Prosper Data Visualisation

Udacity Data Analyst Nanodegree

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Summary

Prosper (https://www.prosper.com/) is America's first peer-to-peer lending company. It was founded in 2005 and it helps to connect both either institutional or individual lenders to borrowers. From the data visualisation that's been created, it's shown that Prosper has been growing in terms of money being lent and that the vast majority of them have been paying off their loans in full. In the process, Prosper has tightened and improved in how it lends money and therefore giving its investors a stable income with minimal risk.

Design

The main aim of the visualisation was to give a brief overview of Prosper and then to show how appropriate it is as an investment vehicle for the everyday "Mum and Dad" investor. The aim of the visualisation was to communicate the following points:

- The story of Prosper up to 2014 because the dataset had data points from 2005 right up to February 2014.
- Show what sort of return an investor would see over the period of 2005 to February 2014. Was there any volatility in that period of available data.
- All investments carry an element of risk. So I wanted to show how Prosper performed with that inherent risk.
- Is Prosper growing as a company? Can investors gain confidence that Prosper is learning from it's mistakes and therefore make improvements?

Initial Design (Before Feedback)

The URL to the initial design:

https://public.tableau.com/profile/sam.cumarasamy#!/vizhome/Prosper_Loans_0/Story1

To achieve the main design points, the design decisions that were made for the first version were the following:

- A storyboard would be used as opposed to a single dashboard. It was felt that a single dashboard wouldn't couldn't reflect the story of Prosper.

- A filter of years would be used showing the progress of Prosper and how it has changed over the years in a positive way for both investors and borrowers.
- For each story point the chart type chosen were as follows:
  - 1st story point - A line chart (time series) was used to show the growth of prosper over the time period of the dataset. To highlight certain milestones in the story of Prosper, Annotation was used to show the viewer.


Prosper MarketPlace Dataset
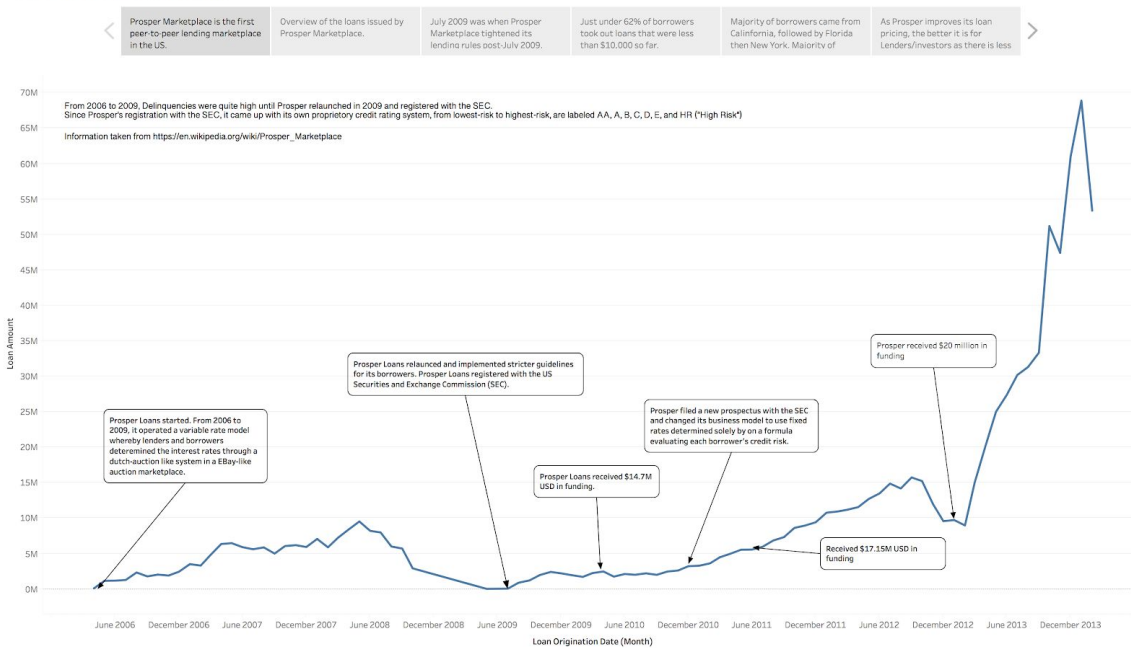
  - 2nd Story point - This was a dashboard that attempted to tell an overview of the loans issued by Prosper. In one area, the reader could see for themselves an overview of the profile of borrowers that used Prosper. In the dashboard, the following chart types were used:
    - Avg Yield vs Loans Underwritten - This was a dual chart showing the Lender's yield (line chart) and total Loan amounts issued per month (bar chart). This was to show that Prosper was increasingly used to issue loans and how the lender's yield (often used to reflect the investor's return on the loan) tracked against it.
    - Loan categories - A circle chart was used to show the different categories of reasons as to why they borrow and the size of the circles would show the number of borrowers as to which category of why they took out the loan.

