analysis_base_first_date

May 12, 2021

1 Analysis of stock prices in different time periods

NOTE: `base date point` means that base value will be set to the first date in dataset.

Example: if we want to get daily prices within a week then `base date point` means that the base value will be set **only** for data point with first date

[1]:
```
from analysis_base_first_date 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_base_first_date import get_best_month

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

[2]:

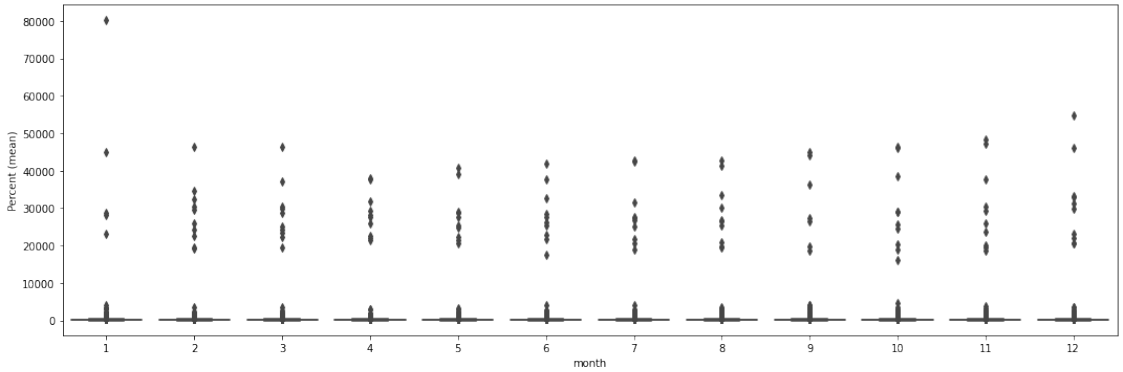
	year	month	Symbol	Percent (mean)
0	2011	1	HSIC	100.0
1	2011	2	HSIC	106.55922
2	2011	3	HSIC	111.668004
3	2011	4	HSIC	113.231259
4	2011	5	HSIC	116.889606
…	…	…	…	…
57716	2020	8	CMA	89.713749
57717	2020	9	CMA	91.040256
57718	2020	10	CMA	88.899231
57719	2020	11	CMA	107.493594
57720	2020	12	CMA	118.501272

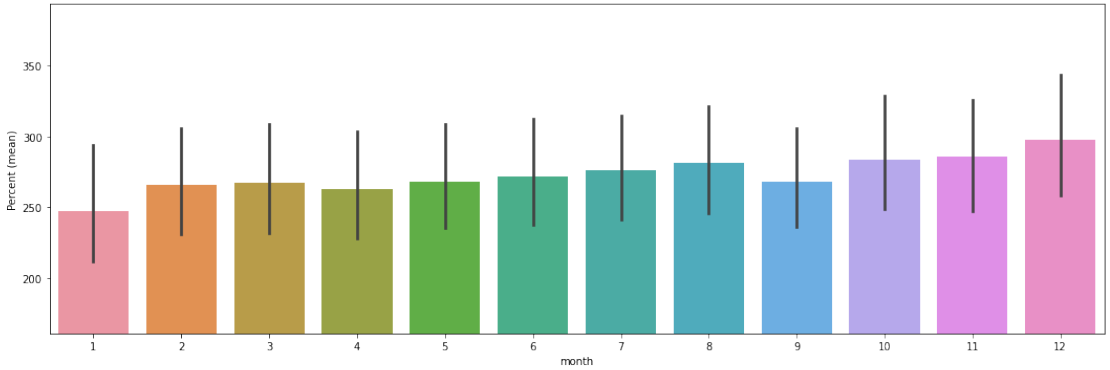
[57721 rows x 4 columns]

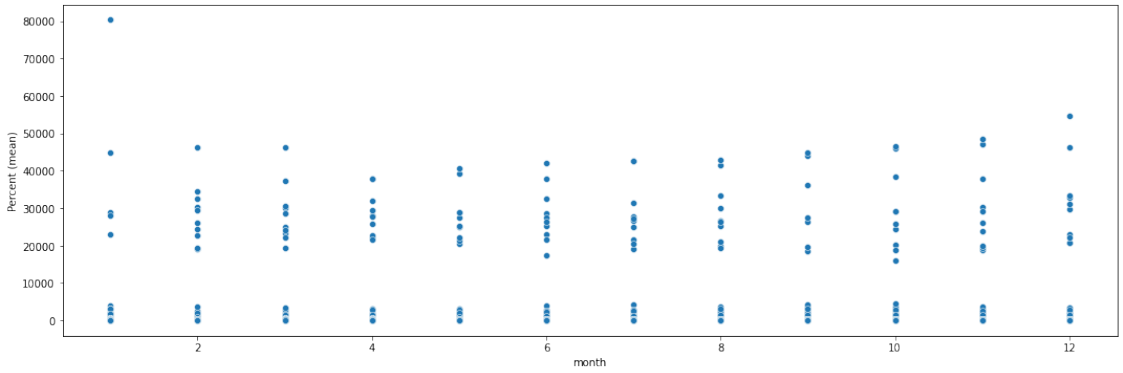
[3]:
```
plot(x=Column.MONTH, y=Column.PERCENT, data=df)
```

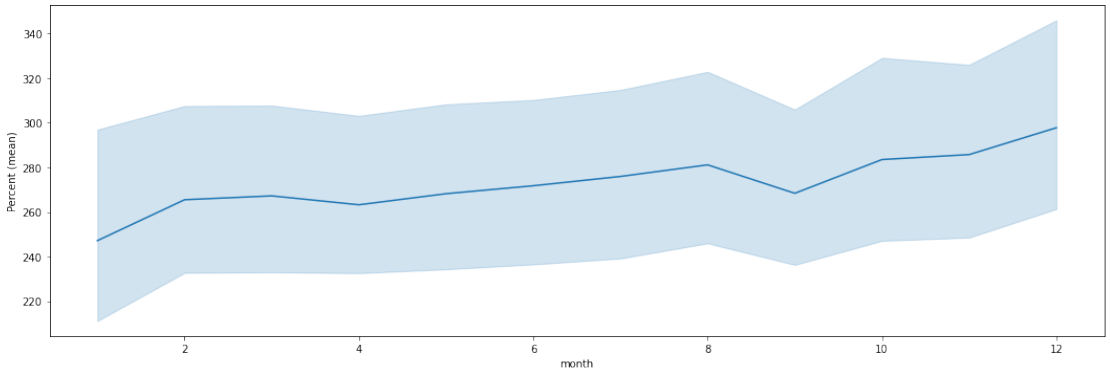
	Percent (mean)
month	

