

Benin

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

## # A tibble: 86 x 3
##   age `1992` `2002`
##   <dbl> <dbl> <dbl>
## 1     0 80766. 117101.
## 2     1 77155. 105326.
## 3     2 90679. 115866.
## 4     3 92932. 117645.
## 5     4 96435. 119606.
## 6     5 97192. 121055.
## 7     6 92823. 117560.
## 8     7 87527. 113242.
## 9     8 80915. 107590.
## 10    9 73594. 100978.
## # ... with 76 more rows

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

## # A tibble: 18 x 2
##   age `1979`
##   <dbl> <dbl>
## 1     0 351457.
## 2     5 268180.
## 3    10 178950.
## 4    15 142937.
## 5    20 150307.
## 6    25 141563.
## 7    30 111638.
## 8    35  85508.
## 9    40  67925.
## 10   45  55549.
## 11   50  44515.
## 12   55  35211.
## 13   60  30311.
## 14   65  24816.
## 15   70  18851.
## 16   75  12313.
## 17   80  28474.
## 18   85    NA

## [1] "Census Males"

## # A tibble: 86 x 3
##   age `1992` `2002`
##   <dbl> <dbl> <dbl>
## 1     0 81377. 118253.
## 2     1 78137. 107408.
## 3     2 91868. 118379.
## 4     3 94884. 120801.
## 5     4 99304. 123360.
## 6     5 101021. 125036.
```

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## 7      6  97612. 121757.
## 8      7  93579. 118155.
## 9      8  88068. 113250.
## 10     9  81470. 107350.
## # ... with 76 more rows
```

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

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

```
##   age `1979`
##   <dbl>   <dbl>
```

```
## 1      0 351689.
## 2      5 288221.
## 3     10 196031.
## 4     15 126149.
## 5     20 101019.
## 6     25  92613.
## 7     30  81036.
## 8     35  67610.
## 9     40  56596.
## 10    45  48757.
## 11    50  41032.
## 12    55  33835.
## 13    60  29670.
## 14    65  25324.
## 15    70  20368.
## 16    75  13851.
## 17    80  31178.
## 18    85     NA
```

Thiele log-Normal Hump Spline

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

##	log_tau2_logpop_f	log_tau2_logpop_f	log_tau2_logpop_m	log_tau2_logpop_m
##	5.4648149	3.9595652	5.5503717	4.3070290
##	log_tau2_gx_m	log_lambda_gx_age_f	log_lambda_gx_age_m	log_lambda_gx_age_m
##	3.5327787	2.3292213	3.9953918	8.0000000
##	log_lambda_gx_agemtime_m	log_lambda_tp	log_lambda_tp_0_inflated_sd	log_dispersion
##	6.9077712	1.4087858	-1.0305956	0.0000000
##	log_marginal_prec_psi_f	log_marginal_prec_A_f	log_marginal_prec_B_f	log_marginal_prec_B_m
##	6.8066293	6.7899375	6.5796126	6.5796126
##	log_marginal_prec_B_m	log_lambda_phi_f	log_lambda_psi_f	log_lambda_phi_m
##	6.7357358	4.3074963	4.3070290	4.3070290
##	log_lambda_A_f	log_lambda_B_f	log_lambda_phi_m	log_lambda_phi_m
##	4.3055565	4.2685567	4.3092794	4.3092794
##	log_lambda_epsilon_m	log_lambda_A_m	log_lambda_B_m	logit_lambda_slope_rho_m
##	4.3480424	4.3042305	4.2999314	0.0000000
##	logit_lambda_slope_rho_m	logit_delta_slope_rho_m	logit_epsilon_slope_rho_m	
##	2.6755569	-0.8097725	-1.0324487	

