analysis

May 12, 2021

1 Analysis of stock prices in different time periods

NOTE: `base date point` will be set separatly for each period.

Example: if we want to get daily prices within a week then each Monday will be set as `base date point`

[18]:

```
from analysis import Column

import sys
from loguru import logger
import numpy as np
import pandas as pd
from seaborn import lineplot, barplot, scatterplot, boxplot
from matplotlib import pyplot

pd.options.mode.chained_assignment = None

START_DATE = "2011-01-01"
END_DATE = "2021-01-01"
FILENAME = "sp500.csv"
LIMIT = None
PLOT_CI = 95

logger.remove()
logger.add(sys.stdout, level="INFO")


def plot(**kwargs):
    funcs = [boxplot, barplot, scatterplot, lineplot]
    # NOTE: after lineplot X will be float

    data = kwargs['data']
    x = kwargs['x']
    y = kwargs['y']
    X = data[x]
    Y = data[y]
    print(kwargs['data'][[x, y]].groupby(x).mean().head())
    fig, axs = pyplot.subplots(nrows=len(funcs), figsize=(15,20))

    plot_kwargs = dict([(func, kwargs.pop(func.__name__, {})) for func in␣
 ↪funcs])

    for i, func in enumerate(funcs):
        ax = axs[i]

        if func == lineplot:
            data[x] = data[x].astype(float)
            kwargs['ci'] = PLOT_CI
        elif func == barplot:
            q_min, q_max = plot_kwargs.get(func).get('quantile', (0.50, 0.90))
            ax.set_ylim(Y.quantile(q_min), Y.quantile(q_max))
            kwargs['ci'] = PLOT_CI

        ax = func(**kwargs, ax=ax)

    fig.tight_layout()
```

1.1 Monthly stock price fluctuations within a year

[2]:

```
from analysis import get_best_month

df = get_best_month(FILENAME, START_DATE, END_DATE, limit=LIMIT)
df
```

[2]:

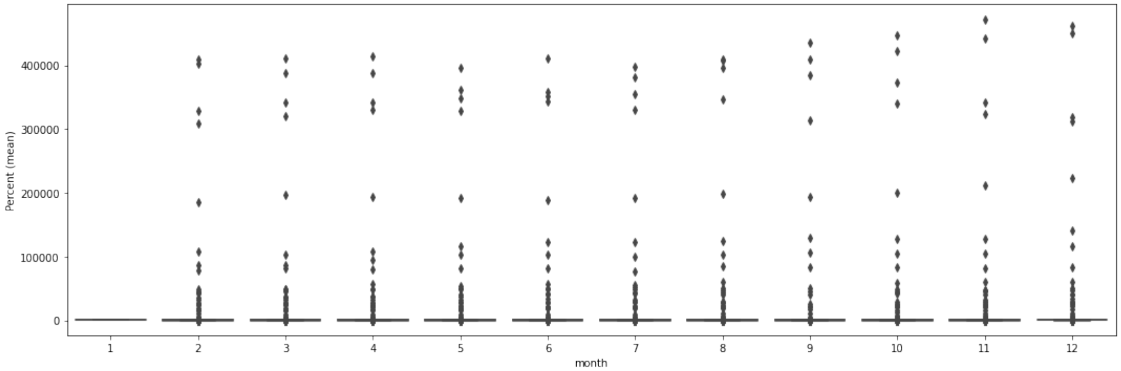
```
       year  month Symbol  Percent (mean)
0      2011      1   HSIC           100.0
1      2011      2   HSIC       106.55922
2      2011      3   HSIC      111.668004
3      2011      4   HSIC      113.231259
4      2011      5   HSIC      116.889606
…       …     …     …              …
57415  2020      8    CMA       53.541666
57416  2020      9    CMA       54.333332
57417  2020     10    CMA       53.055557
57418  2020     11    CMA       64.152776
57419  2020     12    CMA        70.72222

[57420 rows x 4 columns]
```

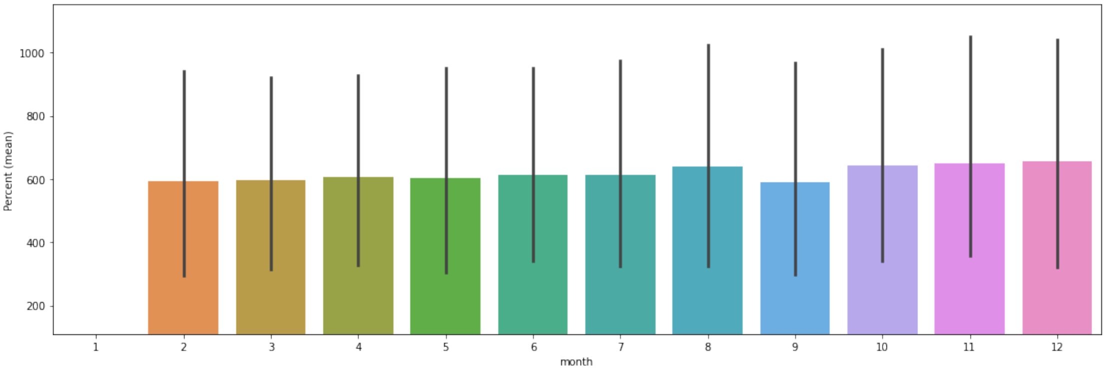
[3]:

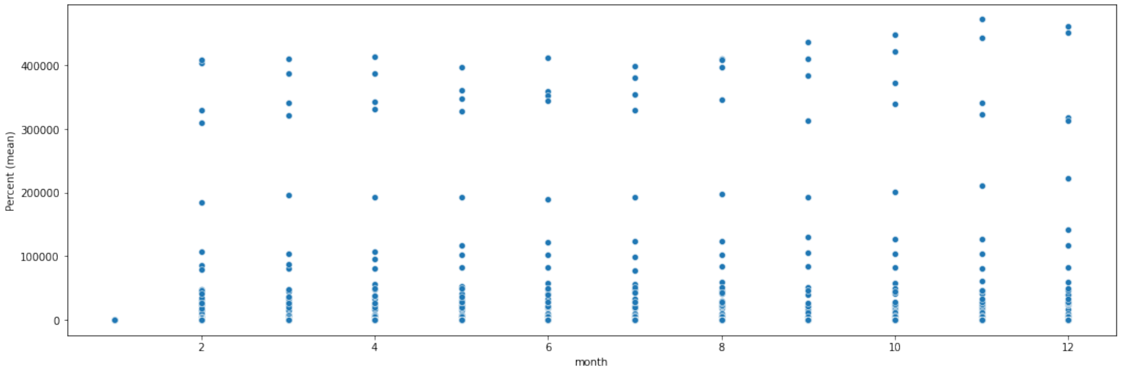
```
plot(x=Column.MONTH, y=Column.PERCENT, data=df, barplot={'quantile': (0.6, 0.
 ↪994)})
```

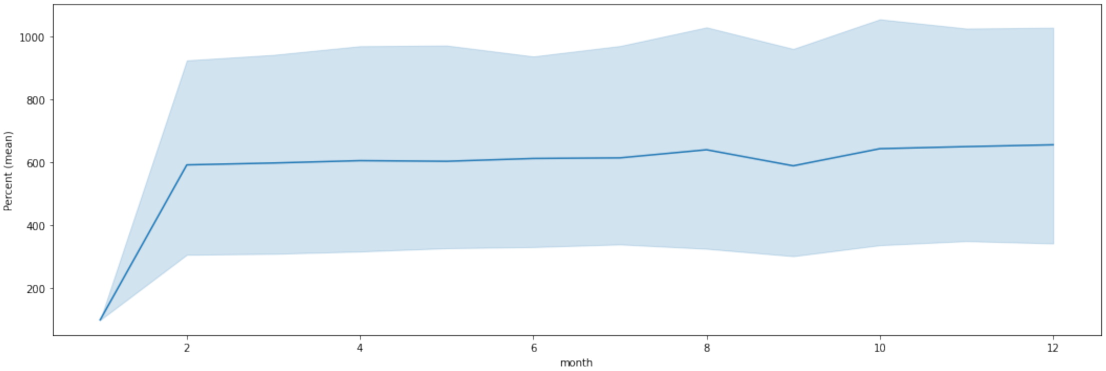
```
       Percent (mean)
```

```
month
1              100.0
2         592.137552
3         598.043293
4         605.551807
5         603.495585
```


Percent (mean)
400000
300000
200000
100000
0
1
2
3
4
5
6
7
8
9
10
11
12
month


Percent (mean)
1000
800
600
400
200
1
2
3
4
5
6
7
8
9
10
11
12
month


Percent (mean)
400000
300000
200000
100000
0
2
4
6
8
10
12
month


Percent (mean)
1000
800
600
400
200
2
4
6
8
10
12
month

1.2 Weekly stock price fluctuations within a year

[4]:

```
from analysis import get_best_week

df = get_best_week(FILENAME, START_DATE, END_DATE, limit=LIMIT)

df
```