```
1     247.148584
2     265.478683
3     267.206162
4     263.218662
5      268.18198
```









1.2 Weekly stock price fluctuations within a year

[4]:
```
from analysis_base_first_date import get_best_week

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

df
```

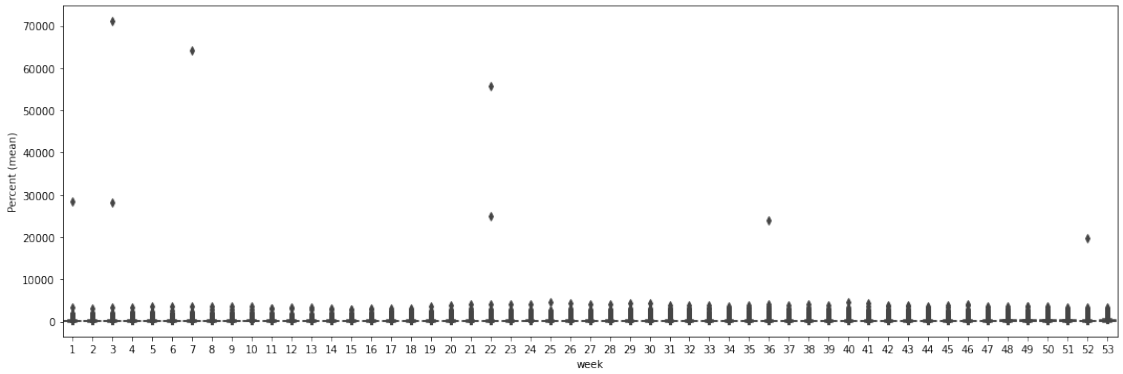
[4]:

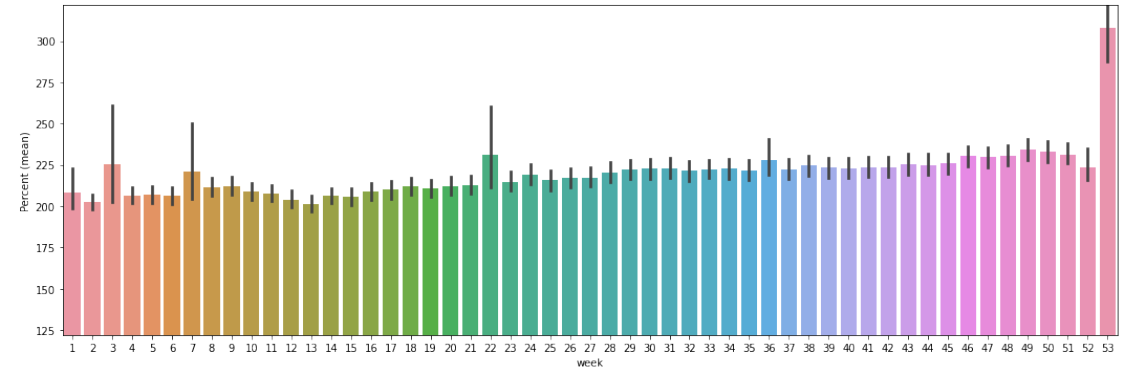
	year	week	Symbol	Percent (mean)
0	2010	52	VRTX	100.0
1	2011	1	VRTX	99.519372
2	2011	2	VRTX	101.639813
3	2011	3	VRTX	111.563473
4	2011	4	VRTX	113.090193
…	…	…	…	…
251493	2020	49	FE	71.505376
251494	2020	50	FE	77.741934
251495	2020	51	FE	82.526882
251496	2020	52	FE	80.698924
251497	2020	53	FE	80.026881

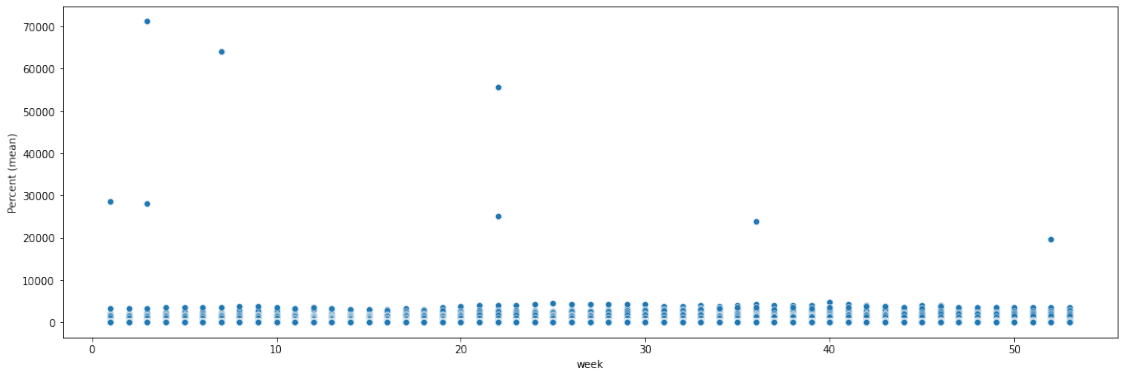
[251498 rows x 4 columns]

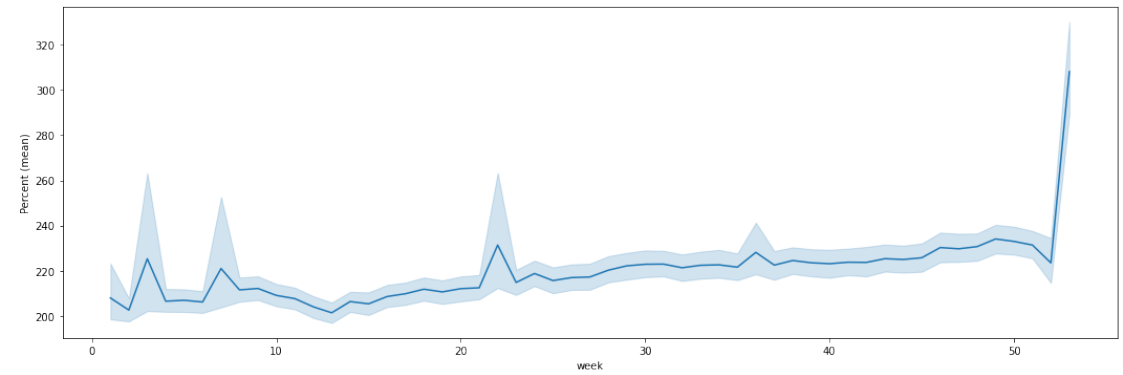
[5]:
```
plot(x=Column.WEEK, y=Column.PERCENT, data=df, barplot={'quantile': (0.3, 0.
↪85)})
```

week	Percent (mean)
1	208.006
2	202.647501
3	225.33356
4	206.569316
5	206.985284


Percent (mean)
week


Percent (mean)
week


Percent (mean)
week


Percent (mean)
week

1.3 Daily stock price fluctuations within a month

[6]:
```
from analysis_base_first_date import get_best_month_day

