

# Mali

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

## # A tibble: 81 x 4
##   age `1987` `1998` `2009`
##   <dbl>   <dbl>   <dbl>   <dbl>
## 1     0 124801. 142036 223369.
## 2     1 130699. 143506. 257789.
## 3     2 143705. 166117. 268530.
## 4     3 145236. 169658. 265587.
## 5     4 145604. 175557. 266091.
## 6     5 142436. 177505. 259251.
## 7     6 133063. 169191. 247642.
## 8     7 123495. 159883. 237080.
## 9     8 112436. 150065. 224554.
## 10    9 102337. 139890. 210831.
## # ... with 71 more rows

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

## # A tibble: 18 x 2
##   age `1976`
##   <dbl>   <dbl>
## 1     0 589461.
## 2     5 469318.
## 3    10 365111.
## 4    15 313740.
## 5    20 283085.
## 6    25 256486.
## 7    30 221242.
## 8    35 176439.
## 9    40 140031.
## 10   45 112098.
## 11   50  92157.
## 12   55  77736.
## 13   60  65678.
## 14   65  48225.
## 15   70  32268.
## 16   75  22262.
## 17   80  17833.
## 18   85  14930.

## [1] "Census Males"

## # A tibble: 81 x 4
##   age `1987` `1998` `2009`
##   <dbl>   <dbl>   <dbl>   <dbl>
## 1     0 125225. 144399 228866.
## 2     1 132390. 146371. 265188.
## 3     2 145200. 169490. 275420.
## 4     3 146748. 173008 272373.
## 5     4 147629. 179622. 273244.
## 6     5 144982. 182525. 266880.
```

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## 7      6 136266. 174741. 255699.
## 8      7 128089. 166574. 246234.
## 9      8 118465. 158195. 234852.
## 10     9 109481. 149394. 222229.
## # ... with 71 more rows
```

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

```
## # A tibble: 18 x 2
```

```
##   age `1976`
##   <dbl>   <dbl>
```

```
## 1      0 587090.
## 2      5 478652.
## 3     10 371670.
## 4     15 294640.
## 5     20 236401.
## 6     25 201103.
## 7     30 183257.
## 8     35 162001.
## 9     40 137909.
## 10    45 116691.
## 11    50 99549.
## 12    55 84109.
## 13    60 67783.
## 14    65 47273.
## 15    70 30306.
## 16    75 20072.
## 17    80 14093.
## 18    85 14057.
```

### *Thiele log-Normal Hump Spline*

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

##	log_tau2_logpop_f	log_tau2_logpop_f	log_tau2_logpop_m	log_tau2_
##	5.5839145	4.5100503	6.0662988	4
##	log_tau2_gx_m	log_lambda_gx_age_f	log_lambda_gx_age_m	log_lambda_g
##	3.7547339	7.6208324	6.9468180	7
##	log_lambda_gx_agemtime_m	log_lambda_tp	log_lambda_tp_0_inflated_sd	log_disp
##	6.9077421	1.1829075	-2.1041170	0
##	log_marginal_prec_psi_f	log_marginal_prec_A_f	log_marginal_prec_B_f	log_marginal_pr
##	6.7981357	6.7610792	6.3984207	6
##	log_marginal_prec_B_m	log_lambda_phi_f	log_lambda_psi_f	log_lambda_
##	4.2409515	4.3057504	4.3065971	4
##	log_lambda_A_f	log_lambda_B_f	log_lambda_phi_m	log_lamb
##	4.2900761	3.9648976	4.3191792	4
##	log_lambda_epsilon_m	log_lambda_A_m	log_lambda_B_m	logit_lambda_slo
##	3.9121980	4.3029350	3.9081870	4
##	logit_lambda_slope_rho_m	logit_delta_slope_rho_m	logit_epsilon_slope_rho_m	
##	2.1675936	-1.2151352	1.0771069	