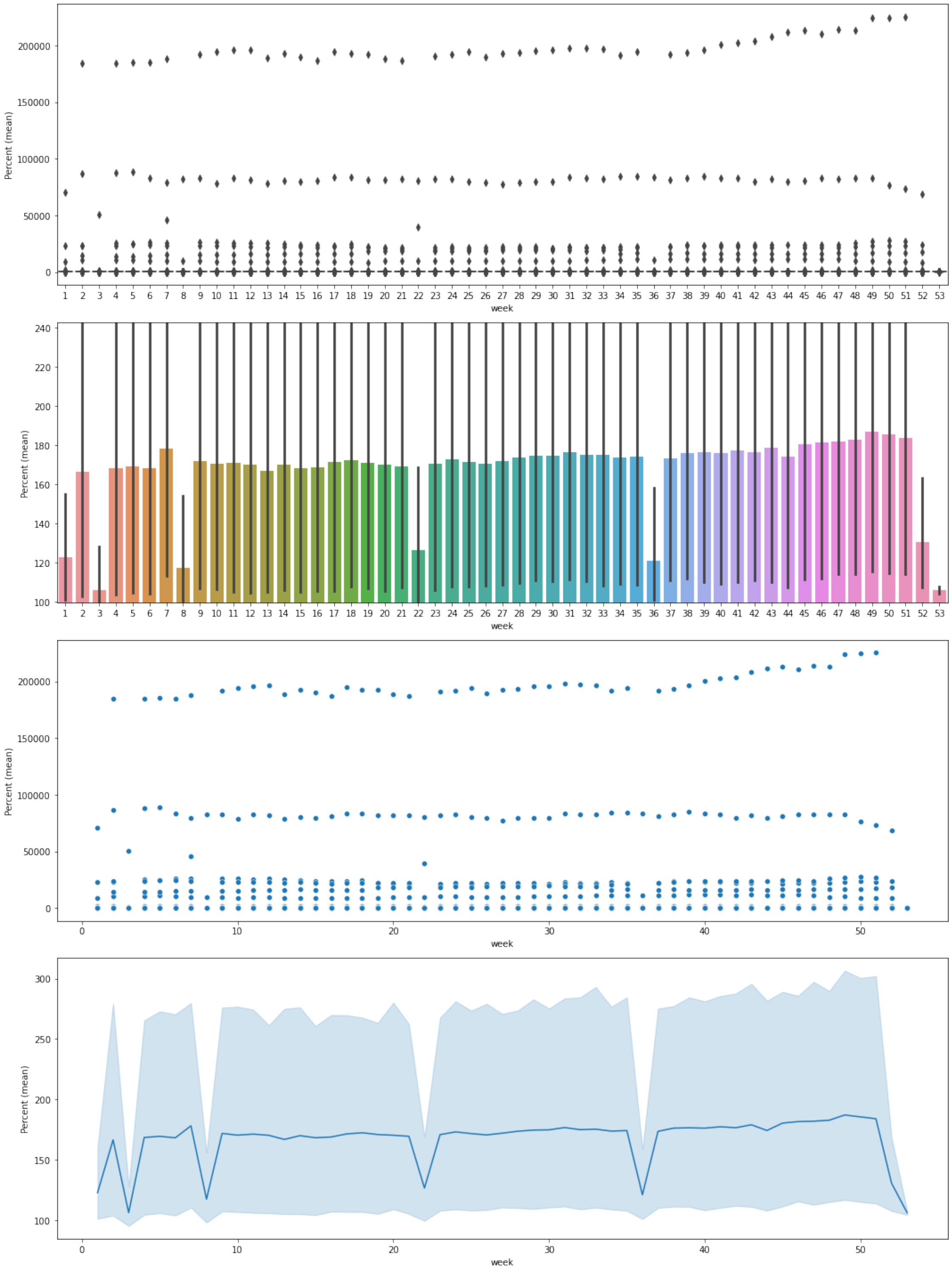
[4]:

```
        year  week Symbol  Percent (mean)
0       2011     1   VRTX           100.0
1       2011     2   VRTX      102.130682
2       2011     3   VRTX      112.102268
3       2011     4   VRTX      113.636361
4       2011     5   VRTX      110.624994
…        …    …     …              …
249817  2020    49     FE       56.000001
249818  2020    50     FE       60.884211
249819  2020    51     FE       64.631581
249820  2020    52     FE       63.200001
249821  2020    53     FE       62.673685

[249822 rows x 4 columns]
```

[5]:

```
plot(x=Column.WEEK, y=Column.PERCENT, data=df, barplot={'quantile': (0.5, 0.
 ↪998)})
```

```
      Percent (mean)
week
1         122.706237
2         166.476245
3         106.225554
4         168.461111
5         169.428628
```


Percent (mean)
0
50000
100000
150000
200000
week
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53
Percent (mean)
100
120
140
160
180
200
220
240
week
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53
Percent (mean)
0
50000
100000
150000
200000
week
0
10
20
30
40
50
Percent (mean)
100
150
200
250
300
week
0
10
20
30
40
50

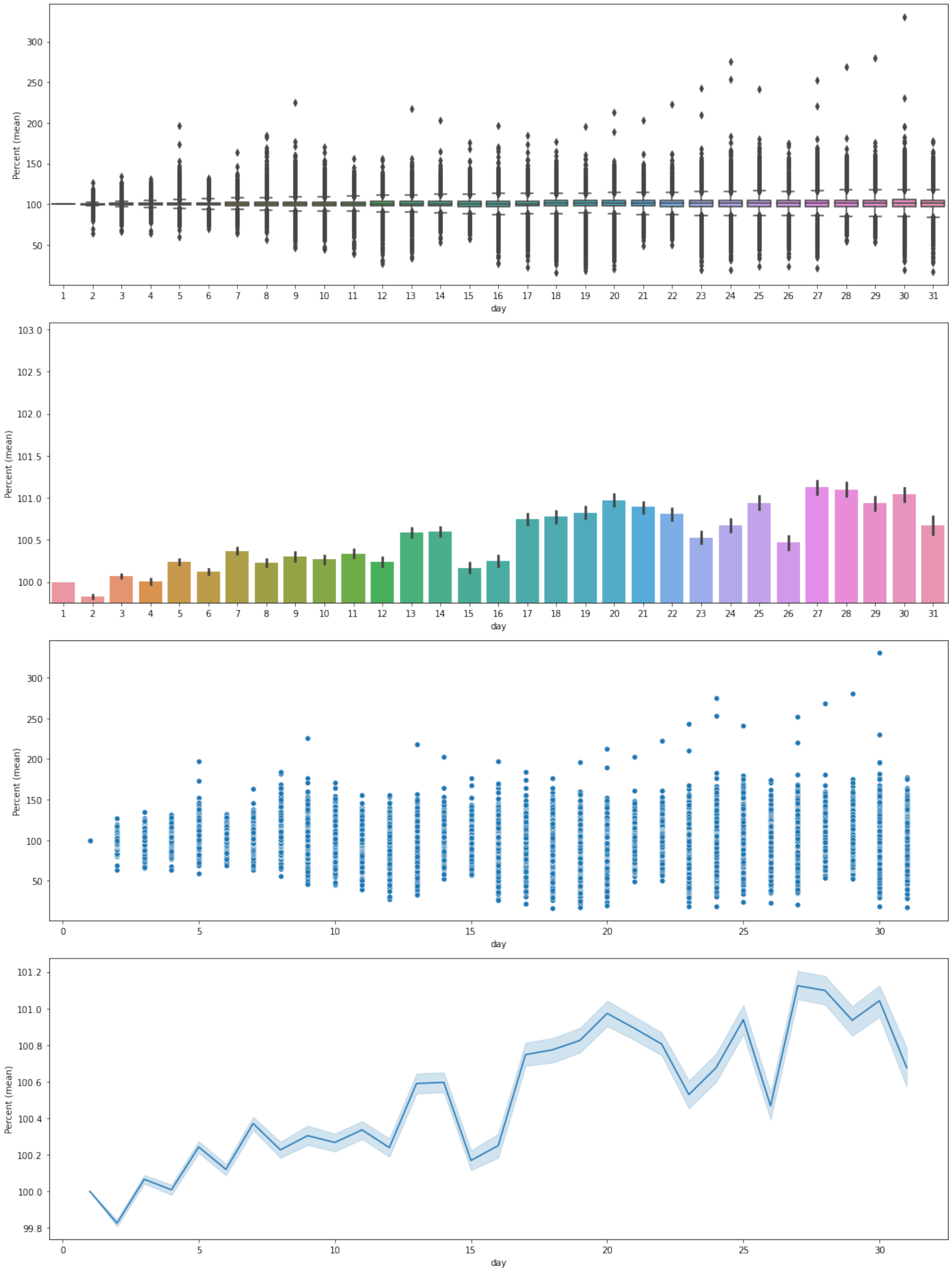
1.3 Daily stock price fluctuations within a month

