Zimbabwe

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

## # A tibble: 86 x 6
##      age `1969` `1982`  `1992`  `2002`  `2012`
##    <dbl>  <dbl>  <dbl>   <dbl>   <dbl>   <dbl>
## 1      0   215. 137199. 169638. 170997. 215623.
## 2      1   200. 134655. 159190. 172117. 211071.
## 3      2   219. 133815. 158420. 168708. 198666.
## 4      3   229. 131120. 158291. 164925. 190736.
## 5      4   240. 128619. 160494. 162274. 183611.
## 6      5   251. 126617. 162425. 159507. 177197.
## 7      6   258. 125956. 164145. 156778. 173472.
## 8      7   261. 125351. 166412. 155377. 171651.
## 9      8   262. 124105. 167841. 153895. 169450.
## 10     9   259. 118378. 165018. 153789. 171475.
## # ... with 76 more rows

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

## # A tibble: 18 x 2
##      age `1969`
##    <dbl>  <dbl>
## 1      0 1100.
## 2      5 1252.
## 3     10 1181.
## 4     15  935.
## 5     20  709.
## 6     25  541.
## 7     30  437.
## 8     35  379.
## 9     40  303.
## 10    45  227.
## 11    50  168.
## 12    55  124.
## 13    60   95.4
## 14    65   67.1
## 15    70   35.5
## 16    75   17.0
## 17    80    9.26
## 18    85   13.4

## [1] "Census Males"

## # A tibble: 86 x 6
##      