3. Historical Data

This section illustrates how to retrieve **historical data** for different instruments.

First, the API connection.

In [1]:

```
import fxcmpy
import pandas as pd
import datetime as dt
con = fxcmpy.fxcmpy(config_file='fxcm.cfg')
```

3.1. Available Instruments

A list of **instruments** for which historical data is available is returned by `con. get_instruments_for_candles()`.

In [2]:

```
instruments = con.get_instruments_for_candles()
for i in range(int(len(instruments)/4)):
    print(instruments[i*4:(i+1)*4])
print(instruments[(i+1)*4:])
```

```
['AUD/CAD', 'AUD/CHF', 'AUD/JPY', 'AUD/NZD']
['AUD/USD', 'AUS200', 'Bund', 'CAD/CHF']
['CAD/JPY', 'CHF/JPY', 'CHN50', 'Copper']
['ESP35', 'EUR/AUD', 'EUR/CAD', 'EUR/CHF']
['EUR/GBP', 'EUR/JPY', 'EUR/NOK', 'EUR/NZD']
['EUR/SEK', 'EUR/TRY', 'EUR/USD', 'EUSTX50']
['FRA40', 'GBP/AUD', 'GBP/CAD', 'GBP/CHF']
['GBP/JPY', 'GBP/NZD', 'GBP/USD', 'GER30']
['HKG33', 'JPN225', 'NAS100', 'NGAS']
['NZD/CAD', 'NZD/CHF', 'NZD/JPY', 'NZD/USD']
['SOYF', 'SPX500', 'TRY/JPY', 'UK100']
['UKOil', 'US30', 'USD/CAD', 'USD/CHF']
['USD/CNH', 'USD/HKD', 'USD/JPY', 'USD/MXN']
['USD/NOK', 'USD/SEK', 'USD/TRY', 'USD/ZAR']
['USDOLLAR', 'USOil', 'XAG/USD', 'XAU/USD']
['ZAR/JPY']
```

3.2. Fetching the Data

In a simple case, the `con.get_candles()` method returns the most recent data points available for a specified `instrument` and `period` value.

In [3]:

```
con.get_candles('USD/JPY', period='D1')  # daily data
```

Out[3]:

```
                    bidopen bidclose bidhigh  bidlow askopen askclose askhigh  asklow tickqty
               date
2018-07-03 21:00:00 110.886 110.563  111.125 110.498 110.908 110.625  111.147 110.518 297494
2018-07-04 21:00:00 110.563 110.470  110.598 110.267 110.625 110.526  110.652 110.288 295074
2018-07-05 21:00:00 110.470 110.579  110.731 110.278 110.526 110.708  110.755 110.300 316198
2018-07-06 21:00:00 110.579 110.439  110.777 110.369 110.708 110.509  110.798 110.392 267247
2018-07-08 21:00:00 110.400 110.400  110.422 110.290 110.459 110.456  110.489 110.315 713
2018-07-09 21:00:00 110.401 110.836  110.893 110.340 110.457 110.859  110.914 110.362 226624
2018-07-10 21:00:00 110.835 110.977  111.343 110.781 110.858 111.016  111.365 110.816 226709
2018-07-11 21:00:00 110.977 111.980  112.163 110.757 111.016 112.053  112.183 110.776 385668
2018-07-12 21:00:00 111.981 112.524  112.617 111.905 112.054 112.557  112.638 111.929 302315
2018-07-13 21:00:00 112.523 112.319  112.790 112.266 112.556 112.352  112.811 112.287 252067
```

By default, the method returns a `pandas` `DataFrame` object which simplifies the majority of typical analytics and visualizations tasks significantly (see http://pandas.pydata.org).

3.3. Data Frequency

The parameter `period` defines the frequency of the data to be retrieved. Below is a list of all currently available frequencies.

- minutes: `m1`, `m5`, `m15` and `m30`,
- hours: `H1`, `H2`, `H3`, `H4`, `H6` and `H8`,
- one day: `D1`,
- one week: `W1`,
- one month: `M1`.

By default, `con.get_candles()` returns data for the last 10 available periods, depending on the parameter value for `period`.

