CS365/765 Fall 2021 Computational Finance Final Project Description

Instructor: Alex Pang

Due Date: 12/5/2021 23:59 pm

Overview

The goal of the final project is to reinforce what you have learned in class and give you a chance to implement some of the pricing models we had discussed in class. The project will be done in a group of 3 students. At the end of the semester, one of the members will have to pack all the files into a single zip file and email that zip file to me with a subject of CF_Fall21_Final_Project. The unzipped files will be in a folder with the name of your group. The package should include the following.

A. A single Microsoft Word or PDF that summarize all of the findings and answers to the questions I asked below.
B. All the corresponding python files along with any data files.
C. A single Jupyter notebook with corresponding results. I should not need to re-run your notebook. But if I do choose to re-run your notebook, it should run through without any errors. I will upload the Jupyter notebook template on Blackboard.

Components of the project

There are 3 parts of the project. The first part is to implement a Bond calculator. Use the BondMath.ipynb notebook presented in class to help you. The second part is to implement some of the technical indicators I shown in class as well as a productionized version of the Discount Cash Flow Model. Use the EquityDemo and DiscountedCashFlowModel notebook to help you implement the code. The last part of the project is to use what you have implemented in part 2 to scan a stock universe to identify stocks that you would recommend buy or sell.

Milestone and code templates of the project

In order to avoid the situation where only one member does most of the work or none of the members start working on the project until the very last min, I require each group to check off each milestones on the class final project google sheet as we progress through the semester. I will upload code templates to help you acheive the goal of the projects. You can deviate from the code template and fix whatever you think is needed. However, I do not see the reason for your final codes to be dramatically different.

Milestone 0

A. Form your team. Start knowing your team members.

Milestone 1

A. Implement a Bond calculator
B. Fill in the missing code in bond.py and bond_calculator.py

Milestone 2

A. Fill in the missing code in stock.py
B. Fill in the missing code in TA.py
C. Fill in the missing code in DCF_model.py

Milestone 3

A. Fill in the missing code in run_analysis.py which will read in a StockUniverse.csv input file and generate an output file called StockUniverseOutput.csv that I will specify.
B. Look through all the data you have collected, including both technical indicators such as RSI, various moving averages as well as fundamental metrics such as P/E, P/S ratios and DCF values, pick a stock that you recommend buy or sell.

Finally Done

A. Write a summary report what your group's buy and sell recommendation is from Part 3. It should have date of the analysis and a description the reasoning behind. You should have examined on both the technical as well as fundamental aspect of the stock that you choose. The recommendation can be either a BUY or a SELL.
B. Answer all the questions in a Jupyter notebook where I will ask you to call your Bond and Option calculators.

Checklist of the files included in the zip file

A. A summary in Word or pdf
B. utils.py, bond.py, bond_calculator.py, stock.py, TA.py, DCF.py, run_analysis.py
C. StockUniverse.csv
D. StockUniverseOutput.csv
E. FinalPoject Jupyter notebook.