Togo

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

## # A tibble: 86 x 2
##      age `1970`
##    <dbl> <dbl>
## 1      0 40430.
## 2      1 37238.
## 3      2 41304.
## 4      3 41179.
## 5      4 41431.
## 6      5 40995.
## 7      6 38433.
## 8      7 35076.
## 9      8 31456.
## 10     9 27541.
## # ... with 76 more rows

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

## # A tibble: 18 x 3
##      age  `1981`  `2010`
##    <dbl>   <dbl>   <dbl>
## 1      0 270991. 445753.
## 2      5 223881. 436083.
## 3     10 164223. 370046.
## 4     15 130977. 309693.
## 5     20 122493. 290666.
## 6     25 111348. 270917.
## 7     30  90044. 229765.
## 8     35  68593. 187312.
## 9     40  53165. 151703.
## 10    45  41694. 120178.
## 11    50  30908.  92157.
## 12    55  22256.  69045.
## 13    60  18221.  54414.
## 14    65  14719.  43884.
## 15    70  10947.  33878.
## 16    75   6866.  20370.
## 17    80  18818.  45734.
## 18    85     NA      NA

## [1] "Census Males"

## # A tibble: 86 x 2
##      age `1970`
##    <dbl> <dbl>
## 1      0 39209.
## 2      1 36913.
## 3      2 41089.
## 4      3 41287.
## 5      4 42040.
## 6      5 42119.
```

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##  7      6 40150.
##  8      7 37523.
##  9      8 34499.
## 10      9 31051.
## # ... with 76 more rows

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

## # A tibble: 18 x 3
##      age  `1981`  `2010`
##    <dbl>   <dbl>   <dbl>
##  1     0 273552. 457477.
##  2     5 240827. 453946.
##  3    10 184640. 395001.
##  4    15 132551. 318112.
##  5    20  96868. 258958.
##  6    25  76324. 220972.
##  7    30  62959. 195558.
##  8    35  51668. 168457.
##  9    40  44478. 139836.
## 10    45  38728. 112004.
## 11    50  30174.  83440.
## 12    55  22170.  59442.
## 13    60  18389.  42713.
## 14    65  15110.  30553.
## 15    70  11486.  22097.
## 16    75   7179.  13278.
## 17    80  20772.  28018.
## 18    85     NA      NA
```

Thiele log-Normal Hump Spline

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

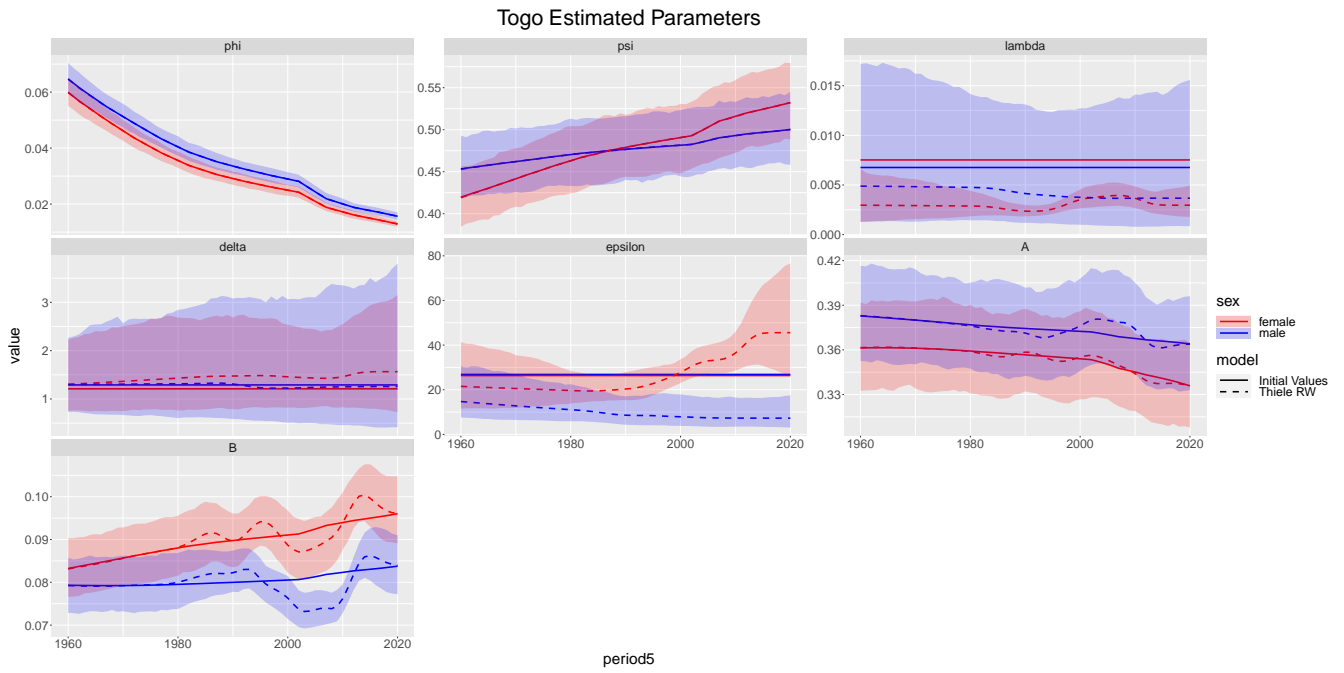|	log_tau2_logpop_f	log_tau2_logpop_f	log_tau2_logpop_m	log_tau2_
##	2.000000e+00	4.000000e+00	2.000000e+00	4.00
##	log_tau2_gx_m	log_lambda_gx_age_f	log_lambda_gx_age_m	log_lambda_g
##	2.000000e+00	5.000000e+00	5.000000e+00	5.00
##	log_lambda_gx_agetime_m	log_lambda_tp	log_lambda_tp_0_inflated_sd	log_disp
##	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_lamb
##	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	3.96
##	logit_lambda_slope_rho_m	logit_delta_slope_rho_m	logit_epsilon_slope_rho_m	
##	1.551839e-11	-3.022194e-12	-1.313152e-11	

