Empirical Comparison of the Two Leading Peer-to-Peer Lending US Platforms

by

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Empirical Comparison of the Two Leading Peer-to-Peer Lending U.S. Platforms

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Abstract

The peer-to-peer lending industry in the United States has seen staggering growth in the last two–several years, with Prosper Market and Lending Club emerging as the two leading platforms. This paper aims to compare, from an investor’s perspective, the difference in performance for loans of varying risk levels. First, this paper will provide an overview of the peer-to-peer lending industry in the United States, explaining the mechanics behind a loan issuance and explaining briefly the impact that the regulatory environment has had over the years. Then, it will examine each company’s history and business model separately, focusing on the differences and similarities that could have led to different borrower and lender populations. Next, this paper analyzes loan descriptive statistics for each independent platform, focusing on Prosper’s to avoid redundancy. Finally, the scope is reduced to the years 2013 and 2014 to conduct an empirical comparison, concluding that Prosper’s high-risk loans outperformed Lending Club’s in 2013, while Lending Club’s low-risk loans outperformed Prosper’s in 2014.

1. Industry Background

Today’s banking industry fails to serve the borrowing needs of many entrepreneurs and small and medium enterprises, creating a financing gap between institutional lenders and borrowers. Although a bank can accurately determine the risk of giving a loan, in most cases it cannot tolerate the risk due to its conservatory balance sheet and/or regulatory requirements. This, in addition to the rise of the Internet, led to the emergence of the peer-to-peer (P2P) lending industry in the U.S. Prosper Marketplace was the first P2P company founded in the U.S. in 2005,
and the following year, Lending Club, the current largest player, followed. Online lending platforms match lenders directly with borrowers, skipping the need of using financial institutions as intermediaries. P2P lending takes advantage of reduced costs due to bank disintermediation and more efficient electronic distribution channels vis-a-vis traditional brick and mortar banks.

After the 2008 financial crisis, the P2P industry gained traction as banks started adopting more stringent lending policies, and alternative sources of credit became more relevant. The credit freeze served as a boost to the P2P industry, which has seen exponential growth in the last decade since, but it also caused an important shift in the mechanics and lending models of the main companies in the industry. The attention that the Big Banks gained for over-lending caused all credit providing organization to be under greater regulatory scrutiny, including P2P lending companies. Since the Securities and Exchange Commission (SEC) forced companies to register as issuers of securities, no P2P company in the U.S. operates under a pure peer-to-peer model anymore.

This section will describe the general mechanics of a peer-to-peer loan transaction, explaining the role the P2P company plays with both lenders and borrowers. Then, it will give an overview of the two largest P2P lending companies, Prosper Marketplace and Lending Club, providing brief historical context and highlighting main characteristics behind their business model.

1.1 P2P Lending Mechanics

P2P lending companies connect borrowers with individual and institutional lenders, assisting in the process of approving, pricing, and originating loans. The business model of these companies is transaction-based: they generate revenue from borrowers through origination fees and from lenders through annual service fees. When a borrower applies for a loan, the P2P company assesses whether the borrower is creditworthy and assigns the loan a rating based on the borrower’s FICO
score (as well as other attributes such as annual income and debt-to-income ratio) and an internal score based on historical company data. This rating is used to determine the loan’s interest rate and origination fee. (It is important to note that companies use different classifications for ratings, which are determined using different methods and are constantly updated over time.) Rated loans are then listed in the company’s online platform, where lenders can choose to fund a fraction of the loan. Once loans are fully funded, they are originated and lenders receive their prorated principal and interest due from the P2P company, which charges a service fee before distributing the proceeds. Loans which are not fully funded are not originated, and the committed funds are simply returned to the lenders.

Although both Prosper and Lending Club claim to match lenders directly with borrowers without any intermediation, neither actually offers a pure P2P lending model. Both companies simulate this model by assisting in the process of originating the loan and then selling it as a security to the lender.¹ This process is intermediated by a partner bank, which issues all loans originated through the lending platform, as shown in Figure 1.1.² Both Prosper and Lending Club partnered with WebBank, an industrial bank based in Salt Lake City, Utah. WebBank gives the borrower the proceeds of a given loan in exchange for a promissory note, and the P2P company aggregates funding from lenders to purchase the promissory note from WebBank.³ Once the P2P company owns the note, it collects from borrowers and distributes to lenders directly.

¹ https://www.frbsf.org/community-development/files/galloway_ian.pdf
³ http://scholarship.law.unc.edu/cgi/viewcontent.cgi?article=1305&context=ncbi
1.2 Prosper Marketplace Background

**History**

As mentioned earlier, Prosper Marketplace was the first P2P lending marketplace in the U.S. It first received funding in April of 2005, when it raised a $7.5M Series A round backed by Benchmark and Accel Partners, yet it wasn’t until February 5, 2006 that the website launched to the public.\(^4\) During the company’s first three years in business, Prosper loans were priced using an auction system which allowed lenders to determine the rate of a loan. This approach relied on lenders doing ample due diligence before bidding on a loan in order for it to be priced fairly, and it allowed them to buy into very risky credit. The auction-based system, in addition to Prosper’s original legal model, and the bursting of the late 2000’s credit bubble, led to very high default rates.

\(^4\) https://www.crunchbase.com/organization/prosper#section-overview
In October 2008, shortly after the beginning of the financial crisis, Prosper had to stop issuing loans as it became susceptible to regulation. A month later, the SEC issued a cease-and-desist letter considering Prosper an issuer of securities, arguing that although the company was not lending money itself, the lenders relied on Prosper’s efforts to realize a return on their investment. After a 9-month shutdown, Prosper issued a prospectus in July of 2009 in which it announced its registration with the SEC. The prospectus outlines its relaunch and partnership with WebBank, adopting the model explained in Section 1.1, in which Prosper notes are obligations of the company and not the original borrower. On December of the following year, Prosper released an amendment to the original prospectus, announcing that it will now use pre-set interest rates for loan listings rather than the original auction mechanism.

