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.
```

```
##  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    log_tau2_logpop    log_tau2_logpop    log_tau2_logpop     log_lambda_fx     log
##          3.8979027          5.3243553          3.7004035          4.9311463         3.9741289
##      log_lambda_tp           tp_slope         tp_params_5        tp_params_10     log_lambda_phi     log_
##          2.8199461         -0.0383413          0.2097821          0.7611662        12.6032184
##  log_lambda_lambda   log_lambda_delta log_lambda_epsilon
##          4.5844335          8.6737565          5.3410196
```
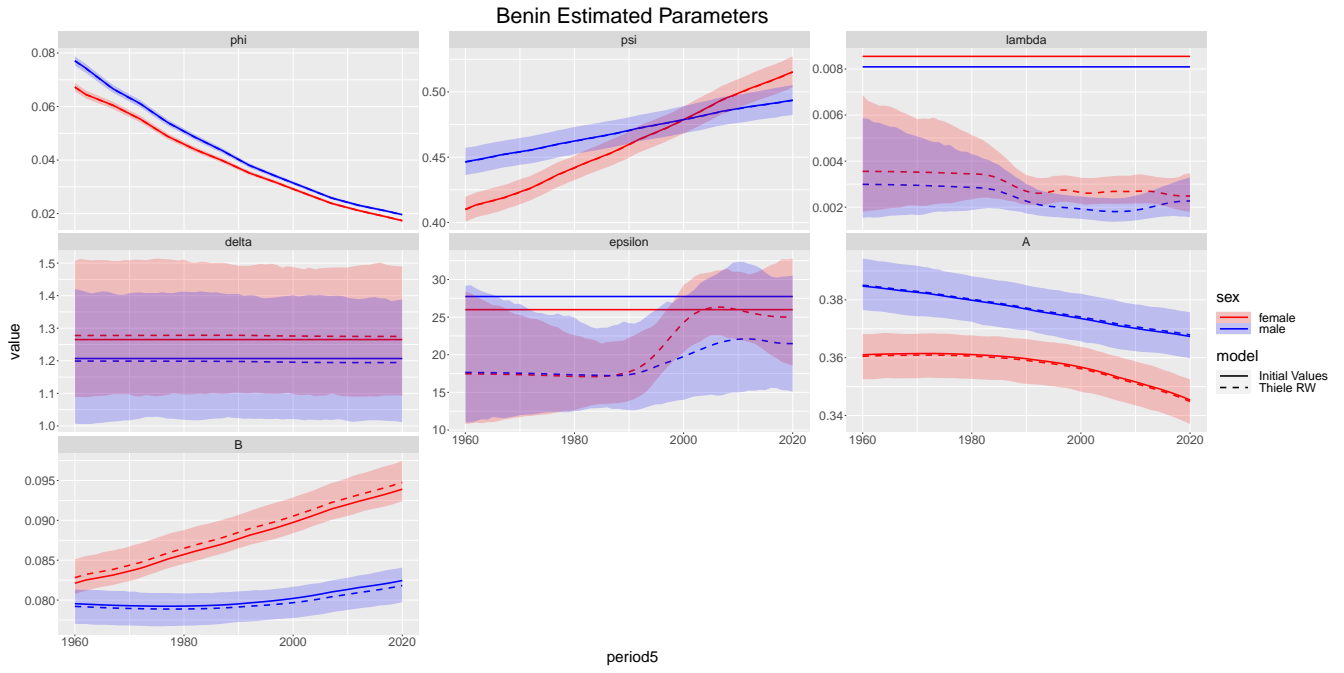
Figure 1: Estimated parameters
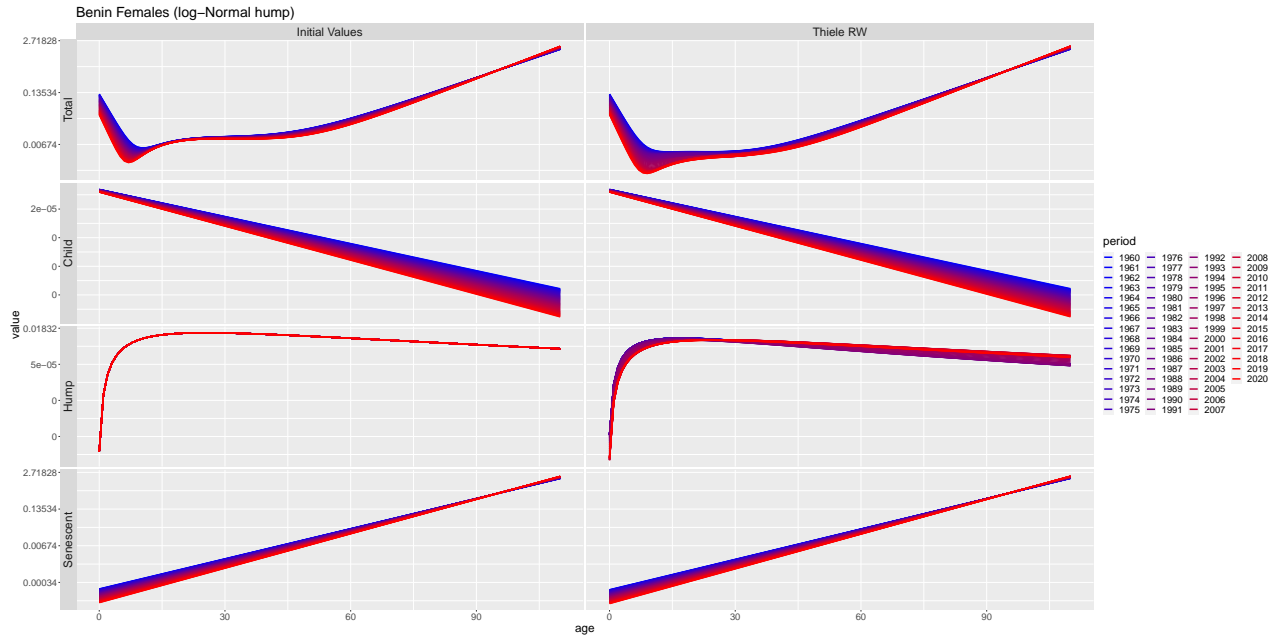
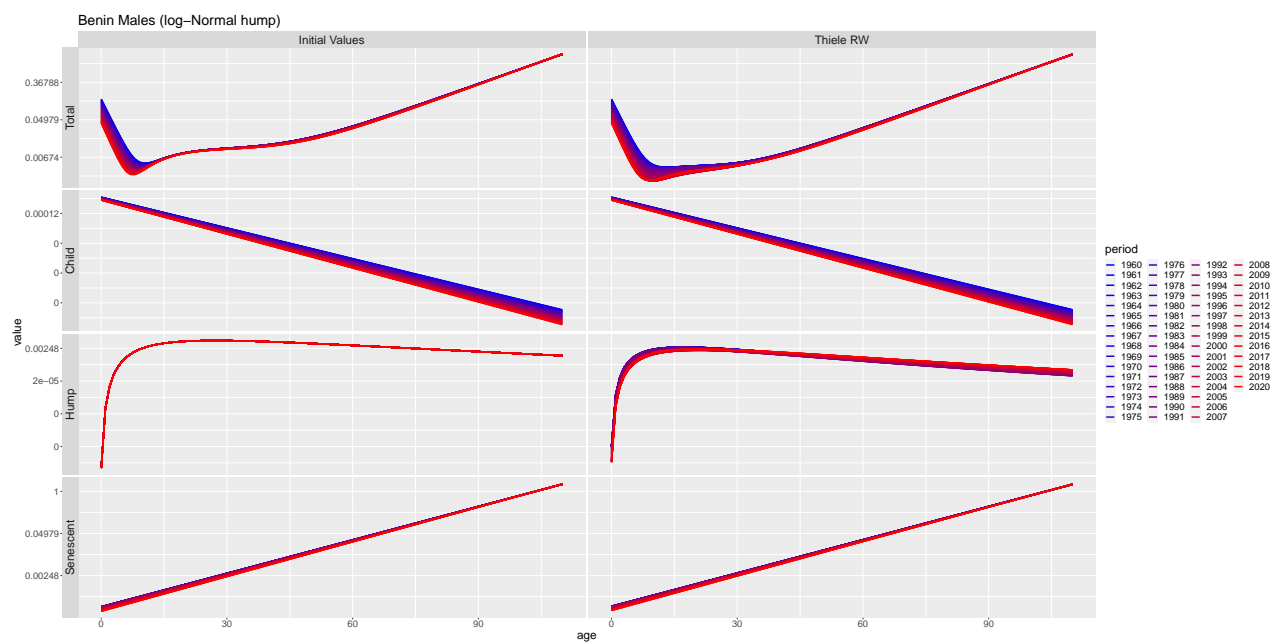
Figure 2: Thiele Decomposed