[6]:
```
from analysis import Column,get_best_month_day

df = get_best_month_day(FILENAME, START_DATE, END_DATE, limit=LIMIT)

df
```

[6]:
```
         year  month  day Symbol  Percent (mean)
0        2016      7    5    FTV           100.0
1        2016      7    6    FTV       95.283401
2        2016      7    7    FTV        96.39676
3        2016      7    8    FTV        97.08502
4        2016      7   11    FTV       99.615383
…          …     …    …     …              …
1209969  2020     11   23    HON      120.360519
1209970  2020     11   24    HON      123.108751
1209971  2020     11   25    HON      122.931444
1209972  2020     11   27    HON      122.736408
1209973  2020     11   30    HON      122.440899

[1209974 rows x 5 columns]
```

[7]:
```
plot(x=Column.DAY, y=Column.PERCENT, data=df, barplot={'quantile': (0.4, 0.75)})
```

```
     Percent (mean)
day
1             100.0
2         99.824726
3         100.06518
4        100.007601
5        100.241902
```


Percent (mean)
300
250
200
150
100
50
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
day
Percent (mean)
103.0
102.5
102.0
101.5
101.0
100.5
100.0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
day
Percent (mean)
300
250
200
150
100
50
0 5 10 15 20 25 30
day
Percent (mean)
101.2
101.0
100.8
100.6
100.4
100.2
100.0
99.8
0 5 10 15 20 25 30
day

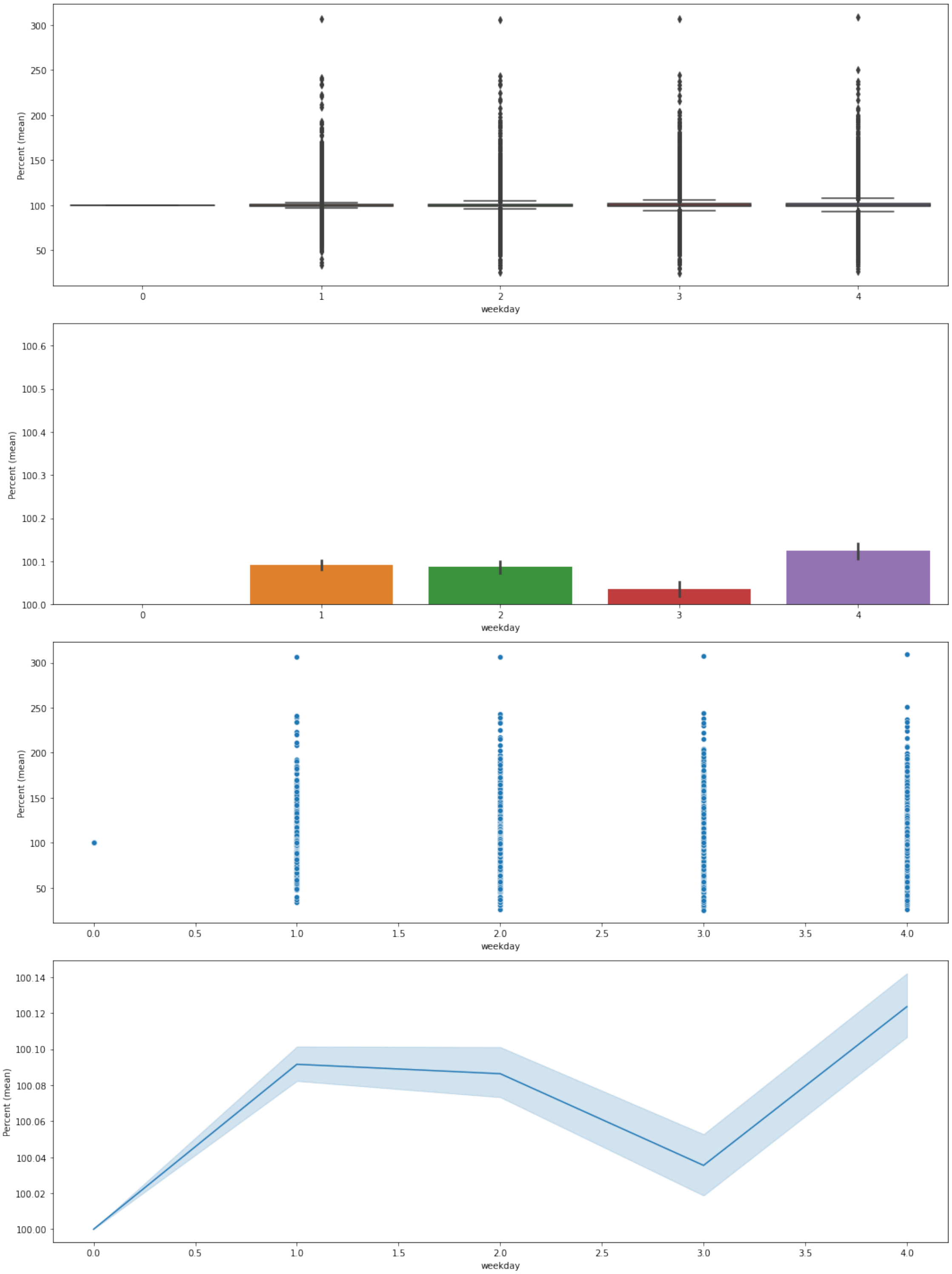
1.4 Daily stock price fluctuations within a week

