What do healthcare data tell us?

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Our goal and methodology

Assess the efficiency of public investment in health care in developed countries:

- collect relevant indexes about the development of health care in a set of chosen countries

Our choice of data

Indexes:

Current health expenditure (% of GDP)

Hospital beds (per 1000 people)

Physicians (per 1000 people)

Life expectancy (years)

Countries:

- France
- Germany
- Denmark
- Spain
- Italy
- Greece
- Great Britain
- USA
- Japan
- South Korea

Our coding: Python API wrapper

```
import wbgapi as wb
import pandas as pd
import requests
```

```
series=wb.series.info(q='health')
```

```
series
```

id	value
SG.DMK.ALLD.FN.ZS	Women participating in the three decisions (own health care, major household purchases, and visiting family) (% of women age 15-49)
SG.DMK.SRCR.FN.ZS	Women making their own informed decisions regarding sexual relations, contraceptive use and reproductive health care (% of women age 15-49)
SH.MED.CMHW.P3	Community health workers (per 1,000 people)
SH.STA.BRTC.ZS	Births attended by skilled health staff (% of total)
SH.UHC.NOP1.CG	Increase in poverty gap at 1.90(2011 PPP) poverty line due to out-of-pocket health care expenditure (USD)

Our coding: Pandas

```
health_expenditure=wb.data.DataFrame('SH.XPD.CHEX.GD.ZS',['FRA','DEU','GBR','ITA','ESP
','GRC','USA','KOR','JPN','DNK'],mrv=5)
health_expenditure['mean'] = health_expenditure.iloc[:, 0:4].mean(axis=1)
health_exp_mean=health_expenditure.drop(columns=columns_to_drop)
```

economy	YR2015	YR2016	YR2017	YR2018	YR2019
DEU	11.183703	11.235637	11.329351	11.450389	11.697249
DNK	10.227166	10.144562	10.039634	10.070716	9.955831
ESP	9.126172	8.952386	8.956942	8.990361	9.132132
FRA	11.447556	11.471637	11.332762	11.185830	11.057472
GBR	9.900724	9.873133	9.807875	9.903841	10.154027
GRC	8.068924	8.321095	8.103092	7.958769	7.837886
ITA	8.856892	8.725330	8.677740	8.675094	8.668569
JPN	10.749700	10.658916	10.656270	10.748388	10.743725
KOR	6.652717	6.914327	7.106949	7.543884	8.164165
USA	16.524073	16.844324	16.805836	16.687105	16.767063

economy	mean
DEU	11.299770
DNK	10.120519
ESP	9.006465
FRA	11.359446
GBR	9.871393
GRC	8.112970
ITA	8.733764
JPN	10.703319
KOR	7.054469
USA	16.715334

Our coding: SQL queries

```
CREATE DATABASE healthcare;
USE healthcare;
CREATE TABLE life_exp_mean(country CHAR(3) PRIMARY KEY, life_expectancy FLOAT);
[ repeat for all indicators ]
```

then create a table with all indicators:

```
CREATE TABLE all_indicators SELECT life_exp_mean.country, life_exp_mean.average AS life_expectancy, [ repeat for all indicators ]
LEFT JOIN ON country codes
```

then normalization:

```
CREATE TEMPORARY TABLE summary SELECT min(life_expectancy) min_life, max(life_expectancy) max_life, min(hospital_beds) min_hospital_beds, max(hospital_beds) max_hospital_beds, min(health_expenditure) min_health_exp, max(health_expenditure) max_health_exp, min(physicians) min_physicians, max(physicians) max_physicians FROM all_indicators;

ALTER TABLE  all_indicators ADD COLUMN  life_expectancy_normal FLOAT GENERATED ALWAYS AS ((life_expectancy-min_life)/(max_life-min_life)) STORED;
```

Final table obtained by SQL queries

country	life_expectancy	hospital_beds	health_expenditure	physicians	comp_index
JPN	84.0224	13.0775	10.7033	2.44555	2.39845
FRA	82.5488	6.02	11.3594	6.4926	2.25503
ITA	83.0201	3.1725	8.73376	7.87122	2.04873
DEU	80.8793	8.06333	11.2998	4.21925	1.72451
KOR	82.3884	12.0725	7.05447	2.33052	1.60316
GRC	81.375	4.215	8.11297	6.15125	1.4695
ESP	83.2189	2.9725	9.00646	3.88503	1.3752
GBR	81.1561	2.555	9.87139	5.5453	1.3442
USA	78.6018	2.81333	16.7153	2.6036	1.07499
DNK	80.903	2.5425	10.1205	4.07317	1.05642

According to the results obtained, the Japanese healthcare system is the best in the world with a value of 2.40, followed by France in second position with a value of 2.26, and Italy in the third one with a value of 2.05. While the USA and Denmark are the worse in the ranking.