■ Income Ranges and Loan Statuses - This is a bar chart with the income range on the x-axis and the number of people in those ranges on the y-axis. More information was added ie a stacked bar chart to show the status of the loans taken out by the borrowers in those particular income ranges.
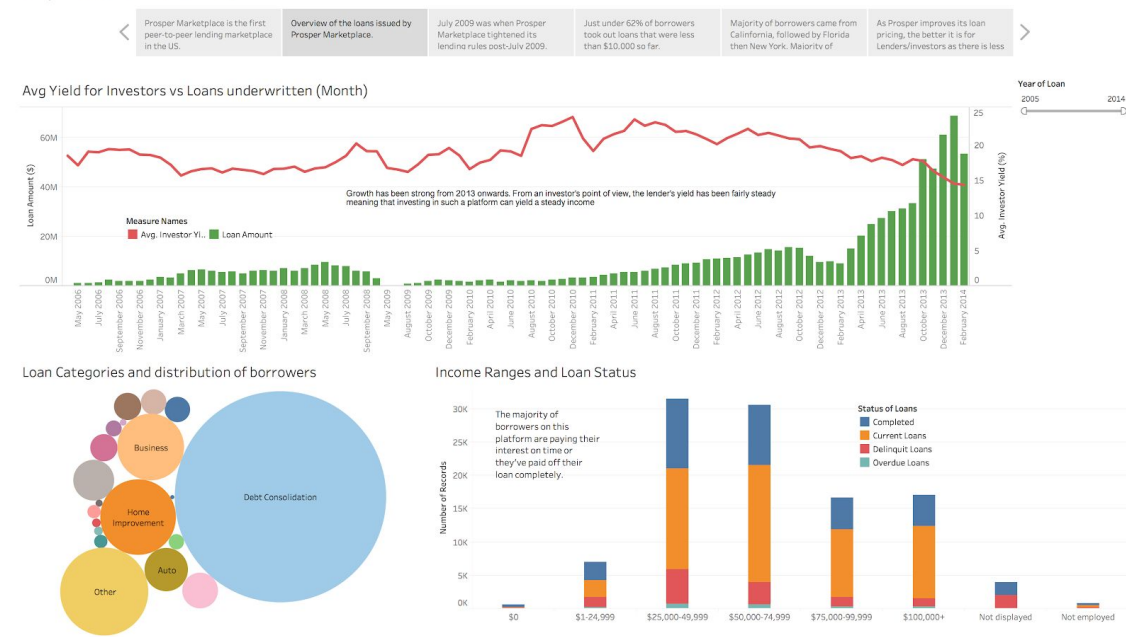

○ 3rd story point - a dashboard was used to show the before and after of Prosper which was pre-July 2009 and post-July 2009. This allows the reader to see the significant change that Prosper has made. The inspiration to use a lollipop style chart was taken from here.

Prosper MarketPlace Dataset

	Prosper Marketplace is the first peer-to-peer lending marketplace in the US.	Overview of the loans issued by Prosper Marketplace.	July 2009 was when Prosper Marketplace tightened its lending rules post-July 2009.	Just under 62% of borrowers took out loans that were less than $10,000 so far.	Majority of borrowers came from California, followed by Florida then New York. Majority of	As Prosper improves its loan pricing, the better it is for Lenders/Investors as there is less	

Loan Status (Pre-July 2009)

Post-July 2009, Prosper Marketplace had tightened its borrowing rules. This resulted in less "Loan Defaults" and "Loan Charge-Offs" when compared to pre-July 2009. This gives investors or Lenders confidence in investing their money on this platform.

Loan Status (Post-July 2009)

○ 4th Story point - The chart used here is a cumulative histogram chart as what's shown [here](). This chart type was chosen in order to show the viewer the profile of loans that are taken out by the borrowers. It shows both the loan amounts (x-axis) in bins, number of borrowers (y-axis) and in a stacked bar chart, the debt-to-income ratio for borrowers in that particular loan bin. Of special note for this chart, the bin size for the histogram can be adjusted by the viewer as well as the year for which the loans were taken out.

