Mappeoppgave 5 - webskraping & linreg

Jeg kjører en regresjon på en tabell som viser oljefondets aksjeeierskap fordelt på hver innbygger (tilfeldig data funnet på e24.no).

Koden er hentet fra Espen Sirnes sine forelesningsnotater (9 - webskraping med python).

In [1]:

```
from bs4 import BeautifulSoup
import requests

def fetch_html_tables(url):
    "Returns a list of tables in the html of url"
    page = requests.get(url)
    bs=BeautifulSoup(page.content)
    tables=bs.find_all('table')
    return tables

tables=fetch_html_tables('https://e24.no/boers-og-finans/i/39BQ5e/soek-i-oljefondets-over-9000-aksjer-saa-mye-e
table_html=tables[0]

#printing top
print(str(table_html)[:1000])
```

```
<table class="table css-g9zmyn"><tbody><tr class="css-0"><style data-emotion="css l4upzl">.css-l4upzl{padding:1
0px var(--gap-unit);background-color:var(--component-background-color-01);color:var(--component-text-color-01);
border-top:none;border-bottom:1px #f1f1f1 solid;border-left:none;border-right:none;}</style><td class="css-l4up
zl">Selskap</td><td class="css-l4upzl">Du eier (kr.)</td><td class="css-l4upzl">Oljefondets aksjer (mrd.kr.)</t
d></tr><tr class="css-0"><td class="css-l4upzl">Microsoft Corp</td><td class="css-l4upzl">28.085</td><td class
="css-l4upzl">150,75</td></tr><tr class="css-0"><td class="css-l4upzl">Apple Inc  </td><td class="css-l4upzl">2
7.726</td><td class="css-l4upzl">148,82</td></tr><tr class="css-0"><td class="css-l4upzl">Amazon.com Inc 121 09
7</td><td class="css-l4upzl">22.561</td><td class="css-l4upzl">121,10</td></tr><tr class="css-0"><td class="css
-l4upzl">Alphabet Inc 90 310</td><td class="css-l4upzl">16.825</td><td class="css-l4upzl">90,31</td></tr><tr cl
as
```

In [2]:

```
def html_to_table(html):
    "Returns the table defined in html as a list"
    #defining the table:
    table=[]
    #iterating over all rows
    for row in html.find_all('tr'):
        r=[]
        #finding all cells in each row:
        cells=row.find_all('td')

        #if no cells are found, look for headings
        if len(cells)==0:
            cells=row.find_all('th')

        #iterate over cells:
        for cell in cells:
            cell=format(cell)
            r.append(cell)

        #append the row to t:
        table.append(r)
    return table

def format(cell):
    "Returns a string after converting bs4 object cell to clean text"
    if cell.content is None:
        s=cell.text
    elif len(cell.content)==0:
        return ''
    else:
        s=' '.join([str(c) for c in cell.content])

    #here you can add additional characters/strings you want to
    #remove, change punctuations or format the string in other
    #ways:
    s=s.replace('\xa0','')
    s=s.replace('\n','')
    return s

table=html_to_table(table_html)

#printing top
print(str(table)[:1000])
```

```
[['Selskap', 'Du eier (kr.)', 'Oljefondets aksjer (mrd.kr.)'], ['Microsoft Corp', '28.085', '150,75'], ['Apple
Inc  ', '27.726', '148,82'], ['Amazon.com Inc 121 097', '22.561', '121,10'], ['Alphabet Inc 90 310', '16.825',
'90,31'], ['Nestlé SA  ', '15.368', '82,49'], ['Roche Holding AG', '12.447', '66,81 '], ['Alibaba Group Holding
Ltd  ', '11.171', '59,96'], ['Facebook Inc ', '10.916', '58,59'], ['Tencent Holdings Ltd ', '9.898', '53,13 '],
['Novartis AG', '8.654', '46,45']]
```

In [3]:

```
';'.join(table[0])
```

Out[3]:

```
'Selskap;Du eier (kr.);Oljefondets aksjer (mrd.kr.)'
```

In [4]:

```
def save_data(file_name,table):
    "Saves table to file_name"
    f=open(file_name,'w')
    for row in table:
        f.write(';'.join(row)+'\n')
    f.close()

save_data('df.csv',table)
```

In [5]:

```
import pandas as pd

df = pd.read_csv('df.csv', delimiter=';', encoding='latin1')
df
```

Out[5]:

	Selskap	Du eier (kr.)	Oljefondets aksjer (mrd.kr.)
0	Microsoft Corp	28.085	150,75
1	Apple Inc	27.726	148,82
2	Amazon.com Inc 121 097	22.561	121,10
3	Alphabet Inc 90 310	16.825	90,31
4	Nestlé SA	15.368	82,49
5	Roche Holding AG	12.447	66,81
6	Alibaba Group Holding Ltd	11.171	59,96
7	Facebook Inc	10.916	58,59
8	Tencent Holdings Ltd	9.898	53,13
9	Novartis AG	8.654	46,45

In [6]:

