Mali

```
## [1] "Census Females"
```

```
## # A tibble: 18 x 5
##    aggr.age  `1976`  `1987`  `1998`   `2009`
##  *    <dbl>   <dbl>   <dbl>   <dbl>    <dbl>
##  1        0 589461. 713518. 824505  1320900.
##  2        5 469318. 587737. 752056. 1140163.
##  3       10 365111. 454909. 626383.  935907.
##  4       15 313740. 372253. 514432.  776702.
##  5       20 283085. 329380. 426025.  651759.
##  6       25 256486. 293568. 357175.  544213.
##  7       30 221242. 249780. 305540.  441083.
##  8       35 176439. 204643. 254144.  346151.
##  9       40 140031. 168372. 204333   279300.
## 10       45 112098. 138593. 164032.  230165.
## 11       50  92157. 114941. 134674.  187778.
## 12       55  77736.  96562. 110227.  148978.
## 13       60  65678.  81473.  90043   116856.
## 14       65  48225.  61222.  68496.   87673.
## 15       70  32268.  40138.  47588.   62602.
## 16       75  22262.  20646.  25240    36935.
## 17       80  17833.  28025.      0    44491.
## 18       85  14930.     NA      NA       NA
```

```
## [1] "Census Males"
```

```
## # A tibble: 18 x 5
##    aggr.age  `1976`  `1987`  `1998`   `2009`
##  *    <dbl>   <dbl>   <dbl>   <dbl>    <dbl>
##  1        0 587090. 719841. 839795  1353138.
##  2        5 478652. 609625. 784428  1184616.
##  3       10 371670. 471434. 649420.  960509.
##  4       15 294640. 352163. 496697   741664.
##  5       20 236401. 274904. 378379.  570403.
##  6       25 201103. 230469. 303352.  461460.
##  7       30 183257. 202136. 263623.  393090.
##  8       35 162001. 178354. 231512.  332552.
##  9       40 137909. 156129. 194900.  279044.
## 10       45 116691. 134533. 161088.  233669.
## 11       50  99549. 115354. 134245   192469.
## 12       55  84109.  99363. 113027.  156346.
## 13       60  67783.  83852.  94609.  125246.
## 14       65  47273.  62772.  73709    94561.
## 15       70  30306.  40520.  52309.   67163.
## 16       75  20072.  21079.  29751    41651.
## 17       80  14093.  25047.      0    42759.
## 18       85  14057.     NA      NA       NA
```

Thiele log-Normal Hump RW

```
## Warning in fit_tmb(input.thiele.loghump.oag.vec.RW, inner_verbose = FALSE, : convergence error: false c
```

```
##    user  system elapsed
##    5.47    0.08    5.56
```

```
## [1] "false convergence (8)"
```

