# Prosper Loans: Building a Data Driven Framework For Investing

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# What Are Prosper Loans?

- The Prosper investment platform provides an innovative new way to connect borrowers and personal investors in financing personal loans. Big banks are no longer the only option for funding a personal venture or to invest in others.
- Our main focus in this presentation is to introduce Prosper Loans first as a product, then as an investment option for your portfolio.
- We will build a framework that is simple to use and backed by data driven insight in how to configure a Prosper Loan asset to your tolerance of risk and what returns to expect using a few key metrics.
- You will leave this presentation knowing exactly how to use these key metrics to make informed and predictable decisions when investing in Prosper Loans

# Who takes out Prosper Loans?

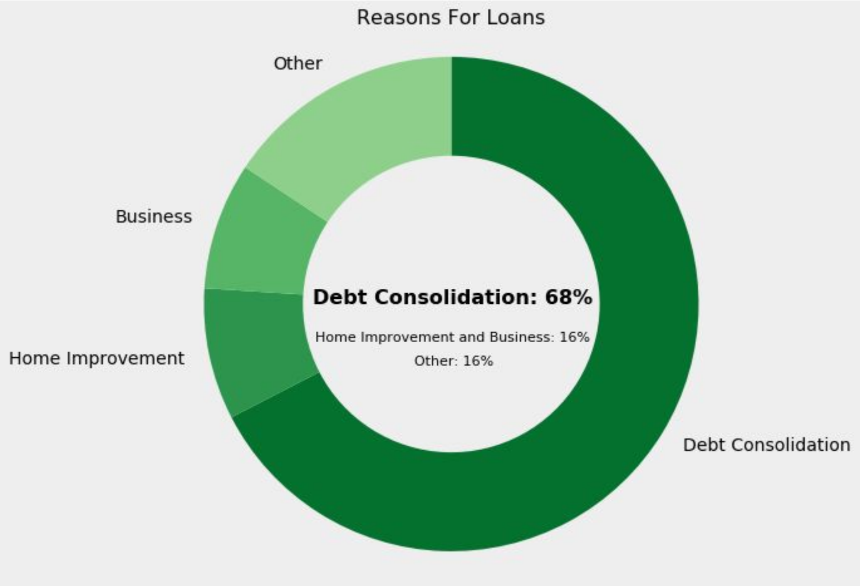
- Before we consider Prosper Loans as an investment option, we should ask ourselves who is on the other end?
    - Who are these people taking out loans? Are they trustworthy? What are they taking them out for?
- In other words, to understand the financial product as an investment, we should first paint a picture of the real people behind the product… the borrowers.

# Uses Of Prosper Loans

- The typical person uses Prosper Loans as a debt consolidation strategy.
  - This strategy is paying back several loans from different sources and consolidating them to one source.
  - Usually it is to get a better interest rate than their previous loans or to change their term limits.
- The other large categories of people using Prosper Loans are small business owners and people looking to make improvements on their home.
- Many additional groups are represented citing various reasons for requesting a loan. Typically these loans are for some kind of personal use.

# Uses Of Prosper Loans

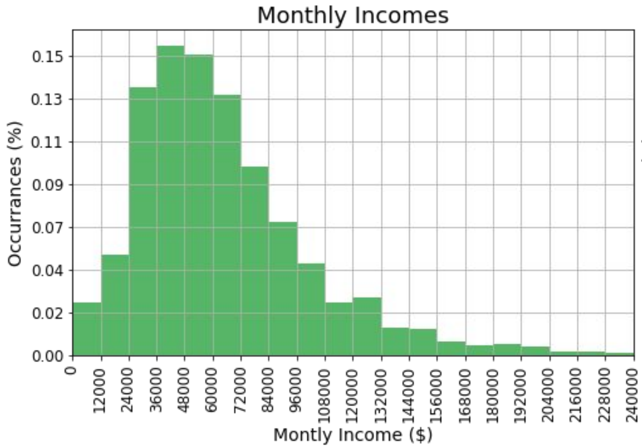
- As we can see below, debt consolidation is the number 1 choice for Prosper Loans at 68%, followed by Home Improvement and Business which are about 8% each. 'Other' typically represents personal use loans that make up below 2% per category.

