Documentation for BankRisk GitHub repository:

5/7/2021 IMPORTANT NOTICE:

This update includes Call Report data through December 2020 and the scenarios for the 2021 CCAR stress tests. However, due to the COVID pandemic, there are significant distortions to national economic variables (particularly unemployment, GDP, mortgage delinquencies. etc.) that significantly distort default and loss models. Therefore, this will be the last update that I will make available.

Installing Anaconda:

* This is the software that I have been using. Recently, it has undergone major modifications in what was formerly called ipython notebook. It is now called jupyter notebook. (I think this switch must exist with Canopy Express, too.) The changes are informally referred to as The Big Switch because the developers are reconfiguring the logic of the software. As such, there are some changes that have affected how the software runs. In particular, there have been changes to the default working directories. This note shows how to return to the prior notebook working directory.
* Choosing between Python 2 and Python 3 versions. The pendulum has swung a lot on this issue recently. Before 2018, there were strong reasons to choose Python 2. However, the tide has turned such that Python 3 is now the better choice, if only because Python 2 is now “retired”.
* After installing Anaconda 2 or 3, go to a Windows command prompt window (click on “Command Prompt” after right-clicking the Windows icon in the lower left corner of the desktop) and type the following commands: “conda update conda”, “conda update --all”, and “conda install pandas-datareader”. (Don’t type the quotes, do these one at a time and follow the prompts.) This will update all of the software packages and add the pandas-datareader package used for downloading data from the FRB St. Louis FRED database.

Files:

* BankRisk\_Demos\_pt1.zip: Contains demo and exhibit excel files for chapters 1-6 (credit risk). These are the files I used to develop all of the exhibits for the book. Many use excel data tables (which I find to be indispensable.) Only one file is incomplete: chap05\_exhib\_2011allbanks\_pds\_template.xlsx. Two worksheets within that file were too big to upload to GitHub. The first worksheet needs to be populated with all of the data in 2011allbanks\_pds\_20111231\_roe0mm2.csv. (I left the first 20 rows or so to show how the data must be arranged.) There are roughly 7000 rows here. Next, there is a huge worksheet named 200903\_201412 that must be populated with all of the data in allbanks\_f2468\_roe0mm2\_2009\_2014.csv (74MB and 165,000+ rows). Again, I left 20 or so rows to show how the data must be arranged. (Note: Those files will be generated by running the ipynb code for the PD\LGD models.) Place these files into the “C:\BankRisk” directory.
* BankRisk\_Demos\_pt2.zip: Contains demo and exhibit excel files for chapters 7-11 (interest rate risk). Place these files into the “C:\BankRisk” directory.
* BankRisk\_ipynb202012.zip: All of the ipython (Jupyter) notebook code files. These files should be placed into a subdirectory called: C:\Users\yourname\bankrisk. The python software will look for the code files in the C:\Users\yourname directory. When it opens you should see bankrisk listed as a subdirectory. Just click on it to work with the code files. (Do not attempt to run these files if you are not proficient in python and ipython notebook. This is not the material to use if you are just beginning to learn python.)
* BankRisk\_processingtables202012.csv: These are the ancillary data tables that are referenced by the ipynb files. They should all be placed into the root directory called “C:\BankRisk”.
* df2\_2001\_200912.7z and df2\_2010\_202012.7z: These are the Call Report raw data extracts for the indicated years for all banks in the country. (I also provided the python code that created these files from the FDIC bulk data files in case you are curious.) You must use 7-Zip open source software (which is superior in many ways to WinZip) to un-compress these files. Put them in the “C:\BankRisk” directory.

How to get started:

1. Run br001b\_CallDataExtr\_concat\_202012.ipynb. This concatenates the two large df2… files into one even larger one which is used for everything.
2. Run br001c\_CallDataCalcs\_AllBanks\_202012.ipynb. This processes the raw Call Report data stored in the df2… files into calculated fields. For example, the Call Report shows year-to-date income and expense numbers. This processing will convert them into quarterly numbers to allow rolling 4q averages to be calculated. (This takes a long time… about 2 hours on my laptop. The output contains timestamps that you can examine before executing each block to get an idea of the time required at each stage.)
3. Once steps 1 and 2 are completed, you are ready to start the stress test code files. These contain either “stress” or “univstress” in the filenames.
4. Definitely study: br003ma, br003mb, and br003mc code files. They are the same code, but they are configured to illustrate how to set up specialized BHCs, large aggregates, or small aggregates. There is a large block of code near the top of the files where all of the selections are made. The output from these three files is discussed in detail in the book.
5. Generally, if you scan through any of the ipynb notebook files, you should recognize the outputs from the book. This will give you a good idea about what each module is used for. Please note that the “univstress” modules provide output for the full models, the 3-variable models, and the 4-variable models. You can select any of those you like.
6. You can run the duration analyses on any bank, bank holding company, or combination of banks or BHCs that you desire. There are two general steps: First, it is essential to run a “univstress” module such as “br003mc…” that has been altered for the banks you want. This will create the df2\_3z… file that contains the Call Report data for your banks. This will be used for the duration regressions. Second, modify the ipynb duration files beginning with “br006dfe…” through “br006ha…” to reference your group of banks instead of “grpUSTotx00” (the code for all US commercial banks). The simplest way to do this is to run a global find and replace in all code cells for those files. Find “grpTotUSx00” and replace it with whatever name you have given for the bank or banks you have selected, such as “grpABCbanks”.
7. Good luck! Let me know if you run into problems.

Update for 2016, 2017, 2018, 2019, 2020, and 2021 CCAR models:

* The latest set of ipynb files that run CCAR stress tests have generally been updated to run the 2016, 2017, 2018, 2019, 2020, and 2021 CCAR scenarios. Note that the detailed start date and end date for the forecasts was shifted in 2016. Instead of starting with 2015-09-30 as earlier CCAR years did, it now starts with 2015-12-31. Also, instead of ending with 2018-12-31, it now ends with 2019-03-31. Certain code files run sets of four CCAR years (such as 2012, 2013, 2014, and 2015). These files contain “bigloop” in the filename. In each, there is a variable “ccyr” that defines which four years to run. If you want the latest four CCAR years (while avoiding the pandemic effects), change this variable as follows: ccyr= [2017,2018,2019,2020]. There are special notes and comments to show you where in the code to make this change. If you list more than four CCAR years in the ccyr variable, generally, only the last four years will be displayed in the four-year exhibits.

Special change (at 5/26/2019):

* In 2019, Zions Bancorporation converted itself from a financial holding company to a national bank. Therefore, the name of the company is now Zions Bancorporation, National Association. As a result of this change, the company is no longer listed by the Federal Reserve as a financial holding company. For purposes of this analytical software, it meant that Zions Bank no longer has any of the prior holding company identifiers in the FFIEC official list of financial institutions (“Institutions2.zip”). This list is used by the software in this repository, especially for deriving the financial aggregates of the CCAR 31-bank group. Unfortunately, this change caused Zions to disappear from the historical 31-bank group financials. To correct this, I have altered the software to reinstate the holding company fields for Zions to preserve the historical totals.
* This means that Zions will still appear in the 31-bank group aggregates. However, any new materials published by the Federal Reserve regarding CCAR results will undoubtedly omit Zions going forward. Please be aware of this difference. (Note: If you want Zions to disappear from the 31-bank aggregate, it is a simple matter to remove “ZION” from the ticker column of the BkAvgAstPR\_FailDate\_BHC2\_ult202012.csv file.)