Prosper MarketPlace Dataset
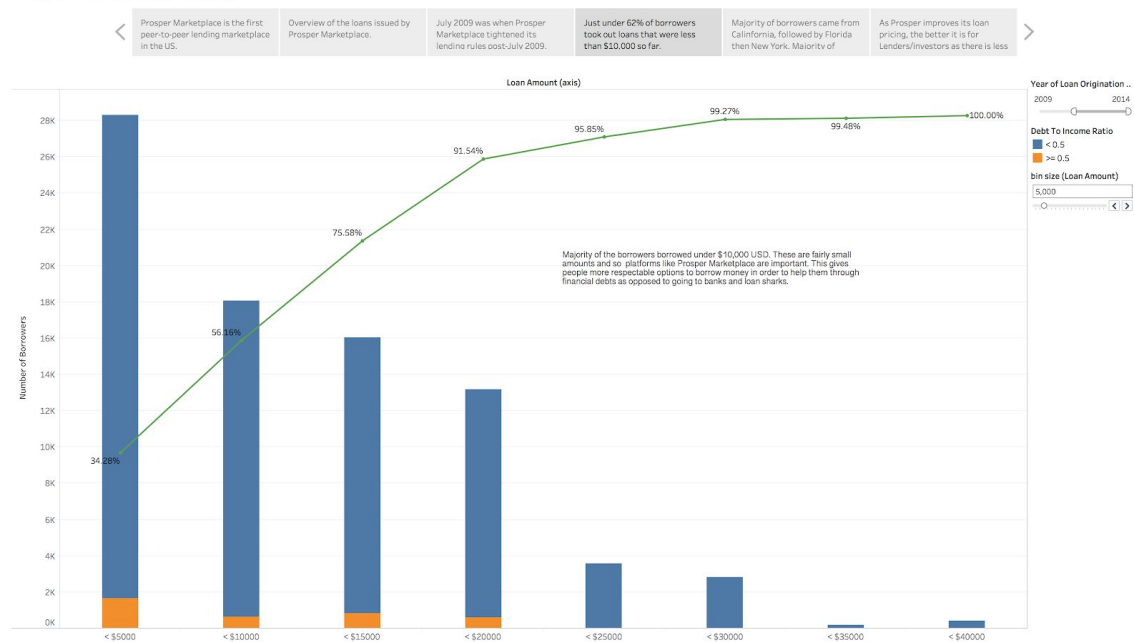
- ○ 5th story point - A map chart was chosen here to reflect which states of the US had the most people using prosper to borrow money and a pie chart was used for each state to show the viewer as to whether the state of the borrowers live influenced their capacity to pay off their loan on time.
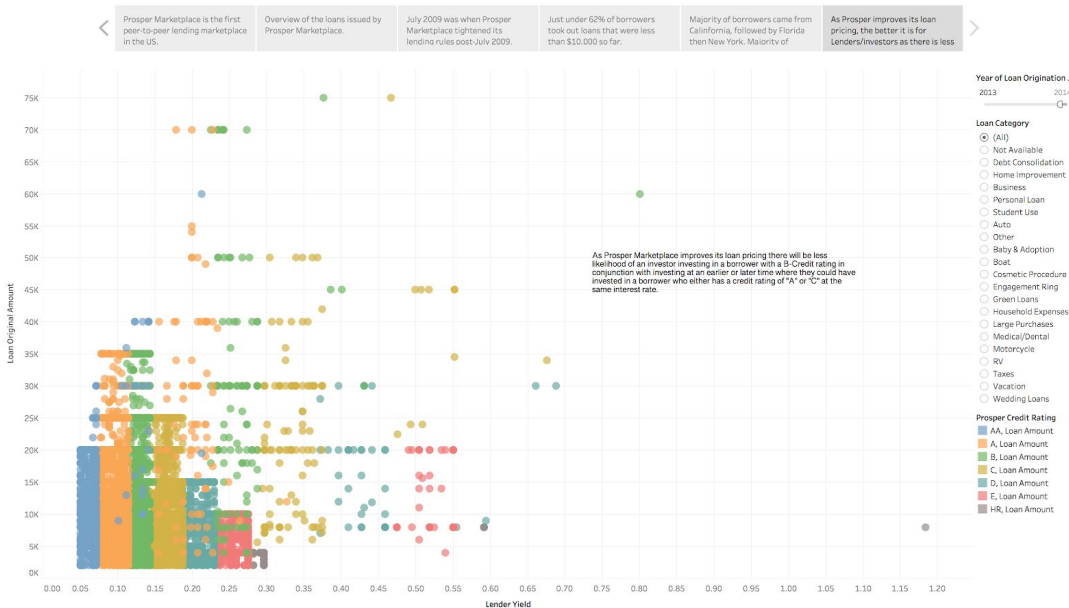
Prosper MarketPlace Dataset
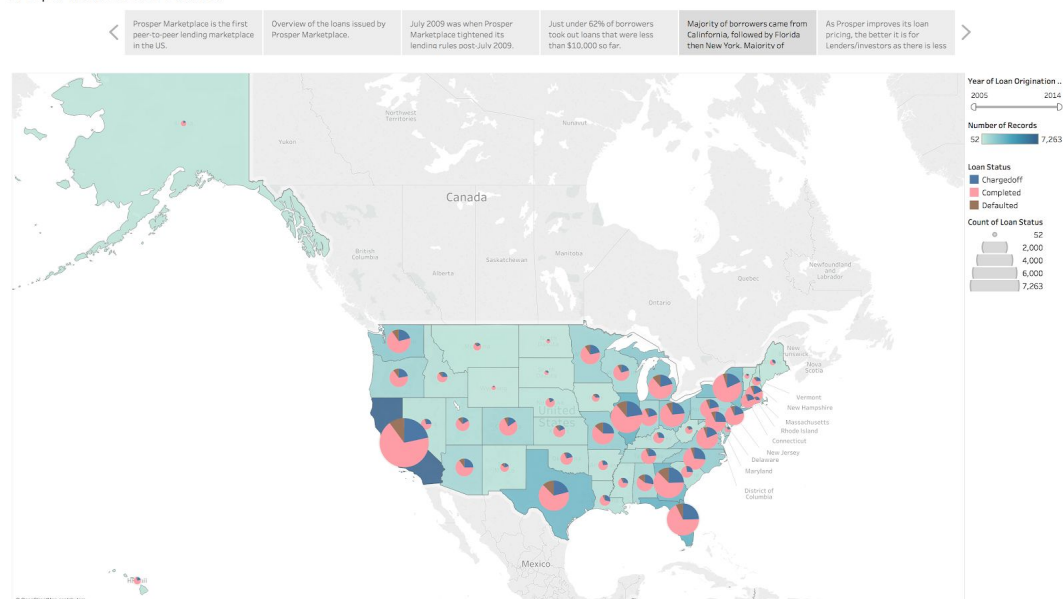
- ○ 6th story point - A scatterplot chart was used to show the Lender's yield against the loan amount for each borrower. This particular chart was

targeted towards the experienced investor who would know the concept of the Lender's yield and what it represented. This chart was inspired by this article. The main aim behind this chart was to show the relationship and the delineation between the borrowers' credit rating and the Lender's yield for each loan that was issued.

Version 2 of Design (After Feedback)

The URL to the redesign after the feedback:

https://public.tableau.com/profile/sam.cumarasamy#!/vizhome/ProsperVisualisationv2/Story1

The feedback that was received can be summarised as follows:

● Story point 1 - The annotation points conflicted with each other. Thus creating a mess of words conflicting with each other. Additionally, a point was made that the annotation points should be made clear with some form of highlighting.

- Story point 2 - There was too much going on with this dashboard. Instead of three charts on the one dashboard, separate into two story points where one story point has one chart and the other has two charts.
- Story points 3 & 4 - The general takeaway from the feedback was that they were useful charts however it was pretty generic.
- Story point 5 - The map chart was very interesting however the pie chart for each state had too many categories according to one of the feedbacks received. Another feedback mentioned to take away the ability to zoom in and out because it was quite annoying.
- Story point 6 - This particular chart was complicated according to the feedback. This can be due to the lack of expertise in finance in interpreting such a chart.
- Overall - Point out to the reader, how they can interact with each story point.