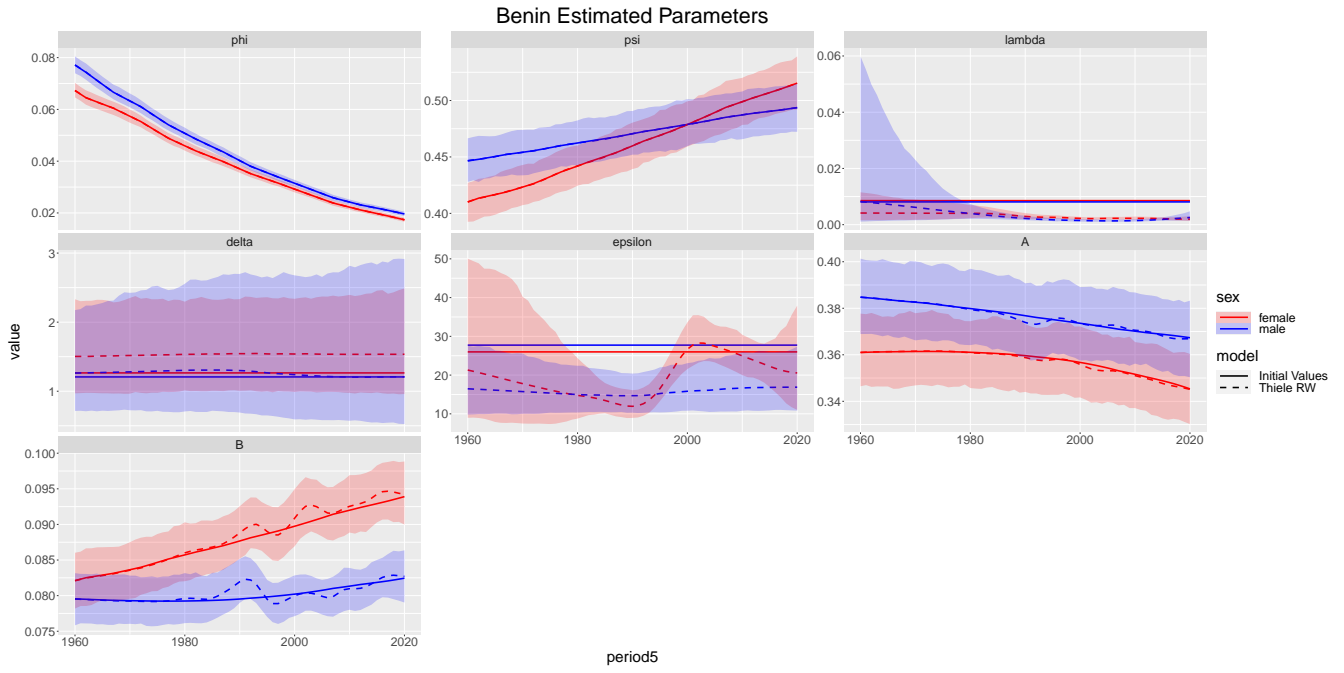


Figure 1: Estimated parameters

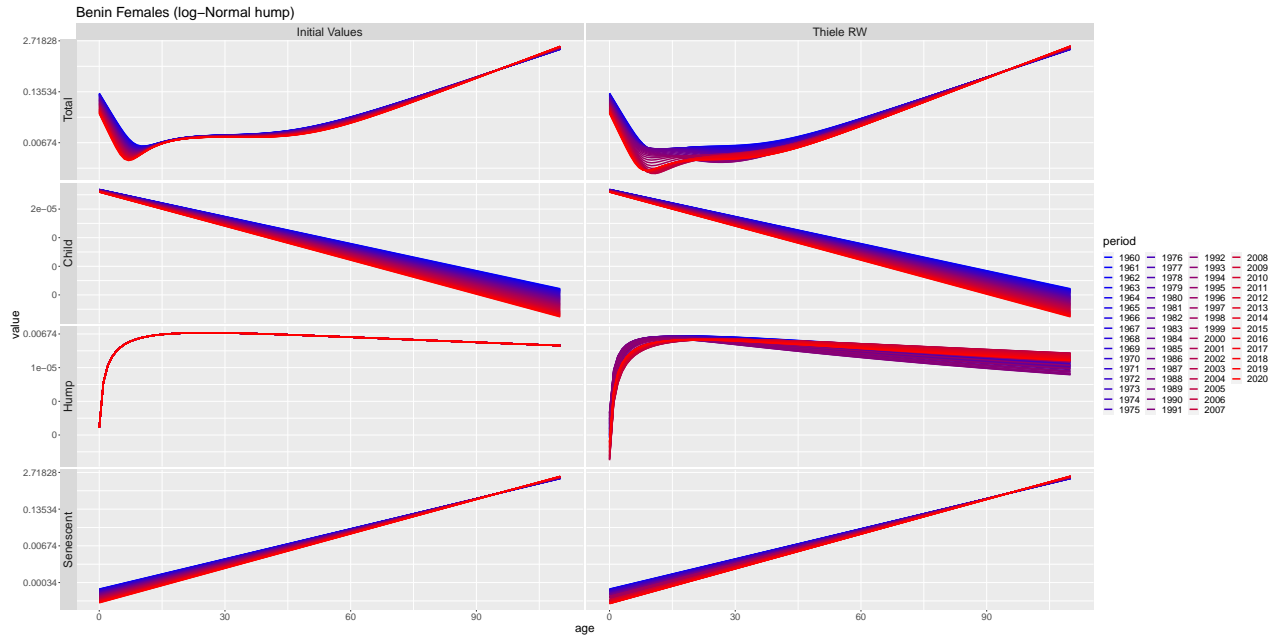


Figure 2: Thiele Decomposed

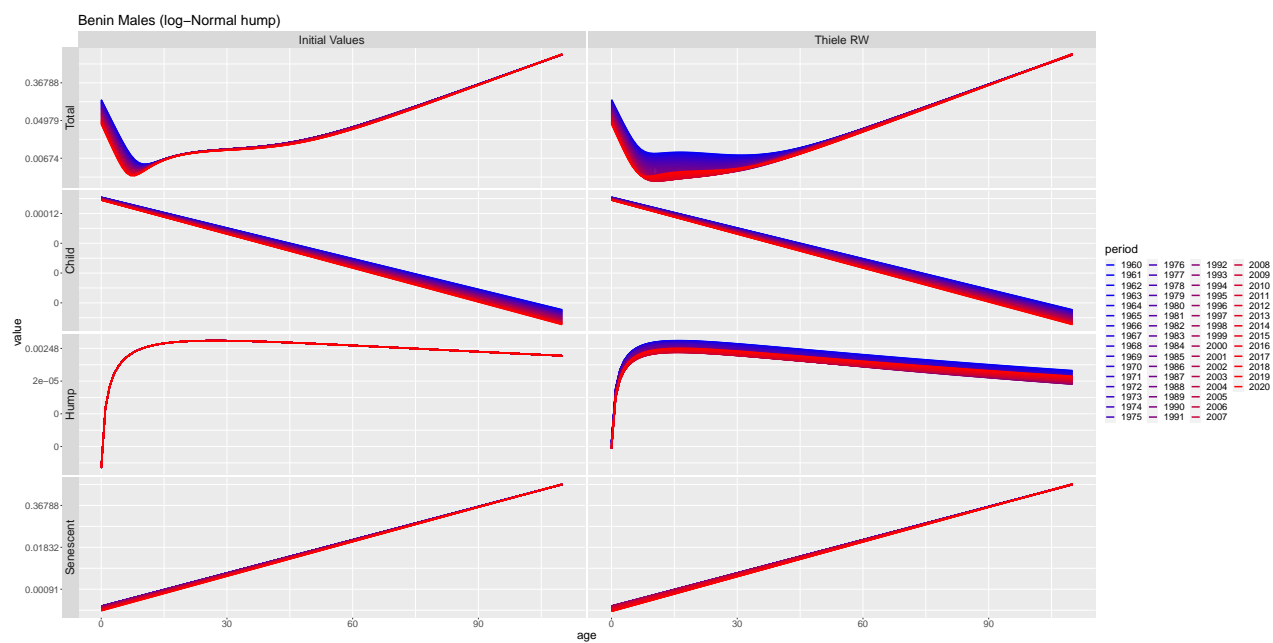


Figure 3: Thiele Decomposed

