# Complex Surveys

#### Ignacio Sepulveda

2020

```
## Warning: package 'survey' was built under R version 4.0.3
## Loading required package: grid
## Loading required package: Matrix
## Loading required package: survival
## Attaching package: 'survey'
## The following object is masked from 'package:graphics':
## dotchart
```

## Chapter II: SIMPLE AND STRATIFIED SAMPLING.

#### ANALYZING SIMPLE RANDOM SAMPLES.

Datos y primeras estimaciones.

Pero y los pesos?

```
data(api)
srs_design = svydesign(id=~1,fpc=~fpc,data=apisrs)
srs_design

## Independent Sampling design
## svydesign(id = ~1, fpc = ~fpc, data = apisrs)

svytotal(~enroll,srs_design)

## total SE
## enroll 3621074 169520

svymean(~enroll,srs_design)

## mean SE
## enroll 584.61 27.368
```

```
nofpc=svydesign(id=~1,weights=~pw,data=apisrs)
nofpc
## Independent Sampling design (with replacement)
## svydesign(id = ~1, weights = ~pw, data = apisrs)
svytotal(~enroll,nofpc)
##
                      SE
            total
## enroll 3621074 172325
svymean(~enroll,nofpc)
                     SE
##
            mean
## enroll 584.61 27.821
Vemos que no hay cambios ni en la media ni en el total pero si los hay en la desviacion estandar
Pueden ser factores igual,
svytotal(~stype,srs_design)
            total
## stypeE 4397.74 196.00
## stypeH 774.25 142.85
## stypeM 1022.01 160.33
Y hacer contrastes,
means=svymean(~api00+api99,srs_design)
means
           mean
## api00 656.58 9.2497
## api99 624.68 9.5003
svycontrast(means,c(api00=1,api99=-1))
           contrast
               31.9 2.0905
## contrast
#update para agregar variables.
srs_design=update(srs_design, apidiff=api00-api99)
srs_design=update(srs_design, apipct=apidiff/api99)
svymean(~apidiff+apipct,srs_design)
##
                mean
## apidiff 31.900000 2.0905
## apipct 0.056087 0.0041
```

#### STRATIFIED SAMPLING

```
strat_design = svydesign(id=~1,strata=~stype,fpc=~fpc,data=apistrat)
strat_design
## Stratified Independent Sampling design
## svydesign(id = ~1, strata = ~stype, fpc = ~fpc, data = apistrat)
svytotal(~enroll,strat_design)
           total
## enroll 3687178 114642
svymean(~enroll,strat_design)
##
           mean
                     SE
## enroll 595.28 18.509
svytotal(~stype,strat_design)
         total SE
## stypeE 4421 0
## stypeH
          755 0
## stypeM 1018 0
```

#### REPLICATE WEIGHTS

```
chis adult=read.dta("C:/Users/nasho/Documents/GitHub/Notes COMPLEX SURVEYS/Adult.dta")
```

```
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('sragef') for 'srage_p' are missing

## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('povgwd') for 'povgwd_p' are missing

## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw0' are missing

## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw1' are missing

## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw2' are missing

## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw3' are missing
```

```
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw4' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw5' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw6' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw7' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw8' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw9' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw10' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw11' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw12' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw13' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw14' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes COMPLEX SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw15' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw16' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw17' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw18' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw19' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw20' are missing
```

```
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw21' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw22' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw23' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw24' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw25' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw26' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw27' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw28' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw29' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw30' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw31' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes COMPLEX SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw32' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw33' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw34' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw35' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw36' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw37' are missing
```

```
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw38' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw39' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw40' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw41' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw42' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw43' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw44' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw45' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw46' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw47' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw48' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes COMPLEX SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw49' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw50' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw51' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw52' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw53' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw54' are missing
```

```
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw55' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw56' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw57' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw58' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw59' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw60' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw61' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw62' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw63' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw64' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw65' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes COMPLEX SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw66' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw67' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw68' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw69' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw70' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes COMPLEX SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw71' are missing
```

```
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw72' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw73' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw74' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw75' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw76' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw77' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw78' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw79' are missing
## Warning in read.dta("C:/Users/nasho/Documents/GitHub/Notes_COMPLEX_SURVEYS/
## Adult.dta"): value labels ('rakedf') for 'rakedw80' are missing
#especificando los weights
chis = svrepdesign(varibles=chis_adult[,1:418],
                   repweights=chis_adult[,420:499],
                   weights=chis_adult[,419],
                   combined.weights=TRUE,
                   type='other',scale=1,rscales=1)
chis
## Call: svrepdesign.default(varibles = chis_adult[, 1:418], repweights = chis_adult[,
       420:499], weights = chis_adult[, 419], combined.weights = TRUE,
       type = "other", scale = 1, rscales = 1)
## with 80 replicates.
#Creando nuestos weights
boot_design = as.svrepdesign(strat_design,type='bootstrap',replicates=100)
jk design=as.svrepdesign(strat design)
svymean(~enroll,boot_design)
            mean
## enroll 595.28 21.731
```

### svymean(~enroll,jk\_design)

```
## mean SE
## enroll 595.28 18.509
```