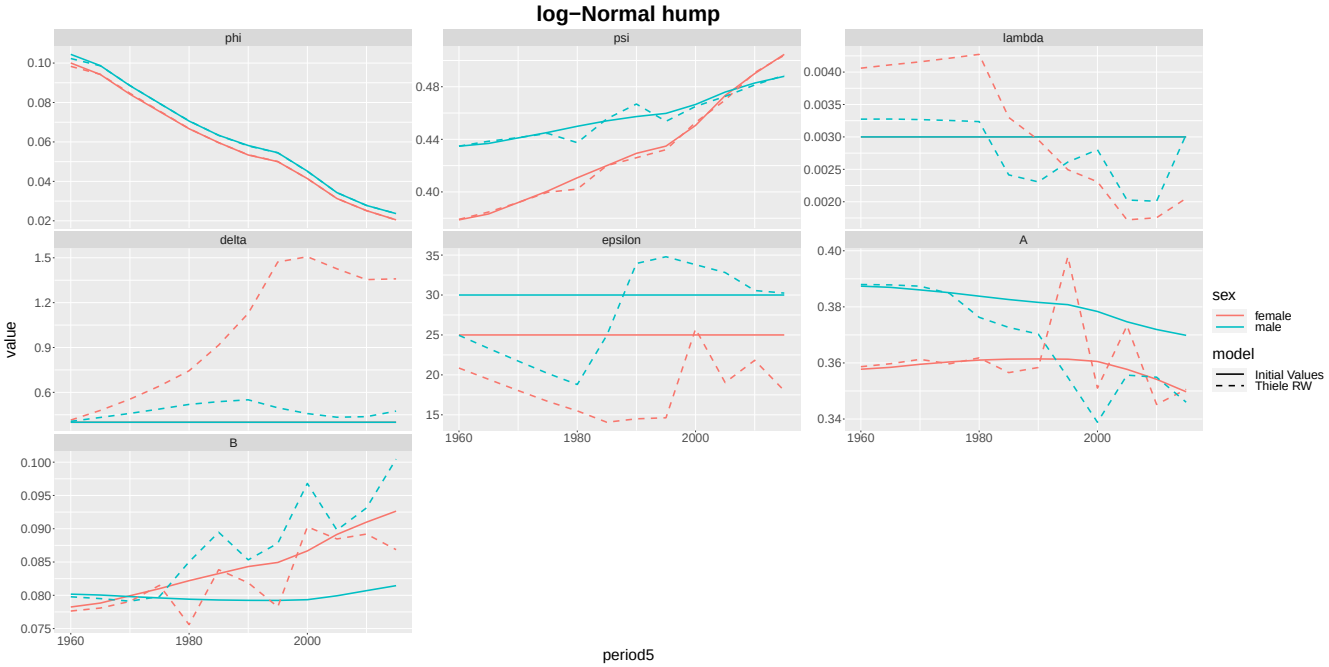

Figure 1: Estimated parameters

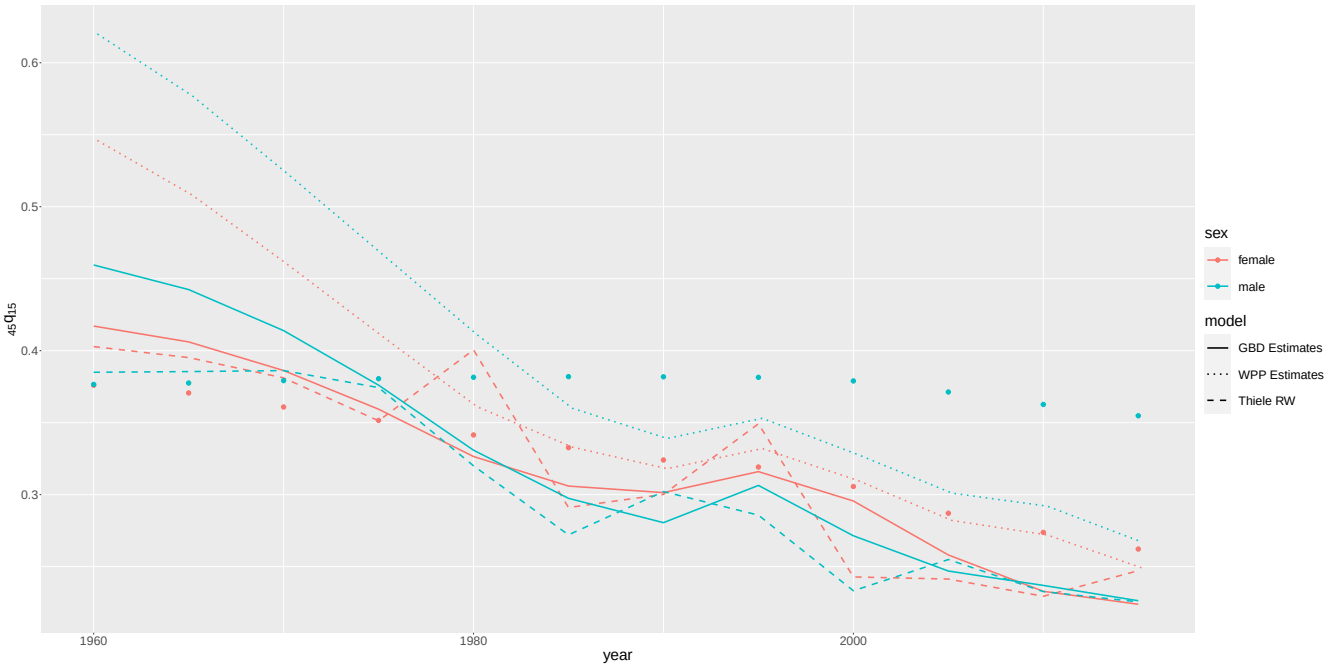

Figure 2: Estimated ${}_{45}q_{15}$

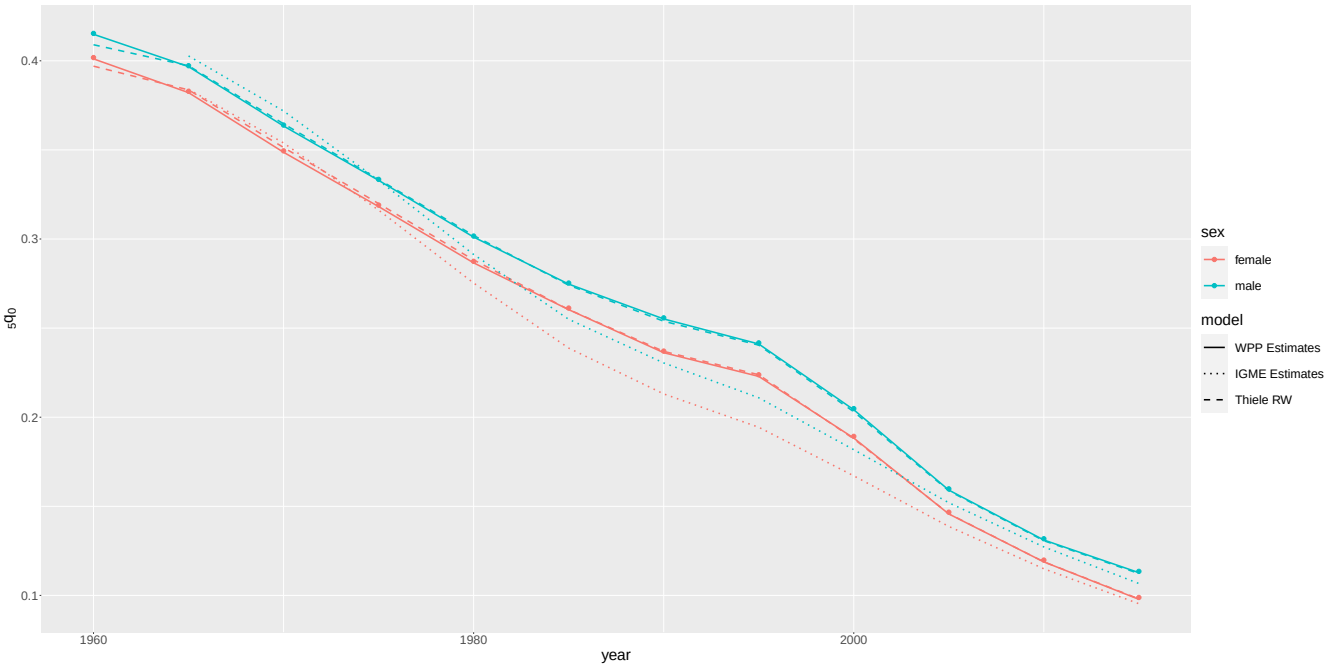