As a result of the feedback provided, the following changes were made to the chart:
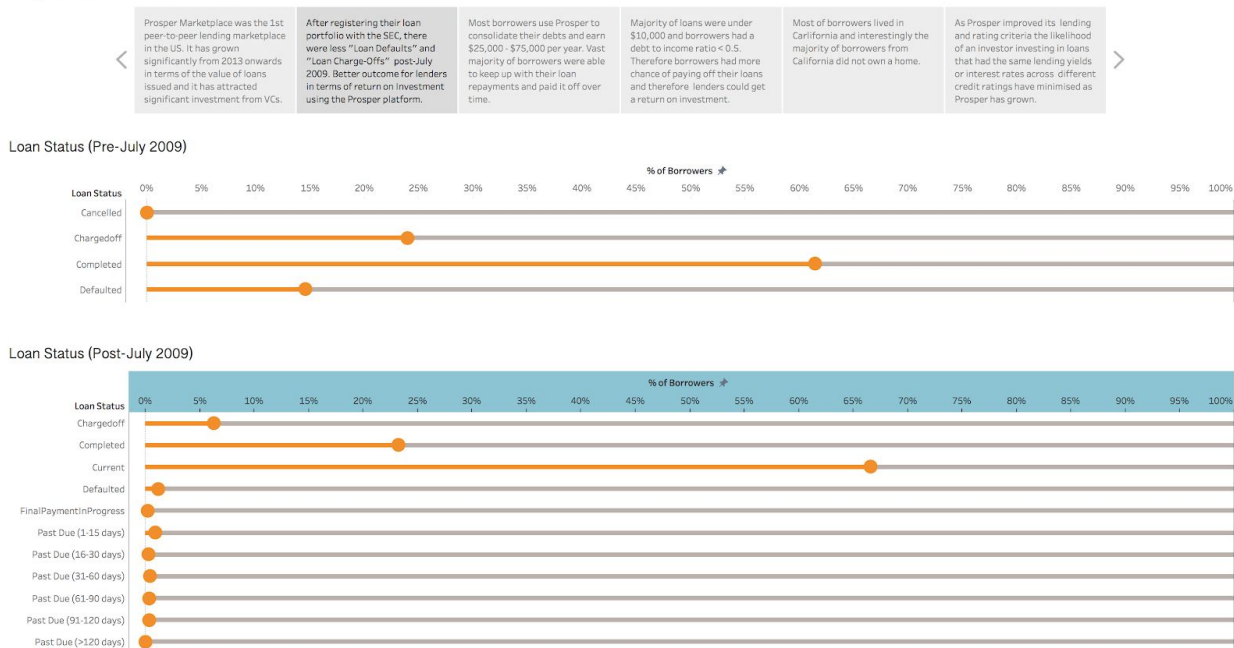

Prosper Data Visualisation
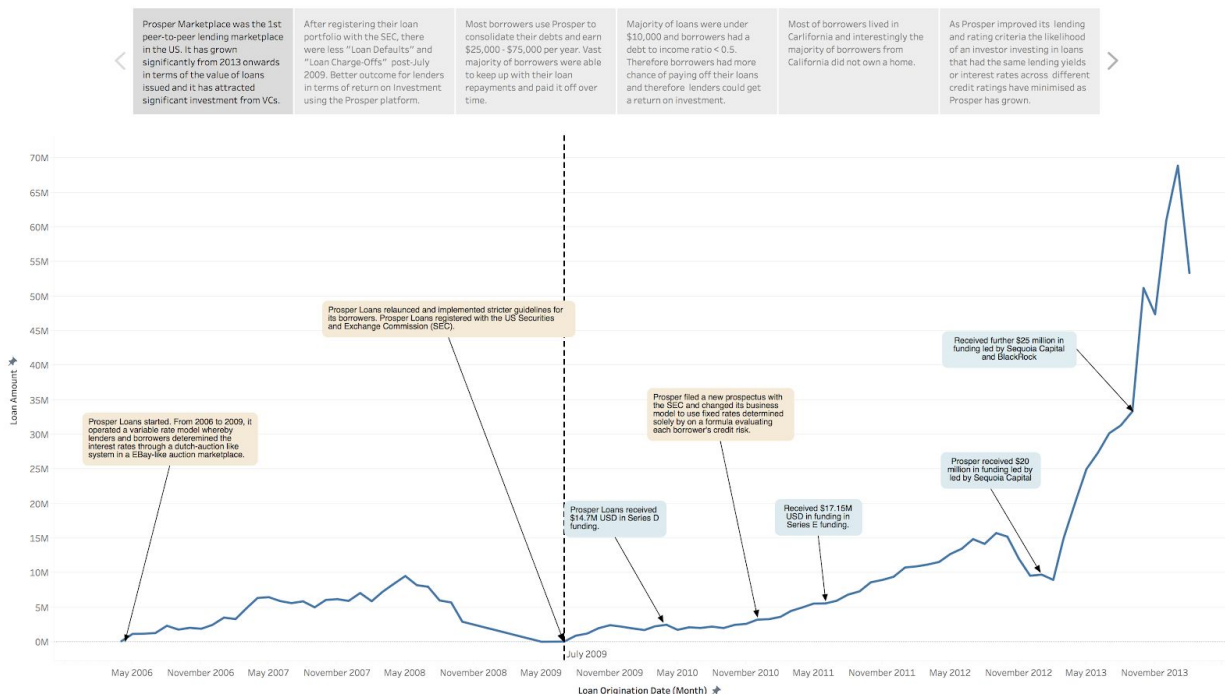
- Story point 1 (See figure above)
  - The annotation points were slimmed down in terms of the number of words to describe each point.

○ Each annotation point had a colour code. Annotations with the orange background explained the changes in business-related events and the blue background showed key financial events.

○ The story point captions were made bigger in order to better explain the chart. This was done in order to remove words from the chart. This resulted in cleaner charts and dashboards.

