

Rwanda

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

## # A tibble: 86 x 3
##   age `2002` `2012`
##   <dbl>   <dbl>   <dbl>
## 1     0 163568 154825
## 2     1 140750. 150252.
## 3     2 131660. 153228.
## 4     3 129435. 155441.
## 5     4 125271. 156600.
## 6     5 120960. 157169.
## 7     6 116586. 156105.
## 8     7 114561. 153505.
## 9     8 111728. 148650.
## 10    9 108620. 144594.
## # ... with 76 more rows

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

## # A tibble: 18 x 3
##   age `1978` `1991`
##   <dbl>   <dbl>   <dbl>
## 1     0 466037. 653170
## 2     5 361325. 580142.
## 3    10 304639. 474522.
## 4    15 275639. 373865
## 5    20 231462. 308889.
## 6    25 173641. 269890
## 7    30 130320. 233112.
## 8    35 111521. 182968.
## 9    40 100240. 133279.
## 10   45  86457. 105644.
## 11   50  74057.  92709.
## 12   55  62652.  79171.
## 13   60  49547.  64911.
## 14   65  32385.  50270
## 15   70  13319.  40610
## 16   75  22368.  35965
## 17   80      NA      NA
## 18   85      NA      NA

## [1] "Census Males"

## # A tibble: 86 x 3
##   age `2002` `2012`
##   <dbl>   <dbl>   <dbl>
## 1     0 161653 154732
## 2     1 138956. 