Mappeoppgave 5 - webskraping & lineær regresjon

Formålet med oppgaven er å lære metoder for å skrape data fra nettet og benytte regresjonsanalyse.
Jeg kjører en regresjon på tilfeldig valgt data fra e24.no som viser oljefondets aksjeeierskap fordelt på hver innbygger.
Koden er hentet fra Espen Sirnes sine forelesningsnotater (9 - webskraping med python).

In [5]:

```python
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 [6]:

```python
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 [7]:

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

Out[7]:

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

In [8]:

```python
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 [9]:

```python
import pandas as pd

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

Out[9]:

	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 [10]:

```python
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 [11]:

```python
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 [12]:

```python
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 [13]:

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

In [14]:

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

In [15]:

```python
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:                Fri, 01 Apr 2022   Prob (F-statistic):           1.18e-36
Time:                        12:36:22   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. Dataene er lite egnet for regresjonsanalyse. Jeg understreker at formålet med oppgaven er å trene på webskraping og bruken av statsmodels i jupyter notebook.

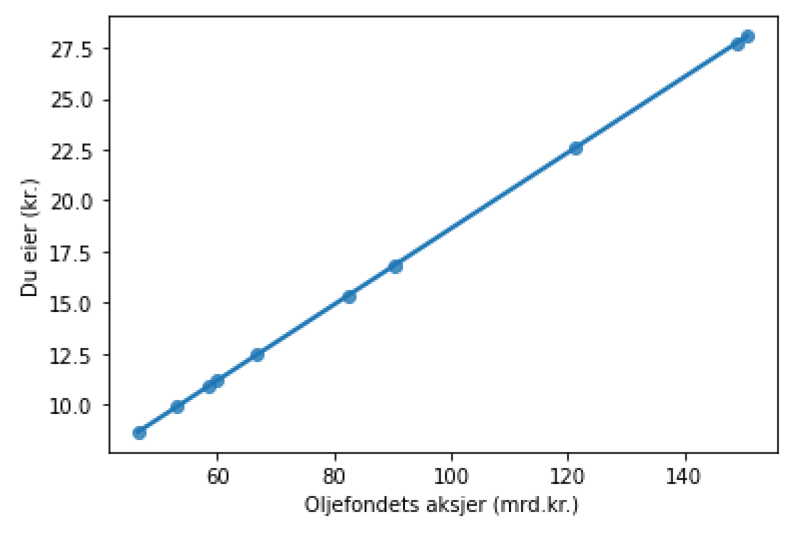
In [16]:

```python
import seaborn as sns

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

Out[16]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x24adbf0f408>
```


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