In [4]:

```
con.get_candles('EUR/USD', period='M1')  # monthly data
```

Out[4]:

```
                    bidopen bidclose bidhigh  bidlow askopen askclose askhigh  asklow tickqty
               date
2017-08-31 21:00:00 1.19081 1.18108  1.20913 1.17160 1.19110 1.18197  1.20937 1.17181 6183348
2017-09-30 21:00:00 1.18108 1.16450  1.18792 1.15731 1.18197 1.16476  1.18810 1.15750 4598301
2017-10-31 21:00:00 1.16450 1.19026  1.19601 1.15528 1.16476 1.19051  1.19624 1.15549 4392023
2017-11-30 22:00:00 1.19026 1.20038  1.20244 1.17165 1.19051 1.20103  1.20267 1.17187 3678417
2017-12-31 22:00:00 1.20038 1.24122  1.25369 1.19144 1.20103 1.24148  1.25392 1.19166 6771090
2018-01-31 22:00:00 1.24122 1.21922  1.25547 1.21867 1.24148 1.21962  1.25566 1.21890 6552190
2018-02-28 21:00:00 1.21922 1.23198  1.24752 1.21534 1.21962 1.23270  1.24777 1.21556 5786487
2018-03-31 21:00:00 1.23198 1.20765  1.24126 1.20544 1.23270 1.20789  1.24150 1.20566 4715448
2018-04-30 21:00:00 1.20765 1.16890  1.20831 1.15091 1.20789 1.16963  1.20855 1.15113 7100027
2018-05-31 21:00:00 1.16890 1.16805  1.18512 1.15069 1.16963 1.16872  1.18535 1.15094 6660473
```

A number different from 10 can also be defined via the `number` parameter.

In [5]:

```
con.get_candles('EUR/USD', period='m1', number=5)  # five one-minute bars
```

Out[5]:

```
                    bidopen bidclose bidhigh  bidlow askopen askclose askhigh  asklow tickqty
               date
2018-07-13 20:55:00 1.16848 1.16850  1.16851 1.16841 1.16874 1.16877  1.16878 1.16868 61
2018-07-13 20:56:00 1.16850 1.16846  1.16854 1.16844 1.16877 1.16874  1.16879 1.16872 67
2018-07-13 20:57:00 1.16846 1.16842  1.16846 1.16841 1.16874 1.16870  1.16874 1.16868 13
2018-07-13 20:58:00 1.16842 1.16847  1.16855 1.16842 1.16870 1.16878  1.16883 1.16870 37
2018-07-13 20:59:00 1.16847 1.16831  1.16847 1.16831 1.16878 1.16879  1.16879 1.16878 5
```

3.4. Time Windows

Alternatively, one can specifiy `start` and `stop` values to specifiy the time window for data retrieval.

In [6]:

```
start = dt.datetime(2018, 5, 15)
end = dt.datetime(2018, 6, 1)
con.get_candles('EUR/USD', period='D1',
                start=start, end=end)
```

Out[6]:

```
                    bidopen bidclose bidhigh  bidlow askopen askclose askhigh  asklow tickqty
               date
2018-05-16 21:00:00 1.18366 1.18057  1.18530 1.17620 1.18389 1.18087  1.18553 1.17644 398017
2018-05-17 21:00:00 1.18057 1.17920  1.18363 1.17752 1.18087 1.17964  1.18388 1.17776 307611
```

```
                     bidopen bidclose bidhigh  bidlow askopen askclose askhigh  asklow tickqty
                date
2018-05-18 21:00:00 1.17920 1.17674  1.18210 1.17486 1.17964 1.17754  1.18234 1.17509 212112
2018-05-20 21:00:00 1.17674 1.17668  1.17785 1.17623 1.17754 1.17745  1.17811 1.17699 168
2018-05-21 21:00:00 1.17668 1.17903  1.17945 1.17155 1.17745 1.17928  1.17968 1.17179 193762
2018-05-22 21:00:00 1.17903 1.17772  1.18287 1.17553 1.17928 1.17809  1.18310 1.17578 275263
2018-05-23 21:00:00 1.17772 1.16944  1.17886 1.16747 1.17809 1.16980  1.17909 1.16770 376471
2018-05-24 21:00:00 1.16944 1.17182  1.17494 1.16897 1.16980 1.17206  1.17516 1.16921 320235
2018-05-25 21:00:00 1.17182 1.16469  1.17325 1.16447 1.17206 1.16529  1.17349 1.16473 313961
2018-05-27 21:00:00 1.16469 1.16849  1.16869 1.16534 1.16529 1.16886  1.16907 1.16597 947
2018-05-28 21:00:00 1.16849 1.16232  1.17273 1.16063 1.16886 1.16260  1.17297 1.16085 243549
2018-05-29 21:00:00 1.16232 1.15383  1.16385 1.15091 1.16260 1.15408  1.16409 1.15113 418712
2018-05-30 21:00:00 1.15383 1.16599  1.16753 1.15176 1.15408 1.16673  1.16774 1.15199 431775
2018-05-31 21:00:00 1.16599 1.16890  1.17233 1.16400 1.16673 1.16963  1.17254 1.16423 380182
2018-06-01 21:00:00 1.16890 1.16561  1.17168 1.16166 1.16963 1.16625  1.17194 1.16190 309563
```