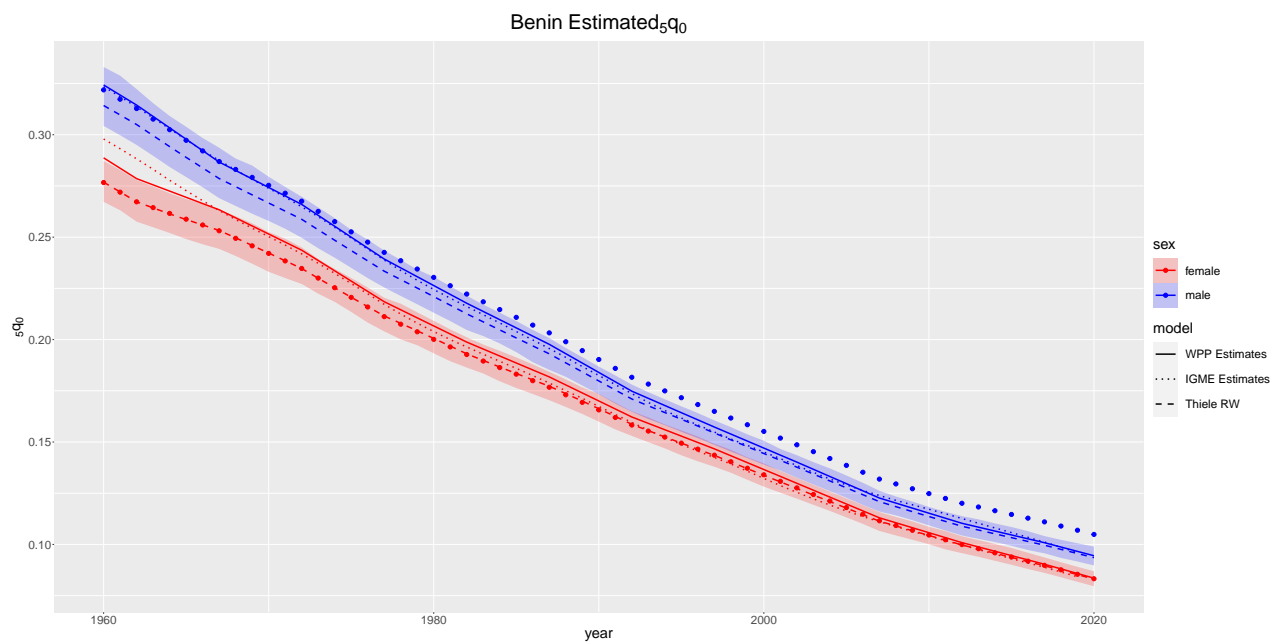


Figure 4: Estimated ${}_5q_0$

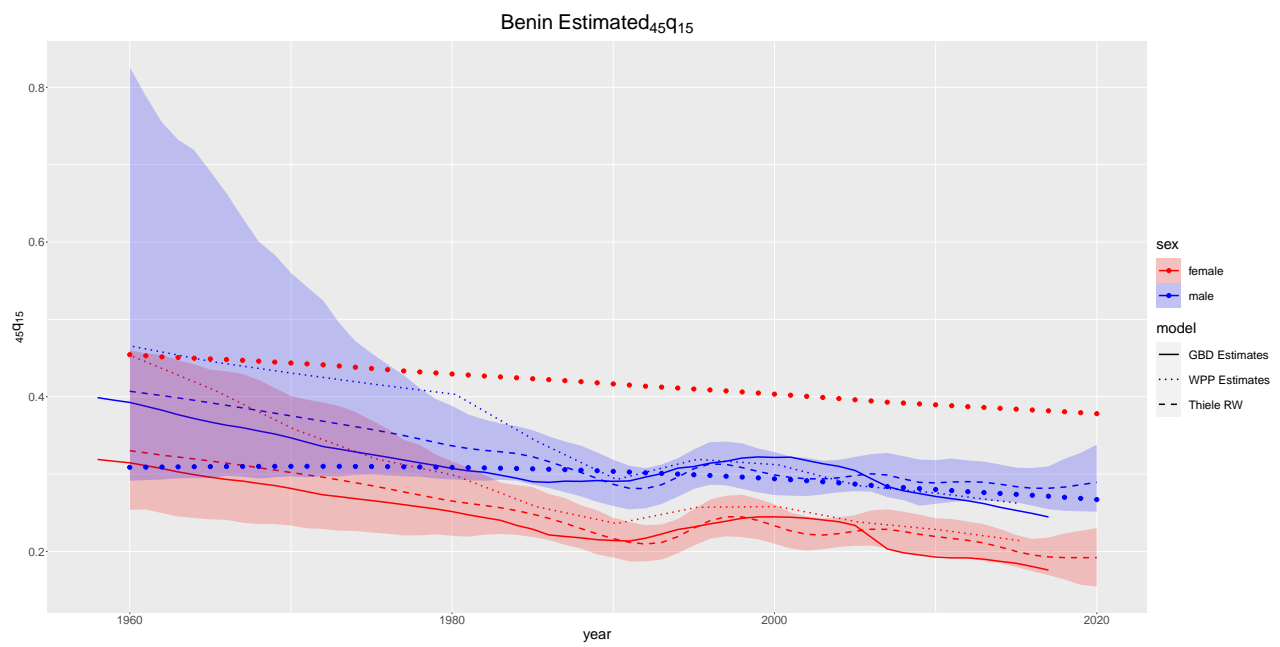


Figure 5: Estimated $_{45}q_{15}$

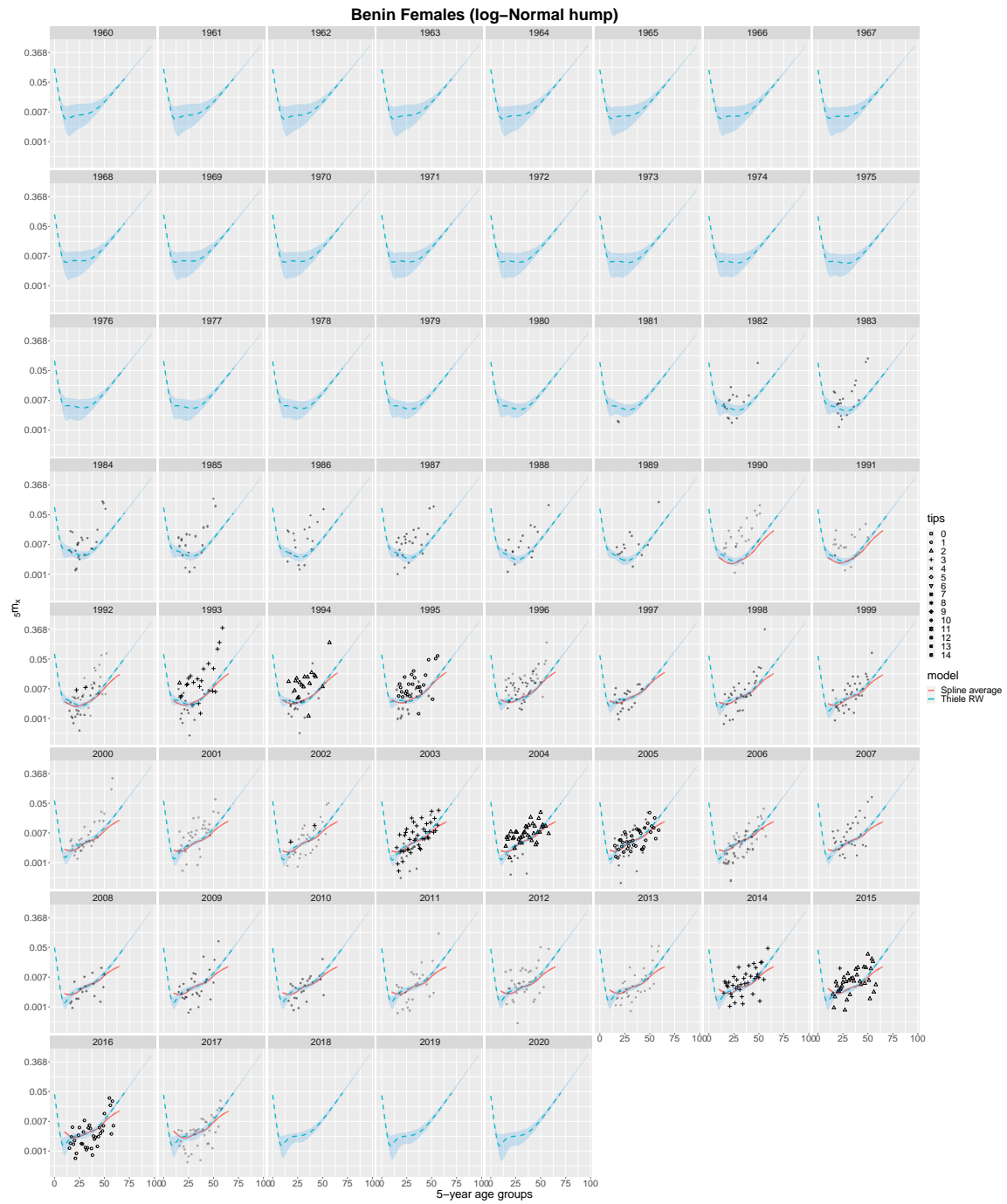


