Historical Period analysis of the Fama-French CAPM models
Phillip Maier, `18

CAPM, the Capital Asset Pricing Model, is designed to describe the relationship between systematic risk and expected return. Fundamental to CAPM is the assumption that there is a mathematical relationship between risk and return. Unfortunately tests of the CAPM have proven that there is not a statistically significant relationship between risk and expected return. In 1993 Fama French (FF) proposed three factors which they hoped would fix CAPM's lack of statistical verifiability: size, price to book ratio, and market risk. FF hoped these three factors would account for most of the previously unaccounted for volatility in asset returns. Unfortunately this newly upgraded CAPM model did not survive under statistical scrutiny.

The purpose of my research was to permute stock data identical to FF's in such a way that CAPM became statistically significant. To give an example of my proposed permutations: calculate two different CAPM models based on days when market return is positive versus negative. As the summer went on I found that actually permuting the data would be one of the easier parts of my task, getting accurate data that matched FF's proved to be a summer in itself.

My method of tackling FF's data was simple, in principle, yet complex in practice. First I would follow the steps laid out in FF's 1992 paper and recreate two of the simpler tables. Following this recreation I would then know I had accurate data identical to FF's with which I would then be able to permute for the remained of my summer. As I soon learned recreating data is not as simple as it seems.

The majority of my summer was spent learning to use STATA, an amazing statistical program that may be seen as a combination of the data functionality of Excel and the simple forward flow of Python. Once I had gotten STATA under grips I began tackling the data itself. There were constant oddities which I would liken to following a rabbit's trail down a hole. My current position in my research is on one of the final rabbit holes before my data is feasible. Over the summer I have grown to have a deep understanding of the data, and as such it would simply feel wrong to leave it off at this. I plan on finishing my research throughout the rest of the year, specifically during an independent study class or honors project. This summer has been amazing, it was a joy to pursue something I had such a deep interest in for so long, and I am grateful now have the tools to progress further in my research over the next year.