SubnationalCRVS Demo

Jeremy Roth

Contents

1 Set up

1.1 Load SubnationalCRVS package (includes example data)

```
#library(devtools)
#install_github("jroth-unfpa/SubnationalCRVS")
library(SubnationalCRVS)
head(ecuador_age_tabulation)
```

```
##   province sex age pop2 pop1       date1       date2 province_name
## 1        1   m   0 6750 6086 2001-11-25 2010-11-28         Azuay
## 2        1   m   1 6984 6555 2001-11-25 2010-11-28         Azuay
## 3        1   m   2 7090 7232 2001-11-25 2010-11-28         Azuay
## 4        1   m   3 7095 7101 2001-11-25 2010-11-28         Azuay
## 5        1   m   4 6961 7083 2001-11-25 2010-11-28         Azuay
## 6        1   m   5 6895 6583 2001-11-25 2010-11-28         Azuay
##   province_name_short
## 1                 Azu
## 2                 Azu
## 3                 Azu
## 4                 Azu
## 5                 Azu
## 6                 Azu
```

```
head(example_data_ecuador)
```

```
##   province sex age  pop1  pop2 deaths      date1      date2 province_name
## 1        1   m   0 34101 34886    772 2001-11-25 2010-11-28         Azuay
## 2        1   m  10 34946 38125    223 2001-11-25 2010-11-28         Azuay
## 3        1   m  15 32387 37611    416 2001-11-25 2010-11-28         Azuay
## 4        1   m  20 25634 33665    480 2001-11-25 2010-11-28         Azuay
## 5        1   m  25 18606 28376    475 2001-11-25 2010-11-28         Azuay
## 6        1   m  30 16193 22026    456 2001-11-25 2010-11-28         Azuay
##   province_name_short
## 1                 Azu
## 2                 Azu
## 3                 Azu
## 4                 Azu
## 5                 Azu
## 6                 Azu
```

1.2 Initialize a few things for the demo

```r
knitr::opts_chunk$set(echo = TRUE)
library(dplyr)
library(knitr)
my_plots_dir <- "Plots/"
```

2 Conduct DDQA

2.1 Sex ratio

```r
s <- PlotSexRatios(data=example_data_ecuador,
                   name.disaggregations="province_name",
                   name.males="m",
                   name.females="f",
                   name.age="age",
                   name.sex="sex",
                   name.date1="date1",
                   name.date2="date2",
                   name.population.year1="pop1",
                   name.population.year2="pop2",
                   line.size.overall=0.6,
                   print.disaggregated=FALSE,
                   print.overall=FALSE,
                   plots.dir="Plots/")
```

2.1.1 View sex ratios in table

```r
s %>% select(province_name, age, pop1, pop2, sex_ratio_1, sex_ratio_2) %>%
    head()
```

```
##   province_name age  pop1  pop2 sex_ratio_1 sex_ratio_2
## 1         Azuay   0 33491 33876   101.82138   102.98146
## 2         Azuay  10 34975 37366    99.91708   102.03126
```

```
## 3         Azuay  15 34181 37215      94.75147      101.06409
## 4         Azuay  20 31000 35753      82.69032       94.15993
## 5         Azuay  25 23844 32054      78.03221       88.52561
## 6         Azuay  30 21317 26520      75.96285       83.05430
```