Figure 6: Mortality Schedules

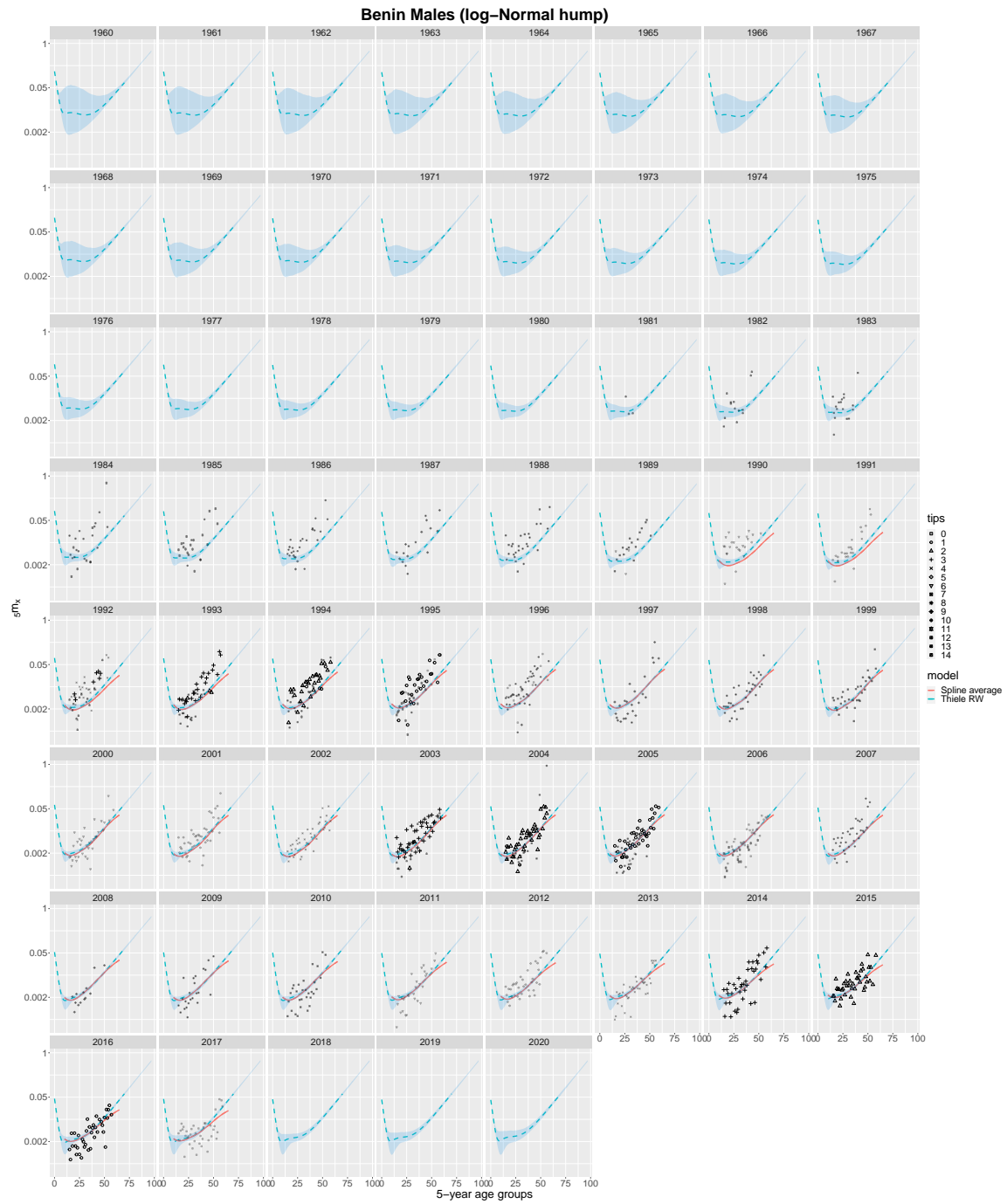


Figure 7: Mortality Schedules

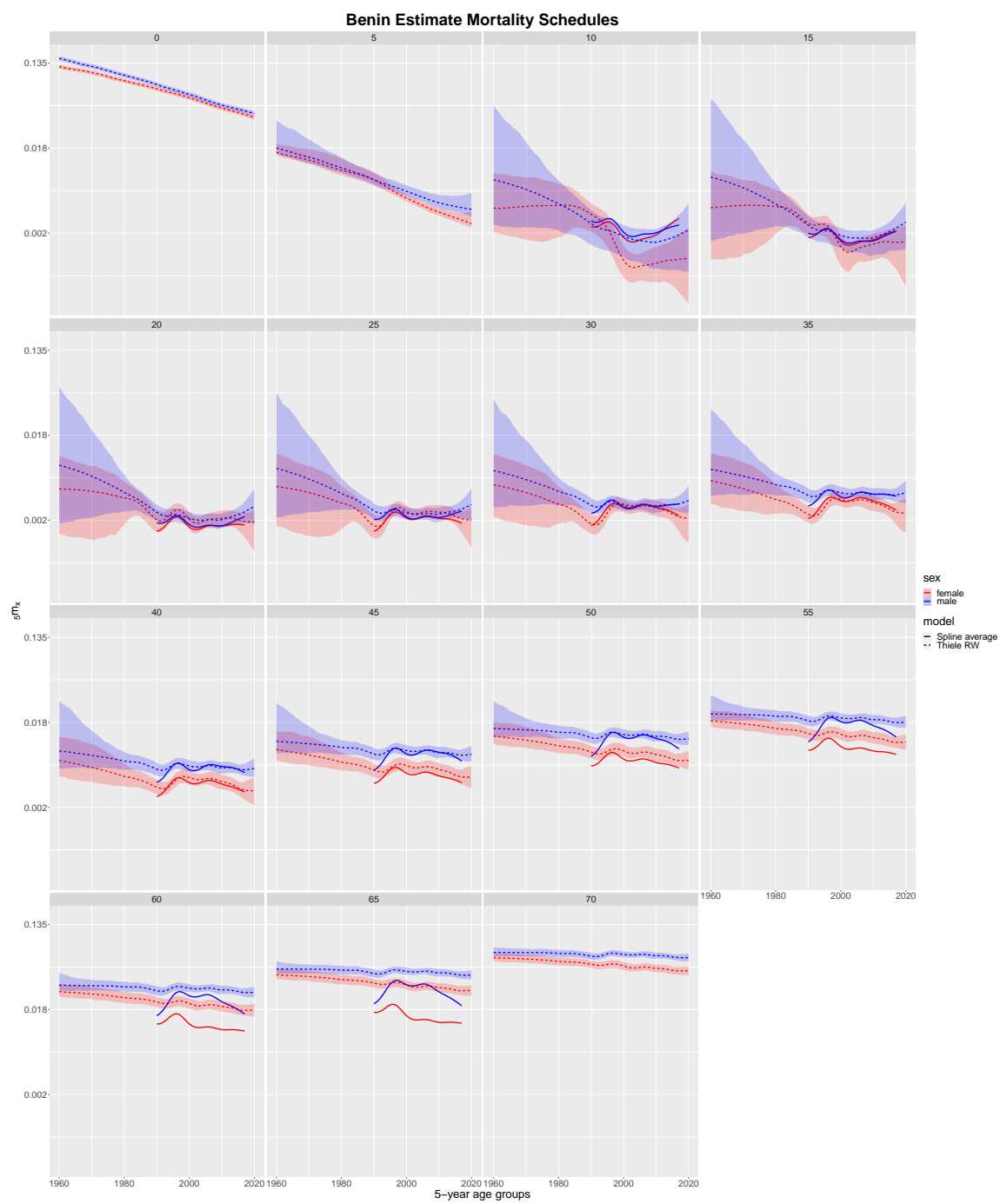


Figure 8: Mortality Schedules

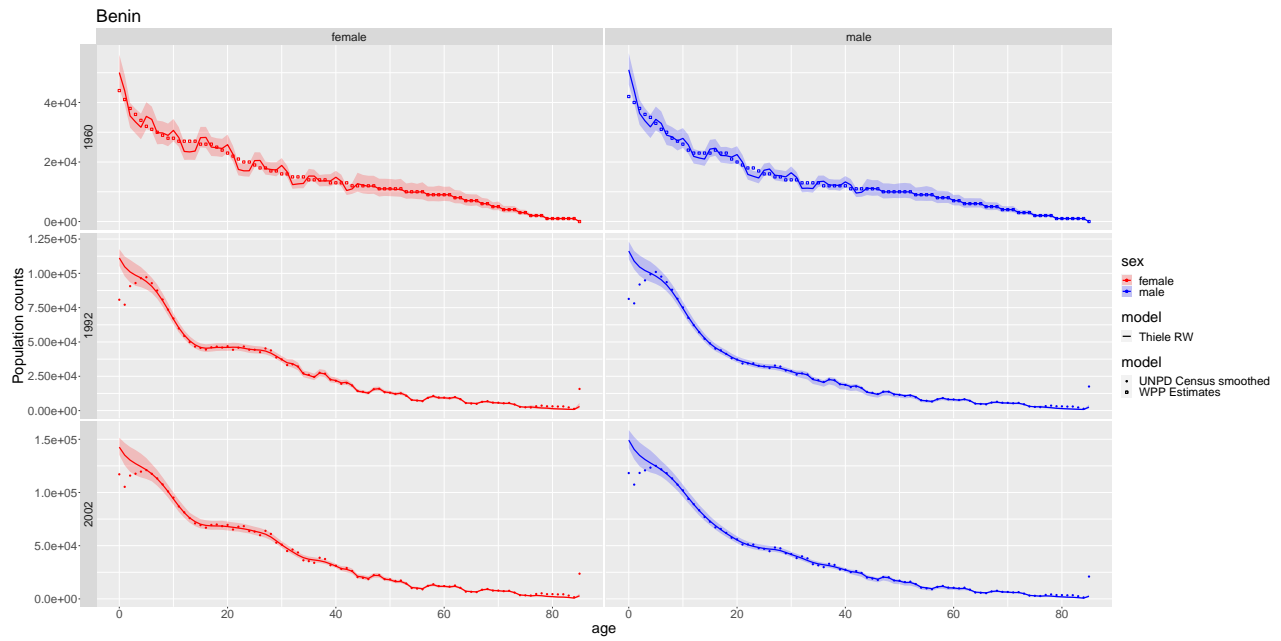