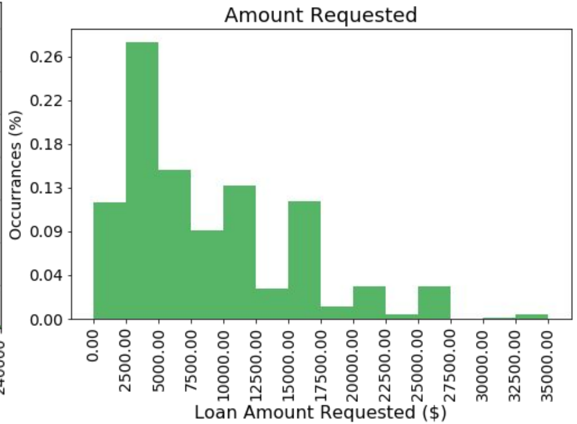


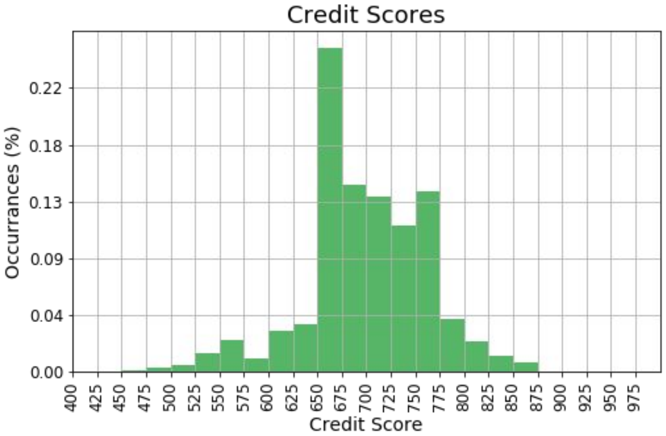
# Typical Borrower: Building a Profile

- The typical Prosper Loans applicant requests between 1000 and 7500 dollars, has an income between 55,000 - 65,000, with a credit score between 650-775, and with the majority residing in California, Texas, New York, or Florida but occurring in every state.
- The profile of a Prosper Loan applicant we together have constructed is a middle income American, usually using them for consolidating other debts, who has good credit. They predominantly reside in a few locations, but live all across America.

# Typical Person: Building a Profile



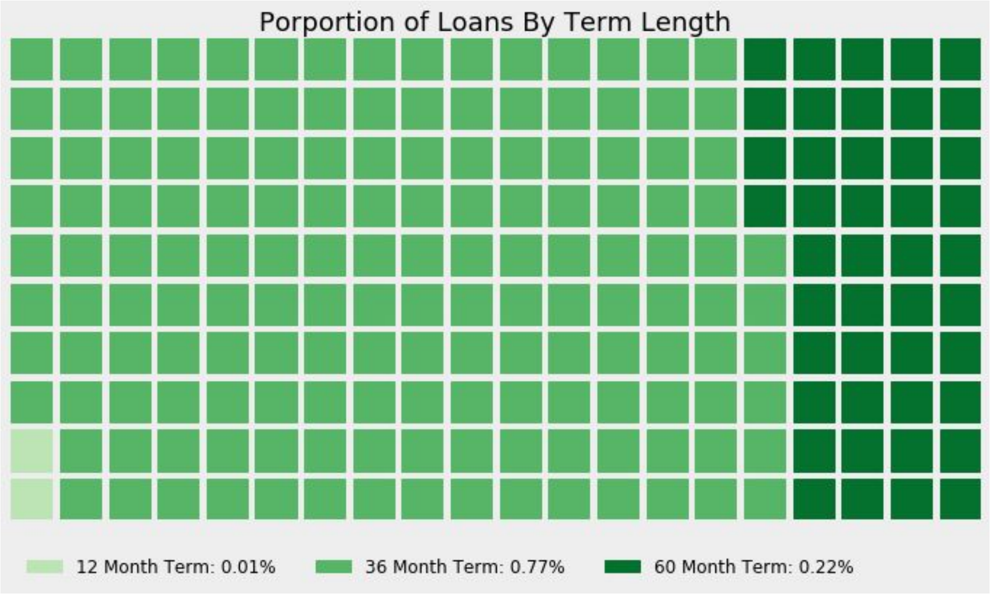
Where Do Prosper Loan Borrower's Live?
Amount Of Loans
14k
12k
10k
8k
6k
4k
2k

# Prosper Loans as a Financial Product

- Now that we have built a profile of a Prosper Loan applicant, we can begin to build our framework by understanding Prosper Loans on the other end: as a financial product.
- The key features of a Prosper Loan is the term limit, the Prosper Score risk rating estimate, the interest rate, and the loan amount.
- From these key features, Prosper Loan derives the APR and the Estimated Return.
    - These represent the true cost to borrowers and the true estimated return to investors
    - Both follow trends around the interest rate on the loan, and the interest rate follows macroeconomic country-wide trends.