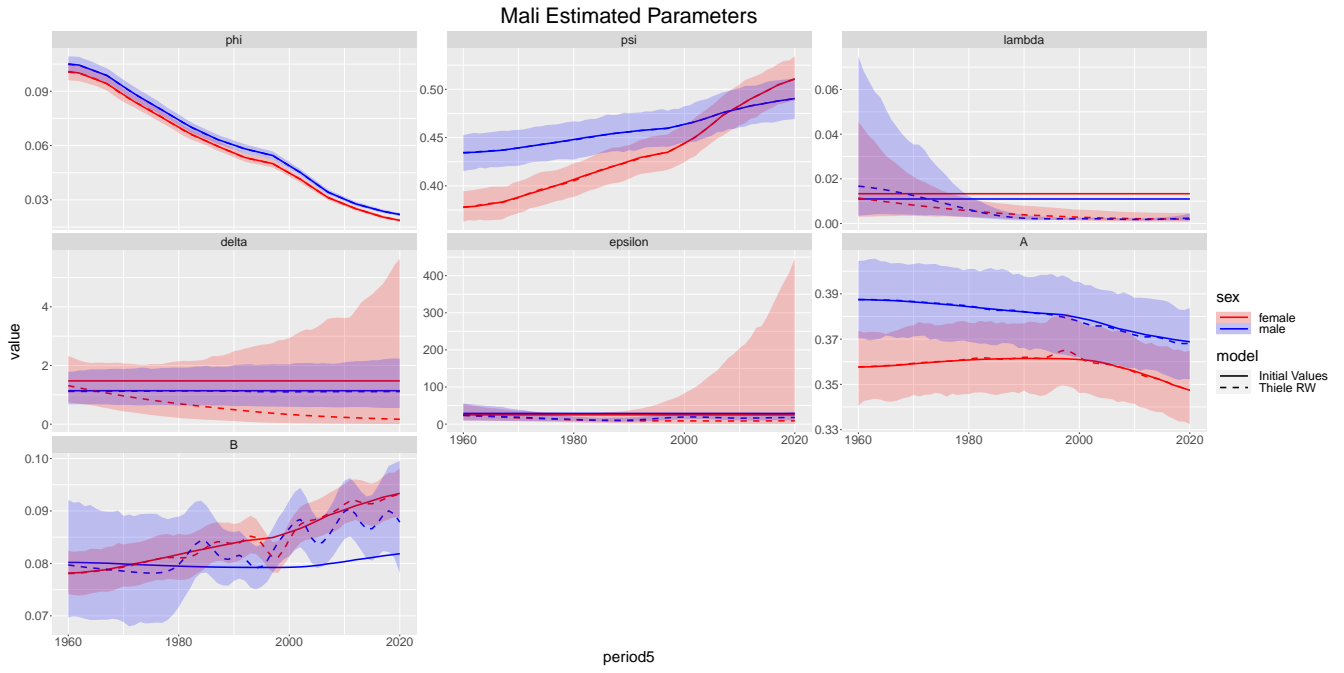


Figure 1: Estimated parameters

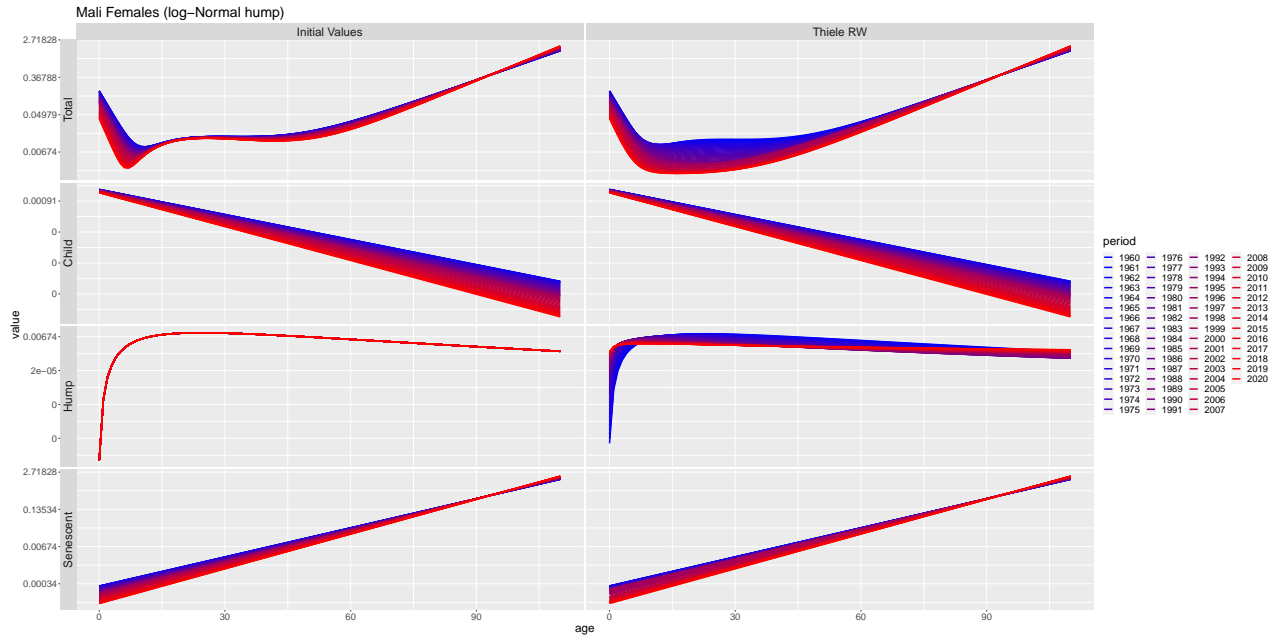


Figure 2: Thiele Decomposed

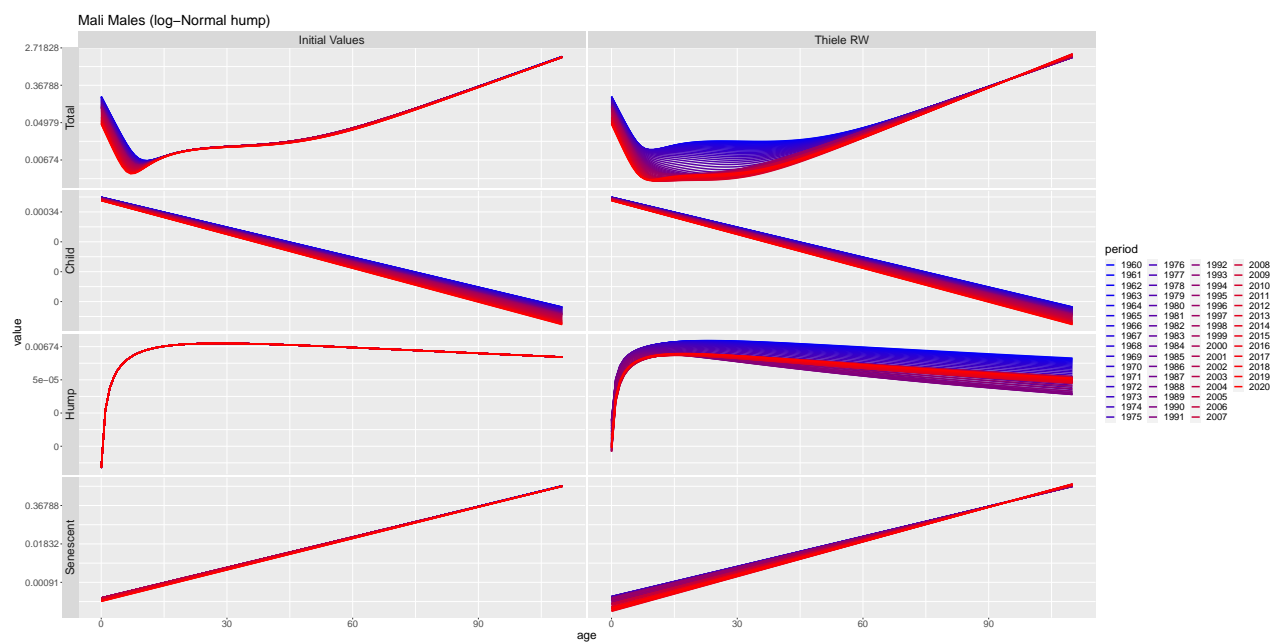