Figure 1: Estimated parameters

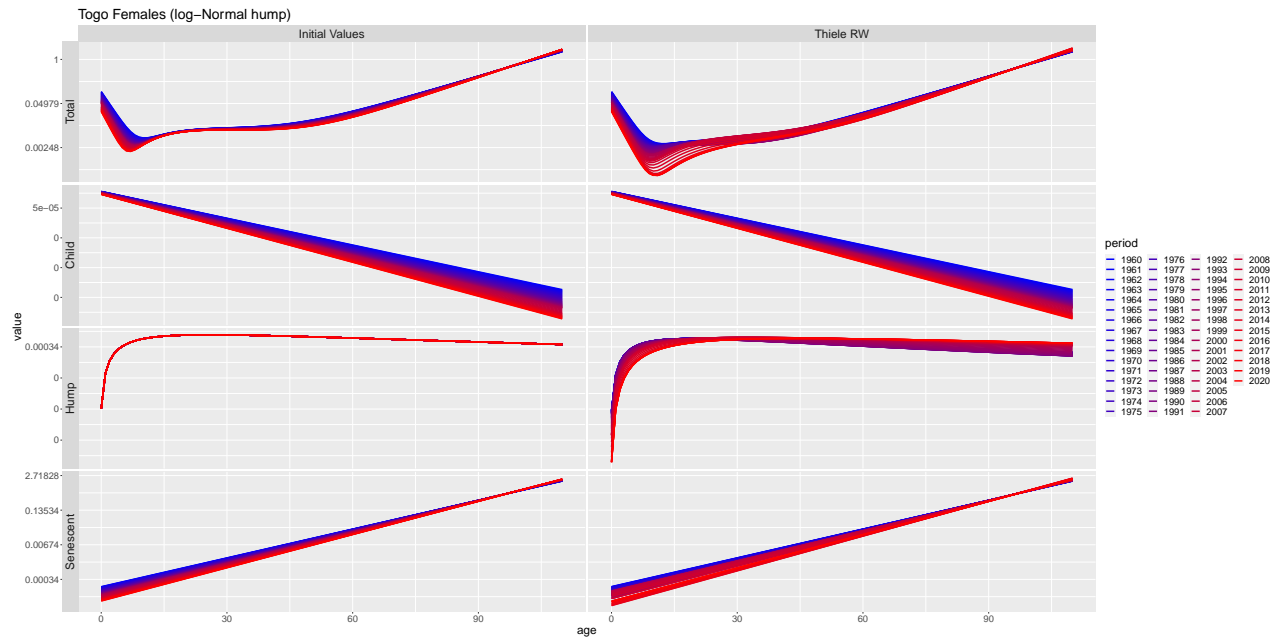Figure 2: Thiele Decomposed

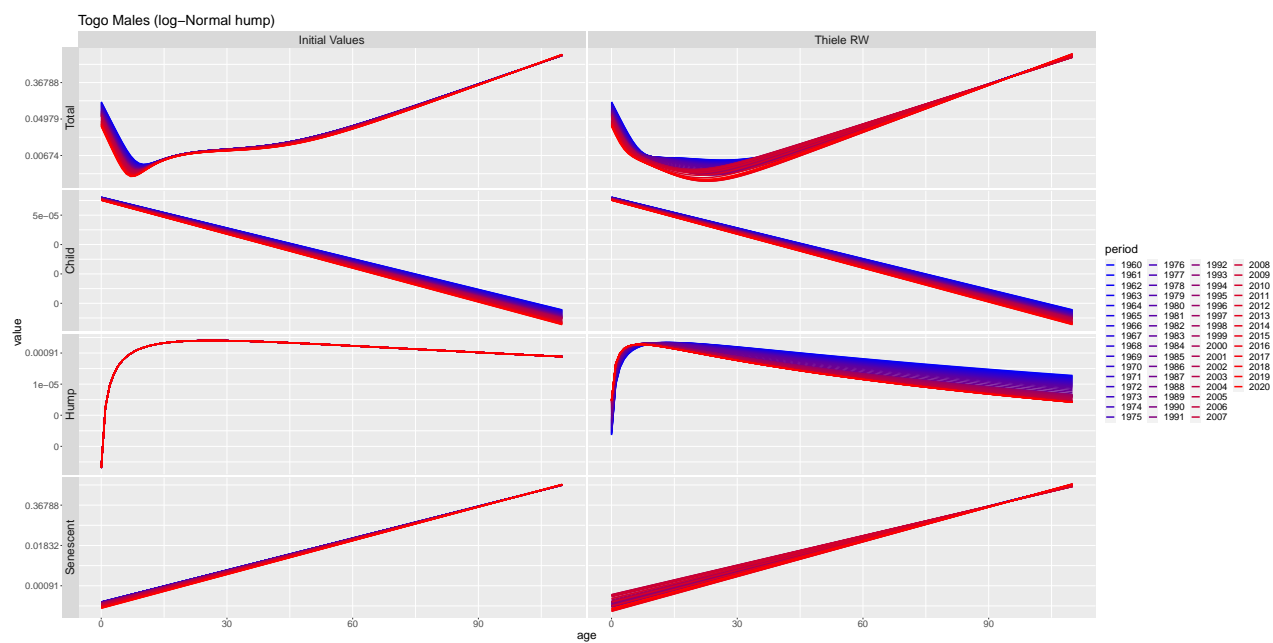Figure 3: Thiele Decomposed

