

Google vs Facebook Relative Performance and Acquisitions, 2013-2019

We want to take a look at the relative performance of Google and Facebook stock and the impact, if any, of acquisitions on the overall performance. For more details, please visit [the project homepage](#).

```
import pandas as pd
import numpy as np
```

▼ Relative Performance

We start by looking at a graph of the relative performance on a percentage basis from January 1, 2013 to January 1, 2019

```
# load price data and setup columns

prices = pd.read_csv('https://raw.githubusercontent.com/kuikala/DataSamples/main/prices.csv')

prices['date'] = pd.to_datetime(prices['date'])

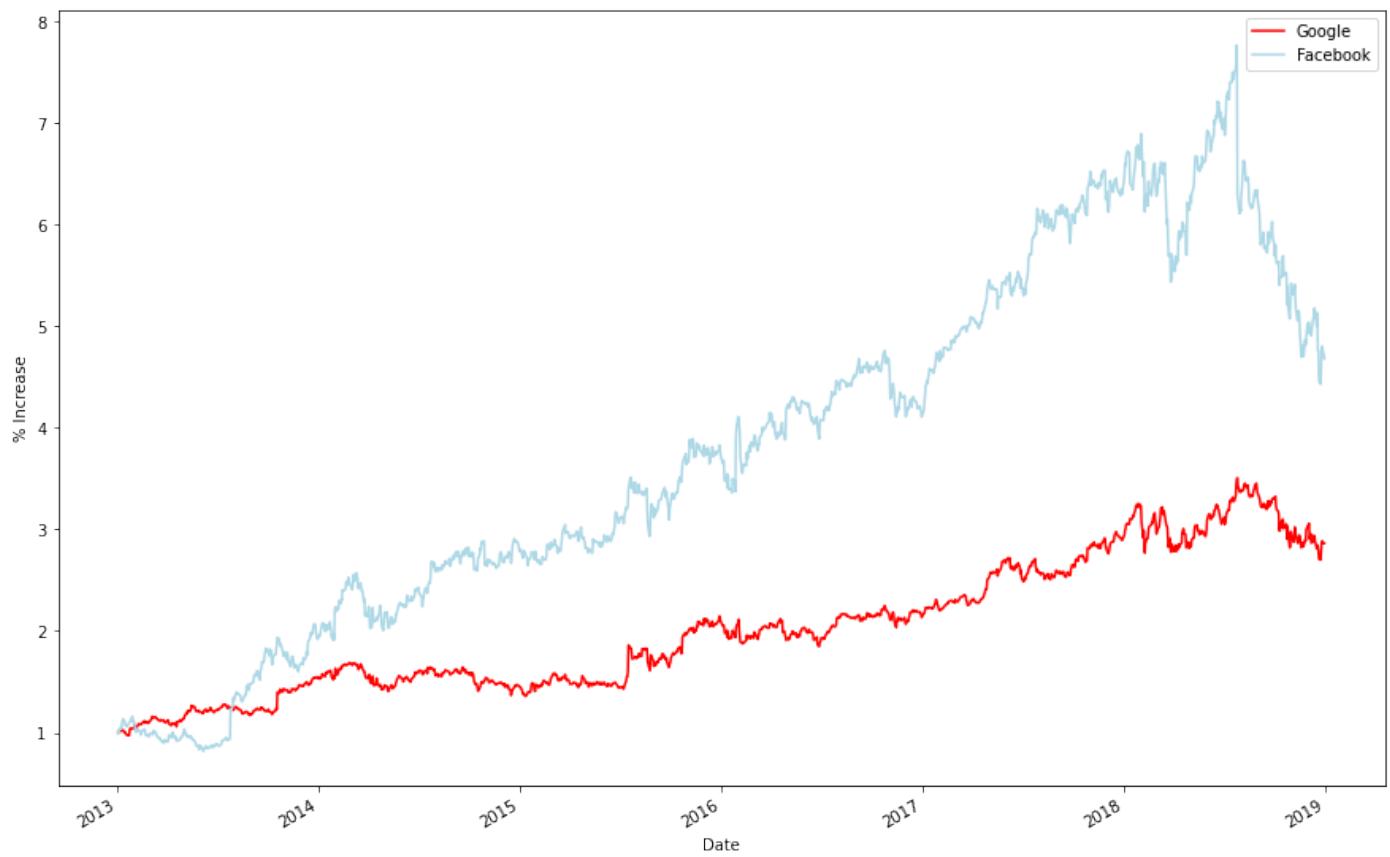
prices.set_index('date')

# calculate relative performance
goog_init_price = prices.goog_price[0]
fb_init_price = prices.fb_price[0]

prices['goog_rel'] = prices['goog_price']/goog_init_price
prices['fb_rel'] = prices['fb_price']/fb_init_price

#plot the relative performance
relperf = prices.plot(x='date', y=['goog_rel', 'fb_rel'], color=['Red', 'LightBlue'],
relperf.legend(['Google', 'Facebook'])
```

