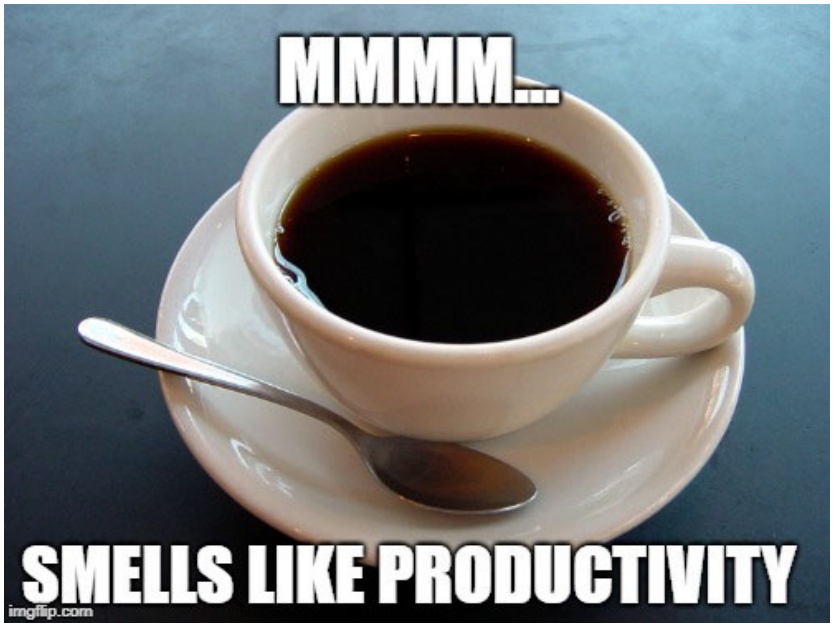
Coffee and Productivity

The-Confabulators


MMMM...
SMELLS LIKE PRODUCTIVITY
imgflip.com


BEFORE COFFEE
AFTER COFFEE

Background

- On an individual level, consumption of coffee and its active ingredient, caffeine (a stimulant), is often associated with higher levels of “energy” and “productivity”. But in a given population, such as a nation-state, does higher coffee consumption indicate a higher level of productivity?

Hypothesis

- Higher coffee consumption correlates with a higher level of productivity of a country.

Contents

- World Coffee Consumption Trend
- World Productivity (GDP per Hour Worked) Trend
- Top Coffee Consuming Countries
- Top Productivity Countries
- Correlation Between Coffee Consumption and Productivity

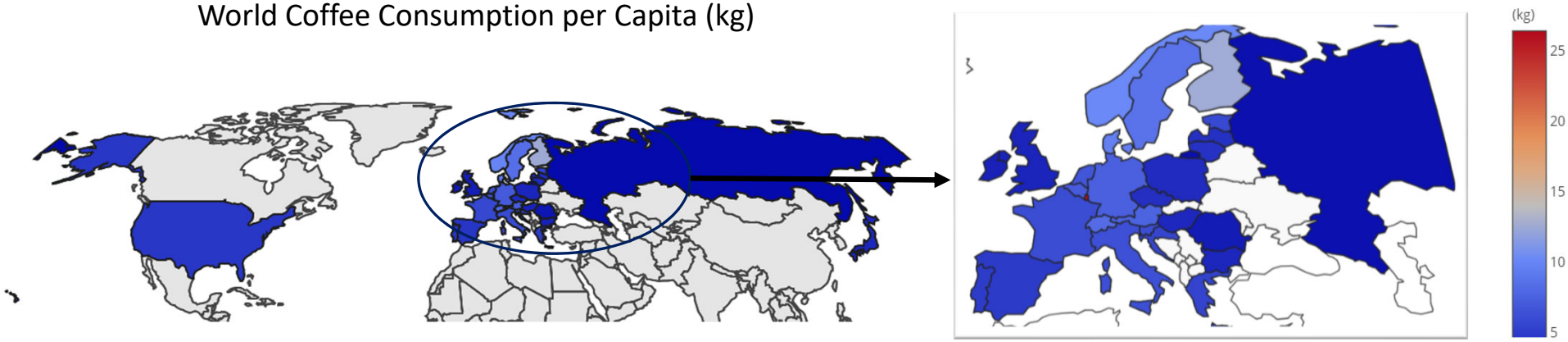
- Does the Amount of Coffee Consumption Affect Productivity?
- Does the Changes in the Coffee Consumption Correlated with the Changes in Productivity?

