Optimizing Peer to Peer Lending on Lending Club

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Peer to Peer Lending Provides Opportunity for Profit

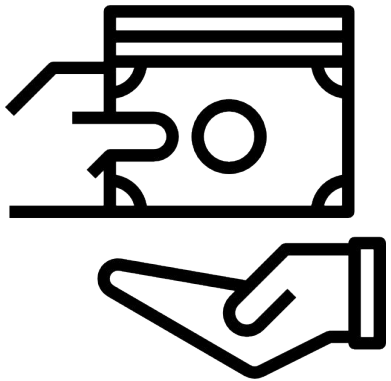
In the data set examined, there were

$34,016,115,925

in total loans requested.

Interest rates up to

30.99%

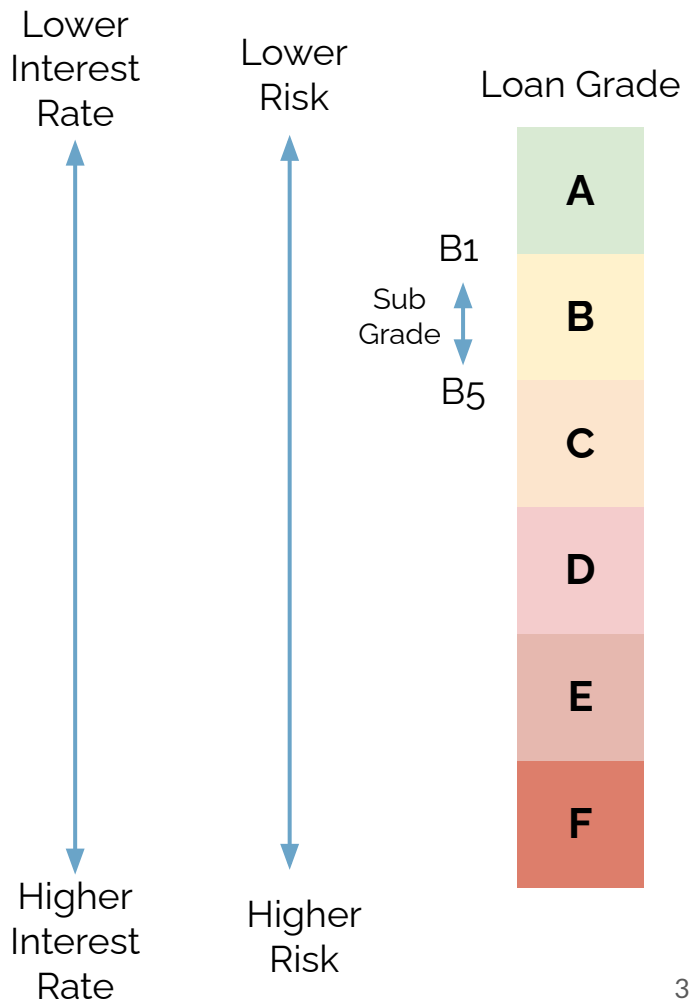


P2P Loan Grades Classify Borrower Creditworthiness

A higher loan grade implies a more consistent, diligent borrower.

But higher grade borrowers have more capacity to pay back their loans (sometimes early), and demand lower interest rates.

Within each loan grade, a sub-grade of 1-5 further specifies creditworthiness (where 1 is better).



Peer to Peer Lending is Risky and Offers Low Returns

Returns calculated using principal loan amount, interest rate, collection fee, late fee, and investment period length

Average return across all grades is **less than -2%!** Worse, volatility of returns within subgrades is high. High risk, low reward!

If choose to invest, need **risk-conscious strategy.**

Essential Question

How can we choose the most profitable portfolio of peer-to-peer loans, while taking risk into consideration?

