Homework 4

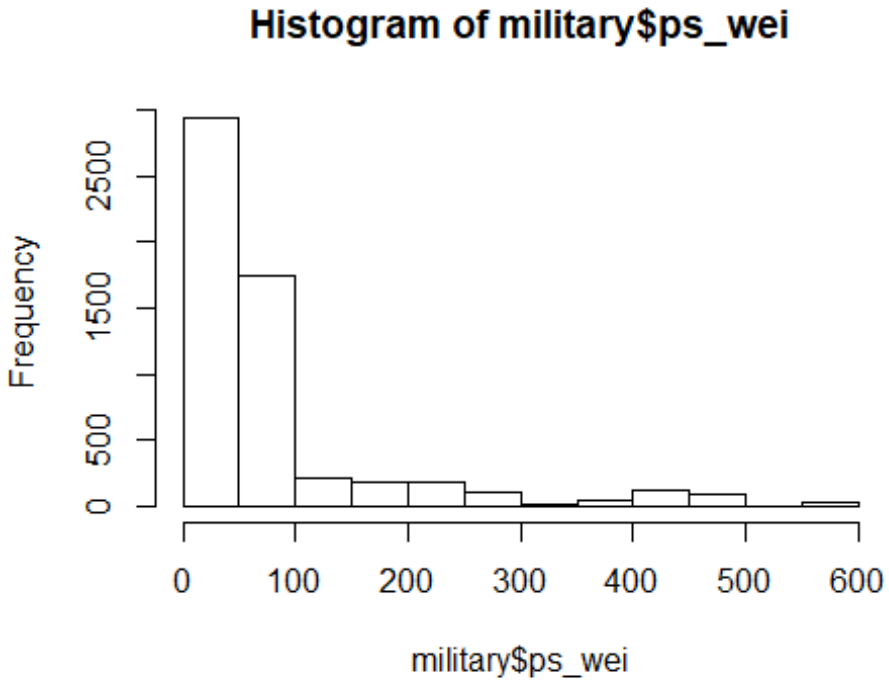
Xinyi Lin

10/5/2019

Question a

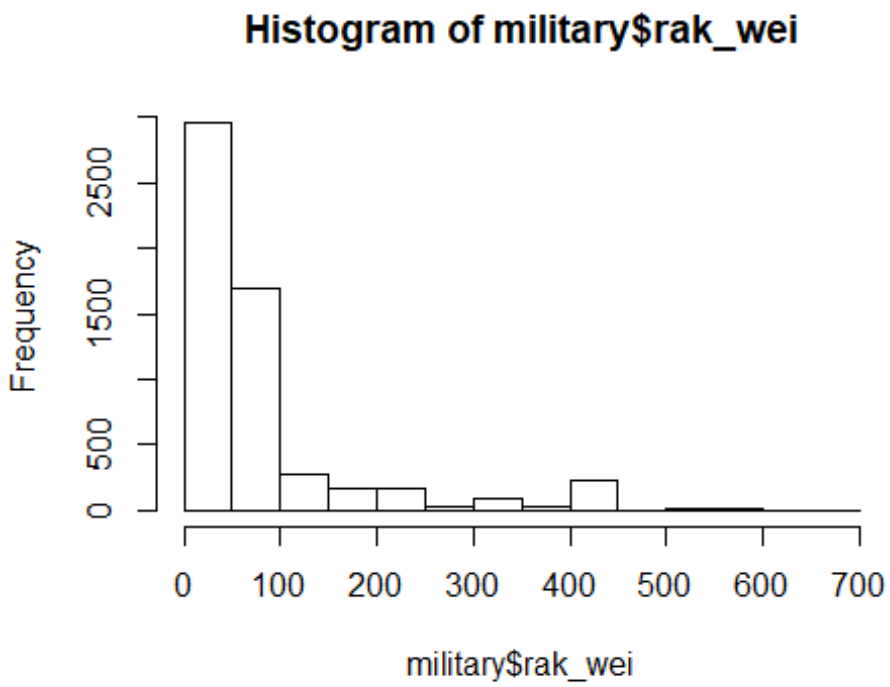
Poststratification

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   10.95   22.58   44.28   83.50   83.29  584.57
```



Raking

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   12.03   22.31   43.85   83.50   84.31  684.65
```



Question b

paygrade	adj_wei	ps_wei	rak_wei	pop_wei
1	71504.42	66465	66465	66465
2	256254.81	274125	274125	274125
3	110620.39	133868	133868	133868

According to results, we can find that even though adjusted weights of each psu given by post-stratification and raking are not the same, weights total of each payroll groups are the same and both of them are the same as population total weights in each payroll groups.

Appendix

```
knitr::opts_chunk$set(echo = FALSE)
library(tidyverse)
library(survey)
military = read.csv("./military.csv") %>%
  mutate(XCPAY1R = ifelse(XCPAY1R==3, 2, XCPAY1R),
         paygrade = ifelse(XCPAY1R %in% c(4,5,6,7), 3, XCPAY1R),
         GENDER = XSEXR,
         RACETH = XRETH4R) %>%
  select(-XCPAY1R, -XSEXR, -XRETH4R)
population = read.csv("./population.csv") %>%
  mutate(GENDER = as.factor(GENDER),
         RACETH = as.factor(RACETH),
         paygrade = as.factor(paygrade))
```

```r
# question a
dclus1 = svydesign(ids = ~X, strata = ~STRATUM, fpc = ~NSTRAT, weights =
~weight, data = military)
dclus1p = postStratify(dclus1, ~ RACETH + GENDER + paygrade, population)
military$ps_wei = weights(dclus1p)
summary(military$ps_wei)
hist(military$ps_wei)
pop.race = population %>%
  group_by(RACETH) %>%
  summarize(Freq=sum(count_s)) %>%
  ungroup()
pop.gender = population %>%
  group_by(GENDER) %>%
  summarize(Freq=sum(count_s)) %>%
  ungroup()
pop.pay = population %>%
  group_by(paygrade) %>%
  summarize(Freq=sum(count_s)) %>%
  ungroup()
rclus1 = rake(dclus1, list(~RACETH, ~GENDER, ~paygrade), list(pop.race,
pop.gender, pop.pay))
military$rak_wei = weights(rclus1)
summary(military$rak_wei)
hist(military$rak_wei)
# question b
# population data
pop_weight = population %>%
  group_by(paygrade) %>%
  summarize(pop_wei=sum(count_s)) %>%
  ungroup()
military %>%
  group_by(paygrade) %>%
  summarize(adj_wei = sum(weight),
            ps_wei = sum(ps_wei),
            rak_wei = sum(rak_wei)) %>%
  ungroup() %>%
  mutate(pop_wei = pop_weight$pop_wei) %>%
  knitr::kable()
```