First Paper Assignment

ECON241

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1.

My benchmark country is Japan

2.

```
library(readxl)
penn_world <- read_excel("~/Documents/2017-18/ECON241/Problem_Sets/first_paper_assignment/pwt90.xlsx",
                         sheet = 3)

suppressMessages(library(dplyr))
dataset_1 <- penn_world %>%
  filter(country %in% c("United States", "Republic of Korea", "Japan")) %>%
  select(country,year,rgdpe,rgdpo,pop,emp,hc,ccon,cda,
         cgdpe,cgdpo,rgdpna,rkna,labsh,delta,csh_c,csh_i,csh_g,csh_x,csh_m,csh_r)
```

3.

```
baro_lee <- read.csv("~/Documents/2017-18/ECON241/Problem_Sets/first_paper_assignment/Baro_Lee.csv")
dataset_2 <- baro_lee %>% filter(country %in% c("USA", "Republic of Korea", "Japan"))
```

4.

```
per_capita <- function(argument){
  outcome <- dataset_1 %>% na.omit() %>% filter(country == argument) %>%
    filter(year %in% c(min(year),max(year))) %>% group_by(country, year) %>%
    summarize(rgdpe_pc = rgdpe/emp, rgdpo_pc = rgdpo/emp,
              cgdpe_pc = cgdpe/emp, cgdpo_pc = cgdpo/emp)
  return(outcome)
}
gdp_per_capita <- lapply(c("Japan","Republic of Korea","United States"), per_capita) %>%
  bind_rows()
knitr::kable(gdp_per_capita)
```

country	year	rgdpe_pc	rgdpo_pc	cgdpe_pc	cgdpo_pc
Japan	1950	5705.321	5502.077	5544.385	5515.277
Japan	2014	68988.770	69394.130	68497.905	68817.331
Republic of Korea	1953	3536.796	3415.820	3672.247	3582.647
Republic of Korea	2014	67246.824	66962.300	66474.798	66253.009
United States	1950	36282.112	36193.161	36221.489	36171.159
United States	2014	112517.285	111799.269	111851.727	111077.098

5.

```r
constant_func <- function(argument){
  outcome <- dataset_1 %>% na.omit() %>% filter(country == argument) %>%
    filter(year %in% c(min(year),max(year))) %>%
    select(country, csh_i, delta, labsh) %>% mutate(marker = c("Earliest","Latest"))
  average <- dataset_1 %>% na.omit() %>% filter(country == argument) %>%
    group_by(country) %>%
    summarize(csh_i = mean(csh_i), delta = mean(delta), labsh = mean(labsh)) %>%
    mutate(marker = "Average")
  outcome <- bind_rows(outcome,average)
  return(outcome)
}

constants <- lapply(c("Japan","Republic of Korea","United States"), constant_func) %>%
  bind_rows()
knitr::kable(constants)
```

country	csh_i	delta	labsh	marker
Japan	0.1411975	0.0395769	0.6859077	Earliest
Japan	0.2177722	0.0462442	0.6027930	Latest
Japan	0.2901476	0.0522386	0.6623223	Average
Republic of Korea	0.1753825	0.0395769	0.7120887	Earliest
Republic of Korea	0.3037231	0.0501055	0.5192448	Latest
Republic of Korea	0.2960866	0.0515819	0.6145677	Average
United States	0.2312361	0.0395769	0.6356340	Earliest
United States	0.2078275	0.0470459	0.6035975	Latest
United States	0.2484804	0.0481978	0.6285230	Average