Data Exploration and Data Cleaning

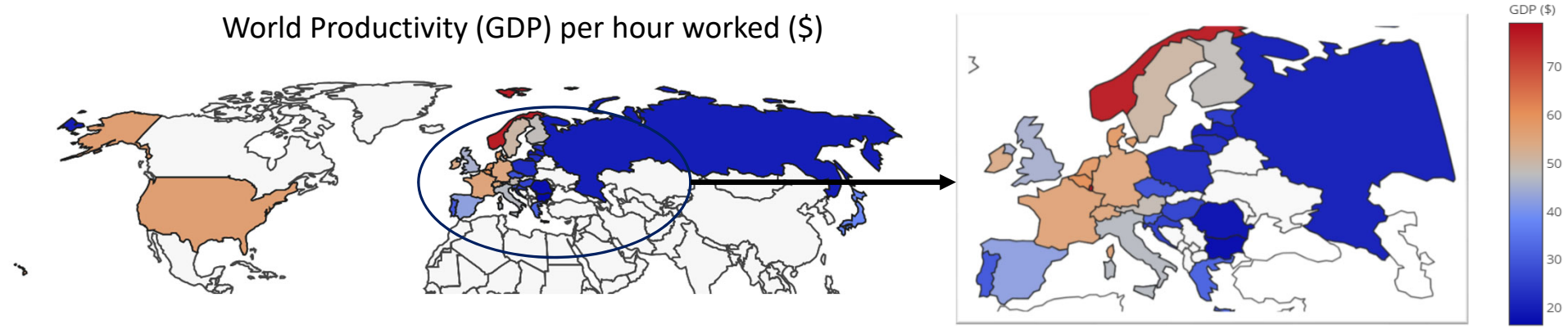
Country Name	Year	Coffee Consum	MEASU	gdp_per_hour_worked (	gdp_for_year ($	gdp_per_capita (	populatic	Unemployed ('	Coffee Consumed in k	Coffee Consumed per Capita in l
Austria	1999	1123	USD	43.673565	217,185,787,343	28722	7561609	3.700000048	67380000	8.910801921
Austria	2000	875	USD	44.712574	196,799,778,883	25922	7592073	3.5	52500000	6.915107376
Austria	2001	1013	USD	45.283182	197,337,879,195	25848	7634560	3.599999905	60780000	7.961166066
Austria	2002	926	USD	46.141633	213,377,771,504	27772	7683162	4	55560000	7.231397698
Austria	2003	720	USD	46.505529	261,695,778,781	33889	7722033	4.300000191	43200000	5.594381687
Austria	2004	996	USD	47.413997	300,904,221,505	38711	7773105	4.900000095	59760000	7.688047441
Austria	2005	772	USD	48.55656	315,974,418,605	40367	7827461	5.199999809	46320000	5.917627696
Austria	2006	612	USD	49.847493	335,998,557,270	42698	7869269	4.699999809	36720000	4.66625299
Austria	2007	847	USD	51.098384	388,691,445,387	49218	7897272	4.400000095	50820000	6.43513355
Austria	2008	908	USD	51.100684	430,294,287,388	54294	7925258	3.799999952	54480000	6.874224158
Austria	2009	886	USD	50.742191	400,172,297,861	50356	7946894	4.800000191	53160000	6.689405949
Austria	2010	903	USD	51.509782	391,892,746,545	49181	7968421	4.400000095	54180000	6.799339543
Austria	2011	1117	USD	52.020889	431,120,310,089	53923	7995146	4.099999905	67020000	8.382586134
Austria	2012	1269	USD	52.586463	409,425,234,155	50979	8031276	4.300000191	76140000	9.480436235
Austria	2013	1249	USD	52.924741	430,068,712,972	53229	8079615	4.900000095	74940000	9.275194424
Belgium	1999	834	USD	56.315921	260,202,429,150	26969	9648277	8.600000381	50040000	5.186418259
Belgium	2000	1133	USD	56.766941	237,904,919,845	24592	9674025	6.599999905	67980000	7.027064743
Belgium	2001	884	USD	56.684256	237,841,968,680	24494	9710055	6.199999809	53040000	5.462378946
Belgium	2002	1484	USD	58.009839	258,860,436,665	26526	9758570	7.5	89040000	9.124287677
Belgium	2003	1579	USD	58.689505	319,002,821,670	32538	9804122	8.199999809	94740000	9.663282444
Belgium	2004	1396	USD	60.41615	370,885,026,074	37661	9848022	8.399999619	83760000	8.50526126
Belgium	2005	1158	USD	61.096958	387,365,750,529	39124	9901014	8.399999619	69480000	7.01746306
Belgium	2006	1537	USD	61.665394	409,813,197,842	41135	9962702	8.199999809	92220000	9.256524987
Belgium	2007	1103	USD	62.581144	471,821,105,940	47040	10030266	7.5	66180000	6.598030401
Belgium	2008	650	USD	62.215758	518,625,897,173	51345	10100850	7	39000000	3.861061198
Belgium	2009	934	USD	61.775449	484,552,792,442	47630	10173366	7.900000095	56040000	5.508501316
Belgium	2010	871	USD	63.158921	483,548,031,197	47355	10211171	8.300000191	52260000	5.117924281
Belgium	2011	934	USD	62.865467	527,008,453,887	50893	10355126	7.099999905	56040000	5.411812469
Belgium	2012	915	USD	62.729225	497,884,216,569	47678	10442637	7.5	54900000	5.25729277
Belgium	2013	1245	USD	63.138168	520,925,468,953	49489	10526149	8.399999619	74700000	7.096612446