Our Risk Assessment Approach: the P2P Sharpe Ratio

Inspired by the common risk/reward assessment in the stock market, we created this P2P Sharpe ratio:

$$\text{P2P Sharpe Ratio} = R_p \,/\, \sigma_p$$

Average return on investment (ROI)

Standard deviation of returns

High Sharpe Ratio =

High return + Low variation

Loan ID	Return
1	4%
2	-4%
3	2%
4	1%

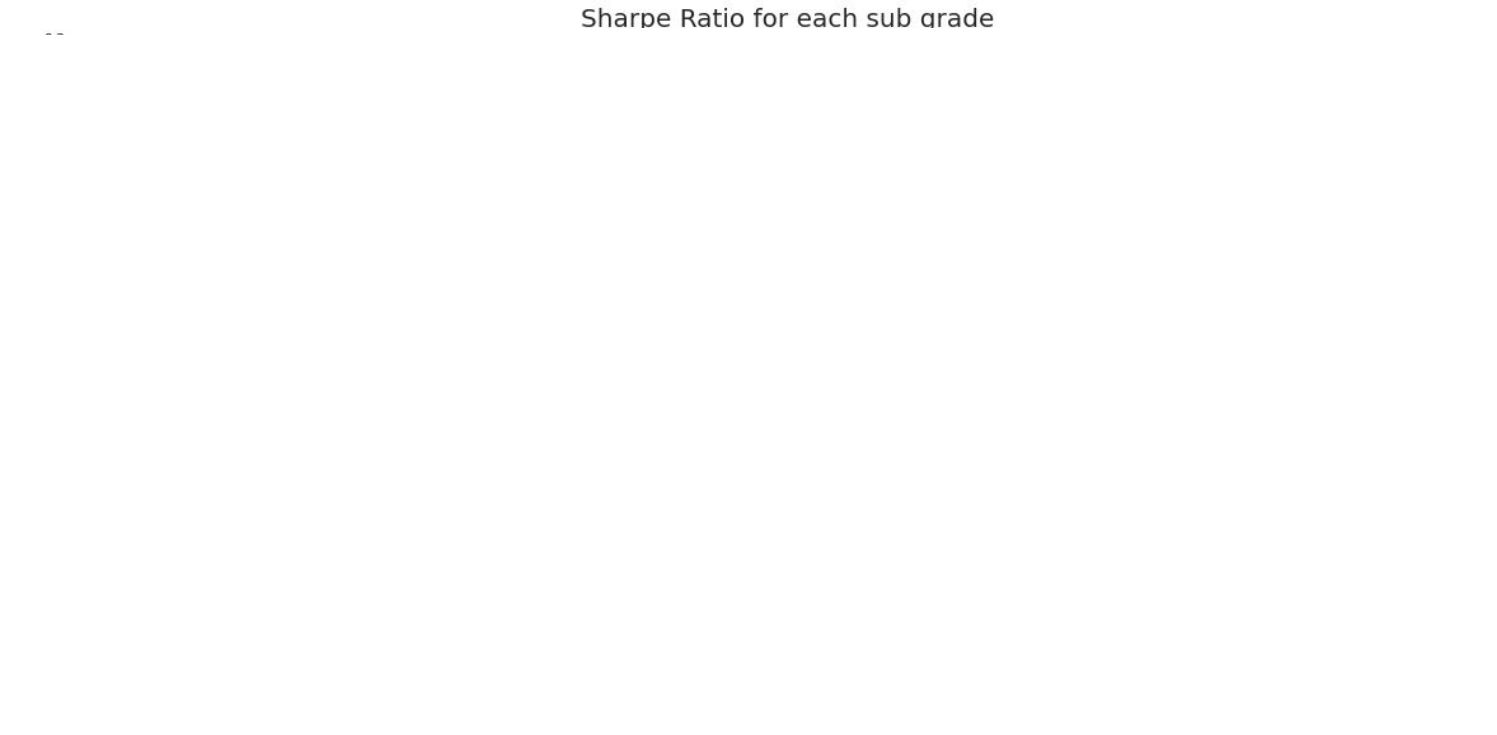
Sharpe Ratio

= Average_return/std

= 1.5/1.8 = 0.83

Rationale: Although we might have high return of 4%, but the range variation (4% to -4%) results in a problematic sharpe ratio