Since making both key adjustments to its lending model, Prosper loans have performed significantly better. The company has experienced rapid growth, becoming the second largest player in the industry with over 880,000 originated loans for a total borrowed amount of more than $11.3B since its inception. To this date, Prosper has remained a private company, raising over $419.5M from 33 different investors, with its most recent Series G round in September of 2017 for $50M on a $500M pre-money valuation.

Business Model and Platform Characteristics

As alluded to earlier, Prosper has a fee-based business model with two primary sources of revenue: transaction fees and servicing fees. Prosper assigns a proprietary credit rating to each loan referred to as the Prosper Rating, a seven-category letter system that indicates the level of risk.

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7 https://www.sec.gov/Archives/edgar/data/1416265/000141626510000555/prosperposam310d22d10.htm
8 https://www.crunchbase.com/organization/prosper#section-investors
associated with the loan (AA, A, B, C, D, E, and HR, in order from lowest to highest risk). The Prosper Rating is derived from two scores: (1) a TransUnion or Experian FICO 08 score and (2) a Prosper Score (ranging from 1 to 11, with 1 being the riskiest) which is calculated by using historical performance of previous Prosper borrowers with similar characteristics. All Prosper loans are unsecured consumer loans with terms of 36 or 60 months, except for a few 12-month term loans which were originated before 2013. The origination fee is determined by the Prosper Rating and term of the loan, ranging from 0.50% to 4.95%, as shown in Figure 1.2.1 below. In addition to the origination fee, Prosper charges a $15 late fee from borrowers who are 15 days late to their monthly payment and a 1% annual servicing fee from investors.9

![Figure 1.2.1 – Origination fees by Prosper Ratings and loan term (May 10, 2018)](https://www.prosper.com/plp/general-prosper_score/)

Additionally, the Prosper Rating along with the loan term and the borrower’s credit history within Prosper are used to determine the interest rate of the loan, as shown in Figure 1.2.2. The rates are reported as of the day this paper was written and have varying ranges according to the economic and competitive environment, which are determined internally by Prosper and are constantly updated, thus giving some flexibility to the company in pricing the loans. To become a borrower, Prosper’s main minimum criteria are a FICO 08 score above 640 and a debt-to-income ratio below 50%. The amount borrowed should be higher than $2,000 and lower than $35,000.

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9 [https://www.prosper.com/plp/general-prosper_score/](https://www.prosper.com/plp/general-prosper_score/)

Lenders, on the other hand, are required to be 18 years old, have a valid Social Security number and bank account, and must pass an identity verification process. Depending on their state of residence, lenders may also need to meet additional requirements like such as a minimum annual gross income or net worth, or a maximum amount of their whole total investment portfolio invested in Prosper loans. The minimum investment amount on a loan is $25, which is also the minimum amount required to open an account.

<table>
<thead>
<tr>
<th>Prosper Rating</th>
<th>Loan Term (yrs)</th>
<th># Previous Prosper Loans</th>
<th>Borrower Rate</th>
<th>Borrower APR***</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Min</td>
<td>Max</td>
</tr>
<tr>
<td>AA</td>
<td>3</td>
<td>0</td>
<td>5.32%</td>
<td>7.36%</td>
</tr>
<tr>
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<td>5</td>
<td>0</td>
<td>7.36%</td>
<td>7.36%</td>
</tr>
<tr>
<td>AA</td>
<td>3</td>
<td>1+</td>
<td>5.32%</td>
<td>5.99%</td>
</tr>
<tr>
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<td>10.43%</td>
</tr>
<tr>
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<td>10.43%</td>
</tr>
<tr>
<td>A</td>
<td>3</td>
<td>1+</td>
<td>7.49%</td>
<td>10.43%</td>
</tr>
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</tr>
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<td>13.46%</td>
</tr>
<tr>
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<td>0</td>
<td>10.76%</td>
<td>13.46%</td>
</tr>
<tr>
<td>B</td>
<td>3</td>
<td>1+</td>
<td>10.76%</td>
<td>13.46%</td>
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</tr>
<tr>
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</tr>
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<td>0</td>
<td>13.99%</td>
<td>17.97%</td>
</tr>
<tr>
<td>C</td>
<td>3</td>
<td>1+</td>
<td>13.99%</td>
<td>21.80%</td>
</tr>
<tr>
<td>C</td>
<td>5</td>
<td>1+</td>
<td>13.99%</td>
<td>17.97%</td>
</tr>
<tr>
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<td>18.80%</td>
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</tr>
<tr>
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<td>0</td>
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<td>22.48%</td>
</tr>
<tr>
<td>D</td>
<td>3</td>
<td>1+</td>
<td>18.80%</td>
<td>26.15%</td>
</tr>
<tr>
<td>D</td>
<td>5</td>
<td>1+</td>
<td>18.80%</td>
<td>22.48%</td>
</tr>
<tr>
<td>E</td>
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<td>30.70%</td>
</tr>
<tr>
<td>E</td>
<td>5</td>
<td>0</td>
<td>23.44%</td>
<td>27.04%</td>
</tr>
<tr>
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<td>1+</td>
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<td>30.70%</td>
</tr>
<tr>
<td>E</td>
<td>5</td>
<td>1+</td>
<td>23.44%</td>
<td>27.04%</td>
</tr>
<tr>
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<td>27.75%</td>
<td>31.90%</td>
</tr>
<tr>
<td>HR</td>
<td>3</td>
<td>1+</td>
<td>27.75%</td>
<td>31.90%</td>
</tr>
</tbody>
</table>

Figure 1.2.2 – Interest rate by Prosper Ratings, loan term and Prosper history (May 10, 2018)
1.3 Lending Club Background

History

Lending Club was founded in late 2006, and shortly after raising $2M in angel funding, it launched as one of Facebook’s first applications in May 2007. Originally, Lending Club intended to have a social networking angle in order to leverage trust, where the goal was to use Facebook’s platform to connect lenders with borrowers within their shared network. However, only 3 months later it decided to switch gears and launch under its own independent online platform, after raising a Series A round of $10.3M from Northwest Venture Partners and Canaan Partners in August 2007.