age `1969` `1982`  `1992`  `2002`  `2012`
##    <dbl>  <dbl>  <dbl>   <dbl>   <dbl>   <dbl>
## 1      0   238. 133357. 168079. 170637. 213895.
## 2      1   232. 129754. 158096. 172216. 210140.
## 3      2   231. 129163. 156962. 168433. 197420.
## 4      3   235. 127343. 157057. 164960. 189835.
## 5      4   242. 125798. 159247. 162197. 182613.
## 6      5   248. 124587. 161170. 159217. 176094.
```

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## 7       6    255. 124714. 162716. 156209. 172218.
## 8       7    265. 124146. 164082. 154419. 170262.
## 9       8    271. 122838. 164791. 152264. 167883.
## 10      9    271. 117620. 161620. 152041. 170380.
## # ... with 76 more rows

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

## # A tibble: 18 x 2
##      age  `1969`
##    <dbl>   <dbl>
## 1      0  1156.
## 2      5  1278.
## 3     10  1207.
## 4     15   931.
## 5     20   636.
## 6     25   459.
## 7     30   389.
## 8     35   341.
## 9     40   280.
## 10    45   229.
## 11    50   186.
## 12    55   142.
## 13    60    97.1
## 14    65    60.0
## 15    70    32.4
## 16    75    15.2
## 17    80     8.24
## 18    85     7.21
```

Thiele log-Normal Hump Spline

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