<matplotlib.legend.Legend at 0x7f614deae390>



▼ Facebook initially performs much better, but falters at the end, let's look at performance post 2016

```

# filter the set
prices_2016 = prices[(prices['date'] > '2016-01-01')].reset_index()
prices_2016.set_index('date')

# calculate relative performance on new date range
goog_init_price = prices_2016.goog_price[0]
fb_init_price = prices_2016.fb_price[0]

prices_2016['goog_rel'] = prices_2016['goog_price']/goog_init_price
prices_2016['fb_rel'] = prices_2016['fb_price']/fb_init_price

relperf_2016 = prices_2016.plot(x='date', y=['goog_rel','fb_rel'], color=['Red', 'LightBlue'])
relperf_2016.legend(['Google', 'Facebook'])

```

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- Performance is roughly the same, let's see if acquisitions could have been a driver for the Google's performance improvements.

```
# load acquisition data and setup columns

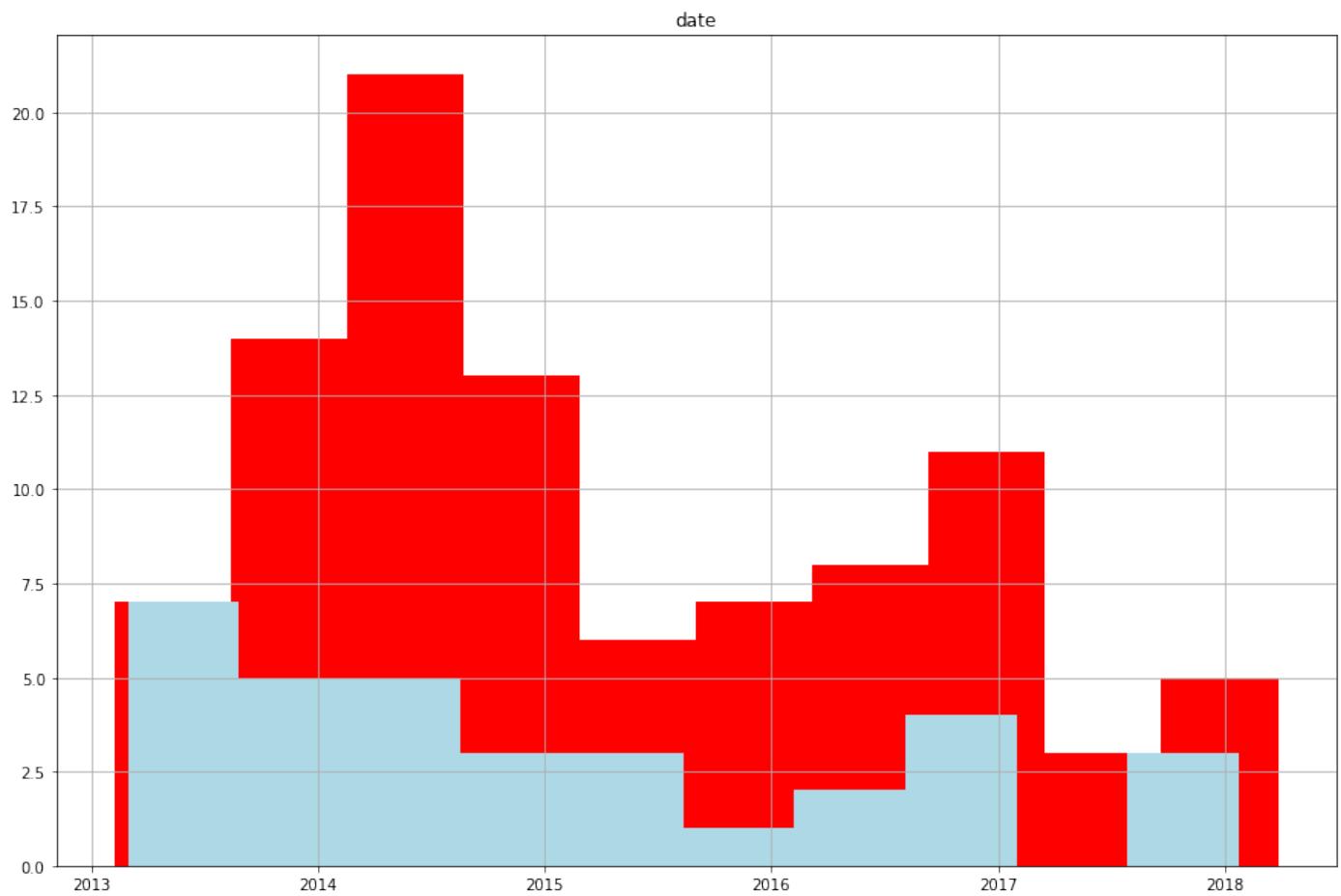
acquisitions = pd.read_csv('https://raw.githubusercontent.com/kuikala/DataSamples/master/acquisitions.csv')

acquisitions['date'] = pd.to_datetime(acquisitions['date'])
acquisitions.set_index('date')

# break down acquisitions by company to plot as a histogram
goog_acquisitions = acquisitions[acquisitions.acquirer=='Google']
fb_acquisitions = acquisitions[acquisitions.acquirer=='Facebook']

histogram = goog_acquisitions.hist(column='date', color='Red', figsize=(15,10))
fb_acquisitions.hist(column='date', color='LightBlue', ax=histogram)
```

```
array([<matplotlib.axes._subplots.AxesSubplot object at 0x7f6146e166d0>],  
      dtype=object)
```