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 10 entries, 0 to 9
Data columns (total 3 columns):
 #   Column                        Non-Null Count  Dtype
---  ------                        --------------  -----
 0   Selskap                       10 non-null     object
 1   Du eier (kr.)                 10 non-null     float64
 2   Oljefondets aksjer (mrd.kr.)  10 non-null     object
dtypes: float64(1), object(2)
memory usage: 368.0+ bytes
```

In [7]:

```
df["Oljefondets aksjer (mrd.kr.)"] = df["Oljefondets aksjer (mrd.kr.)"].str.replace(',','.')
df["Oljefondets aksjer (mrd.kr.)"] = pd.to_numeric(df["Oljefondets aksjer (mrd.kr.)"])
```

In [8]:

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 10 entries, 0 to 9
Data columns (total 3 columns):
 #   Column                        Non-Null Count  Dtype
---  ------                        --------------  -----
 0   Selskap                       10 non-null     object
 1   Du eier (kr.)                 10 non-null     float64
 2   Oljefondets aksjer (mrd.kr.)  10 non-null     float64
dtypes: float64(2), object(1)
memory usage: 368.0+ bytes
```

Regresjon

In [9]:

```
from statsmodels.regression.linear_model import OLS
import statsmodels.api as sm
```

In [10]:

```
y=pd.DataFrame(df['Du eier (kr.)'])
x=pd.DataFrame(df['Oljefondets aksjer (mrd.kr.)'])
x = sm.add_constant(x)
```

In [11]:

```
res=OLS(y,x).fit()
print(res.summary())
```

```
                            OLS Regression Results
==============================================================================
Dep. Variable:          Du eier (kr.)   R-squared:                       1.000
Model:                            OLS   Adj. R-squared:                  1.000
Method:                 Least Squares   F-statistic:                 5.555e+09
Date:                Sun, 27 Mar 2022   Prob (F-statistic):           1.18e-36
Time:                        11:36:58   Log-Likelihood:                 68.254
No. Observations:                  10   AIC:                            -132.5
Df Residuals:                       8   BIC:                            -131.9
Df Model:                           1
Covariance Type:            nonrobust
================================================================================================
                                   coef    std err          t      P>|t|      [0.025      0.975]
------------------------------------------------------------------------------------------------
const                            0.0002      0.000      0.797      0.448      -0.000       0.001
Oljefondets aksjer (mrd.kr.)     0.1863    2.5e-06   7.45e+04      0.000       0.186       0.186
==============================================================================
Omnibus:                        0.661   Durbin-Watson:                   2.754
Prob(Omnibus):                  0.718   Jarque-Bera (JB):                0.593
Skew:                           0.275   Prob(JB):                        0.743
Kurtosis:                       1.941   Cond. No.                         245.
==============================================================================

Warnings:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.
```

```
C:\Users\mgmal\anaconda3\lib\site-packages\scipy\stats\stats.py:1535: UserWarning: kurtosistest only valid for
n>=20 ... continuing anyway, n=10
  "anyway, n=%i" % int(n))
```

En kan se at sammenhengen mellom x og y er statistisk signifikant og at 100% av variasjonen i y kan forklares ved regresjonslinjen. Dette er ikke overraskende siden varibelen x er variabelen y delt på antallet innbyggere i Norge. Det er meningsløst å tolke koeffisientene for denne regresjonen.

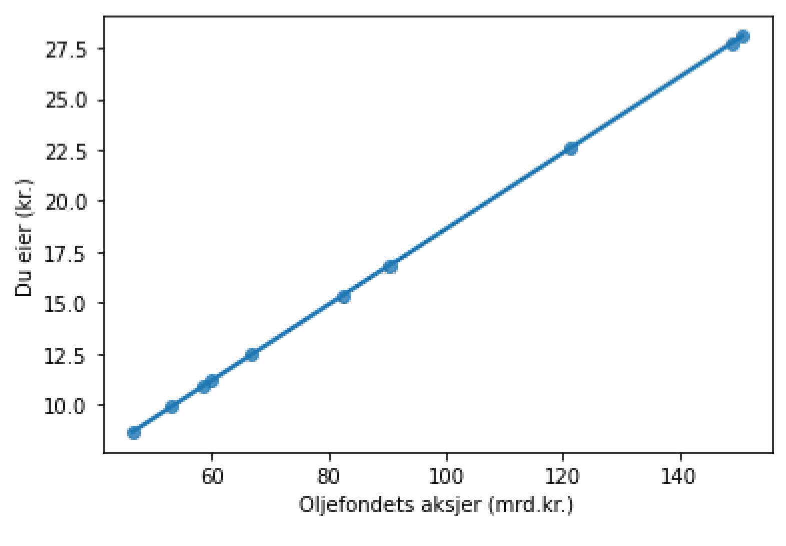
In [12]:

```
import seaborn as sns

sns.regplot(x='Oljefondets aksjer (mrd.kr.)', y='Du eier (kr.)', data=df)
```

Out[12]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x23af66ab9c8>
```


Du eier (kr.)
Oljefondets aksjer (mrd.kr.)