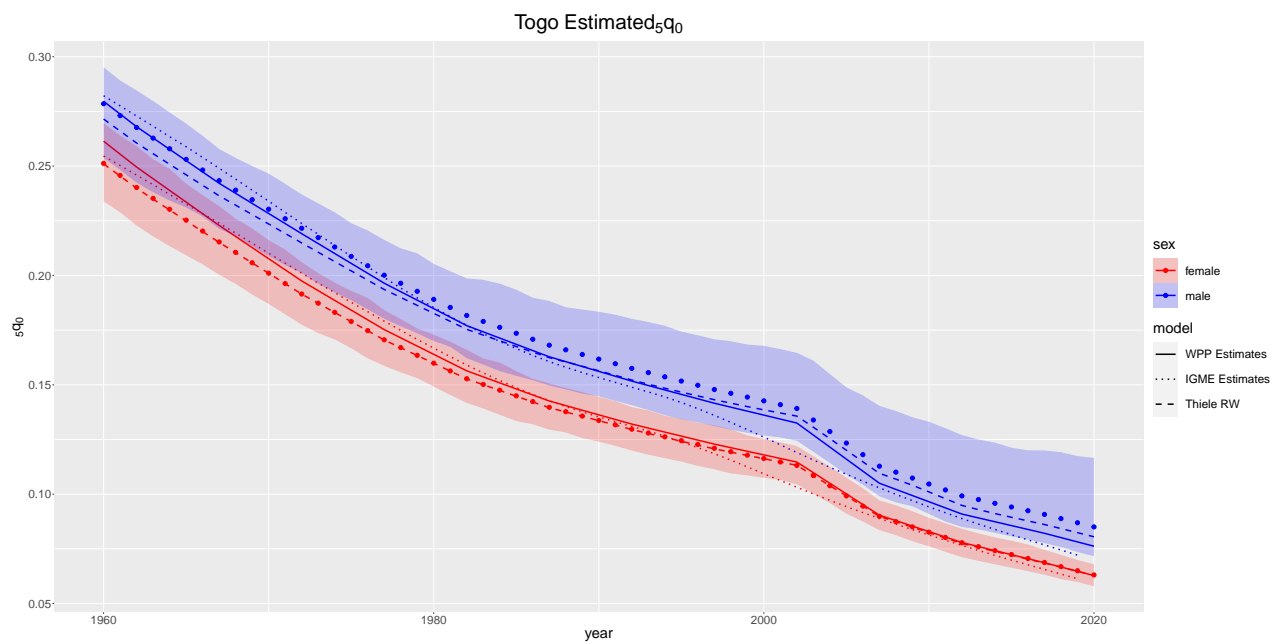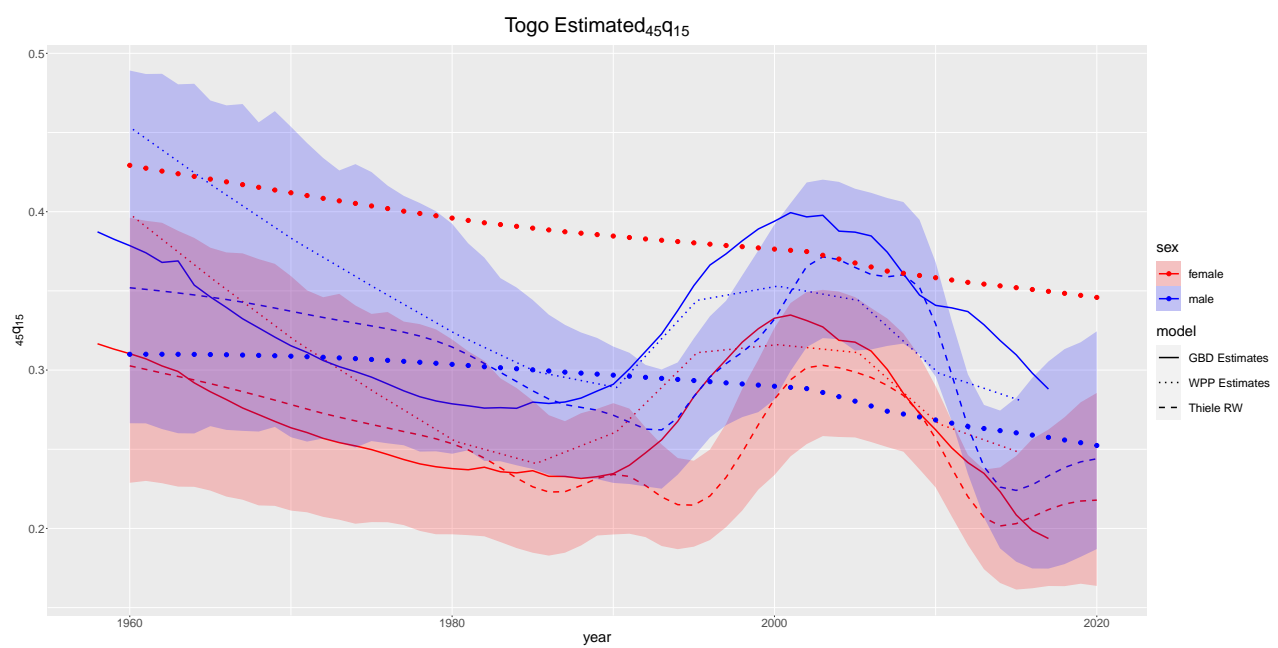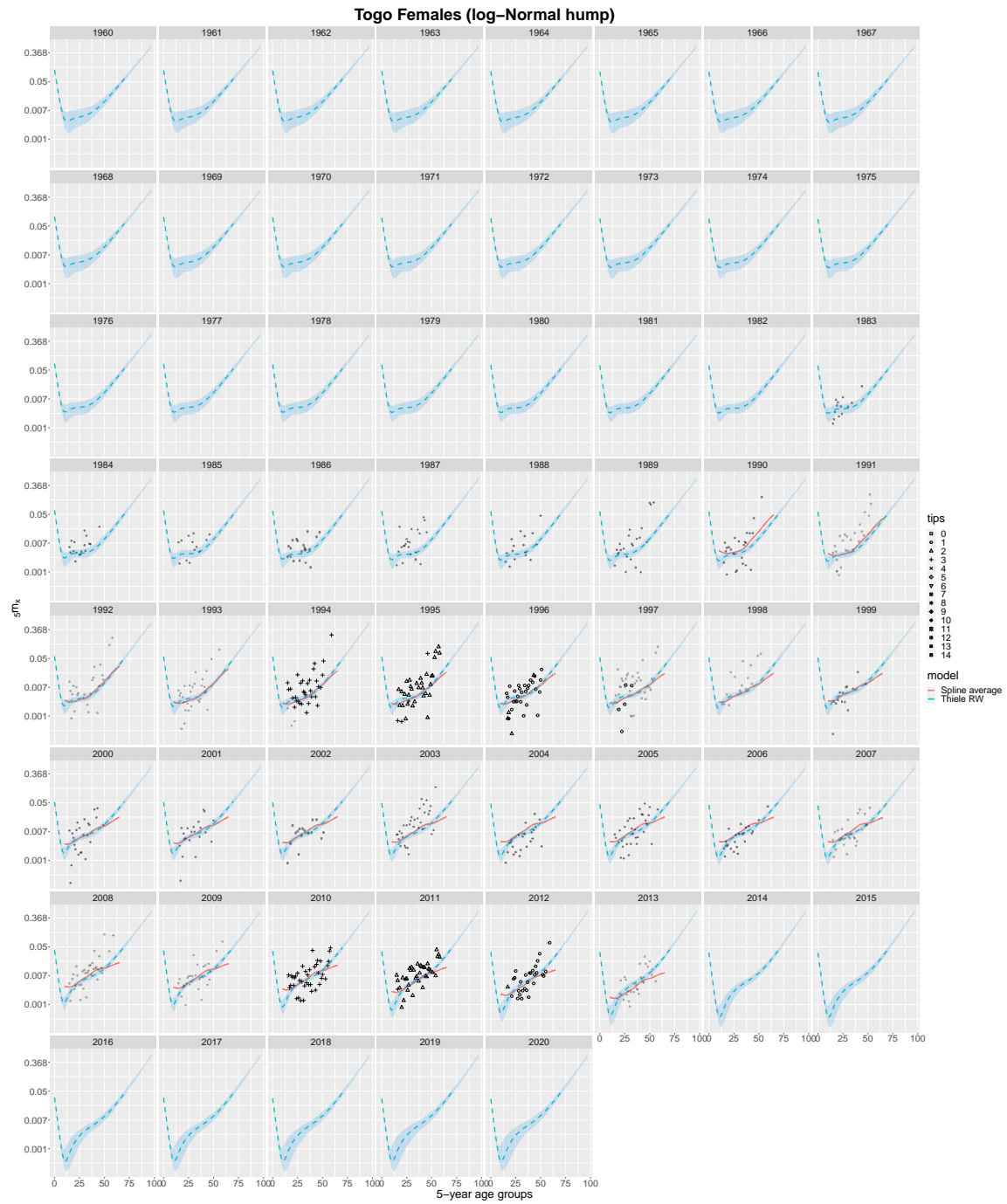Figure 4: Estimated $_5q_0$