World View – Consumption & Productivity

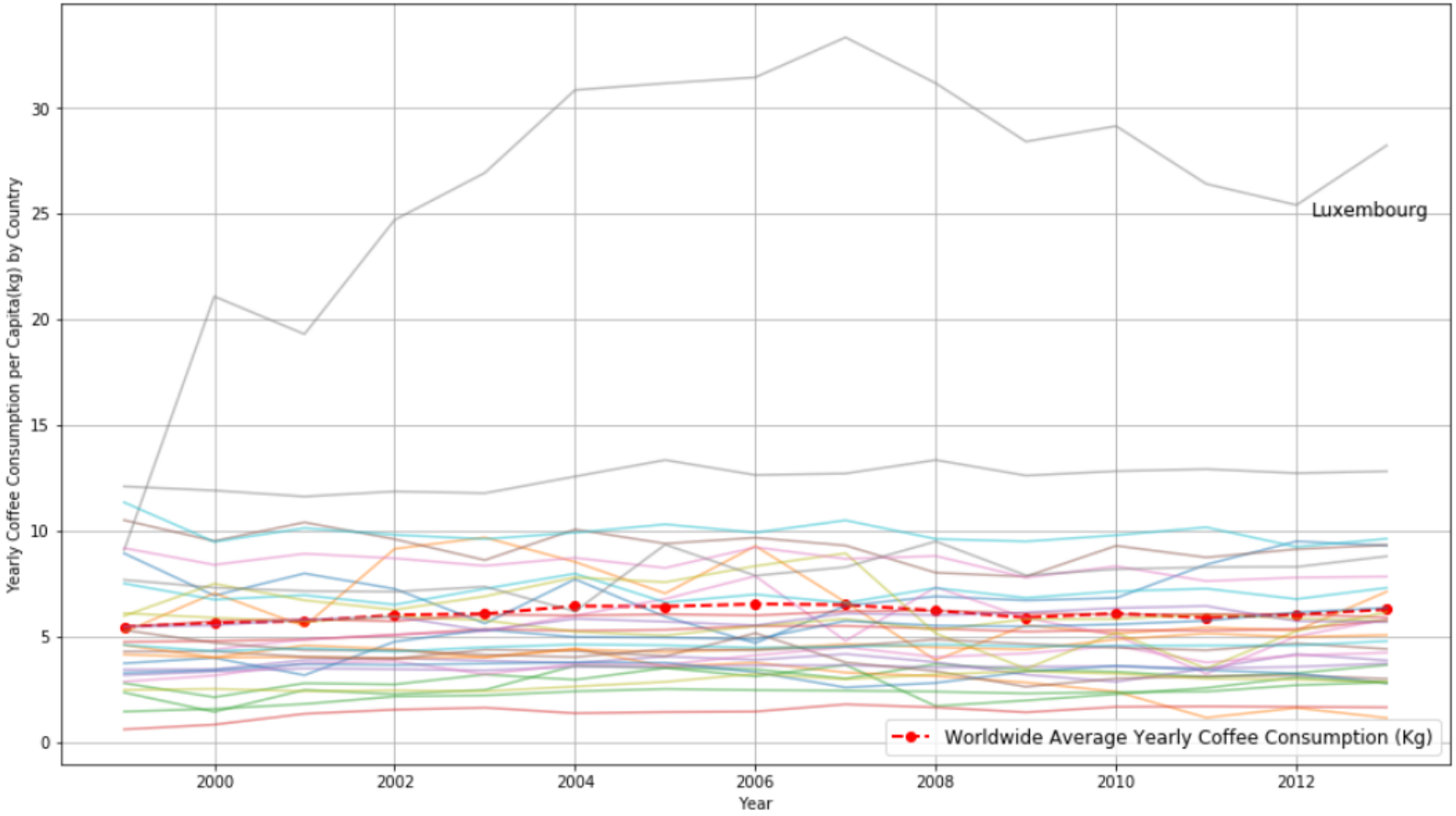
World Coffee Consumption per Capita (kg)



