Zimbabwe

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

```
## # A tibble: 87 x 6
##      age `1969`  `1982`  `1992`  `2002`  `2012`
##    <dbl>  <dbl>   <dbl>   <dbl>   <dbl>   <dbl>
##  1     0   215. 137199. 169638. 170997. 215623.
##  2     1   200. 134655. 159190. 172117. 211071.
##  3     2   219. 133815. 158420. 168708. 198666.
##  4     3   229. 130631. 160059. 164925. 190736.
##  5     4   240. 129885. 161282. 162274. 183611.
##  6     5   251. 128021. 163172. 159507. 177197.
##  7     6   258. 125143. 162237. 156778. 173472.
##  8     7   261. 121845. 161873. 155377. 171651.
##  9     8   262. 118680. 161182. 153895. 169450.
## 10     9   259. 115303. 158541. 153789. 171475.
## # ... with 77 more rows
```

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

```
## # A tibble: 87 x 6
##      age `1969`  `1982`  `1992`  `2002`  `2012`
##    <dbl>  <dbl>   <dbl>   <dbl>   <dbl>   <dbl>
##  1     0   238. 133357. 168079. 170637. 213895.
##  2     1   232. 129754. 158096. 172216. 210140.
##  3     2   231. 129163. 156962. 168433. 197420.
##  4     3   235. 127117. 158863. 164960. 189835.
##  5     4   242. 126939. 159839. 162197. 182613.
##  6     5   248. 125405. 161234. 159217. 176094.
##  7     6   255. 123103. 160066. 156209. 172218.
##  8     7   265. 120555. 159669. 154419. 170262.
##  9     8   271. 118210. 159182. 152264. 167883.
## 10     9   271. 115542. 156666. 152041. 170380.
## # ... with 77 more rows
```

Thiele log-Normal Hump Spline

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

```
##           log_tau2_logpop_f           log_tau2_logpop_f           log_tau2_logpop_m           log_tau2_
##                   6.5377135                   5.0294383                   6.5941878                   4
##               log_tau2_gx_m         log_lambda_gx_age_f         log_lambda_gx_age_m        log_lambda_g
##                   2.9684527                   6.9393240                   6.7729680                   6
##     log_lambda_gx_agetime_m               log_lambda_tp log_lambda_tp_0_inflated_sd           log_dispe
##                   6.9078045                   2.8394563                   0.4647327                   1
##     log_marginal_prec_psi_f       log_marginal_prec_A_f       log_marginal_prec_B_f     log_marginal_pre
##                   4.2867178                   6.7580086                   6.0963576                   4
##       log_marginal_prec_B_m            log_lambda_phi_f            log_lambda_psi_f        log_lambda_
##                   2.3062999                   4.3303309                   4.3131605                   1
##              log_lambda_A_f              log_lambda_B_f            log_lambda_phi_m           log_lambd
##                   4.3051581                   4.2537468                   4.3359574                   4
##        log_lambda_epsilon_m              log_lambda_A_m              log_lambda_B_m
##                   5.0937827                   4.3028501                   3.9330368
```

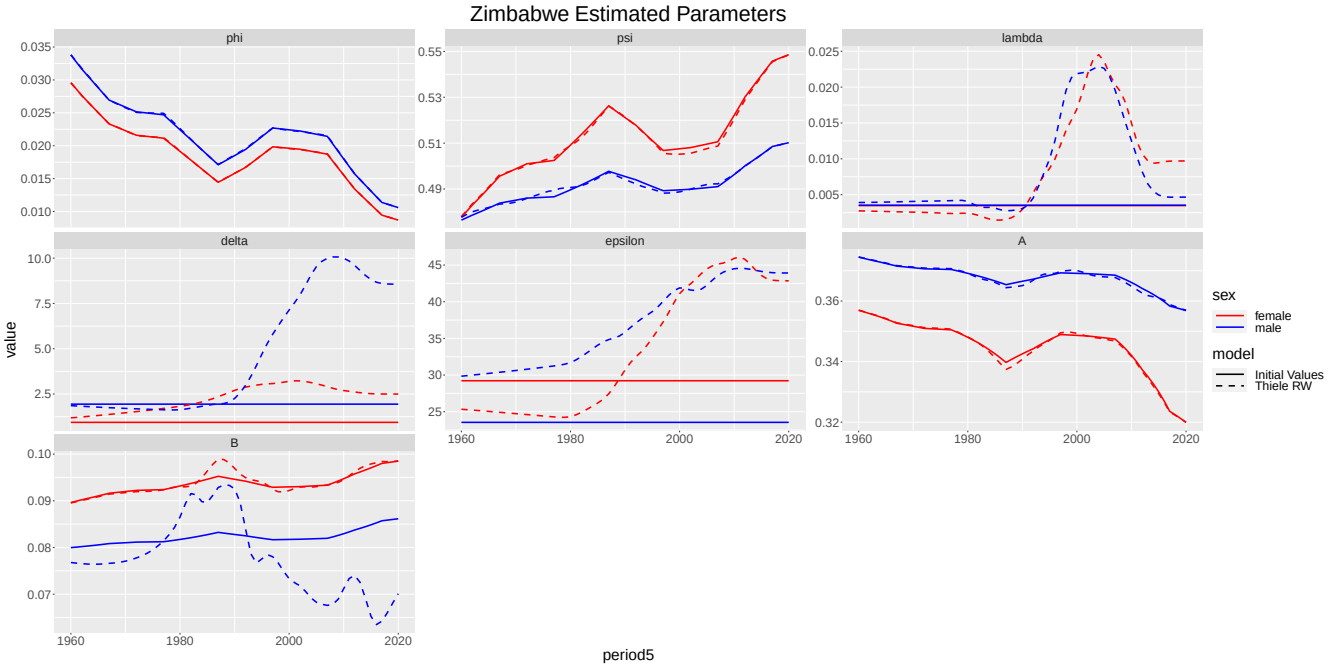

Figure 1: Estimated parameters

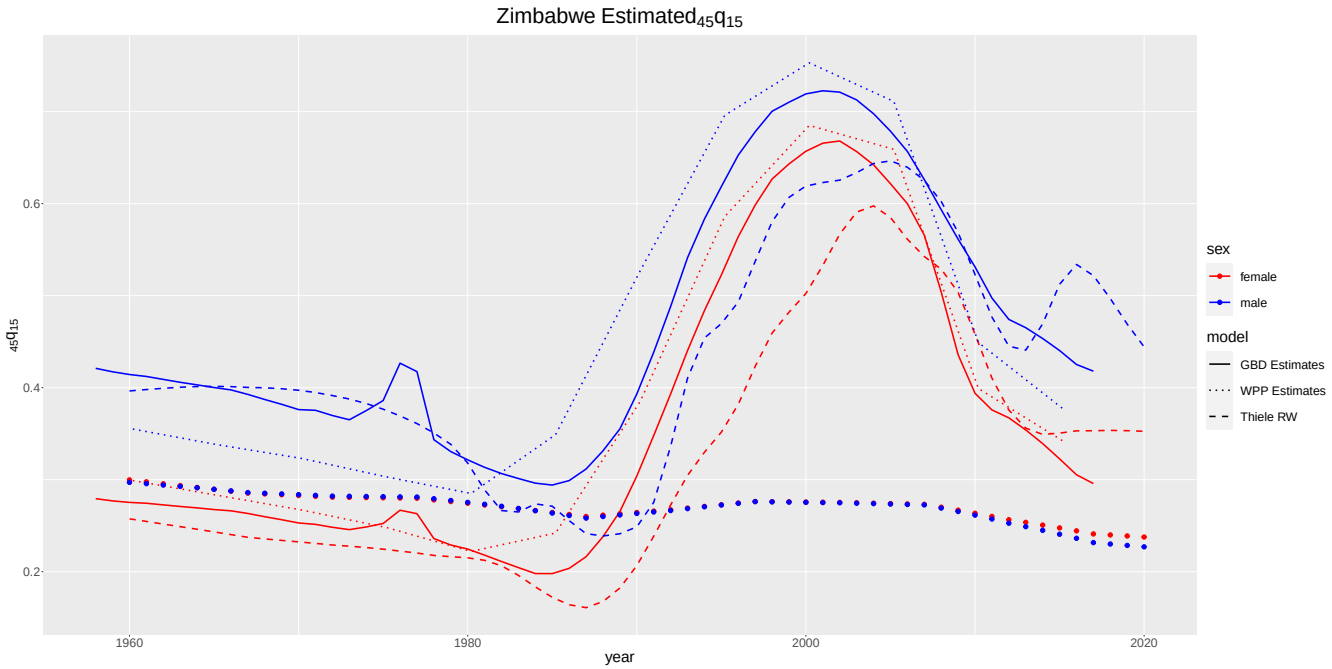

Figure 2: Estimated ${}_{45}q_{15}$

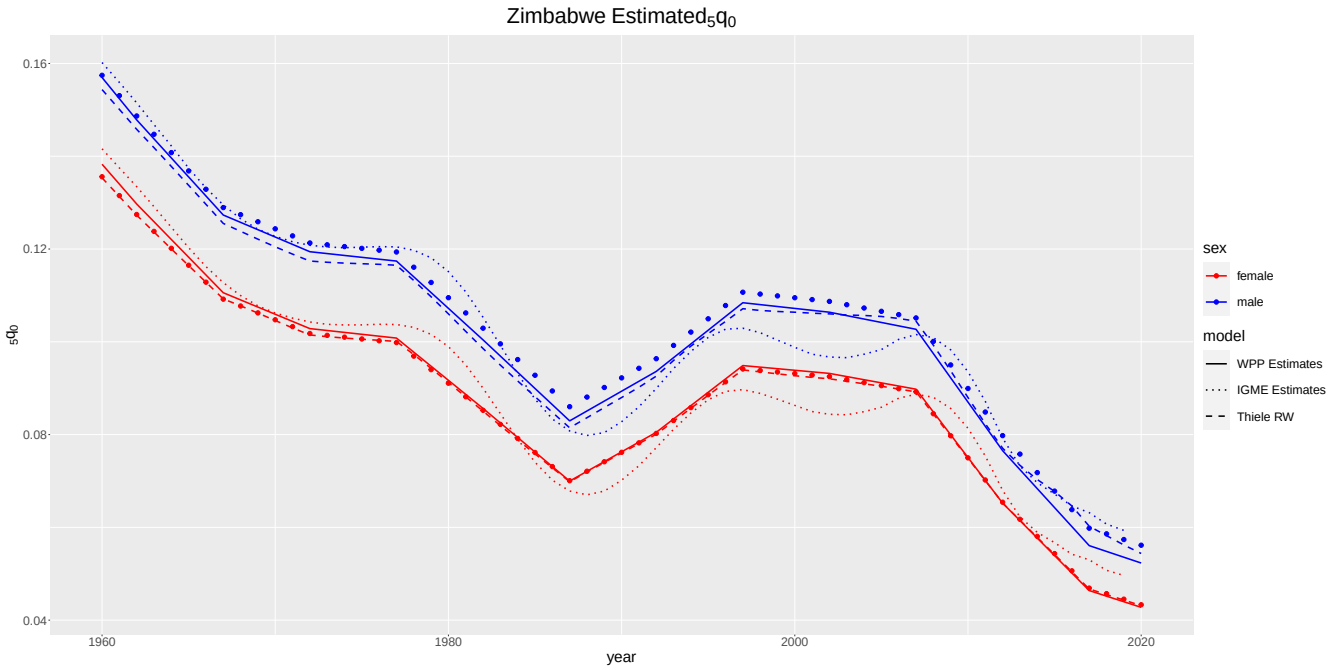

Figure 3: Estimated $_5q_0$

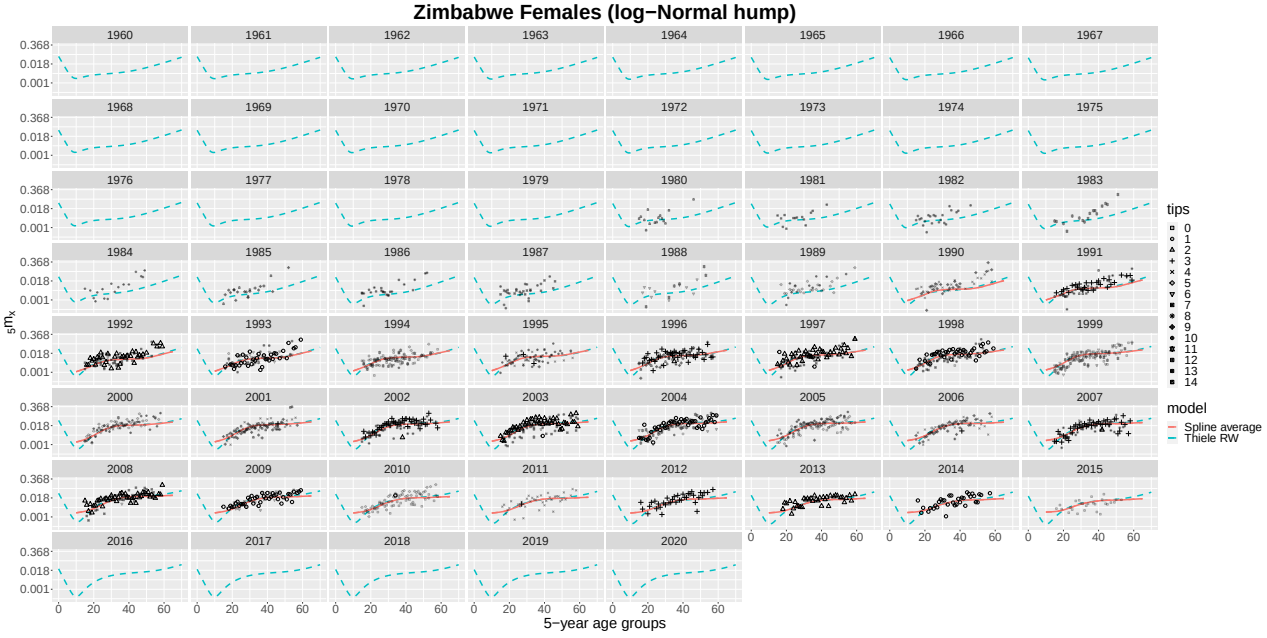

Figure 4: Mortality Schedules

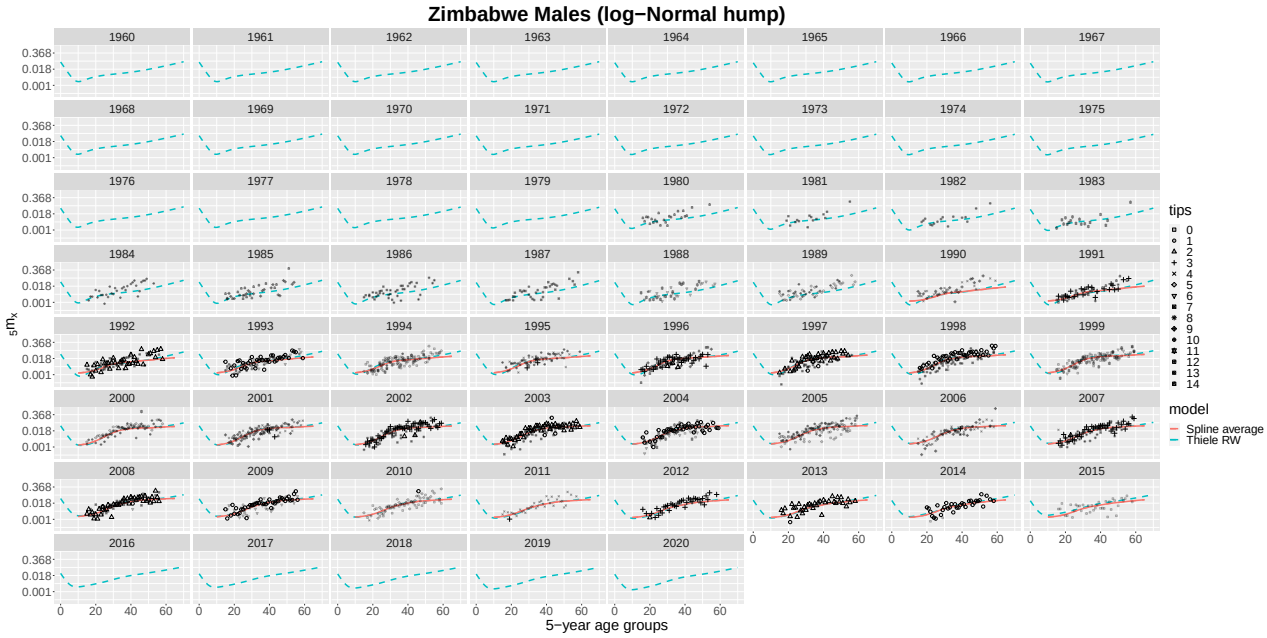

Figure 5: Mortality Schedules

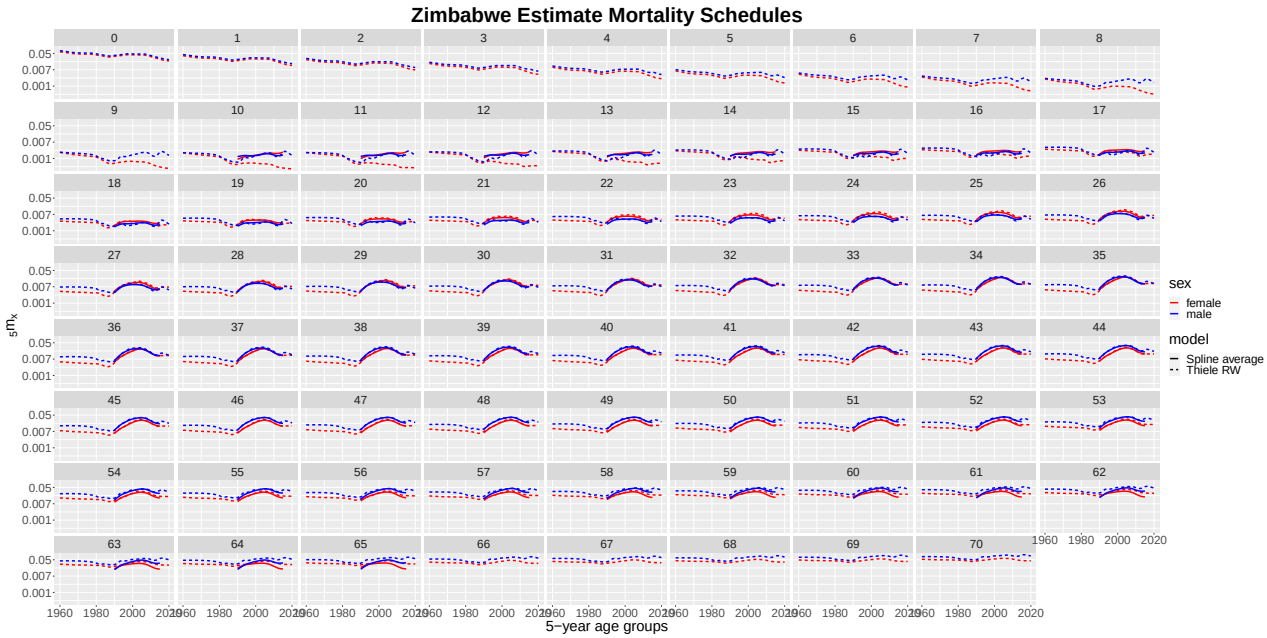

Figure 6: Mortality Schedules

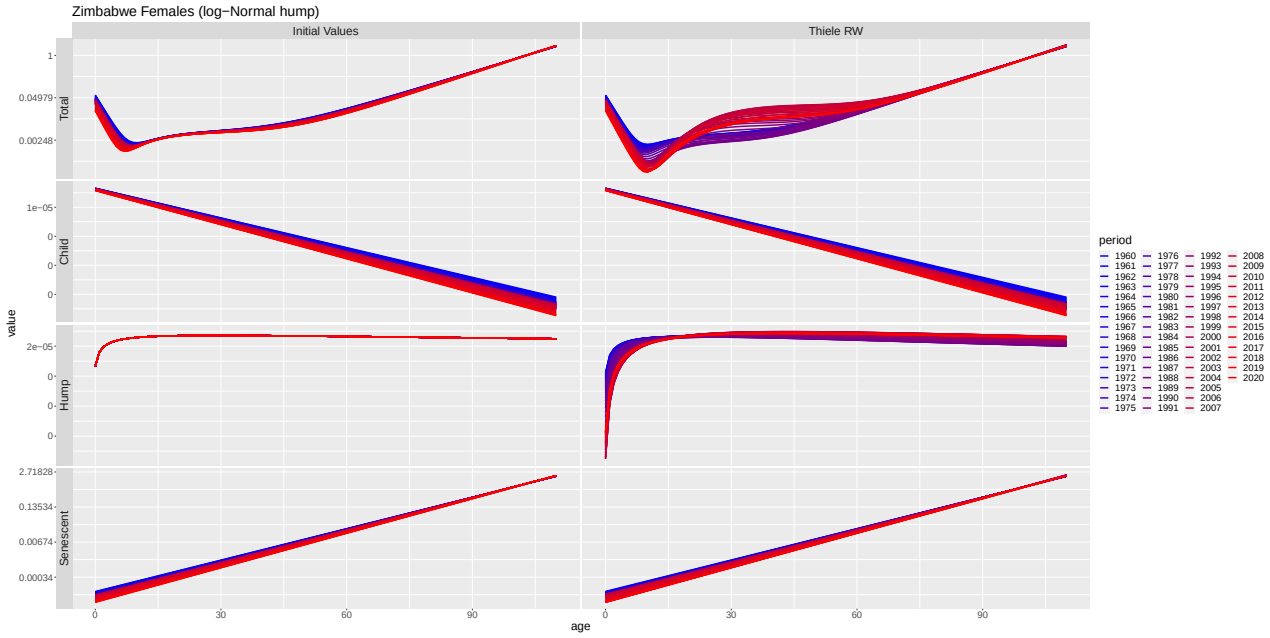

Figure 7: Thiele Decomposed

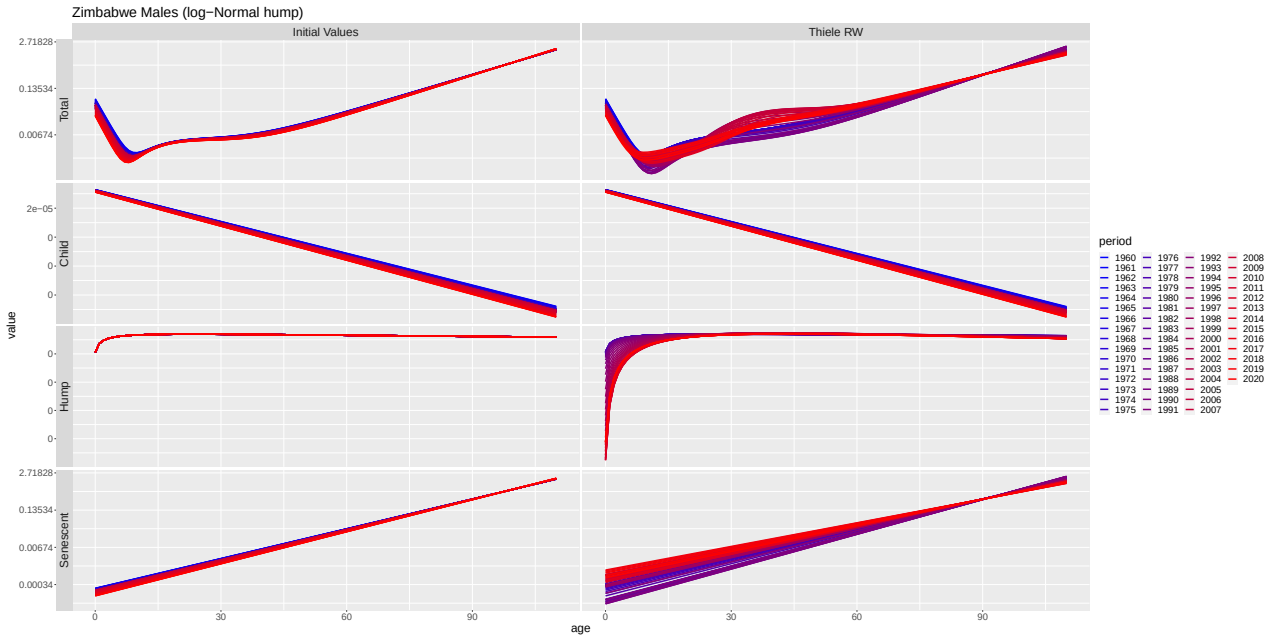

Figure 8: Thiele Decomposed

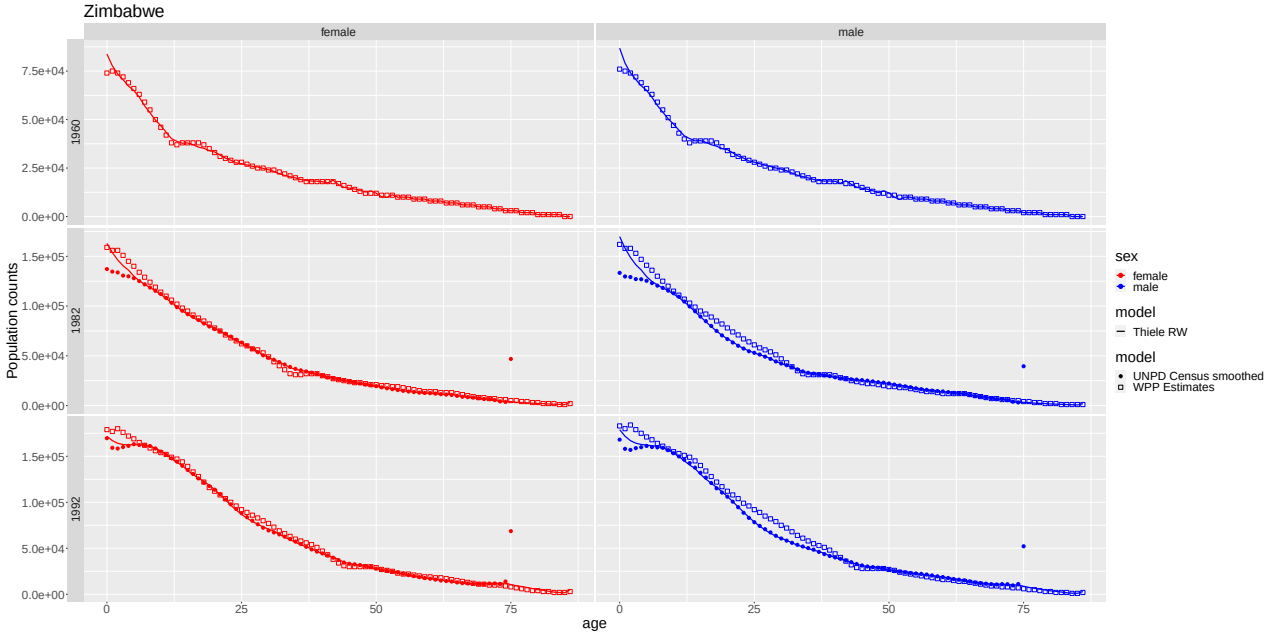

Figure 9: Population

Figure 10: Population

Figure 11: Population

Figure 12: Population

Figure 13: Population

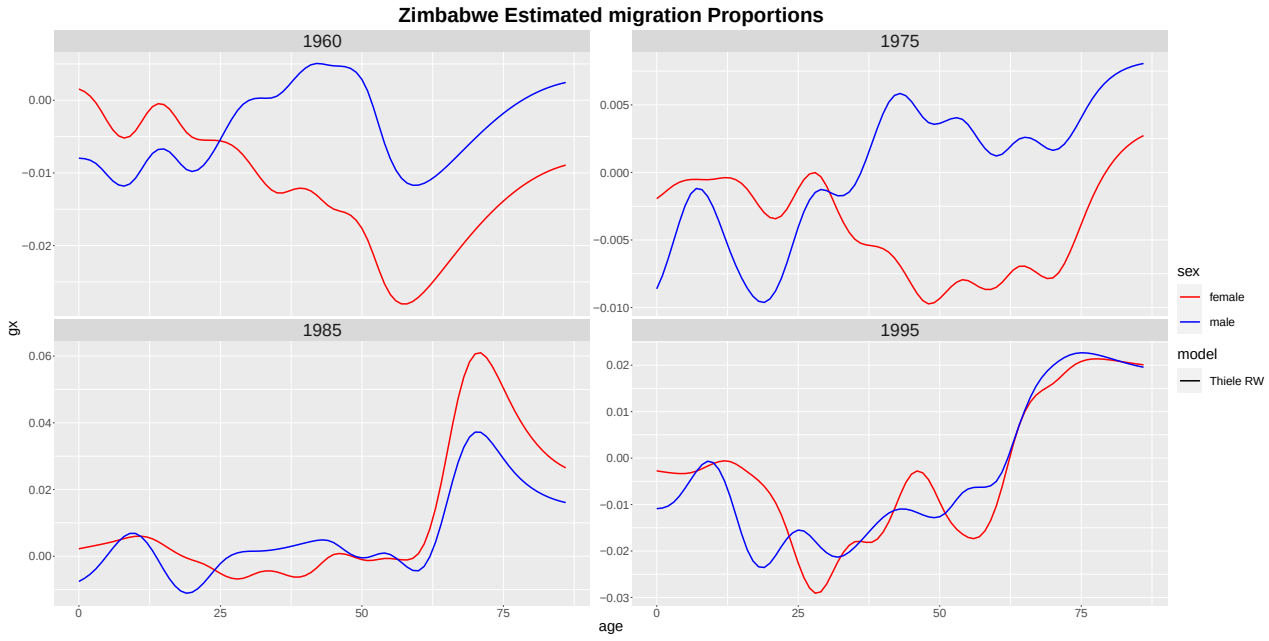

Figure 14: Migration

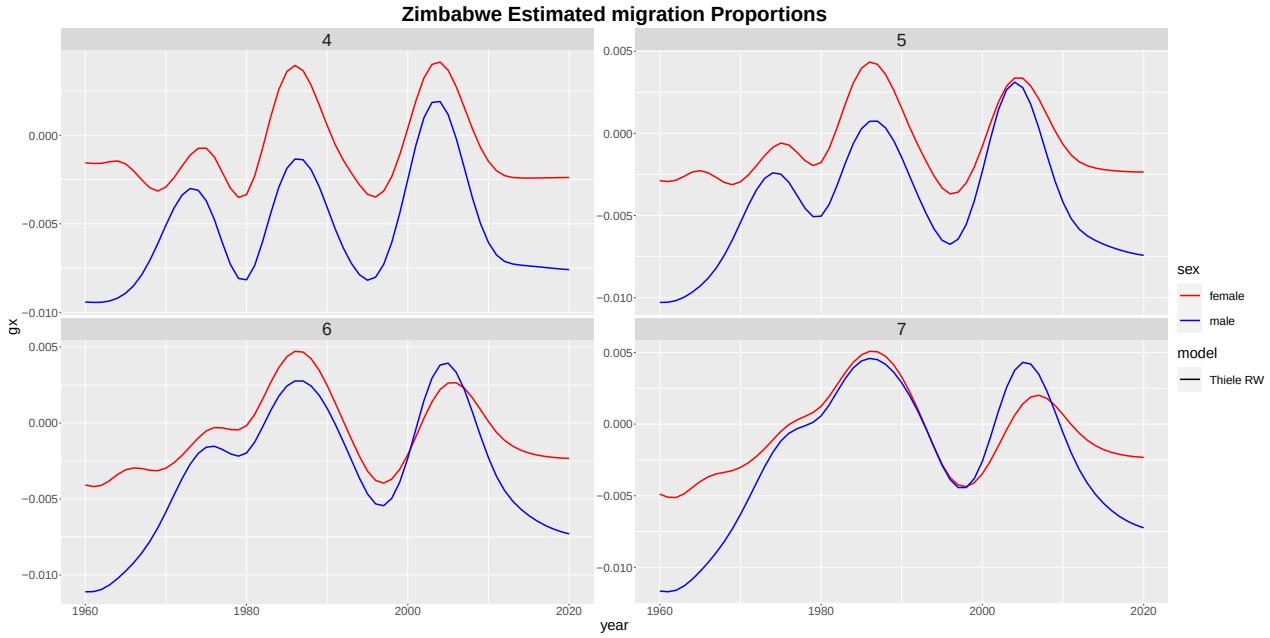

Figure 15: Migration

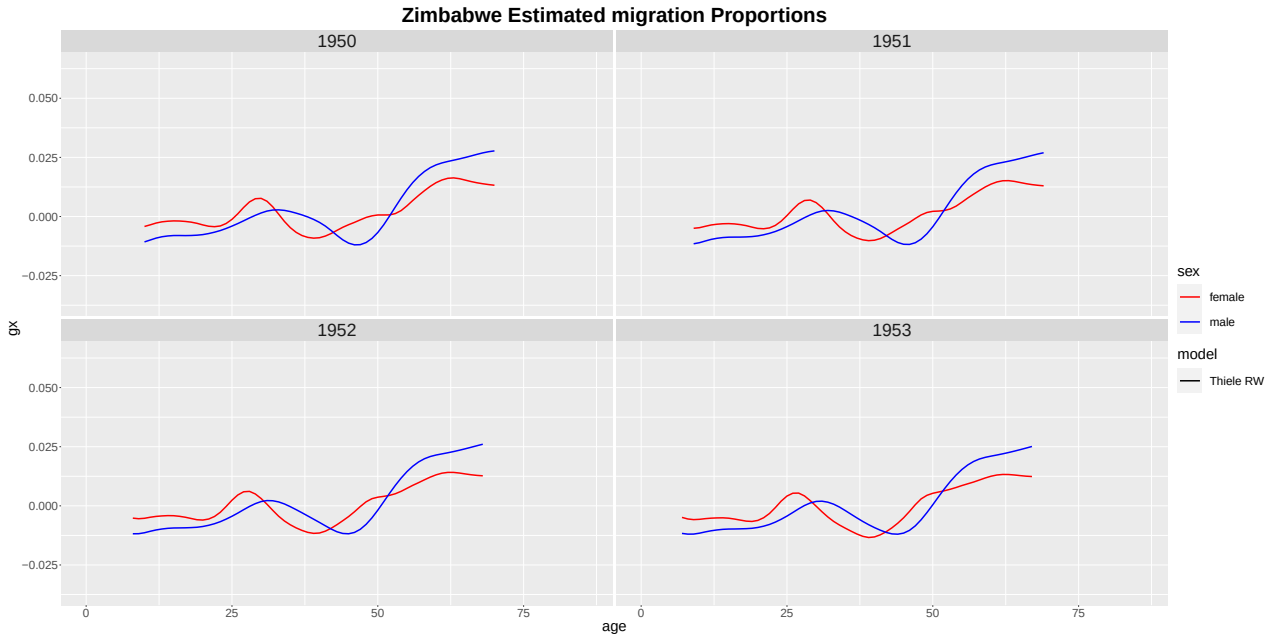

Figure 16: Migration

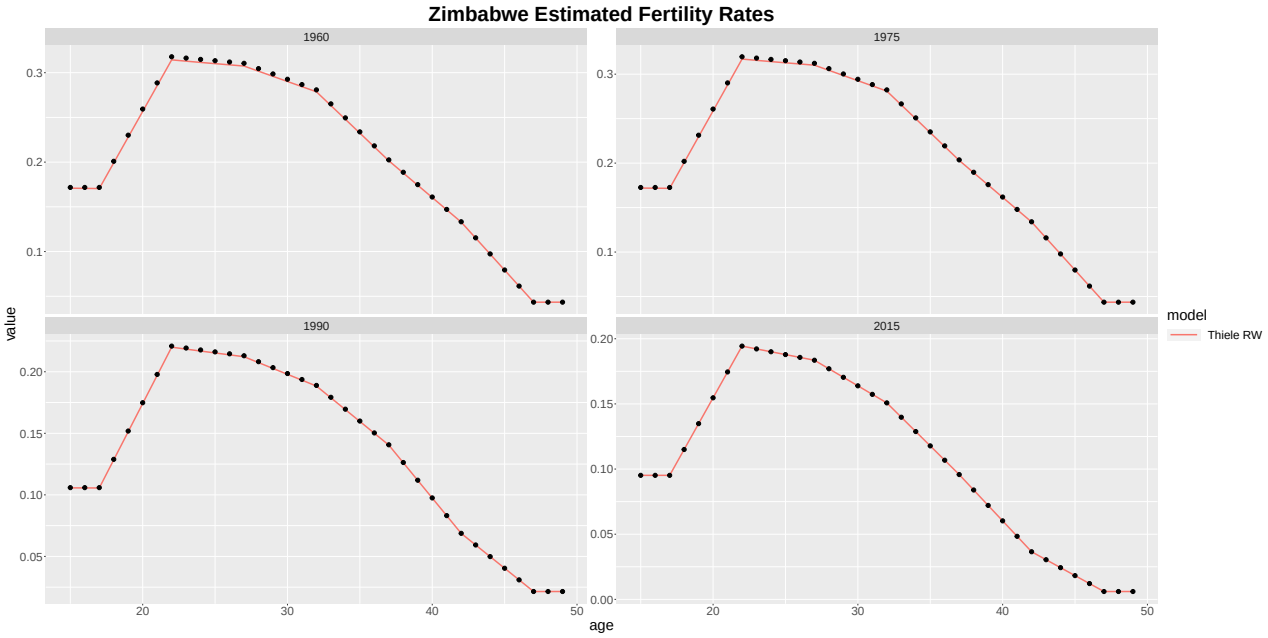

Figure 17: Fertility

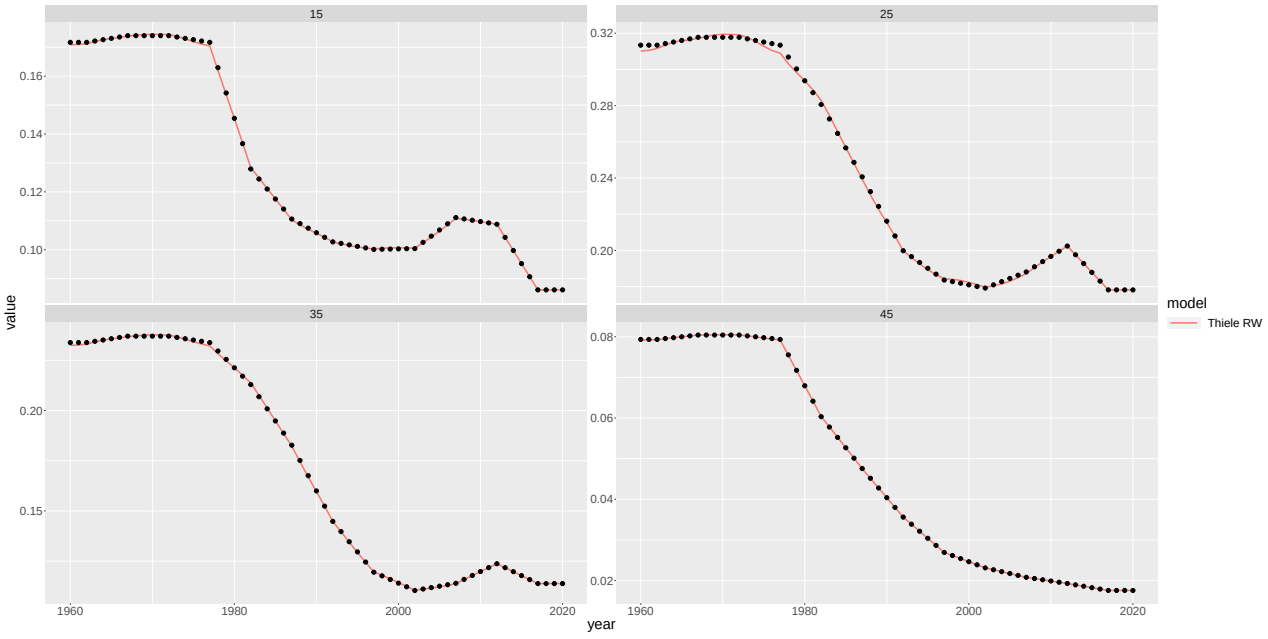

Figure 18: Fertility

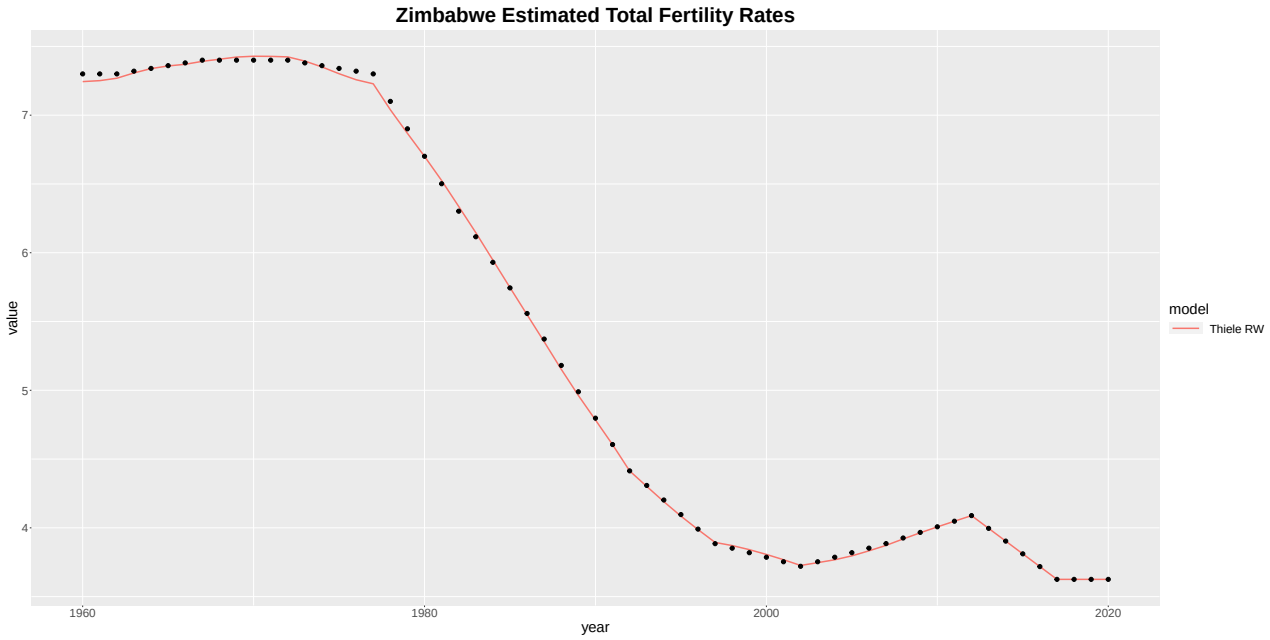

Figure 19: Total Fertility