MAT1856/APM466 Assignment 1

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Fundamental Questions - 25 points

1.

   (a) Printing more money would cause inflation and currency collapse, and to keep the currency stable and in constant motion, governments issue bonds, borrowing money to financial institutions in this way.

   (b) The long-term portion of the yield curve can flatten if there is a period of high short-term interest rates. High rates are highly volatile and unreliable due to unpredictable economic circumstances and the possibility of rapid decline.

   (c) Quantitative easing is a monetary policy used by governments to fix the monetary system when traditional approaches have failed. The approach is to buy government bonds or other financial assets to stimulate the national economy where there is a risk of inflation. Owning government bonds is a good way for a country to invest because the rates on government bonds are usually long-term and high.

2. I have chosen such bonds:

   "CANADA 20/23", "CANADA 21/23", "CANADA 21/24", "CANADA 22/24", "CANADA 22/25", "CANADA 20/25", "CANADA 20/26", "CANADA 21/26", "CANADA 21/27", "CANADA 22/27"

   The reason is that I wanted to plot the 0-5 year yield based on 10 bonds, so I needed the maturity dates of each bond six months apart so I could plot the curve based on an equal distribution.

3. Principal Component Analysis is a useful tool when dealing with complex multidimensional data. PCA allows us to reduce the dimensionality of a given dataset while preserving all the trends and characteristics of the original dataset. Thus, we remain with eigenvalues and eigenvectors, which I can definitely call "principal" and "important" components. With eigenvectors, we can understand the most variability in a data set and the direction in which our data is scattered. Eigenvalues, on the other hand, give us a clue about how variables and their measures are multicorrelated with each other.

Empirical Questions - 75 points

4.

   (a)

   (b)

   (c)

5.

6.

References and GitHub Link to Code

https://github.com/vyzhyvu/APM466.git; https://www.bankofengland.co.uk/monetary-policy/quantitative-easing