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

df
```

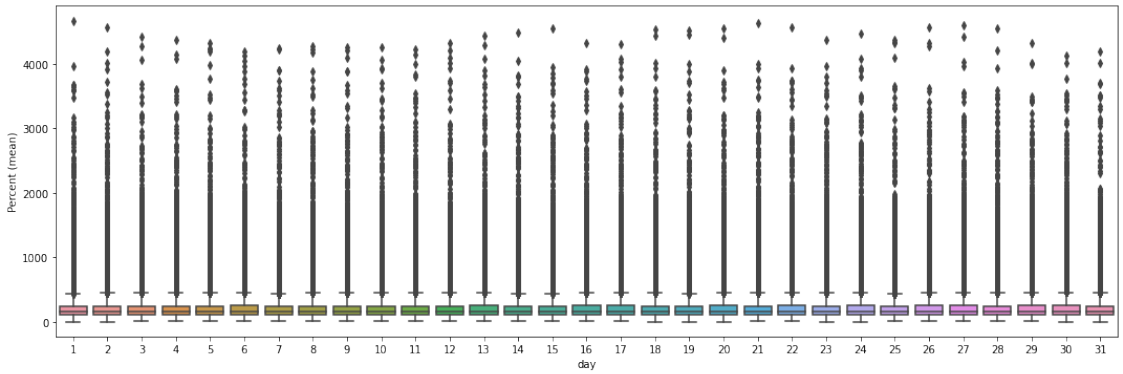
[6]:

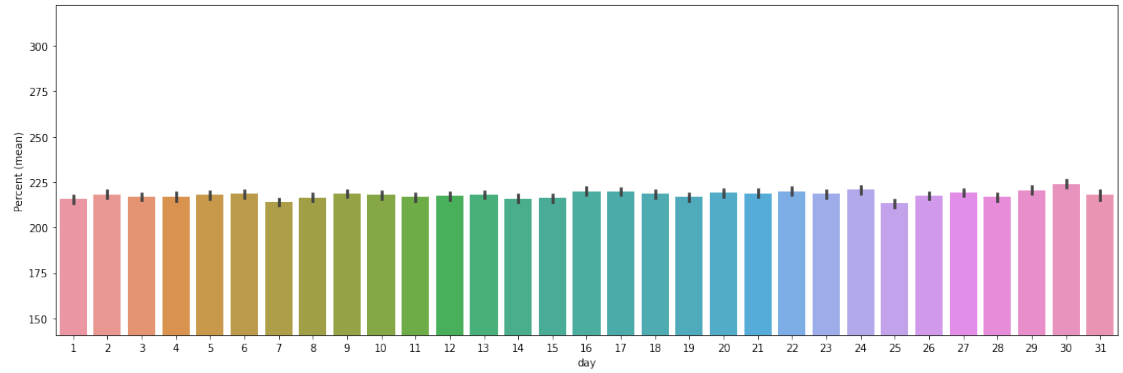
	year	month	day	Symbol	Percent (mean)
0	2016	7	5	FTV	100.0
1	2016	7	6	FTV	95.283401
2	2016	7	7	FTV	96.39676
3	2016	7	8	FTV	97.08502
4	2016	7	11	FTV	99.615383
…	…	…	…	…	…
1210794	2020	12	24	HON	417.127469
1210795	2020	12	28	HON	418.058692
1210796	2020	12	29	HON	418.851208
1210797	2020	12	30	HON	416.077371
1210798	2020	12	31	HON	418.058692

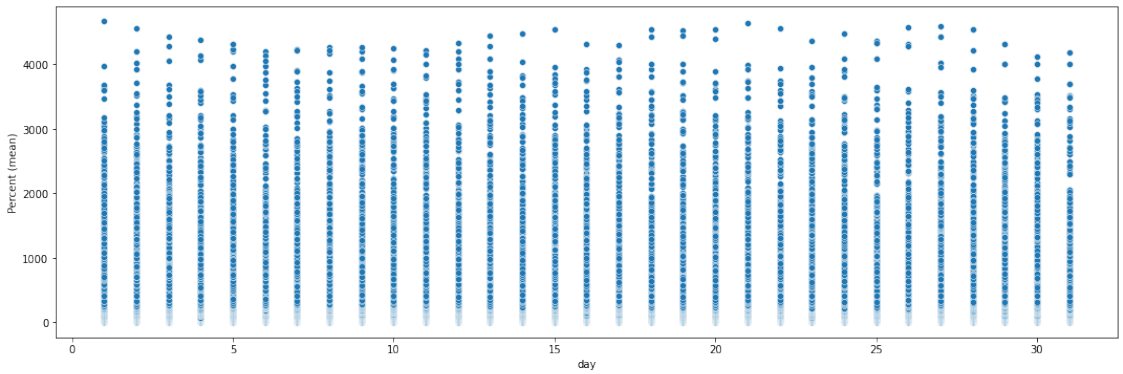
[1210799 rows x 5 columns]

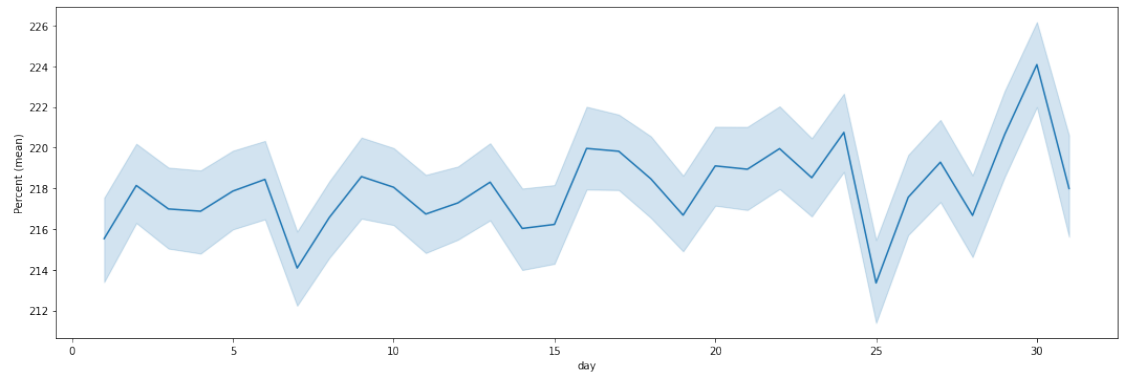
[7]:
```
plot(x=Column.DAY, y=Column.PERCENT, data=df, barplot={'quantile': (0.40, 0.
↪85)})
```

day	Percent (mean)
1	215.527959
2	218.140033
3	216.986208
4	216.873947
5	217.863107


Percent (mean)
day


Percent (mean)
day


Percent (mean)
day


Percent (mean)
day

1.4 Daily stock price fluctuations within a week

[8]:
```
from analysis_base_first_date import get_best_weekday