149970.
## 3     2 129712. 152394.
## 4     3 127166. 154607.
## 5     4 122924. 155501.
## 6     5 118518 155912.
```

```
## 7      6 113903. 154665.
## 8      7 111691. 151774.
## 9      8 108860. 146477
## 10     9 105726. 142001.
## # ... with 76 more rows
```

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

```
## # A tibble: 18 x 3
##   age `1978` `1991`
##   <dbl>   <dbl>   <dbl>
## 1     0 462588. 644055
## 2     5 358634. 566505
## 3    10 303160. 460628.
## 4    15 273928. 358739.
## 5    20 226121. 293768.
## 6    25 161692. 261421.
## 7    30 110684. 229449.
## 8    35  87492. 177671.
## 9    40  79283. 122634.
## 10   45  71068.  86745
## 11   50  61257.  71374.
## 12   55  51816.  62772.
## 13   60  42545.  52764.
## 14   65  30119.  41664.
## 15   70  14043.  32755
## 16   75  23333.  33020
## 17   80      NA      NA
## 18   85      NA      NA
```

Thiele log-Normal Hump Spline

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

##	log_tau2_logpop_f	log_tau2_logpop_f	log_tau2_logpop_m	log_tau2_
##	2.000000e+00	4.000000e+00	2.000000e+00	