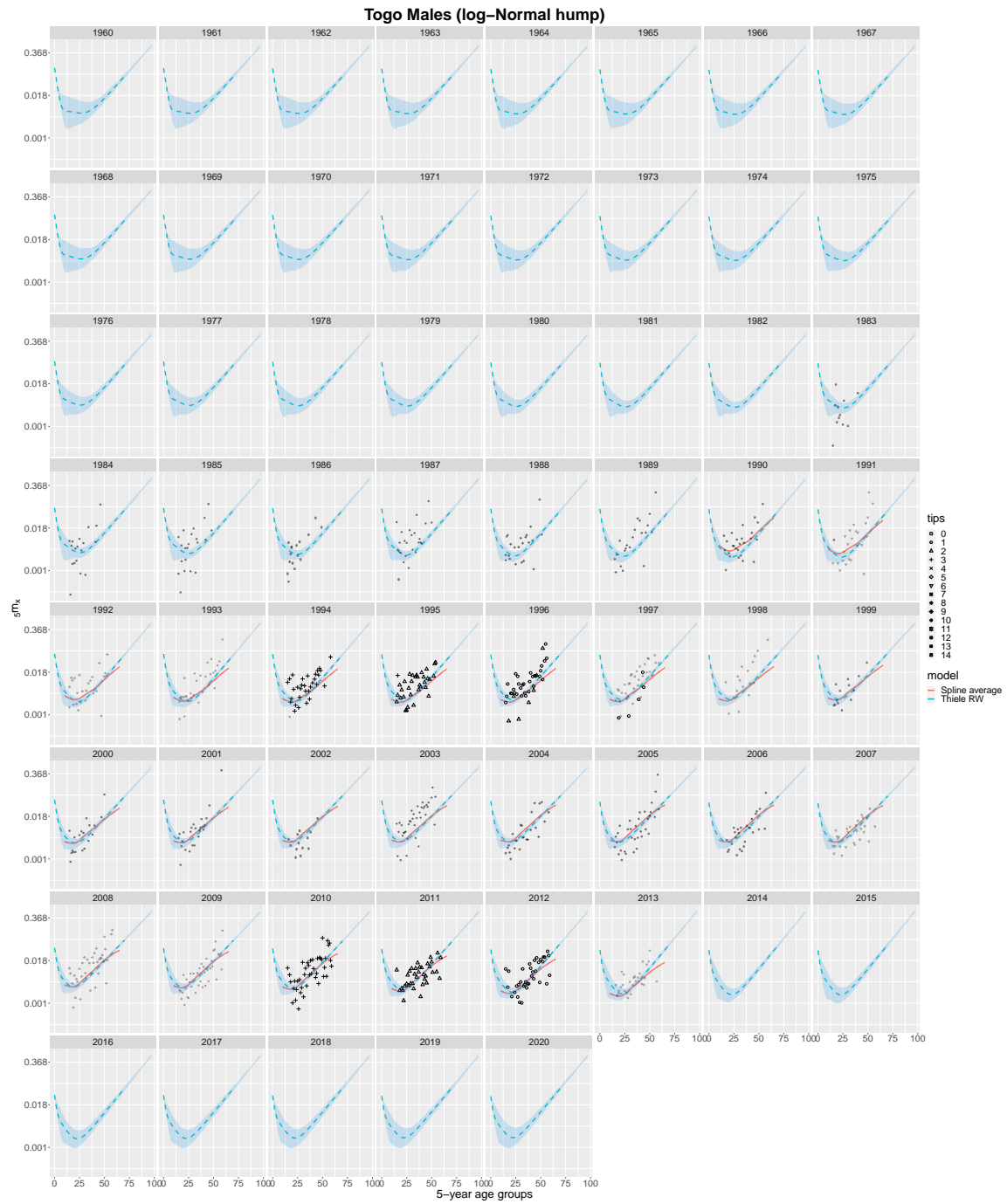Figure 5: Estimated $_{45}q_{15}$

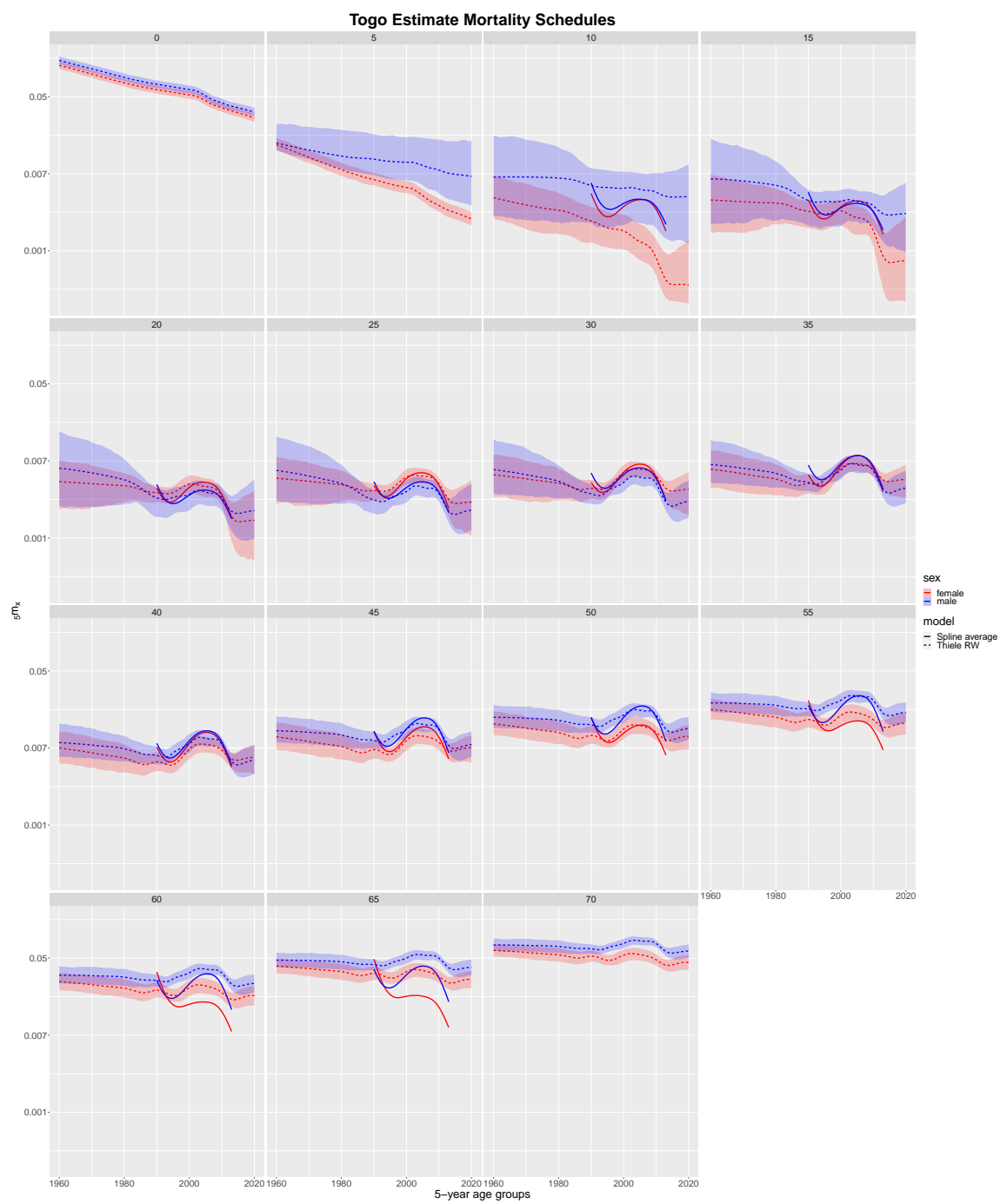Figure 6: Mortality Schedules

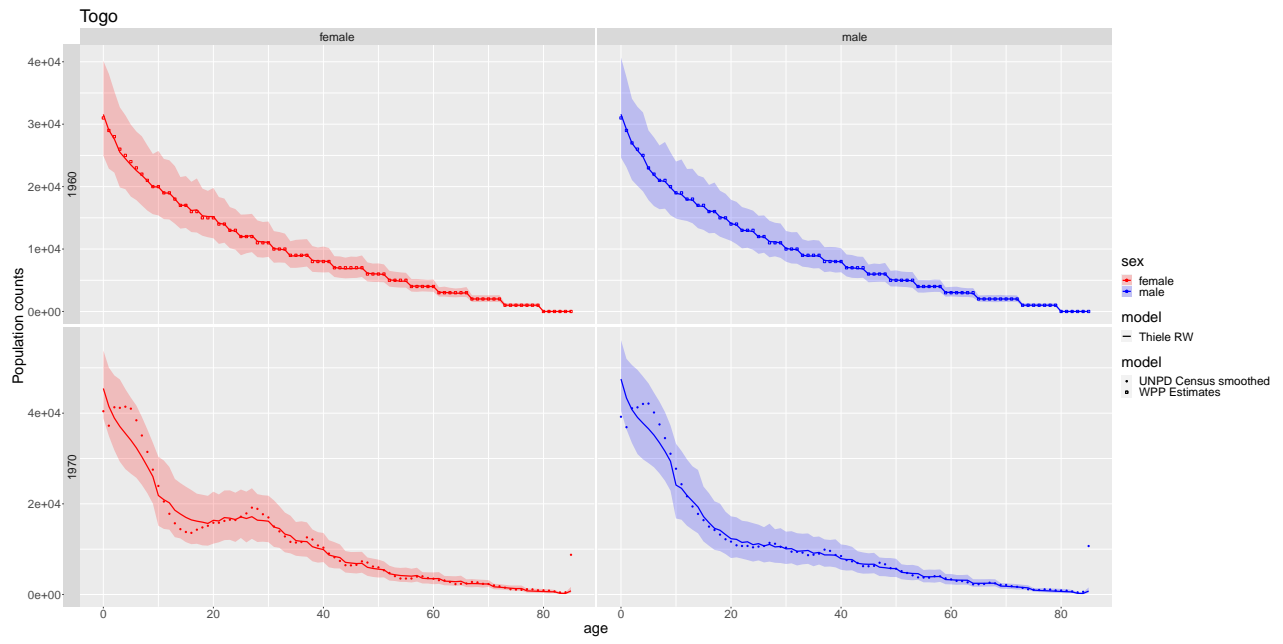Figure 7: Mortality Schedules
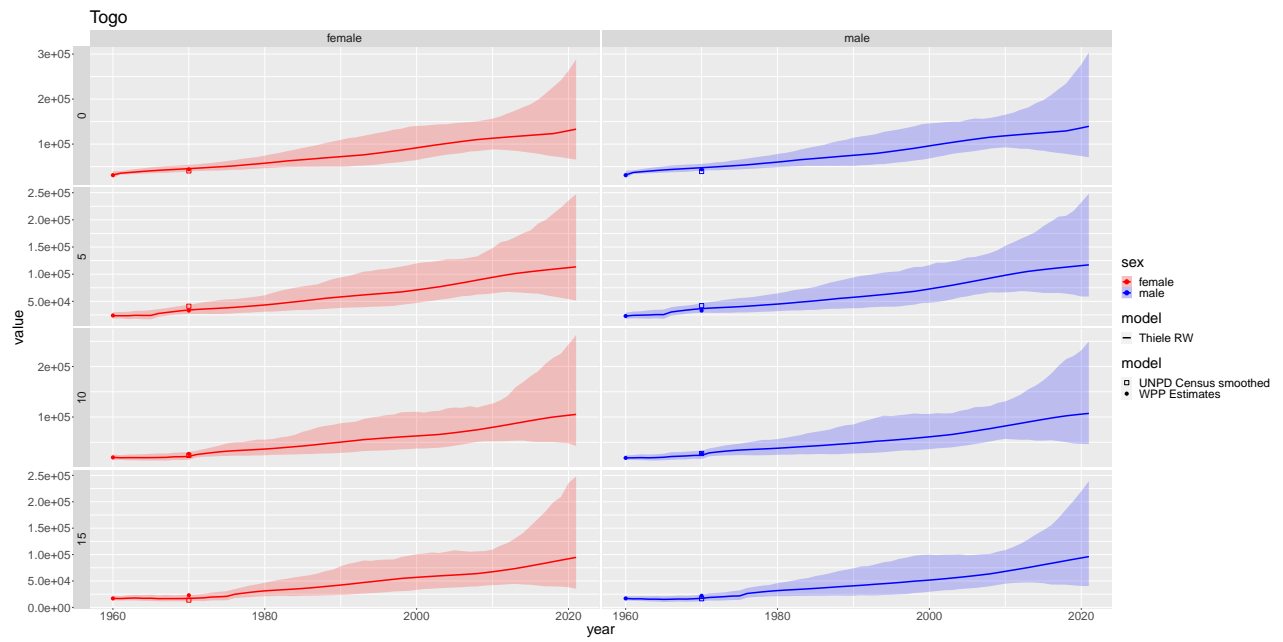
Figure 8: Mortality Schedules