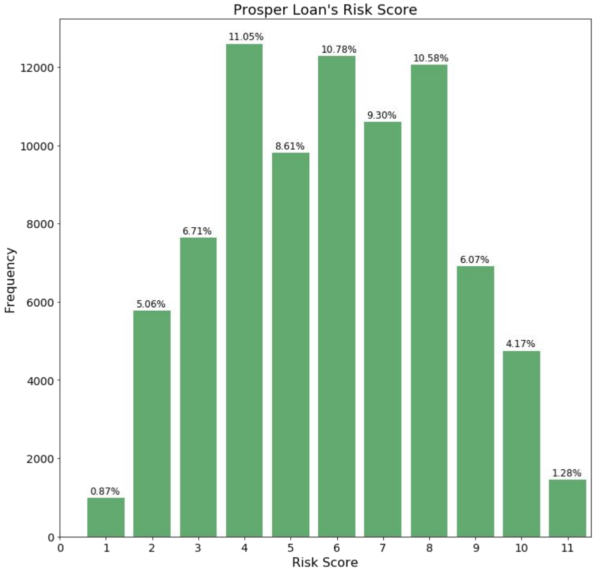
# Prosper Loans as a Financial Product: Term Limits

- They come in three options for amount of months to repay the debt: 12 month term limits, 36 month term limits, and 60 month term limits.
- 36 month term limits are by far the most common. Later we will see why….



# Prosper Loans as a Financial Product: Prosper Risk Score

- Each loan also has a risk score associated with it ranging from 1-11. 1 represents the riskiest investment.
- They mostly are between 4 and 7, which is roughly 50% of the distribution



# Prosper Loans as a Financial Product: Interest Rates

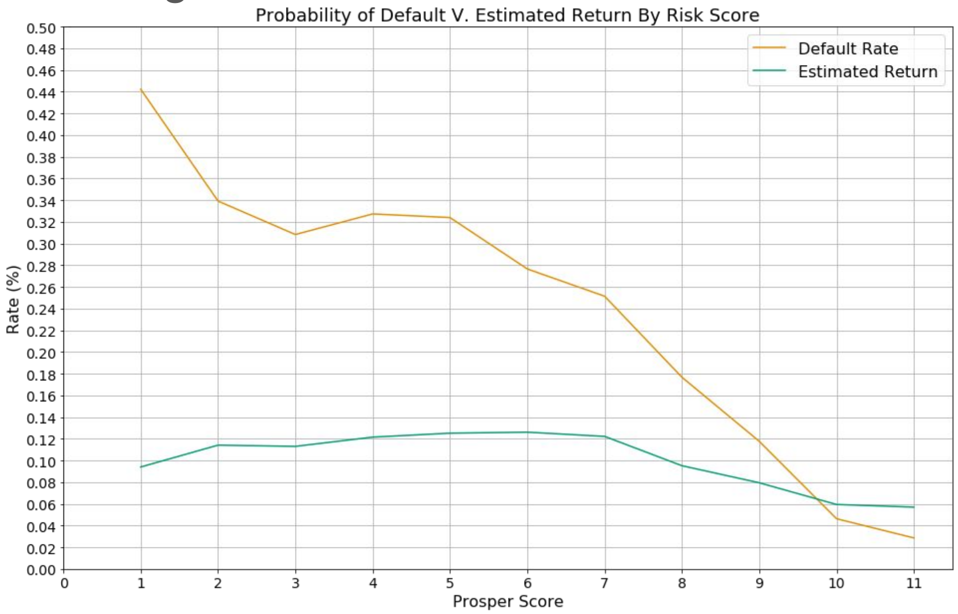
- The cost to borrowers and the estimated return follow closely to the interest rates on the loan, which fluctuate according to macroeconomic trends

# Prosper Loans as a Financial Product: Takeaway

- Now that we understand the key features of Prosper Loans as a financial asset, we can build a framework to use these metrics to make informed and predictable decisions when investing in Prosper Loans.
- We will examine the outcomes of the loans aside key metrics to create a data driven  framework derived from historical trends that anyone can easily use and understand.