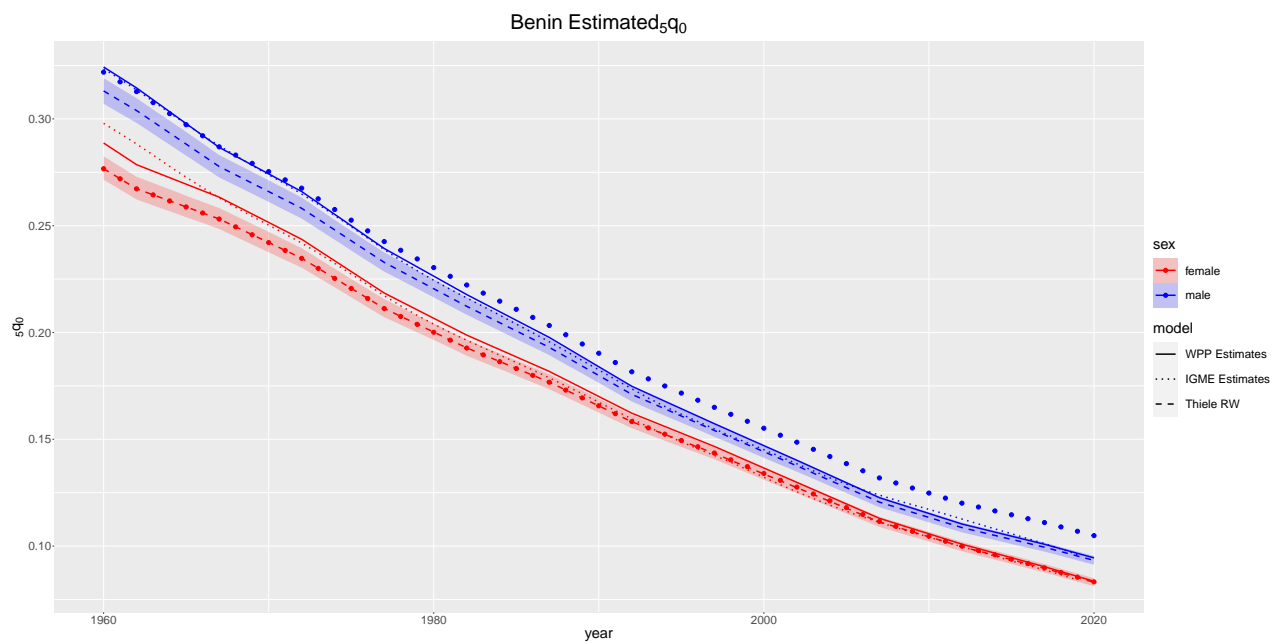Figure 3: Thiele Decomposed

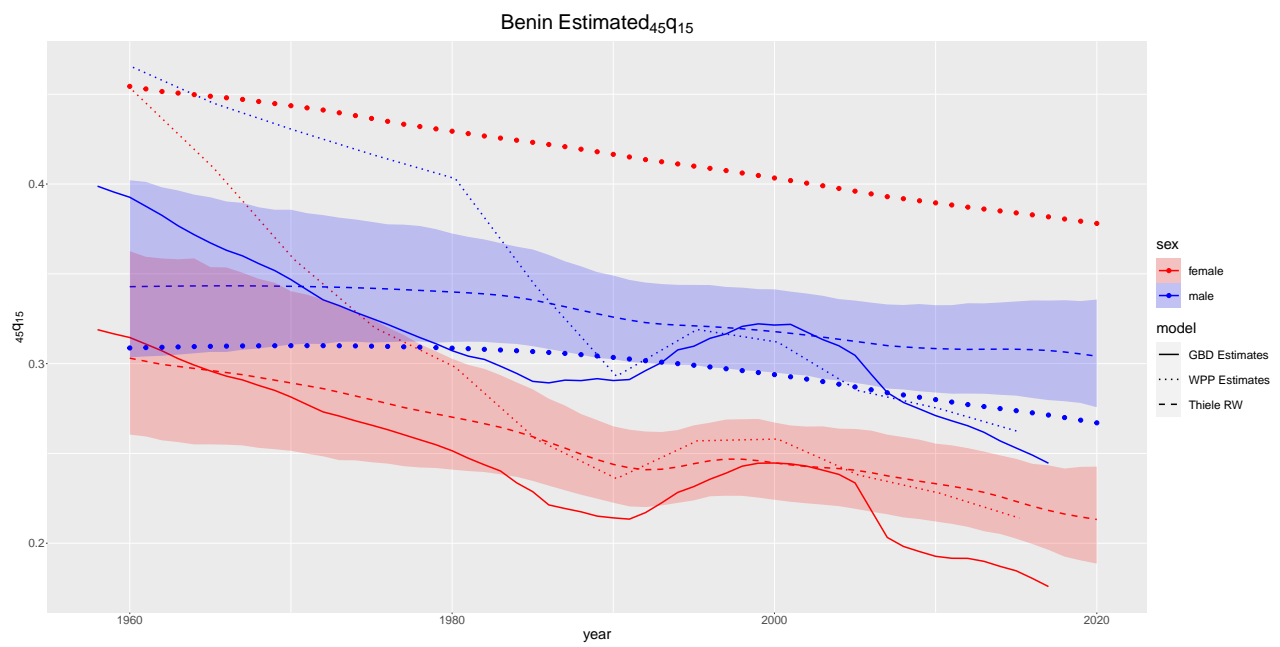
Figure 4: Estimated $_5q_0$

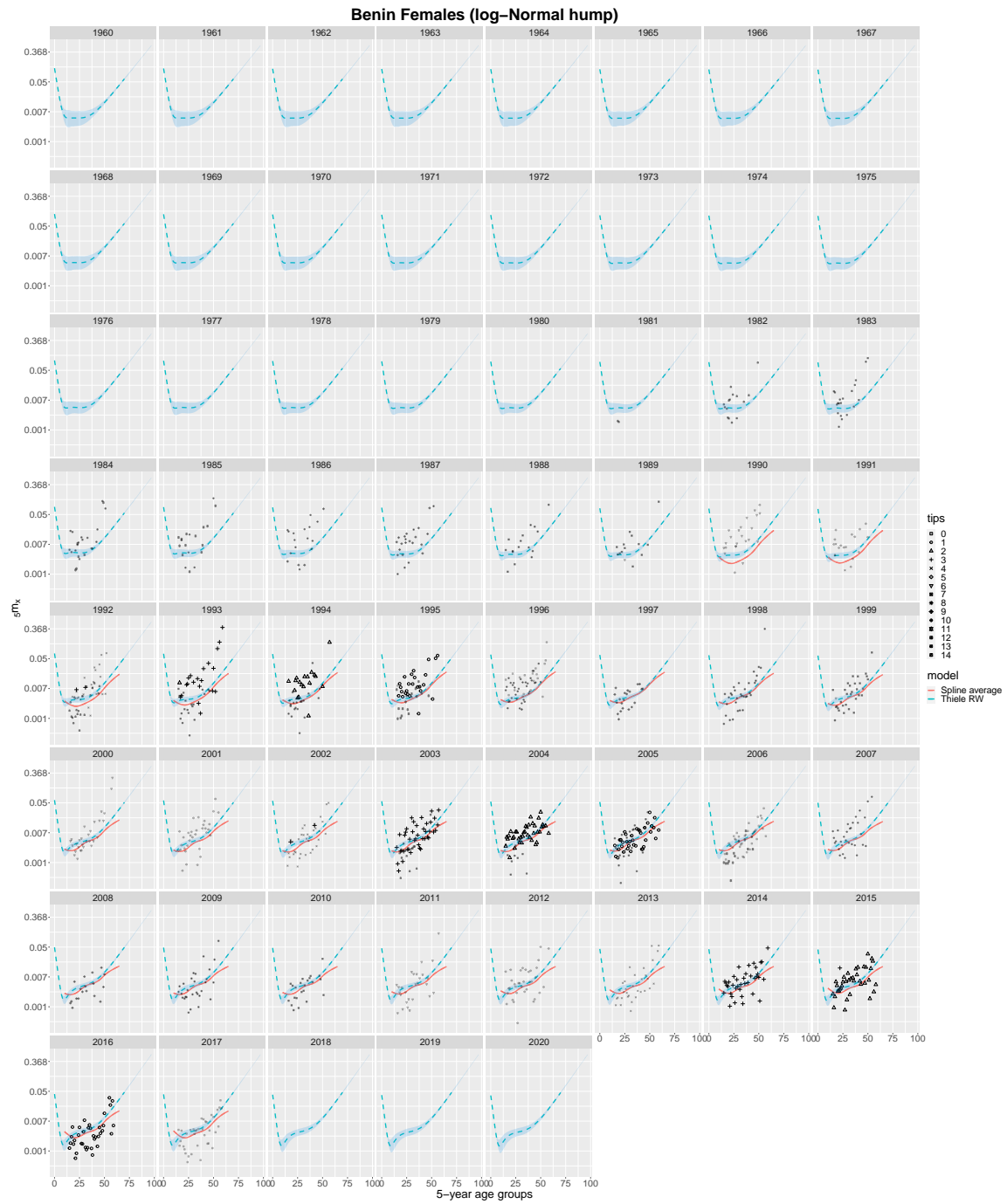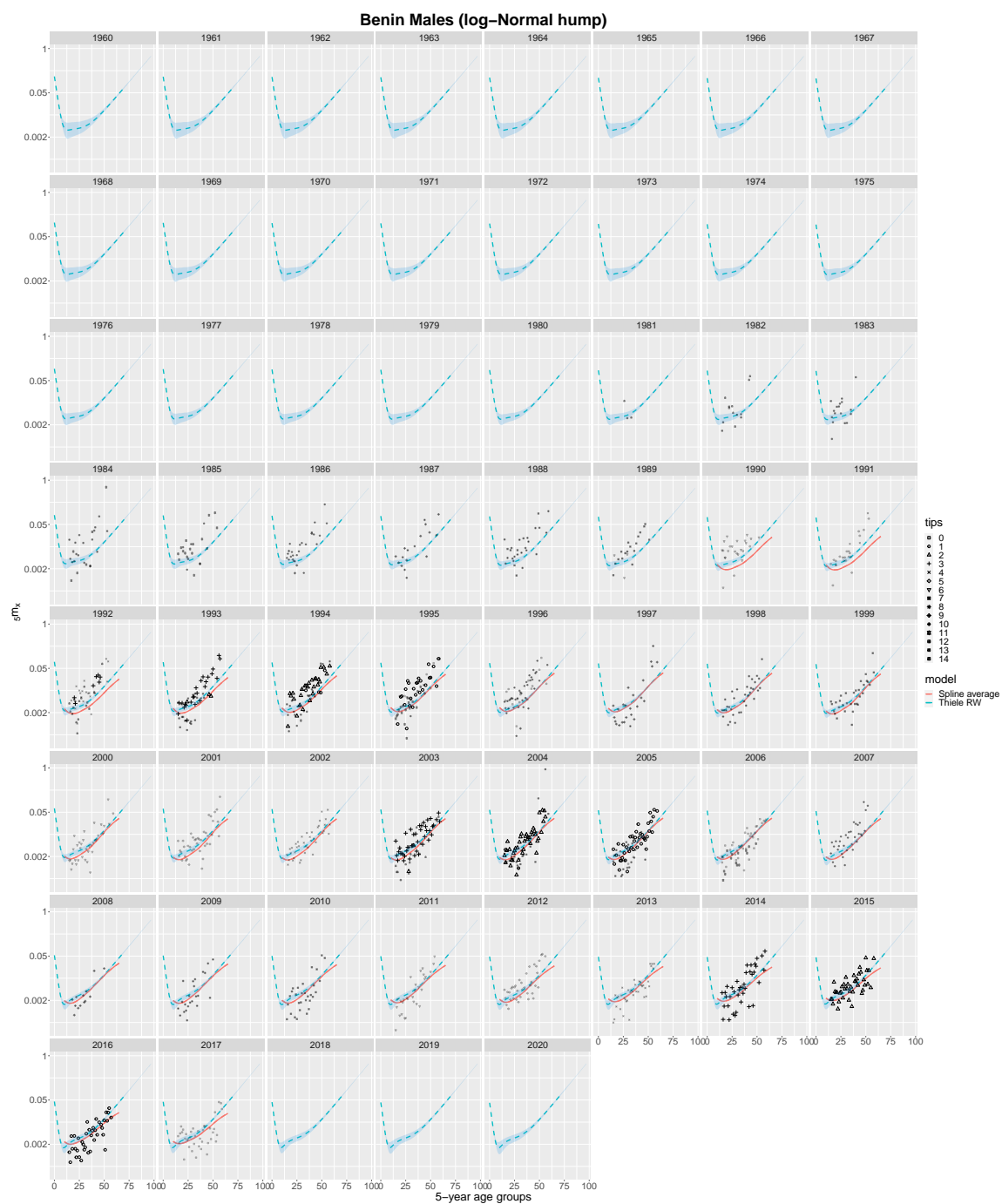Figure 5: Estimated $_{45}q_{15}$

Figure 6: Mortality Schedules