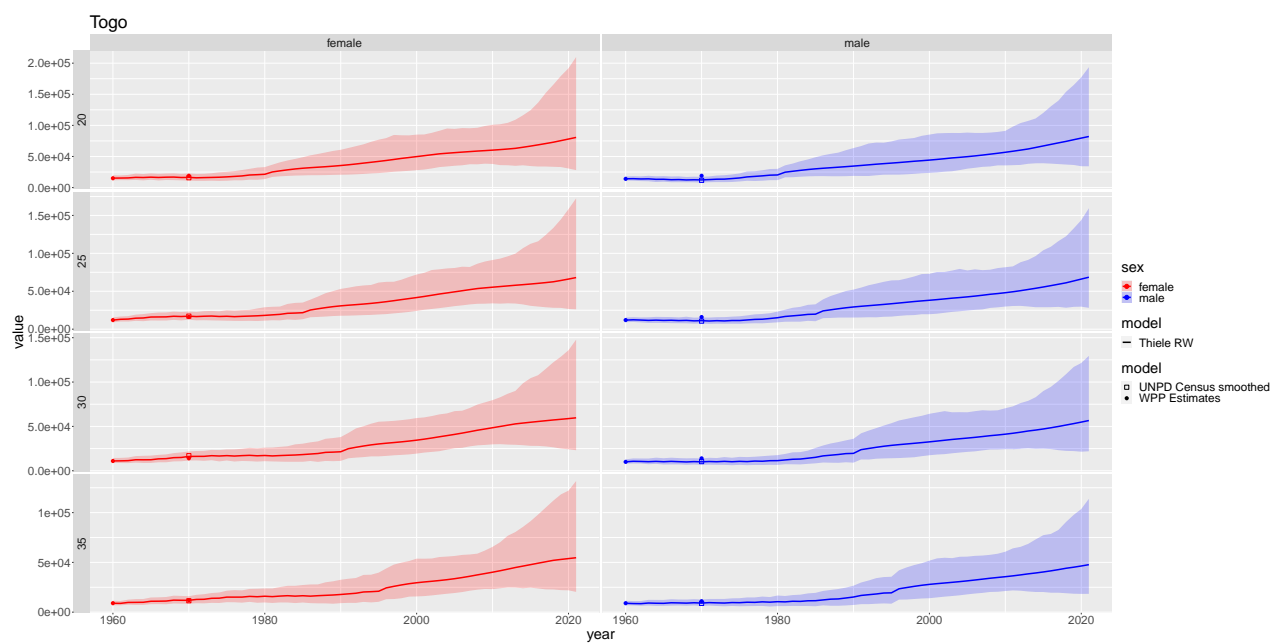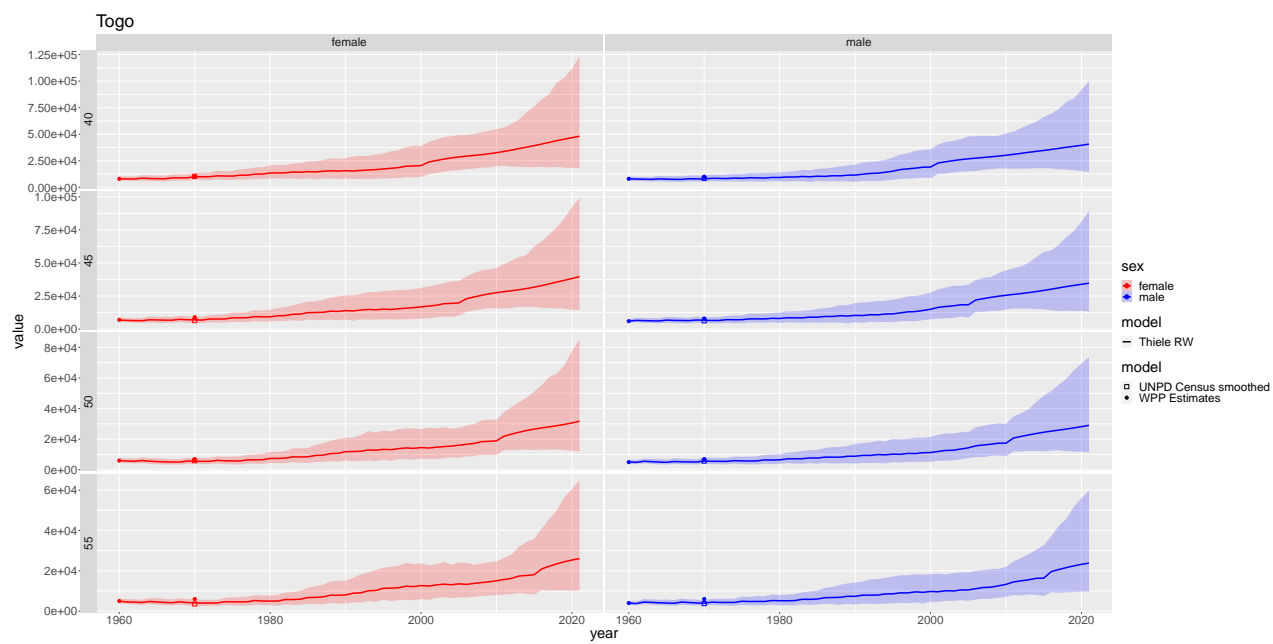Figure 9: Population