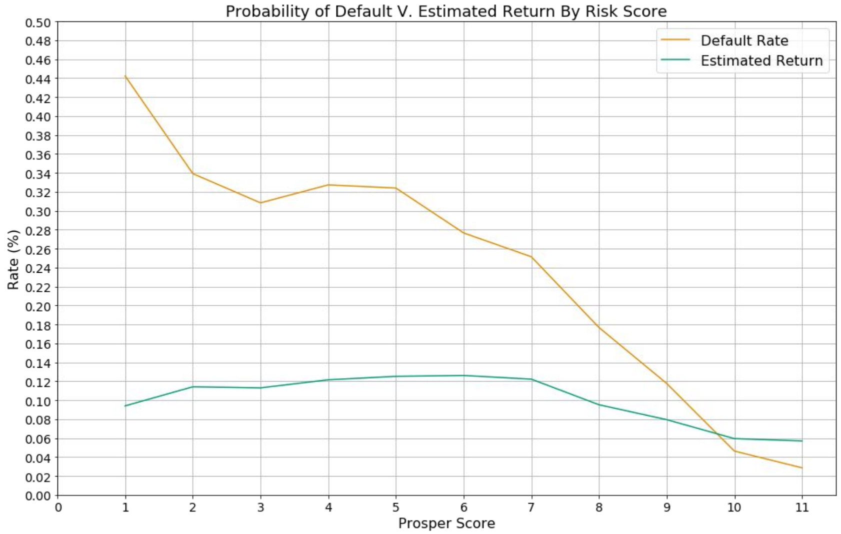
# Prosper Score: Default Risk and Estimated Returns

- The Prosper Score provides the tuning parameter to make an investment higher or lower risk and the estimated return is between 6% and 12%.
- The risk of default ranges from 45% chance of default to a 3% chance of default.



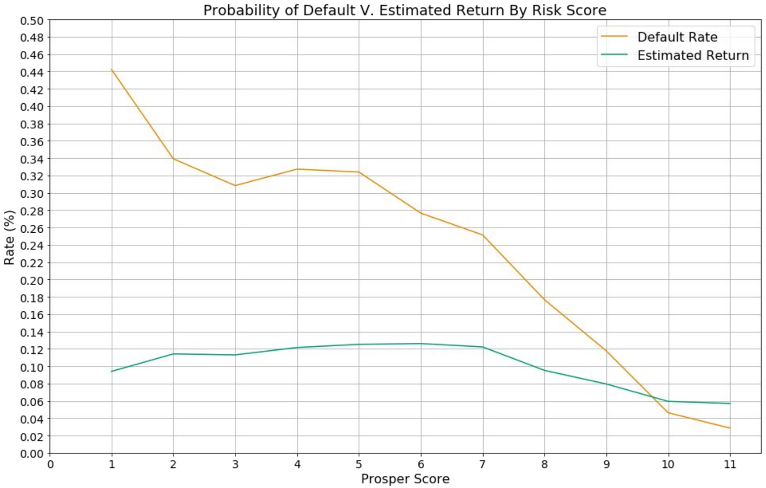
# Prosper Score: Default Risk and Estimated Returns