Using our Modified Sharpe Ratio Folds Risk into Return



Bad Strategies: All-As and the Trap of High Interest

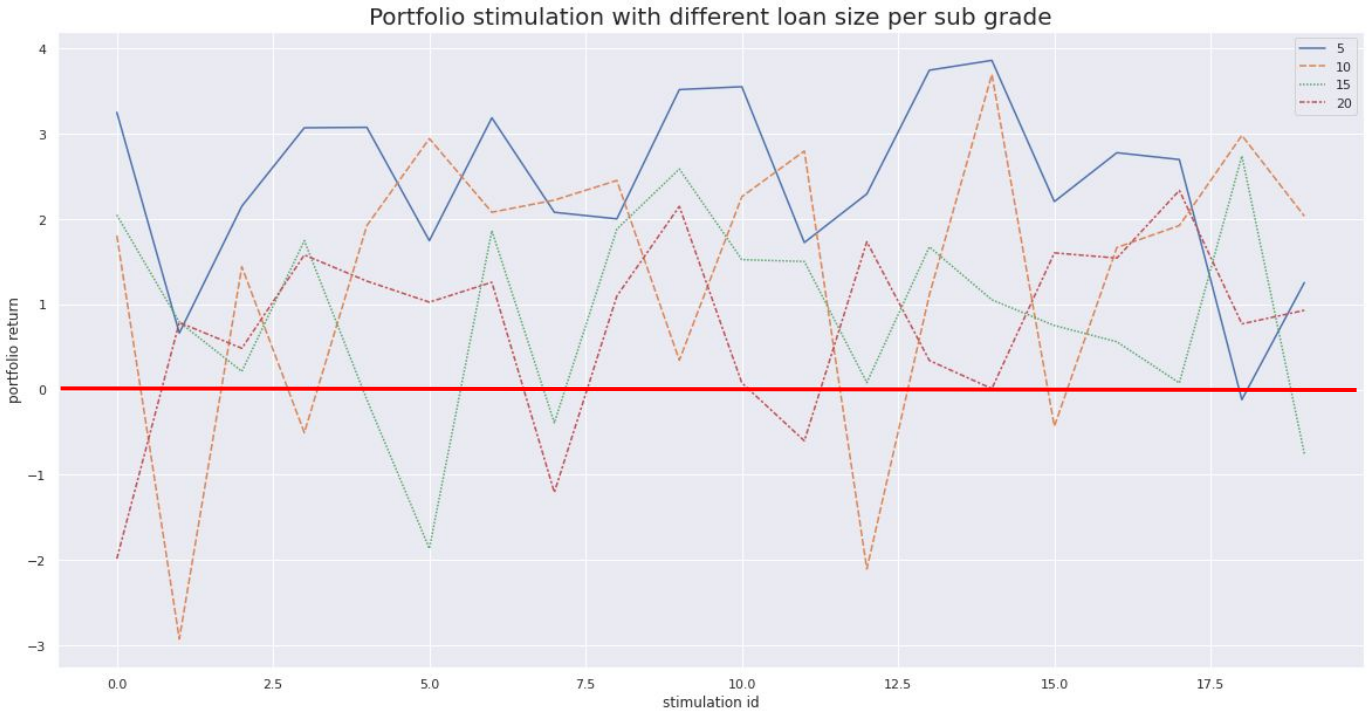
Higher interest rates mean disproportionately higher risk; it's a trap!

On average, choosing loans by high interest rates leads to net losses.

While a portfolio of only A-grade loans is safer, it is not optimal ROI-wise.

	grade	int_rate	avg_ret	std_ret	Sharpe Ratio
0	A	7.109369	1.560431	15.424073	0.101169
1	B	10.683642	0.096813	22.389827	0.004324
2	C	14.024032	-2.980885	29.355287	-0.101545
3	D	17.711014	-5.956228	34.619864	-0.172047
4	F	24.907450	-13.222233	42.822522	-0.308768
5	Total	13.260895	-2.514803	28.154758	-0.089321