Figure 9: Population

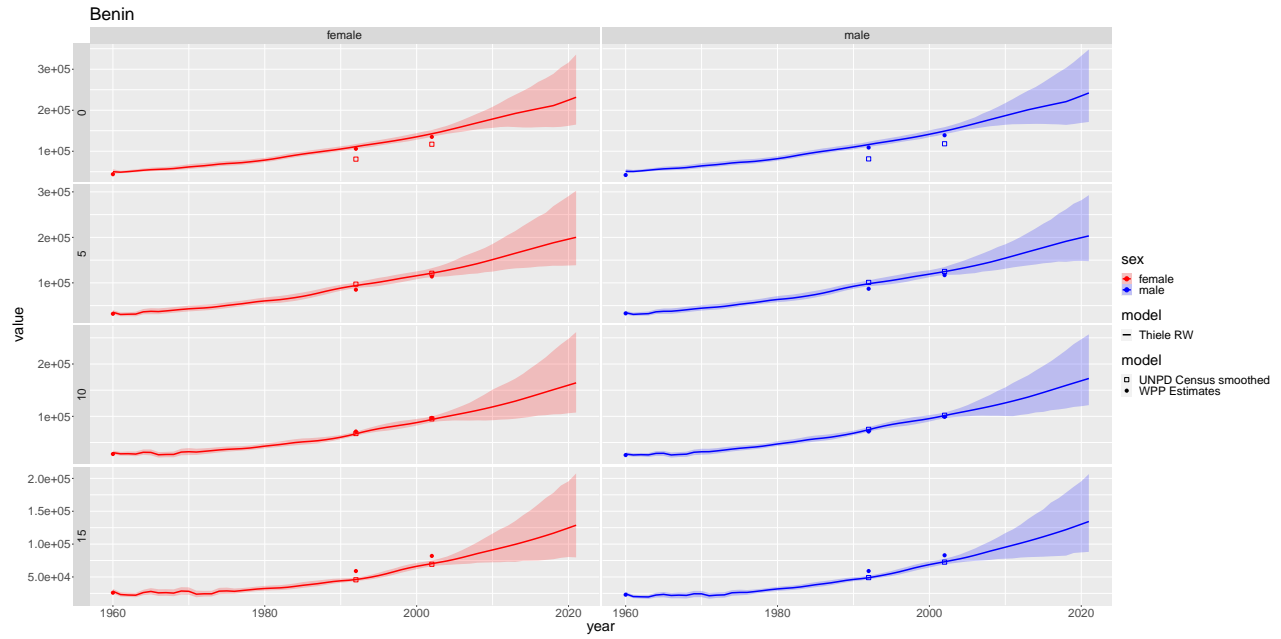


Figure 10: Population

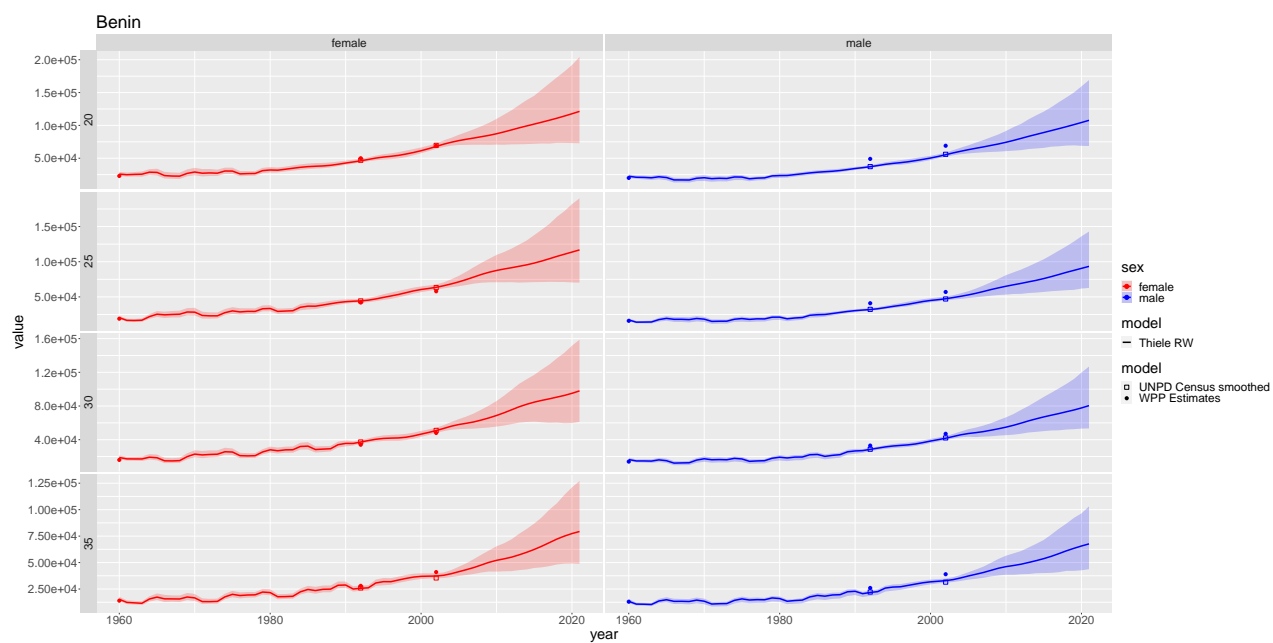


Figure 11: Population

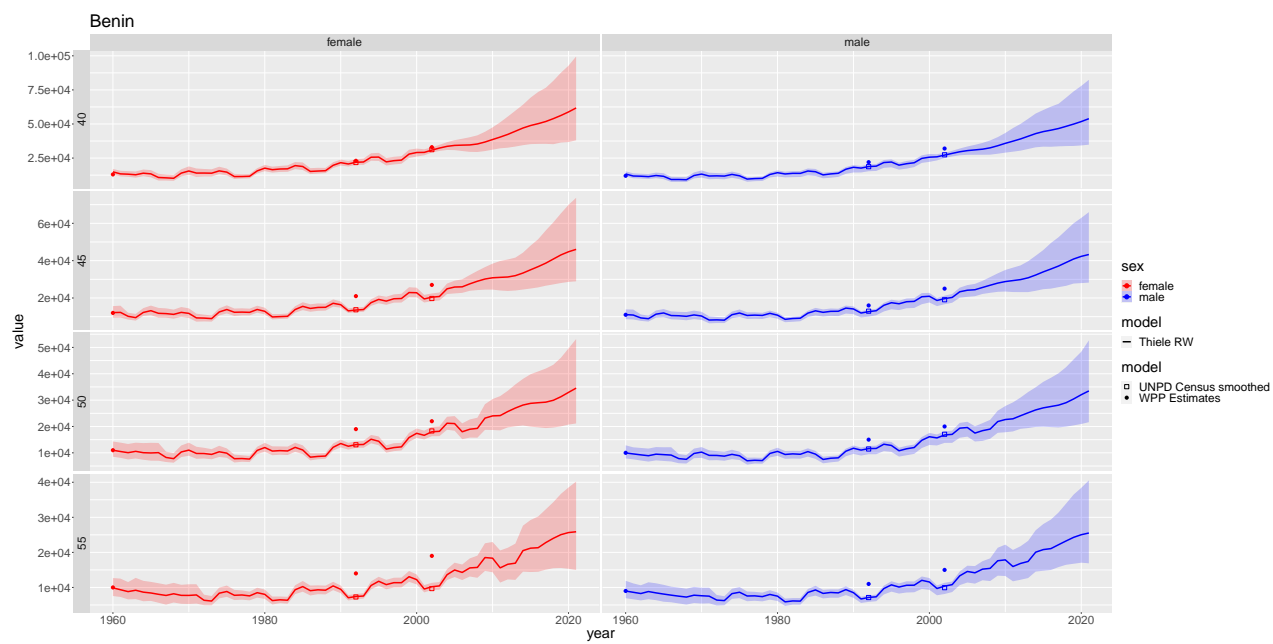