Figure 3: Thiele Decomposed

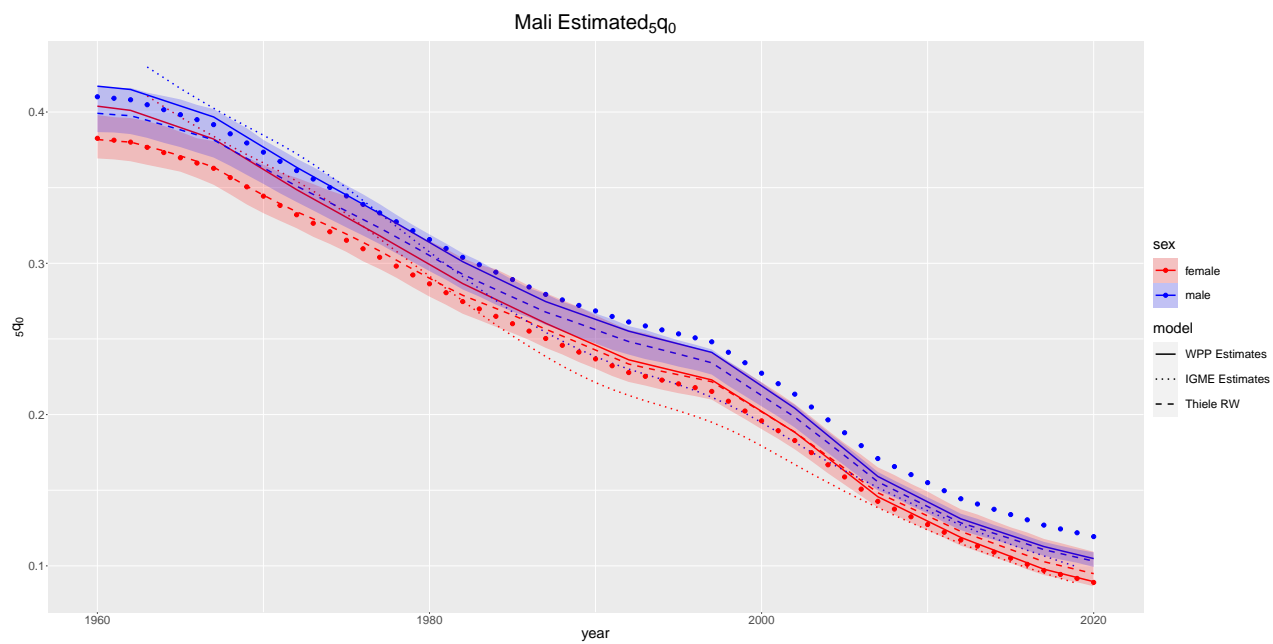


Figure 4: Estimated  $5q_0$

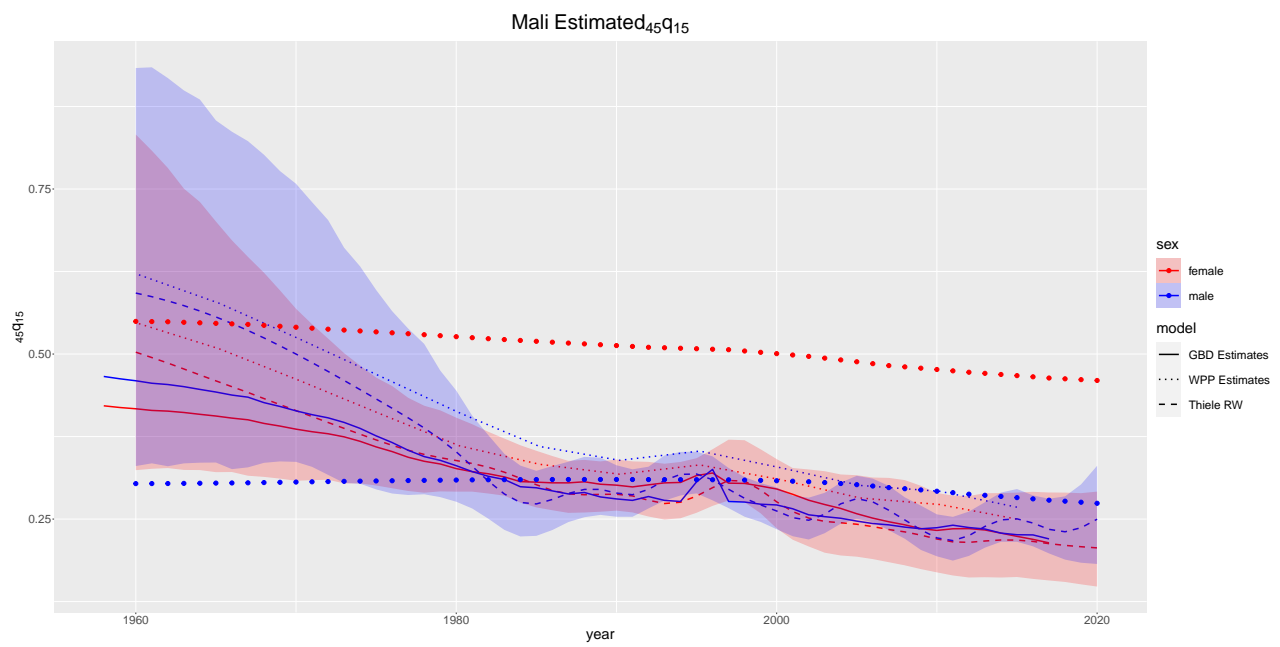


Figure 5: Estimated  $_{45}q_{15}$

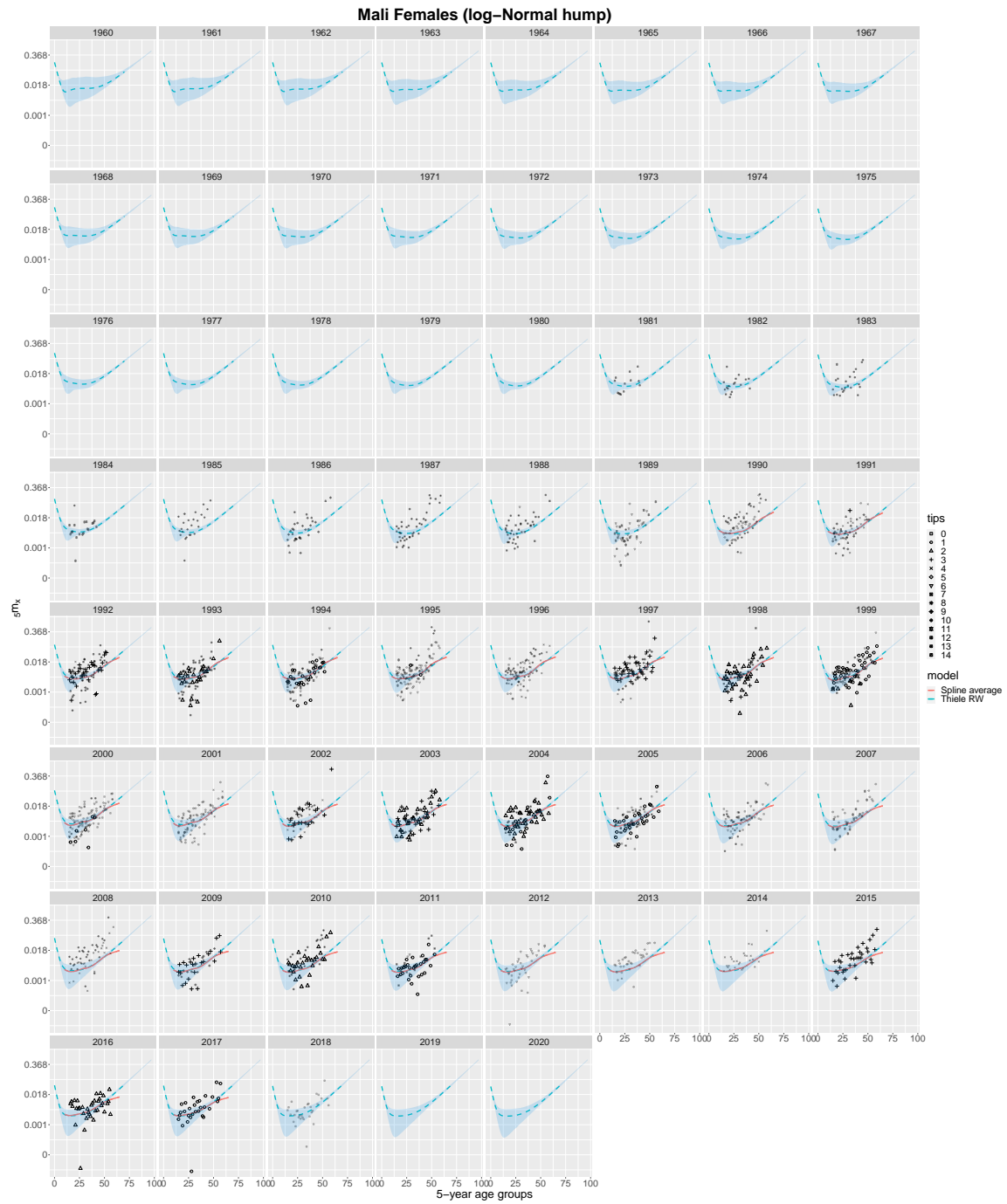