○ Added a reference line to the chart to show an important milestone which leads to the next chart.
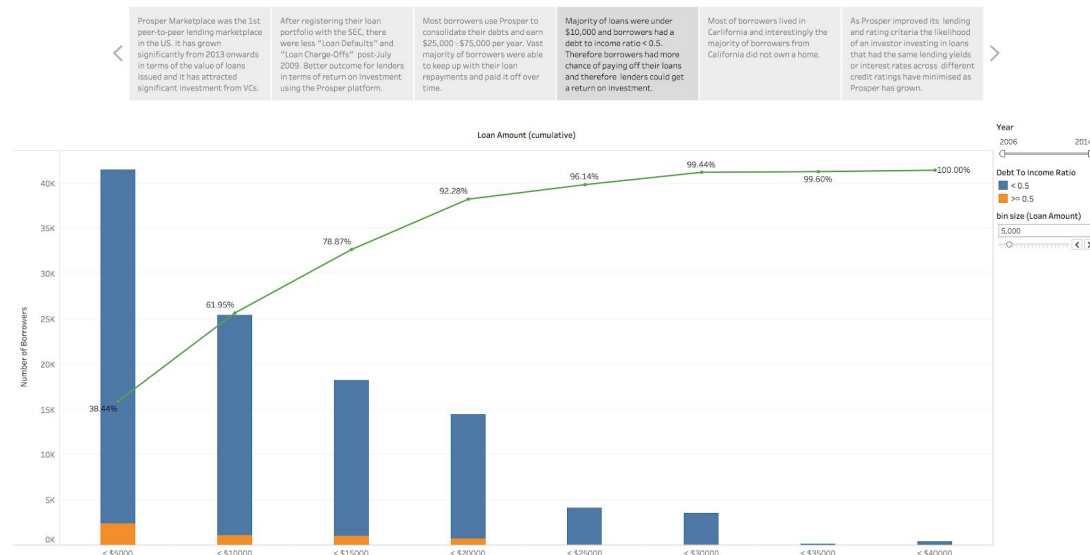
Prosper Data Visualisation

| | Prosper Marketplace was the 1st peer-to-peer lending marketplace in the US. It has grown significantly from 2013 onwards in terms of the value of loans issued and it has attracted significant investment from VCs. | After registering their loan portfolio with the SEC, there were less "Loan Defaults" and "Loan Charge-Offs" post-July 2009. Better outcome for lenders in terms of return on Investment using the Prosper platform. | Most borrowers use Prosper to consolidate their debts and earn $25,000 - $75,000 per year. Vast majority of borrowers were able to keep up with their loan repayments and paid it off over time. | Majority of loans were under $10,000 and borrowers had a debt to income ratio < 0.5. Therefore borrowers had more chance of paying off their loans and therefore lenders could get a return on investment. | Most of borrowers lived in California and interestingly the majority of borrowers from California did not own a home. | As Prosper improved its lending and rating criteria the likelihood of an investor investing in loans that had the same lending yields or interest rates across different credit ratings have minimised as Prosper has grown. |

Loan Status (Pre-July 2009)

Loan Status (Post-July 2009)

● Story Point 2 (See figure above)
  ○ This dashboard was promoted to provide a continuation of the first story point.
  ○ Removed the caption that sat in-between the charts. The wording was moved to the story caption. This made the chart have more clarity.

Prosper Data Visualisation
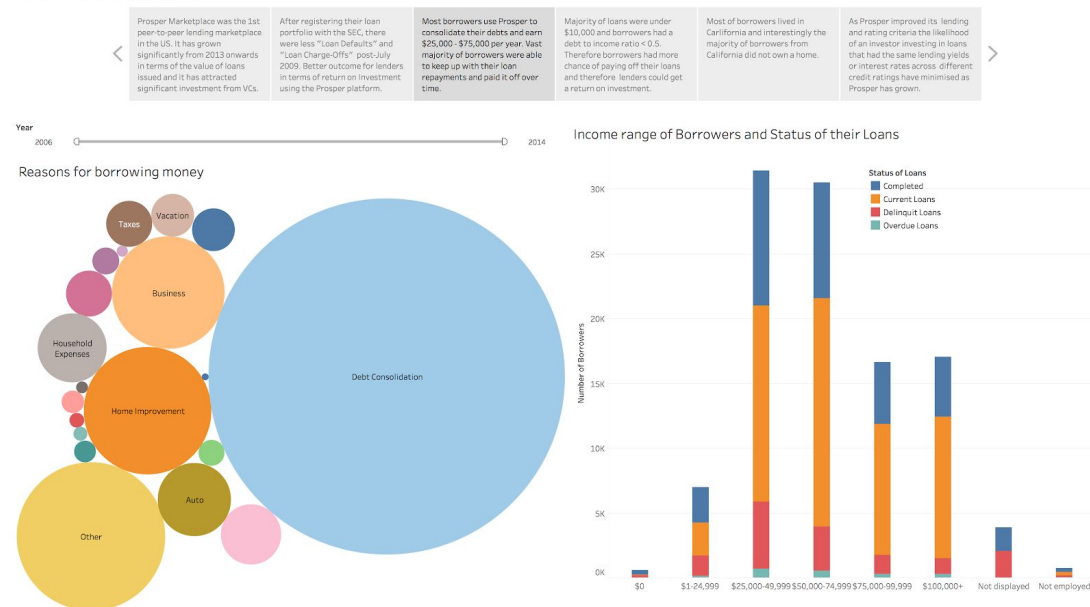
- Story point 3 (See above)
  - The dual line & bar chart was removed and replaced with the Year filter which was moved from the side of the dashboard. This made it more cleaner according to the feedback provided.
  - Annotations were removed from the chart and the text was moved into the story caption.

