

Income comparison

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Contents

Preparation	1
practice problem 1.	2
practice problem 2.	2

Preparation

```
# load packages

packages <- c("readr", "dplyr", "janitor", "stringr", "tidyr")
lapply(packages, library, character.only = TRUE)

# import data
path <- "https://bit.ly/3qDA2VN"
df_raw <- read_csv(path)

# tidy columns
df_tidy <- df_raw %>%
  clean_names()

# rename columns by removing 'x' from their columns
df_tidy <- 'colnames<-'(df_tidy, str_remove(colnames(df_tidy), "x"))

# create a new dataframe
df <- tibble(
  "2007" = c(df_tidy[[1]], df_tidy[[3]], df_tidy[[5]]),
  "2017" = c(df_tidy[[2]], df_tidy[[4]], df_tidy[[6]])
)
```

For this problem set, I used the following dataframe with 2 columns and 51 data entry.

```
# show
knitr::kable(head(df))
```

2007	2017
58	54
6	2
59	55
71	57
30	26
38	34

practice problem 1.

```
# practice problem 1.
result1 <- tibble(
  mean_value = lapply(df, mean, na.rm = T),
  median_value = lapply(df, median, na.rm = T),
  sd_value = lapply(df, sd, na.rm = T),
  q_25 = lapply(df, quantile, probs = 0.25, na.rm = T),
  q_75 = lapply(df, quantile, probs = 0.75, na.rm = T),
  q_95 = lapply(df, quantile, probs = 0.95, na.rm = T)
)

# add some modification
result1 <-
  unnest(result1) %>% # unnest
  t() %>% # exchange rows and columns
  `colnames<-`(value = c("2007", "2017")) # add column names

# adjust to $000s
result1 <-
  result1 * 1000

# show
knitr::kable(result1)
```

	2007	2017
mean_value	62700.00	67120.0
median_value	59000.00	57500.0
sd_value	39661.96	48086.5
q_25	30250.00	27500.0
q_75	92750.00	97000.0
q_95	124550.00	149550.0

practice problem 2.

It is true that the average income increased from 2007 to 2017 because it went up from \$63k to \$67k during his/her administration. However, the country as a whole would not be better off since the median and the first quantile income decreased by \$1.5k and \$2.75k respectively, though people in the upper class experienced

a huge increase in their income. It would indicate that the only wealthy get wealthier, and the income gap widened. It would be misleading to consider an increase in the average income as economic benefits for all people in the country.