6.

```r
productivity_func <- function(argument){
  outcome <- dataset_1 %>% na.omit() %>% filter(country == argument) %>%
    mutate(avg_labsh = mean(labsh)) %>% filter(year %in% c(min(year),max(year))) %>%
    mutate(Period = c("Earliest","Latest")) %>%
    mutate(log_gdpPercap = log(rgdpna/emp),
           log_capitalPercap = log(rkna/emp),
           log_hc = log(hc),
           log_productivity1 = log_gdpPercap-1/3*log_capitalPercap-2/3*log_hc,
           log_productivity2 =
             log_gdpPercap-(1-avg_labsh)*log_capitalPercap-avg_labsh*log_hc) %>%
    select(country, year, Period, log_gdpPercap,
           log_capitalPercap, log_productivity1, log_productivity2, log_hc)
  return(outcome)
}
productivity <- lapply(c("Japan","Republic of Korea","United States"),
                       productivity_func) %>% bind_rows()
knitr::kable(productivity %>% select(-log_hc))
```

country	year	Period	log_gdpPercap	log_capitalPercap	log_productivity1	log_productivity2
Japan	1950	Earliest	8.822201	7.812043	5.665819	5.635480
Japan	2014	Latest	11.166614	12.516430	6.151727	6.102843
Republic of Korea	1953	Earliest	8.458783	8.885549	5.095295	4.663755
Republic of Korea	2014	Latest	11.099916	12.448079	6.097781	5.515892
United States	1950	Earliest	10.487821	11.672257	5.964379	5.555356
United States	2014	Latest	11.617938	12.750729	6.491372	6.055152

7.

```r
ratio <- productivity %>% filter(Period == "Latest") %>%
  mutate(ratioA = exp(log_productivity1[2]-log_productivity1),
         ratioCap = exp(1/3*(log_capitalPercap[2]-log_capitalPercap)),
         ratioHc = exp(2/3*(log_hc[2]-log_hc))) %>%
    select(country, Period, year, ratioA, ratioCap, ratioHc) %>%
  filter(country != "Republic of Korea")

knitr::kable(ratio)
```

country	Period	year	ratioA	ratioCap	ratioHc
Japan	Latest	2014	0.9474835	0.9774738	1.0100829
United States	Latest	2014	0.6746296	0.9040384	0.9767284

8.

```r
growth_rate_func <- function(nation){
  subset <- dataset_1 %>% filter(country == nation) %>% na.omit() %>%
    mutate(gdpPercap = rgdpe/emp, capPercap = rkna/emp)
```

```r
  output <- subset %>% group_by(country) %>%
    summarize(`Output Growth Rate`=
                (gdpPercap[nrow(subset)]/gdpPercap[1])^(1/(year[nrow(subset)]-year[1]))-1,
              `Physical Capital Growth Rate`=
                (capPercap[nrow(subset)]/capPercap[1])^(1/(year[nrow(subset)]-year[1]))-1,
              `Human Capital Growth Rate` =
                (hc[nrow(subset)]/hc[1])^(1/(year[nrow(subset)]-year[1]))-1,
              `Productivity Growth Rate = Productivity's relative share of gdp growth` =
                `Output Growth Rate` -
                1/3*`Physical Capital Growth Rate` -
                2/3*`Human Capital Growth Rate`) %>%
    mutate(`Human Capital's relative share of gdp growth` =
             2/3*`Human Capital Growth Rate`,
           `Physical Capital's relative share of gdp growth` =
             1/3*`Physical Capital Growth Rate`)
  return(output)
}

growth_rate <- lapply(c("Republic of Korea","United States","Japan"),
                      growth_rate_func) %>% bind_rows()
```

country	Output Growth Rate	Physical Capital Growth Rate	Human Capital Growth Rate
Republic of Korea	0.0494656	0.0601412	0.0111553
United States	0.0178414	0.0169939	0.0057265
Japan	0.0397143	0.0762750	0.0068289

country	Productivity Growth Rate = Productivity's relative share of gdp growth
Republic of Korea	0.0219817
United States	0.0083591
Japan	0.0097367

country	Human Capital's relative share of gdp growth	Physical Capital's relative share of gdp growth
Republic of Korea	0.0074369	0.0200471
United States	0.0038177	0.0056646
Japan	0.0045526	0.0254250