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

df
```

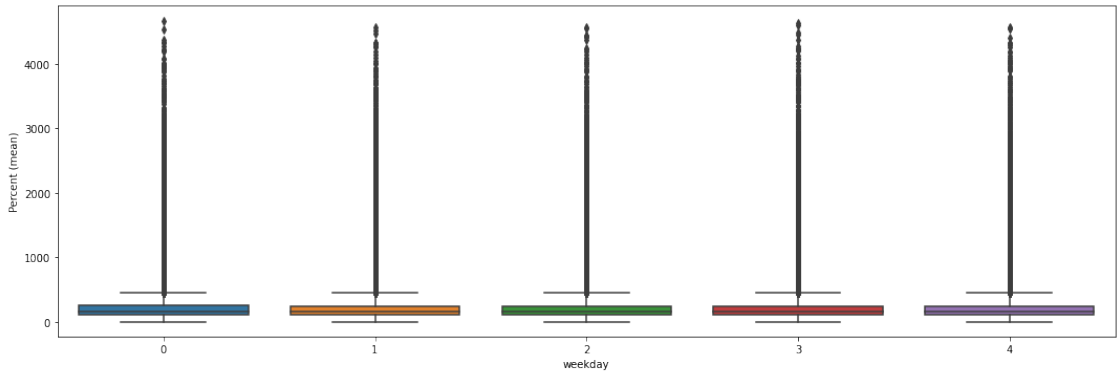
[8]:

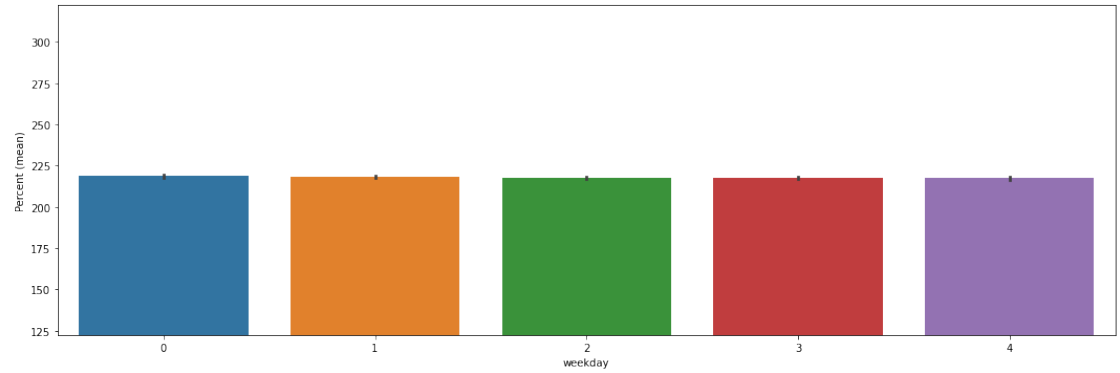
	year	week	weekday	Percent (mean)
0	2016	27	1	100.0
1	2016	27	2	95.283401
2	2016	27	3	96.39676
3	2016	27	4	97.08502
4	2016	28	0	99.615383
…	…	…	…	…
1210794	2020	52	3	417.127469
1210795	2020	53	0	418.058692
1210796	2020	53	1	418.851208
1210797	2020	53	2	416.077371
1210798	2020	53	3	418.058692

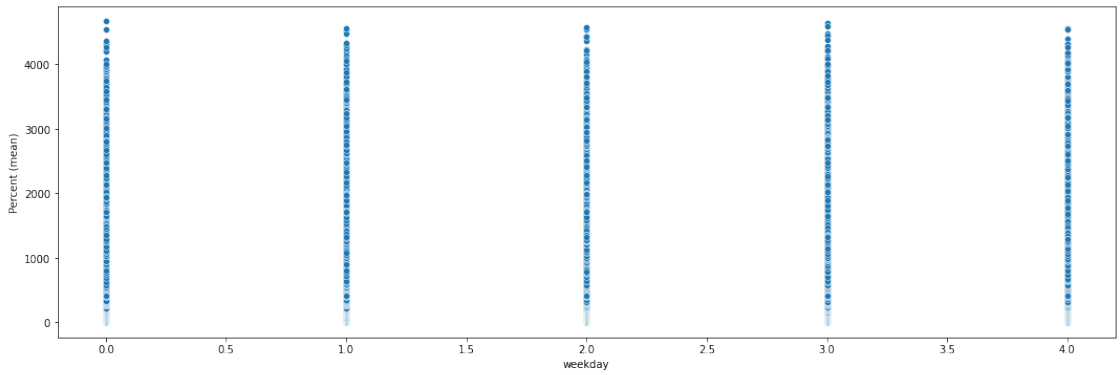
[1210799 rows x 4 columns]

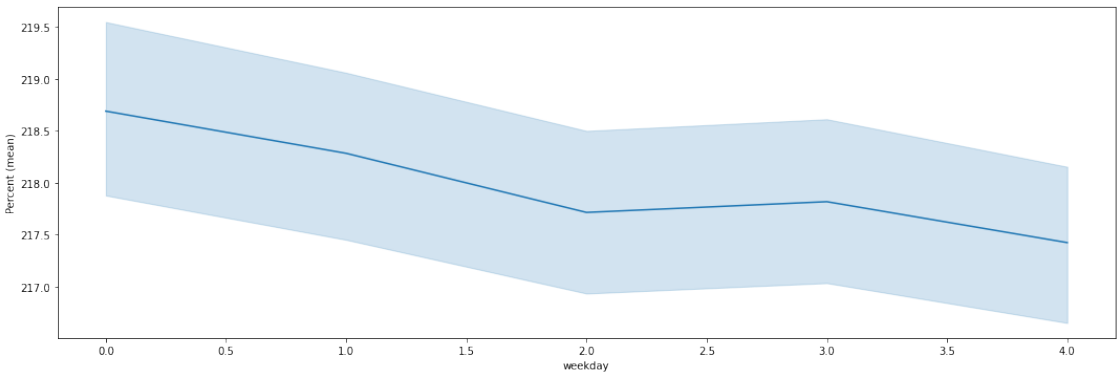
[9]:
```
plot(x=Column.WEEKDAY, y=Column.PERCENT, data=df, barplot={'quantile': (0.3, 0.
↪85)})
```

weekday	Percent (mean)
0	218.689407
1	218.28383
2	217.715372
3	217.818413
4	217.424899


Percent (mean)
4000
3000
2000
1000
0
0
1
2
3
4
weekday


Percent (mean)
300
275
250
225
200
175
150
125
0
1
2
3
4
weekday


Percent (mean)
4000
3000
2000
1000
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
weekday


Percent (mean)
219.5
219.0
218.5
218.0
217.5
217.0
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 within a day

[10]:
```
# Yahoo support hour history only for 2 years
START_DATE = '2019-06-01'
END_DATE = '2021-05-01'
```

[11]:
```
from analysis_base_first_date import get_best_hour