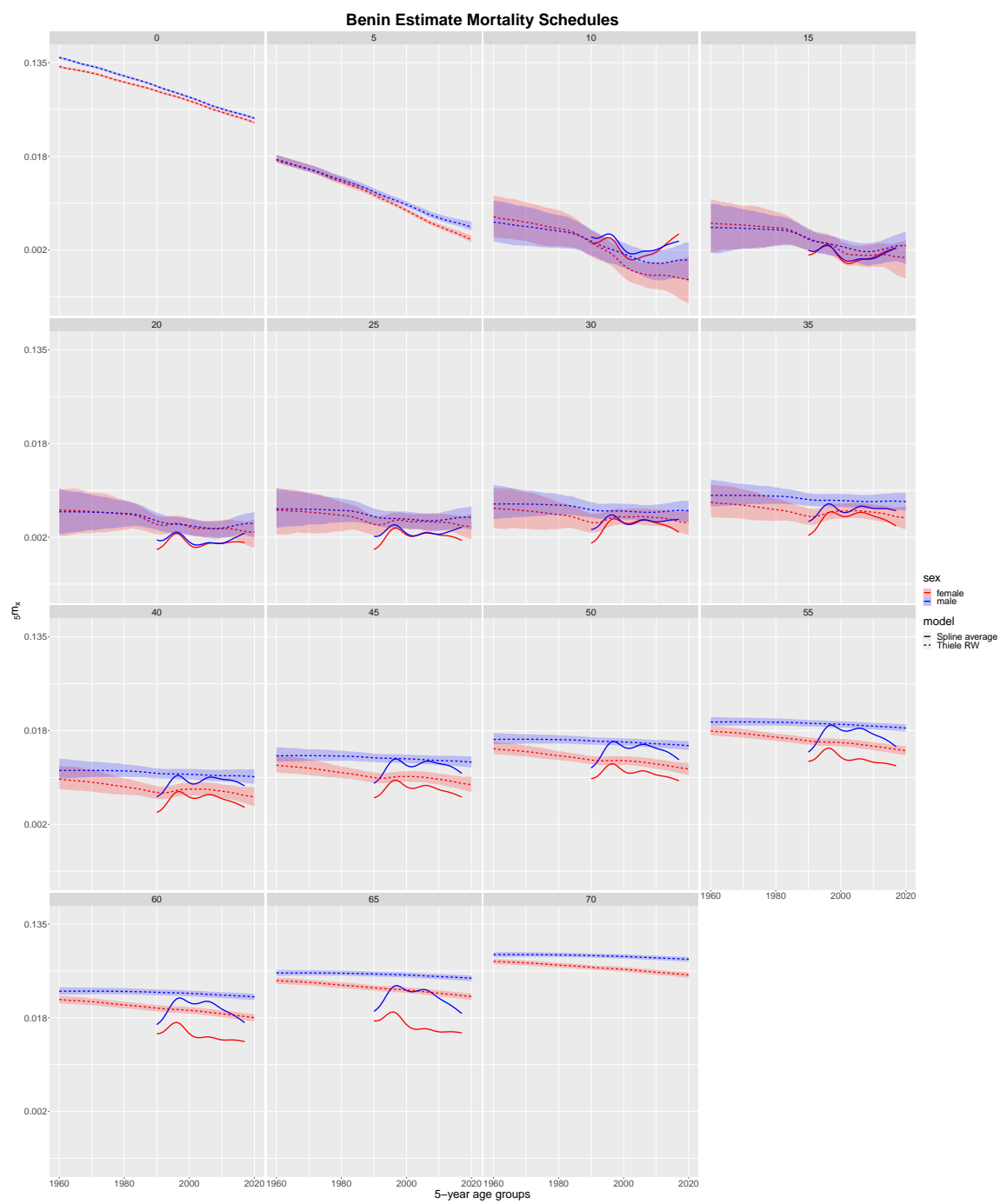
Figure 7: Mortality Schedules
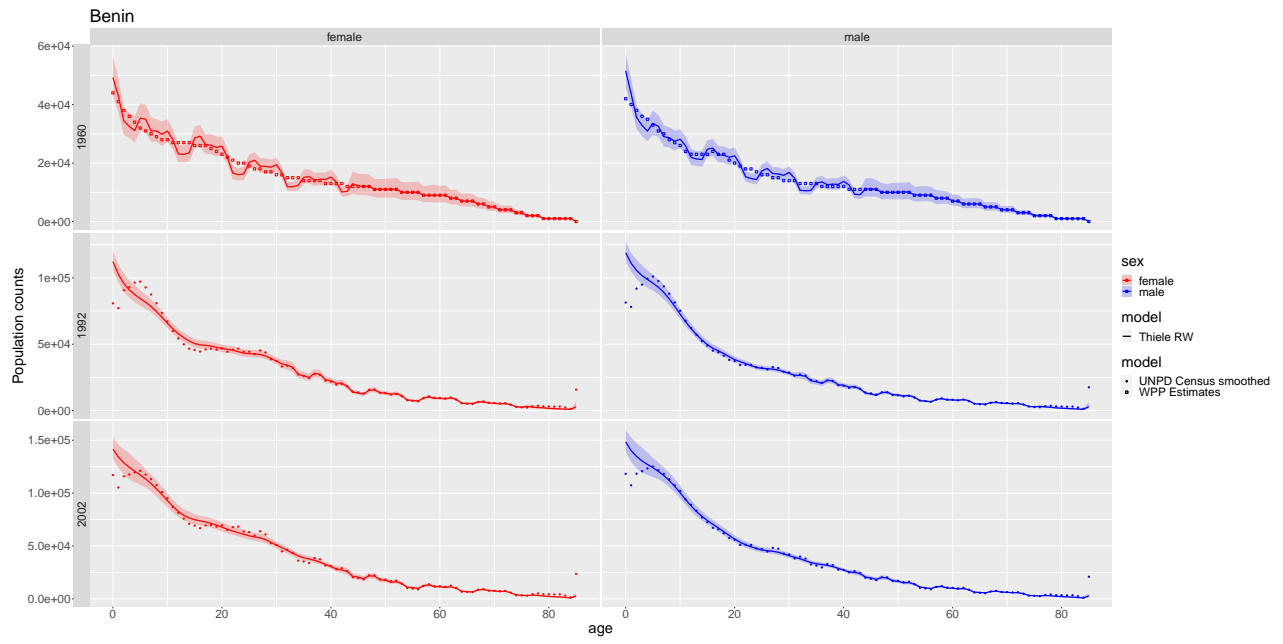
Figure 8: Mortality Schedules
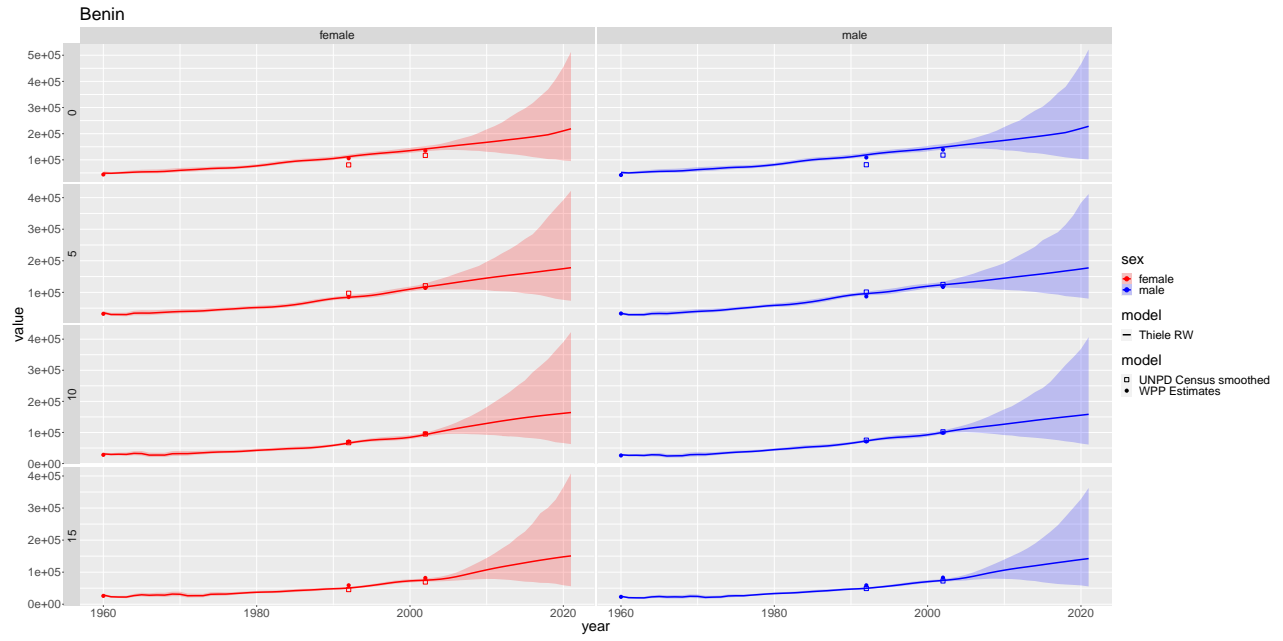
Figure 9: Population

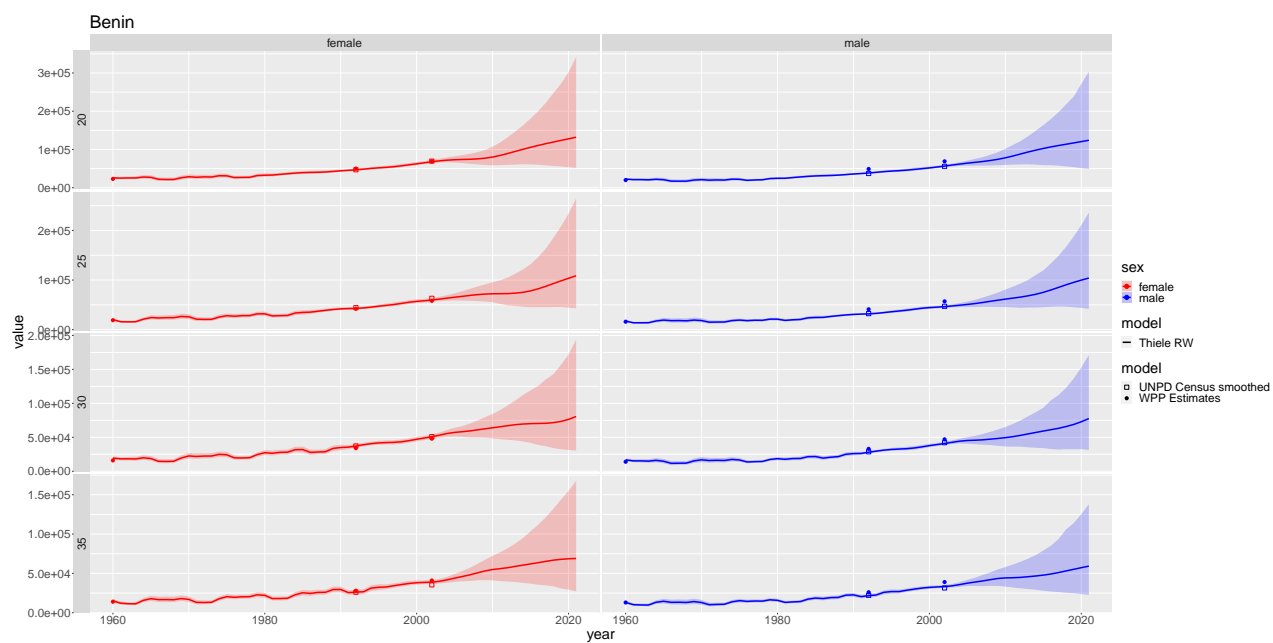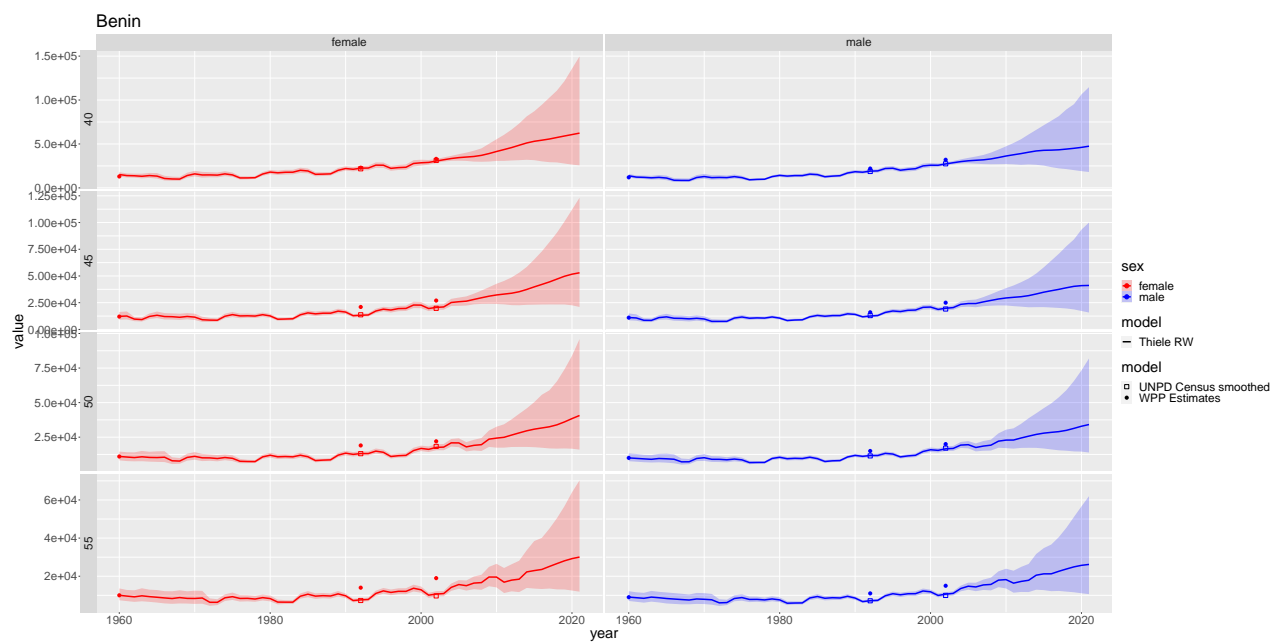