Figure 6: Mortality Schedules

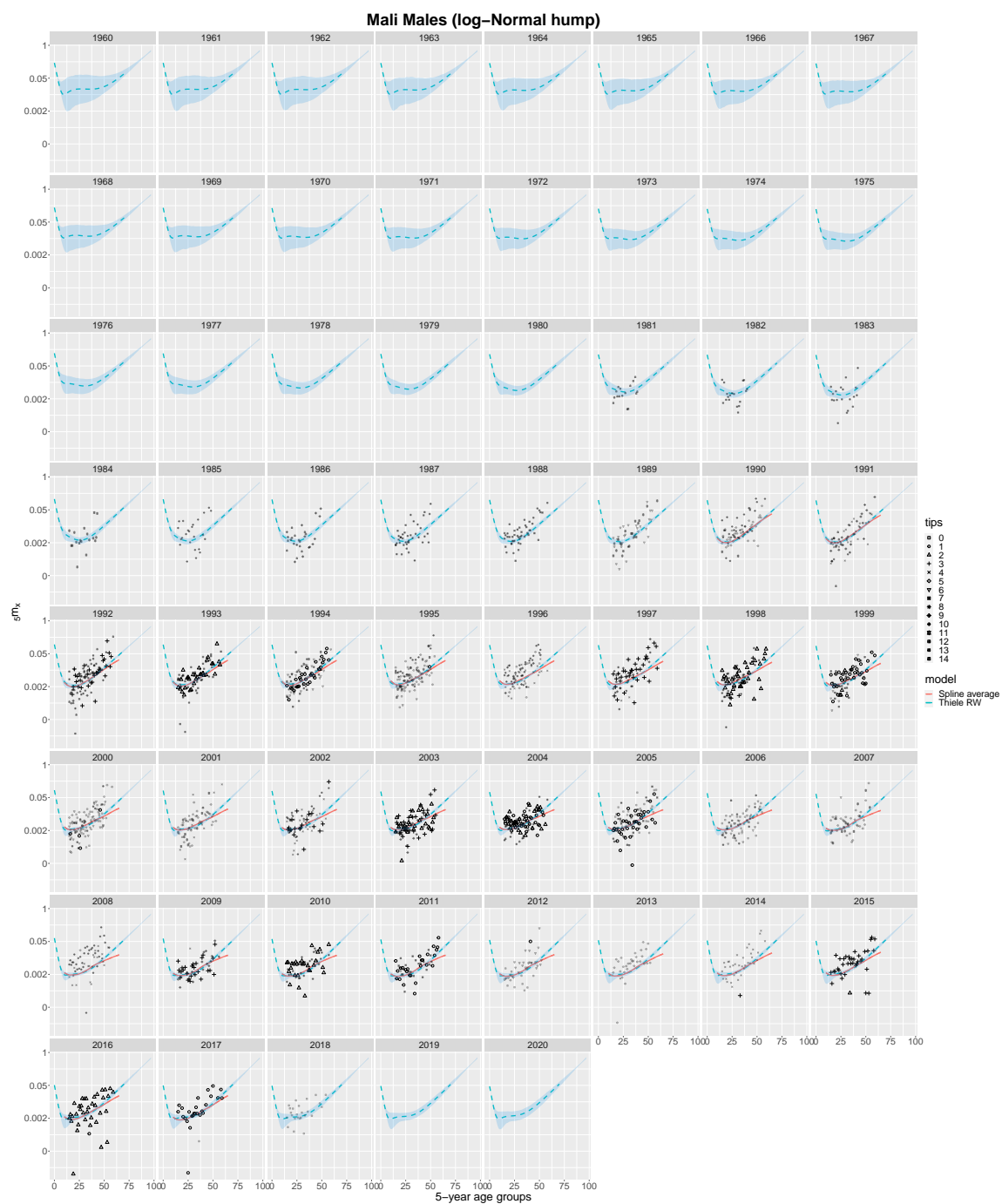


Figure 7: Mortality Schedules

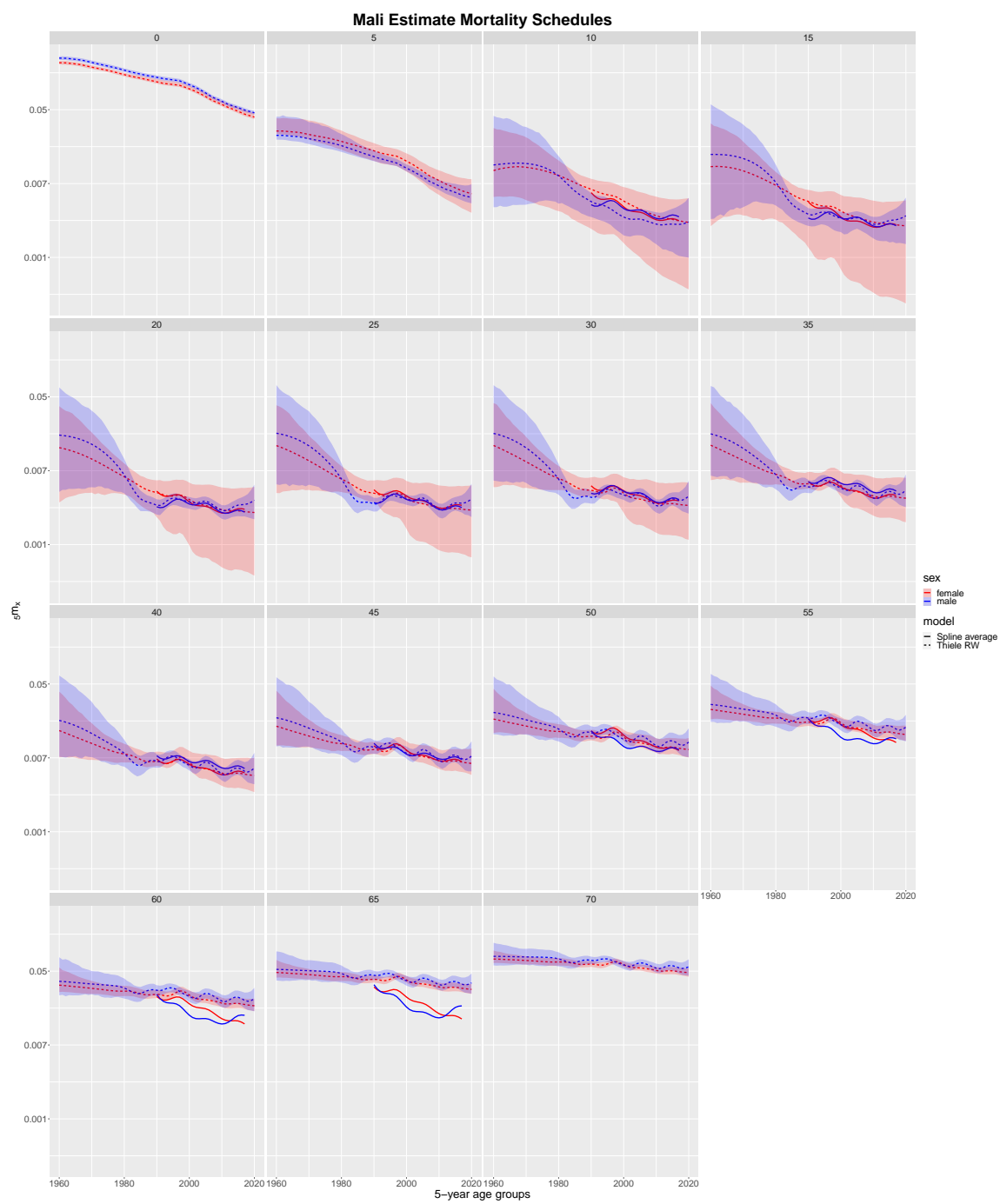


Figure 8: Mortality Schedules



