Research Check-in

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Goals for the week:

- **Finish event study and generalize across multiple companies**

For my event study model, I am largely relying on this guide from the Princeton Library on how to construct one. As with analysis 1, my goal is to see if EBITDA, Net Income, Liquidity, and Return on Equity growth is sustained or statistically significant pre and post IPO on a per company basis. As of last week, I was able to complete estimation for normal performance, calculated abnormal and cumulative abnormal returns, and then tested for significance. After completing my initial analysis on GoDaddy, I abstract further and generalize my model to work for each of the PE companies.

Steps completed this week:

Estimating Normal Performance

Given the success I had with using the dependent variables in my propensity score estimations in Analysis 1, I decided to use the same regressors to construct the initial estimates of normal performance. Using the Linear Regression extension from the scikit-learn python package, I constructed my regression. Data for each company was split into two tables representing company financials within the estimation window that I train the OLS models on and the event window that I use for predictions and testing.

I decided to repeat the estimation of normal performance in favor of a different python package. I realized that the linear regression model that I was previously using was not giving me accurate predictions of the tested variables. Instead, I went in the direction of using a simple OLS-based regression that seemed to have much better results.

Calculating Abnormal and Cumulative Abnormal Growth

Once normal performance was calculated appropriately for each of the tested variables, I compared these predicted values to the actual performance in the event window by taking the difference of these values.

Testing for Significance

After the difference between my predictions and actual growth within the event window were calculated, I was able to test for statistical significance for the company performance variables using a one-sample, two-sided t-test to see if actual estimates differ statistically from what was predicted from the OLS models. The test for each company variable is of the form:

$$t = \frac{E[D]}{\frac{\sigma(D)}{n^2}}$$

Where d is the list of differences and n is the length of the list of differences.

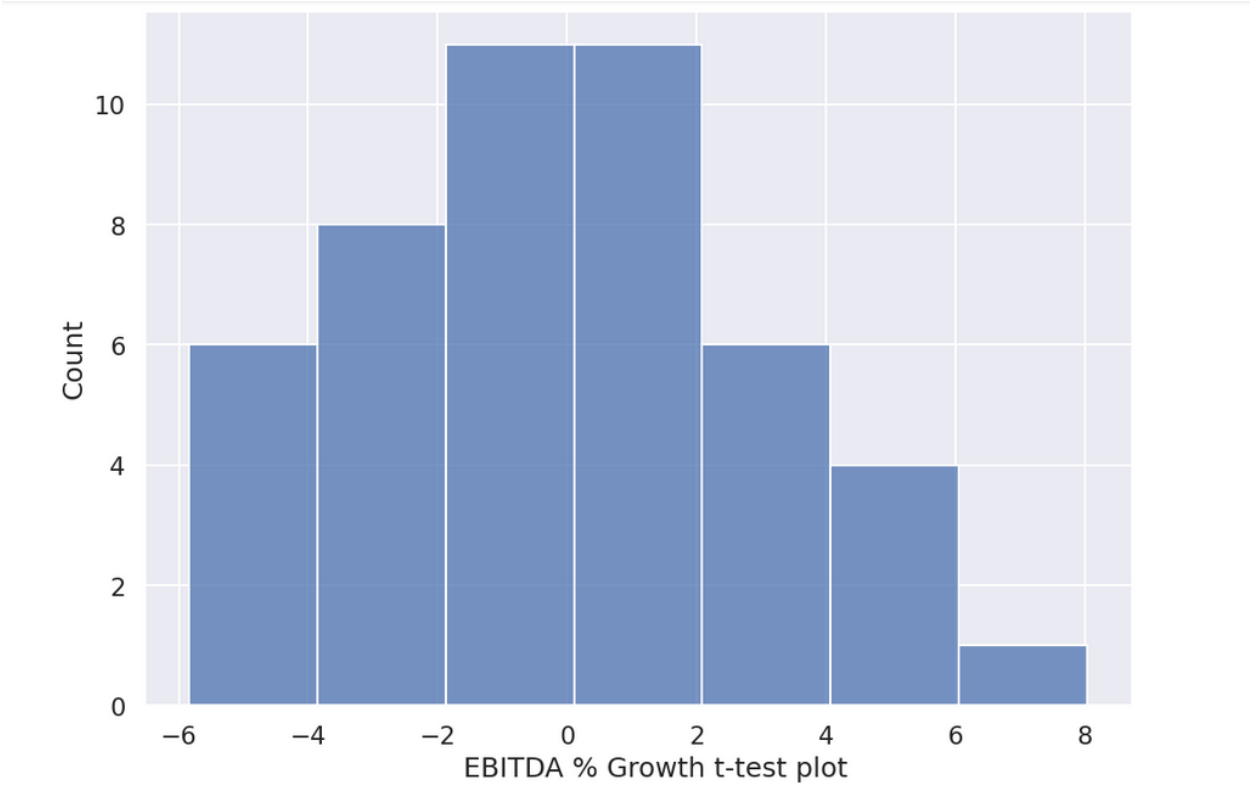
Generalizing the Model for All Companies