Prosper Data Visualisation

- Story point 4 (See above)
  - The annotation point was moved into the story caption. Other than that, no other changes were made to it.

Prosper Data Visualisation
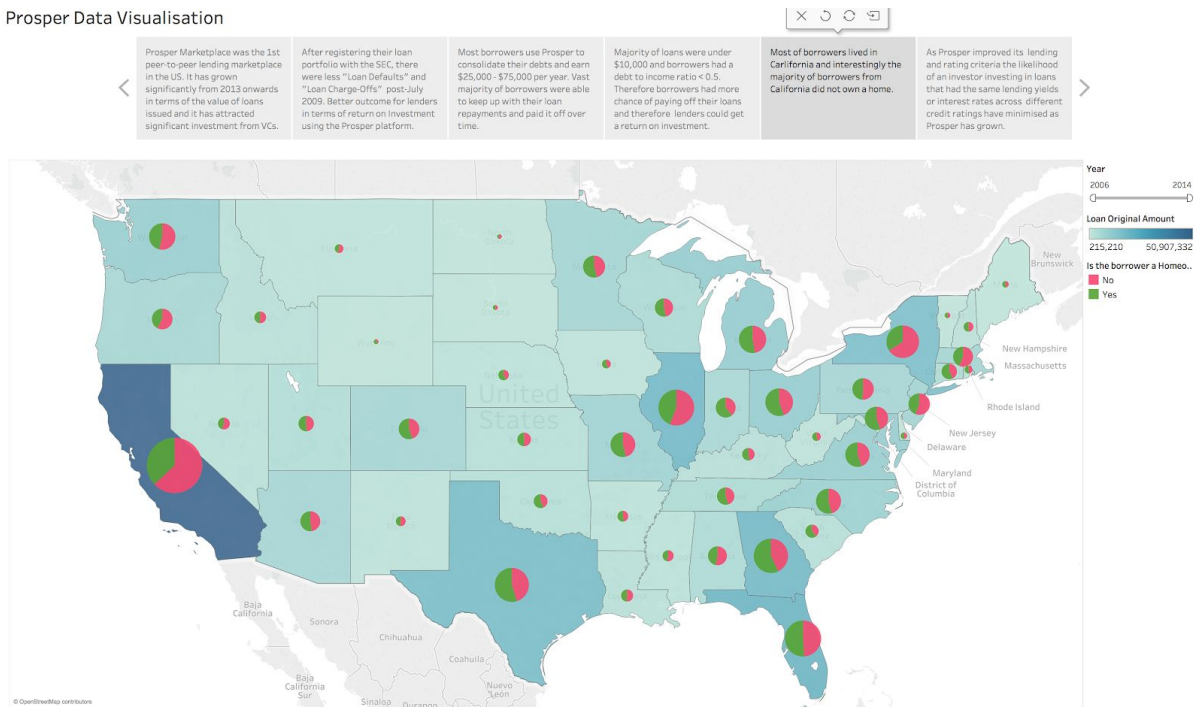
- Story point 5 (See above)
  - Removed the map controls which enabled the zoom in and out feature.
  - The pie charts were simplified in communicating only two categories of home ownership. The sizing of the pie charts were left alone as it was felt that it was important to reflect the population of borrowers from each state.
  - To show the map more clearly on the screen, a decision was made to remove Hawaii and Alaska.

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- Story point 6 (See above)
    - The main change made here was to add a boxplot to provide another view of the scatter plot in order to further emphasise the point of how Prosper has changed for the better. In the process of this change, the Year filter as well as the Loan category filter was moved into the middle of the dashboard to make it more visible to the viewer.
    - The annotation points were moved into the story caption.

Feedback

The visualisation was published to Public Tableau. To get feedback on it, five people were emailed with the following questions to help guide their feedback:

- What do you notice in the visualisation?
- What questions do you have about the data?
- What relationships do you notice?
- What do you think is the main takeaway from this visualization?
- Do you feel convinced in using or investing in such a platform? Why?
- Do you know more about Prosper? if not, what's missing?
- Is there something you don't understand in the graphic?

From the 5 people that were ask, 4 people had responded.

Feedback Responses

Response 01:

What do you notice in the visualisation?

Visualisation is very nice a clean.

Modern professional look.

First page has some text overwriting other text.

What questions do you have about the data?

Not really there is a lot on information which requires time to register.

What relationships do you notice?

As time has progress ed this lending/investing scheme seems to have gained exponential momentum.

What do you think is the main takeaway from this visualization?

The scheme is beneficial to both the lender and the investor.

Do you feel convinced in using or investing in such a platform? Why?

From the data, yes however I would still need to discuss with experts in the field to make a conclusive decision.

Do you know more about Prosper? if not, what's missing?

Yes this info gives me a good idea how Prosper operates.

**Is there something you don't understand in the graphic?**

To a regular person the amount of info can be overwhelming. To an individual who works in this area, this would be ideal.
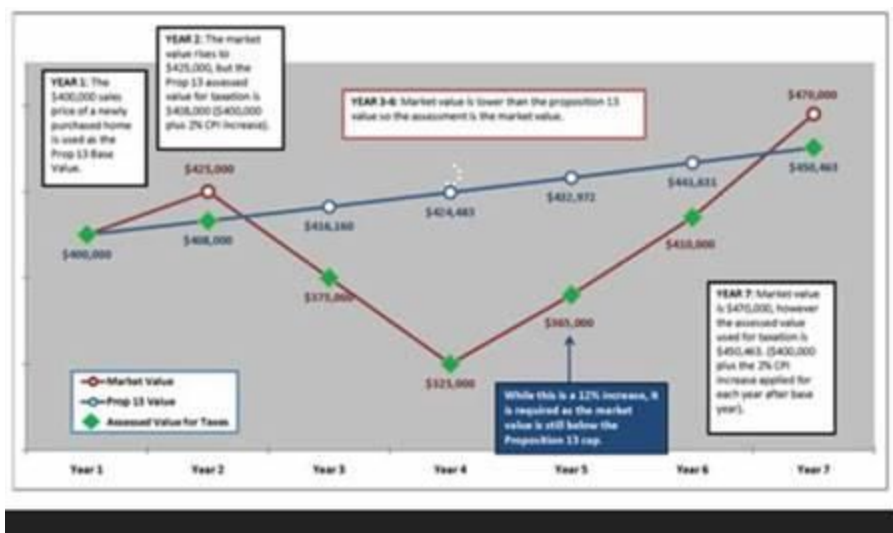
Response 02:

Tab 1:

What do you notice in the visualization?