Figure 10: Population

9

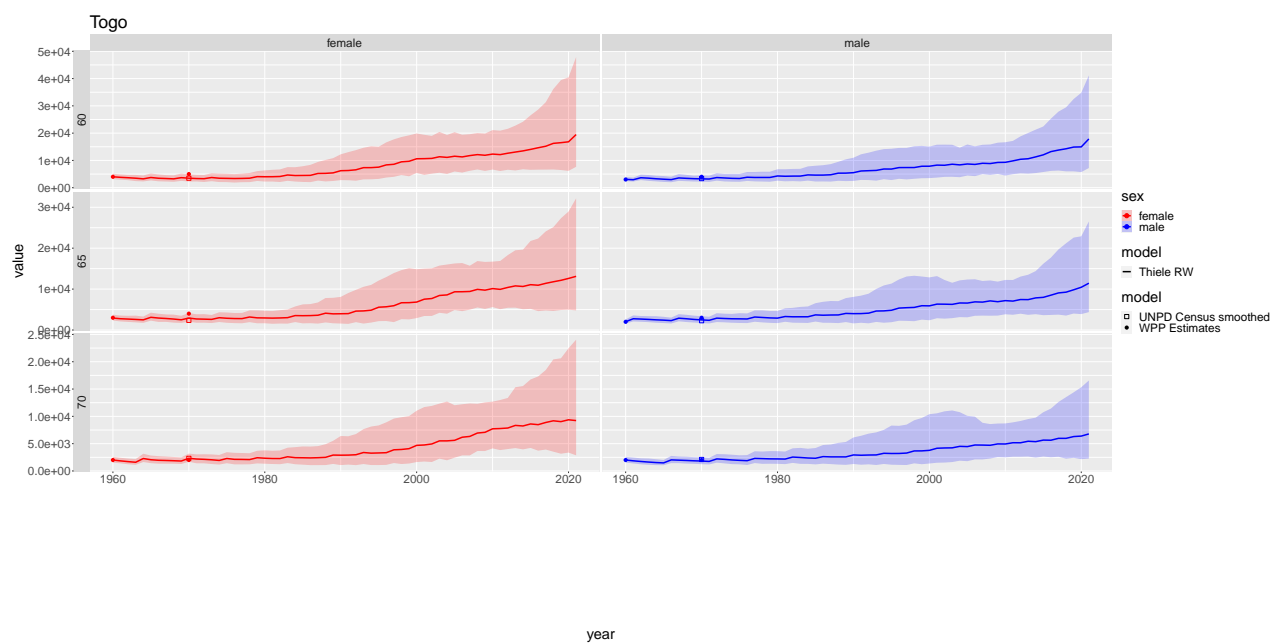Figure 11: Population
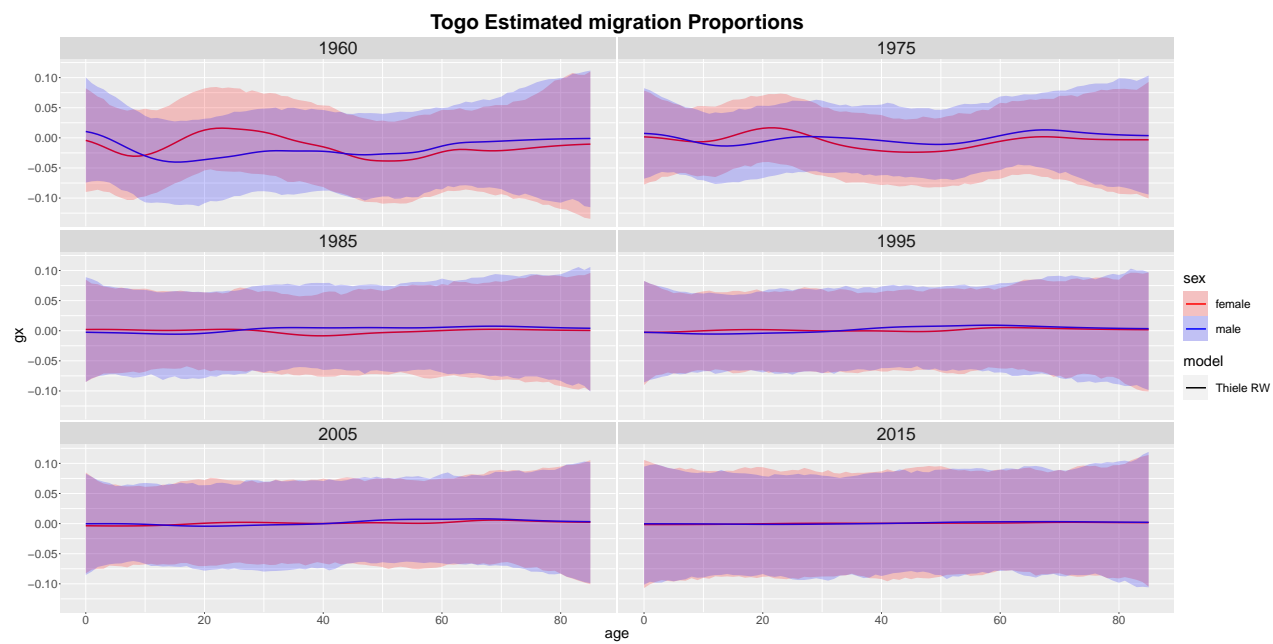