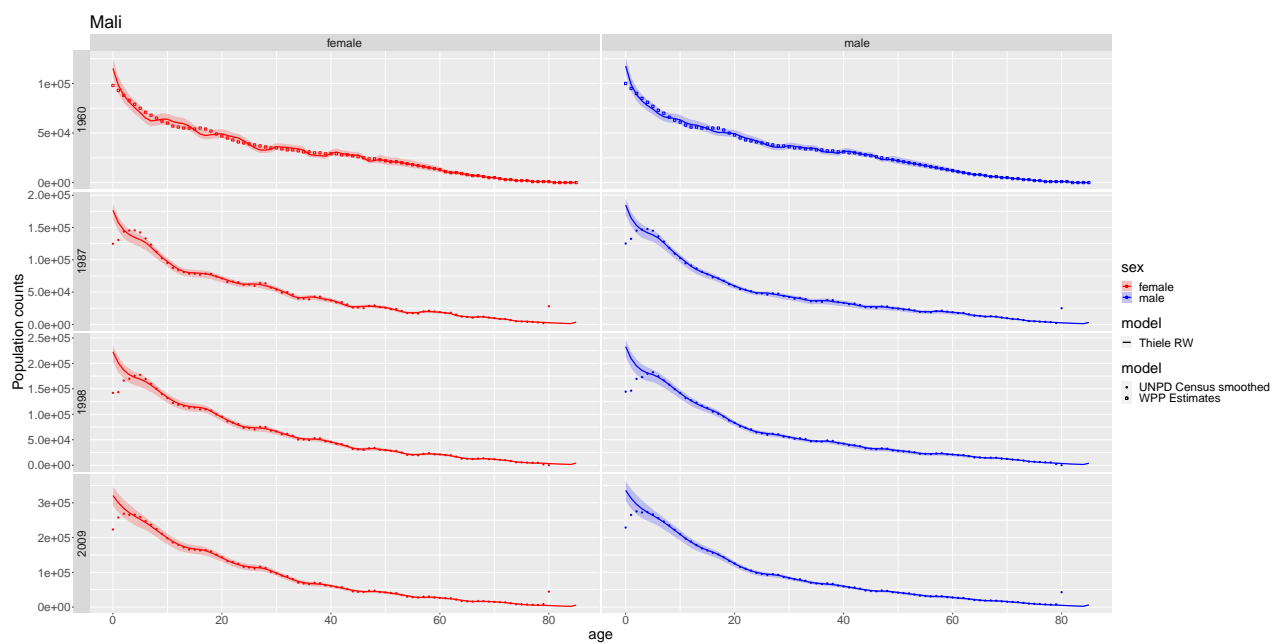


Figure 9: Population

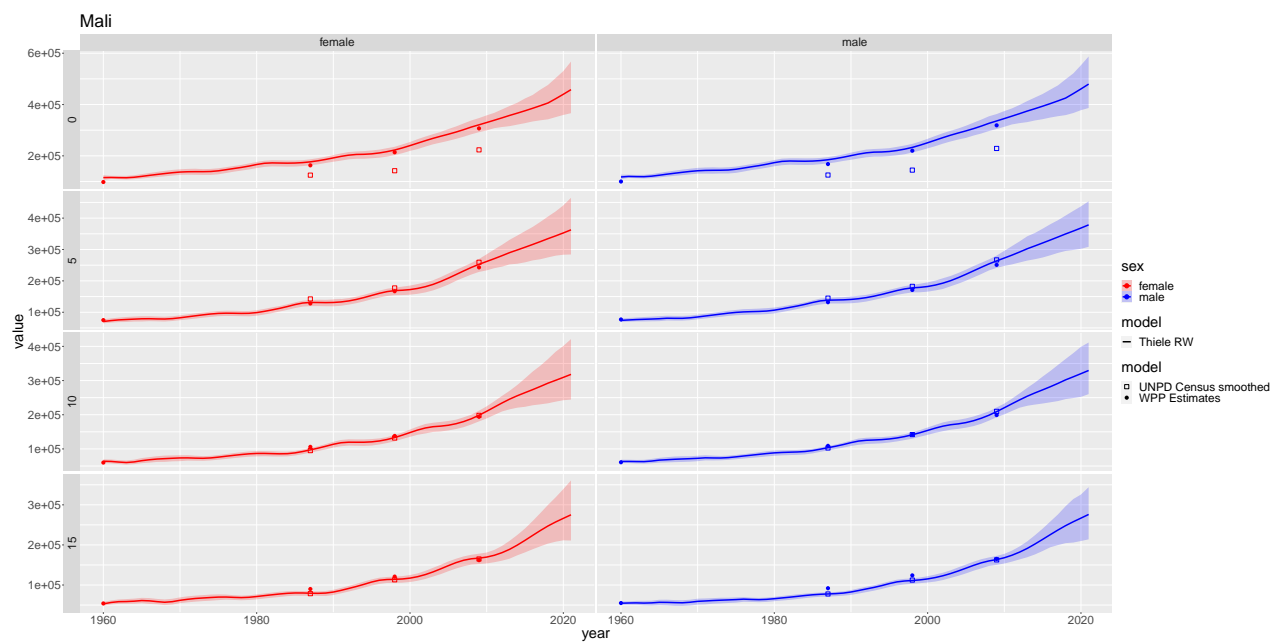


Figure 10: Population

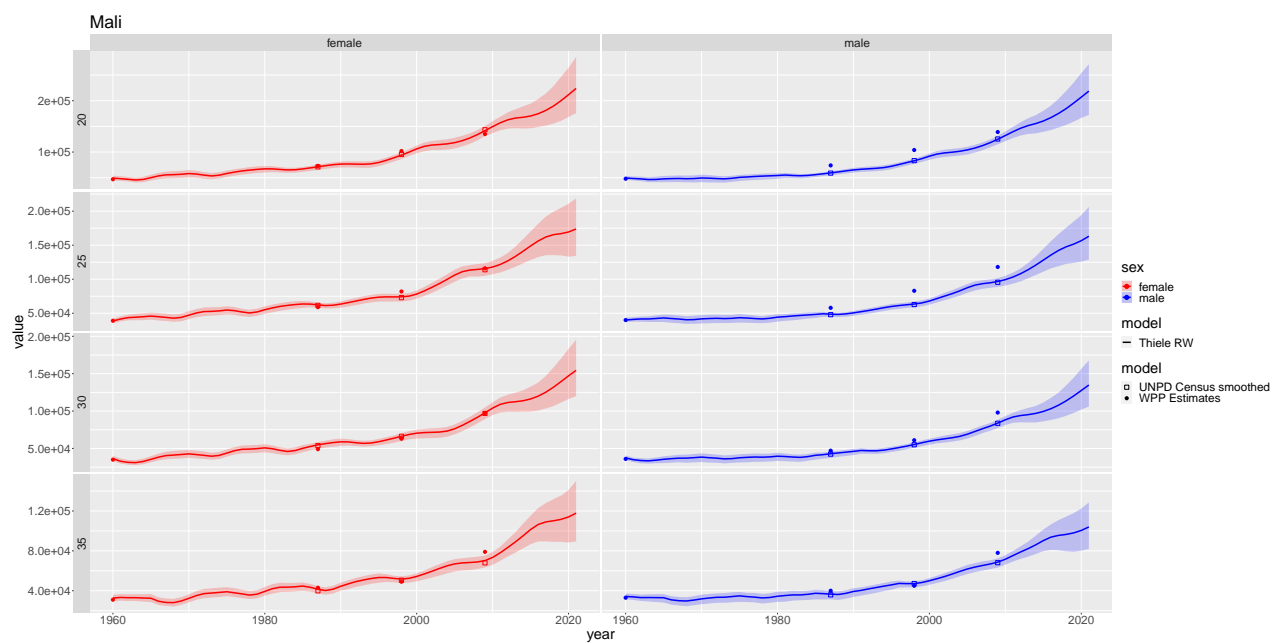


Figure 11: Population