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

df
```

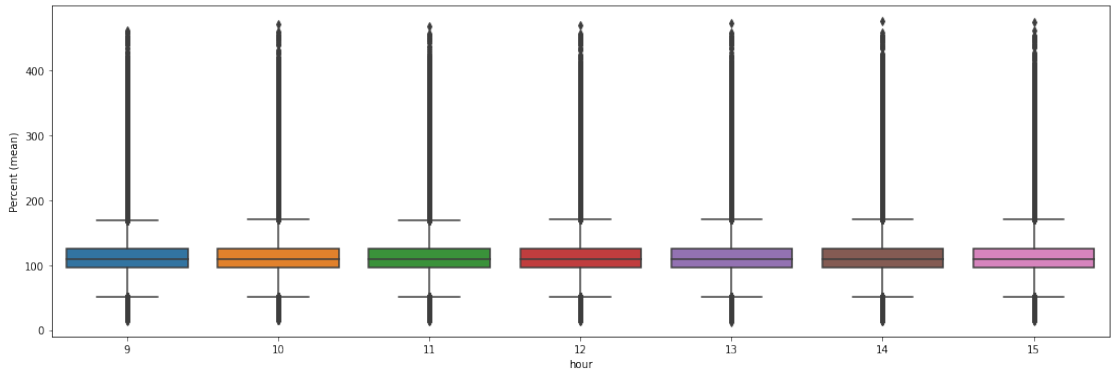
[11]:

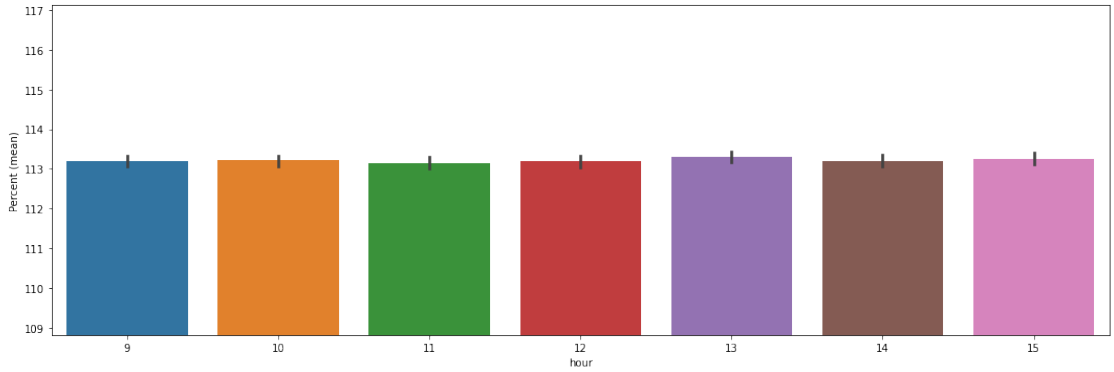
	year	week	day	hour	Symbol	Percent (mean)
0	2019	23	3	9	SRE	100.0
1	2019	23	3	10	SRE	99.613043
2	2019	23	3	11	SRE	99.38922
3	2019	23	3	12	SRE	99.339901
4	2019	23	3	13	SRE	99.658576
…	…	…	…	…	…	…
1647076	2021	17	30	11	FRC	189.57772
1647077	2021	17	30	12	FRC	189.443167
1647078	2021	17	30	13	FRC	189.779549
1647079	2021	17	30	14	FRC	190.436757
1647080	2021	17	30	15	FRC	190.271156

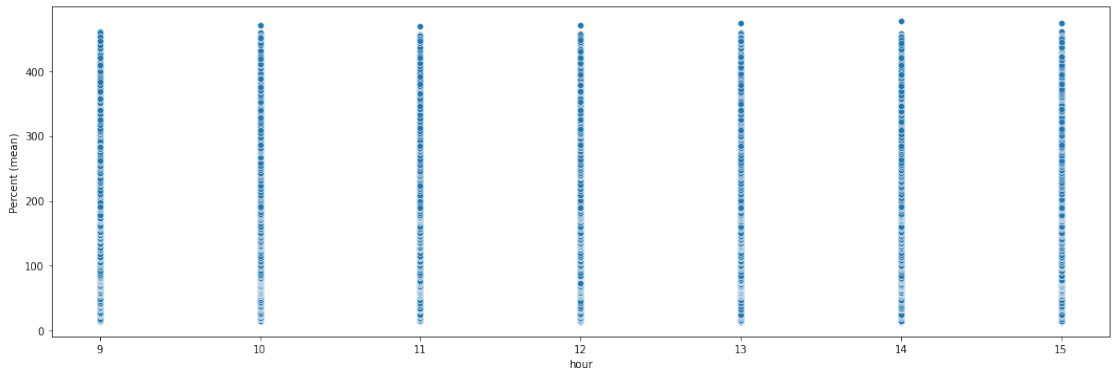
[1647081 rows x 6 columns]

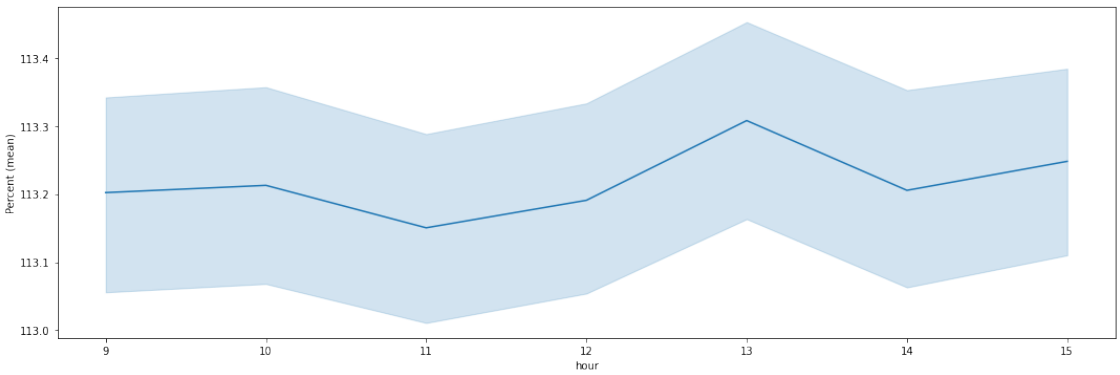
[12]:
```
plot(x=Column.HOUR, y=Column.PERCENT, data=df, barplot={'quantile': (0.5, 0.
↪65)})
```

hour	Percent (mean)
9	113.202194
10	113.212851
11	113.150465
12	113.190888
13	113.308001


Percent (mean)
hour


Percent (mean)
hour


Percent (mean)
hour


Percent (mean)
hour

1.6 Hourly and quarterly stock price fluctuations within an day

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

[14]:
```
from analysis_base_first_date import get_best_time