2.1.2   View sex ratios in plot
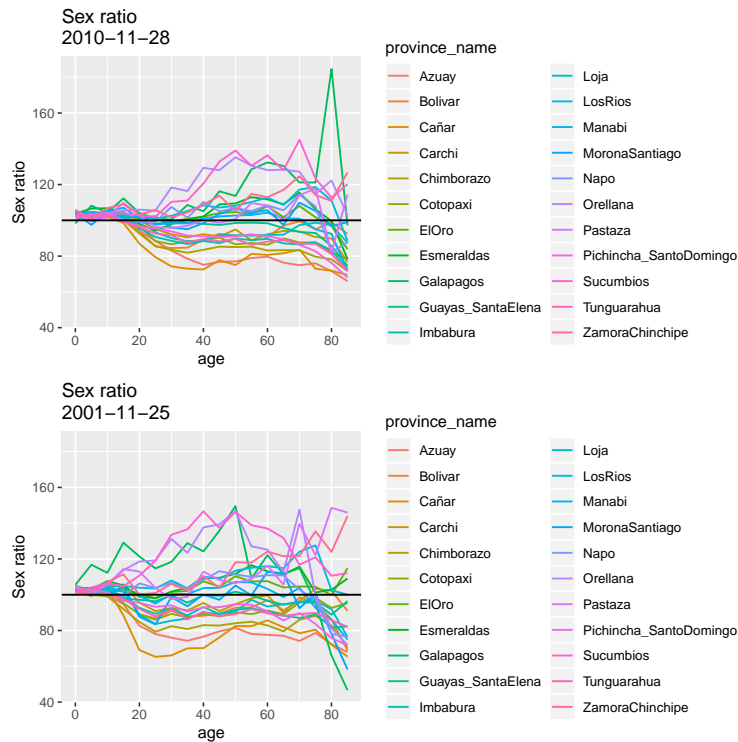

Figure 1: A caption

2.2   Age ratios

```
a <- PlotAgeRatios(data=example_data_ecuador,
            name.disaggregations="province_name",
            name.males="m",
            name.females="f",
            name.age="age",
            name.sex="sex",
            name.date1="date1",
            name.date2="date2",
            name.population.year1="pop1",
            name.population.year2="pop2",
            line.size.overall=0.6,
            print.disaggregated=FALSE,
            print.overall=FALSE,
            plots.dir="Plots/")
```

2.2.1 View age ratios in table

```
a %>% select(province_name, age, pop1, pop2, age_ratio_1, age_ratio_2) %>%
    head()
```

```
##   province_name age  pop1  pop2 age_ratio_1 age_ratio_2
## 1         Azuay   0 33491 33876          NA          NA
## 2         Azuay   5 33817 35701    98.78480    100.2246
## 3         Azuay  10 34975 37366   102.87067    102.4905
## 4         Azuay  15 34181 37215   103.61804    101.7930
## 5         Azuay  20 31000 35753   106.85050    103.2294
## 6         Azuay  25 23844 32054    91.15202    102.9467
```

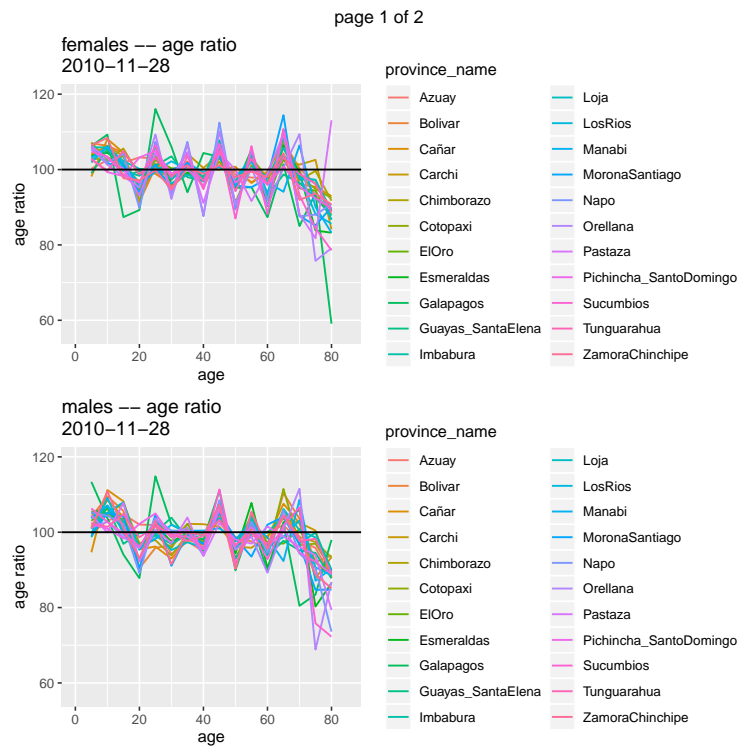### 2.2.2 View age ratios in plot

Figure 2: A caption

2.3 Potential age heaping

```
PlotPotentialAgeHeaping(data=ecuador_age_tabulation,
          name.disaggregations="province_name",
          name.males="m",
          name.females="f",
          name.age="age",
          name.sex="sex",
          name.date1="date1",
          name.date2="date2",
```

```
            name.population.year1="pop1",
            name.population.year2="pop2",
            print.disaggregated=FALSE,
            print.overall=FALSE,
            plots.dir="Plots/")
```

```
## [1] "need to add a way to check for single-year ages"
```

```
## NULL
```

2.3.1 View potential age heaping plots
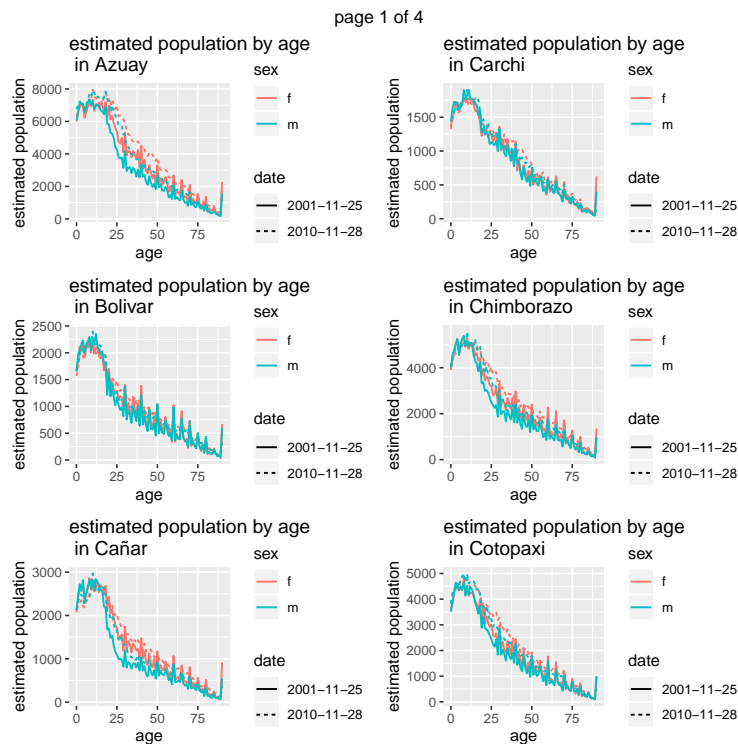
Figure 3: A caption

2.4 Age heaping indices

```
ageheaping_name_full <- PlotAgeHeapingScores(data=ecuador_age_tabulation,
                               name.disaggregations="province_name",
                               name.males="m",
                               name.females="f",
                               name.age="age",
                               name.sex="sex",
                               name.date1="date1",
                               name.date2="date2",
                               name.population.year1="pop1",
                               name.population.year2="pop2",
```

```
                                              print.plots=FALSE,
                                              plots.dir="Plots/")
```

```
## [1] "need to add a way to check for single-year ages"
ageheaping_name_short <- PlotAgeHeapingScores(data=ecuador_age_tabulation,
                                              name.disaggregations="province_name",
                                              name.males="m",
                                              name.females="f",
                                              name.age="age",
                                              name.sex="sex",
                                              name.date1="date1",
                                              name.date2="date2",
                                              name.population.year1="pop1",
                                              name.population.year2="pop2",
                                              print.plots=FALSE,
                                              plots.dir="Plots/")
```

```
## [1] "need to add a way to check for single-year ages"
```

2.4.1 View age heaping indices in table

{r "age_heaping_indices_table"}head(example_data_ecuador) head(ageheaping_name_full) ###
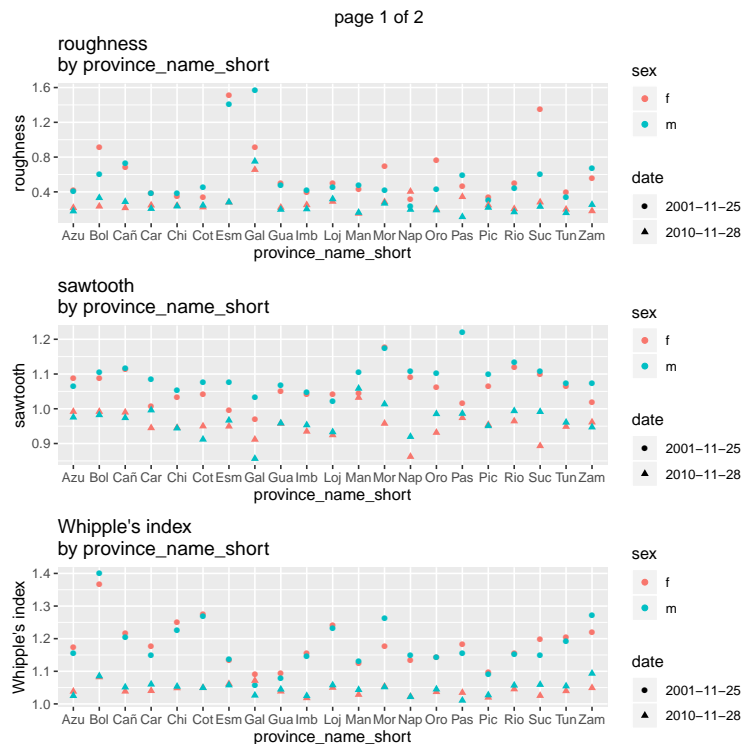View age heaping indices in plots

Figure 4: A caption

3 DDM estimation

3.1 Compute DDM estimates

```
ddm_results_name_short <- EstimateDDM(data=example_data_ecuador,
            name.disaggregations="province_name_short",
            name.age="age",
            name.sex="sex",
            name.males="m",
            name.females="f",
            name.date1="date1",
            name.date2="date2",
            name.population.year1="pop1",
            name.population.year2="pop2",
            name.deaths="deaths",
            deaths.summed=TRUE,
            min.age.in.search=15,
            max.age.in.search=75,
            min.number.of.ages=8)
```

```
## [1] "performing DDM estimation within each of 21 possible age ranges..."
```

```
ddm_results_name_full <- EstimateDDM(data=example_data_ecuador,
            name.disaggregations="province_name",
            name.age="age",
            name.sex="sex",
            name.males="m",
            name.females="f",
            name.date1="date1",
            name.date2="date2",
            name.population.year1="pop1",
            name.population.year2="pop2",
            name.deaths="deaths",
            deaths.summed=TRUE,
            min.age.in.search=15,
            max.age.in.search=75,
            min.number.of.ages=8)
```

```
## [1] "performing DDM estimation within each of 21 possible age ranges..."
```

3.2 Plot DDM estimates

```
PlotDDM(ddm_results=ddm_results_name_short,
        size.text.sensitivity=8,
        plots.dir="Plots/")
PlotDDM(ddm_results=ddm_results_name_full,
        size.text.sensitivity=8,
        plots.dir="Plots/")
```

3.2.1 View DDM point estimates in table

```
head(ddm_results_name_full$ddm_estimates)
```

```
##        cod     sex    ggbseg       ggb       seg lower_age_range upper_age_range
## 1   Azuay Females 0.6690215 0.9869457 0.8062717              15              50
## 2   Azuay   Males 0.7268026 1.0688804 0.9169165              15              50
## 3 Bolivar Females 0.7128565 0.9876368 0.7200723              20              60
## 4 Bolivar   Males 0.7427068 0.9553584 0.7963881              25              60
## 5   Cañar Females 0.6188313 0.9981219 0.5754533              20              55
## 6   Cañar   Males 0.7085910 0.9534686 0.7923367              15              50
```
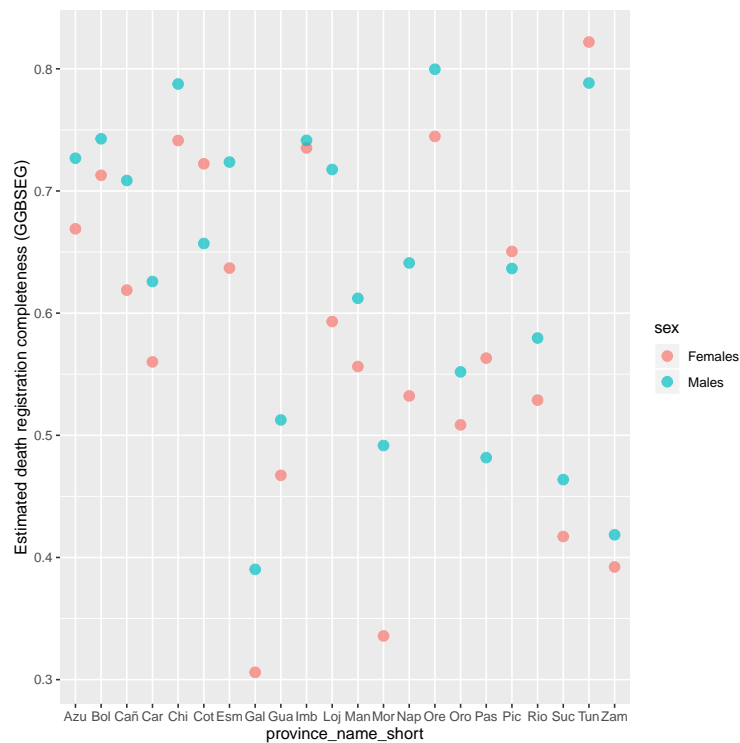
3.2.2 View DDM point estimates in plot

Figure 5: A caption

3.2.3 View age-range sensitivity of DDM point estimates in table

```
head(ddm_results_name_full$sensitivity_ddm_estimates)
```

```
##      cod     sex    ggbseg       ggb       seg lower_age_range upper_age_range
## 1 Azuay Females 0.6104842 0.9869457 0.8112473              15              50
## 2 Azuay Females 0.6387823 0.8742469 0.8089535              15              55
## 3 Azuay Females 0.6293945 0.8566154 0.8057450              20              55
## 4 Azuay Females 0.6690215 0.8292898 0.8062717              15              60
## 5 Azuay Females 0.6607905 0.8151276 0.8031217              20              60
## 6 Azuay Females 0.6505367 0.7836742 0.8012668              25              60
```

8

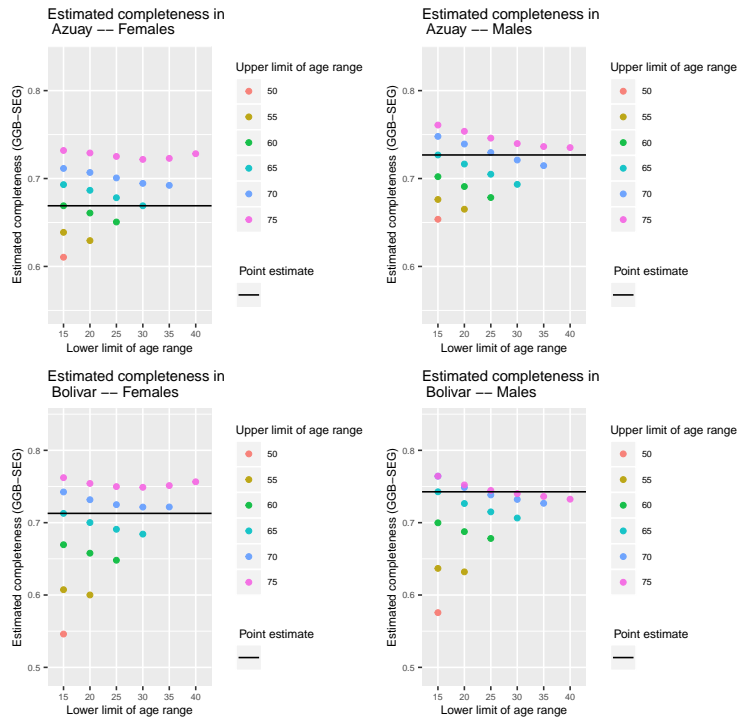### 3.2.4 View sensitivity of DDM point estimates in plot

Figure 6: A caption