Figure 10: Population
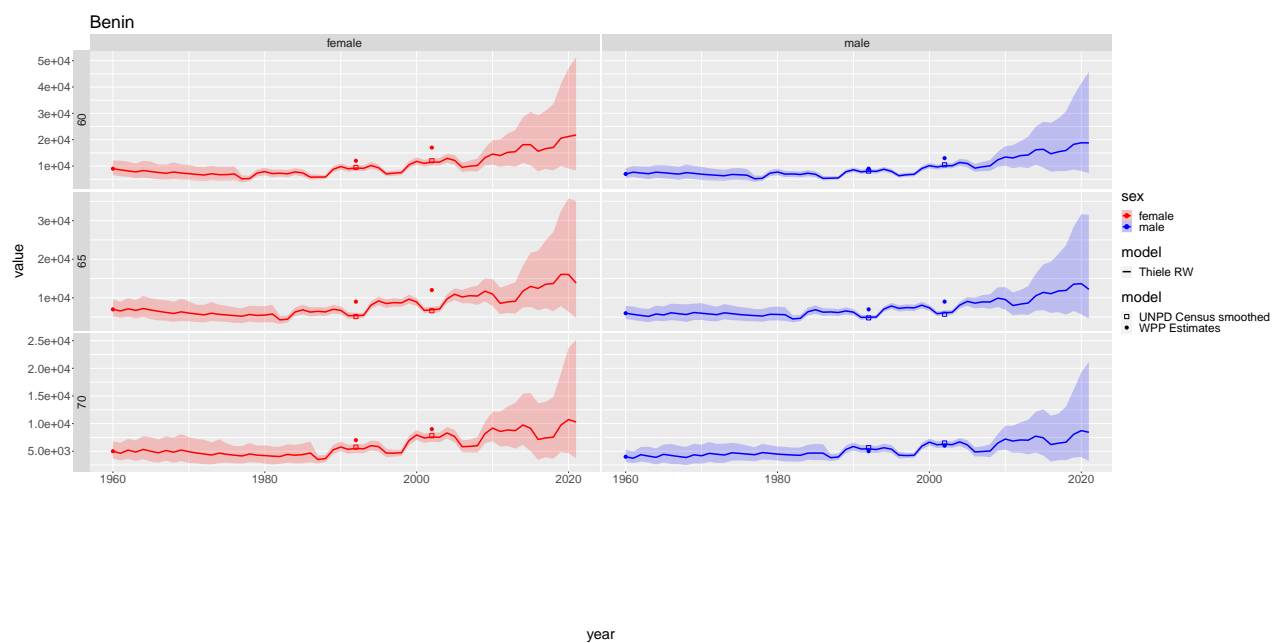
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Figure 11: Population
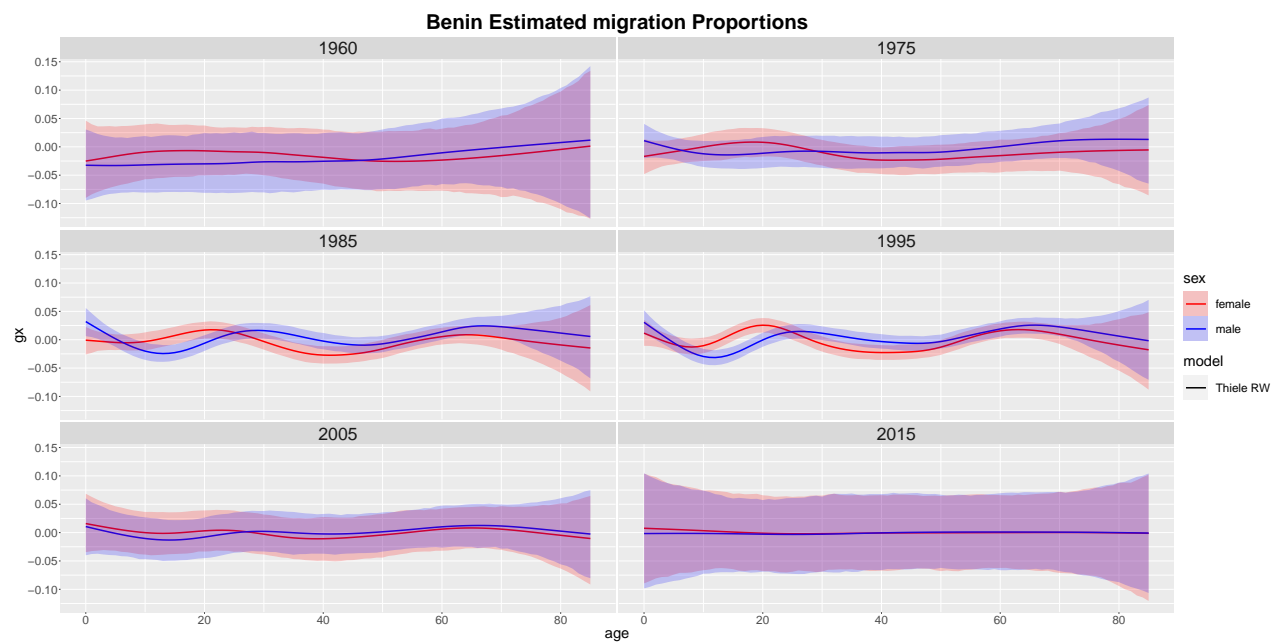

Figure 12: Population
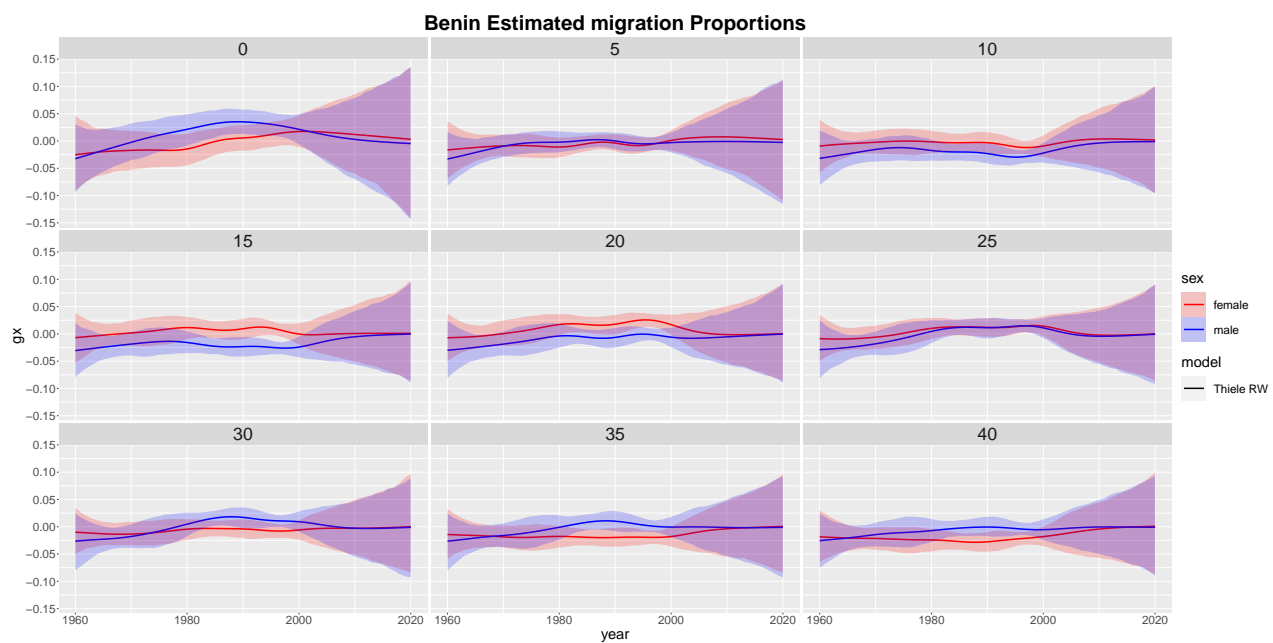
Figure 13: Population