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

df
```

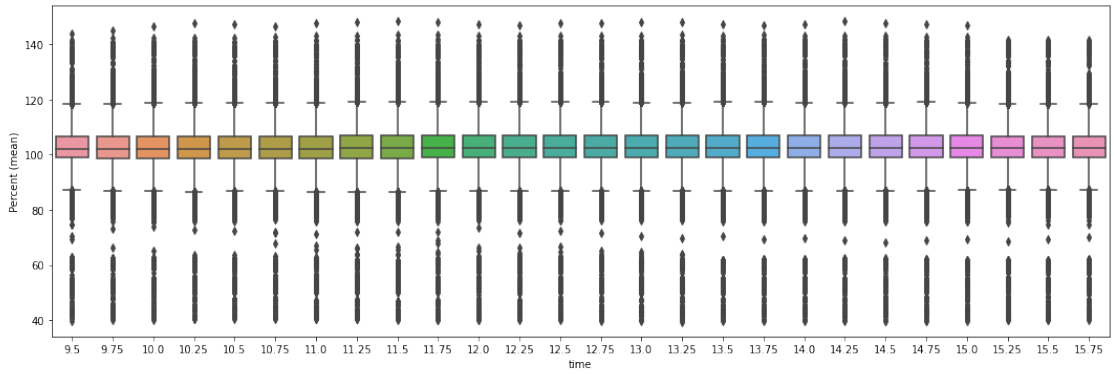
[14]:

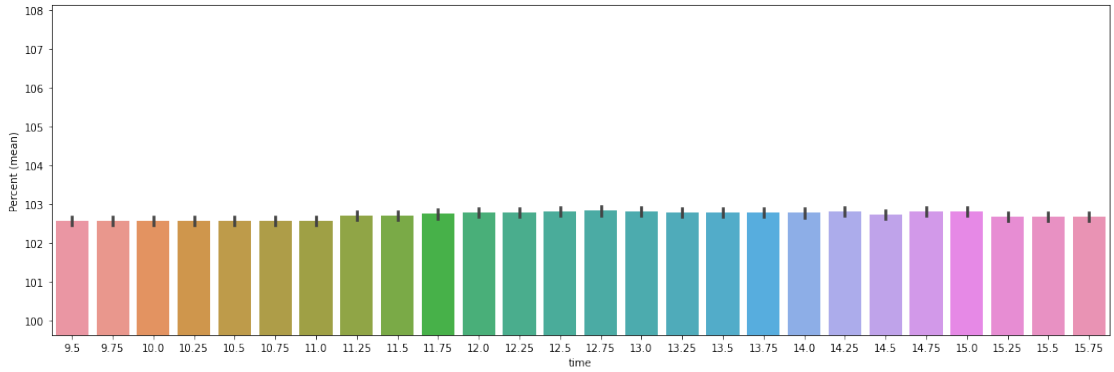
	year	week	day	hour	minute	time	Symbol	Percent (mean)
0	2021	11	15	9	30	9.5	CF	100.0
1	2021	11	15	9	45	9.75	CF	100.211863
2	2021	11	15	10	0	10.0	CF	99.636803
3	2021	11	15	10	15	10.25	CF	99.878932
4	2021	11	15	10	30	10.5	CF	100.302659
…	…	…	…	…	…	…	…	…
484919	2021	19	10	14	0	14.0	CHTR	111.648417
484920	2021	19	10	14	15	14.25	CHTR	111.433012
484921	2021	19	10	14	30	14.5	CHTR	111.209602
484922	2021	19	10	14	45	14.75	CHTR	110.945363