World Productivity (GDP) per hour worked ($)

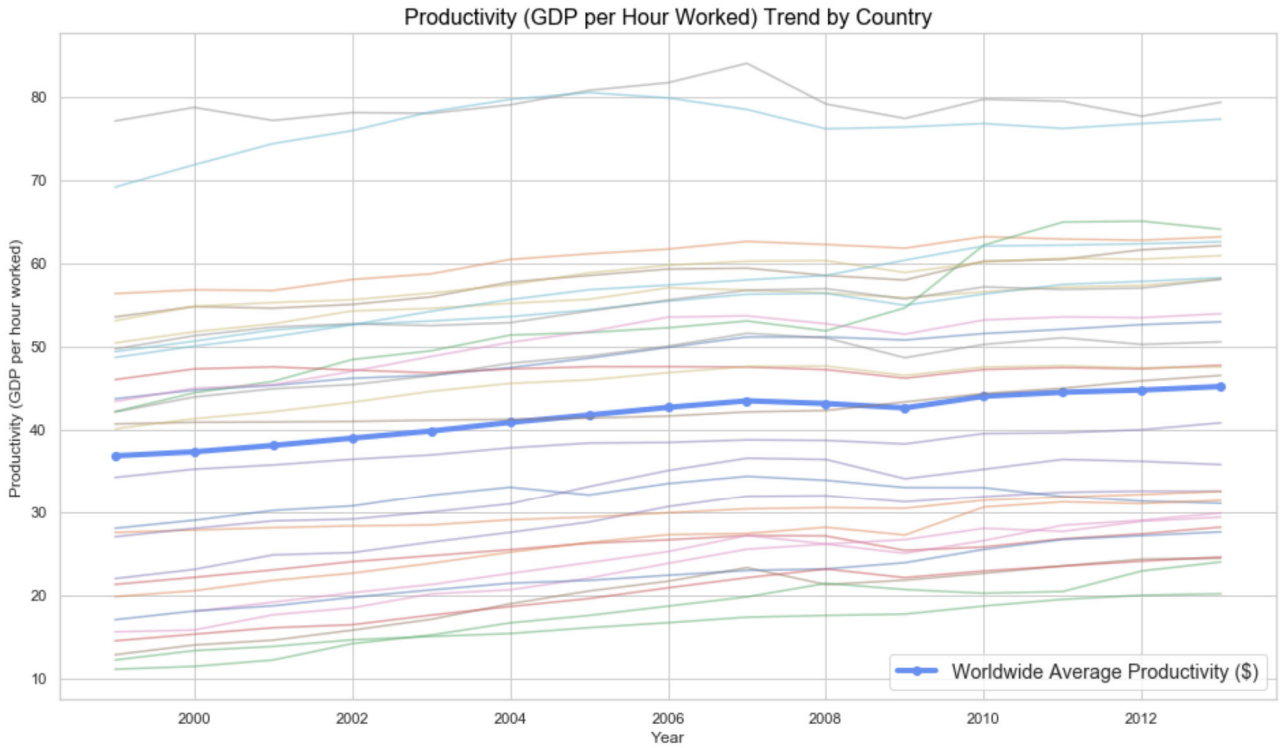


Coffee Consumption Trend by Country

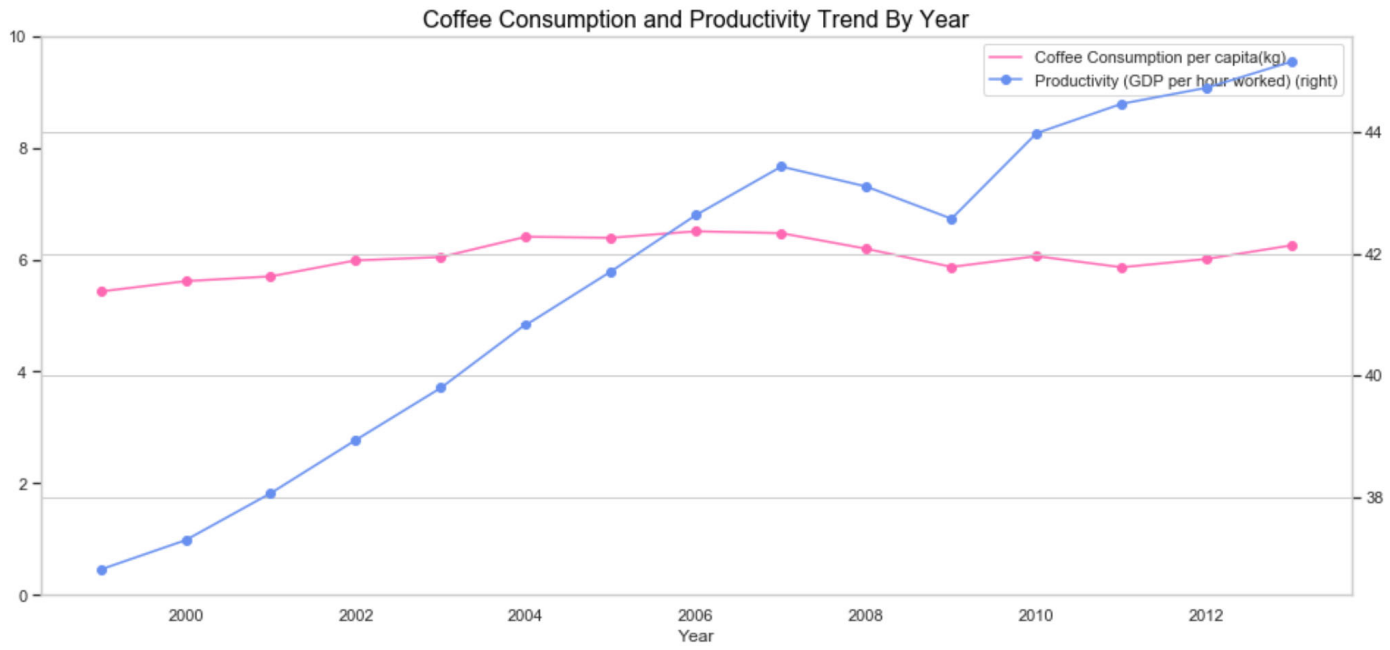


Productivity Trend by Country