When the financial crisis was still in its early stages, and the SEC had just started to pay more attention to Prosper’s high default rates, Lending Club foresaw the direction the regulatory environment was heading towards. On April 2008, Lending Club decided to voluntarily suspend operations and cooperate with the SEC by filing a registration to become securities issuers. By October 2008, when Prosper’s shut-down period had just began, Lending Club had already gone through the process of registration and it had already resumed operations. This 9-month period in which Prosper wasn’t competing was pivotal for Lending Club, as they managed to capture a lot of the significant market share in this rapidly growing sector.

In the following six years, Lending Club saw tremendous growth in the path towards its IPO. It received funding from 11 additional venture rounds between March 2009 and August 2014, raising over $380M from 23 different investors, including important players such as Union Square Ventures.
Ventures, Thomson-Reuters, and Google Capital. In November 2012, Lending Club announced it had surpassed $1B in loans issued and was already cash flow positive. In April 2014, when it raised its latest venture round placing it at a $3.7B pre-money valuation, Lending Club acquired Springstone Financial for $140M to increase its foothold in the education and healthcare credit market. On August 2014, Lending Club filed for an IPO with the SEC and the offering took place on December 10, 2014, raising $865.5M in what was the largest U.S. tech IPO of 2014. After its first day of trading, the stock was up 56%, valuing the company at almost $8.5B. To this day, Lending Club remains the world’s largest peer-to-peer lending company, having issued over $33B to more than 2,000,000 customers.

Loan Manipulation Speculations

In May 2016, a scandal caused Renaud Laplanche, Lending Club’s CEO, to resign. An employee had reported that the origination dates of around $3M of loans had been altered. After further investigation, an internal auditor found out that $22M of loans had been sold to Jefferies investment bank that did not meet the investor’s criteria, and that Laplanche did not disclose to the board that he had a stake on an investment fund which the company was considering investing in. This sequence of events led to the board losing confidence in Laplanche and led to his resignation.

Lending Club’s public issuance allowed the company to grow at staggering rates, yet it also eventually led to issues of conflict of interest from management and lack of trust form investors. The news of 2016 have been the only reported case of loan manipulation in the company’s history.

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16 https://www.nytimes.com/2016/05/10/business/dealbook/as-lending-club-stumbles-its-entire-industry-faces-skepticism.html?_r=0
yet many skeptics believe that there are incentives to make this a continuing practice. With financial earnings being reported every quarter and revenues coming mostly from origination fees, there is an opportunity for management to originate more loans when approaching earnings in order to influence the stock price. Since Lending Club assesses the interest rate for any loan at their own disclosure, a simple way to inflate numbers would be by pricing riskier loans more expensively (with lower interest rates) in order to meet demand that comes mostly from institutional investors which have less risk tolerance. This could be done by changing the internal algorithms that determine the credit rating for a given borrower’s profile, and since it is done internally and does not require disclosure, it would be hard for the public to detect.

Business Model and Platform Characteristics

Lending Club has its own proprietary methodology to determine the credit level of a borrower and the price of a loan. The company assesses the credit risk of a loan by assigning a Lending Club grade, ranging alphabetically from A to G with five more granular sub-grades numbered 1-5 for each (ranging from A1 to G5 in order of from lowest to highest risk). Once an application is approved, the Lending Club sub-grade is determined by its Model Rank. The Model Rank ranges from 1 to 25 and is calculated based on an internal algorithm that compares the performance of other Lending Club borrowers with similar characteristics, and takes into account additional credit attributes such as the FICO score. Then, modifiers are used on the Model Rank to adjust for the requested loan amount and term-length, finally arriving at a final Lending Club sub-grade. Figure 1.3.1 below shows the interest rates associated with each loan based on its Lending Club sub-grade at the time this report was written, as it is important to emphasize that the
Interest rates per segment are updated constantly based on the economic environment and can change over time. \[\text{Need to add the date it was accessed as it may changed with time.}\]

<table>
<thead>
<tr>
<th>Loan Grade</th>
<th>Interest Rate</th>
<th>Loan Grade</th>
<th>Interest Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 1</td>
<td>5.31%</td>
<td>D 1</td>
<td>17.47%</td>
</tr>
<tr>
<td>A 2</td>
<td>6.07%</td>
<td>D 2</td>
<td>18.45%</td>
</tr>
<tr>
<td>A 3</td>
<td>6.71%</td>
<td>D 3</td>
<td>19.42%</td>
</tr>
<tr>
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<td>7.34%</td>
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</tr>
<tr>
<td>A 5</td>
<td>7.96%</td>
<td>D 5</td>
<td>21.85%</td>
</tr>
<tr>
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<td>9.43%</td>
<td>E 1</td>
<td>22.90%</td>
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<td>9.92%</td>
<td>E 2</td>
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<td>E 4</td>
<td>25.81%</td>
</tr>
<tr>
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<td>E 5</td>
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</tr>
<tr>
<td>C 2</td>
<td>13.58%</td>
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</tr>
<tr>
<td>C 3</td>
<td>14.07%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C 4</td>
<td>15.04%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C 5</td>
<td>16.01%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 1.3.1 – Interest rate by Lending Club sub-grade (May 10, 2018)

Lending Club has a business model that generates revenue from origination and servicing fees, with very similar characteristics to Prosper’s. All loans originated by Lending Club have either 36 or 60 month terms, with fixed interest rates and equal payments. The origination fee ranges from

\[\text{https://www.lendingclub.com/foliofn/rateDetail.action}\]
1.11% to 5.00% and is determined by the Lending Club sub-grade and its term length, as can be seen from Figure 1.3.2. In addition to the origination fees, Lending Club charges the same $15 late fee from borrowers and 1% annual service fee from investors as Prosper does. The minimum criteria to become a Lending Club borrower is more lenient than Prosper’s, while to become an investor it is slightly stricter. A borrower needs a FICO score greater than 600, a debt-to-income ratio lower than 40%, and the amount borrowed has to be between $1,000 and $40,000. Lending Club lenders have the same requirements as Prosper’s, except for the fact that the minimum amount required to open an account is $1,000 instead of $25, with the minimum investment amount per loan being $25 for both platforms.

<table>
<thead>
<tr>
<th>Loan Term</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-Grade</td>
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<td>2-3</td>
<td>4-5</td>
<td>1-5</td>
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<td>1-5</td>
</tr>
<tr>
<td>36-Month</td>
<td>1.11%</td>
<td>2.00%</td>
<td>3.00%</td>
<td>4.00%</td>
<td>5.00%</td>
<td>5.00%</td>
<td>5.00%</td>
</tr>
<tr>
<td>60-Month</td>
<td>3.00%</td>
<td>3.00%</td>
<td>3.00%</td>
<td>5.00%</td>
<td>5.00%</td>
<td>5.00%</td>
<td>5.00%</td>
</tr>
</tbody>
</table>

Figure 1.3.2 - Origination fees by Lending Club sub-grade and loan term (May 10, 2018) (as before, add the date accessed)

2. Loan Descriptive Statistics

Since Lending Club maintains an updated interactive website to view descriptive statistics on its loans, this section will mostly focus on Prosper Market loans and will direct readers to the relevant resources in Section 2.2.  

2.1 Prosper Market Loans

Data Selection and Pre-processing

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[18] https://www.lendingclub.com/info/demand-and-credit-profile.action
Prosper data is publicly available and can be downloaded online as CSV files. There are two types of files: Loan Data files and a Listing Data files, both of which are broken down split into multiple files segmented by year. The Loan Data contains an entry for every loan that has been originated, each with 22 attributes including the amount borrowed, borrower rate, Prosper Rating, term, origination date, and loan status, among others. The Listing Data contains an entry for every loan that has ever been listed (even if it was not approved and or originated), each with the same attributes as the Loan Data, in addition to detailed information about each the borrower. The borrower’s attributes range from the FICO score to the employment title, annual income, home ownership status, among others, in addition to very specific credit bureau underwriting elements from either TransUnion or Experian, totaling 862 attributes in aggregate. For the purposes of this project, only the Loan Data files will be used, since the intention is to get a descriptive comparison of the loans themselves, and not of the borrowers.

The data shown on used to generate the following descriptive statistics includes all loans originated between January 1st, 2013 and December 31st, 2017. These dates were chosen selected since they bound a stable period with regards to Prosper’s lending model; that is, after they registered with the SEC, moved from an auction-based to a pre-set interest rate system, and stopped issuing 12-month term loans. Additionally, only loans that have been terminated will be considered to avoid introducing biases in the analysis. (I think it is important here to mention that another important reason is that we want to focus on terminated loans to avoid introducing biases in the comparisons.) The main attributes analyzed, as they appear in order, are: loan status, term, Prosper Rating, amount borrowed, duration, interest rate, percentage of default, and average returns. Each attribute is analyzed in comparison with different subsets of the same data set. For instance, the Prosper Ratings are compared based on their loan status, while the average returns are compared
based on their loan status, term, and Prosper Rating. All attributes could’ve been compared against all other subsets of the data set; the ones shown below were chosen based on the relevance of the comparison. The attributes themselves were chosen selected based on their relevance with regards to the comparison with Lending Club loans that will be presented in Section 3.

Loan Status

The loans are classified in the following status categories: Current – if the loan is currently active and making payments on time; Completed – if the loan has been fully paid fully– either on time or early; Defaulted – if the borrower fails to pay after 30 days; Charged-off (?) – if the borrower fails to pay after 120 days, or if it has been sold to a debt collecting agency; and Cancelled – if the loan was approved but then Prosper failed to verify the borrower’s identity. Figure 2.1.1 shows presents the loan status breakdown as shown in the original data set. As mentioned earlier, since Current and Cancelled loans are not relevant for the analysis to come conducted in this work, they were dropped from the data. Unless indicated otherwise, the rest of this section refers to “All Loans” as the data subset with Current and Cancelled loans removed, which contains 388,757 loans for a total amount borrowed slightly above $5B. The loan status distribution of the “cleaned” data set is shown in Figure 2.1.2.

19 https://www.orchardplatform.com/blog/understanding-loan-statuses/
Further, to differentiate among the Completed loans which ones were prepaid, a duration variable is created. The duration indicates the lifetime value of a loan in months, rounded to the nearest month. Duration is defined as the next payment due date subtracted by the origination date, divided by the average days in a month (30.44), rounded to the nearest integer. Note that for Completed loans, the next payment due date is the last recorded payment date. In short:

$$\text{Duration} = \text{round}\left(\frac{Next \ Payment \ Date - Origination \ Date}{Avg. \ Days \ in \ a \ Month}\right)$$

With the new duration variable, Completed loans are now broken down into two categories: Early Paid and Paid on Time. An Early Paid loan is one which is already completed and the difference between it term length and its duration is greater than 10% of its term length. For instance, if a 36-month loan has a duration of 28, it is labeled as Early Paid since the difference between the term length and its duration (8) is greater than 10% of its term length (3.6). Completed loans that are not labeled as Early Paid are labeled Paid on Time. Additionally, for simplification purposes, Chargeoff and Defaulted loans are combined into one category labeled simply as Defaulted. Figure 2.1.3 shows the new distribution of loans after adjusting for both the early paid and default adjustment loans.
Loan Term

Figures 2.2.1 and 2.2.2 show the term loan distribution of loans with term of 36-months and 60-months, respectively. Note that the reason that only 0.4% of all 60-month loans are labeled as Paid on Time. This follows from the fact that there are only 60 months of data in the data set under consideration (from January 1, 2013 to December 31, 2017).

As can be seen from the term distribution on Figure 2.1.6, about 74% of all loans have 36-month terms. Out of the Defaulted loans, 64% are 36-month while 77% of the Completed loans have a 3-year term. Within the Completed loans, virtually none of the loans that are Paid
on Time loans have a 60-month term, but as mentioned earlier, this is because there are only 60 months of data in the data set.

Figure 2.1.6 – Term Length Distribution by Loan Status

Prosper Rating

As mentioned in Section 1.2, Prosper assigns to each loan a Prosper Rating according to its risk level, ranging from AA to HR. Figure 2.1.7 shows the number of loans per Prosper Rating, in addition to the loan status distribution within each Rating. Roughly one fourth of all loans are C-rated, while only slightly more than 2% are HR-rated, or high-risk. The default percentage increases as the rating is riskier, except for loans rated E which default less frequently than D-rated loans. The opposite occurs with loans Paid on Time, which are less common with riskier loans, again except for E-rated loans which have a higher percentage of being paid early relative to loans rated B or C.
The average amount borrowed on a loan is $12,974. Figure 2.1.8 shows the frequency of amounts borrowed from all loans; the histogram is right-tailed, with a median of $11,500 and a high standard deviation of $7,755. Interestingly, as it can be seen from Figures 2.1.9 and Figure 2.1.10, the shape of both Defaulted and Completed loan histograms is merely identical, although it is important to note that the median amount borrowed are $12,000 and $11,00 respectively.
As mentioned earlier, the loan duration of a loan indicates its lifetime in months. Figure 2.1.11 shows the duration distribution of Completed loans, with a median of 21 months and a standard deviation of 10.74 months. The average duration of a Completed loan is 20.52 months. Given the high percentage of Early Paid loans, it makes sense to observe that the average duration is well significantly lower than the loan’s term. However, it is interesting to notice that 60-month loans have a shorter average duration (≈20.85 months) than relative to 36-month loans (≈19.77 months). Figures 2.1.12 and Figure 2.1.13 show the duration distribution of 36 and 60-month loans, respectively, which have a shape that roughly mirrors each other; the former is left-tailed with a median of 21 months and a standard deviation of 10.93 months, whereas the latter is right-tailed with a median of 20 months and a larger standard deviation of 12.06 months.
Furthermore, it is interesting to note that Early Paid loans have a shorter duration than Defaulted loans. A loan is early paid on average after 17.60 months, and it defaults on average after 21.25 months. Figures 2.1.14 and Figure 2.1.15 show the duration distribution of Early Paid and Default Loans respectively; the former is right-tailed with a median of 18 months and a standard deviation of 9.76 months, whereas the latter is roughly symmetrical with a median of 21 months and a standard deviation of 8.63 months.
As mentioned in Section 1.2, the interest rate of a loan is mainly determined by its Prosper Rating. The interest rate distributions for every Prosper Rating are shown in Figure 2.1.16. There is an interest rate lower and upper bound for each Prosper Rating, as it was shown earlier in Figure 1.2.2, however, these bounds change over time as Prosper adjusts for market conditions, which explains the overlap of the histograms below.

The interest rate of a loan is on average 15.22%. However, this varies depending on the loan status and the term. Figures 2.1.17 and Figure 2.1.18 show the interest rate distribution by loan...
status and term length, respectively. As one would expect, Defaulted loans have the highest average interest rate at 17.41%, and loans that are Early Paid have a slightly higher average interest rate, at 14.60%, than those Paid on Time, at 14.08%. Also, the average interest rate for 60-month loans is 17.13% which is higher than the 14.54% of 36-month loans.

Default Percentage

The percentage of default varies depending on the loan’s Prosper Rating and term, as one would expect. Figures 2.1.19 and Figure 2.1.20 show the percentage of loans that have defaulted for every Prosper Rating and term length, respectively. This suggests that Prosper does a good job assessing how risky a loan is, since the percentage of default is higher for loans labeled with a riskier Prosper Grade. However, once a loan is D-rated or worse, the percentage of default doesn’t change as significantly as the jumps between each rating from AA to C. Also, 60-month loans have a much higher percentage of default than 36-month loans.
Finally, the average return is the return that investors get on a given loan, based on the actual cash flows reported. This is different than the interest rate since when a loan is defaulted or prepaid, the returns are no longer what they were promised originally, hence the risk. The average return is computed as the total principal and interest paid to the investor minus the amount borrowed, divided by the amount borrowed. This is then computed annually by multiplying the return times 12 (for every month) and dividing it by the term length. Note that this computation does not consider compounding, excludes any fees paid by the investor or borrower, and assumes that if a loan is Early Paid the proceeds are not reinvested. In short:

$$\text{Average Return} = \frac{\text{Principal Paid} + \text{Interest Paid} - \text{Amount Borrowed}}{\text{Amount Borrowed}} \times 12 \times \frac{1}{\text{Term Length}}$$

The average return of any loan in the data set is -0.34%. This number is negative because when a loan is Defaulted, part of the principal and/or interest is not repaid, resulting in cash inflows being lower than outflows, namely the amount borrowed. Figure 2.1.21 shows the average return by loan status, showing how Defaulted loans are largely negative making the total average...
lower. Early Paid loans have lower average returns than relative to loans Paid on Time since, although the full principal is repaid, part of the anticipated interest is not paid received. As mentioned in the Duration sub-section above, a loan is prepaid on average after 17.60 months, leaving roughly half of the expected interest rates unpaid for 36-month loans and more than a third for 60-month loans.

![Figure 2.1.21 – Average Return by Loan Status](image)

Average returns vary depending on the loan’s Prosper Rating and its term length. To get a clearer picture, *Figure 2.1.22* and *Figure 2.1.23* show the average return for every Prosper Rating and term length, respectively, for all loans and for Completed loans only. This allows us to analyze average returns regardless of probability percentage of default. If we were to look at the subset of Completed loans which were Paid on Time, we would see that the average returns are the same as the average interest rates, as expected. It is worth noting that the average returns by Prosper Rating behave inversely when looking at all loans vs. Completed loans. The riskier the loan, the lower the return is, yet logically, if the loan is not Defaulted, the riskier the loan, the higher the return is. This is true for all except E-rated loans, which have a higher average return than C and D rated loans, which indicates that those have lower default rates and/or prepaid rates, on aggregate. Average returns by term-length, on the other hand, are higher for shorter loans regardless of their default status.
2.2 Lending Club Loans

The descriptive statistics shown for Prosper above have been replicated for Lending Club’s loans and can be found in the appendix from Figures 2.2.1–2.2.21. Additionally, Lending Club maintains a website updated every month with interactive charts for different loan features. The loans statistics include historical returns by grade, average interest rate, grade mix over time, loan

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20 https://www.lendingclub.com/info/demand-and-credit-profile.action
performance details, net annualized return by vintage, and loan status migration over 9 months. Some of the charts are more relevant than others in this context. The more important insights for the purposes of this paper are shown reported in Section 3, where we present a side-by-side empirical comparison of both platforms.

3. Comparison of Prosper Market and Lending Club

Data Pre-processing

The motivation behind the comparison in this section is to take the position of a small, unsophisticated investor interested in peer-to-peer loans, and assess which platform is better for him/her to invest through based on his/her risk profile. It is important to notice that the nature of the analysis is historical and not prescriptive, and the insights that are relevant for past years are not necessarily useful for future years. The analysis will focus on two key metrics that were defined in Section 2: average returns and default rates. In general, one would expect default rates to behave inversely to average returns, or at least in opposite directions. Higher average returns tend to have lower default rates, and vice versa.

The data set has been narrowed down to focus only on loans that have been through a “full cycle”, meaning loans that were termed to terminate earlier than the day this analysis began. If we were to look at any terminated loan, those with an origination date after December 31, 2015 would create a bias towards a higher proportion of Default and Early Paid loans. This bias would influence both compared key metrics. Additionally, as was shown in Figures 2.1.5 and 2.1.6, virtually no 60-month loans were Paid on Time, since there are only 60 months of data in the data set. Given these restrictions, the narrowed data set used in this section includes only 36-month loans originated in 2013 and 2014, which comprises of 100,860 Prosper loans with a total
amount borrowed of $1.1B and 261,807 Lending Club loans with a total amount borrowed of $3.3B.

**Interest Rate Segmentations**

As mentioned earlier, Prosper and Lending Club use different classifications for ratings, which are determined using different methods and that are constantly updated over time. Prosper Ratings cannot be easily translatable into Lending Club sub-grades, nor vice versa, because even if the interest rate thresholds are adjusted to fit each other, those bounds have been updated quarterly depending on the economic environment. Instead, to avoid confusions, we have determined our own interest rate bounds by splitting loans into three segments ranging from I-III representing low-risk, medium-risk, and high-risk loans respectively, as can be seen in Table 3a. Rather than using a sophisticated methodology to determine the interest rate thresholds in each segment, we have taken a simple approach keeping in mind the perspective of a small investor and choosing round numbers that allude to the level of risk in an easily understandable way. In order to identify more granular differences, we have gone a step further and done also consider a five-bucket segmentation with loans ranging from I-V, as shown in Table 3b.

<table>
<thead>
<tr>
<th>I</th>
<th>II</th>
<th>III</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.31% - 10.00%</td>
<td>10.00% - 15.00%</td>
<td>15.00% - 31.92%</td>
</tr>
</tbody>
</table>

Table 3a – Segmentation by three levels of risk

<table>
<thead>
<tr>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.31% - 7.50%</td>
<td>7.50% - 10.00%</td>
<td>10.00% - 15.00%</td>
<td>15.00% - 20.00%</td>
<td>20.00% - 31.92%</td>
</tr>
</tbody>
</table>

Table 3b – Segmentation by five levels of risk

The reason the lower risk segments have a narrower range is because there are more loans issued within those interest rates than the higher ones. Also, from an investor’s perspective, a 15.00% loan is already considered to be pretty high risk, while the risk perspective of a 6% interest rate
loan and a 10% one is more clearly different. Loans with an interest rate between 10.00% - 15.00% would fall in the middle segment in both segmentations. Originally, a statistical segmentation was attempted, where the thresholds on each segment were decided based on the number of loans in different quantiles of the combined data set. However, when looking at the distribution of the segments in each individual platform (Prosper and Lending Club), the proportion of loans in each segment were not nearly similar to the original distribution. This caused an uneven comparison which wasn’t representative of the loan’s performance on each platform per risk level of risk.

Comparison Methodology

To avoid comparing loan performance on different population sizes per segment, small random samples are used. Out of each segment, a sample varying in size is chosen at random and the average return and default rate is computed. In order to be statistically robust, the random sample is taken 100 times and the average of all the simulations is recorded. On the three-segmented comparison, the sample size ranges from 100-2,000 while in the one-analysis, with five segments the sample size only ranges from 50-500, given the more dispersed distribution.

The figures displayed in this section have the sample size as the x-axis and the key metric compared, average returns or default rate, as the y-axis. A color-coded legend is used to distinguish between risk segments, and a dashed line represents Prosper’s metric while a solid one line represents corresponds to Lending Club’s. The delta indicated in the analysis is calculated as the difference in the metric between both platforms for the largest random sample size simulation (2,000 for three-segment charts and 500 for five-segment charts), and is reported per segment and in basis points. Average returns will be compared first, followed by default rates. For each metric, the analysis will be on loans split by both three and five segmentations for each of 2013 and 2014, but the deltas discussed values mentioned will be based on the three-segmentation
breakdown. The deltas for five segmentations will be analyzed separately by looking at the trend line of Prosper’s metric minus Lending Club’s (Prosper – LC Δ) per segment per year, where a negative delta means Lending Club outperformed Prosper, and vice versa.

3.1 Average Returns

In 2013, when looking at three segmentations, Prosper loans outperformed Lending Club’s for all interest rate segments. As can be seen from Figure 3.1.1, the dashed line is above the solid one in all three categories. The difference between both platforms is much greater within high-risk loans, with a delta of 113 bps, while both segments I and II only have a delta of 14 and 13 bps respectively. However, when taking a more granular look at the average returns split by five segmentations, Lending Club’s lowest-risk loans in segment I actually outperform Prosper’s slightly. Prosper loans in segments II-V outperform Lending Club’s across the board, but most significantly in the highest-risk segment.

Figure 3.1.1 – 2013 Prosper vs. Lending Club average returns using three segments
Figure 3.1.2 – 2013 Prosper vs. Lending Club average returns by using five segments

The following year, in contrast, there wasn’t a clear outperforming platform. In 2014, Lending Club low-risk and medium-risk loans performed better than Prosper’s, while Prosper high-risk loans performed slightly better than Lending Club’s, as seen in Figure 3.1.3. Medium-risk loans (i.e., the ones in segment II), have the largest delta of all segments in that year with Lending Club outperforming Prosper by 47 bps. Loans in segments I and III perform better than their counterparts by 26 and 19 bps respectively, with the former having higher average returns for Lending Club and the latter for Prosper. Interestingly, when segmenting further, Prosper’s II tier loans perform virtually the same as Lending Club’s tier I loans, as can be seen in Figure 3.1.4. Prosper high-risk loans in segments IV and V perform only slightly better than Prosper’s.
As discussed earlier, Prosper loans of all tiers except the lowest risk one outperformed Lending Club’s in 2013, while in 2014 only high-risk loans did so. As it can be seen in Figure 3.1.5, in 2013 Lending Club segment-I loans only performed better than Prosper’s by 10%.
bps, while Lending Club’s II-V loans performed increasingly better than Prosper’s as the level of risk increased (except for a small hiccup between segment II and III), with deltas of 22, 9, 43, and 107 bps, respectively. In 2014, on the other hand, Lending Club I-III loans outperformed Prosper’s increasingly by 21, 30, and 44 bps respectively, yet switching directions completely once the for high-risk loans got of higher risk, with Prosper IV and V loans outperforming Lending Club’s slightly by 7 and 9 bps respectively. In both years, the lowest-risk loans performed better for Lending Club and the highest-risk ones for Prosper.

3.2 Default Rates

In 2013, default rates are higher for low-risk and medium-risk Lending Club loans, as expected from their lower average returns, yet surprisingly they are higher for high-risk Prosper loans. Figure 3.1.7 shows that for high-risk loans, Prosper has higher default rates than Lending Club, despite its significantly higher average returns shown in Figure 3.1.1 above. Lending Club loans have higher default rates than Prosper’s in segments I and II by 131 and 92 bps respectively, while the inverse is true by 96 bps for segment-III loans. Additionally, in a similar way
average returns, when breaking it down into five segments, Lending Club no longer has higher default rates for the least risky loans, as can be seen in the segments of Figure 3.1.7.

**Figure 3.1.7** – 2013 Prosper vs. Lending Club default rates **using** three segments

**Figure 3.1.8** – 2013 Prosper vs. Lending Club default rates **using** five segments
In 2014, when splitting by considering three segmentation segments, the default rates were higher for Prosper for low-risk loans and almost the same for both other segments, again, including high-risk loans where Prosper had higher average returns. As can be seen from Figure 3.1.9, the lowest-risk loans have the most significant delta compared to the other two other segments, with Prosper defaulting more frequently than Lending Club by 138 bps, while only doing so by 7 and 17 bps in I and II loans respectively. When segmenting further, high-risk loans had higher default rates for Lending Club.

Figure 3.1.9 – 2014 Prosper vs. Lending Club default rates using three segments
When looking at loans split by five segmentations, the deltas in default rates vary significantly in almost every segment between both years. As it can be seen from Figure 3.1.11, loans in segments I and V in 2013 had almost the same default rates, with only an 11 and 10 bps delta, respectively, while the ones in between had higher default rates for Lending Club by 186, 116, and 242 bps for segments II-IV respectively. In 2014, loans in segment III had roughly equal default rates, the riskier ones had higher default rates for Lending Club by 209 and 110 bps for segments IV and V respectively, and the ones in segments I and II having higher default rates for Prosper by 72 and 152 bps, respectively, creating a roughly symmetrical shape as shown in Figure 3.1.11. Loans in segment IV remain the ones where Lending Club has the highest delta in default rates over Prosper in both years, while the delta of loans in segment II changed most drastically in between years, having higher default rates for Lending Club (resp. Prosper) in 2013 and higher for Prosper in 2014 (resp. 2014).
3.3 Average Returns vs Default Rate Discordance

As mentioned earlier, it is expected that average returns to behave in the opposite direction than default rates, with high average returns coinciding with low default rates, and vice versa. When looking at all five segments for both years, in eight out of ten cases that this was indeed the case. However, for high-risk loans in 2013 and medium-risk loans in 2014, this relationship did not hold. In 2013, Prosper V loans had higher average returns than Lending Club’s by 107 bps, yet the default rates were only 10 bps lower, as shown in Figures 3.1.5 and 3.3.11. Similarly, in 2014, Lending Club III loans outperformed Prosper’s by 44 bps, while the default rates were actually 6 bps higher. Two possible explanations for this effect can be (i) significantly higher offered average interest rates or (ii) higher than usual Early Paid rates.

In the case of Prosper’s high-risk loans of 2013, the discrepancy is explained by the fact that the loans have significantly higher offered average interest rates compared to Lending Club’s. The average interest rate of Prosper V loans in 2013 is 25.45%, while the ones for the same segment and year for Lending Club have an average interest rate of only 21.62%, a delta of 383 bps. This is the only segment that year where the difference in average interest rates is higher by more than
Despite the higher default rates, the average returns are still higher for Prosper loans since the interest rates are consistently higher.

However, the same is not true for Lending Club’s medium-risk loans of 2014. The average interest rates of both Prosper and Lending Club loans in segment III of that year are almost the same, relatively similar, the former being 12.34% and the latter 12.73%, only a 39 bps difference. Further, when looking at Early Paid rates, the discordance is not clearly explained either. One would expect Prosper loans to have significantly higher Early Paid rates to explain why Lending Club loans performed better despite their higher default rates. However, Prosper actually had lower Early Paid rates, at 49.12% compared to Lending Club’s 51.68%. The explanation behind this unusual behavior is not clear and could lie behind other factors not being considered in this calculation. I think we need to find a good explanation for this. This is not good to finish the thesis with this unsolved result, in my opinion. Also, it has to be the case that one of the two reasons holds. Maybe, you can check the time of early payment and/or the time of default, could lie behind the duration of both Early Paid and Default loans. Loans that are not Paid on Time account for 63.19% of Prosper loans and 65.81% of Lending Club loans in this segment. The average lifetime of a Prosper Default and Early Paid loan is 17.92 and 18.14 months, while for Lending Club the durations are 24.34 and 24.12 months, respectively. There is approximately a 6 month difference in duration in roughly two thirds of the loans where the borrower does not pay interest. This could account for the discrepancy in average returns and default rates for Lending Club III loans versus Prosper’s during 2014.

4. Conclusion and Further Research

In summary, relative loan performance varied greatly for different risk levels of risk in across years, and in some cases the default rates were in discordance with the average
returns. Overall, average returns decreased and default rates increased between 2013 and 2014. In 2013, Prosper loans performed better than Lending Club’s for all risk levels except for those with the lowest interest rates, where Lending Club performed slightly better. In 2014, Lending Club’s low-risk loans performed significantly better than Prosper’s while Prosper high-risk loans performed only slightly better than Lending Club’s.

Furthermore, Prosper riskiest loans in 2013 and Lending Club’s medium-risk loans in 2014 performed significantly better than its counterpart, despite default rates being roughly the same in both cases. The reasons for the discordance in the 2014 loans are not clear, and intuitive explanations like high Early Paid rates or consistently high interest rates are not sufficiently evident. This could be an area for further research. This discordance can be explained by higher average interest rates and lower durations on Early Paid and Default loans.

In conclusion, Prosper and Lending Club are intrinsically different platforms and are not straight-forward to compare. Although both companies have very similar business models, they have a different organizational history that has shaped their lending policies and market positions, and different borrower and lending requirements that lead to a different population of applicants. In this analysis, borrower’s selection bias was ignored, a crucial yet difficult factor to control. When conducting an empirical comparison. In further research, Heckman appropriate econometrics tools could be used to control and adjust for this selection bias. However, when taking the position of a small-private unsophisticated investor, there are some interesting insights to take note on. Depending on the risk profile of said investor, holding a portfolio of high-risk Prosper loans issued in 2013 or low-risk Lending Club loans issued in 2014 would’ve yield better relative returns. Yet, to truly achieve best returns, an investor should’ve hand-selected loans based on specific internal criteria that meet the desired risk profile in
order to avoid high default rates. Bottom line, the difference between using either platforms shows to be relatively small, and there is not one clear better clear winner among both P2P companies than the other platforms.
5. Appendix

Lending Club Loans

Loan Status

Figure 3.1.1 — Loan Status Distribution

Figure 3.1.2 — Loan Status Distribution of 36-month Loans

Figure 3.1.3 — Loan Status Distribution of 60-month Loans
Term Length

Figure 3.1.4 – Term Length Distribution by Loan Status

Figure 3.1.5 – Prosper Rating Distribution by Loan Status
Amount Borrowed

Figure 3.1.6 – Amount Borrowed Distribution of All Loans

Figure 3.1.7 – Amount Borrowed Distribution of Defaulted Loans

Figure 3.1.8 – Amount Borrowed Distribution of Completed Loans
Figure 3.1.9 – Duration of All Loans

Figure 3.1.10 – Duration of 36-month Loans

Figure 3.1.11 – Duration of 60-month Loans

Figure 3.1.12 – Duration of Early Paid Loans

Figure 3.1.13 – Duration of Defaulted Loans
Interest Rates

Figure 3.1.14 – Interest Rate by Prosper Rating

Figure 3.1.15 – Interest Rate by Loan Status

Figure 3.1.16 – Interest Rate by Term
**Default Percentage**

<table>
<thead>
<tr>
<th>Letter</th>
<th>Default Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>6.38%</td>
</tr>
<tr>
<td>B</td>
<td>13.77%</td>
</tr>
<tr>
<td>C</td>
<td>23.14%</td>
</tr>
<tr>
<td>D</td>
<td>31.60%</td>
</tr>
<tr>
<td>E</td>
<td>40.43%</td>
</tr>
<tr>
<td>F</td>
<td>46.88%</td>
</tr>
<tr>
<td>G</td>
<td>50.87%</td>
</tr>
</tbody>
</table>

*Figure 3.1.17 – Default Percentage by Prosper Rating*

<table>
<thead>
<tr>
<th>Term</th>
<th>Default Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>36-month</td>
<td>17.07%</td>
</tr>
<tr>
<td>60-month</td>
<td>34.52%</td>
</tr>
</tbody>
</table>

*Figure 3.1.18 – Default Percentage by Term*
Average Return

Figure 3.1.19 – Average Return by Loan Status

Figure 3.1.20 – Average Return by Prosper Rating

Figure 3.1.21 – Average Return by Term