

Python & Finance - Spring 2021

Kurt Semm

The New School for Social Research

semmk268@newschool.edu

January 26, 2021

Overview

- 1 What is Python?
 - Introduction
 - Data Analysis
 - Graphing and Regressions
- 2 Section II - Reporting Python Output
- 3 Section III
 - Portfolio and Personal Finance
 - Corporate Finance with Python
 - Futures, Options and Conclusion
 - Conclusion and Extra Resources

What is Python?

Python is an interpreted, object-oriented, high-level programming language with dynamic semantics. Its high-level built in data structures, combined with dynamic typing and dynamic binding, make it very attractive for Rapid Application Development, as well as for use as a scripting or glue language to connect existing components together. Python's simple, easy to learn syntax emphasizes readability and therefore reduces the cost of program maintenance. Python supports modules and packages, which encourages program modularity and code reuse. The Python interpreter and the extensive standard library are available in source or binary form without charge for all major platforms, and can be freely distributed.

Python and Economics

Objectives: For you to be able to use Python comfortably for your basic data analysis needs. Add Python to your Coding Swissarmy Knife. I.E To import, format, manipulate data,

I would also like to aide in writing a paper, or OP-ED piece. In what way does coding help you get published? Something I want you to think about throughout the course.

Python Attributes



Python Introduction

Today, in the second half of the lecture, I will cover the following syntax in Python:

- Download Python and Anaconda
- Variables
- Strings
- List & Dictionaries
- Boolean
- Loops

Data Analysis

- pip install
- Importing CSV, FRED, BLS, USGS, IPUMS, CPS, yfinance
- Calculations using pandas, scipy, numpy
- Writing functions to make calculations easier.

Graphing and Regressions

Matplot.lib

Matplot.lib lot is a collection of functions that make matplotlib work like MATLAB. Each pyplot function makes some change to a figure: e.g., creates a figure, creates a plotting area in a figure, plots some lines in a plotting area, decorates the plot with labels, etc.

Distributions

Will show the simplicity of doing histograms and density functions in python. I think it is more intuitive and easier than Rstudio. Primarily, the `numpy.histogram`.

Regression Analysis

The section covers regressions because I would like to encourage you to look at plots and distributions along with regression output. Using the `statsmodel` library we can also do timeseries, simple and weighted moving averages, and ARIMA models

Organizing Python Output

Starting a virtual environment:

- Combining Python with Word and Latex
- Importing tables, charts, and graphs from Python
- Transition to Finance
- Finance Analysis as Example

Portfolio and Personal Finance

We will use what we learned in the first part of the course to compute, analyze, and critique:

- Systematic vs Unsystematic Risk
- CAPM and the 'Greeks'
- Diversification
- Creating Portfolios and their Returns
- Retirement Funds – 401k's, Pension Funds, and other investment vehicles.

Corporate Finance with Python

At this point we can start understanding how to read a firms' or industries financials in Python. Furthermore, it is an introduction to non-academic, or private sectors uses of python.

- Financial Statements
- Monte Carlo simulations and Projections
- Sharpe Ratio
- Proprietary Trading Intro

Market Valuations and Options

The aim is to show how python can help with Futures, and options. This relates more specifically to my research on the privatization and financialization of Colorado River water.

- Black Scholes
- Other data to explore
- Students Projects and progress
- Course Recap and Conclusion

Extra Resources

The whole point of this course is to help students with their research and build their technical toolbox. Therefore, whatever YOU need is my priority. So please feel free to share your reserach and don't hesitate to reach out to me if you have any questions on how Python can help you.

- Homebrew and Animation
- Django for apps
- NetLogo and Agent-based modelling
- Python and SQL

The End