First tab needs to be a little cleaner especially since it's the first tab and will set the pace and expectation for the rest. May be like this example, no box but highlighted or the second one where the boxes are not staggered but more in rows
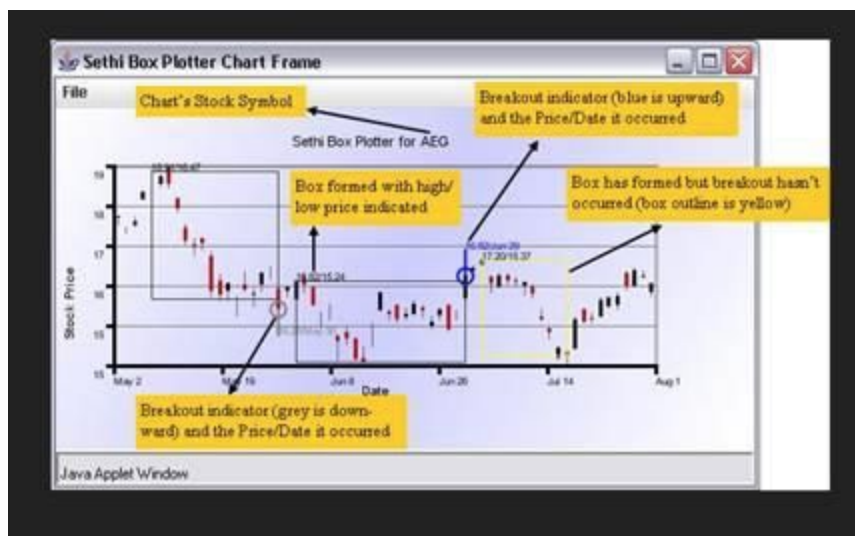
Need to be consistent, ie the explanatory data is sitting on the top and at one glance it seems unrelated to the data below. Suggest it too be in a text box. The odd text box at the bottom needs to be moved

I personally don't like the font

The time lines are a great idea as it starts the reader on the right path as to what Proper does and their progression

What questions do you have about the data?

No questions about the data, you have given me enough information to start

What relationships do you notice?

It's a good flow of information for the reader to start off on and set the pace for following slides

What do you think is the main takeaway from this visualization?

It's giving historical information to the reader

Do you feel convinced in using or investing in such a platform?

Not at this point because it's too early to tell but one thing that stands out is why was there 3x of funding. I understand this to be injections of funds into the business?

Do you know more about Prosper? if not, what's missing?

Maybe a little more about the funding, explain if it's what they were funding people or was it a fund injection to the business?

Is there something you don't understand in the graphics?

Graph is clear.

Tab 2:

What do you notice in the visualization?

I notices that it's an interaction slide graph, but I had to figure it our myself. Should bring readers attention to this fact

The slide graph from Default to Past Due (>120) is too tight. Suggest you create a separate graph to show this information

What questions do you have about the data?

Explain further why they had to tighten their lending rules. Was is market driven, was it because of regulation or was it surely their strategy? If it was their strategy then it will give investors' confidence that they are conscious of their market place and not being forced to change because the regulatory board forced them to do so

What relationships do you notice?

Just want happened to the business after the changes were made

What do you think is the main takeaway from this visualization?

As above

Do you feel convinced in using or investing in such a platform? Why?

Getting there

Do you know more about Prosper? if not, what's missing?

Yes, but my points above will give me more information

Is there something you don't understand in the graphics?

All good

Tab 3:

What do you notice in the visualization?

I notices that it's an interaction slide graph, but I had to figure it our myself. Should bring readers attention to this fact

Like the look of this visual

What is the purpose of the extra bubbles when it seems that there are only 5 main categories

What questions do you have about the data?

None

What relationships do you notice?

I honestly feel there is too much info on the one visual that I don't want to try and decipher it

What do you think is the main takeaway from this visualization?

I didn't have much time to evaluate all the data to give you an answer. It just tells me what investors earned and which were the main reasons for the loans. Also tells me ration of what they completed against current and overdue loans.

Do you feel convinced in using or investing in such a platform? Why?

Still not there yet

Do you know more about Prosper? if not, what's missing?

Yes

Is there something you don't understand in the graphics?

Its too much for one visual. May want to break it up a little more

Tab 4:

What do you notice in the visualization?

I notices that it's an interaction slide graph, but I had to figure it our myself. Should bring readers attention to this fact

Make more know the slider to the reader

What questions do you have about the data?

I should have understood this slide, but I didn't (at one glance)

What relationships do you notice?

N/A due to above

What do you think is the main takeaway from this visualization?

The heading tells me that 62% of borrowers took loan less than $10K

Do you feel convinced in using or investing in such a platform? Why?

This slide did nothing got me

Do you know more about Prosper? if not, what's missing?

N/A due to above

Is there something you don't understand in the graphics?

All of it (hee hee!!)

Tab 5:

What do you notice in the visualization?