[19]:
```
from analysis import get_best_weekday


df = get_best_weekday(FILENAME, START_DATE, END_DATE, limit=LIMIT)

df
```

[19]:
```
          year  week  weekday Symbol  Percent (mean)
0         2016    27        1    FTV           100.0
1         2016    27        2    FTV       95.283401
2         2016    27        3    FTV        96.39676
3         2016    27        4    FTV        97.08502
4         2016    28        0    FTV           100.0
…          …     …        …      …              …
1208795   2020    51        4    HON       98.282404
1208796   2020    53        0    HON           100.0
1208797   2020    53        1    HON      100.189571
1208798   2020    53        2    HON       99.526066
1208799   2020    53        3    HON           100.0

[1208800 rows x 5 columns]
```

[20]:
```
plot(x=Column.WEEKDAY, y=Column.PERCENT, data=df, barplot={'quantile': (0.4, 0.
 ↪7)})
```

```
         Percent (mean)
weekday
0                 100.0
1            100.091577
2            100.086353
3            100.035454
4            100.123566
```


Percent (mean)
300
250
200
150
100
50
0
1
2
3
4
weekday
Percent (mean)
100.6
100.5
100.4
100.3
100.2
100.1
100.0
0
1
2
3
4
weekday
Percent (mean)
300
250
200
150
100
50
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
weekday
Percent (mean)
100.14
100.12
100.10
100.08
100.06
100.04
100.02
100.00
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
weekday

1.5 Hourly stock price fluctuations with a day

[10]:

```
# Yahoo support hour history only for 2 years
START_DATE = '2019-06-01'
END_DATE = '2021-05-01'
```

[11]:

```
from analysis import get_best_hour

df = get_best_hour(FILENAME, START_DATE, END_DATE, limit=LIMIT)

df
```

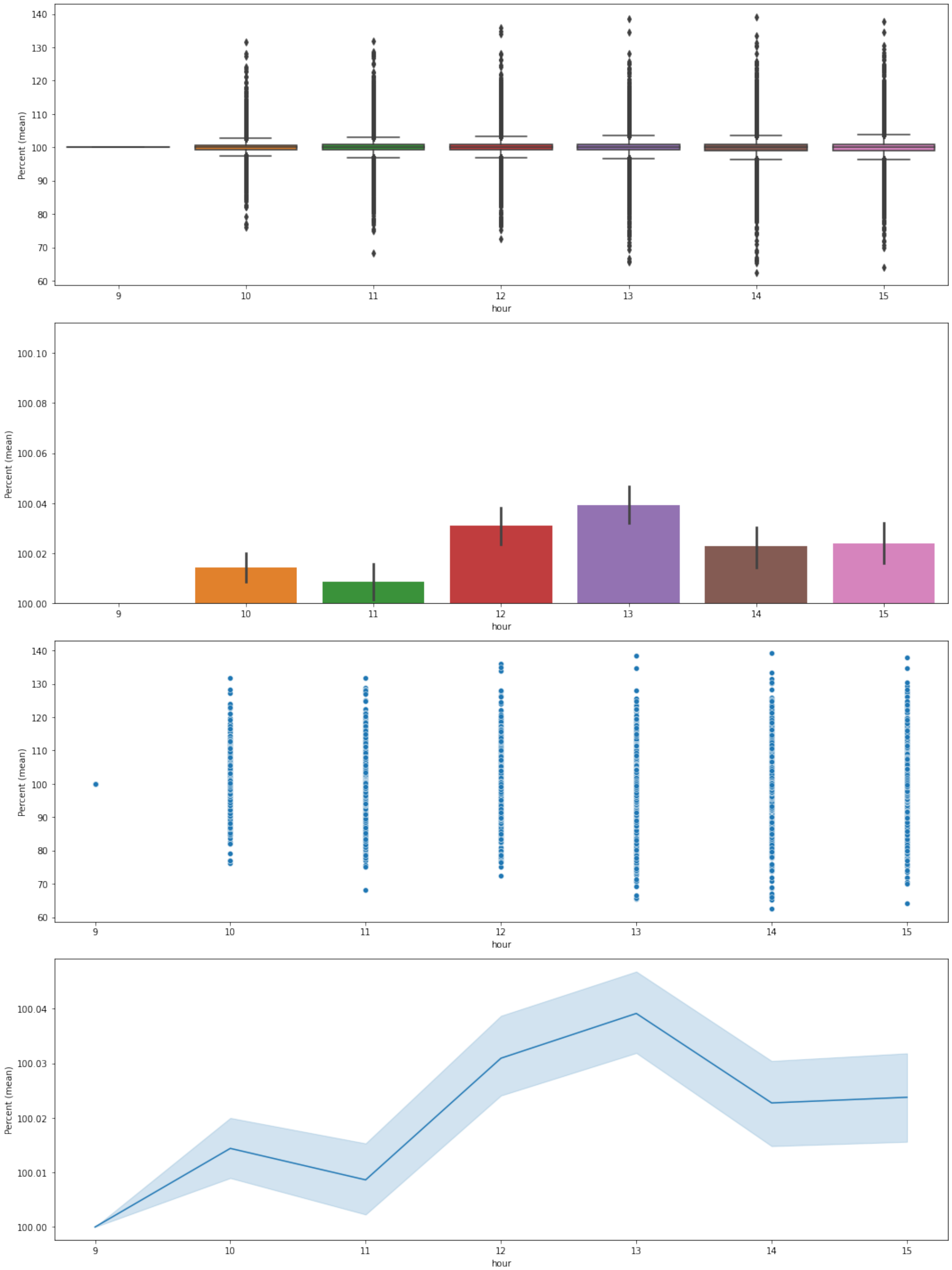
[11]:

```
         year  week  day  hour Symbol  Percent (mean)
0        2019    23    3     9    SRE           100.0
1        2019    23    3    10    SRE       99.613043
2        2019    23    3    11    SRE        99.38922
3        2019    23    3    12    SRE       99.339901
4        2019    23    3    13    SRE       99.658576
…        …    …    …    …     …              …
1631795  2021    17   30    11    FRC       99.246858
1631796  2021    17   30    12    FRC       99.176417
1631797  2021    17   30    13    FRC       99.352518
1631798  2021    17   30    14    FRC       99.696577
1631799  2021    17   30    15    FRC       99.609882

[1631800 rows x 6 columns]
```