484923	2021	19	10	15	0	15.0	CHTR	111.495473

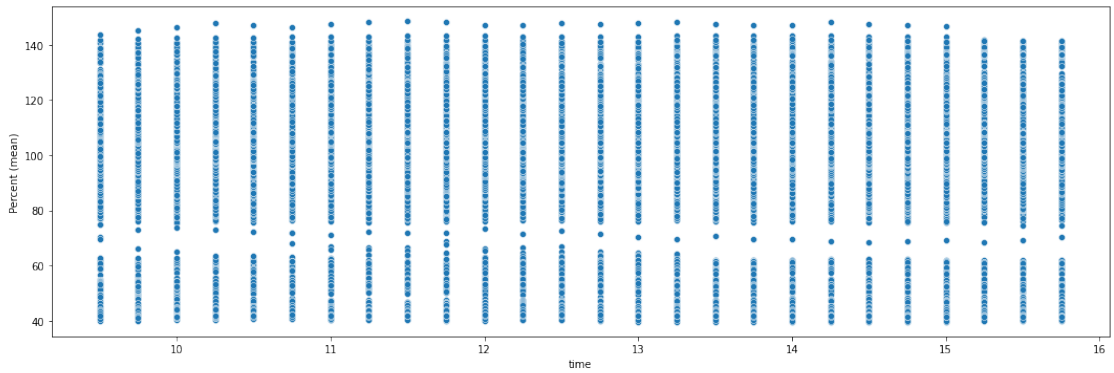
[484924 rows x 8 columns]

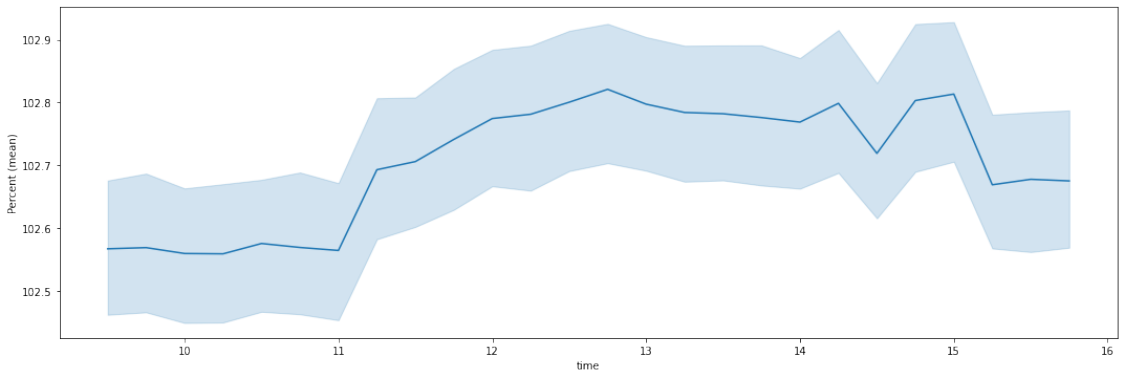
[15]:
```
plot(x=Column.TIME, y=Column.PERCENT, data=df, barplot={'quantile': (0.3, 0.
↪80)})
```

time	Percent (mean)
9.50	102.566944
9.75	102.568816
10.00	102.559469
10.25	102.558959
10.50	102.575407


Percent (mean)
time


Percent (mean)
time


Percent (mean)
time


Percent (mean)
time

1.7 Quarterly stock price fluctuations within an hour

[16]:
```
from analysis_base_first_date import get_best_quarter