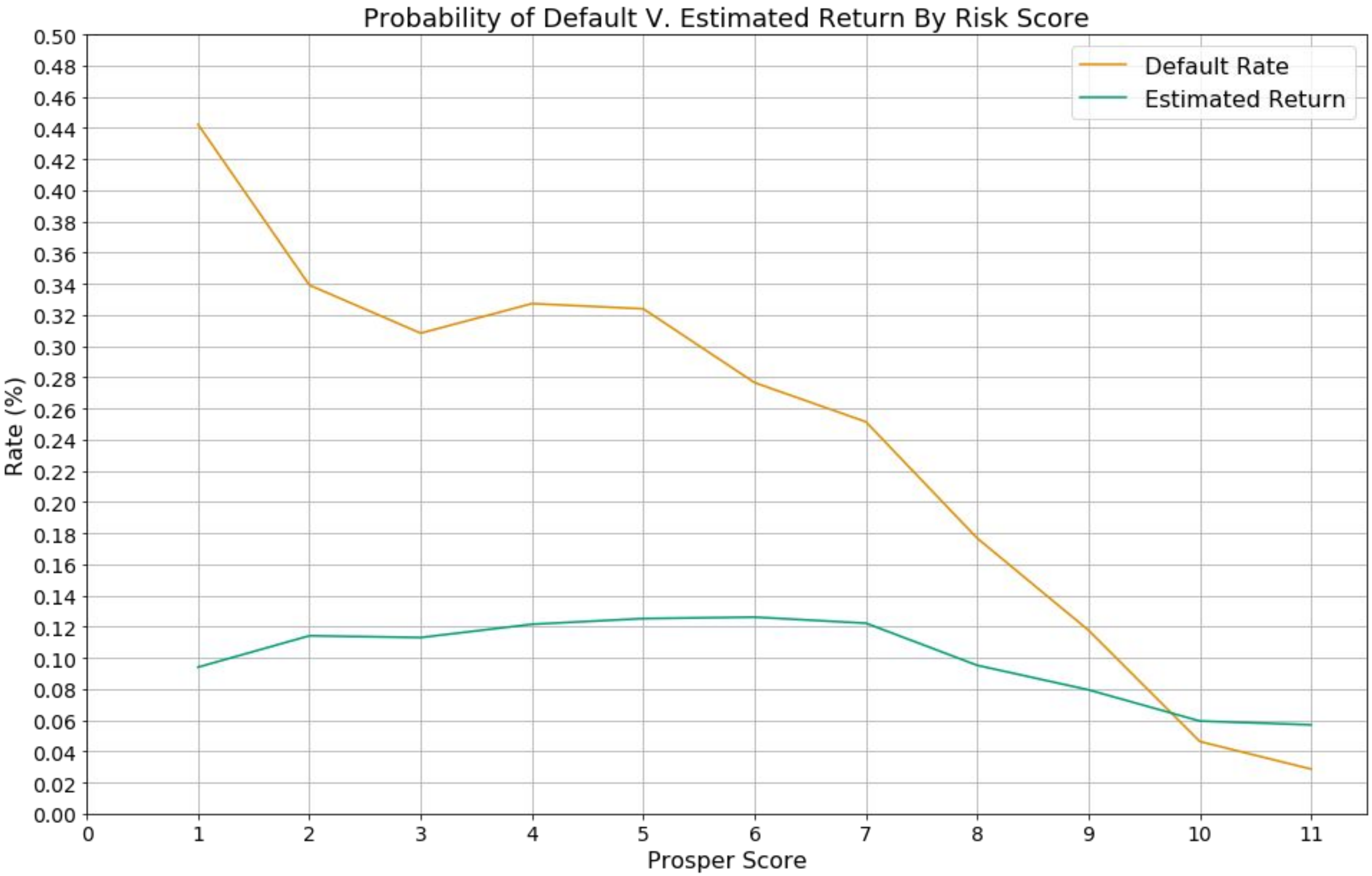
- Risk scores between 4-7 have greater returns then 1-3, (9-11% vs 12-13%) yet have a much lower probability of default. Prosper Scores between 6 and 8 have the highest return with the lowest probability of default. These represent the best investment options for investors with a higher risk tolerance.



# Prosper Score: Default Risk and Estimated Returns

- In the Prosper Score range of 8-11 the return rate and the probability of default decrease the fastest. These options are best for investors with low risk tolerance. Prosper scores of 1, 2, and possibly 3 are the worst options for investors even with high risk tolerance because they encompass the highest probability of default without the highest estimated return.