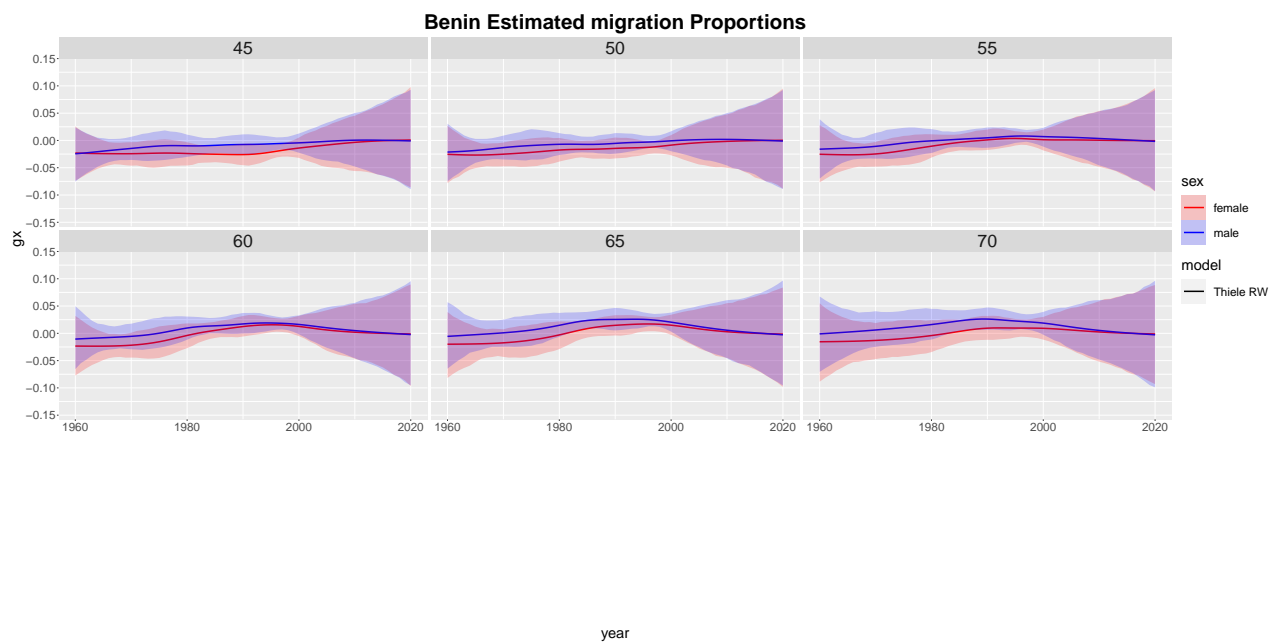Figure 14: Migration

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Figure 15: Migration
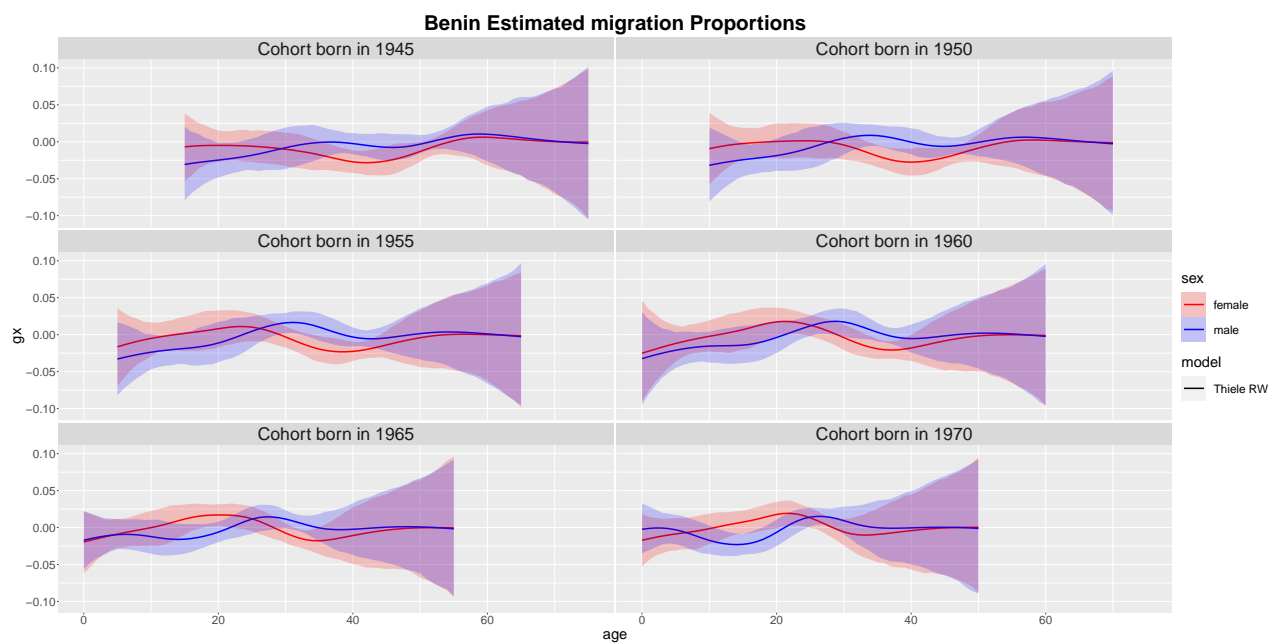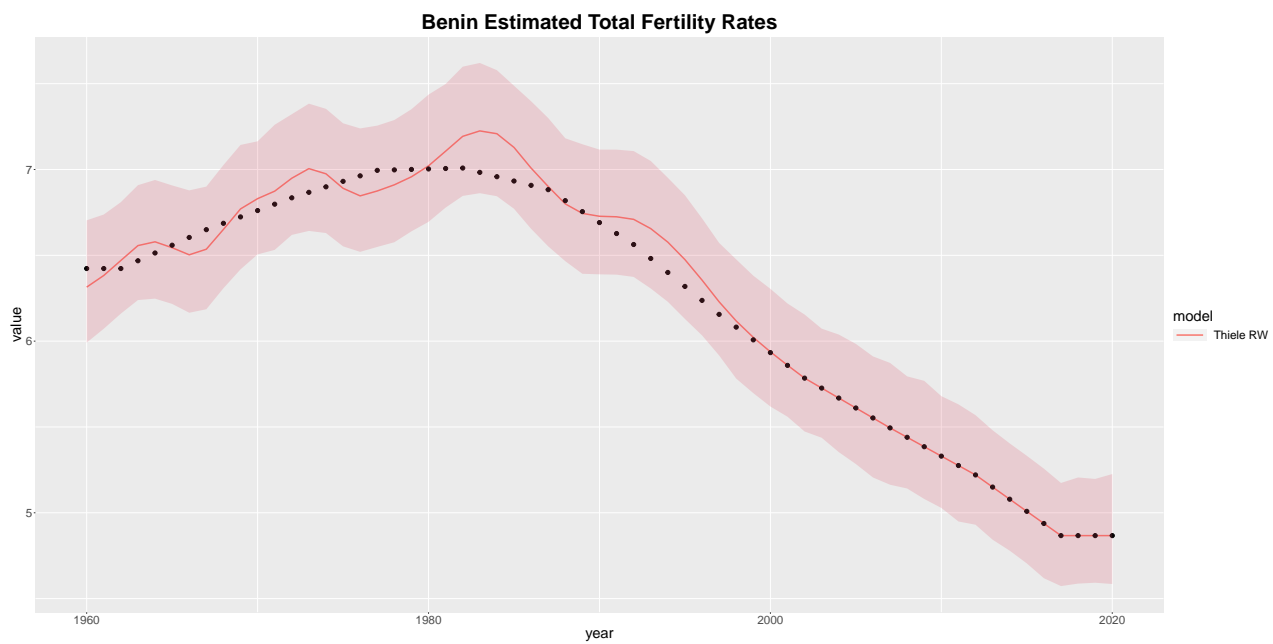

Figure 16: Migration

Figure 17: Migration