Figure 12: Population

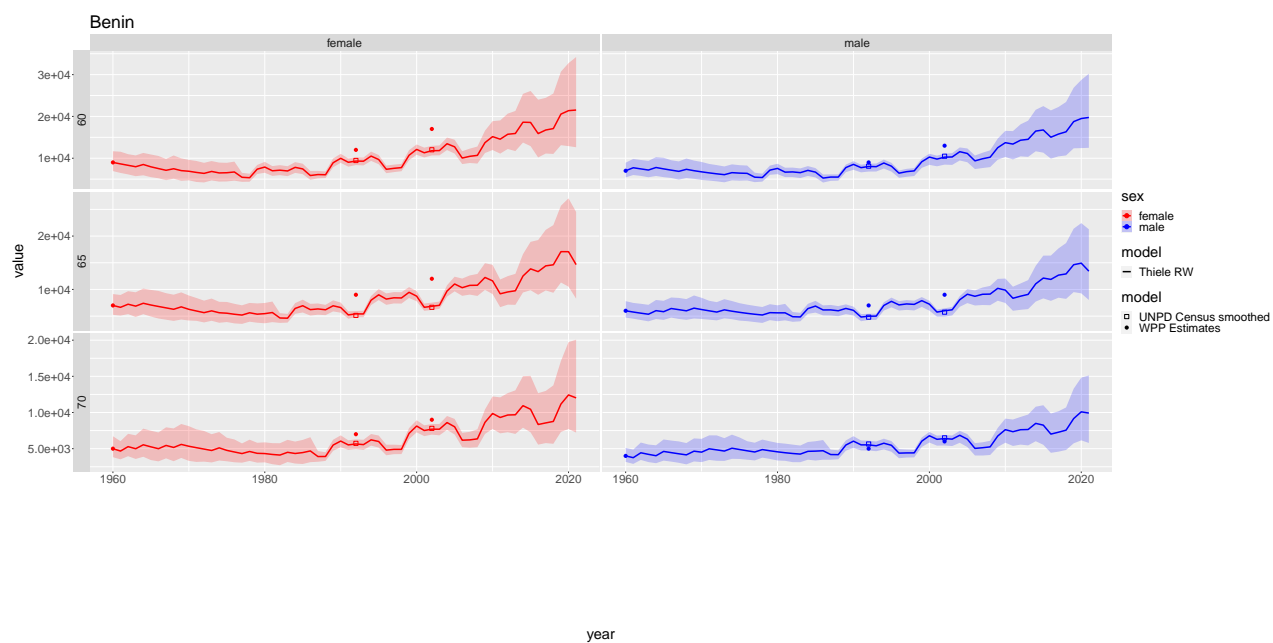


Figure 13: Population

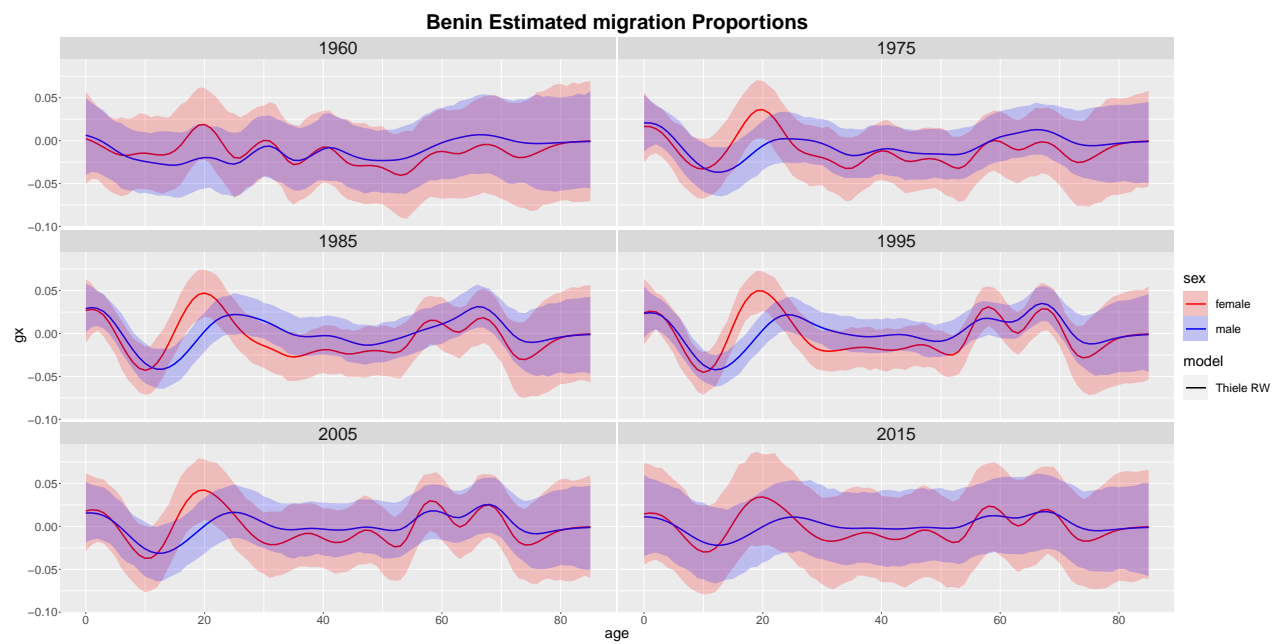


Figure 14: Migration

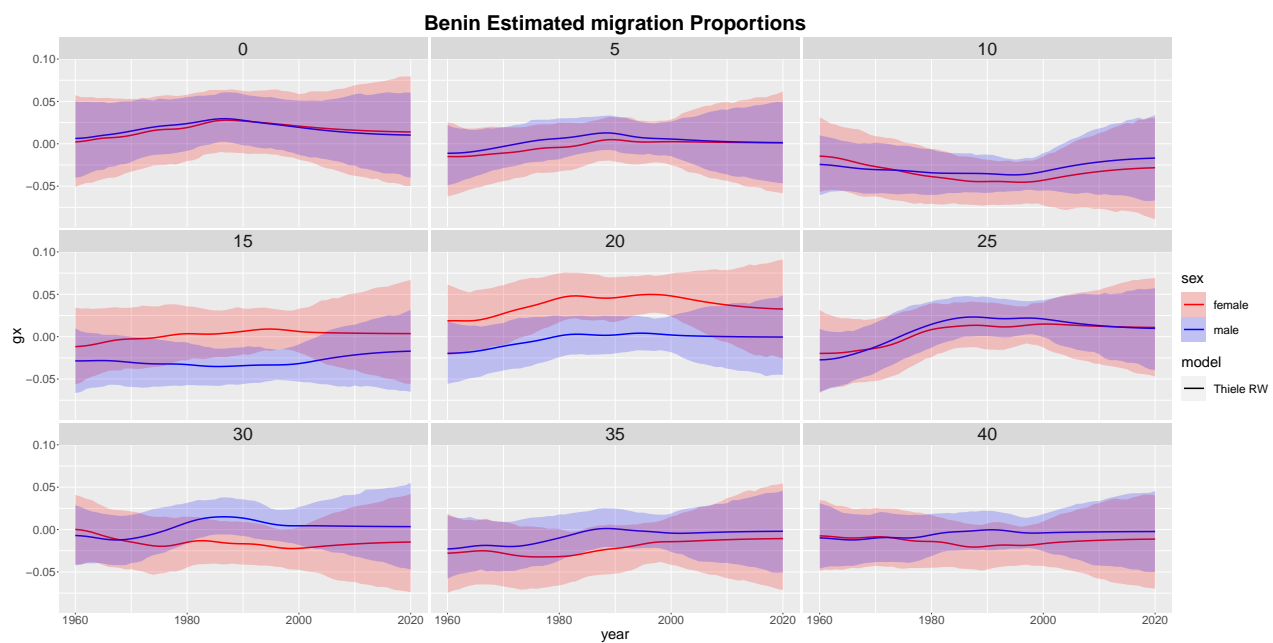