[12]:

```
plot(x=Column.HOUR, y=Column.PERCENT, data=df, barplot={'quantile': (0.5, 0.6)})
```

```
      Percent (mean)
hour
9              100.0
10        100.014402
11        100.008636
12        100.030923
13        100.039122
```


Percent (mean)
140
130
120
110
100
90
80
70
60
9
10
11
12
13
14
15
hour
Percent (mean)
100.10
100.08
100.06
100.04
100.02
100.00
9
10
11
12
13
14
15
hour
Percent (mean)
140
130
120
110
100
90
80
70
60
9
10
11
12
13
14
15
hour
Percent (mean)
100.04
100.03
100.02
100.01
100.00
9
10
11
12
13
14
15
hour

1.6 Hourly and quarterly stock price fluctuations within a day

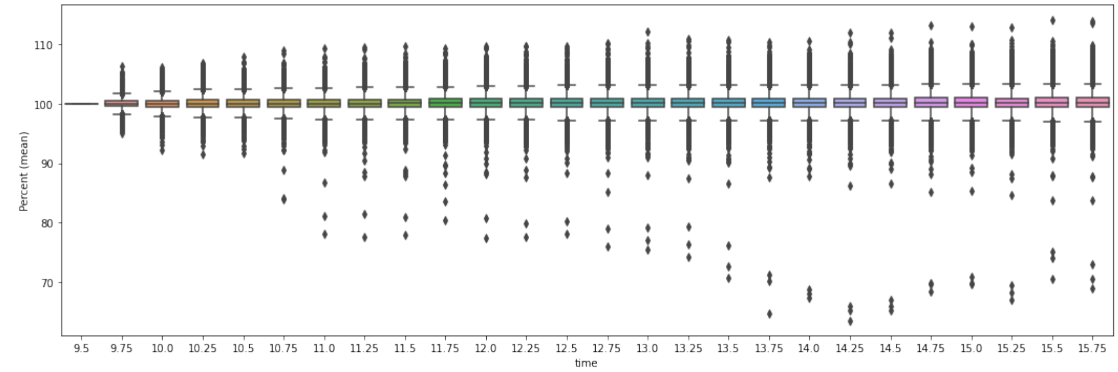
```
[13]: # Yahoo support minute history only for 2 months
      START_DATE = '2021-03-14'
      END_DATE = '2021-05-11'
```

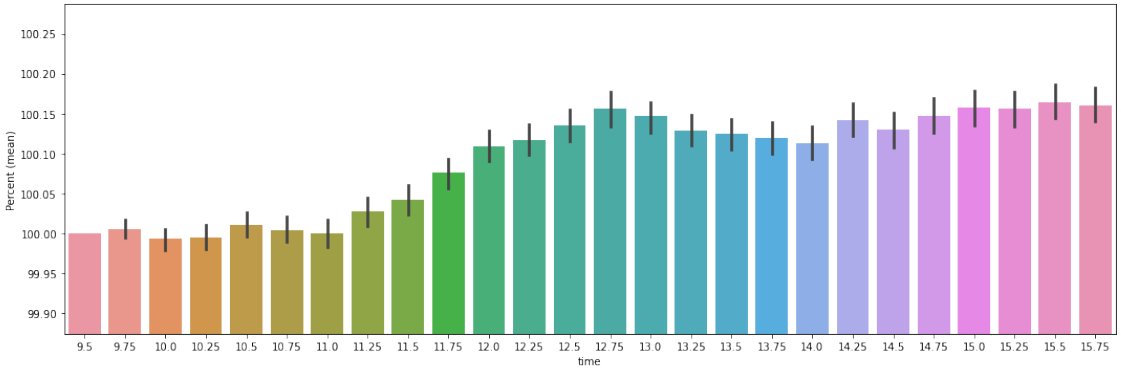
```
[14]: from analysis import get_best_time

      df = get_best_time(FILENAME, START_DATE, END_DATE, limit=LIMIT)

      df
```