Our Recommendation: Less is More



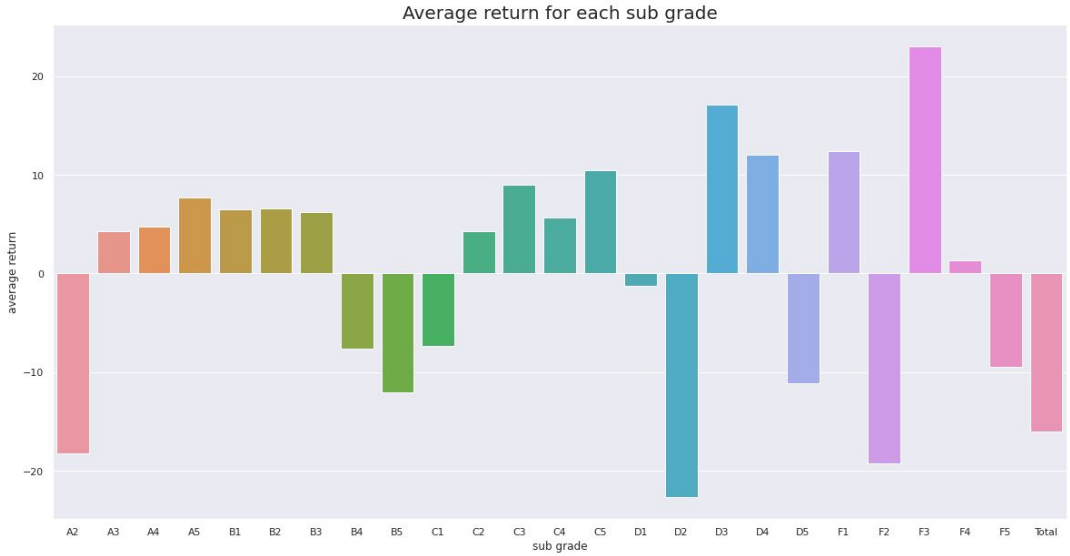
Our simulations reveal that choosing 5 loans in each subgrade (125 loans in total) yields better returns than choosing 20 loans in each subgrade.

So, aim to invest in a **few top loans from each subcategory** (see next slide for details).

Definition of “Top” Loan Differs by Sub-Grade

For Grade A loans, you want lower subgrades! Grade A is liquid, but you lose if they’re *too* capable to repay (due to early repayment). Notice the negative returns for A2.

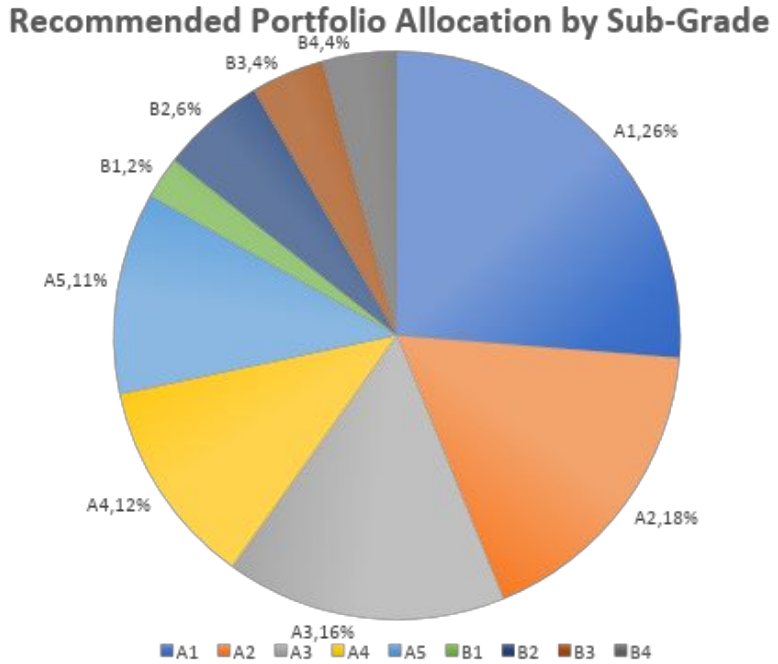
For Grade C and lower, higher capability to pay is better (e.g. F3) due to default risk.



Portfolio Optimization: Take High-Grade Risks

Mixing “shaky” high grade loans (e.g. A4s, B3s) with sure bets (e.g. A1s) yields the highest returns.

Our regressions reveal this ideal allocation:



200% Better

That's how much more returns our strategy generates than a randomly sampled portfolio (average ROI **-2.73%).**

A portfolio of A-grade loans averages at an ROI of **1.56%.** Our portfolio beats both, with an average ROI of **3.14%.** If you're investing $10M with our strategy, you'd **earn ~$600K more!**