Figure 15: Migration

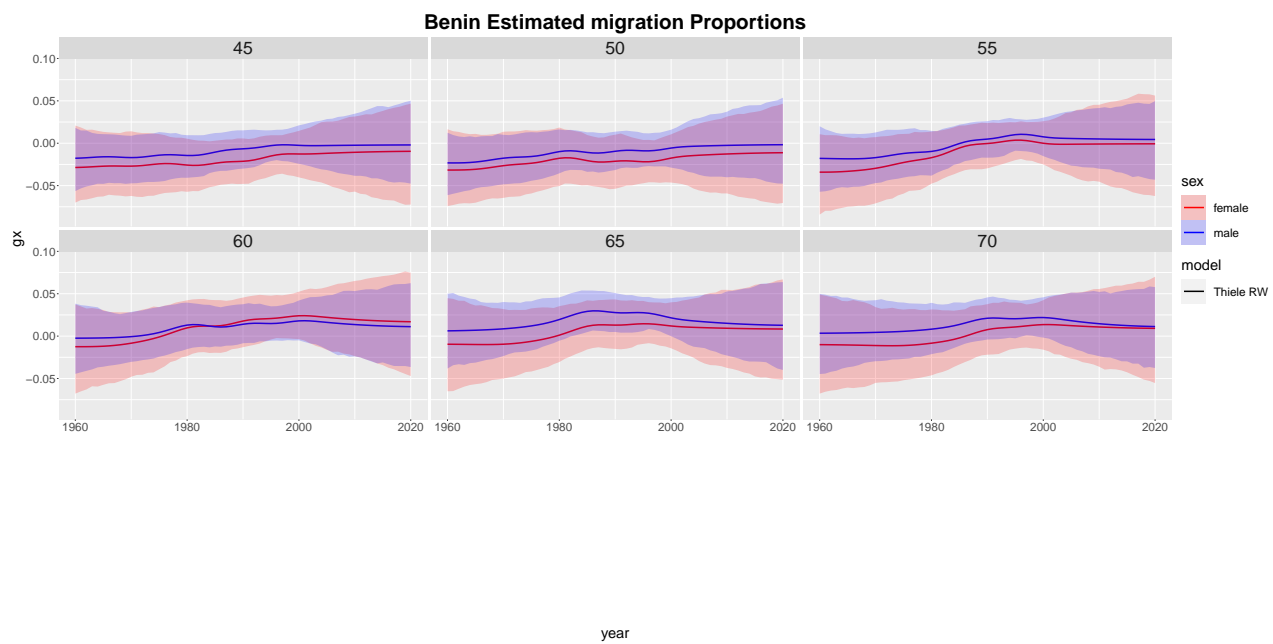


Figure 16: Migration

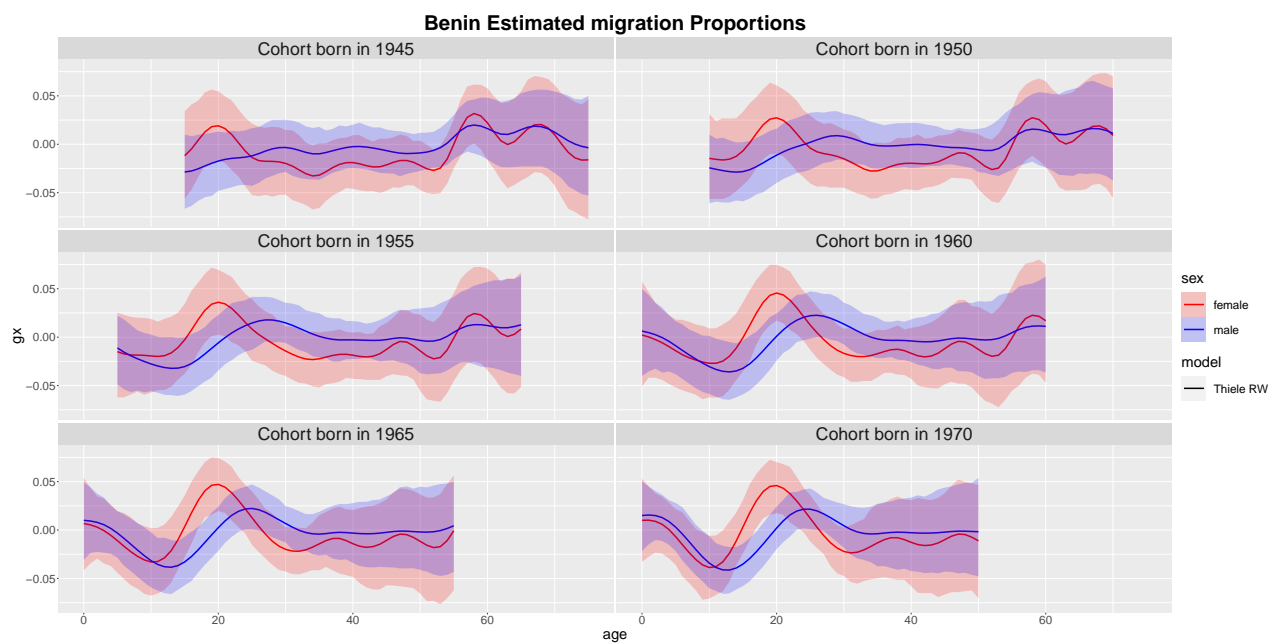


Figure 17: Migration

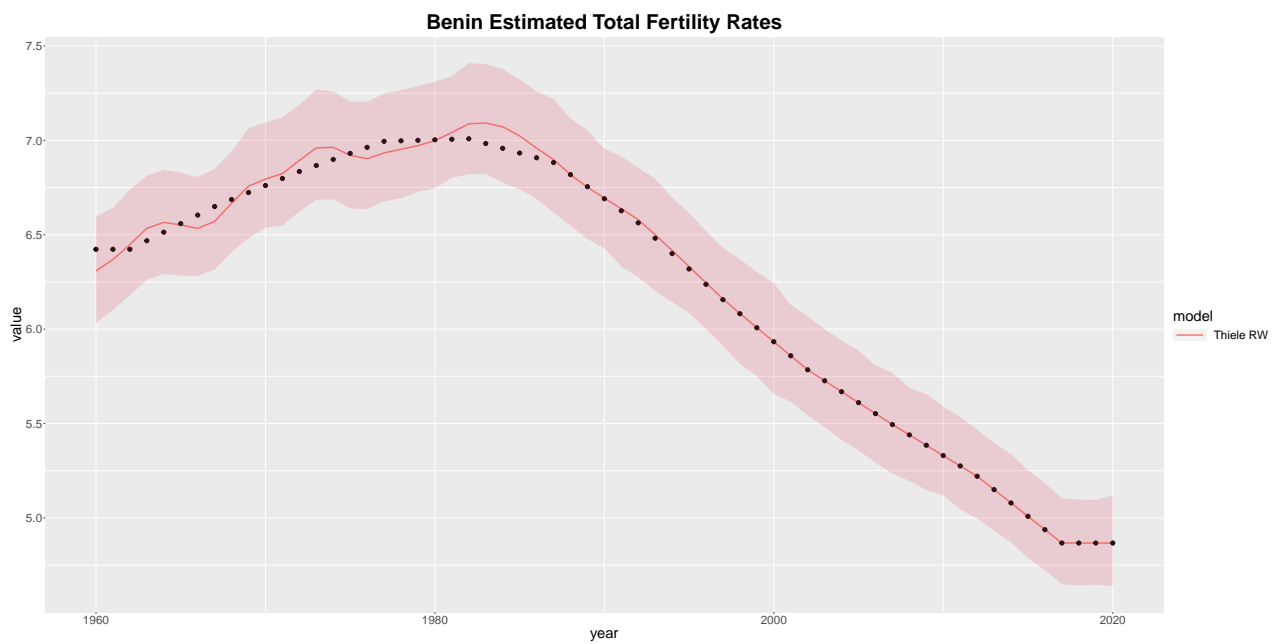


Figure 18: Total Fertility