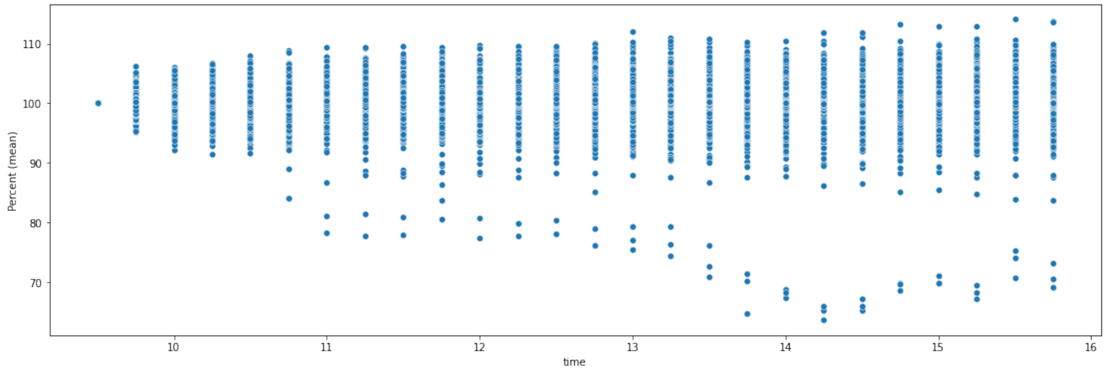
```
[14]:         year  week  day  hour  minute   time Symbol  Percent (mean)
      0       2021    11   15     9      30    9.5     CF           100.0
      1       2021    11   15     9      45   9.75     CF      100.211863
      2       2021    11   15    10       0   10.0     CF       99.636803
      3       2021    11   15    10      15  10.25     CF       99.878932
      4       2021    11   15    10      30   10.5     CF      100.302659
      …        …   …   …   …      …    …    …             …
      484919  2021    19   10    14       0   14.0   CHTR      100.105546
      484920  2021    19   10    14      15  14.25   CHTR       99.912411
      484921  2021    19   10    14      30   14.5   CHTR       99.712098
      484922  2021    19   10    14      45  14.75   CHTR       99.475178
      484923  2021    19   10    15       0   15.0   CHTR       99.968414

      [484924 rows x 8 columns]
```

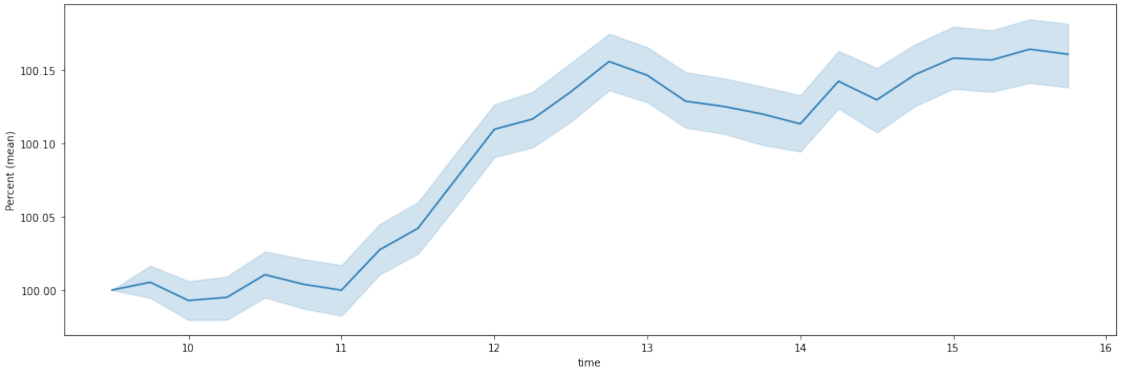
```
[15]: plot(x=Column.TIME, y=Column.PERCENT, data=df, barplot={'quantile': (0.40, 0.
       ↪6)})
```

```
       Percent (mean)
time
9.50            100.0
9.75       100.005306
10.00       99.992883
10.25       99.994966
10.50      100.010451
```


Percent (mean)
110
100
90
80
70
time
9.5
9.75
10.0
10.25
10.5
10.75
11.0
11.25
11.5
11.75
12.0
12.25
12.5
12.75
13.0
13.25
13.5
13.75
14.0
14.25
14.5
14.75
15.0
15.25
15.5
15.75


Percent (mean)
100.25
100.20
100.15
100.10
100.05
100.00
99.95
99.90
time
9.5
9.75
10.0
10.25
10.5
10.75
11.0
11.25
11.5
11.75
12.0
12.25
12.5
12.75
13.0
13.25
13.5
13.75
14.0
14.25
14.5
14.75
15.0
15.25
15.5
15.75


Percent (mean)
110
100
90
80
70
time
10
11
12
13
14
15
16


Percent (mean)
100.15
100.10
100.05
100.00
time
10
11
12
13
14
15
16

1.7 Quarterly stock price fluctuations within an hour

[16]:

```
from analysis import get_best_quarter

df = get_best_quarter(FILENAME, START_DATE, END_DATE, limit=LIMIT)

df
```