Figure 12: Population

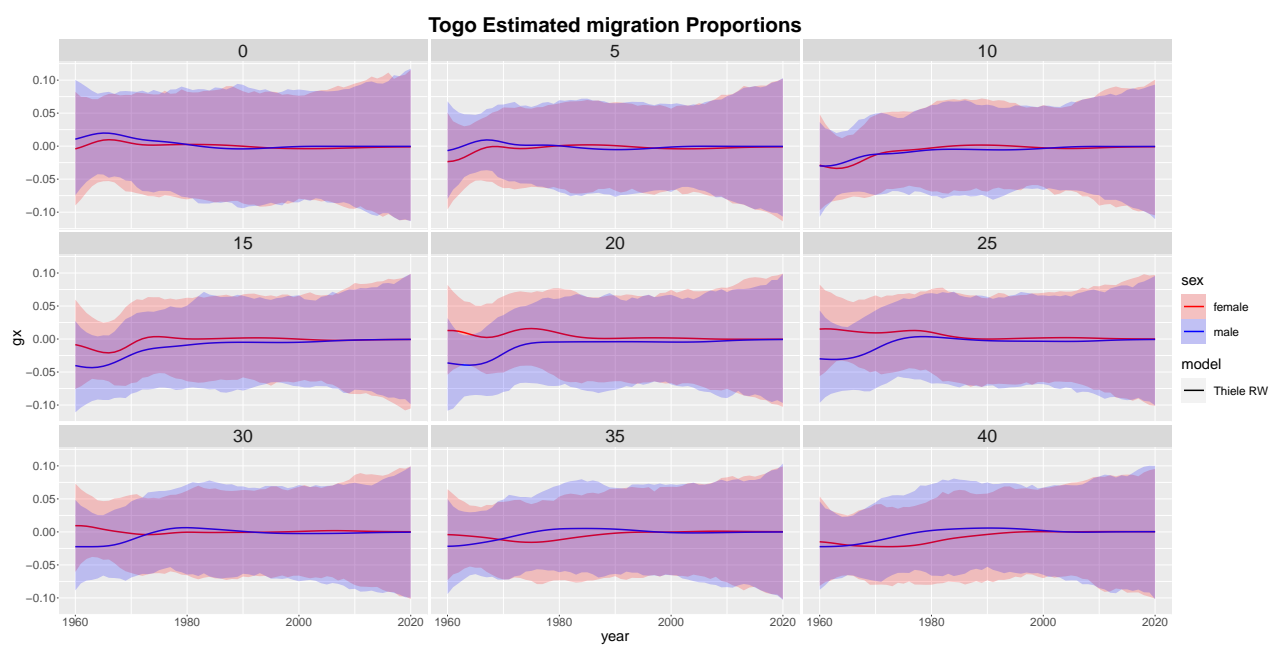10

Figure 13: Population

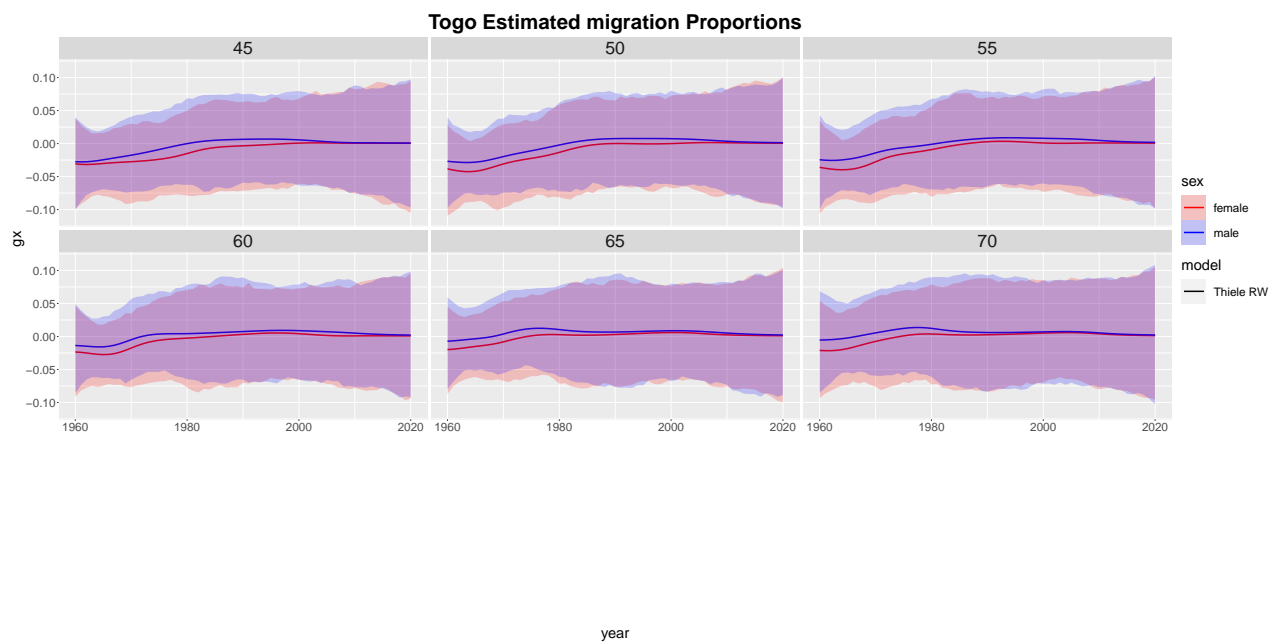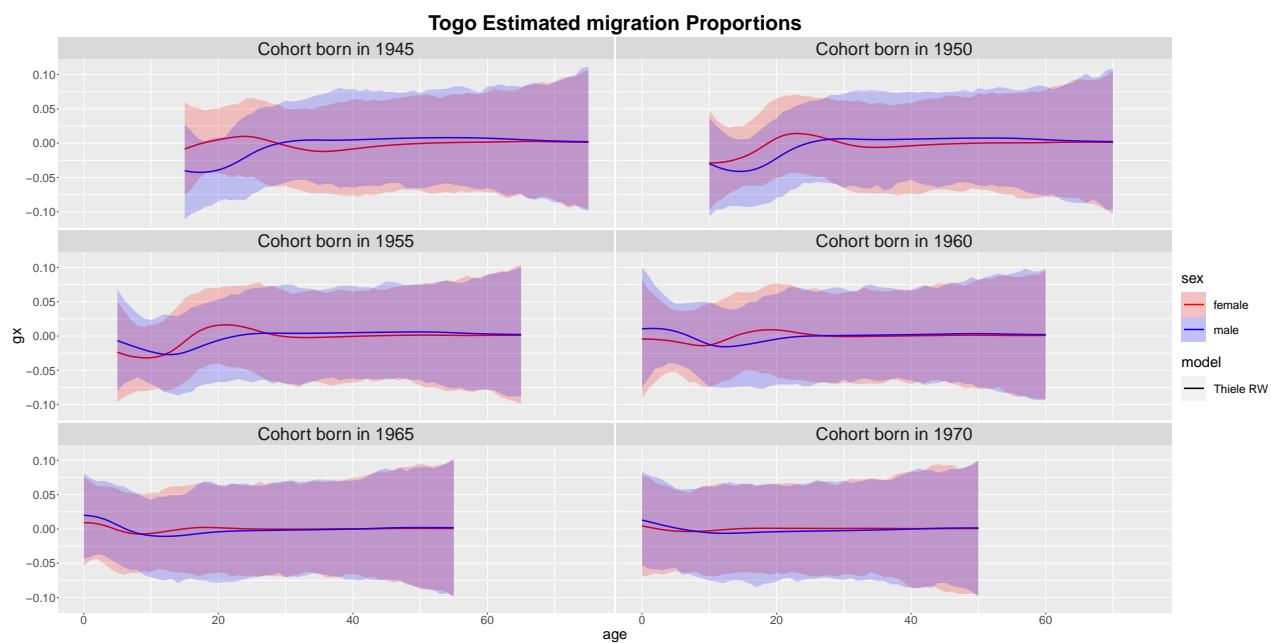Figure 14: Migration