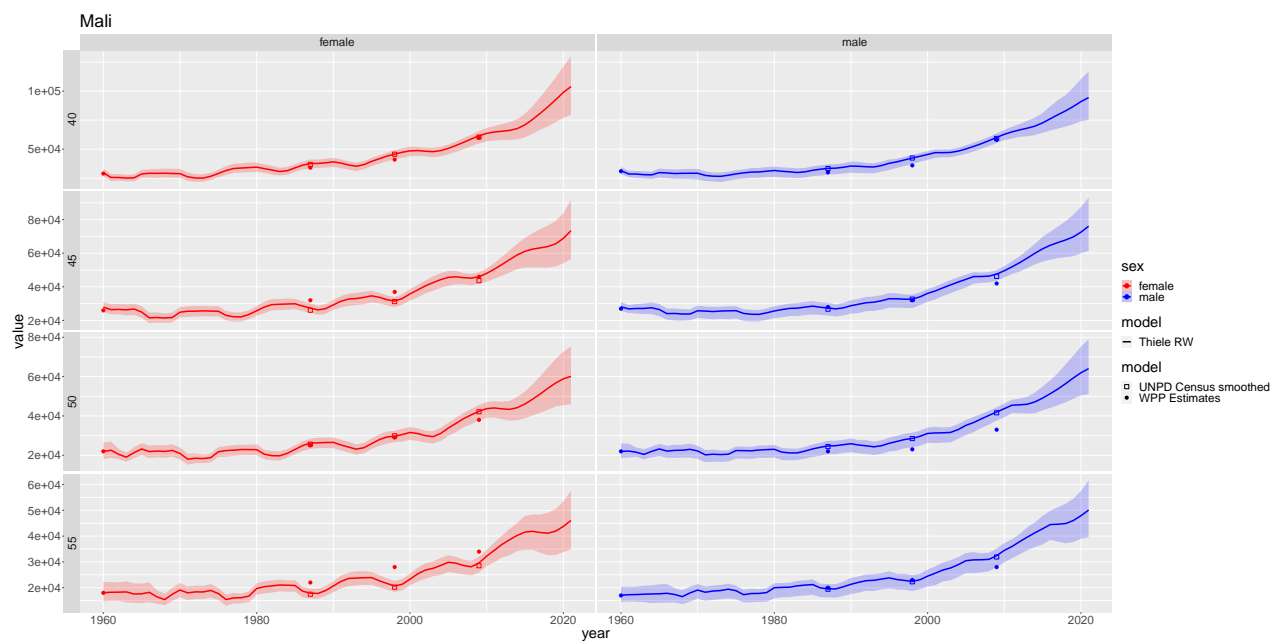


Figure 12: Population



Figure 13: Population

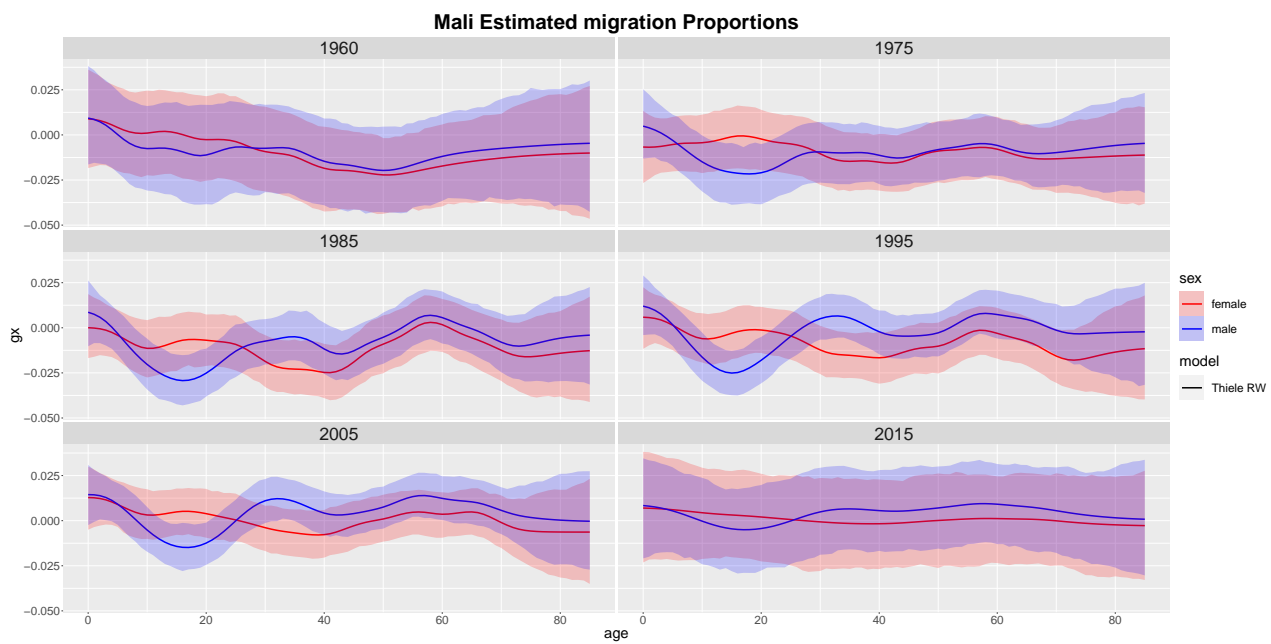


Figure 14: Migration

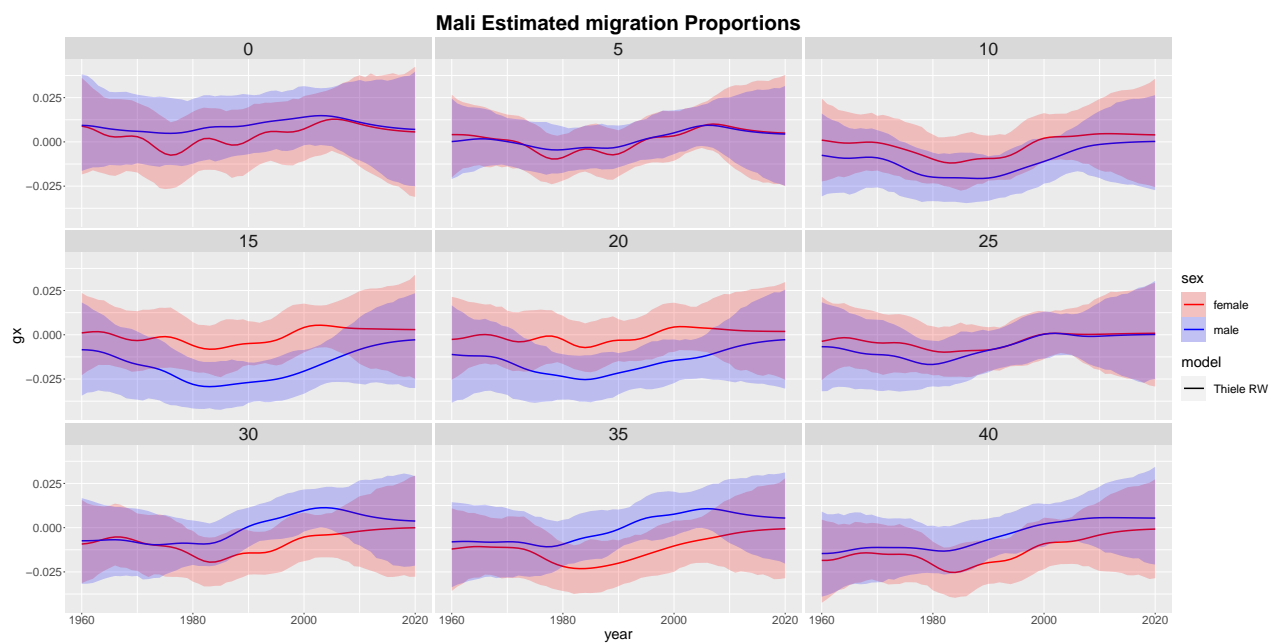


Figure 15: Migration