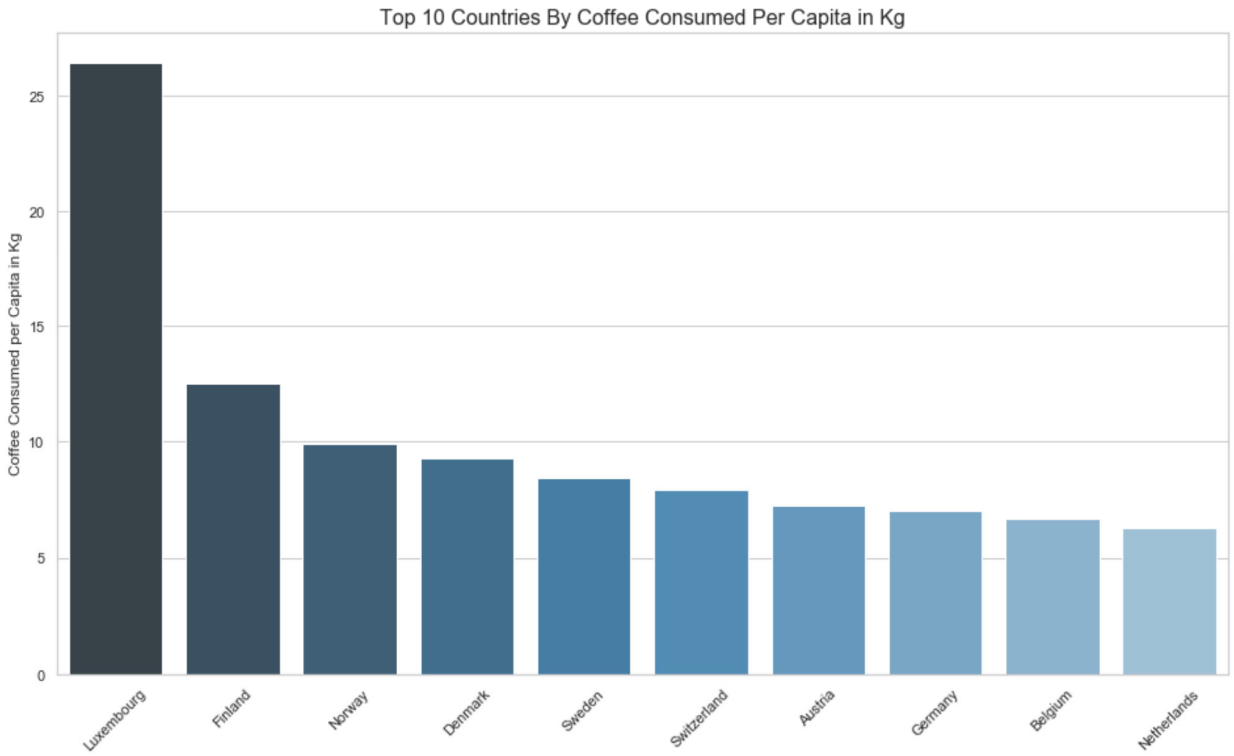
- Productivity is measured by GDP(Gross Domestic Product) by hour per worked.
- Growth in labor productivity indicates a higher level of output for every hour worked.