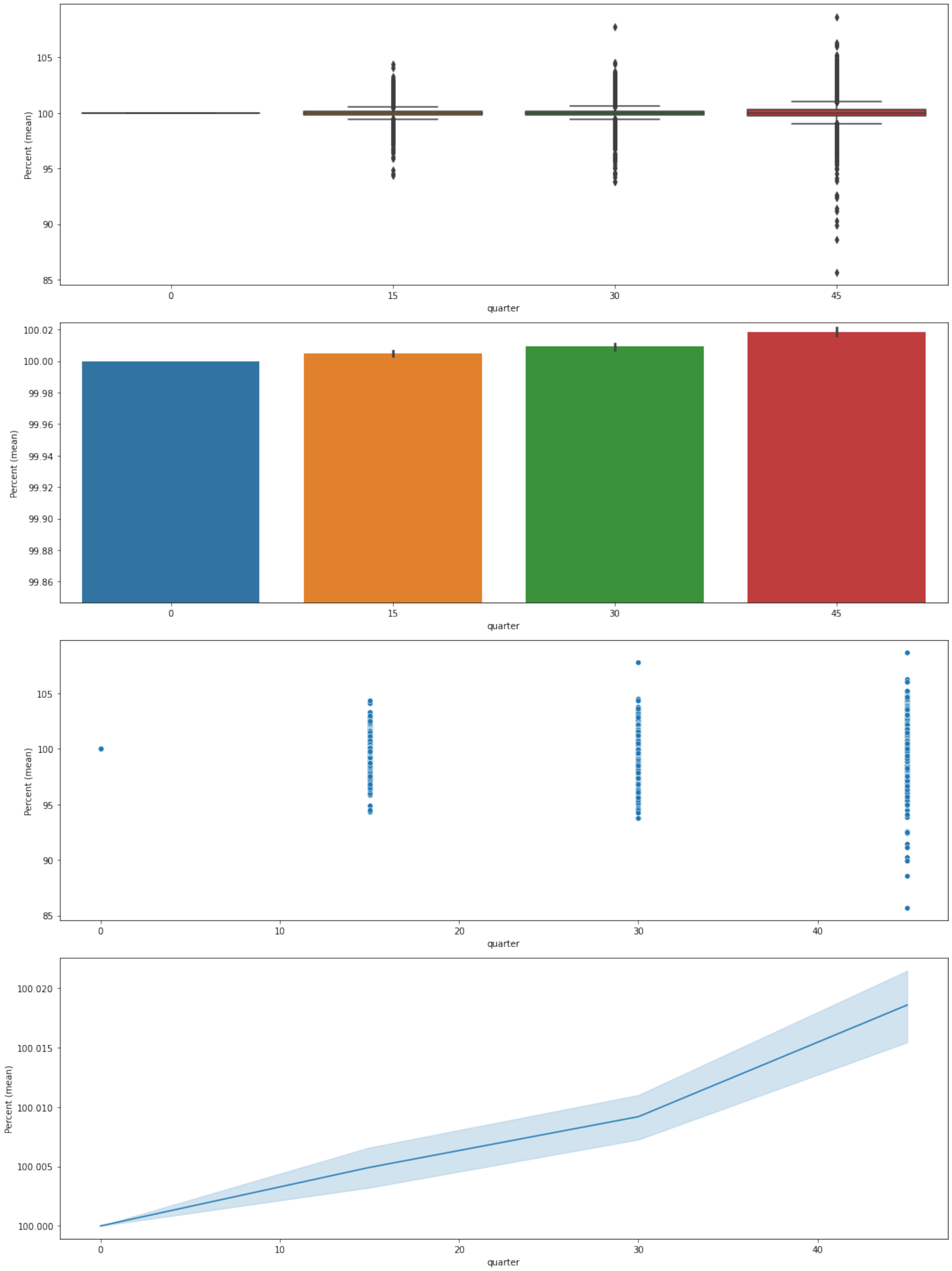
[16]:

```
        year  week  day  hour  minute  quarter Symbol  Percent (mean)
0       2021    11   15     9      30       30     CF           100.0
1       2021    11   15     9      45       45     CF      100.211863
2       2021    11   15    10       0        0     CF           100.0
3       2021    11   15    10      15       15     CF      100.243011
4       2021    11   15    10      30       30     CF      100.668283
…        …    …    …    …      …       …     …            …
483933  2021    19   10    13      45       45   CHTR      100.032916
483934  2021    19   10    14       0        0   CHTR           100.0
483935  2021    19   10    14      15       15   CHTR       99.807068
483936  2021    19   10    14      30       30   CHTR       99.606967
483937  2021    19   10    14      45       45   CHTR       99.370296

[483938 rows x 8 columns]
```

[17]:

```
plot(x=Column.QUARTER, y=Column.PERCENT, data=df, barplot={'quantile': (0.20, 0.
 ↪65)})
```

```
         Percent (mean)
quarter
0                 100.0
15           100.004919
30           100.009187
45            100.01858
```


105
100
95
90
85
Percent (mean)
0
15
30
45
quarter
100.02
100.00
99.98
99.96
99.94
99.92
99.90
99.88
99.86
Percent (mean)
0
15
30
45
quarter
105
100
95
90
85
Percent (mean)
0
10
20
30
40
quarter
100.020
100.015
100.010
100.005
100.000
Percent (mean)
0
10
20
30
40
quarter

```
[ ]:
```