Figure 3: Estimated ${}_{5}q_{0}$

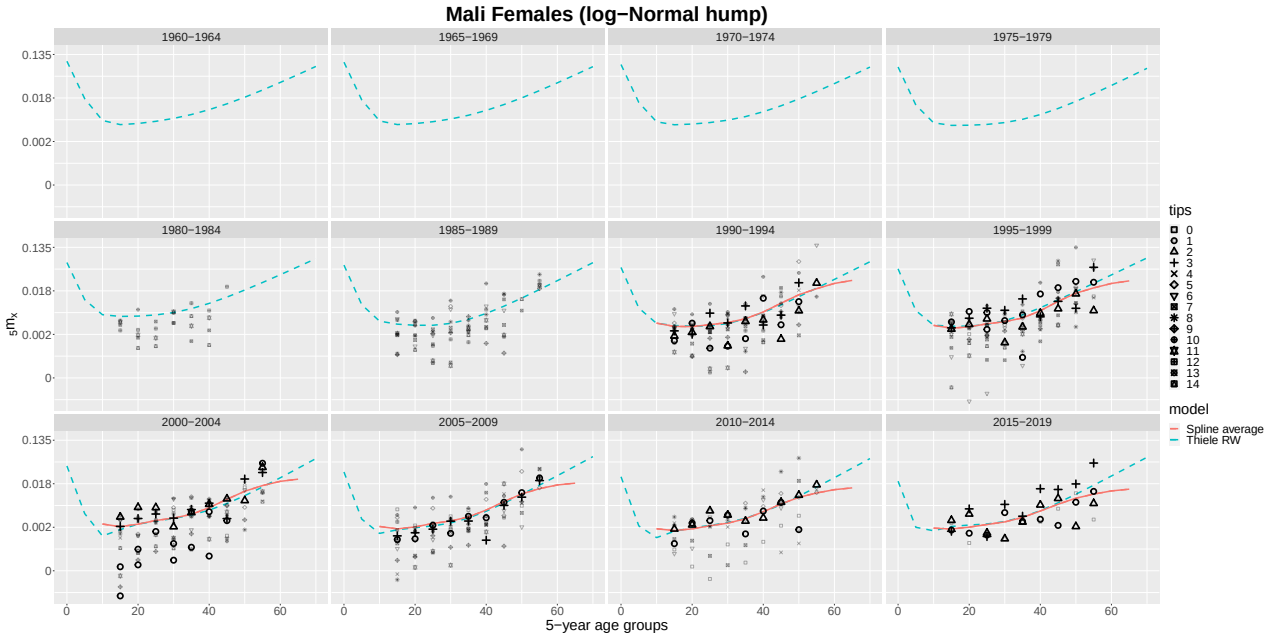

Figure 4: Mortality Schedules

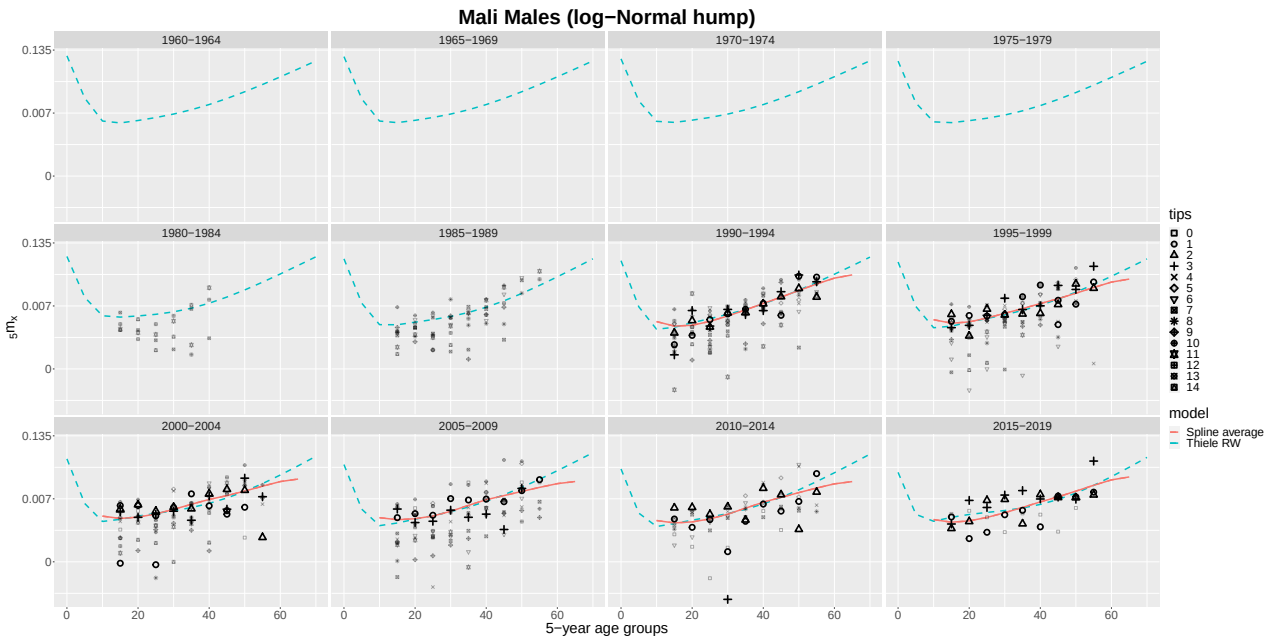