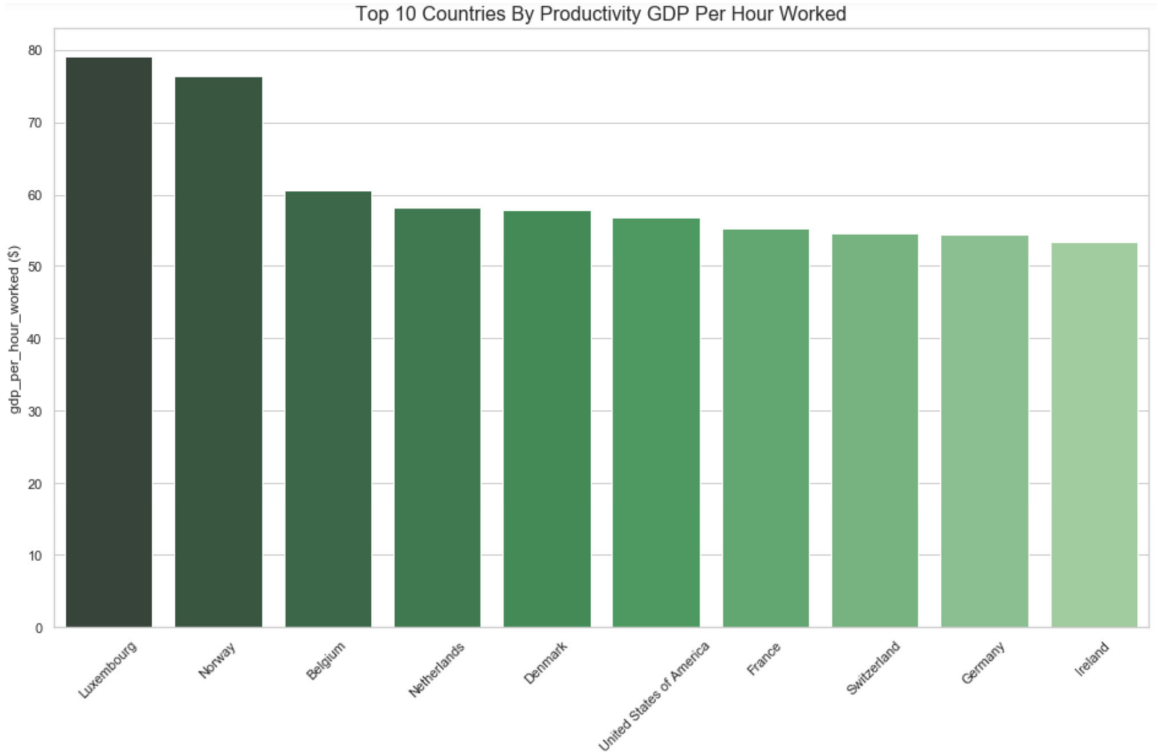
Mean Coffee Consumption and Mean of Productivity by Year