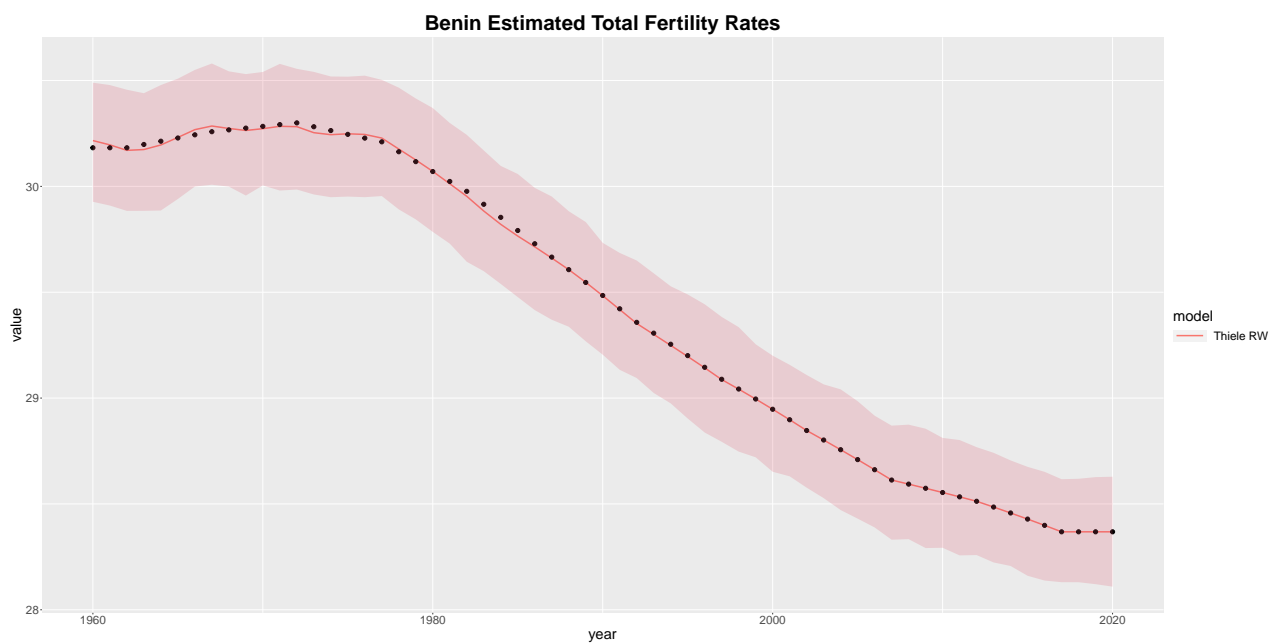


Figure 19: Total Fertility

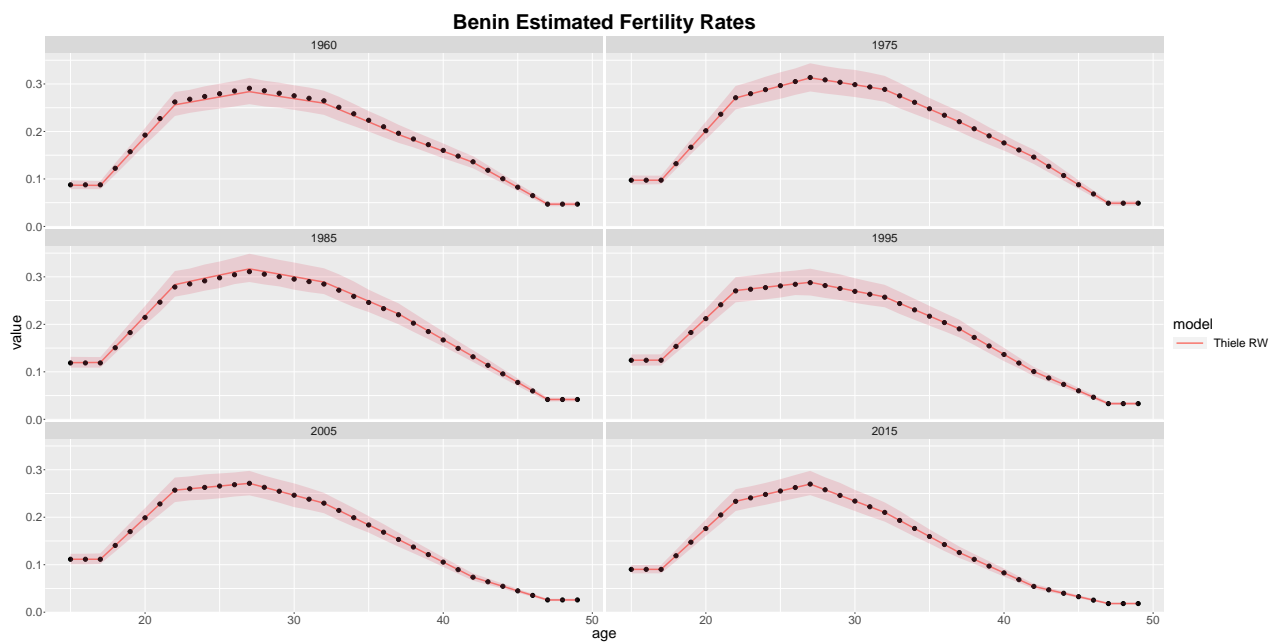


Figure 20: Fertility

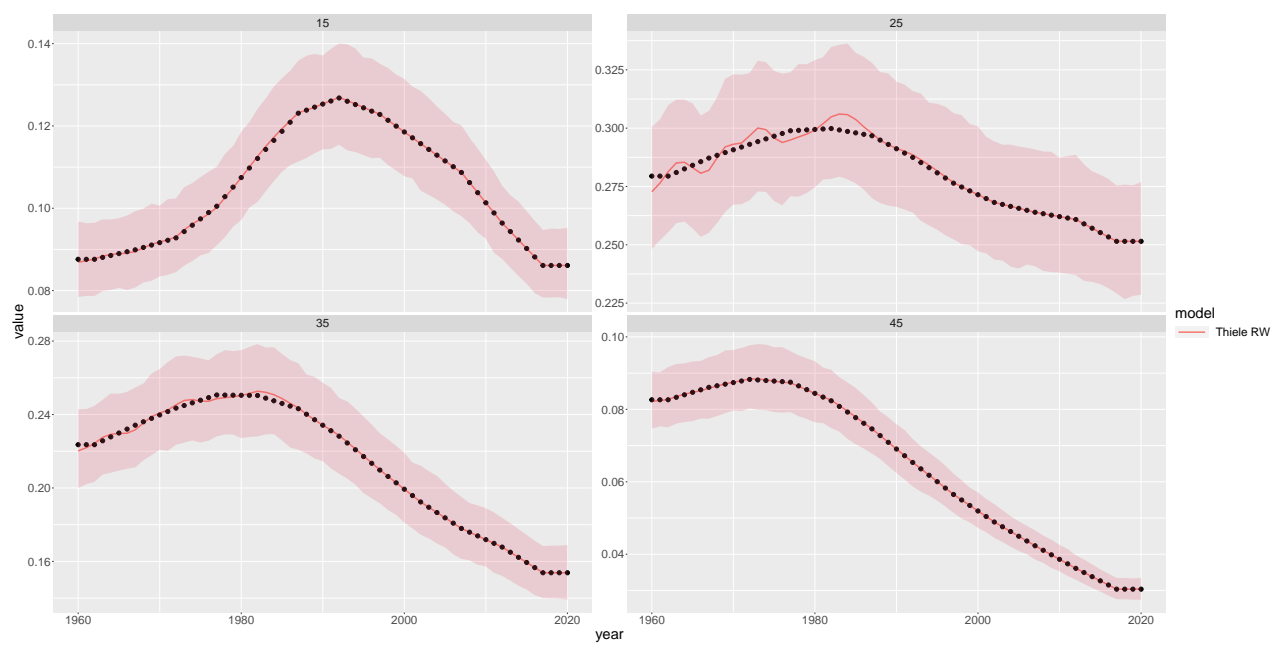


Figure 21: Fertility