Figure 5: Mortality Schedules

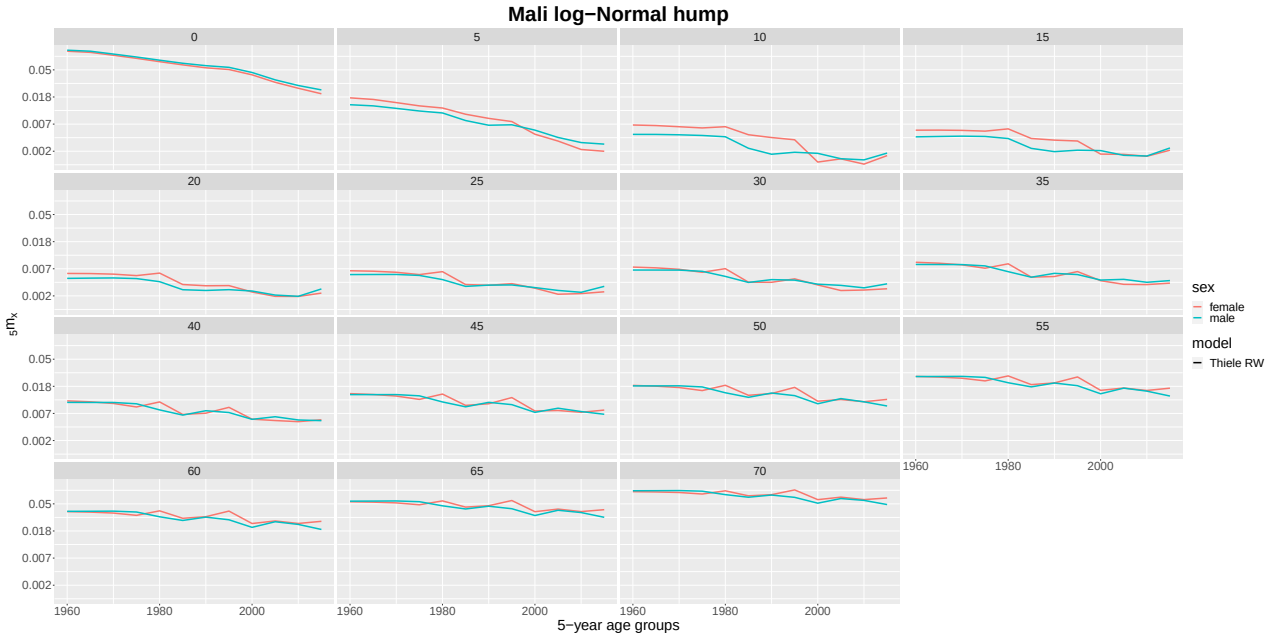

Figure 6: Mortality Schedules

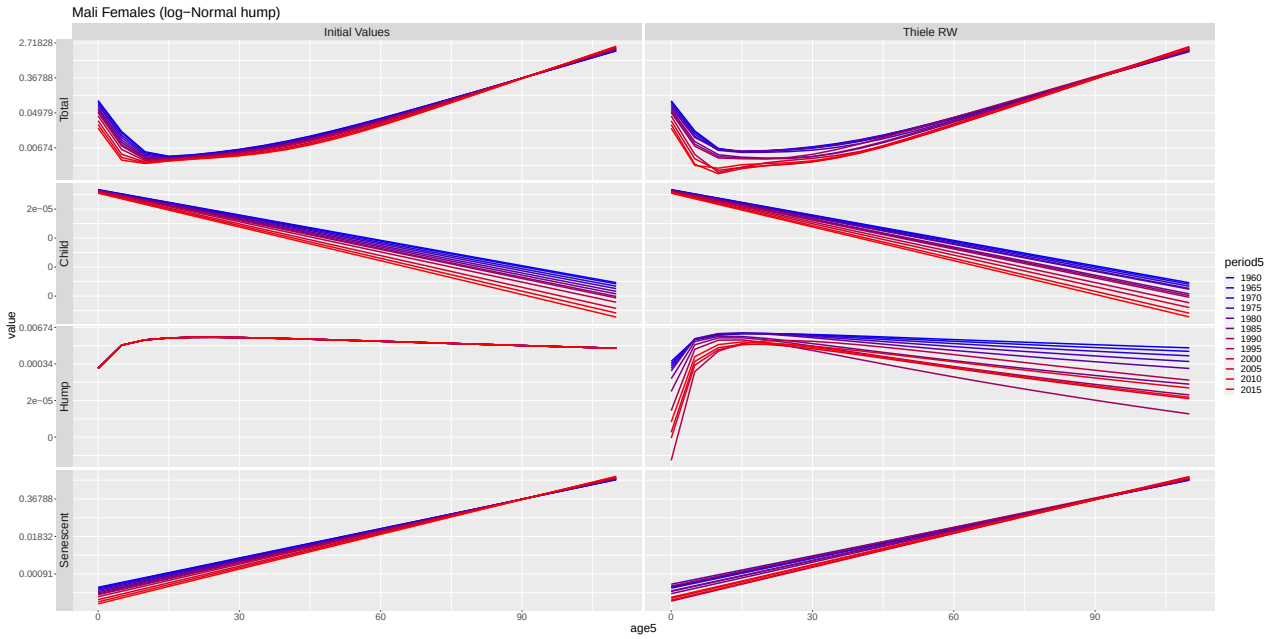

Figure 7: Thiele Decomposed

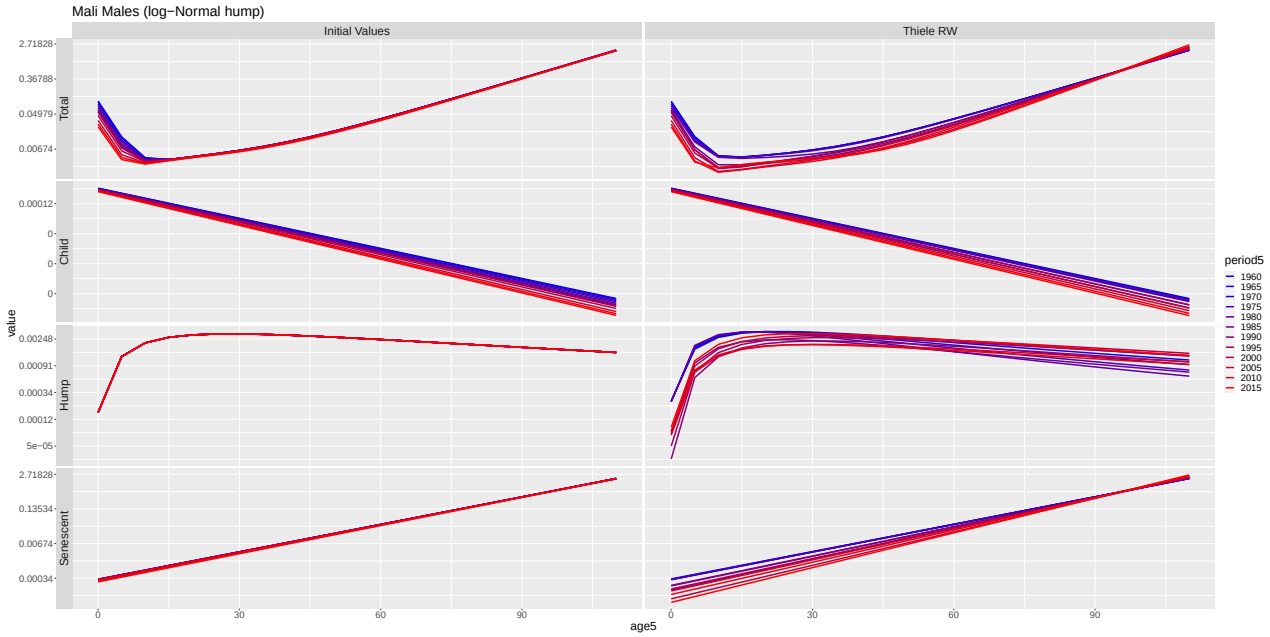

Figure 8: Thiele Decomposed

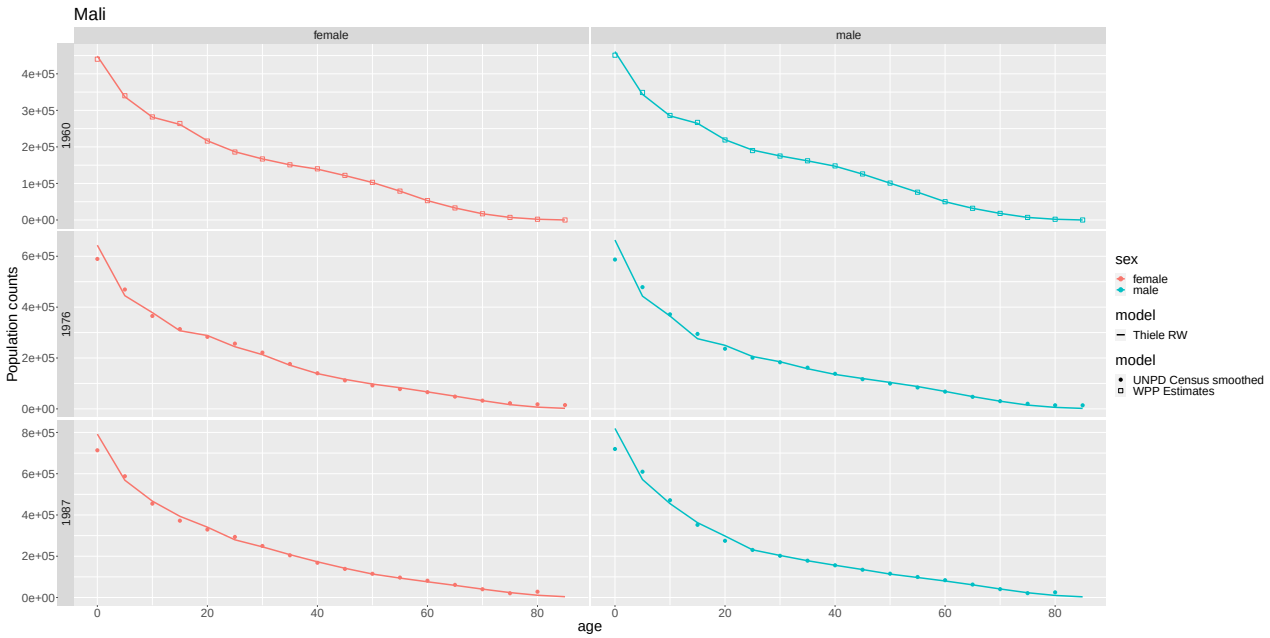

Figure 9: Population

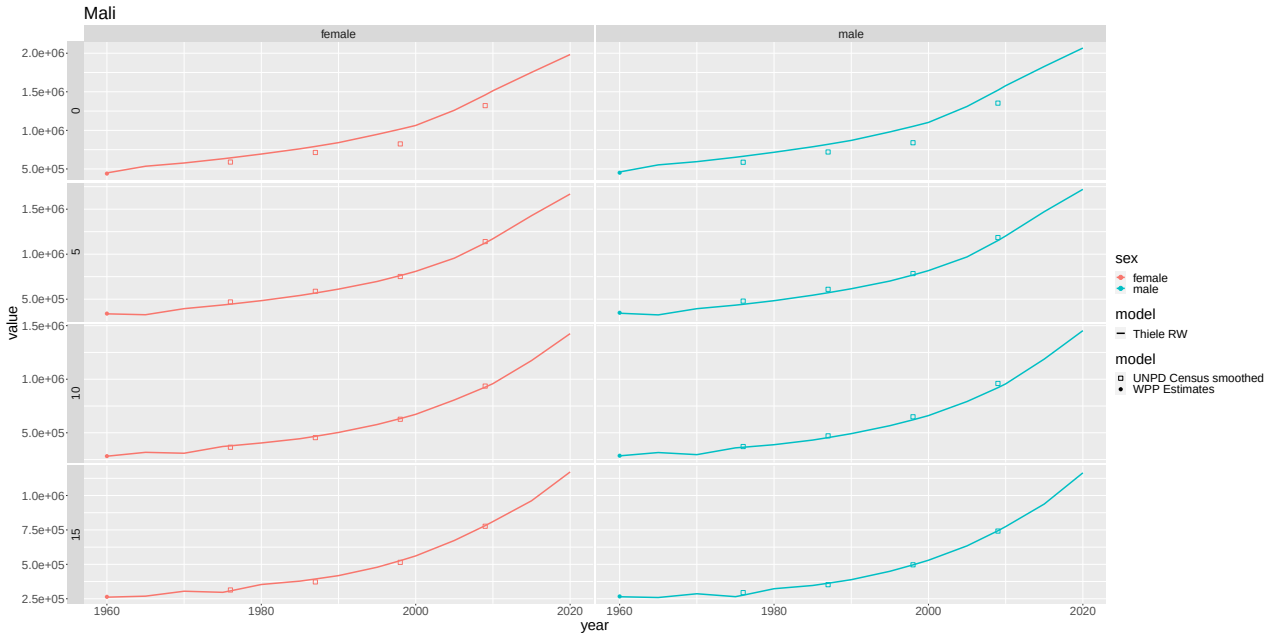

Figure 10: Population

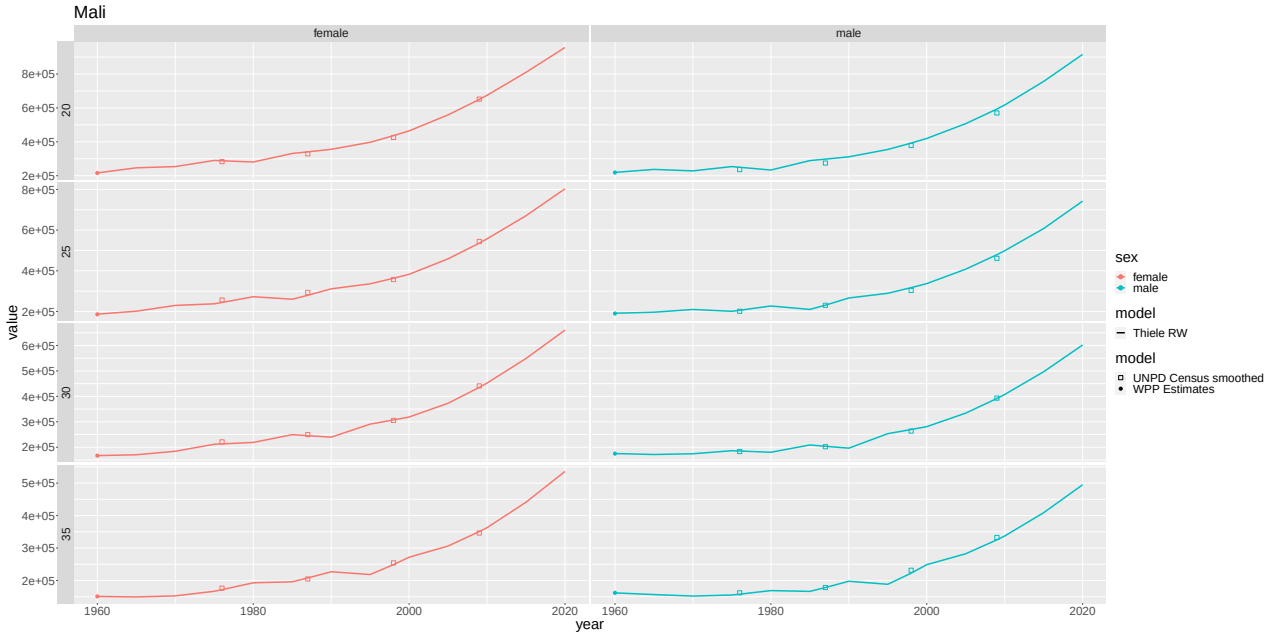

Figure 11: Population

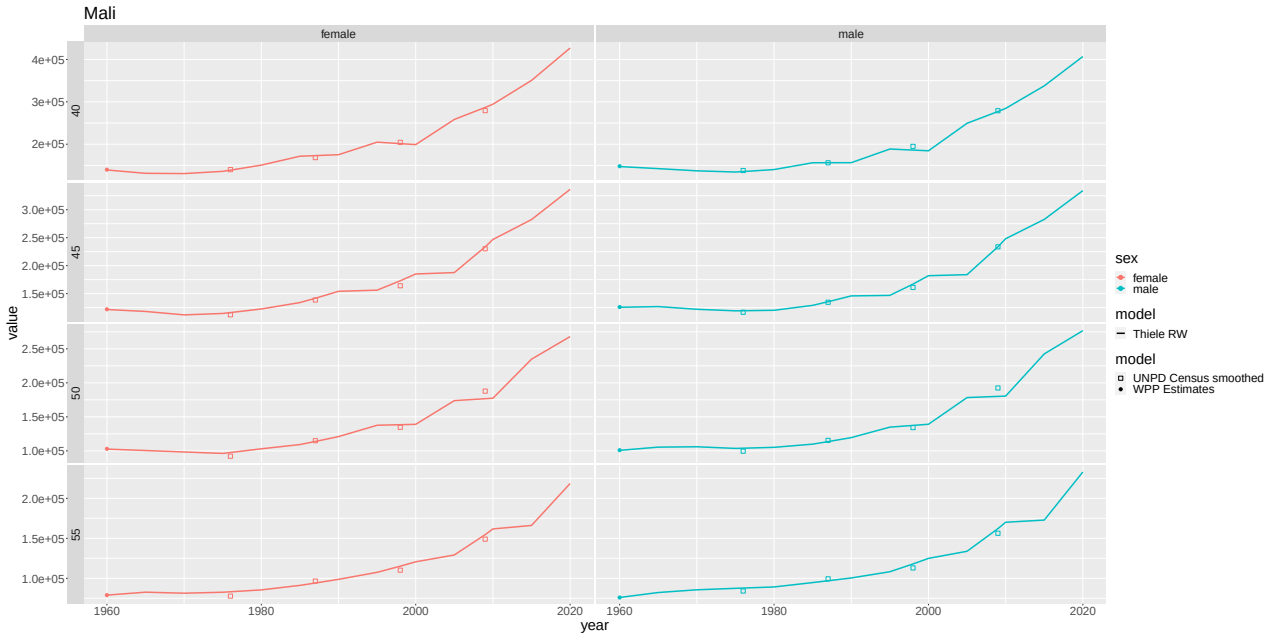

Figure 12: Population

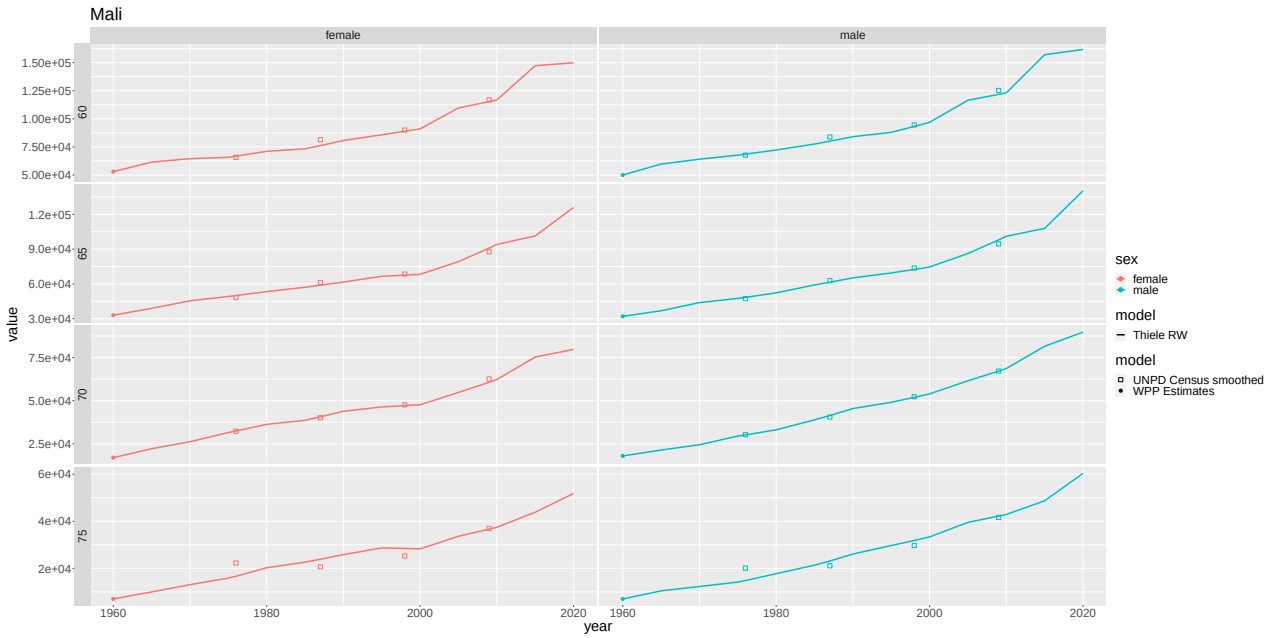

Figure 13: Population

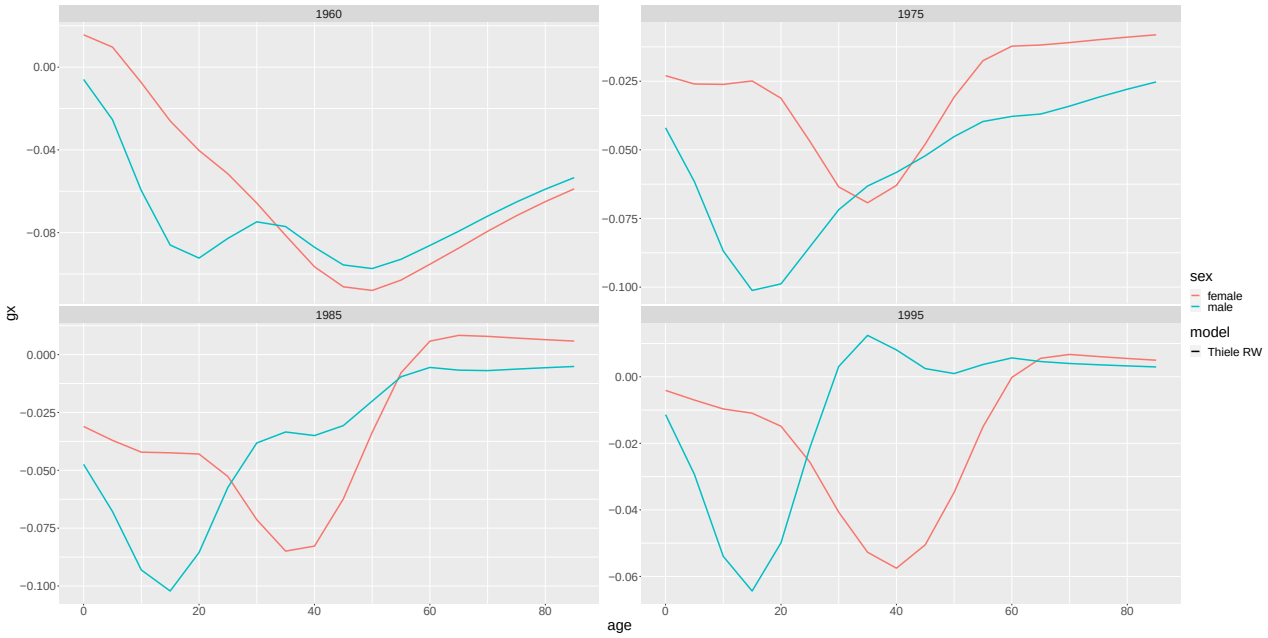

Figure 14: Migration

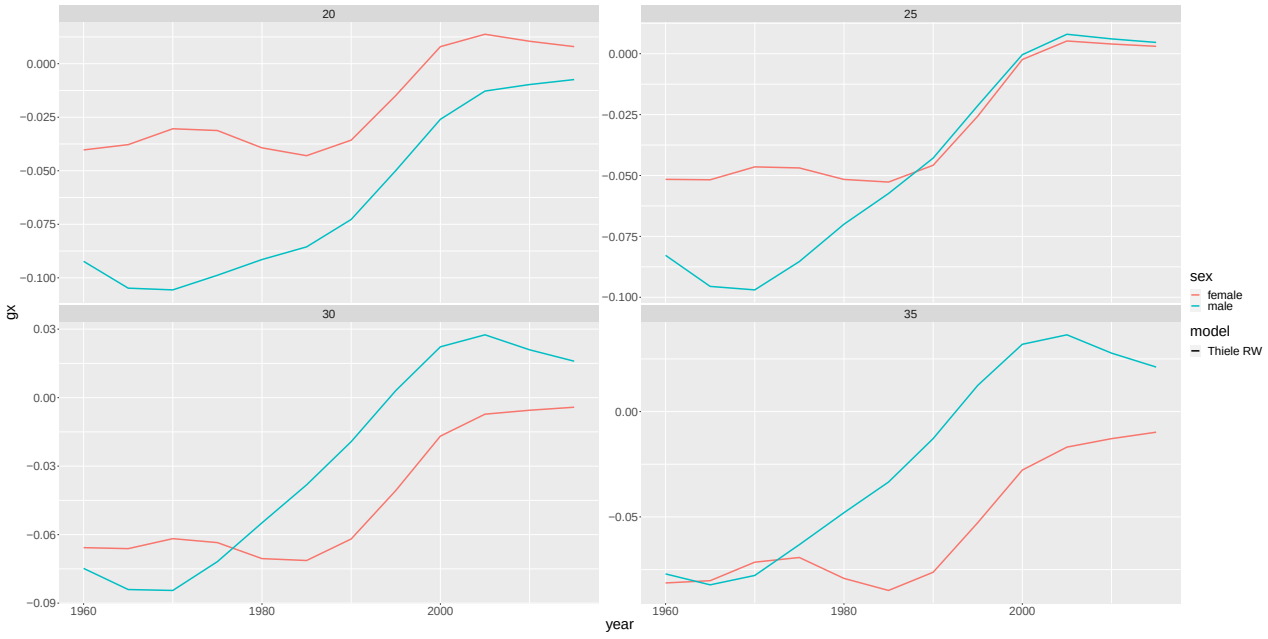

Figure 15: Migration