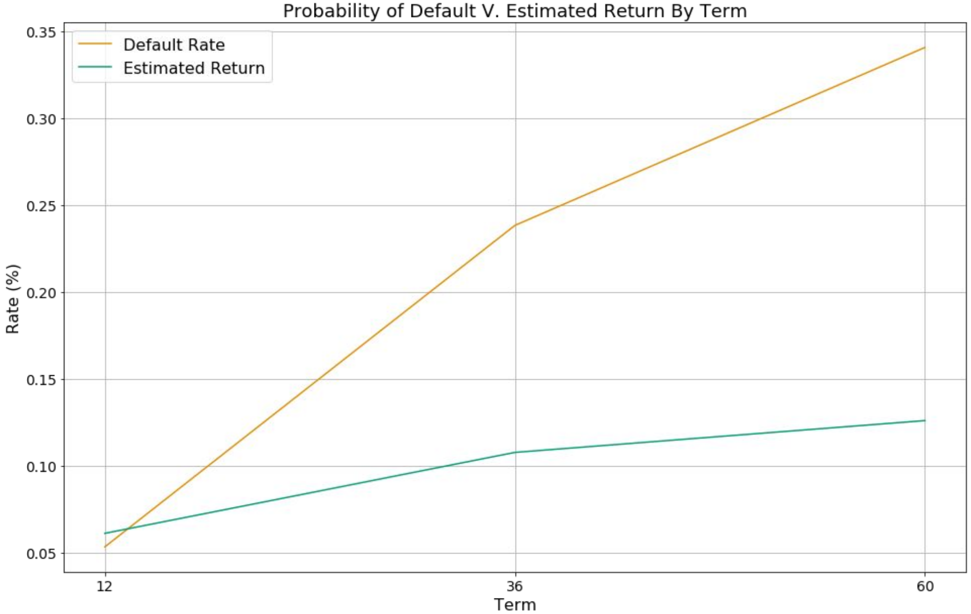




Probability of Default V. Estimated Return By Risk Score
Default Rate
Estimated Return
Rate (%)
Prosper Score
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16
0.18
0.20
0.22
0.24
0.26
0.28
0.30
0.32
0.34
0.36
0.38
0.40
0.42
0.44
0.46
0.48
0.50
0
1
2
3
4
5
6
7
8
9
10
11

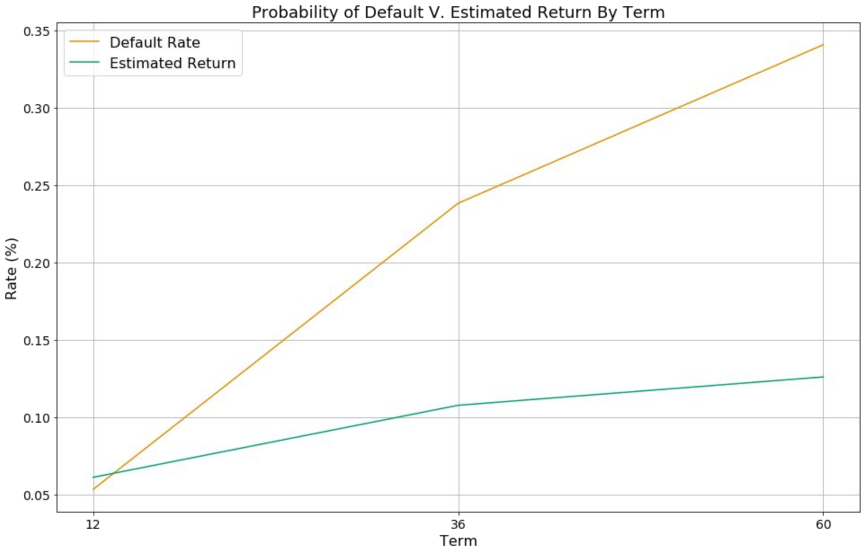
# Term Limit: Default Risk and Estimated Return