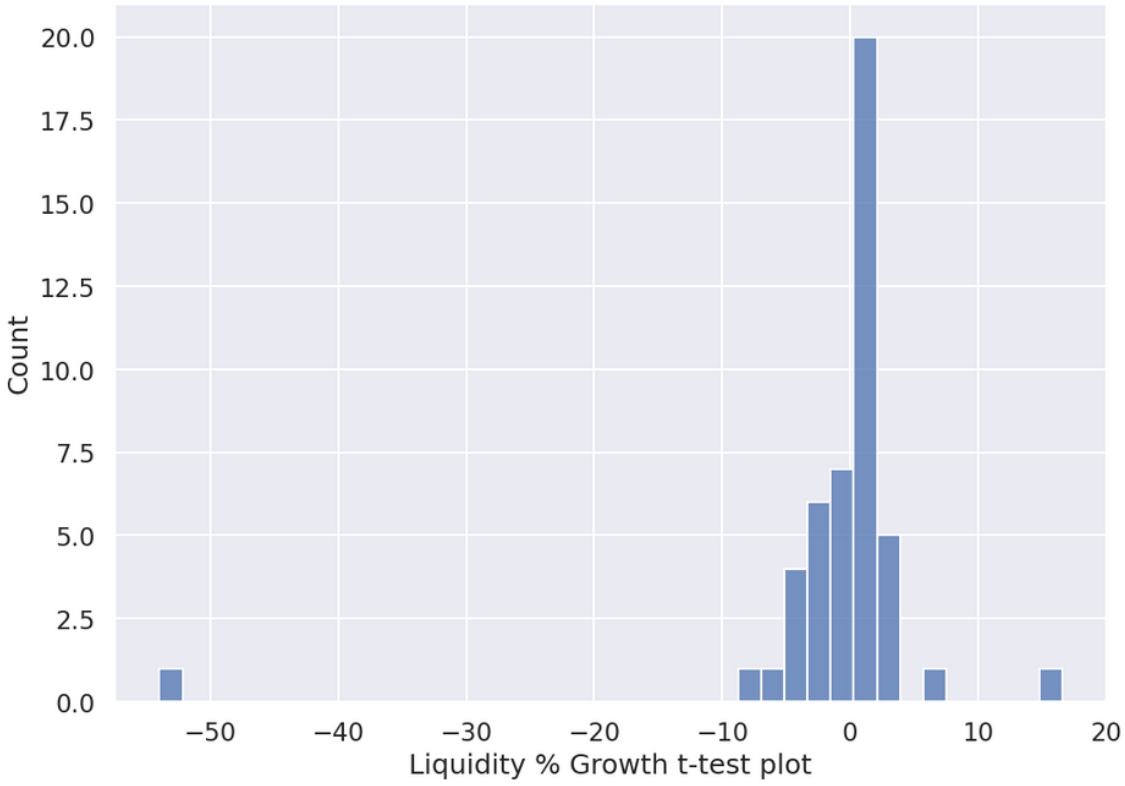
One thing of significant note during this phase was that I filtered companies that did not have enough years of financial data to compute. I eliminated companies that did not have three years of company financials pre-IPO so that I could make more accurate OLS models, and eliminated companies that were missing data fields for several of the financial variables I'm regressing on. This ended up limiting my sample size from 124 to 54.

Results

Once I had t-tests for each company, the next step was compiling them into a histogram. By doing so, I intend to see how the t-tests are distributed for the companies tested. For the most part, significance for variables tested seems normally distributed.

Question: Can I run an additional one sample t-test with the compiled company t-tests to see if, on average, the performance of the companies is statistically significant?

