

6057_group14_PS1

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[ ]: ## This file is the answer to problem set 1 by group 14 in course 6057.
## The group members are as following:
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import pandas as pd
import numpy as np
import matplotlib.pyplot as plt

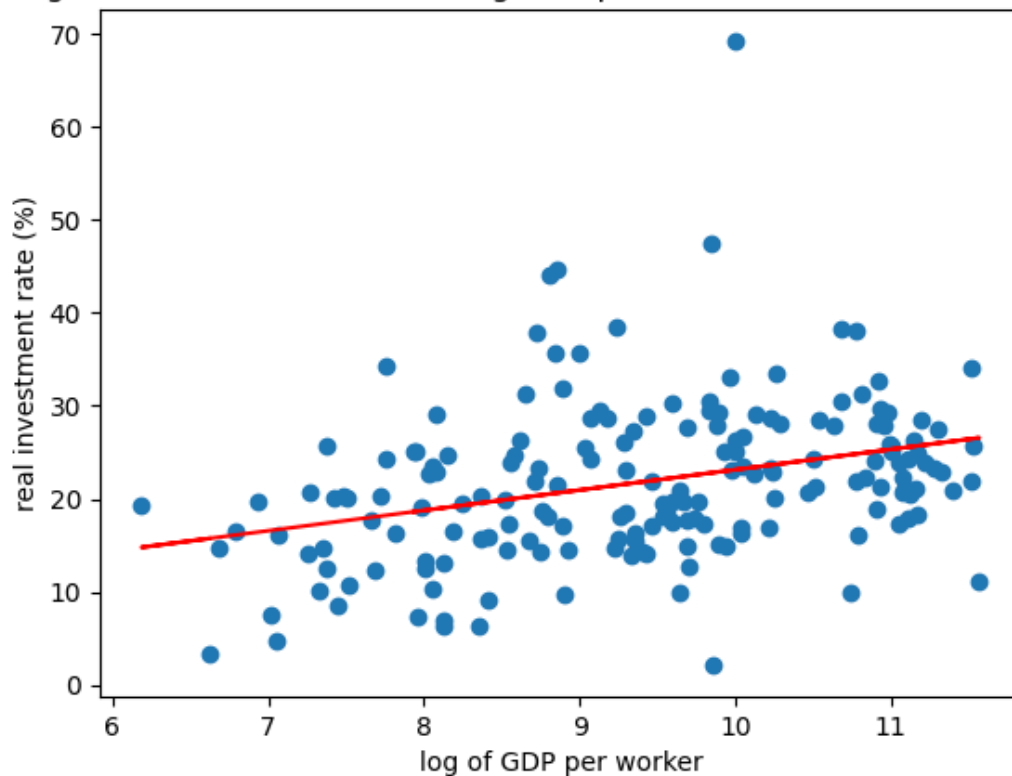
file = './data_for_problem_set_1.xlsx'
df = pd.read_excel(file)
df = df.loc[(df['year'] == 2003) & df['ki'] & df['rgdpwok']]

[ ]: ## Q1
# a
df['loggdpwok'] = np.log(df['rgdpwok'])
plt.scatter(df['loggdpwok'], df['ki'])
plt.xlabel('log of GDP per worker')
plt.ylabel('real investment rate (%)')
plt.title('Figure 1: Investment rate to log GDP per worker of all countries, 2003')

coef = np.polyfit(df['loggdpwok'], df['ki'], 1)
linfit = np.poly1d(coef)
plt.plot(df['loggdpwok'], linfit(df['loggdpwok']), color='red')

plt.show()
```

Figure 1: Investment rate to log GDP per worker of all countries, 2003



As we can see from the Figure 1 and the fit line, there is a weak positive relation between the per capita GDP of a country and its investment rates. A poor country tends to have a lower investment rate.

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[ ]: # b
g = 0.02
delta = 0.1
df['prod_k'] = (g + delta) / df['ki']
plt.scatter(df['loggdpwok'],df['prod_k'])
plt.xlabel('log of GDP per worker')
plt.ylabel('productivity of capital')
plt.title('Figure 2: Capital productivity to log GDP per worker of all_
countries, 2003')

coef = np.polyfit(df['loggdpwok'],df['prod_k'],1)
linfit = np.poly1d(coef)
plt.plot(df['loggdpwok'],linfit(df['loggdpwok']),color='red')

plt.show()
```

Figure 2: Capital productivity to log GDP per worker of all countries, 2003

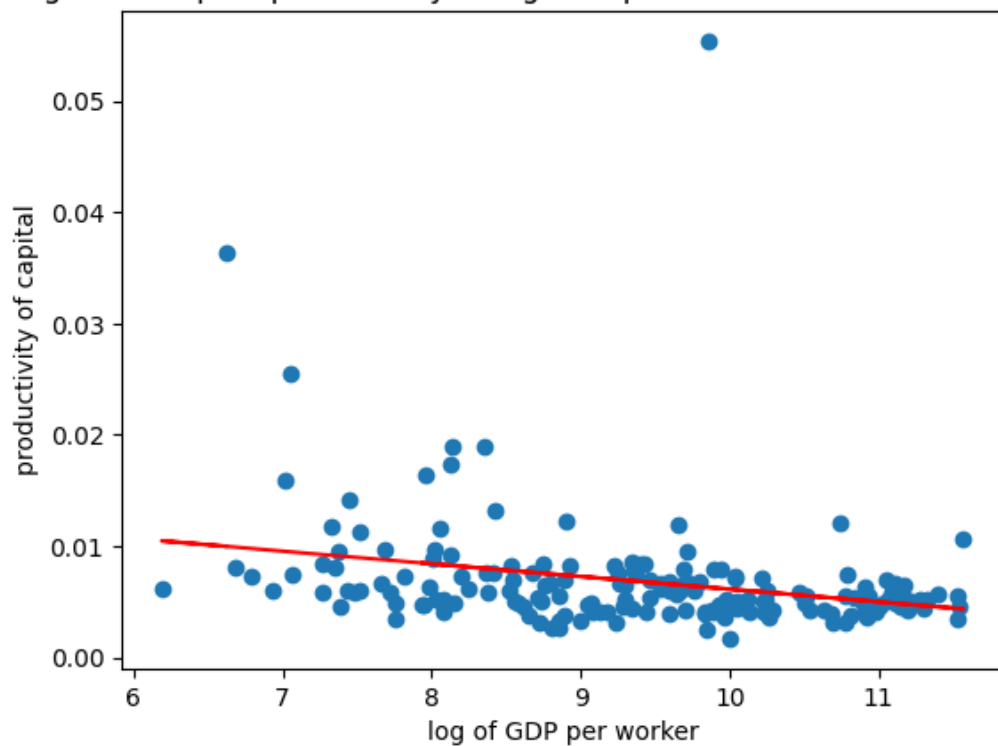


Figure 2 shows a negative correlation between log per capital GDP and productivity. A poor country has higher productivity of capital. This can be explained by the fact that poorer countries, defined as lower GDP per capita, have a lower level of capital given economic growth and capital depreciation rate, and thus it has a higher level of marginal return to capital.

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