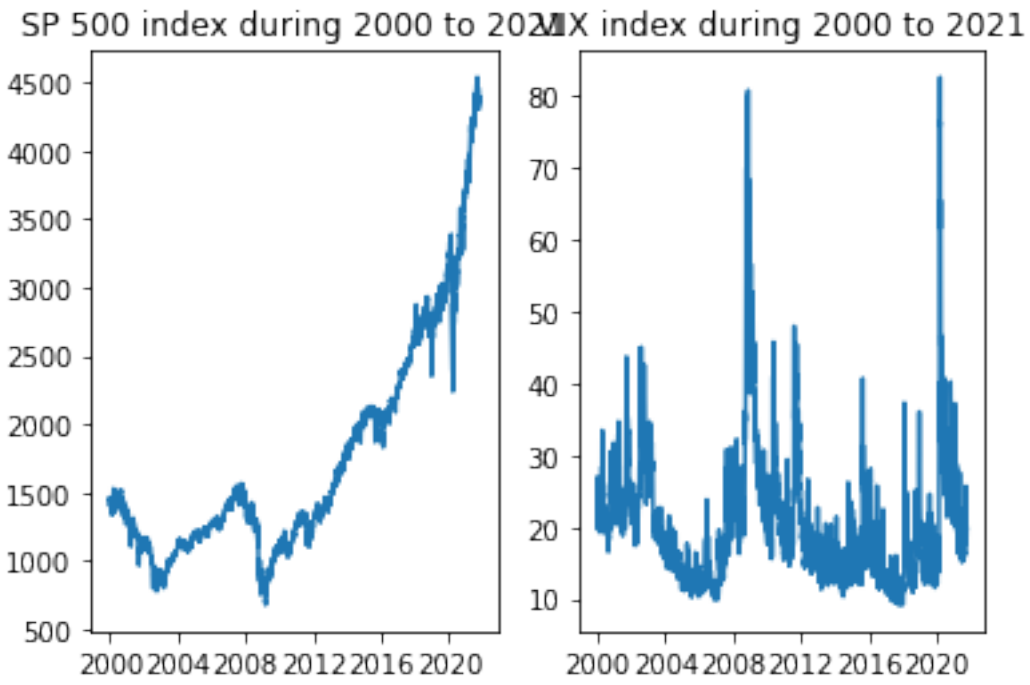
result

October 16, 2021

[ ]:
```
import garchUtilities
import numpy as np
from garchMLE import GARCH11
start = "2000-01-02"
end = "2021-10-12"
SPXfilePath = "/Users/zhiwang/Desktop/PythonPackage/GARCHOptionPricing/Data/
 ↪HistoricalPrices.csv"
VIXfilePath = "/Users/zhiwang/Desktop/PythonPackage/GARCHOptionPricing/Data/
 ↪VIX_History.csv"
spxdf = garchUtilities.preprocessSPXdata(SPXfilePath, start, end)
vixdf = garchUtilities.preProcessVIXData(VIXfilePath, start, end)
combineddf = garchUtilities.combineVixSPX(spxdf,vixdf)
combineddf = combineddf.rename(columns={" Close":"SPX.Close", "CLOSE":"VIX.
 ↪Close"})
paramArray = np.array([1.6746e-6,0.0473,0.9498,0.2068])
mygarch = GARCH11(combineddf, paramArray)
#mygarch.MaximumLikeliHood(mode = "VIX")
#print(mygarch.LogLikehood(mode = "Combined"))
```

[ ]:
```
## Plot the SPX and VIX index
import matplotlib.pyplot as plt
fig, (ax1, ax2) = plt.subplots(1, 2)
ax1.plot(combineddf.index, combineddf["SPX.Close"])
ax1.set_title("SP 500 index during 2000 to 2021")
ax2.plot(combineddf.index, combineddf["VIX.Close"])
ax2.set_title("VIX index during 2000 to 2021")
```

[ ]:
```
Text(0.5, 1.0, 'VIX index during 2000 to 2021')
```



[ ]:
```
combineddf.columns
```

[ ]:
```
Index([' Open', ' High', ' Low', 'SPX.Close', 'OPEN', 'HIGH', 'LOW',
       'VIX.Close'],
      dtype='object')
```