Figure 15: Migration
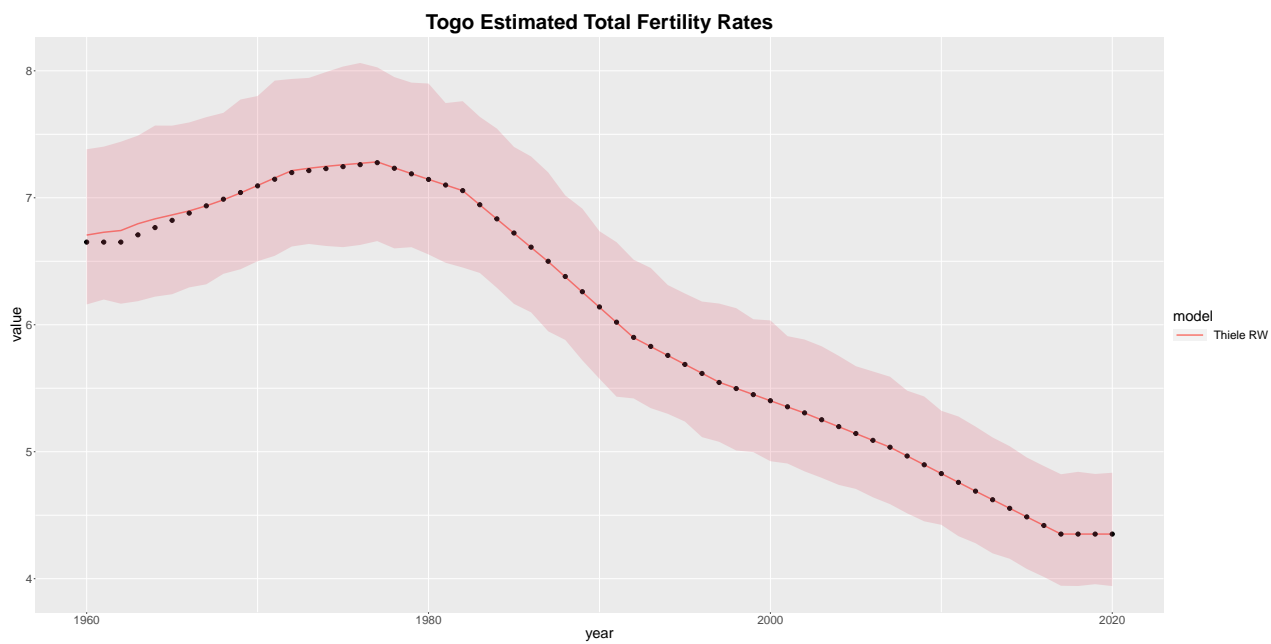

Figure 16: Migration

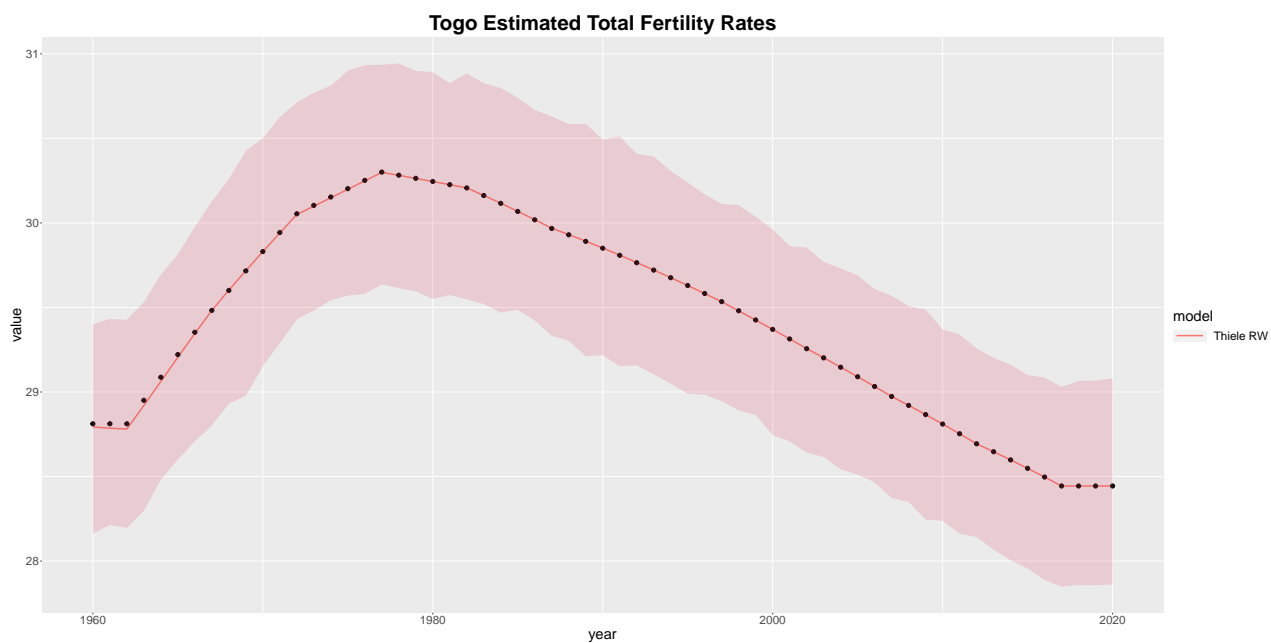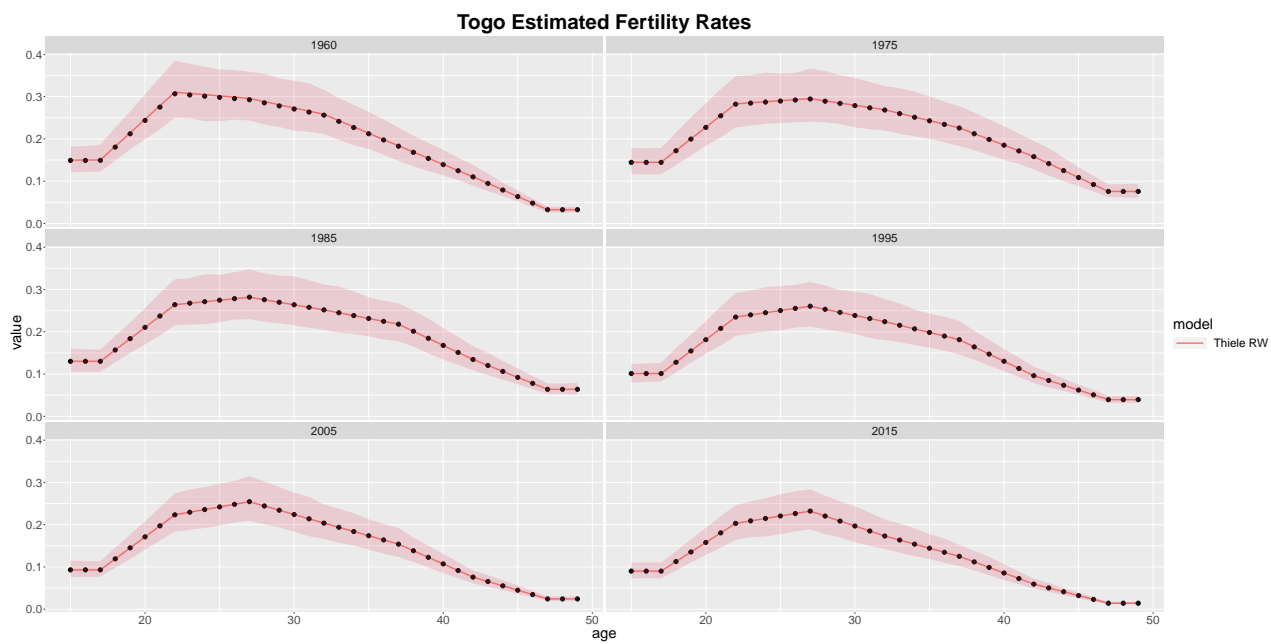Figure 17: Migration

Figure 18: Total Fertility

Figure 19: Mean age at births
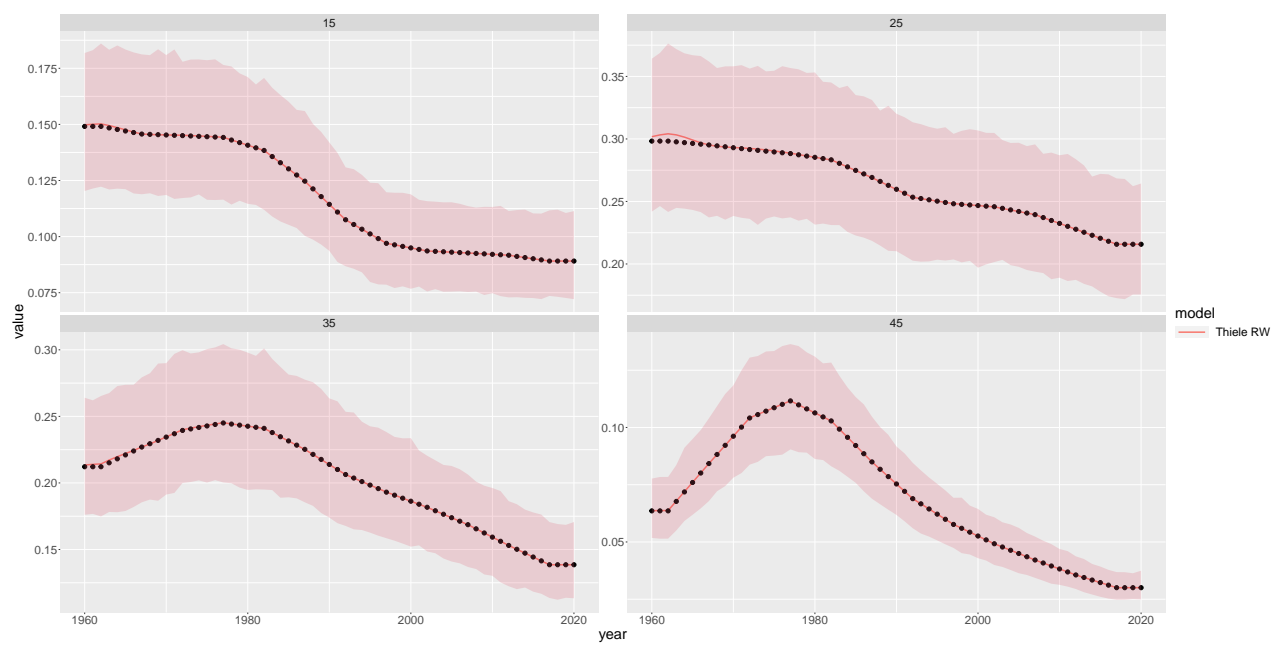

Figure 20: Fertility

Figure 21: Fertility