON THE PROSPER LOANS?

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INTRODUCTION

Prosper is a peer to peer lending company that offers personal loans. These loans are unsecured, which means you do not have to put up any collateral (like a house or car) that could get taken away if you can't make payments. Each loan is typically funded by multiple people all over the United States.

In this investigation, I wanted to look at the characteristics of loans granted through the Prosper peer to peer lending company that could be used to predict their interest rates. The main focus was on the credit/risk scores features as these variables are the most important and should be considered by lenders before granting a loan to a particular person.
In addition to that, some other variables such as term, purpose, and income range were used in this particular analysis.
The dataset consisted of over 100 000 of loans with a variety of different attributes. Some of the entries were removed from the given dataset because of quality issues.

SUMMARY OF FINDINGS

In the exploration part, I found that credit/risk score variables (Credit Score and Proper Score) have the strongest correlation with the variable of interest. Prosper Score has a higher correlation coefficient with interest rate rather than Credit Score because Prosper Scores are developed internally taking into account characteristics of the loan. Contrary, Credit Scores are developed by a third party Consumer Credit Rating Agency and take into consideration only characteristics of the particular individual which allow them to serve as an initial risk score. Therefore, the higher the Credit Score/Prosper Score the lower interest rate will be set for a loan. Furthermore, the relationships between interest rates and some categorical variables were investigated.

- Overall, the interest rates tend to be higher for the long-term loans as the default risk is increasing within the time.
- Borrowers who own real estate receive on average slightly lower interest rates comparing to borrowers who don't. However, the Prosper company doesn't take houses as collateral and no difference in Prosper Scores is evidence of that. So, the Prosper Company is indifferent whether a borrower owns a house or not, this feature doesn't affect the risk score developed internally. On the other hand, third party Consumer Credit Rating agencies make their scores by taking into account this feature. That's why we observe the higher Credit Scores for homeowners. Therefore, just slightly lower interest rates for homeowners is partially an effect of the correlation between Credit Scores and Borrower rates.
- Overall, there are no big differences in interest rates across different purposes but still on average the highest interest rates are set for the loans which are taken for the household expenses and the lowest rates for the purchasing of a boat and personal expenses.
- Average interest rates are lower for individuals with the higher income range and the highest for not employed across all levels of the Prosper Score. However, this difference is negligible in two extreme cases when Prosper Scores are extremely low (min value = 1) or extremely high (max value = 10).
- Finally, I also checked relationship between loan amounts, Prosper scores and interest rates. It looks like that most of the loans with high ProsperScores and as a result, low-interest rates are for the amounts mostly below 20K dollars.

For the presentation, I use all of these relationships. I start by introducing the interest rate variable, its historical trend, and distribution as well as distributions of the Prosper Scores and Credit Scores. Afterwards, I plot a correlation matrix to show that our expectations were correct, followed with scatterplots as only coefficients can be misleading.
Then, I introduce categorical variables and their impact across relationship between interest rates and Prosper Scores.
At the end of the presentation, I also use a multivariate plot to show that most of the loans with high Credit Scores and low interest rates are below 20K dollars.