4.00
##	log_tau2_gx_m	log_lambda_gx_age_f	log_lambda_gx_age_m	log_lambda_g
##	2.000000e+00	5.000000e+00	5.000000e+00	5.00
##	log_lambda_gx_agemtime_m	log_lambda_tp	log_lambda_tp_0_inflated_sd	log_disp
##	5.000000e+00	1.000000e+00	3.000000e-01	1.30
##	log_marginal_prec_psi_f	log_marginal_prec_A_f	log_marginal_prec_B_f	log_marginal_pr
##	5.306853e+00	5.306853e+00	5.306853e+00	5.30
##	log_marginal_prec_B_m	log_lambda_phi_f	log_lambda_psi_f	log_lambda_
##	5.306853e+00	4.306853e+00	4.306853e+00	4.30
##	log_lambda_A_f	log_lambda_B_f	log_lambda_phi_m	log_lambd
##	4.306853e+00	4.306853e+00	4.306853e+00	4.30
##	log_lambda_epsilon_m	log_lambda_A_m	log_lambda_B_m	logit_lambda_slo
##	4.306853e+00	4.306853e+00	4.306853e+00	1.36
##	logit_lambda_slope_rho_m	logit_delta_slope_rho_m	logit_epsilon_slope_rho_m	
##	1.305454e-12	7.406185e-14	6.464456e-13	

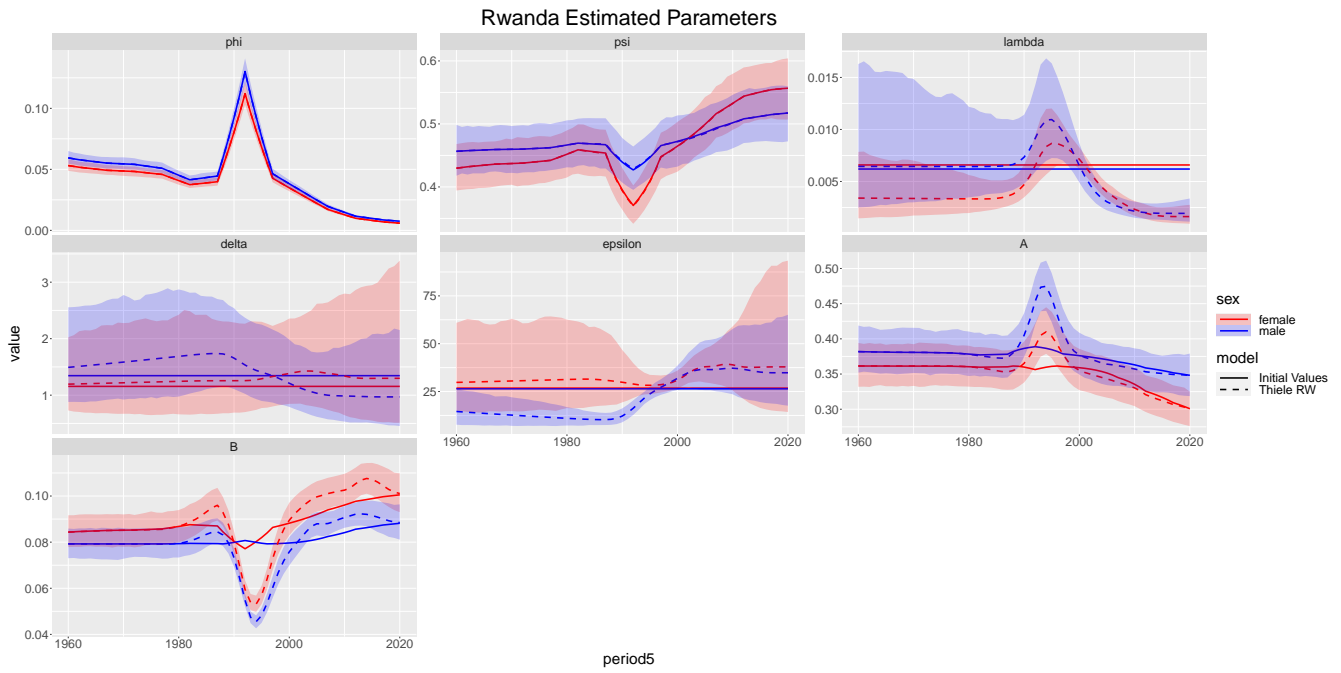


Figure 1: Estimated parameters

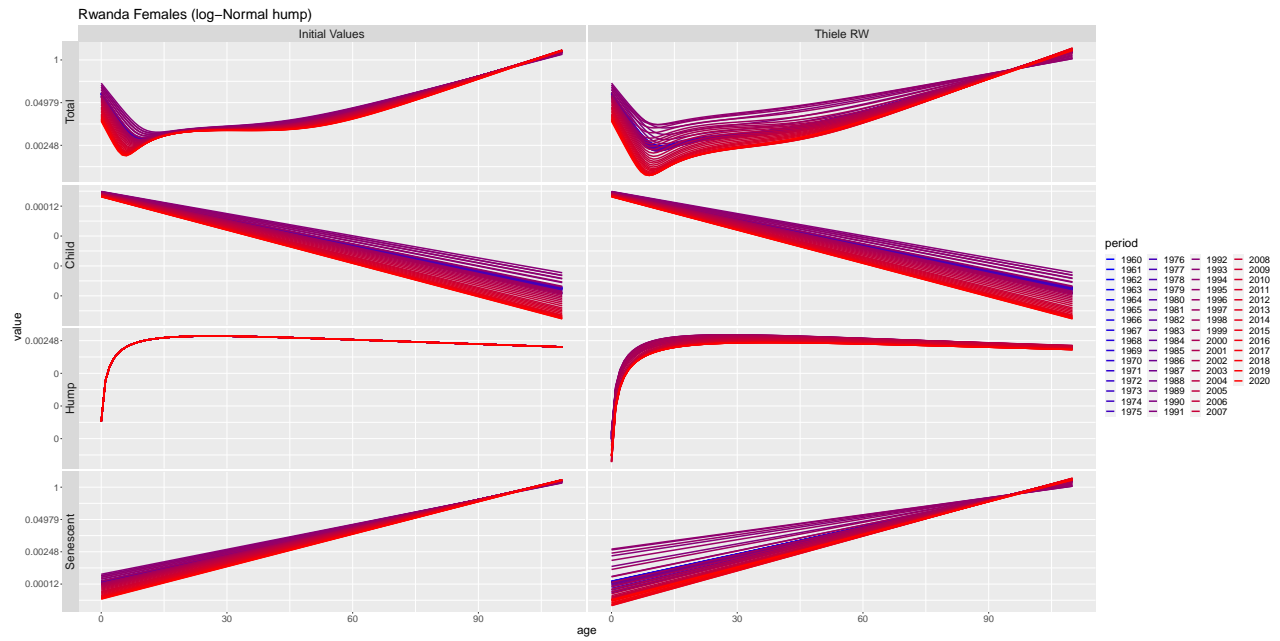


Figure 2: Thiele Decomposed

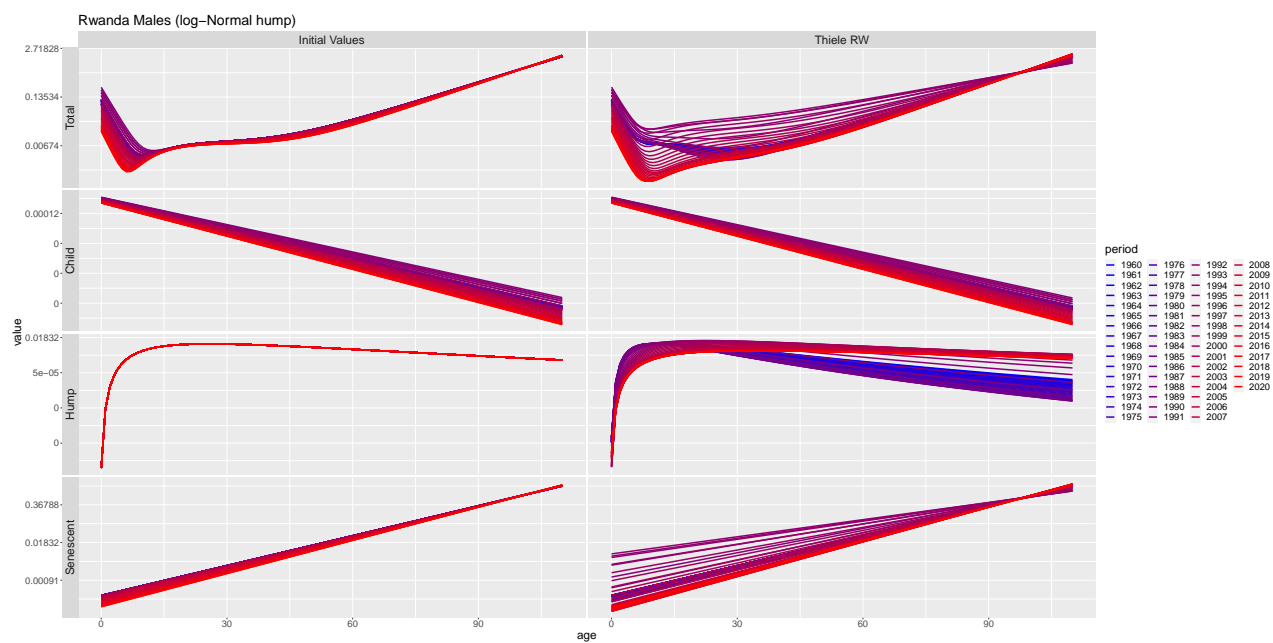


Figure 3: Thiele Decomposed

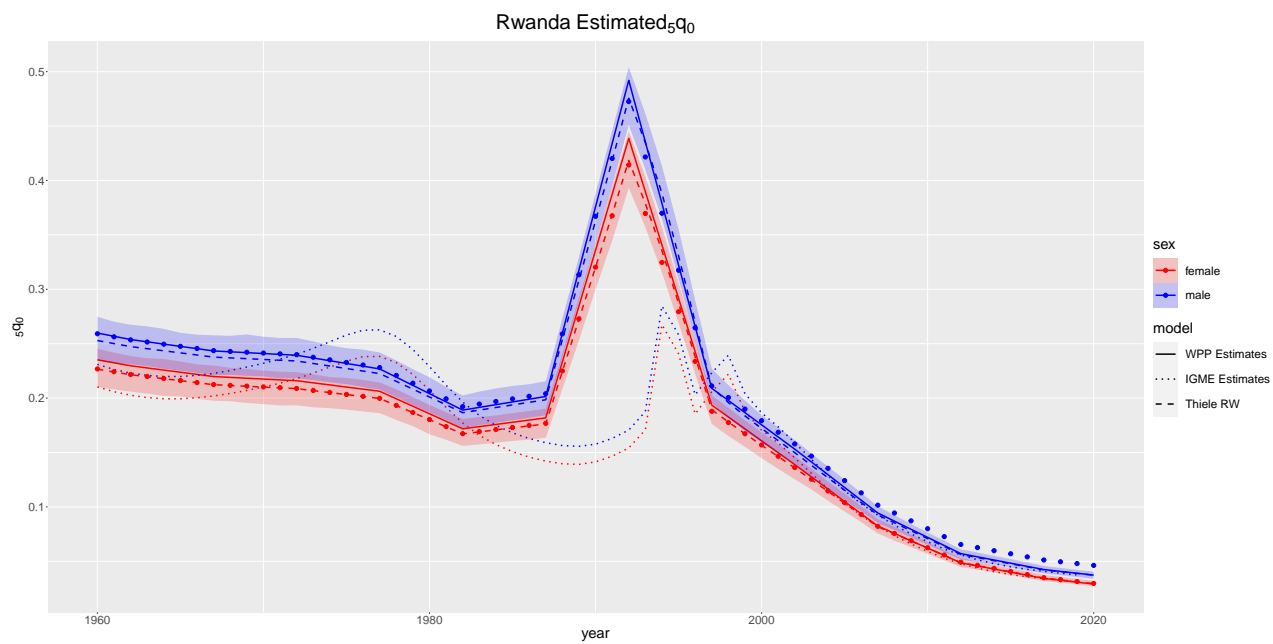


Figure 4: Estimated ${}_5q_0$

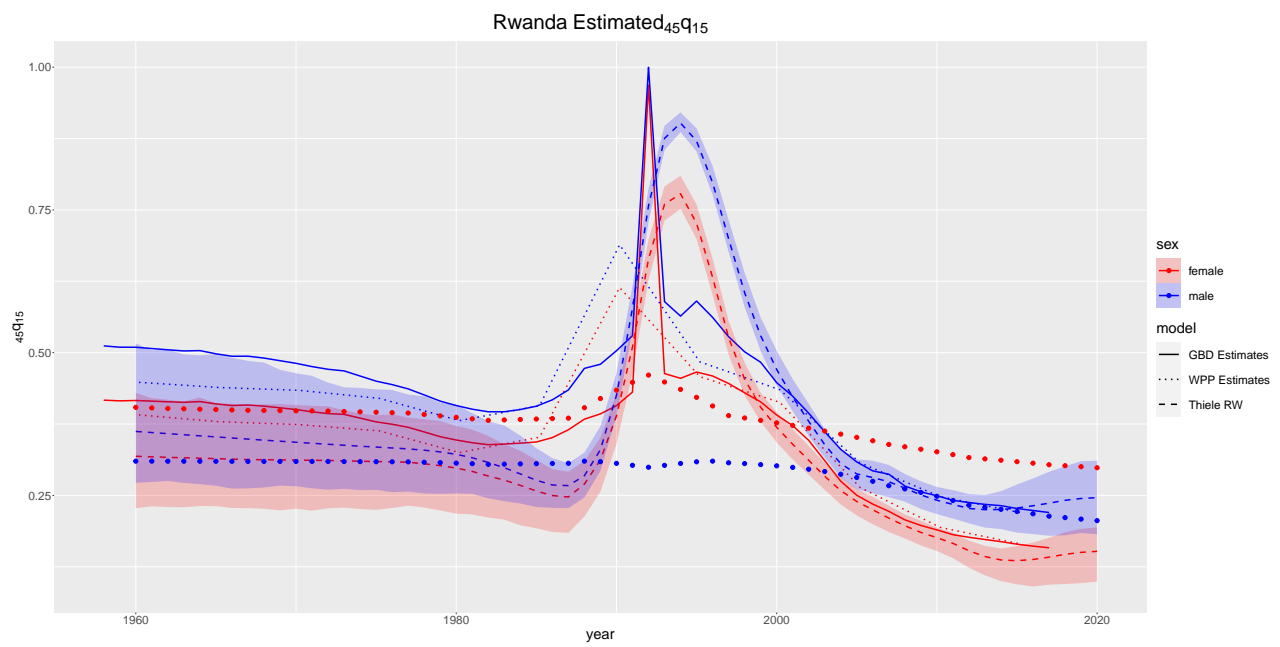


Figure 5: Estimated $_{45}q_{15}$

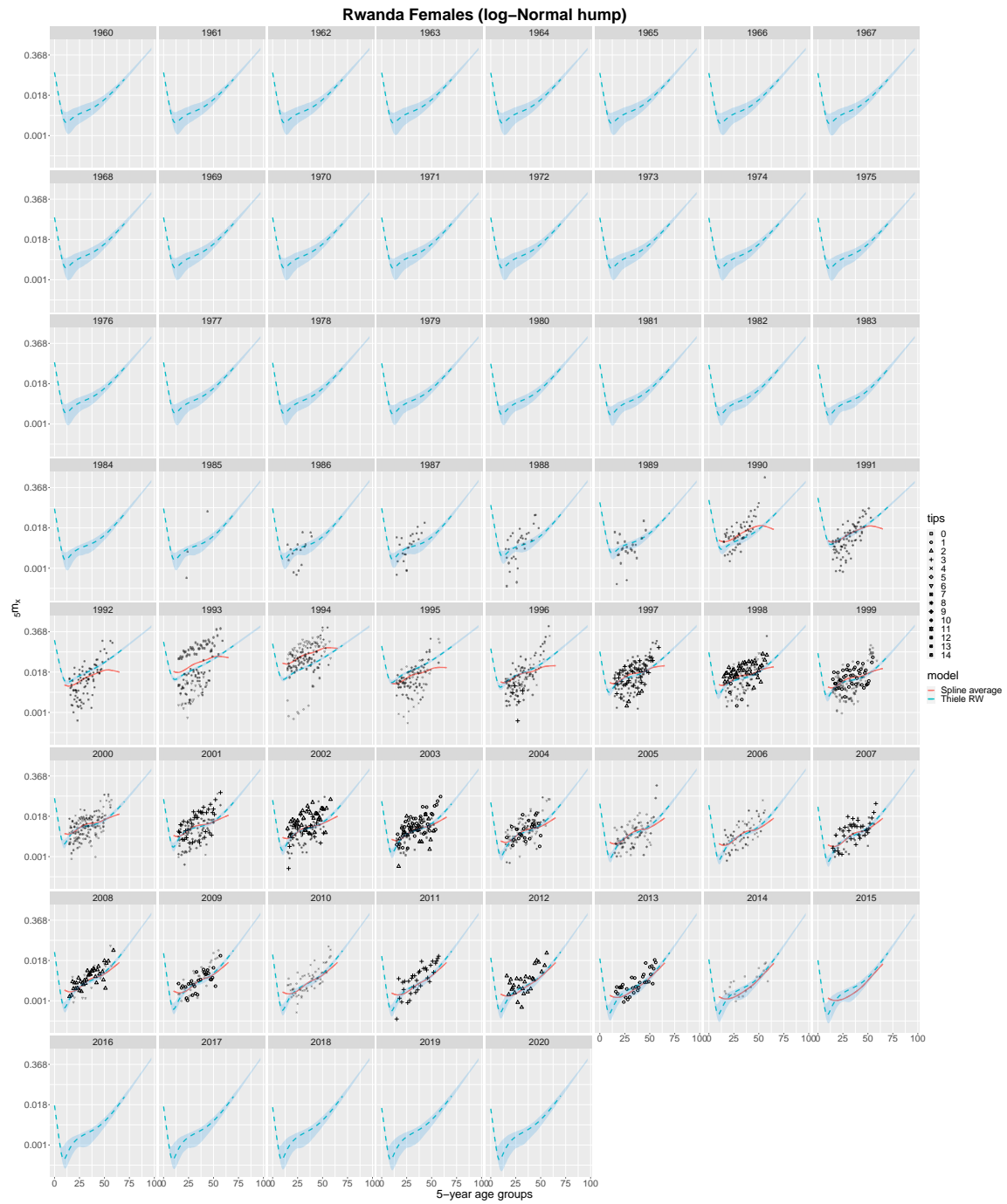


Figure 6: Mortality Schedules

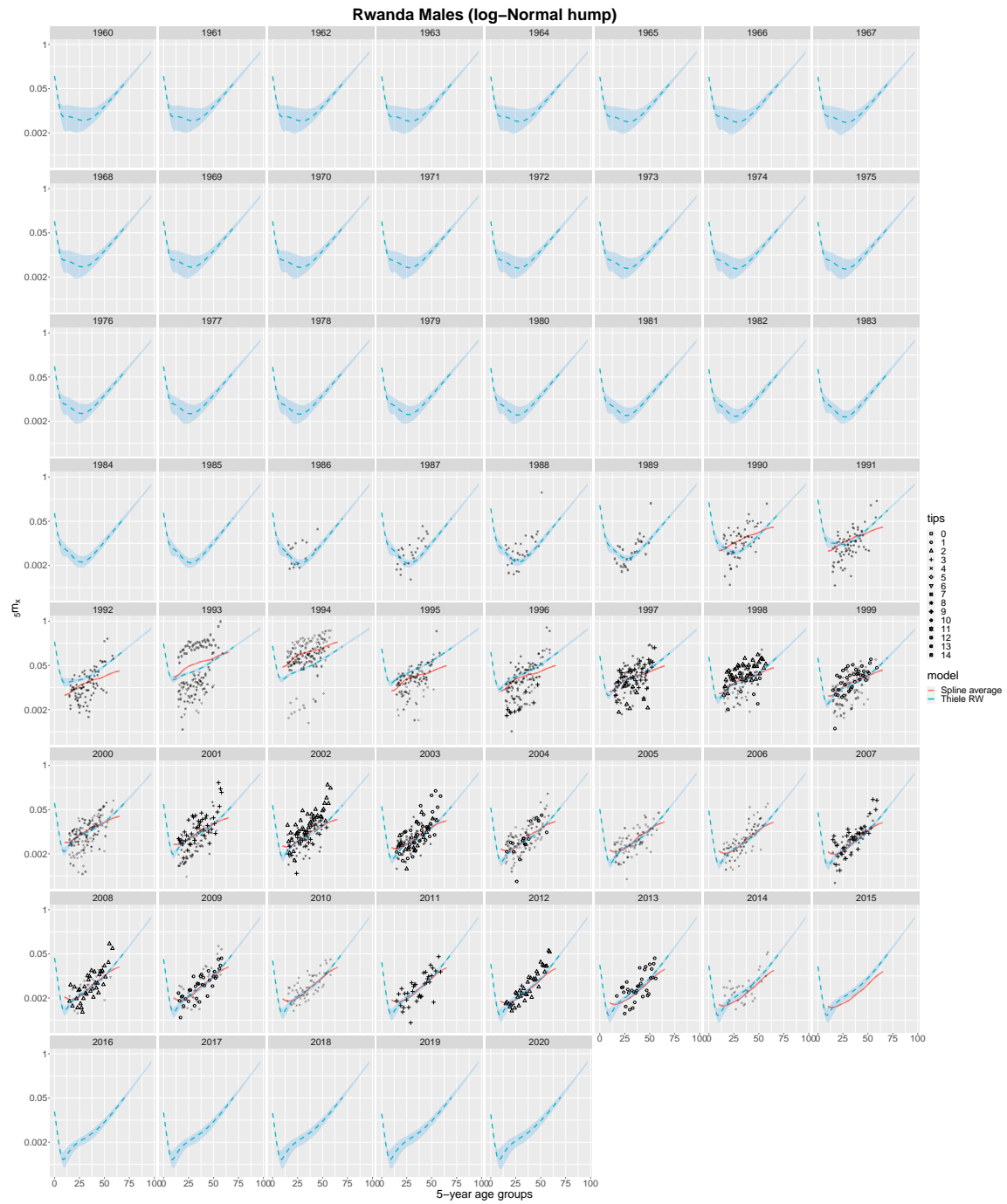


Figure 7: Mortality Schedules

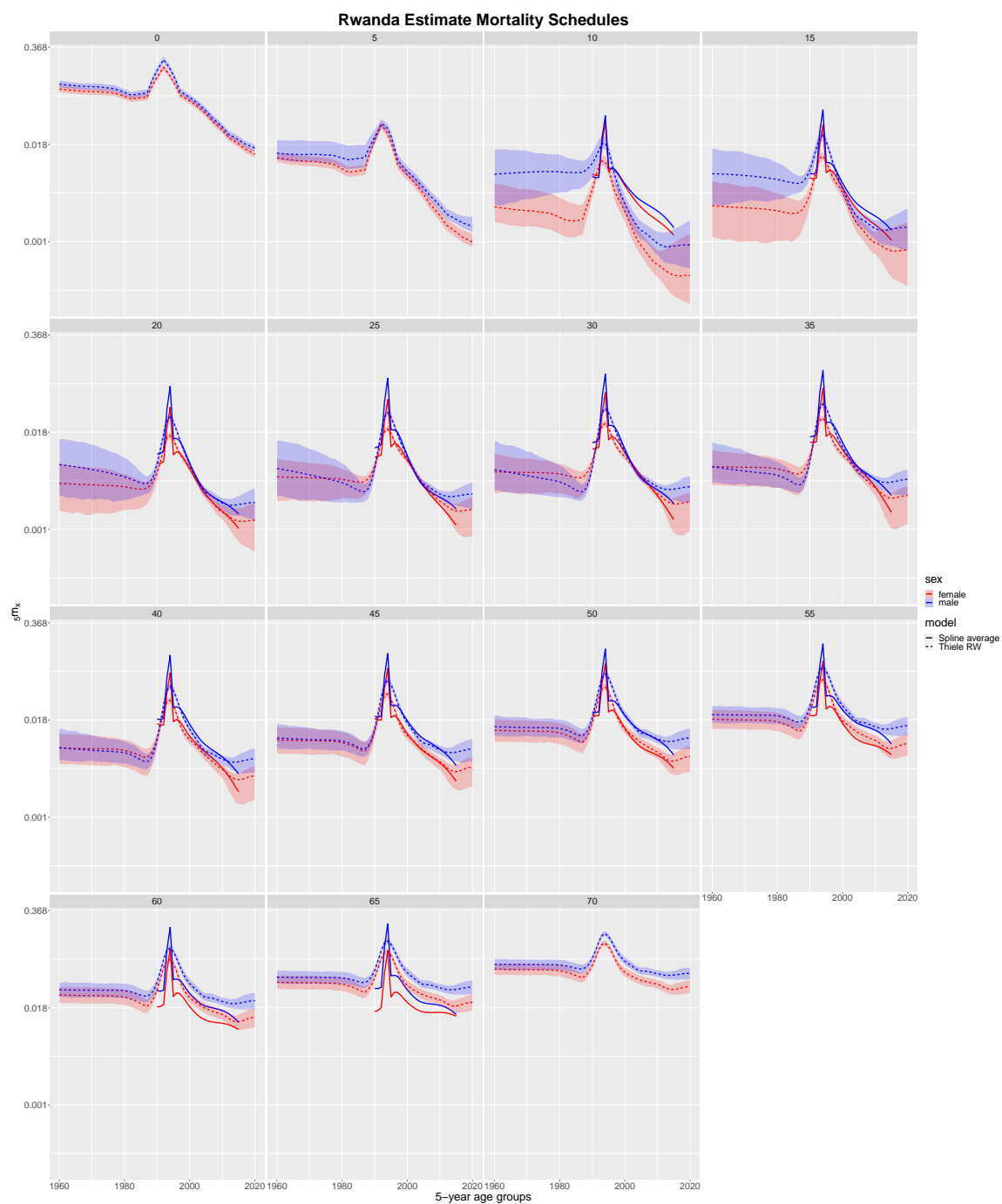


Figure 8: Mortality Schedules

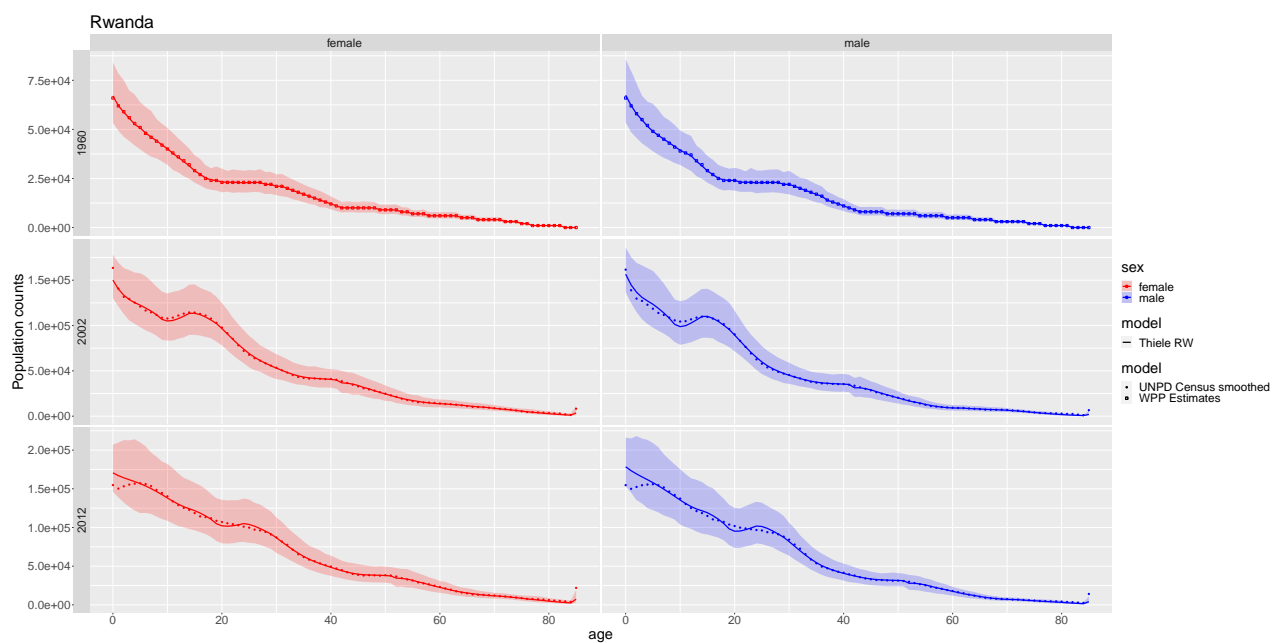


Figure 9: Population



Figure 10: Population

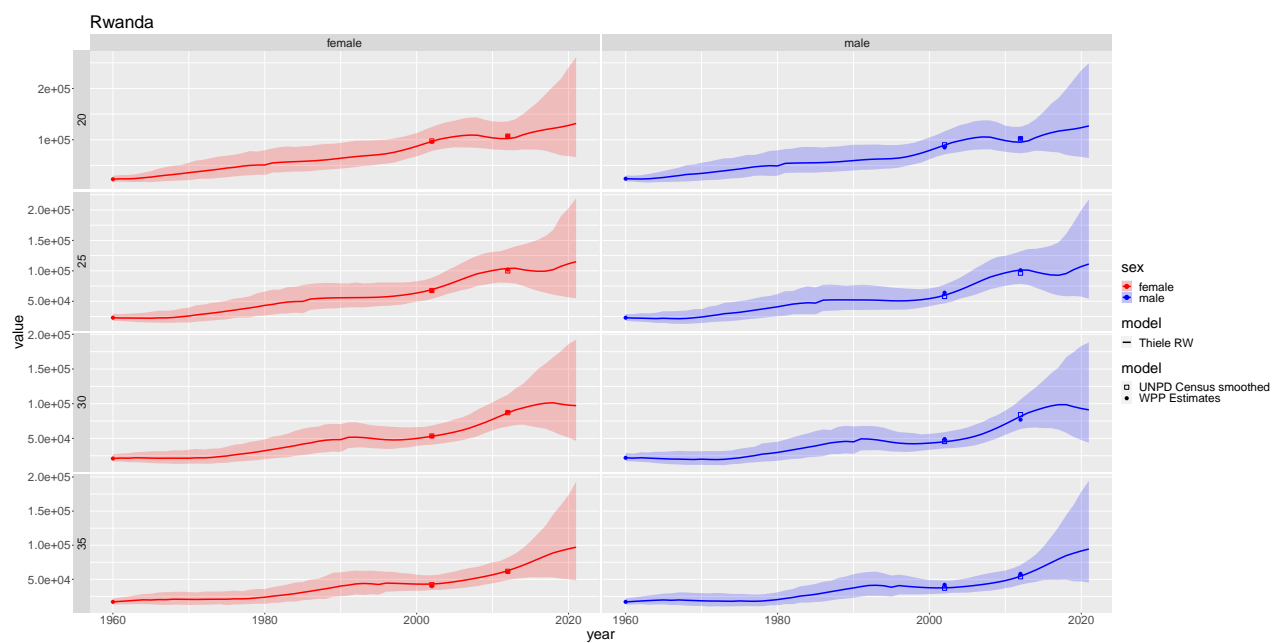


Figure 11: Population

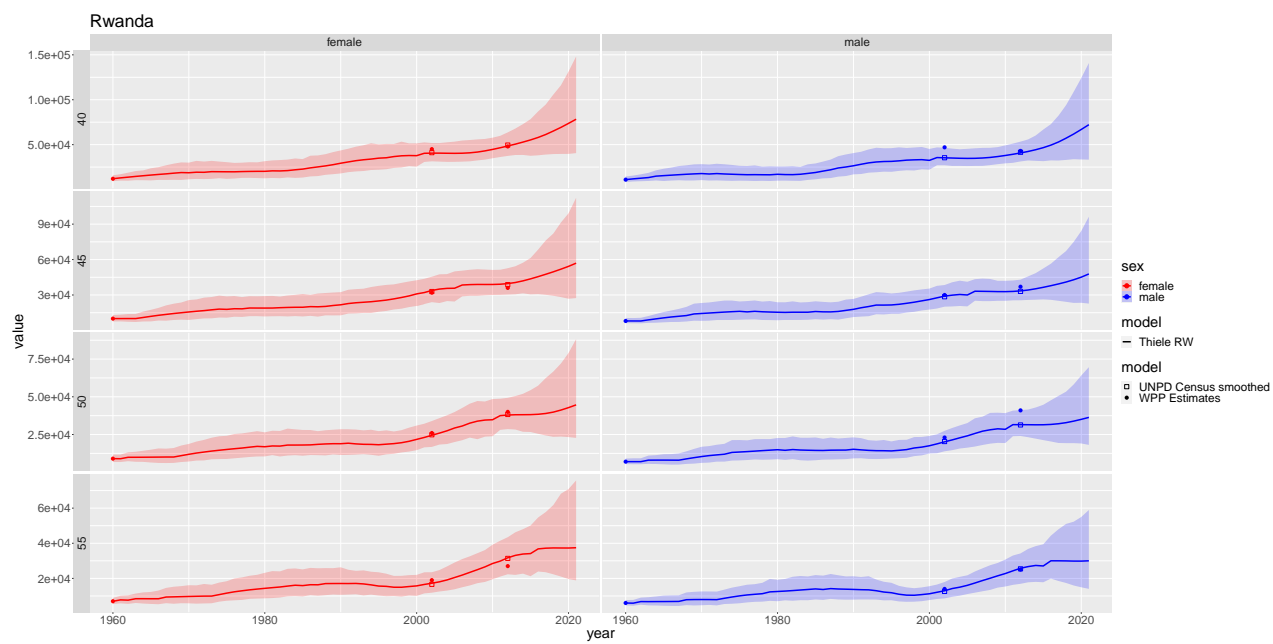


Figure 12: Population

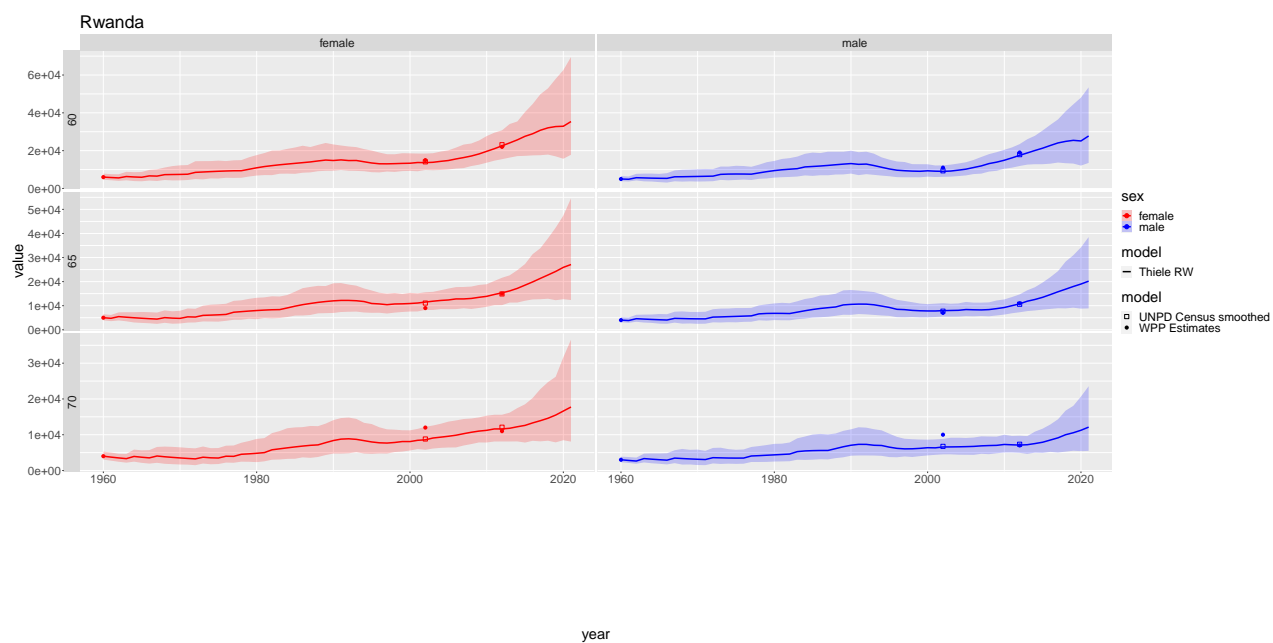


Figure 13: Population

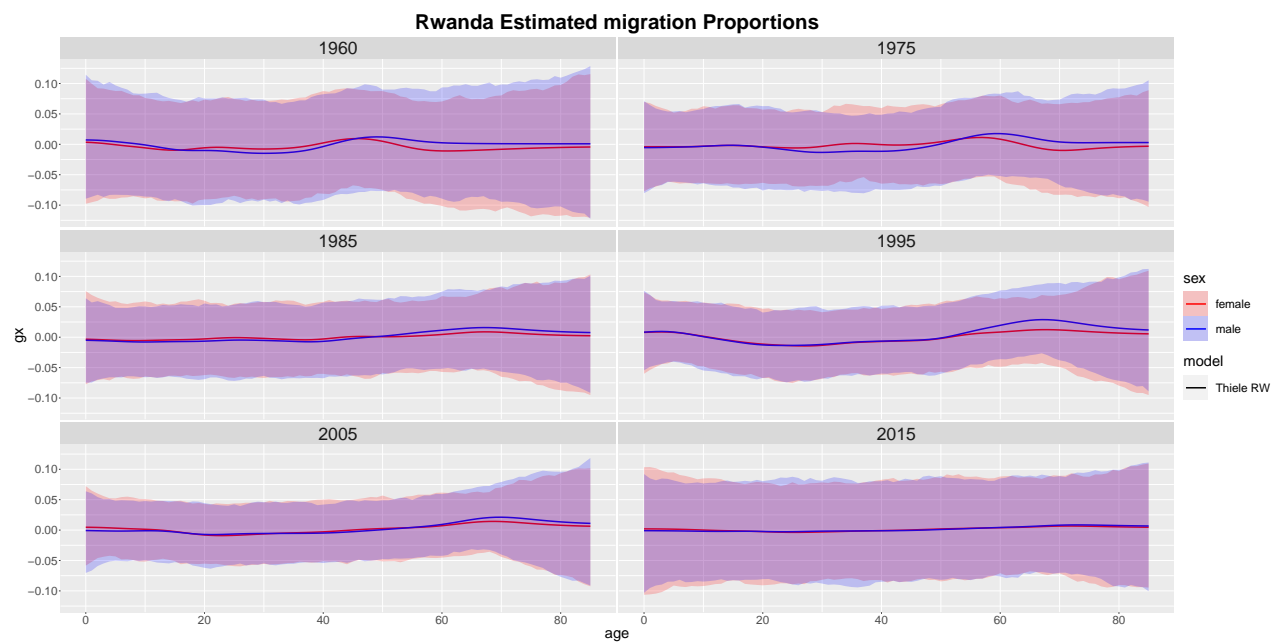


Figure 14: Migration

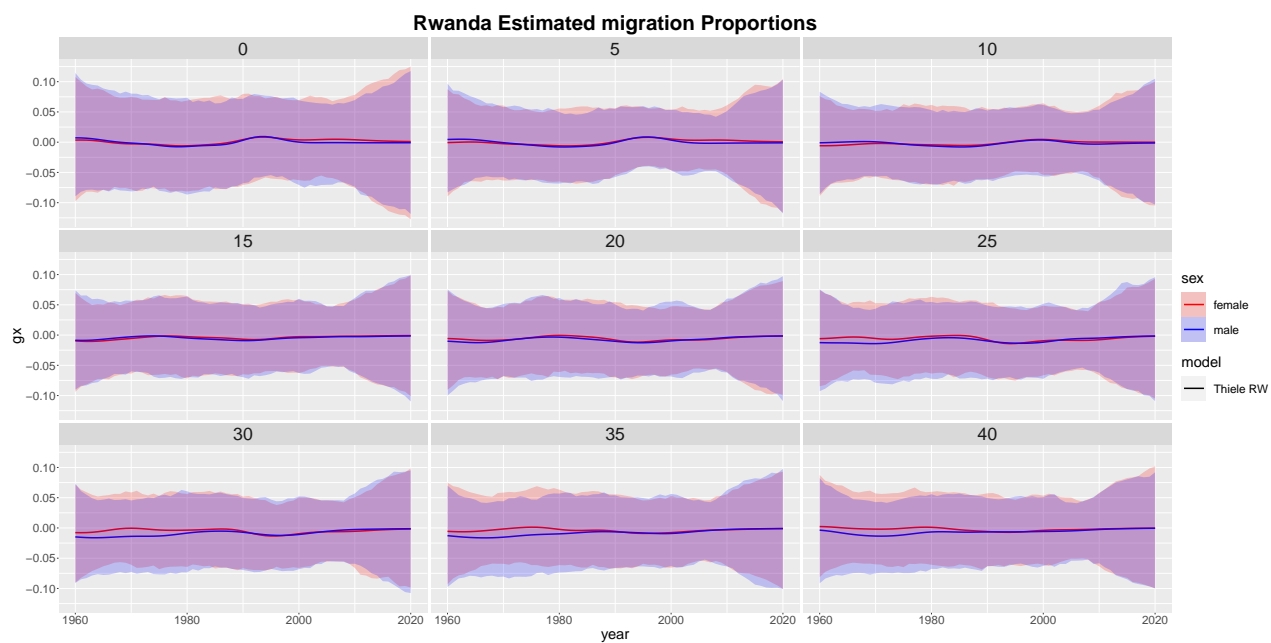


Figure 15: Migration

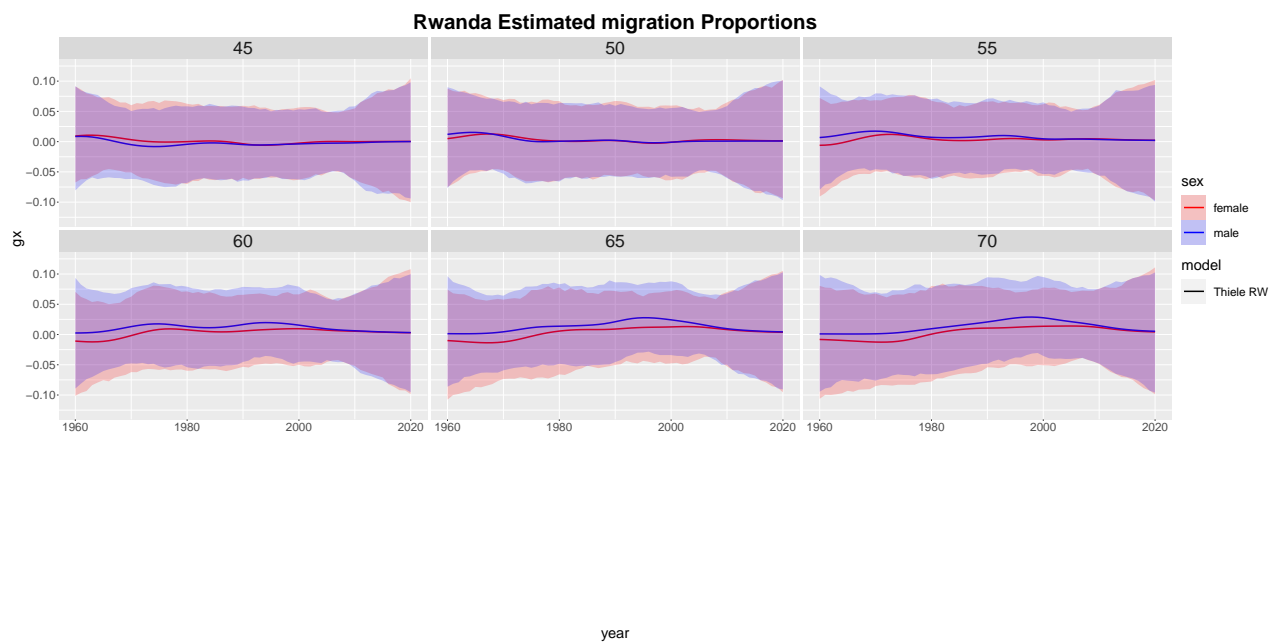


Figure 16: Migration

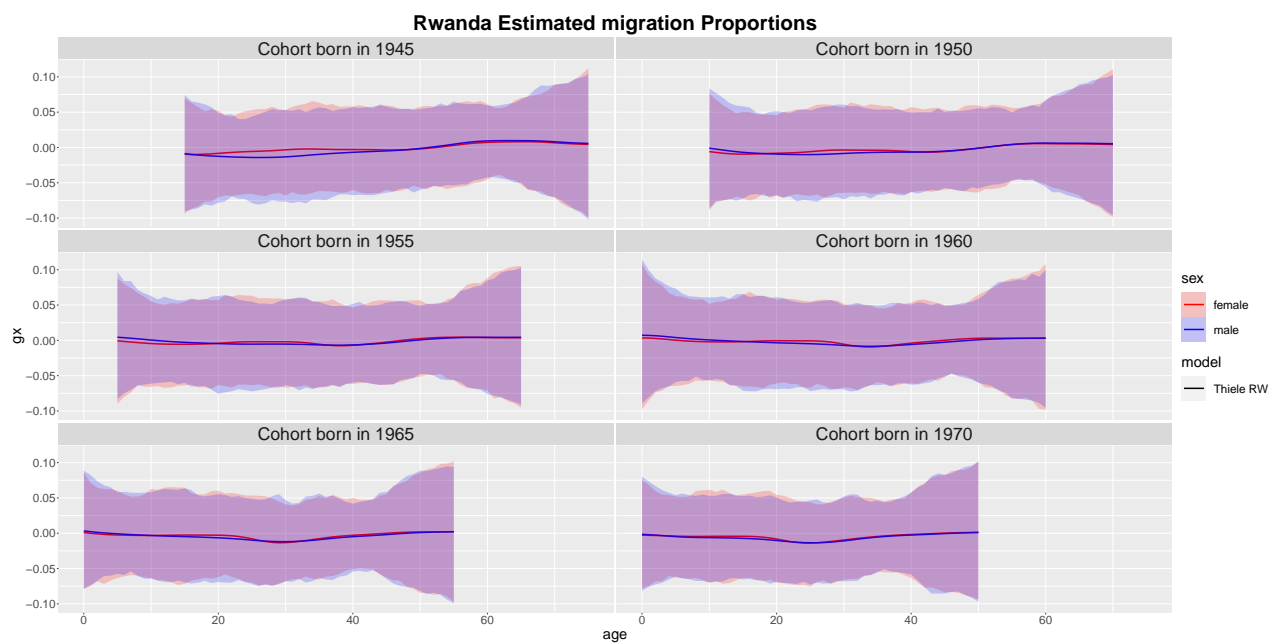


Figure 17: Migration

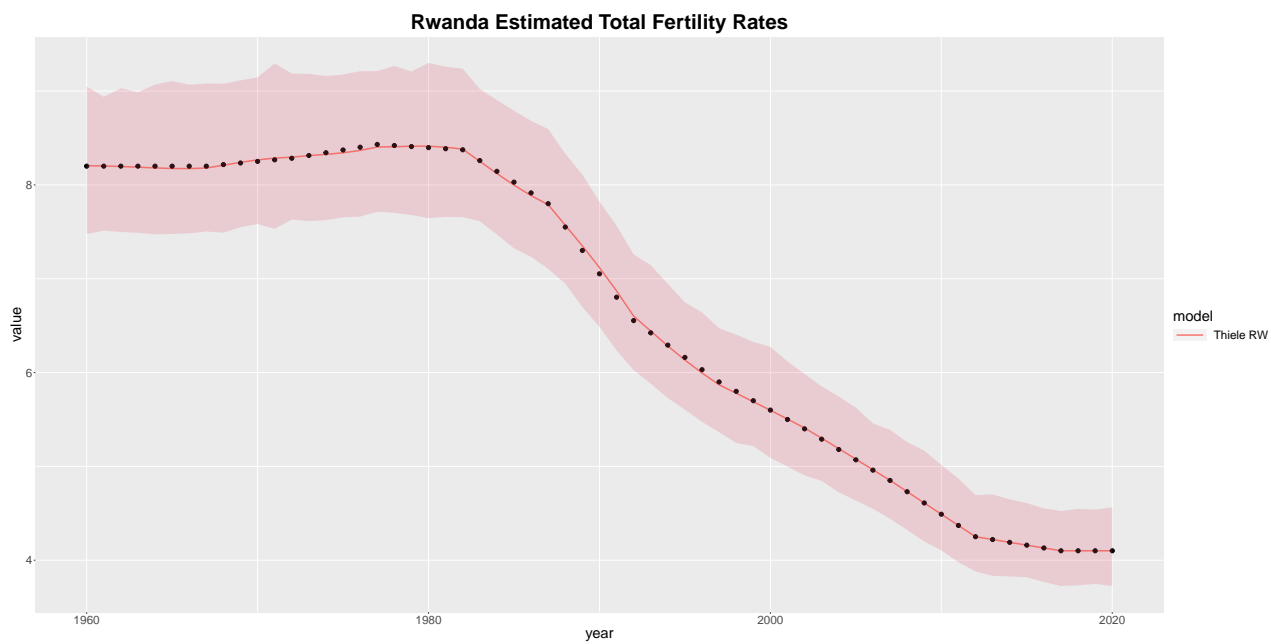


Figure 18: Total Fertility

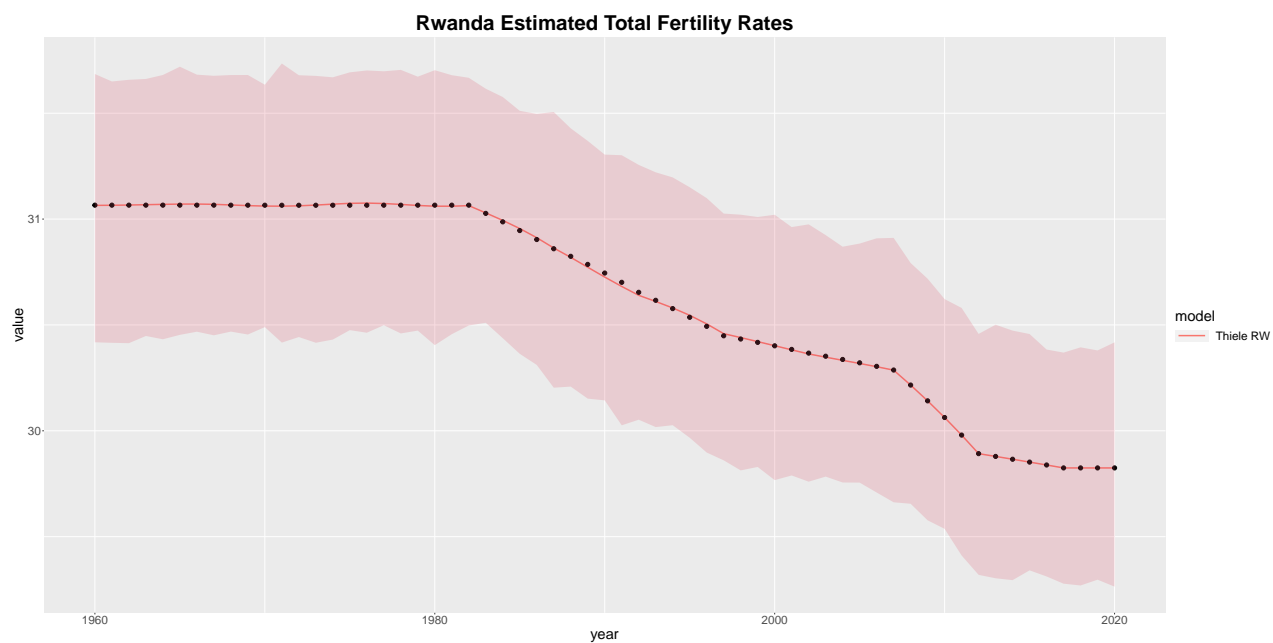


Figure 19: Mean age at births

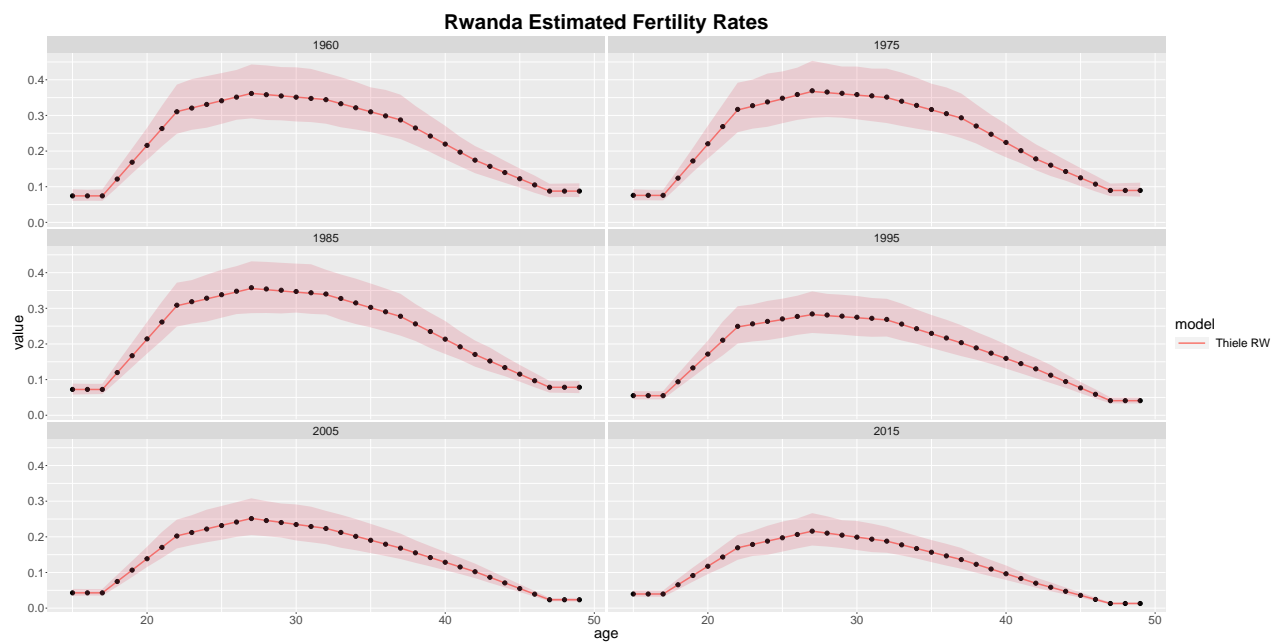


Figure 20: Fertility

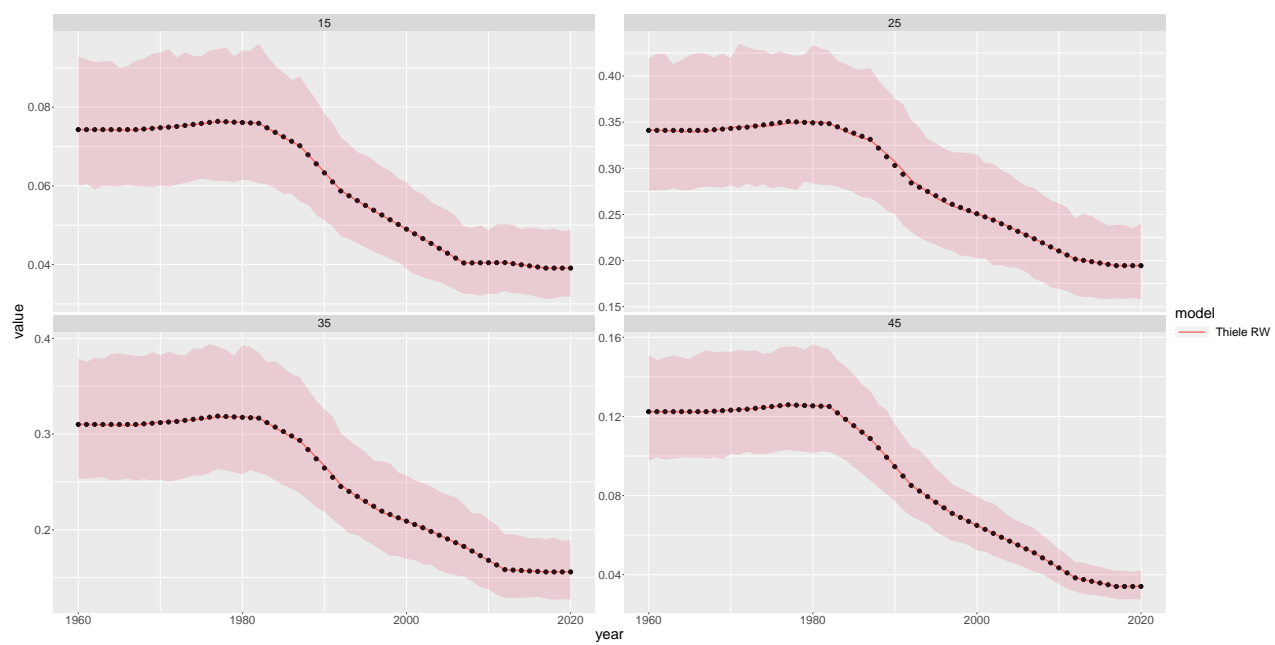


Figure 21: Fertility