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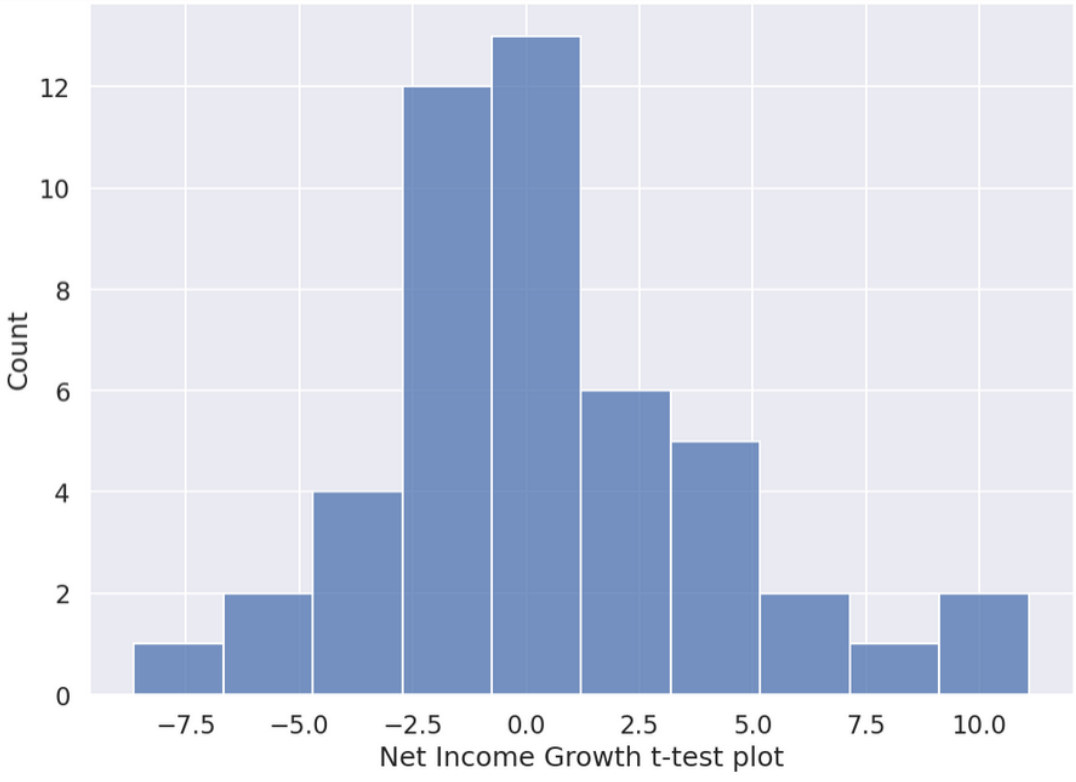
Liquidity % Growth t-test plot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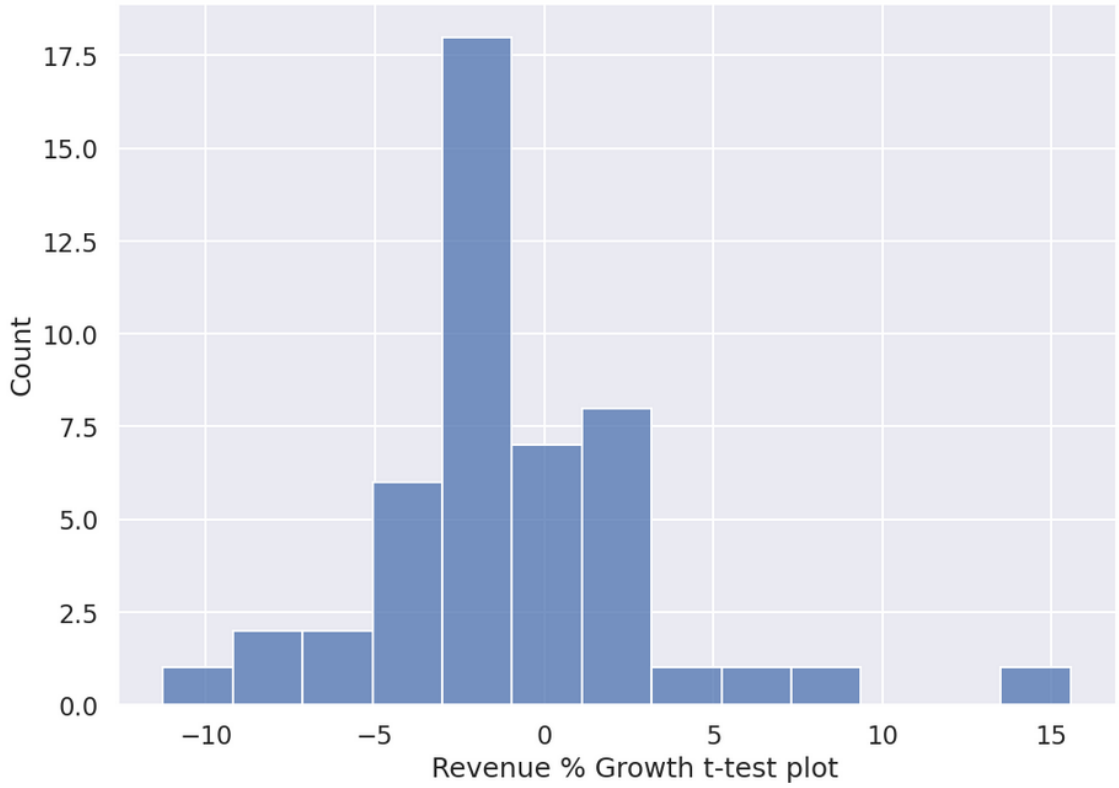
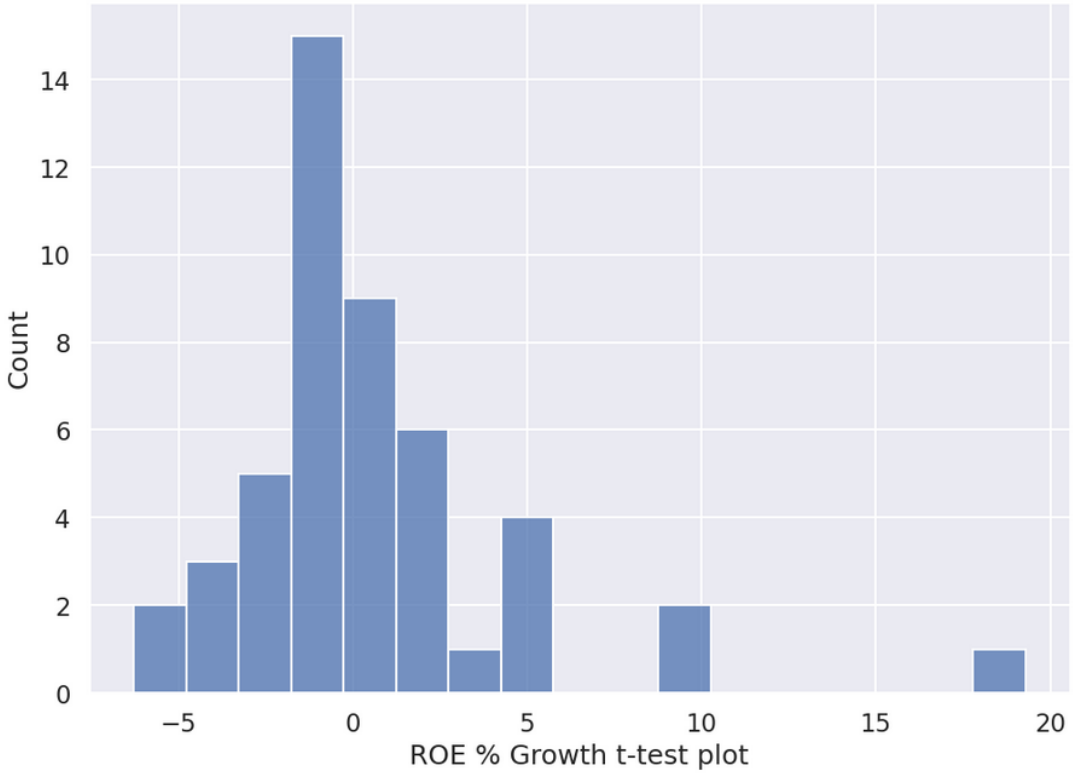
Net Income Growth t-test plot





What I will focus on this upcoming week: Goal for next week is to submit somewhere near a first draft of the paper