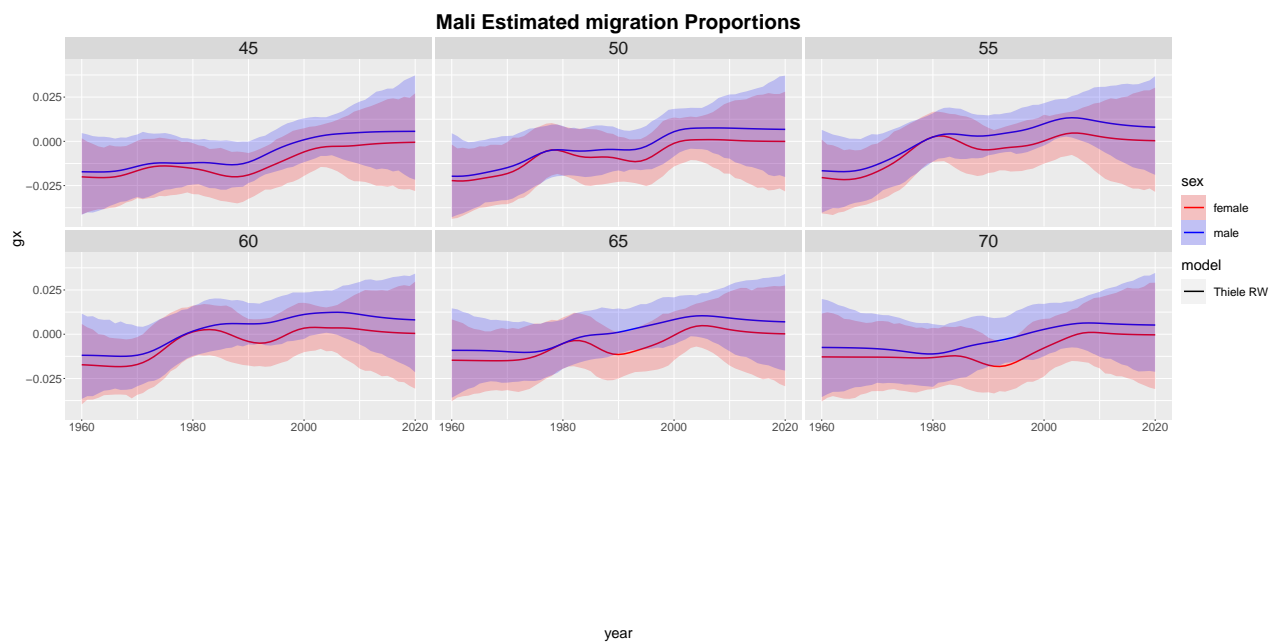


Figure 16: Migration

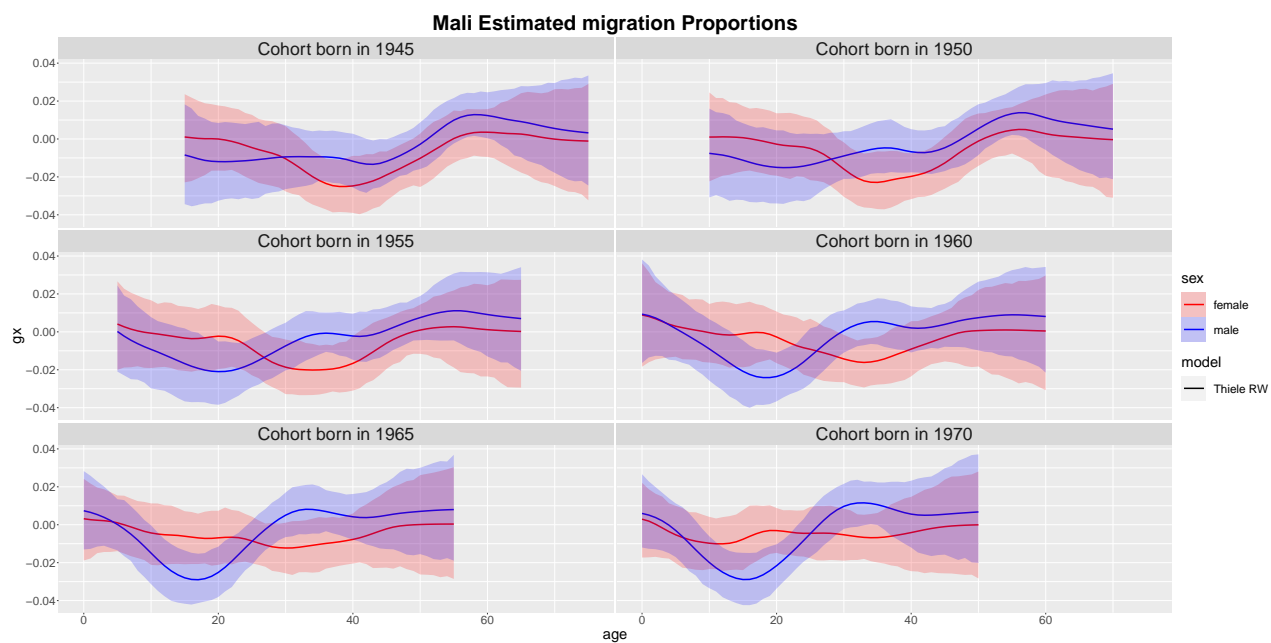


Figure 17: Migration

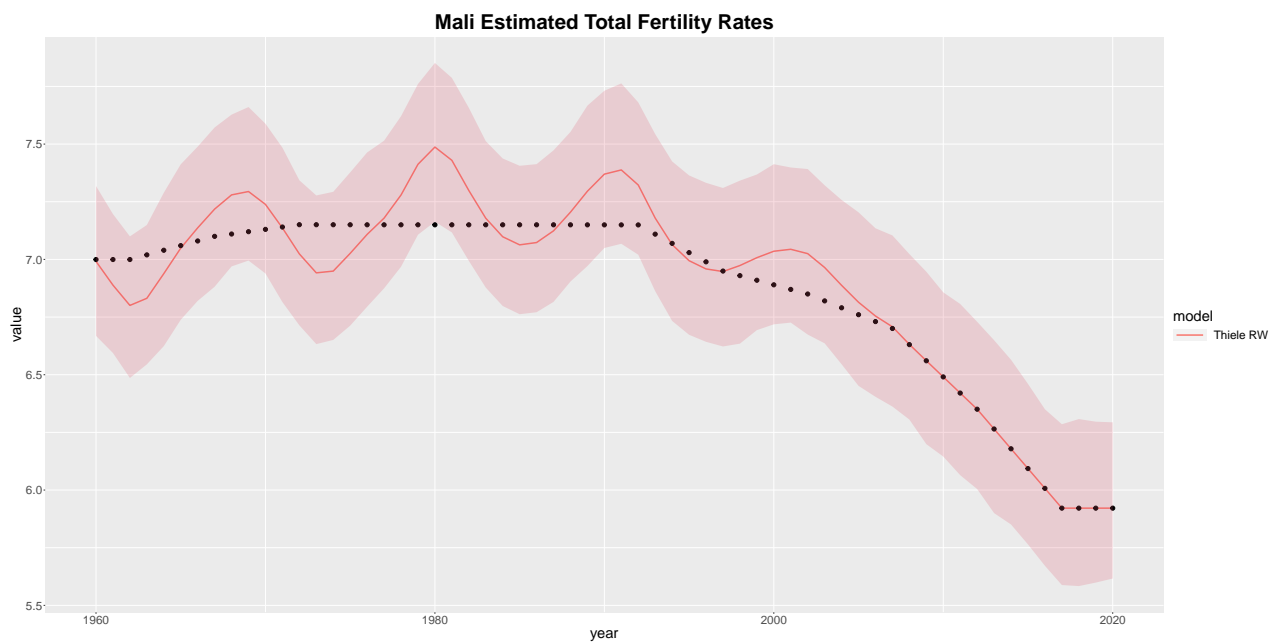


Figure 18: Total Fertility