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

df
```

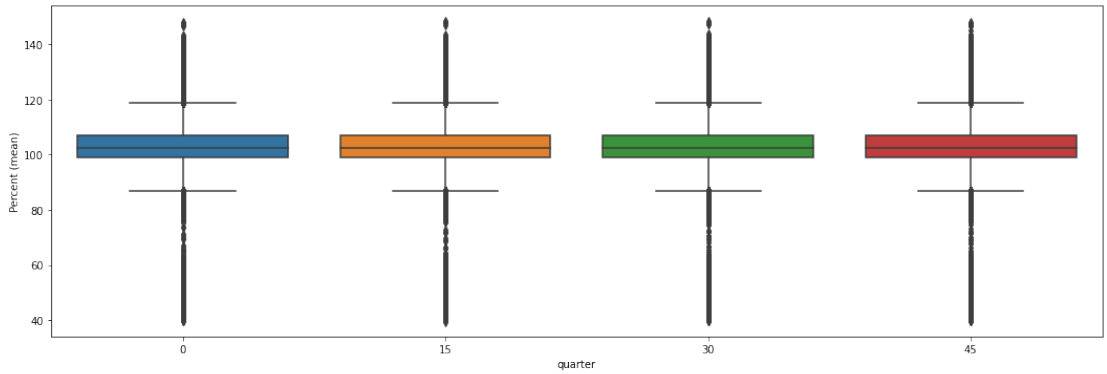
[16]:

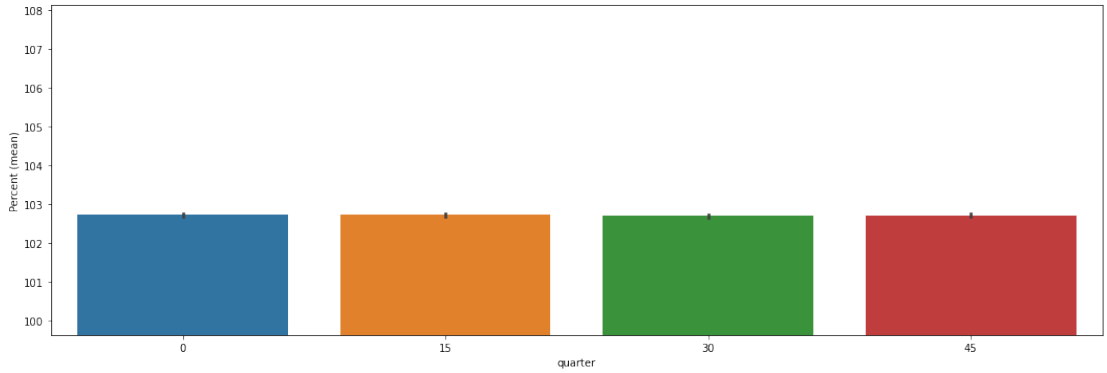
	year	week	day	hour	minute	quarter	Symbol	Percent (mean)
0	2021	11	15	9	30	30	CF	100.0
1	2021	11	15	9	45	45	CF	100.211863
2	2021	11	15	10	0	0	CF	99.636803
3	2021	11	15	10	15	15	CF	99.878932
4	2021	11	15	10	30	30	CF	100.302659
…	…	…	…	…	…	…	…	…
484919	2021	19	10	14	0	0	CHTR	111.648417
484920	2021	19	10	14	15	15	CHTR	111.433012
484921	2021	19	10	14	30	30	CHTR	111.209602
484922	2021	19	10	14	45	45	CHTR	110.945363
484923	2021	19	10	15	0	0	CHTR	111.495473

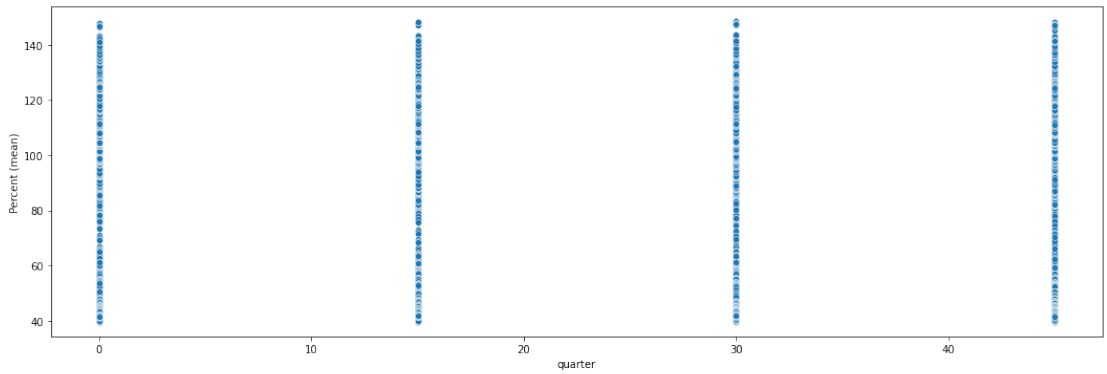
[484924 rows x 8 columns]

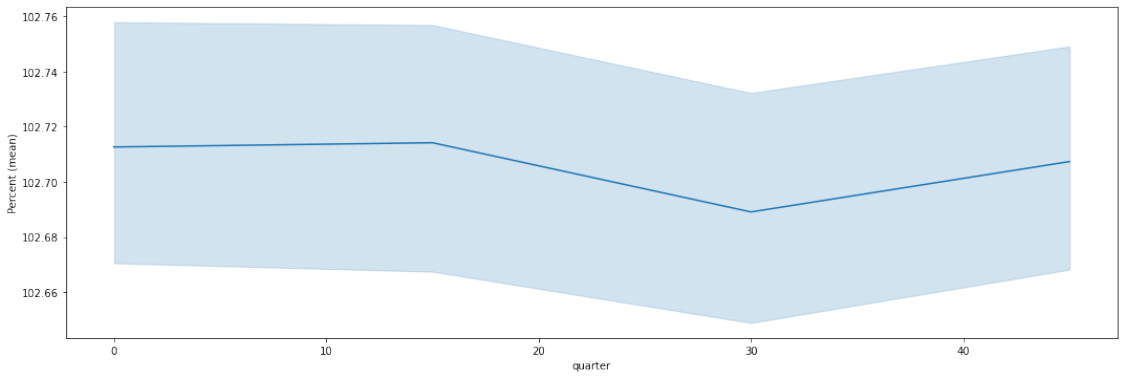
[17]:
```
plot(x=Column.QUARTER, y=Column.PERCENT, data=df, barplot={'quantile': (0.3, 0.
↪80)})
```

quarter	Percent (mean)
0	102.712637
15	102.714177
30	102.689099
45	102.707352


Percent (mean)
quarter
0
15
30
45


Percent (mean)
quarter
0
15
30
45


Percent (mean)
quarter
0
10
20
30
40


Percent (mean)
quarter
0
10
20
30
40

[ ]: