Madagascar

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

```
## # A tibble: 86 x 2
##      age  `2018`
##    <dbl>   <dbl>
##  1     0 357691
##  2     1 357578.
##  3     2 373911.
##  4     3 382000.
##  5     4 383486.
##  6     5 374668.
##  7     6 365993
##  8     7 355233.
##  9     8 349398.
## 10     9 346686.
## # ... with 76 more rows
```

```
## [1] "Census Females 5-year"
```

```
## # A tibble: 18 x 2
##      age   `1993`
##    <dbl>    <dbl>
##  1     0 1112652
##  2     5  887806.
##  3    10  762170.
##  4    15  681774.
##  5    20  578889.
##  6    25  476792.
##  7    30  394886.
##  8    35  317271.
##  9    40  242574.
## 10    45  186136.
## 11    50  153940.
## 12    55  130986.
## 13    60  105274
## 14    65   77069
## 15    70   51143.
## 16    75   26121
## 17    80   26112
## 18    85      NA
```

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

```
## # A tibble: 86 x 2
##      age  `2018`
##    <dbl>   <dbl>
##  1     0 354033
##  2     1 354710
##  3     2 370674.
##  4     3 380199.
##  5     4 383242
##  6     5 376076.
```

```
##  7     6 369810.
##  8     7 359838.
##  9     8 355567
## 10     9 354478
## # ... with 76 more rows
```

```
## [1] "Census Males 5-year"
```

```
## # A tibble: 18 x 2
##      age   `1993`
##    <dbl>    <dbl>
##  1     0 1121953
##  2     5  904633
##  3    10  770146.
##  4    15  665691.
##  5    20  549330.
##  6    25  451859
##  7    30  383614.
##  8    35  317992.
##  9    40  242723.
## 10    45  178846.
## 11    50  144310
## 12    55  124371.
## 13    60  103204.
## 14    65   79529.
## 15    70   55241.
## 16    75   28062
## 17    80   23935
## 18    85      NA
```

Thiele log-Normal Hump Spline

```
## [1] "relative convergence (4)"
```

```
##        log_tau2_logpop        log_tau2_logpop        log_tau2_logpop        log_tau2_logpop          lo
##             4.01989029             5.39351905             3.91596781             5.30415584
##         log_dispersion         log_dispersion          log_lambda_tp              tp_slope           t
##             0.19252509             0.27761147             3.24918958             0.04982472
##         log_lambda_phi         log_lambda_psi          log_lambda_A          log_lambda_B      log_la
##            11.32784817            11.32725078            11.30871659             5.59952704
##     log_lambda_epsilon
##             2.20180702
```

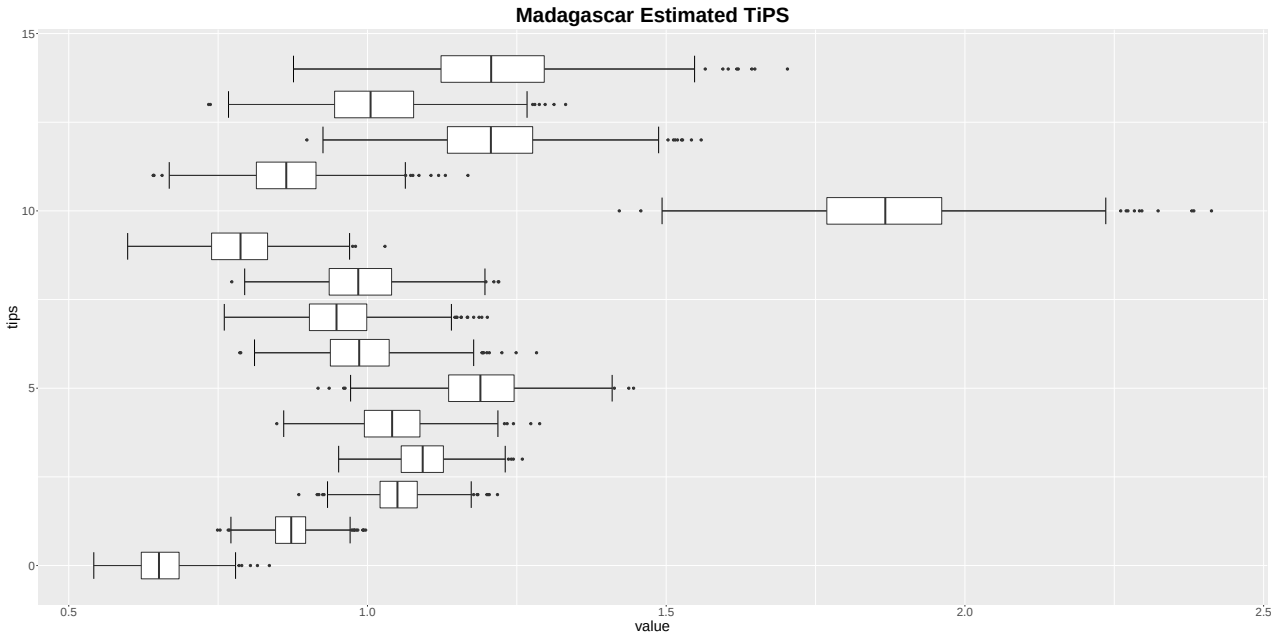

Figure 1: Estimated TiPS

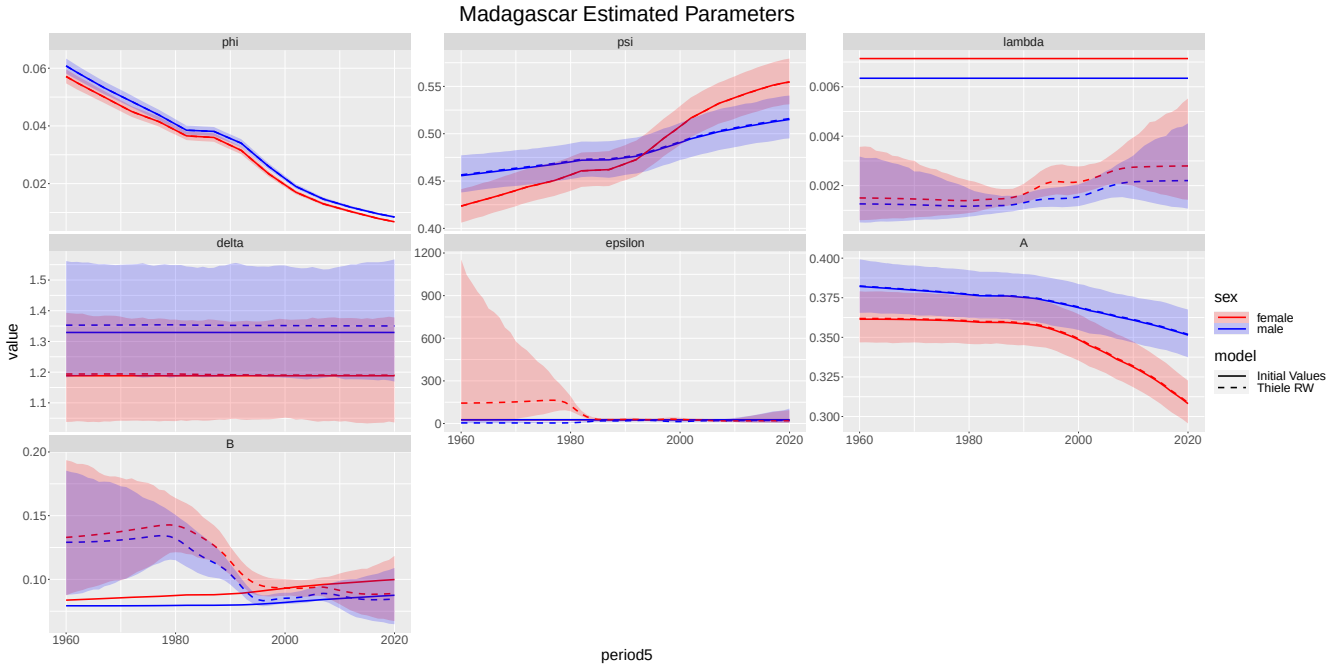

Figure 2: Estimated parameters

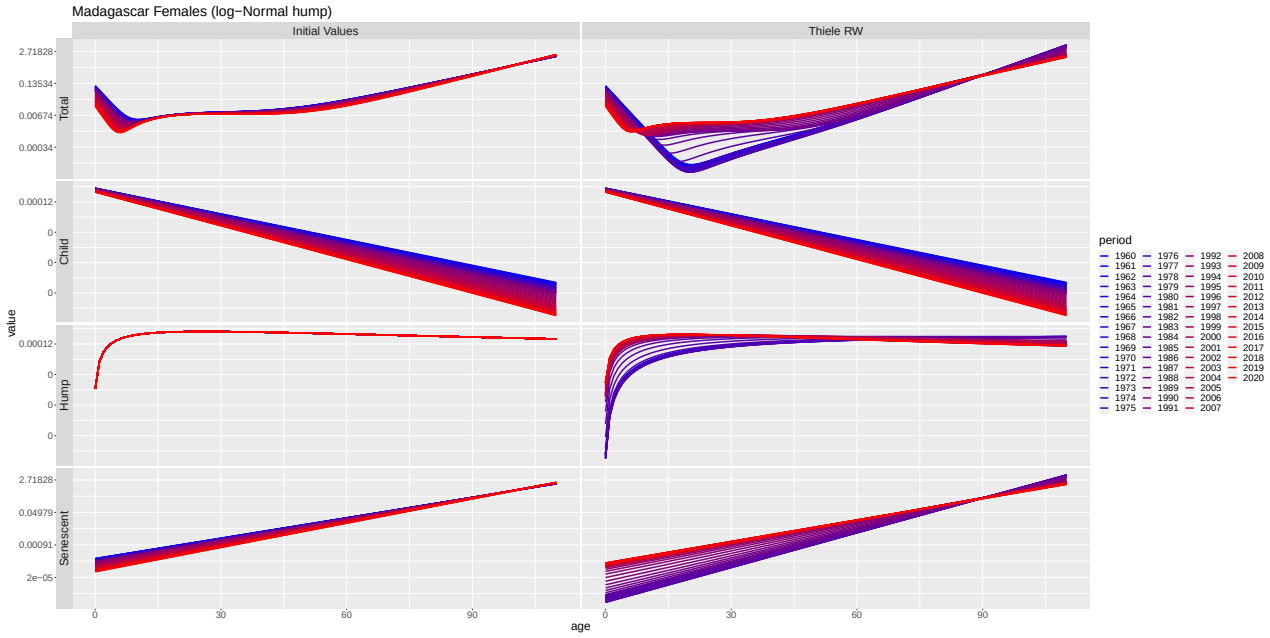

Figure 3: Thiele Decomposed

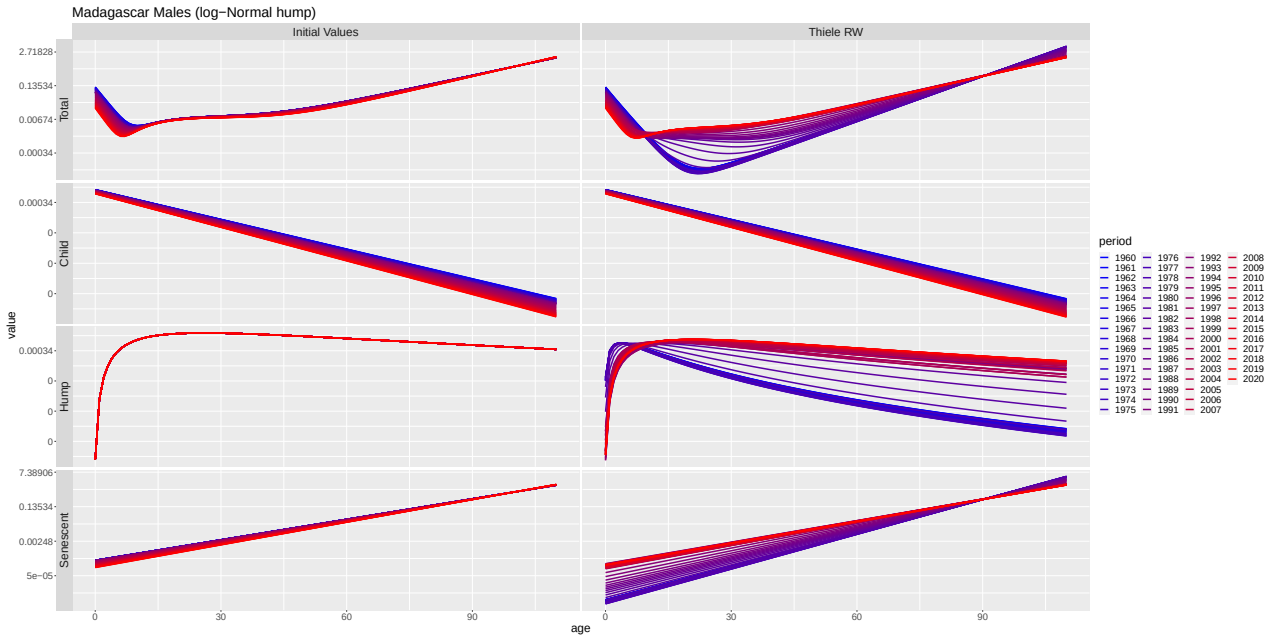

Figure 4: Thiele Decomposed

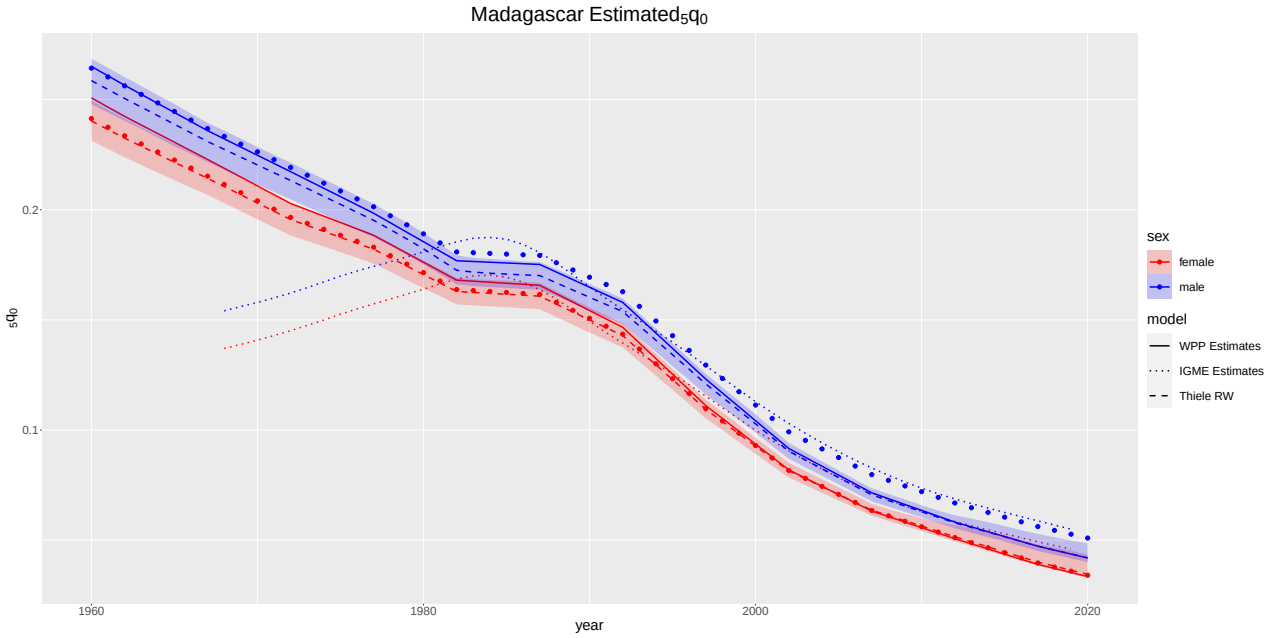

Figure 5: Estimated ${}_5q_0$

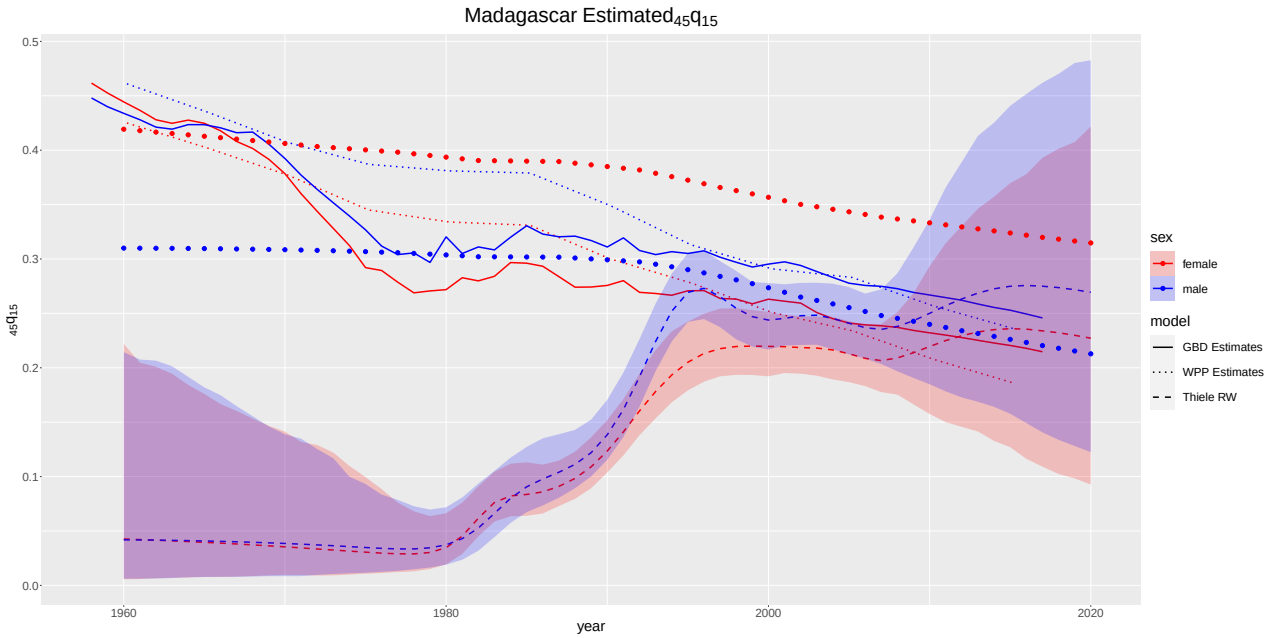

Figure 6: Estimated ${}_{45}q_{15}$

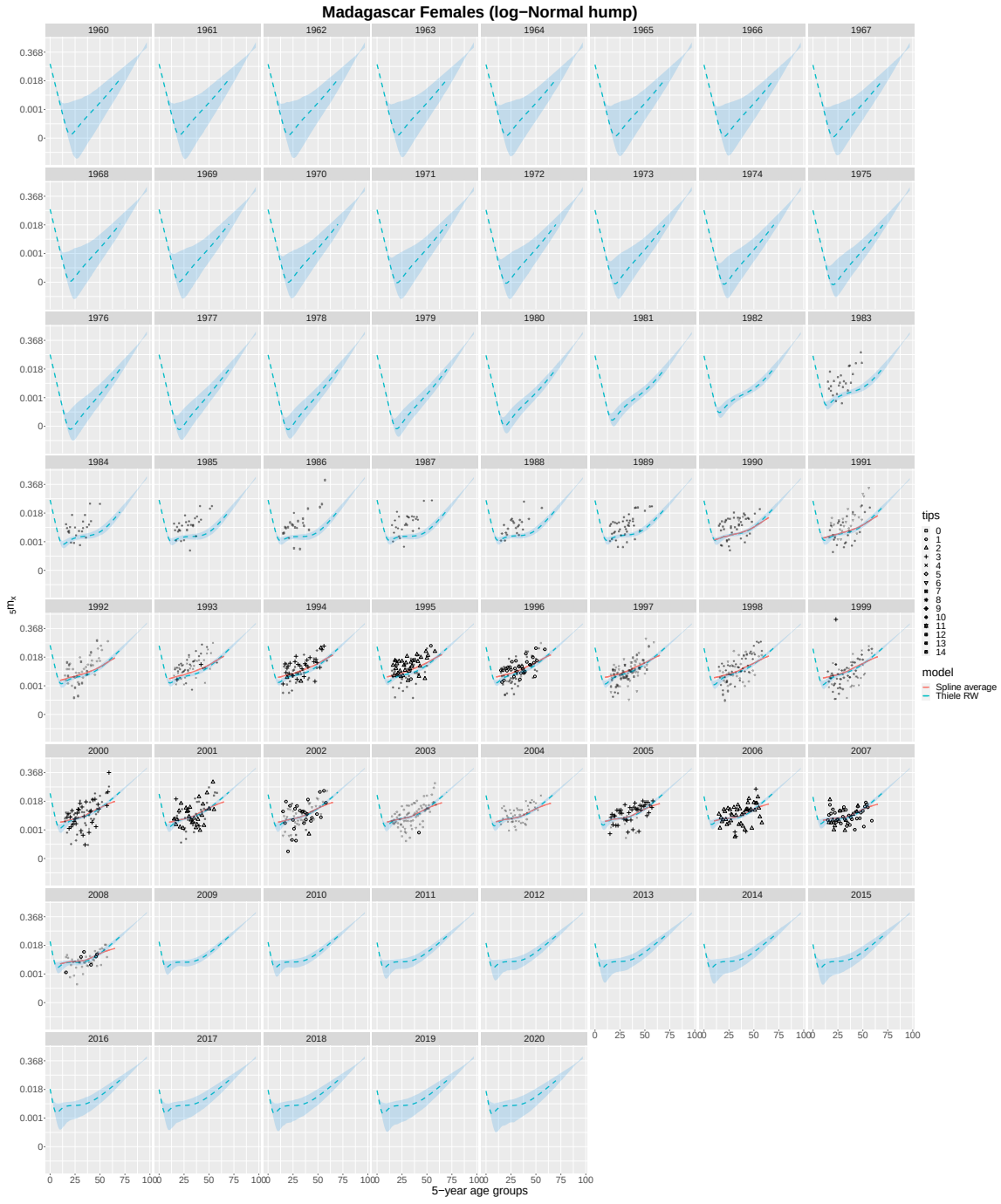

Figure 7: Mortality Schedules

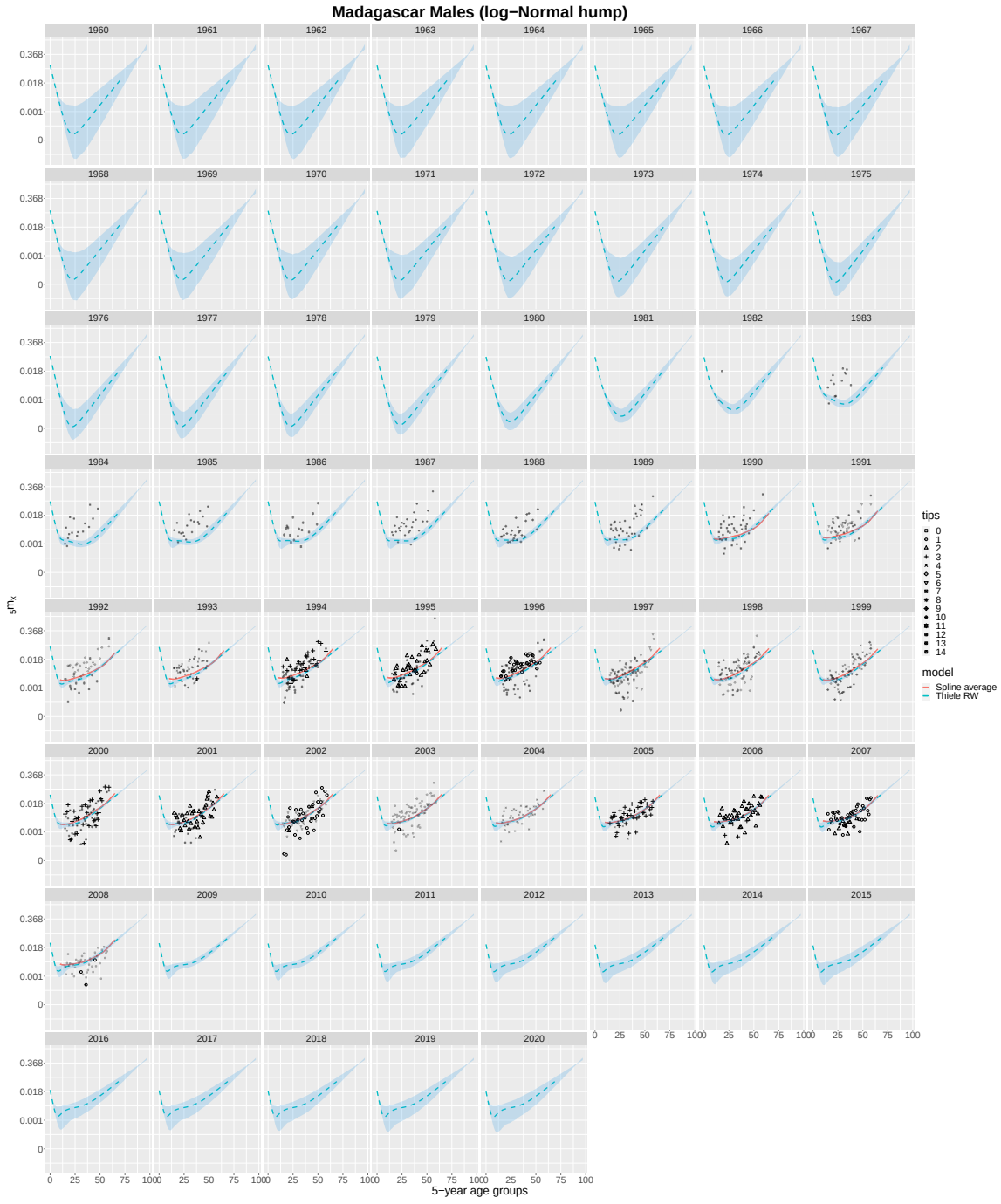

Figure 8: Mortality Schedules

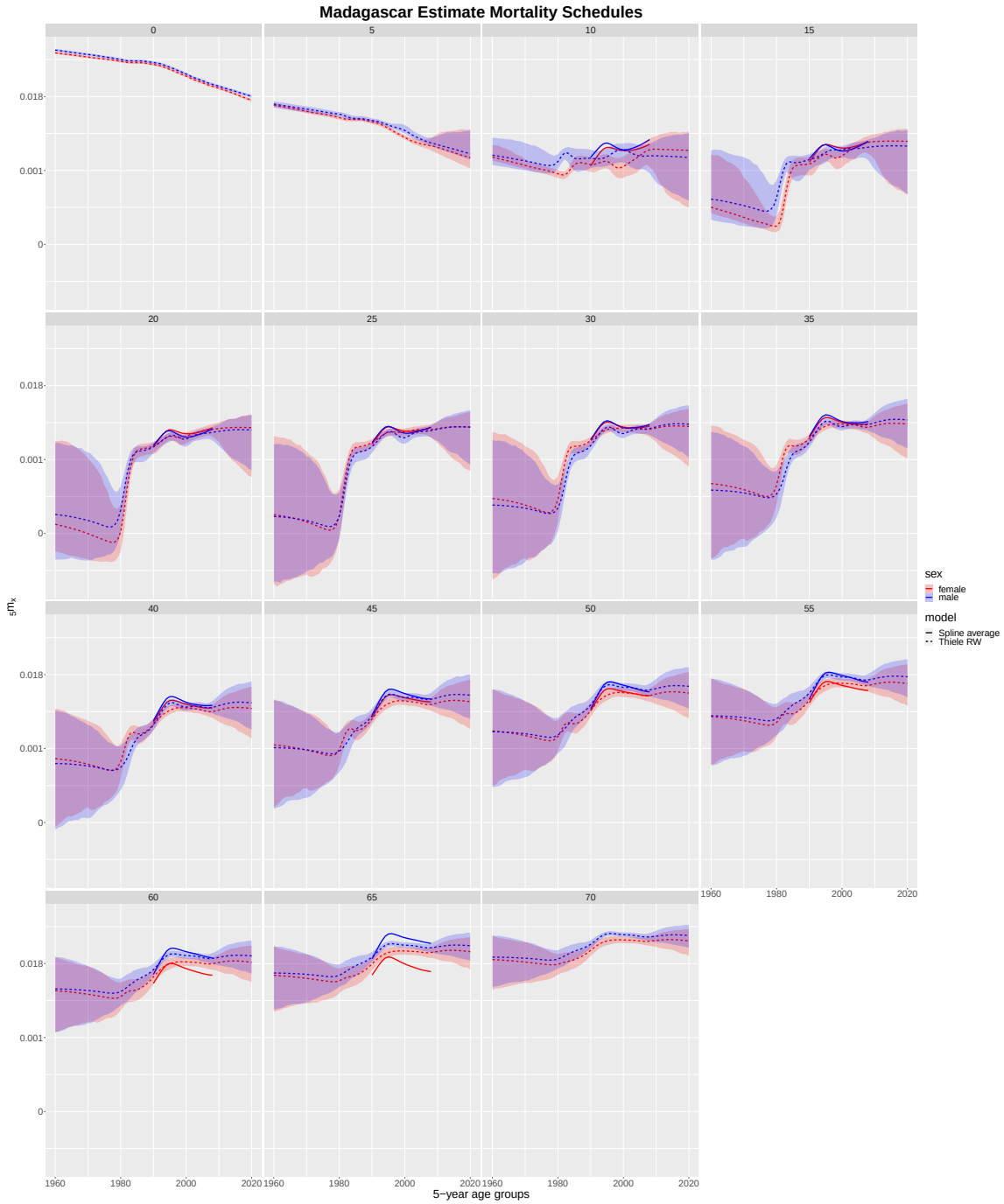

Figure 9: Mortality Schedules

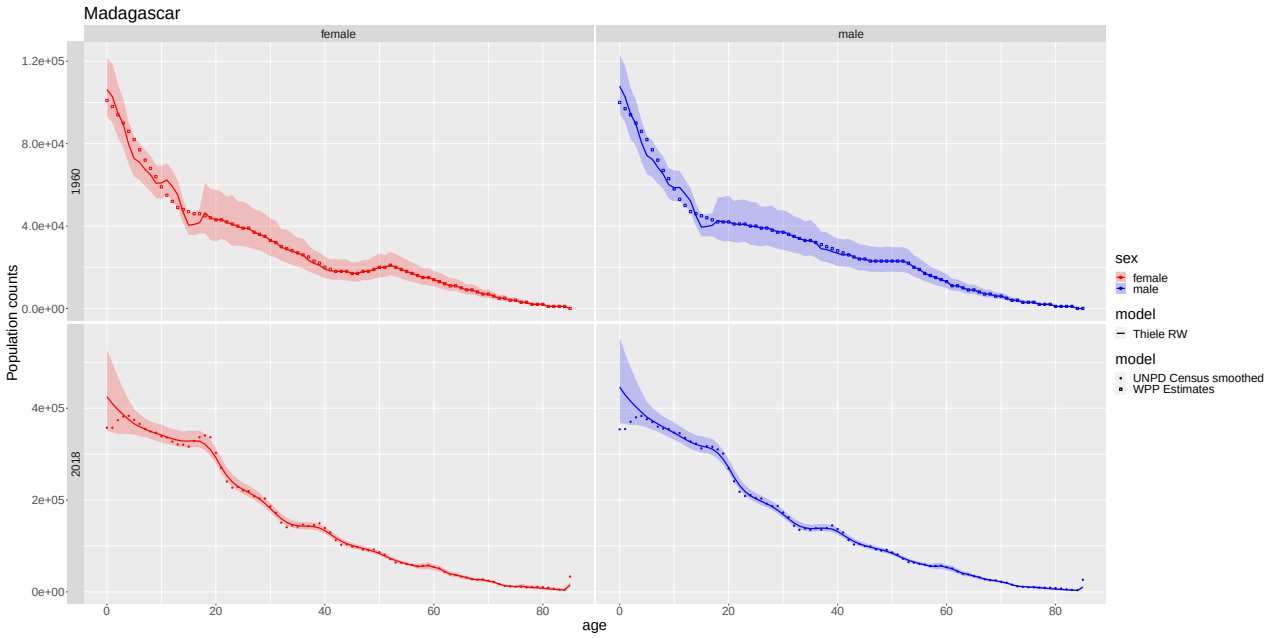

Figure 10: Population

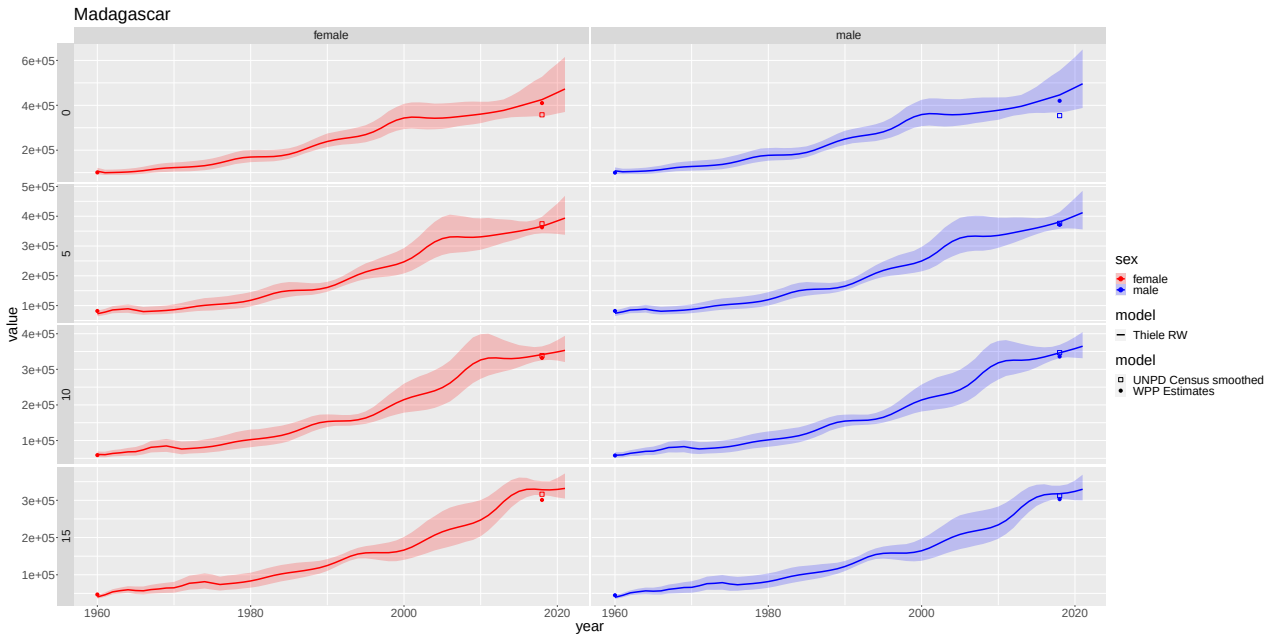

Figure 11: Population

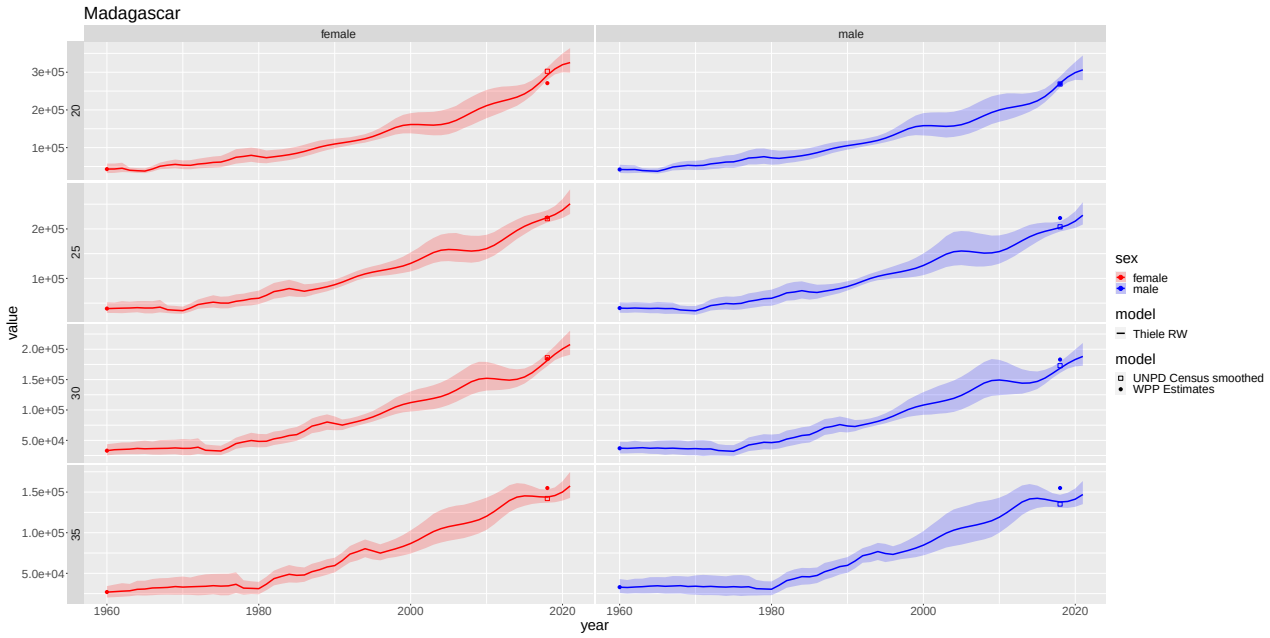

Figure 12: Population

Figure 13: Population

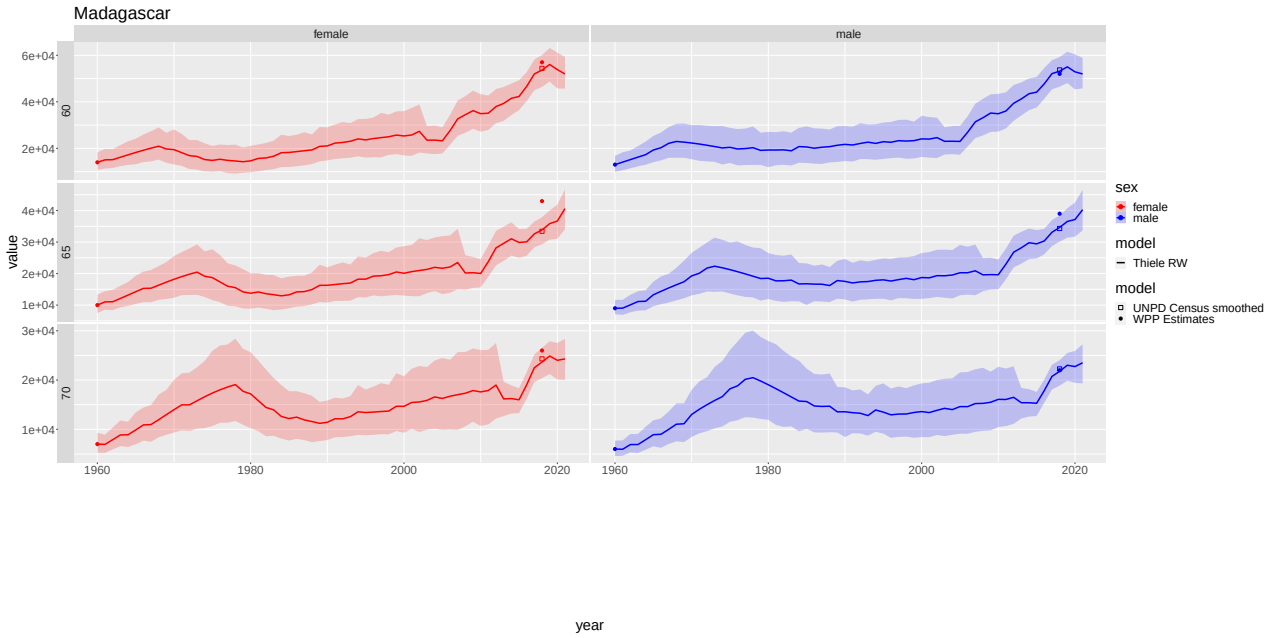

Figure 14: Population

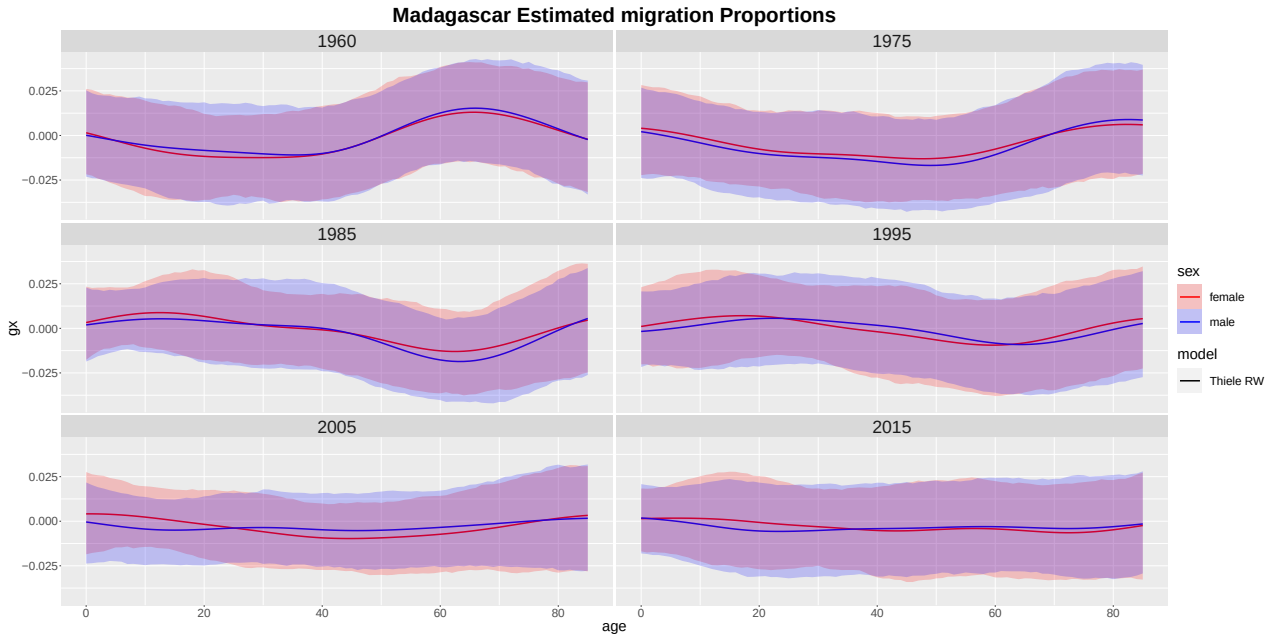

Figure 15: Migration

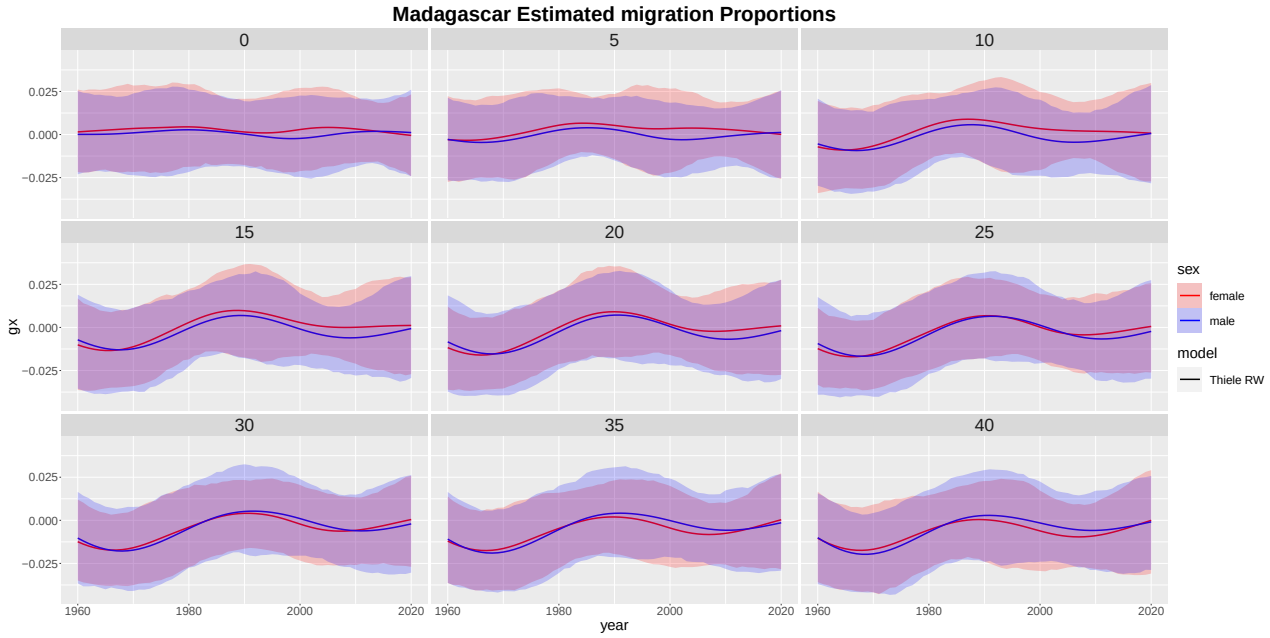

Figure 16: Migration

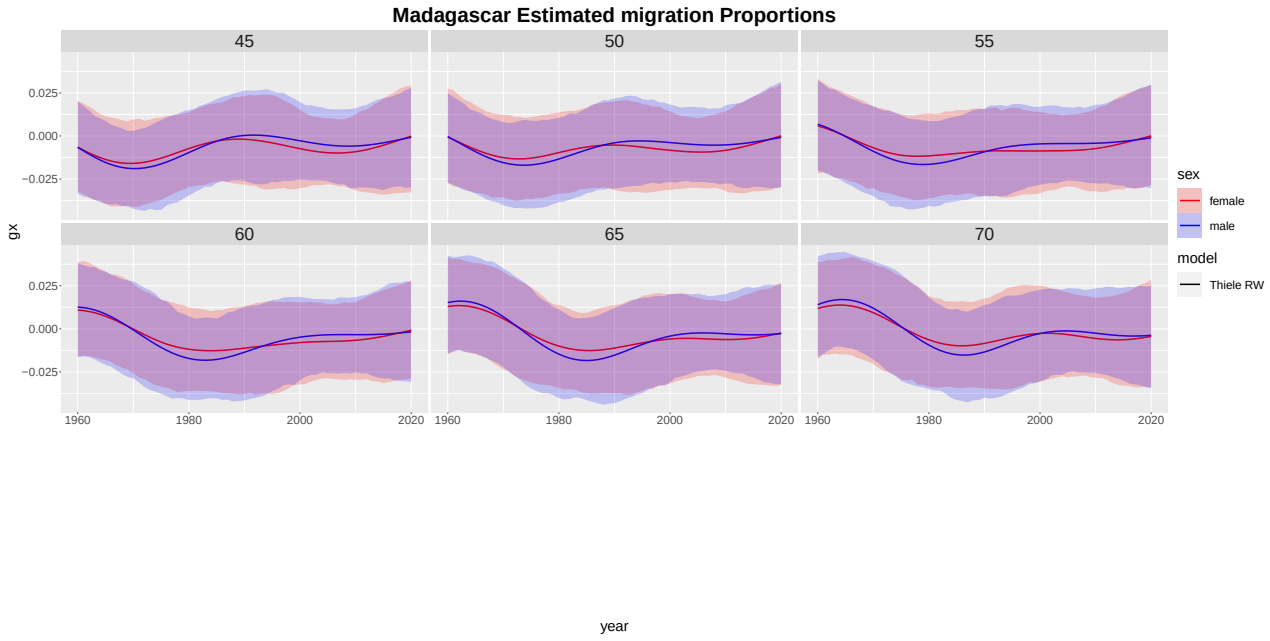

Figure 17: Migration

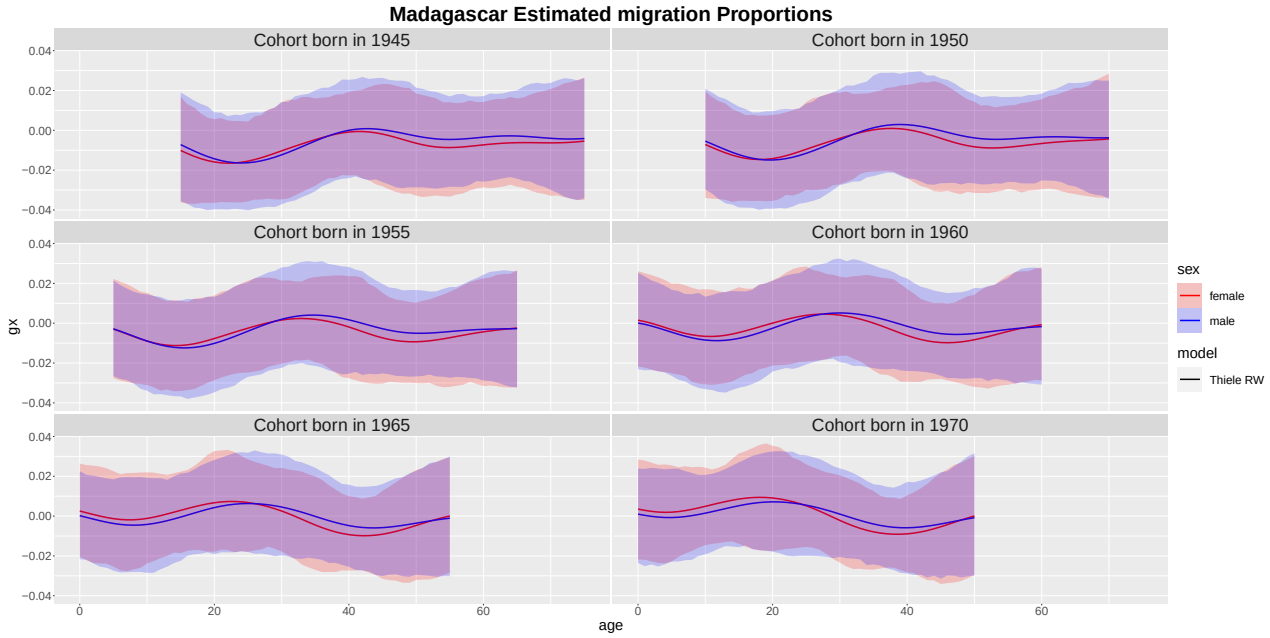

Figure 18: Migration

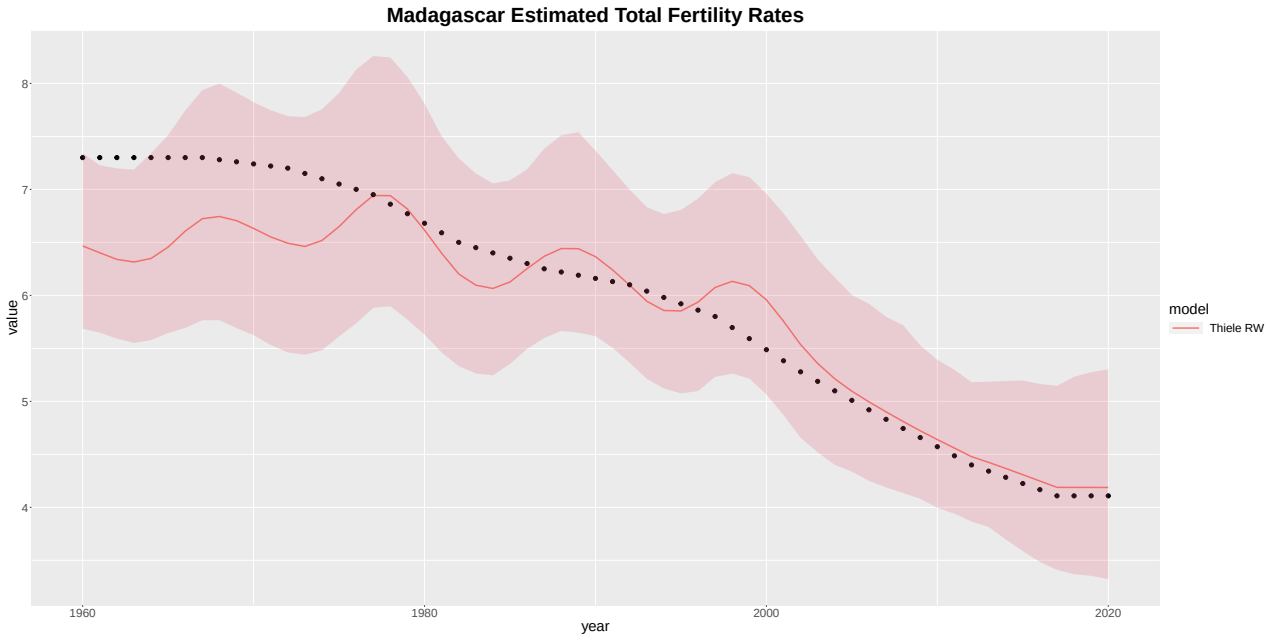

Figure 19: Total Fertility

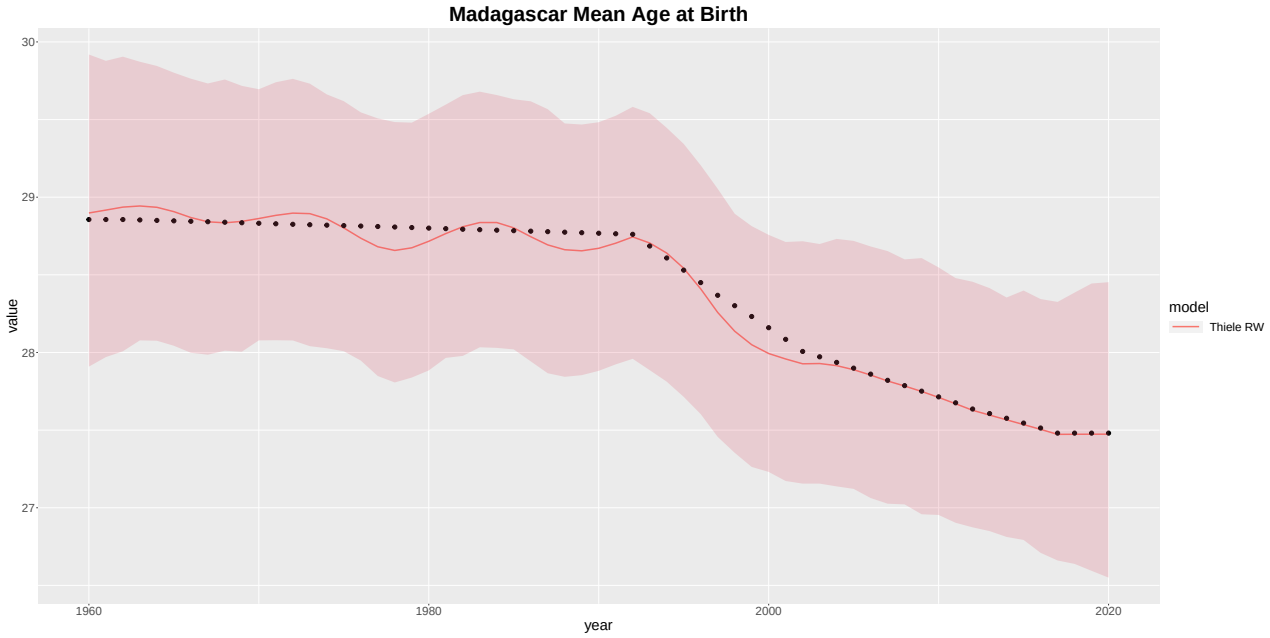

Figure 20: Mean age at births

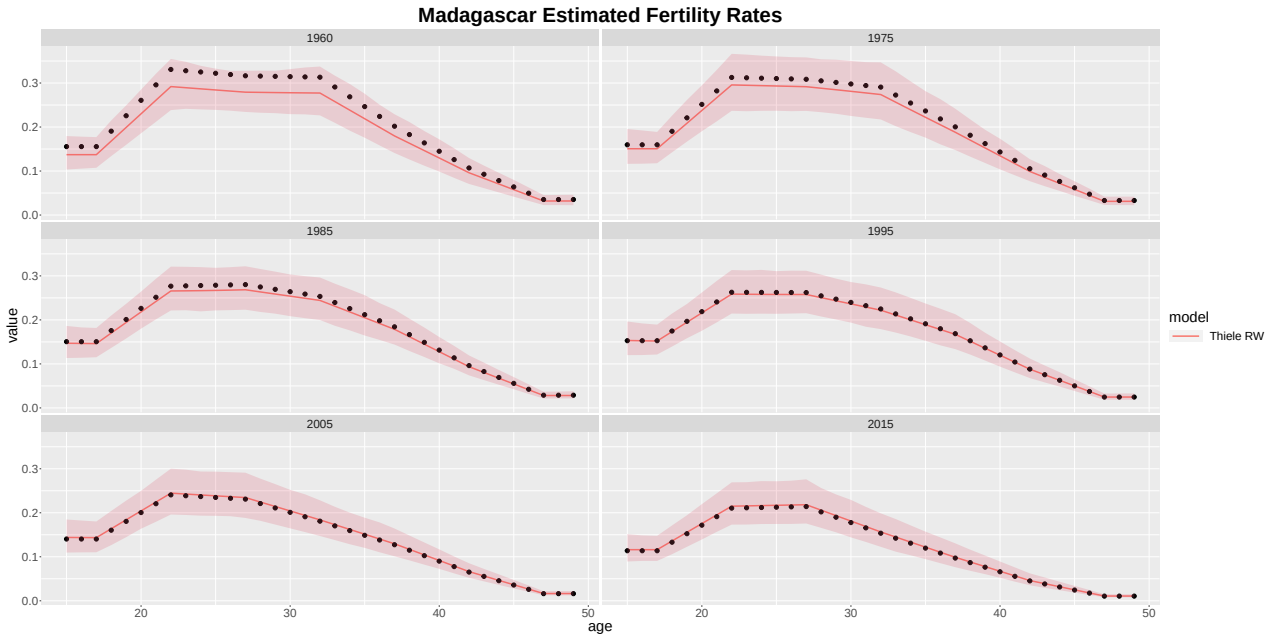

Figure 21: Fertility

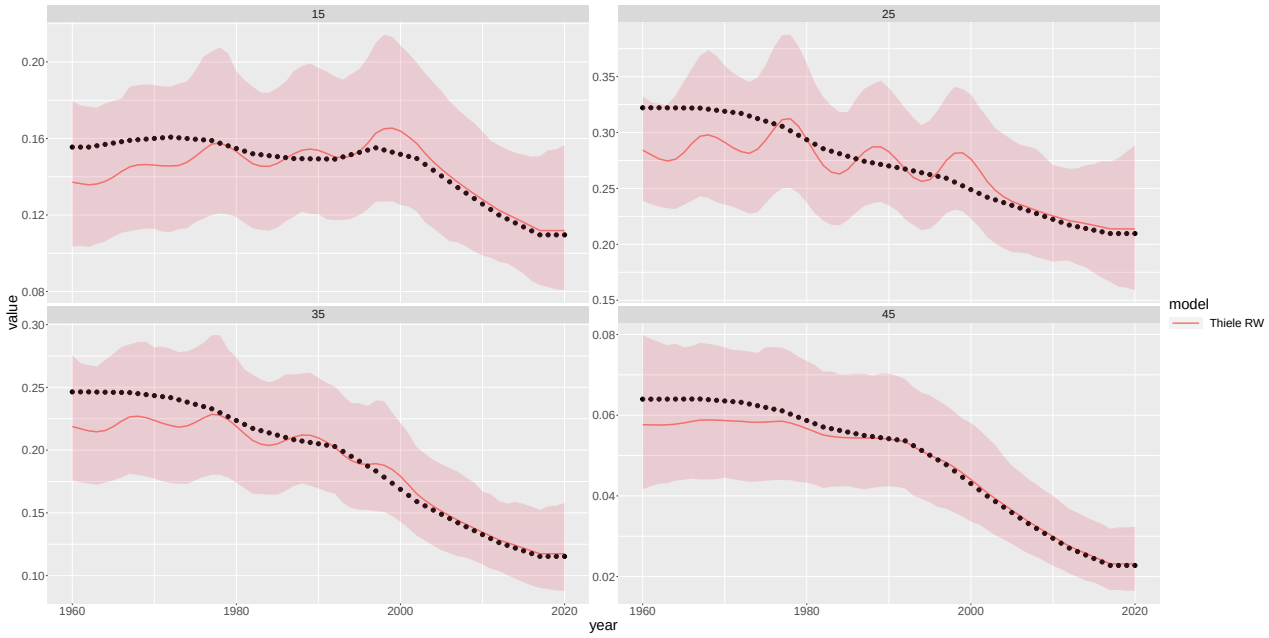

Figure 22: Fertility