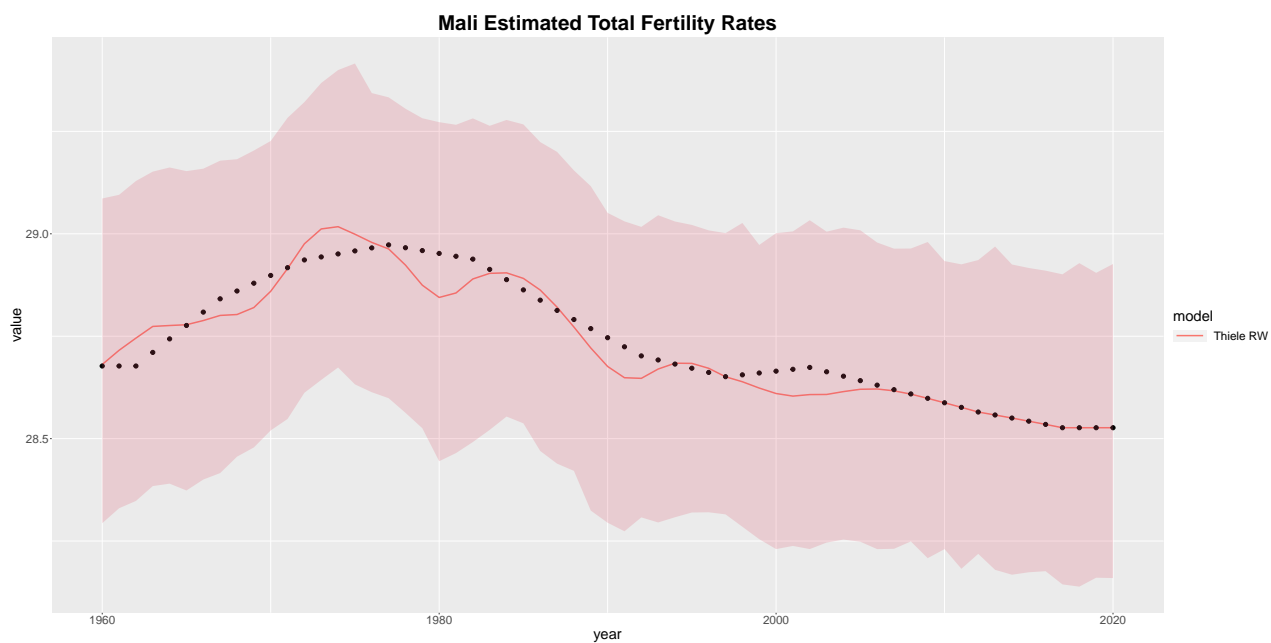


Figure 19: Mean age at births

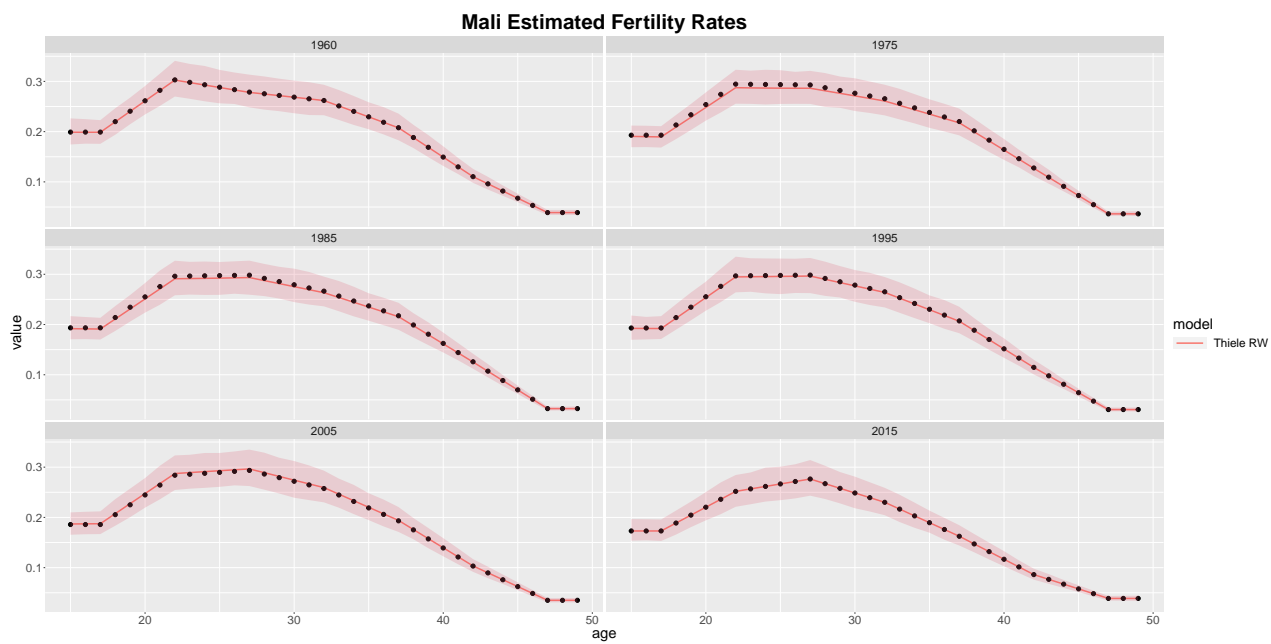


Figure 20: Fertility

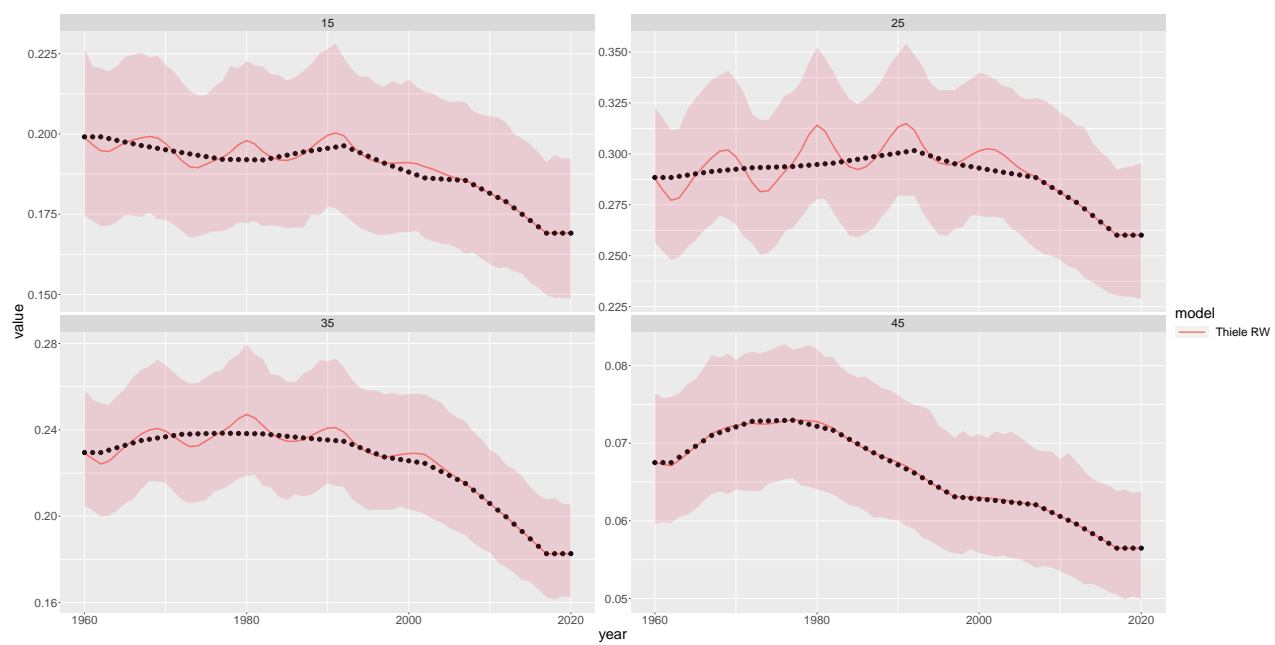


Figure 21: Fertility