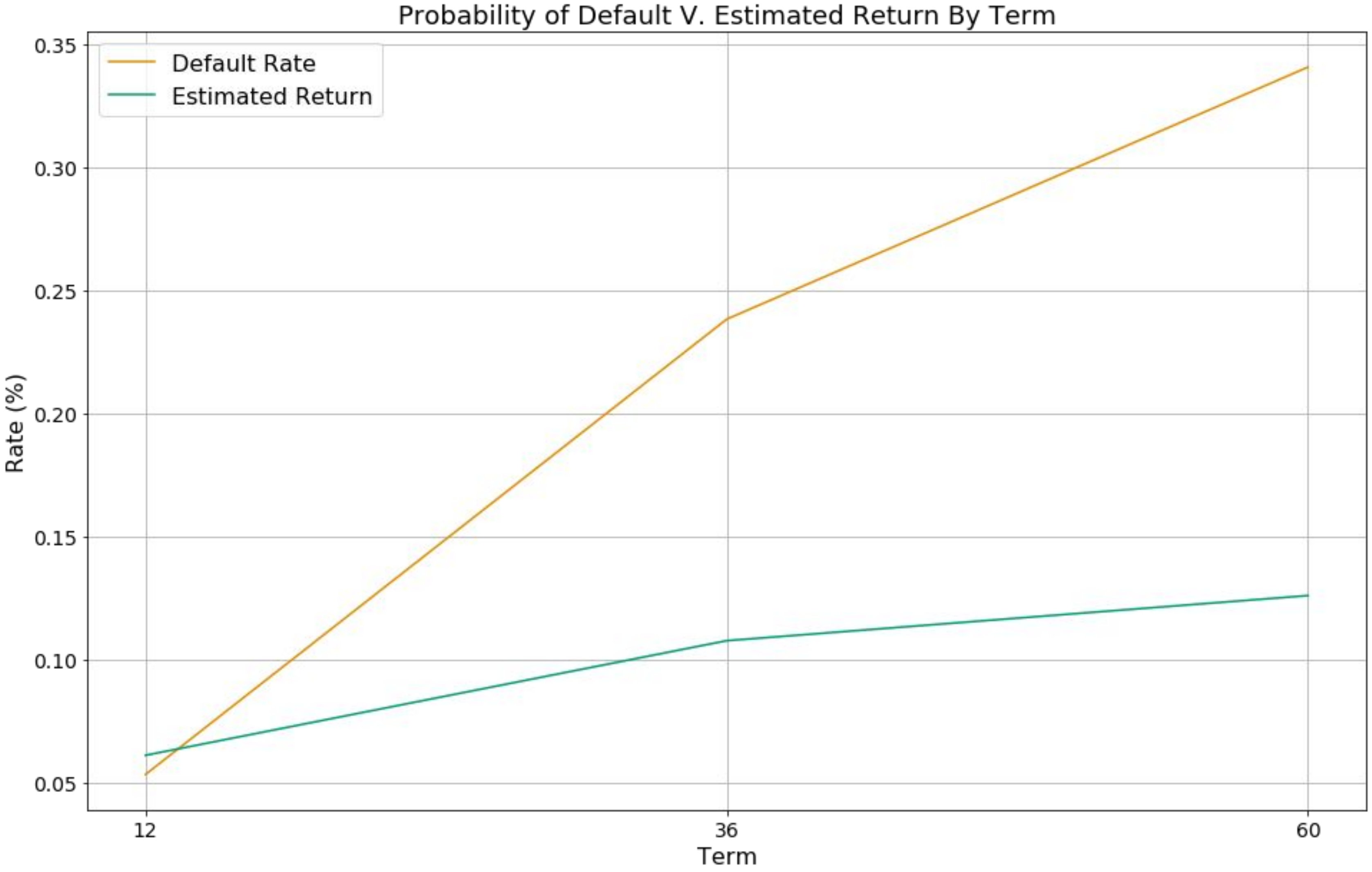
- The relationship between term limits and estimated return follow a similar trend. The estimated return is between a 6% and 12% and it ranges between a 6% to 35% probability of default.



# Term Limit: Default Risk and Estimated Return

- Term limits of 12 are best for investors with low risk tolerance. Term limits of 36 are best for investors with high risk tolerance. Term limits of 60 are usually associated with much higher risk without much of a higher reward and therefore aren't typically the best option.




Probability of Default V. Estimated Return By Term
Default Rate
Estimated Return
Rate (%)
0.35
0.30
0.25
0.20
0.15
0.10
0.05
12
36
60
Term

# Takeaways: A Data Driven Framework for Investing In Prosper Loans

- An investor can use Prosper Loans in their portfolio using the term limit and the prosper score as tools to create the asset that is best for their risk preference.
- Most investors tend to use Prosper Loans in their portfolio at a term limit of 36 with a risk score between 4 and 8. They typically accept about a 30% probability of default and expect about a 12% return.
- Any investor can also except a roughly 6% return at a much lower default risk if the Prosper Risk Score is very high and/or the term limits are very low.
- The return doesn't improve much after 12% so very low risk scores and very high term limits are associated with a much higher probability of default with no better return. They should be avoided.

# Limitations

- Averages were used in this analysis for the measure of center. While this is a good metric for measure of center because the key metric, estimated returns, is roughly normally distributed, it still leaves out valuable data that could be a key determinant in a particular investment.
- Although term limits and prosper scores were statistically significant and practically important, calculating estimated returns is much more complicated than these two metrics alone. They account for explaining only 15% in the model created for estimated returns. Lots of other prior information is available in the datasets made available by Prosper to create models with more predictive power.
    - This would require lots of domain knowledge and analytical abilities to use effectively, the purpose of this analysis was to construct a ***basic*** data driven framework for making investment decisions.