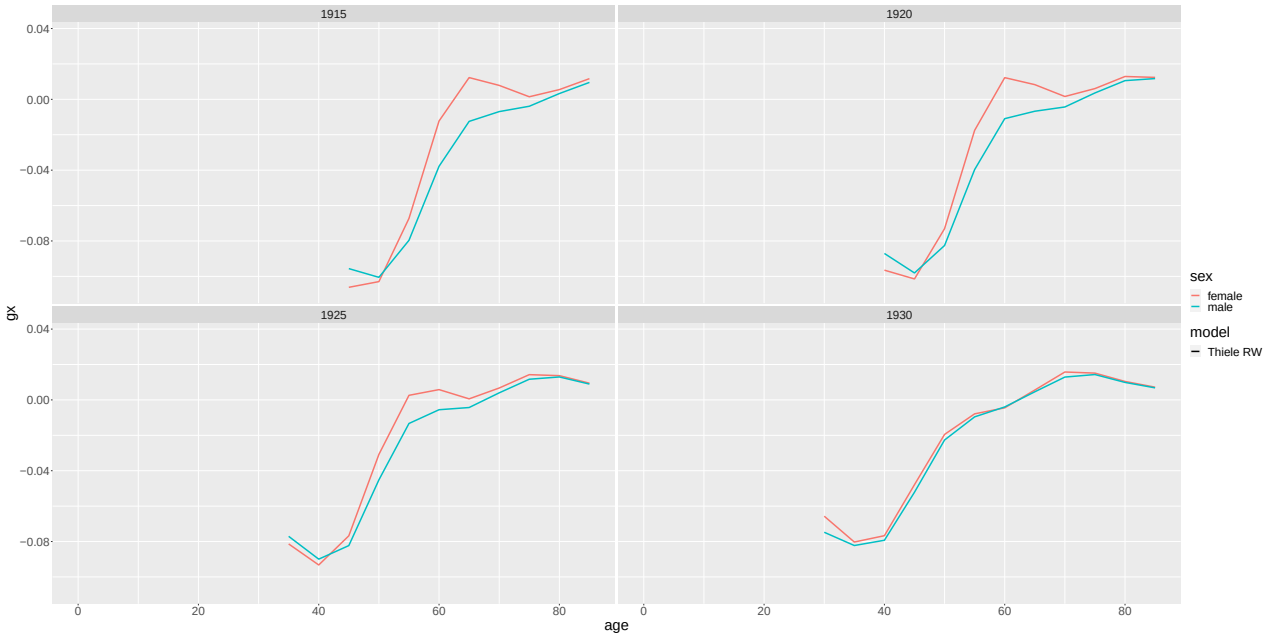

Figure 16: Migration

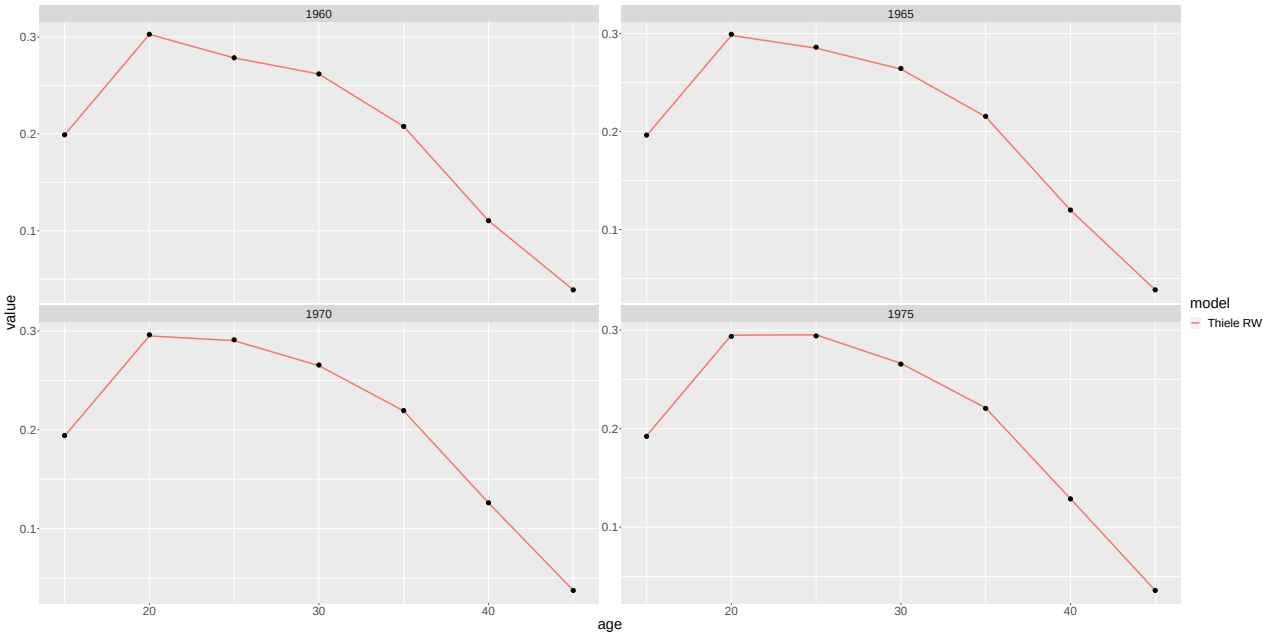

Figure 17: Fertility

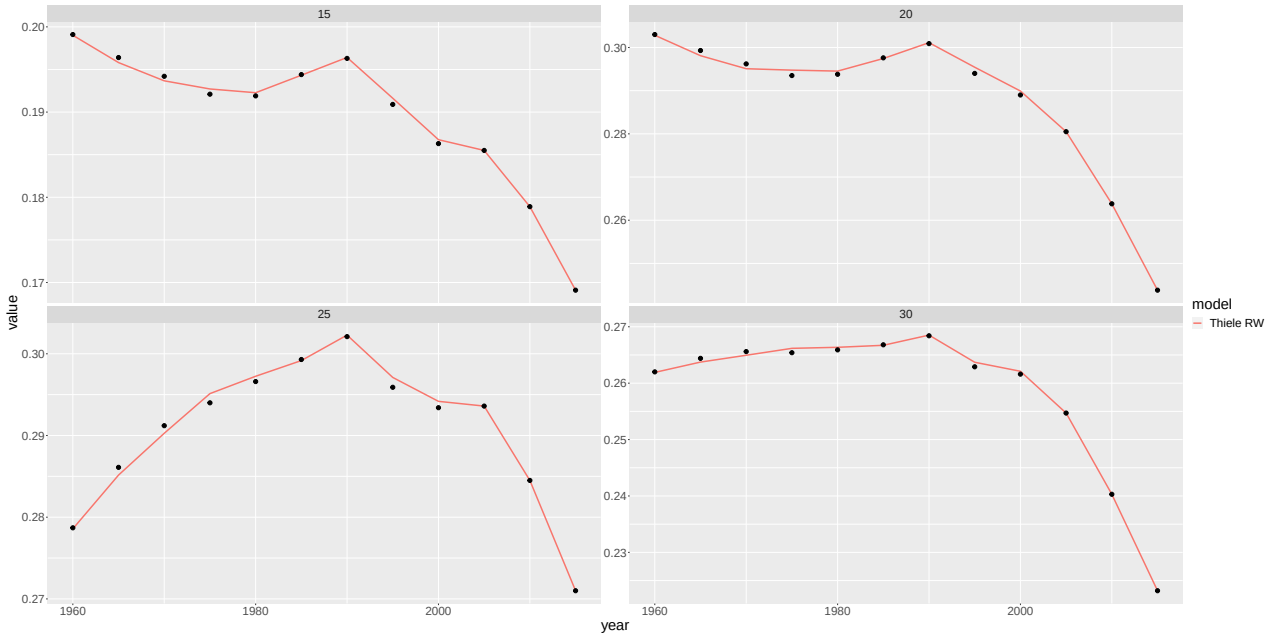

Figure 18: Fertility