3.5. Data Visualization

The Python ecosystem provides a number of alternatives to **visualize financial time series data**. The standard plotting library is `matplotlib` (see http://matplotlib.org) which is tighly integrated with `pandas` `DataFrame` objects, allowing for efficient visualizations.

In [7]:

```
from pylab import plt
plt.style.use('seaborn')
%matplotlib inline
```

Using the `columns` parameter, one can specifiy which data columns are returned. Here, just one column is specified.

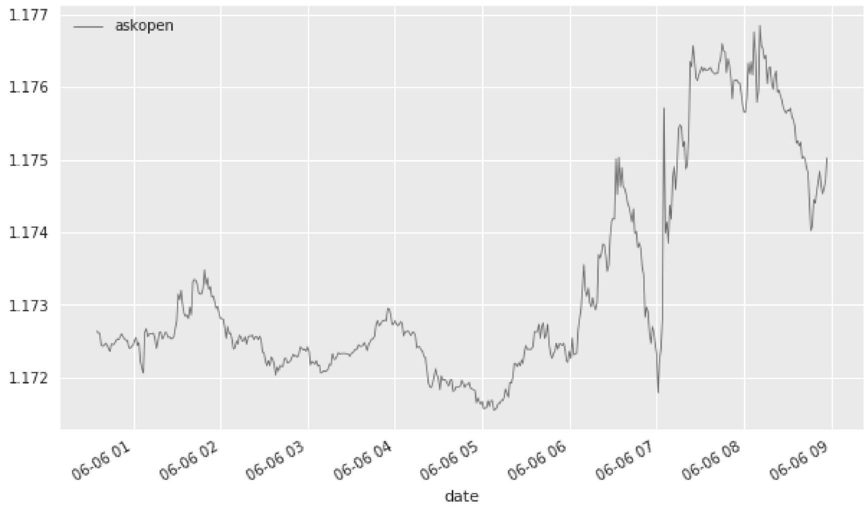
In [8]:

```
data = con.get_candles('EUR/USD', period='m1',
                       columns=['askopen'], number=500)
```

The following code visualizes the only financial time series in the `DataFrame` object.

In [9]:

```
data.plot(figsize=(10, 6), lw=0.8);
```



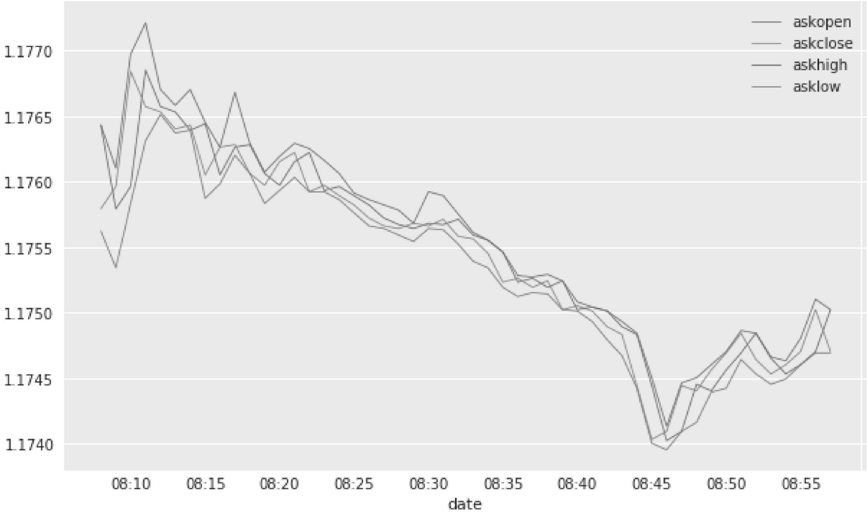
Specifying the `columns` parameter to be `asks` (`bids`) returns all columns related to ask (bid) prices.

In [10]:

```
data = con.get_candles('EUR/USD', period='m1',
                       columns=['asks'], number=50)
```

In [11]:

```
data.plot(figsize=(10, 6), lw=0.8);
```



In [12]:

```
con.close()
```