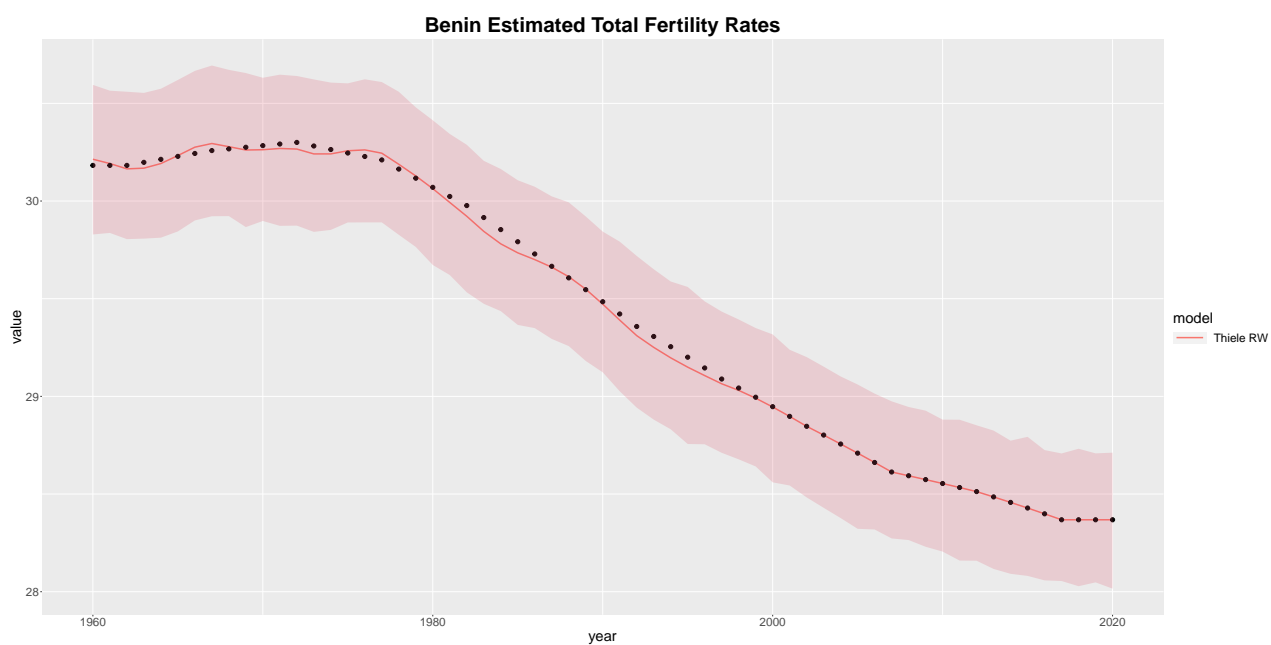

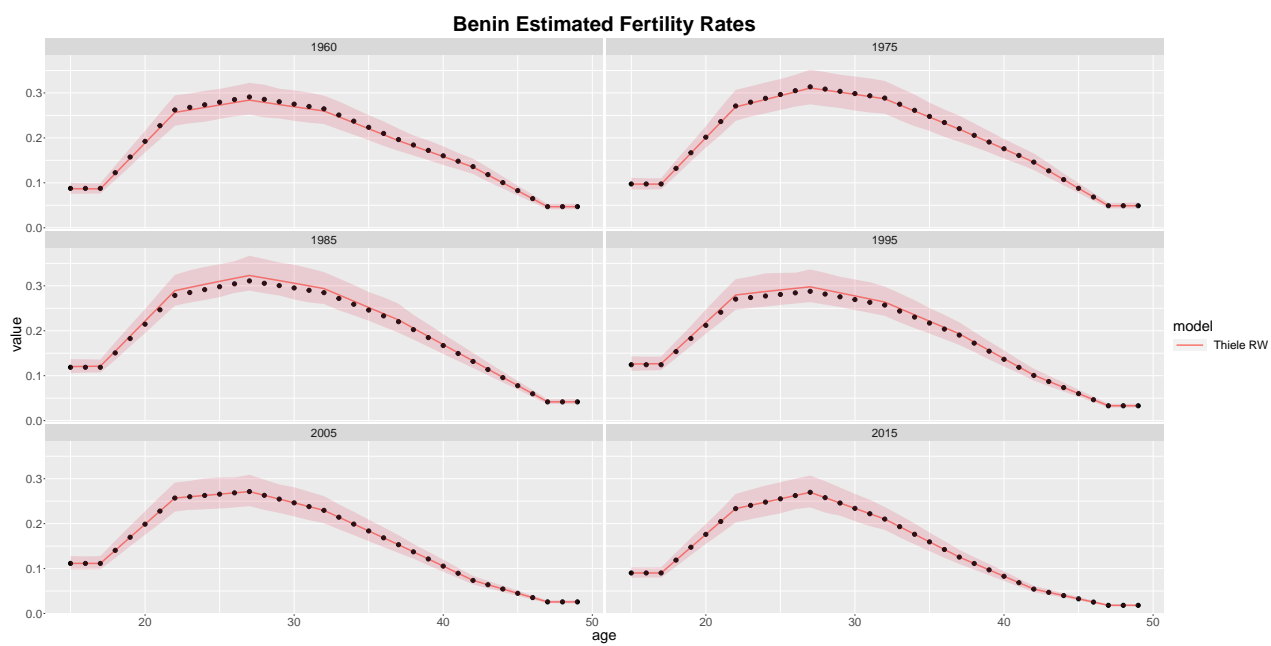Figure 18: Total Fertility

Figure 19: Mean age at births
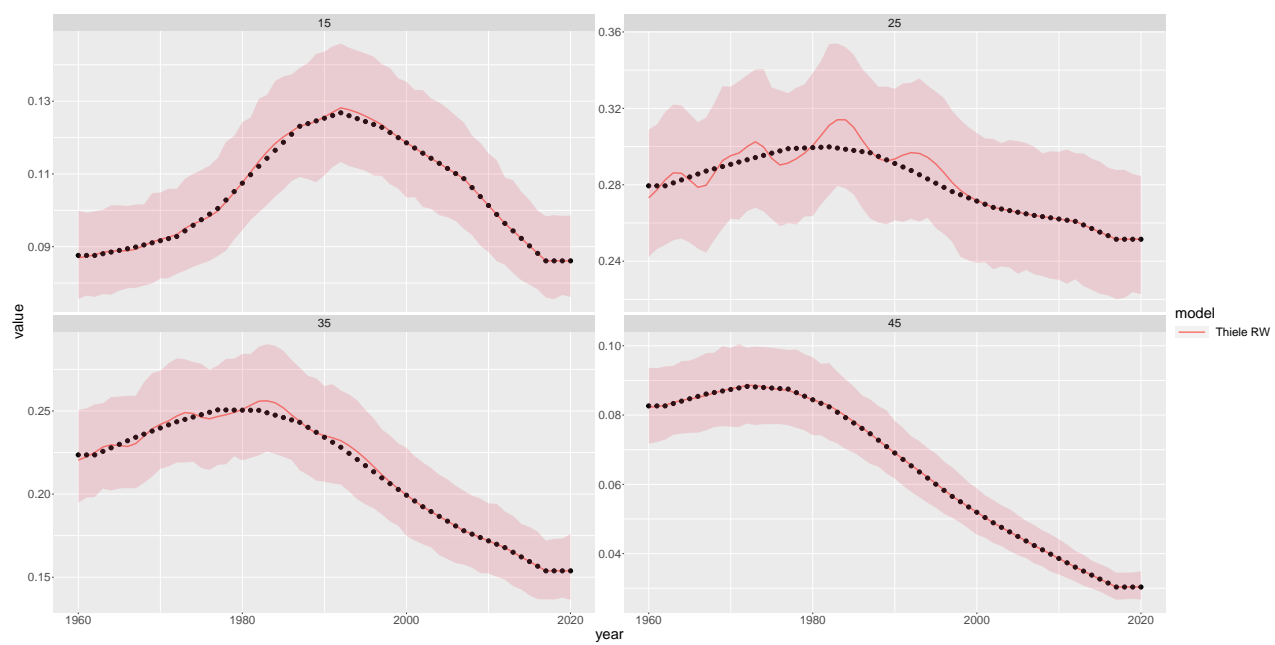

Figure 20: Fertility

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Figure 21: Fertility