Starting in the second half of 2013, Google had more acquisitions. Let's see if the acquisitions affected any price movements for both companies.

```
# filter acquisitions post 2016  
acquisitions_2016 = acquisitions[(acquisitions['date'] > '2016-01-01')].reset_index()  
  
# combine the data  
price_acquisitions_2016 = pd.merge(prices_2016, acquisitions_2016, how='left', on='date')  
  
# create scatter plot data for prices and relative prices  
price_acquisitions_2016['goog_price_acq'] = np.where((price_acquisitions_2016['acquisitions'] >
```

```

price_acquisitions_2016['fb_price_acq'] = np.where((price_acquisitions_2016['acquirer'] == 'Facebook') & (price_acquisitions_2016['target'] == 'Google'), 1, 0)
price_acquisitions_2016['goog_rel_acq'] = np.where((price_acquisitions_2016['acquirer'] == 'Google') & (price_acquisitions_2016['target'] == 'Facebook'), 1, 0)
price_acquisitions_2016['fb_rel_acq'] = np.where((price_acquisitions_2016['acquirer'] == 'Facebook') & (price_acquisitions_2016['target'] == 'Facebook'), 1, 0)

relperf_acquisitions_2016 = price_acquisitions_2016.plot(x='date', y=['goog_rel'], color='Black', ax=ax1)
price_acquisitions_2016.plot.scatter(x='date', y=['fb_rel_acq'], color='Black', ax=ax1)
price_acquisitions_2016.plot(x="date", y=['fb_rel'], color='LightBlue', ax=relperf_ax)
price_acquisitions_2016.plot.scatter(x='date', y=['fb_rel_acq'], color='Black', ax=relperf_ax)

relperf_acquisitions_2016.legend(['Google', 'Facebook'])

```

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While no concrete conclusions can be made from the data, Google's stock price tends to go up 12-15 months after sets of acquisitions, while Facebook with fewer acquisitions does not have the same outcome.

▼ Appendix -- Plot of comparative price with acquisition

```
# combine the data
price_acquisitions = pd.merge(prices, acquisitions, how='left')

# create scatter plot data for prices and relative prices
price_acquisitions['goog_price_acq'] = np.where((price_acquisitions['acquirer']=='Google'), 1, 0)
price_acquisitions['fb_price_acq'] = np.where((price_acquisitions['acquirer']=='Facebook'), 1, 0)

price_acquisitions['goog_rel_acq'] = np.where((price_acquisitions['acquirer']=='Google'), 1, 0)
price_acquisitions['fb_rel_acq'] = np.where((price_acquisitions['acquirer']=='Facebook'), 1, 0)

relperf_acquisitions = price_acquisitions.plot(x='date', y=['goog_rel'], color='Red')
price_acquisitions.plot.scatter(x='date', y=['goog_rel_acq'], color='Black', ax=relperf_acquisitions)

price_acquisitions.plot(x='date', y=['fb_rel'], color='LightBlue', ax=relperf_acquisitions)
price_acquisitions.plot.scatter(x='date', y=['fb_rel_acq'], color='Black', ax=relperf_acquisitions)

relperf_acquisitions.legend(['Google', 'Facebook'])
```

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