I notices that it's an interaction slide graph, but I had to figure it our myself. Should bring readers attention to this fact

I would remove the pie charts and only have them appear the cursor hovers over it

I would shade the states with what you want more noted to the investor; ie completed, defaulted or charged off loans

What questions do you have about the data?

None

What relationships do you notice?

I understand all you want to say but I think you should also provide industry figures (competitor intel) to make a proper comparison

What do you think is the main takeaway from this visualization?

Loan status comparisons against each state

Do you feel convinced in using or investing in such a platform? Why?

Not totally sure because I don't know what are the industry standards or expected % for loans that are meant to complete, default , etc in the market. You may want to give the reader this information so that they can then do a proper comparison

Do you know more about Prosper? if not, what's missing?

Yes, I know more about you with this graphic

Is there something you don't understand in the graphics?

No, all good

Tab 6:

What do you notice in the visualization?

I notices that it's an interaction slide graph, but I had to figure it our myself. Should bring readers attention to this fact

I have never used this sort of graph before, so I am not reading it at its full potential.

What questions do you have about the data?

Have heaps of questions but unfortunately don't have time to write it down today

What relationships do you notice?

N/A

What do you think is the main takeaway from this visualization?

No comment

Do you feel convinced in using or investing in such a platform? Why?

N/A

Do you know more about Prosper? if not, what's missing?

Till now, I can't tell who their target audience is.

Is there something you don't understand in the graphics?

As above.

Response 03:

What do you notice in the visualisation?

First slide is complex, hard to read due to overlapping bubbles, therefore makes my brain shut off immediately. I moved to the next tab

What questions do you have about the data?

SLIDE 3 MAJORITY of the borrowers are for debt consolidation. These are people who have a problem with borrowing and are borrowing to manage previous debts ... that is

concerning but the fact that default rates are low and completion and current rates are high, it seems fine to me.

What relationships do you notice?

More investors, more capital accessible, more loans under management, good solid growth in business. What's the connection with California and Florida being the biggest consumers - money to blow on holidays?

What do you think is the main takeaway from this visualization?

Main takeaway is that this is a convincing investment vehicle because the loan amounts are small, so is risk and upside is high. (Answers question below)

Do you feel convinced in using or investing in such a platform? Why?

Do you know more about Prosper? if not, what's missing?

Who is their target market?

**Is there something you don't understand in the graphics**

Good information overall. layout wasn't conducive for a small laptop. Legends and charts were obscured at times.

Response 04:

Some issues I noticed that can be improved:

1.data labels overlapping with each other in first tab

2.second tab the x axis labels (month, year) need to posed vertically to let readers see full names, or if you want, change the values in the dataset and rename them. Also putting 3 plots under same tab look a bit too tight for the layout, you may consider breaking up the tab into two tabs, one has one chart and the other has rest of the two, in that way the description is also able to be fully shown
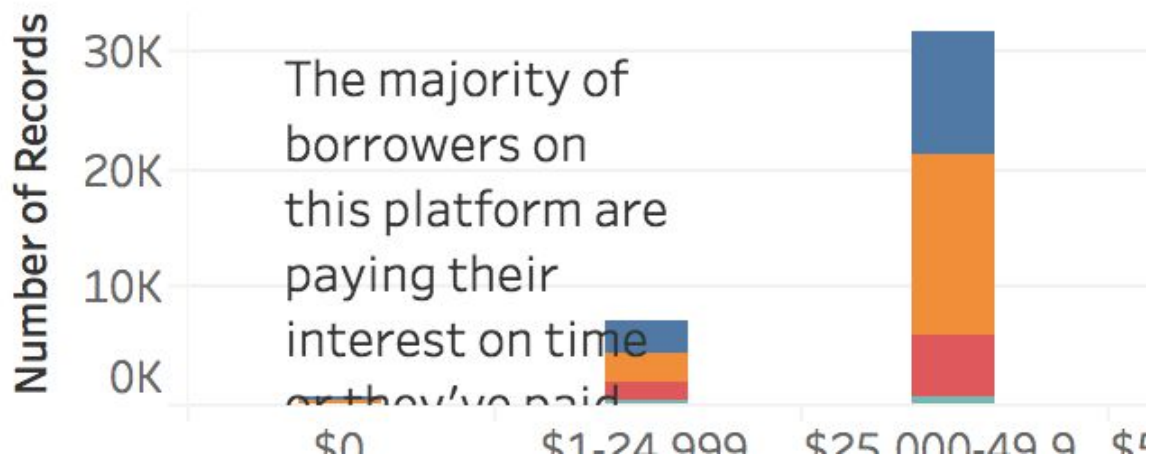
3. similar issue in tab 3 with layout as tab 2

Other than that, you've done a good job choosing the right plot type for visualization, I especially like your geo visualization and last scatter point plot. I'm not very familiar with doing map visualization in tableau, but when I try to scroll up and down seems like I'm not able to do that, I can only zoom in/out, it'll be great if you can add a scroll bar for that plot too

Resources

The following resources were used throughout this project:

- https://www.tableau.com/solutions/gallery/kiva-loan-story - This was the main inspiration behind this visualisation.
- https://www.orchardplatform.com/blog/2014519lender-yield-prosper/ - This website was used to help craft the visualisation in the last story point.
- https://www.tableau.com/solutions/gallery - The Tableau gallery was used to see the possibility of what can be done with Tableau.
- https://www.prosper.com/ - This was referred to a lot in order to learn what Prosper was all about.
- http://www.vizwiz.com/p/tips.html - A lot was learnt about how to do certain visualisations in Tableau using this website.
- https://en.wikipedia.org/wiki/Prosper_Marketplace - Information on Prosper was taken from here and is the source of information in the very first Story point of the storyboard visualisation.
- https://www.tutorialgateway.org/cumulative-histogram-in-tableau/ - This was used to learn how to do the cumulative histogram type chart.