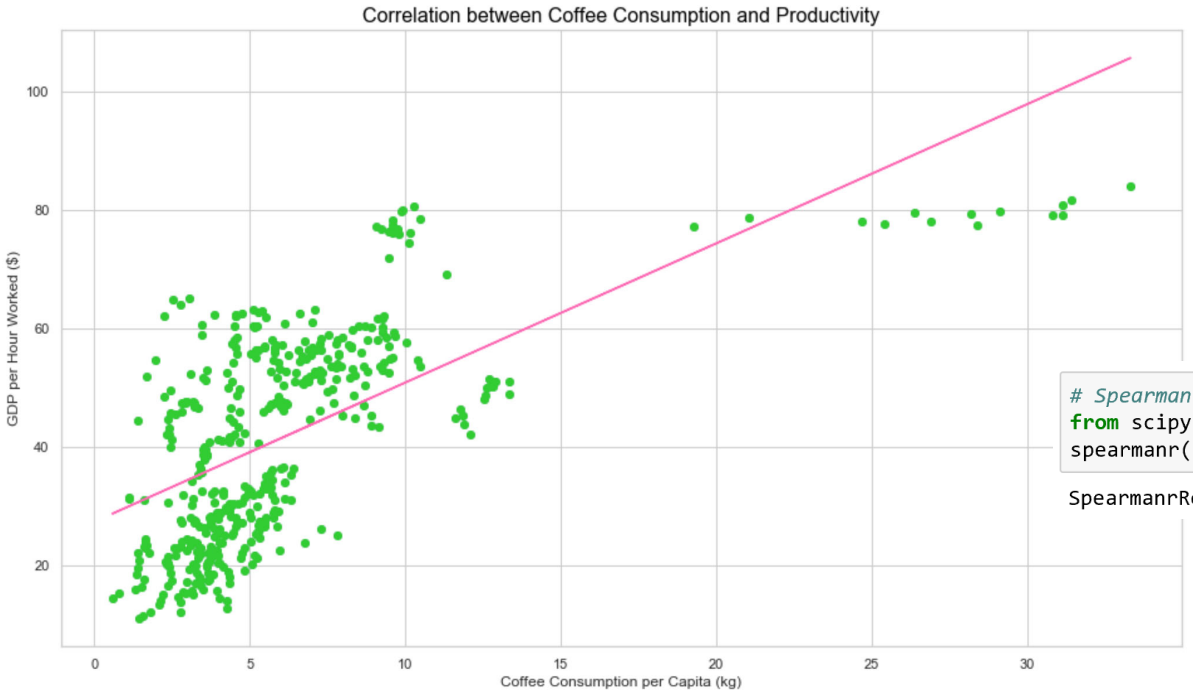
Top Coffee Consuming Countries



Top Productivity Countries (GDP per hour worked)



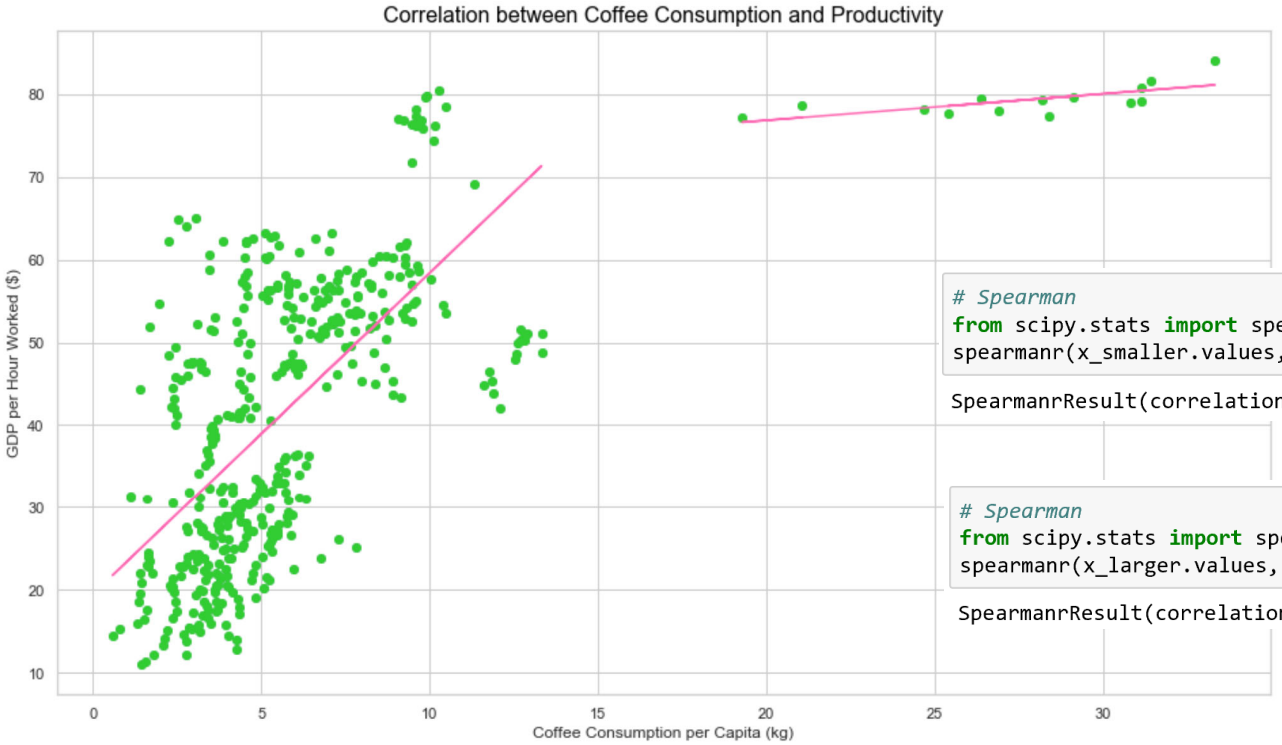
Correlation Between Coffee Consumption and Productivity




```
# Spearman
from scipy.stats import spearmanr
spearmanr(x.values, y.values)
```

```
SpearmanrResult(correlation=0.6651688938381588, pvalue=1.1140237618904332e-58)
```

