NOTES

1. Use

pip install package name or conda install package name

packages utilized in this project:

pathlib (e.g. pip install pathlib in the terminal, make sure it is installed in the same environment)

matplotlib

numpy

pandas

seaborn

scipy

varname

collections

Once all installed, open the ‘VIX Project Folder’ in any IDE, and open ‘main.py’. Run it. It should output all graphs and tables into the same folder.

1. It currently involves data for 203 full cycles till the July 2021 contract in the folder ‘FULL CYCLE’. The price files include open, high, low, close, settle prices.
   1. To add a new price file, open up an empty excel file, use a bql formula that is the same with previous formulas, replace index name with the new future. e.g. Open UXM20.xlsx in the folder, the A1 cell contains the formula to pull all data from Bloomberg, formula is as follows (note, this pulls 30 days, change the number to change the length):

=@BQL(“UXM20 Index”,"last(dropna(PX\_OPEN),30) as #Open,last(dropna(PX\_HIGH),30) as #High,last(dropna(PX\_LOW),30) as #Low,last(dropna(PX\_LAST),30) as #Close,last(dropna(PX\_SETTLE),30) as #Settle,last(dropna(PX\_VOLUME),30) as #Volume","dates=range(-20y,0d)","XLSORT=ASC")

* 1. After this, go to CBOE website (updated the day after final settlement), <https://www.cboe.com/us/futures/market_statistics/historical_data/>

Download the excel file for the same future. This file will have the difference close price column compared with the prices from Bloomberg. Replace the close column with the close prices from CBOE.

1. Other data files utilized in this project include SPX prices.xlsx, SPX hist vol.xlsx, SPX\_IV.xlsx, VIX Spot.xlsx, which all have Bloomberg formulas in cell A2, it will update the price to today when open.

Two other data files ma\_spx.xlsx and ma\_vix.xlsx requires a BQNT script to update, please see the python file BQNT Script to update Mas and copy the code to BQNT to get the csv file contains all ma data for both SPX and VIX in the same file. Remember to change the end date to today.

Above is all you need to run the project from today.

\*The followings are discrepancies during the data cleaning process for existing data files.

THOSE WITH MISSING INTRADAY DATA: UXF06 ON 12/5/2005, UXN04 06/03/2004, UXJ06 3/23/2006.

UXZ11 DID NOT HAVE LAST PRICE, USED SETTLEMENT PRICE THERE

Starting UXN12, hand entered settlement, CBOE verified settlement prices

Starting 10/02/2013, UXV13, volume started to differ

UXZ05 BBG uses settlement for close, consequently its high is lower than close for some days

UXV14 LOOKED FOR SETTLEMENT DATA FROM CBOE, BBG DOES NOT HAVE

STARTING UXX14, SETTLEMENT PRICE MATCHED, VOLUME AVAILABLE ON LAST DAY. CLOSING PRICE WAS THE SAME WITH SETTLEMENT ON BBG, HOWEVER DIFFERED ON CBOE, TOOK CBOE CLOSING PRICE

STARTING WITH UXG15, ON THE LAST DAY, CBOE VOLUME IS SMALLER THAN BBG VOLUME

Some of CBOE older data were 10 times actual price, corrected. (UXM04 error occurred due to this issue)

UXJ15 MISSED 4/3/2015, TOOK DATA FROM CBOE (T-9)

Deleted additional row 3/4/2015

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 17.3 | 17.83 | 17.25 | 17.35 | 17.325 | 40289 | 48894 |

UXJ15 extra row was created for a day where it was very low volume on the day (BBG volume zero)

UXN15 ON LAST DAY LOW WAS 12.5 FROM BBG BUT 12.4 ON CBOE, REPLACED

FROM UXJ16 ON, MISSING FINAL SETTLEMENT DATA, FILLED IN FROM CBOE; LAST DAY VOLUME MATCHING CBOE VOLUME ON THIS DAY

Dropped these two data points for settlement below because all other columns were NAs

UXF 06 12/5/2005 13.02

UXJ06 3/23/2006 12.45

UXF06 ON, BBG DATA HAD CLOSE MATCHING SETTLE THE ENTIRE PATH, BUT CBOE HAD DIFFERENT CLOSE DATA, FILLED IN FROM CBOE

STARTING UXN1, SETTLEMENT PRICE FILLED IN FROM CBOE, CLOSE PRICE STILL REPLACED. CBOE DOES NOT HAVE 6/22/2021 DATA (SO CLOSE PRICE ON THIS DATE IS STILL FROM BBG)

UXG2 ONLY HAS DATA SINCE 5/24/2021 FROM CBOE, CLOSE DATA OF THOSE DATES WERE REPLACED WITH CBOE DATA, THE REST REMAINS FROM BBG

NO MORE VOLUME DATA UXF07 AND PRIOR

Note, discrepancies of LOW not being the lowest price on the day, although all of these differences are < -0.3 so we accepted this discrepancy; same with the higher ones at < -0.2

In Future, there may still be differences between BBG and CBOE data, (although expected to be much better than the older data, using BBG data should suffice)