optimization_with_tcosts_solution

April 24, 2023

1 Optimization with Transaction costs (Solution)

In this lesson, we'll show you how to incorporate transaction costs into portfolio optimization. This will give your backtest a more realistic measure of your alpha's performance. In addition, we'll show you some additional ways to design your optimization with efficiency in mind. This is really helpful when backtesting, because having reasonably shorter runtimes allows you to test and iterate on your alphas more quickly.

```
In [ ]: import sys
        !{sys.executable} -m pip install -r requirements.txt
```

```
In [ ]: import pandas as pd
        import numpy as np
        import matplotlib.pyplot as plt
        import pickle
        import gzip
        import bz2
        from statsmodels.formula.api import ols
        from scipy.stats import gaussian_kde
        import scipy
        import scipy.sparse
        import patsy
        from statistics import median
        import datetime
```

1.1 Barra data

We'll be using factor data that is generated by Barra. This will be good practice because Barra data is used throughout the industry.

Note that we've pre-processed the raw barra data files and stored the data into pickle files. The alternative would be to load the original data, and perform the parsing each time. Since parsing and pre-processing takes time, we recommend doing the pre-processing once and saving the pre-processed data for later use in your backtest.

Choose the number of years to use for the backtest. The data is available for years 2003 to 2008 inclusive.

```
In [ ]: barra_dir = '../../data/project_8_barra/'
```