Correlation Between Coffee Consumption and Productivity (Two Cohort)



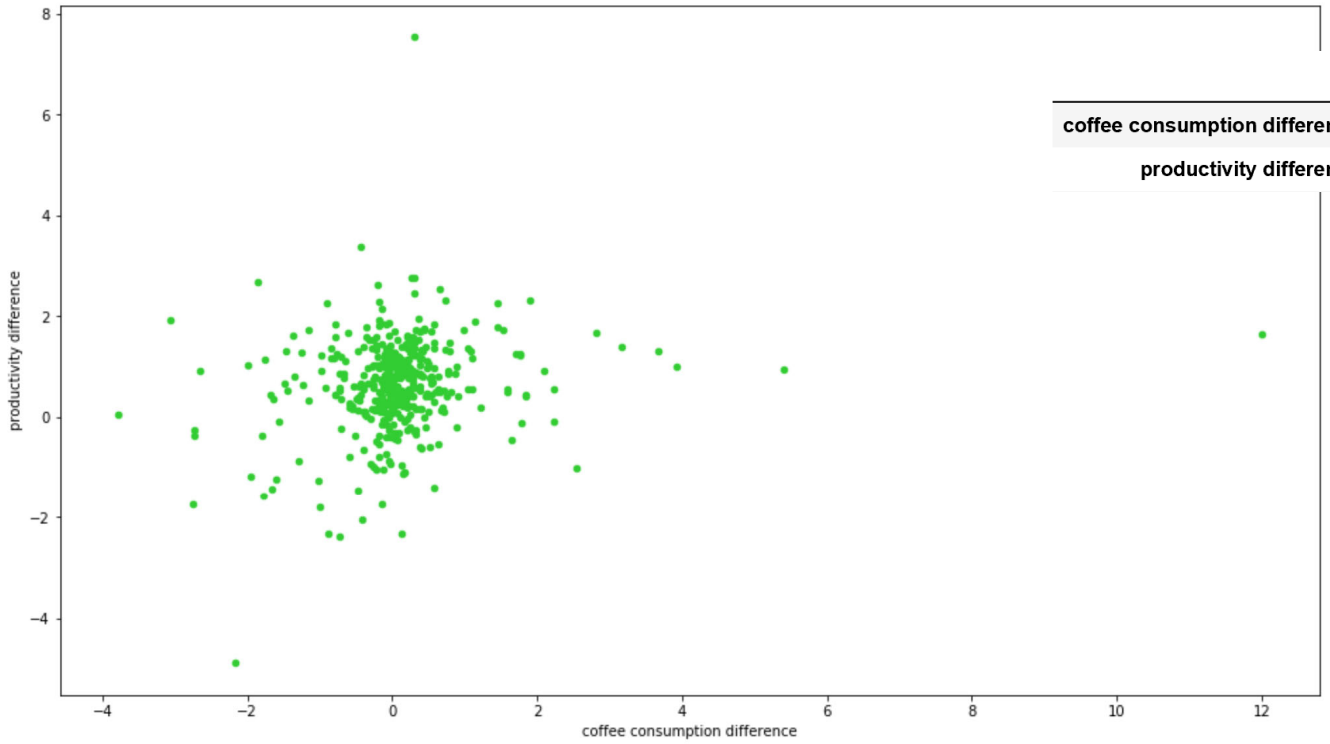

```
# Spearman
from scipy.stats import spearmanr
spearmanr(x_smaller.values, y_smaller.values)
```

```
SpearmanrResult(correlation=0.6319734902768038, pvalue=7.022143773167701e-50)
```

```
# Spearman
from scipy.stats import spearmanr
spearmanr(x_larger.values, y_larger.values)
```

```
SpearmanrResult(correlation=0.7362637362637363, pvalue=0.0026764473596131945)
```

Correlation Between Changes in Coffee Consumption and Changes in Productivity



	coffee consumption difference	productivity difference
coffee consumption difference	1.000000	0.169293
productivity difference	0.169293	1.000000

Conclusions

- Amount of coffee consumed and higher productivity measured as GDP per hour worked are correlated.

  (p-value < 0.05 and correlation coefficient = 0.665)

- According to linear regression, if the amount of coffee consumption is less than 15 kg (33 lbs), productivity increases much faster (bigger slope), while the productivity decreases slowly when the consumption is larger than 15 kg (slope: $m_{<15} = 3.89$, $m_{>15} = 0.32$),

- The changes in coffee consumption do not directly affect the changes of productivity. This is because there are several factors that decide productivity and coffee is not the only factor for productivity.