##     log_tau2_logpop    log_tau2_logpop    log_tau2_logpop    log_tau2_logpop
##         4.188311709        6.003080052        4.348179163        5.757824367
##       log_lambda_fx      log_lambda_gx     log_dispersion     log_dispersion
##        10.634214243       10.881303496        1.188040609        1.182731942
##       log_lambda_tp           tp_slope        tp_params_5       tp_params_10
##         3.589509963       -0.006255899        0.225700924        0.421151124
##      log_lambda_phi     log_lambda_psi       log_lambda_A       log_lambda_B
##        15.275057021       14.654590261       15.252392419       14.444144593
##  log_lambda_lambda   log_lambda_delta log_lambda_epsilon
##         2.922373903        5.739305891        3.906946997
```
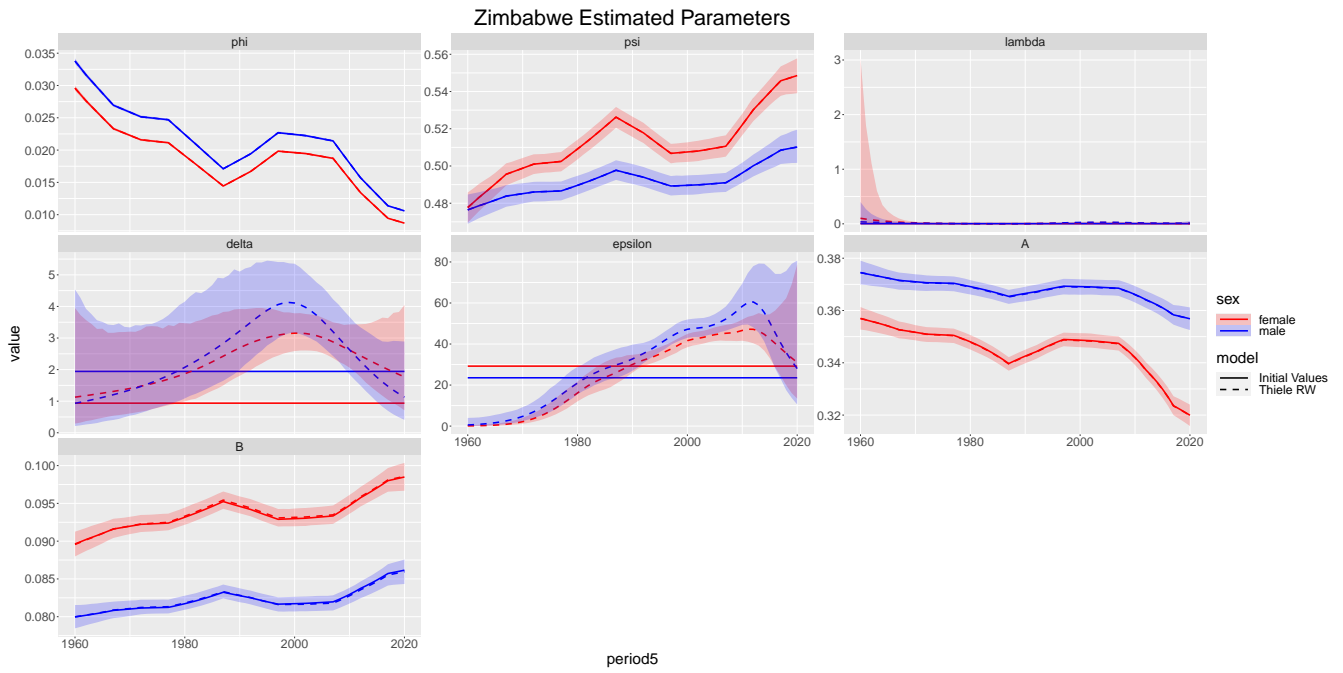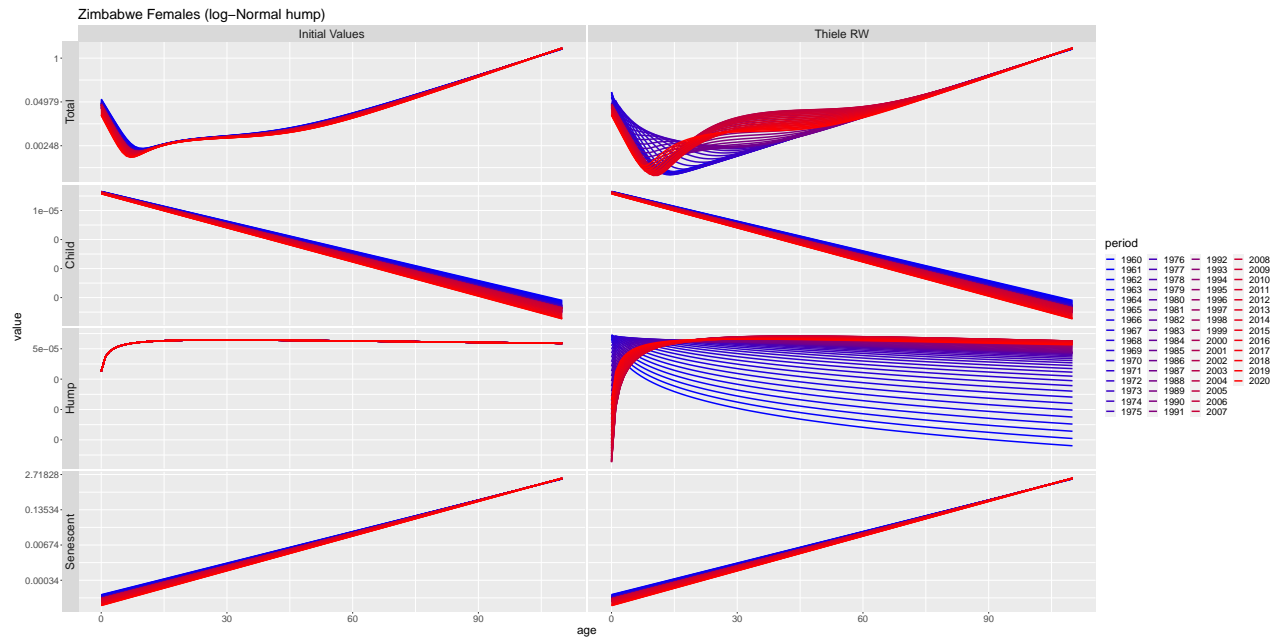
Figure 1: Estimated parameters
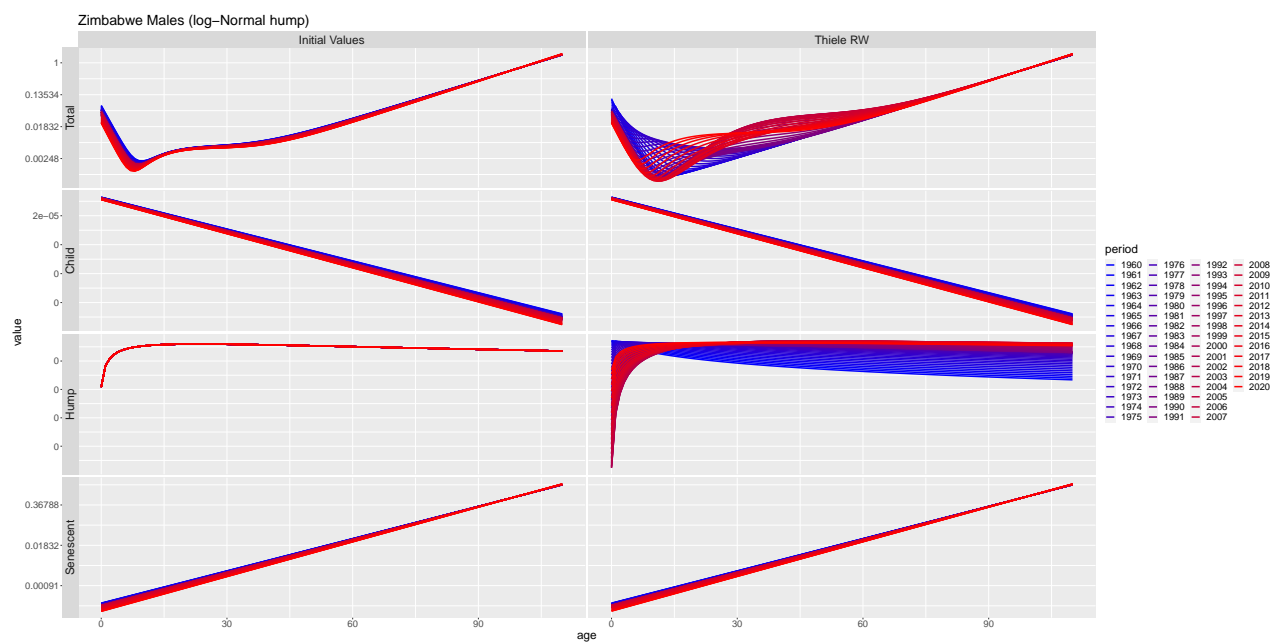

Figure 2: Thiele Decomposed
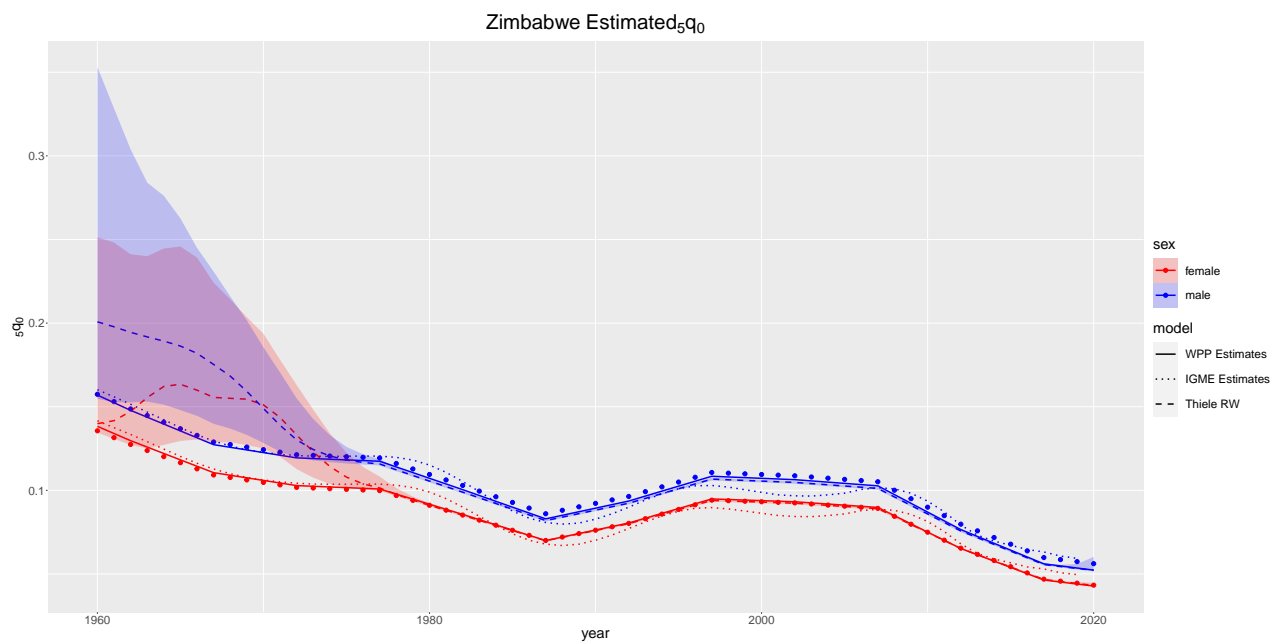
Figure 3: Thiele Decomposed
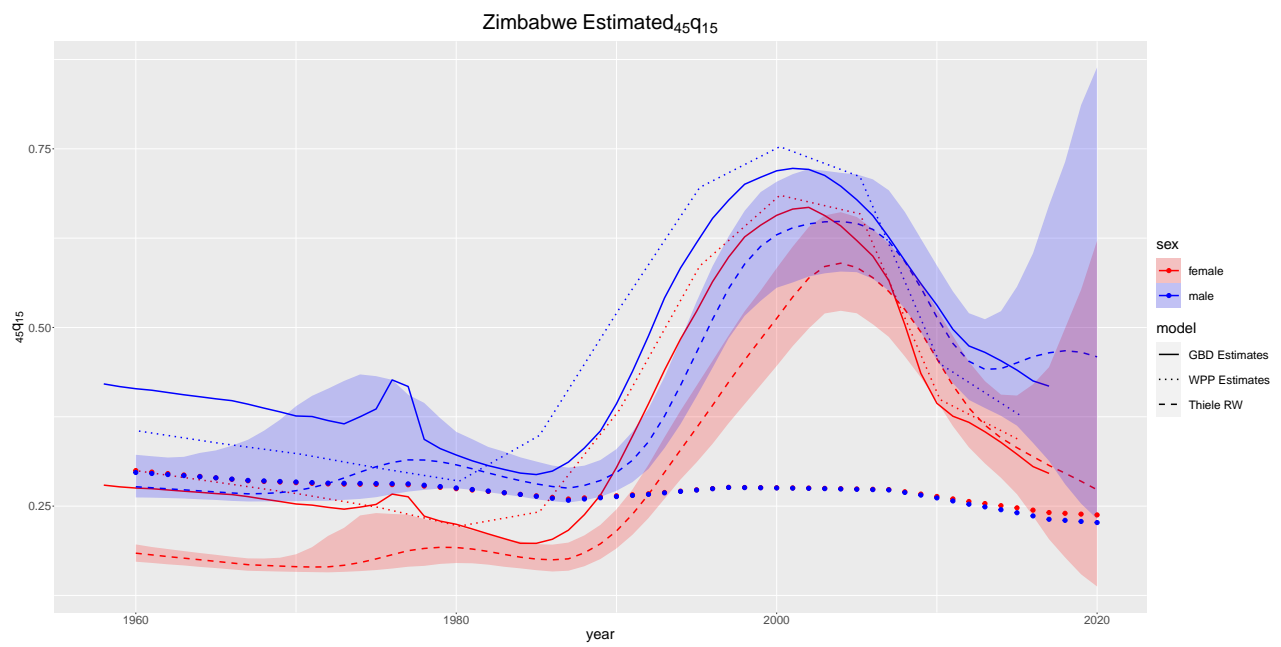

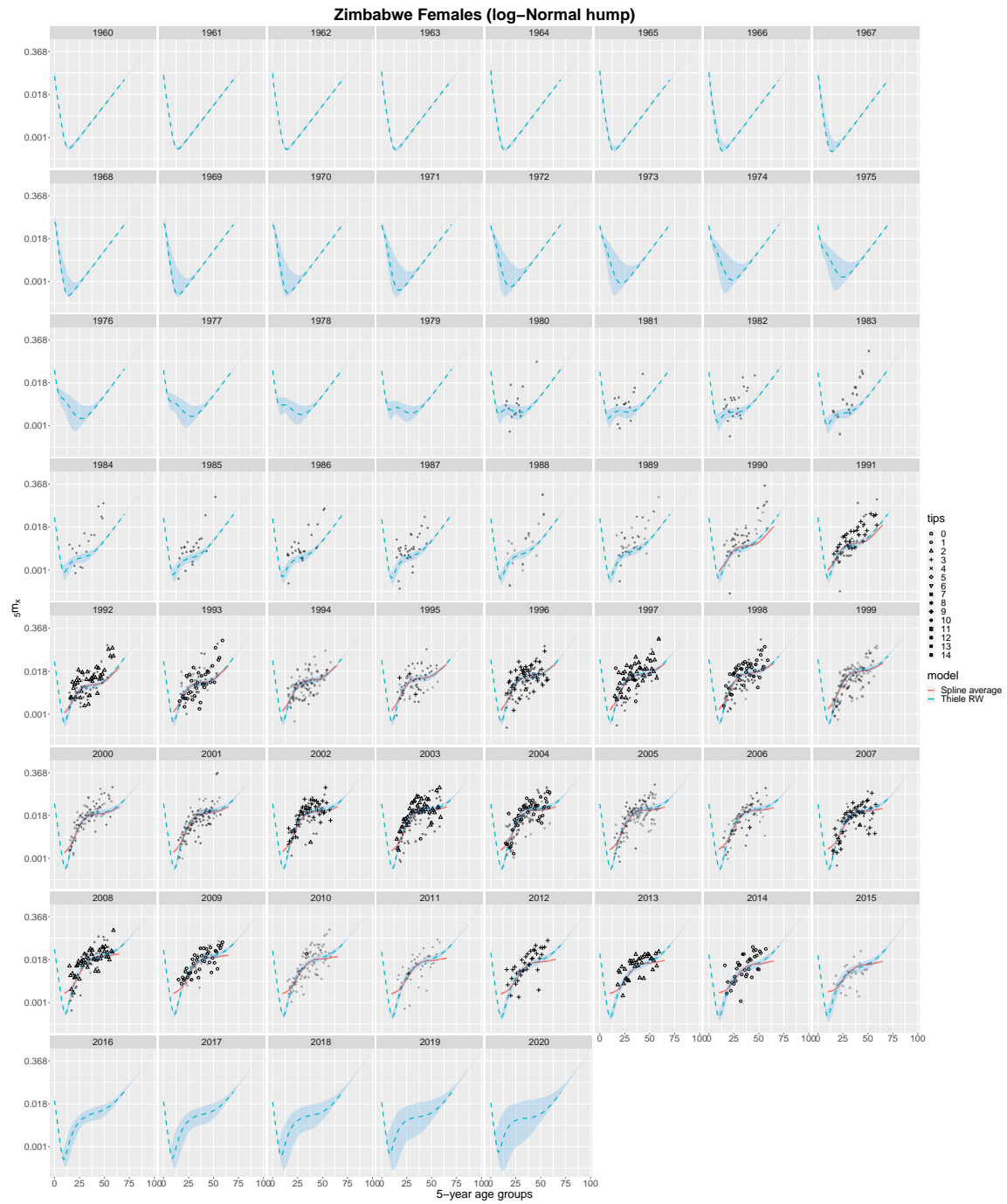Figure 4: Estimated $_5q_0$

Figure 5: Estimated $_{45}q_{15}$
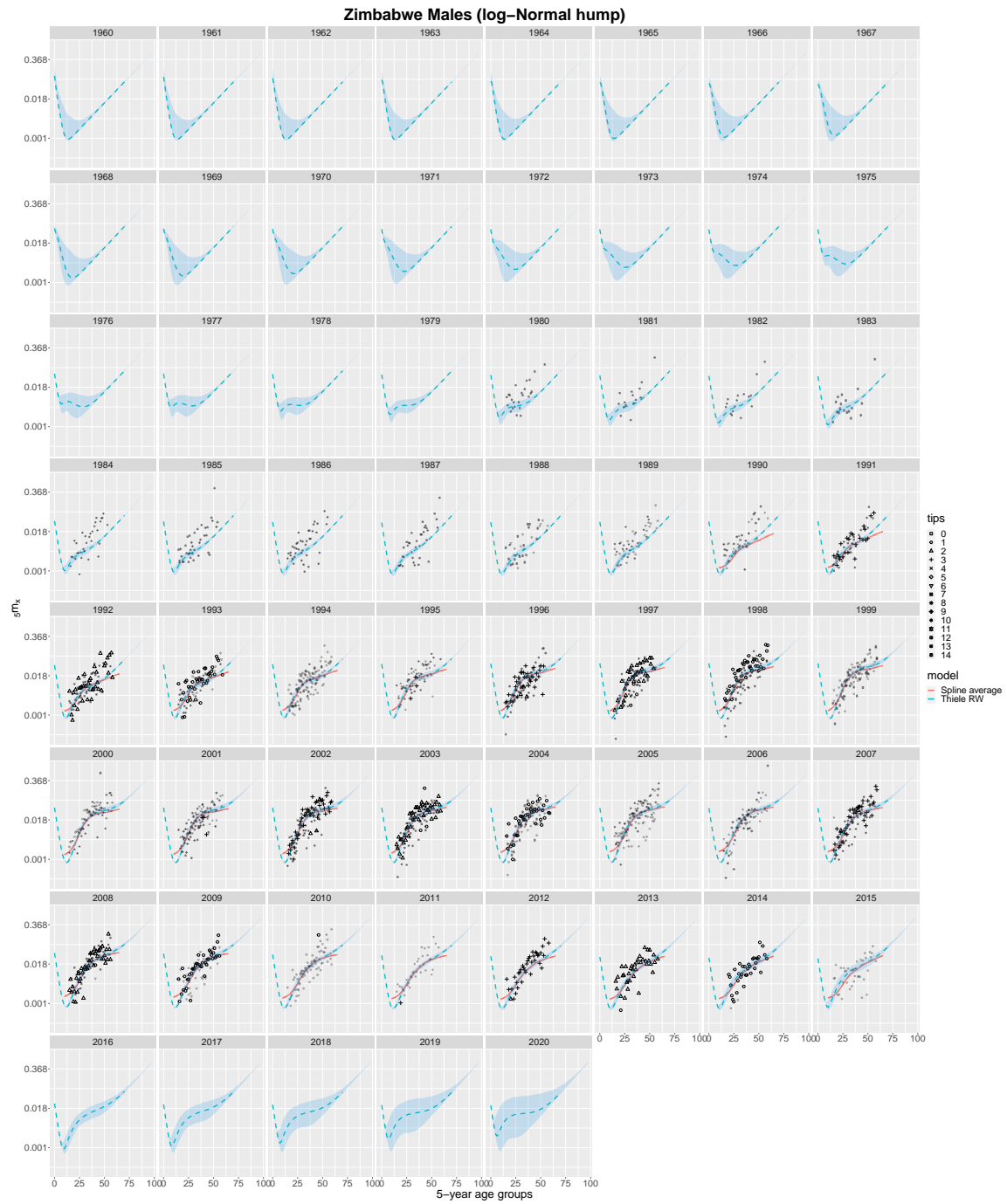
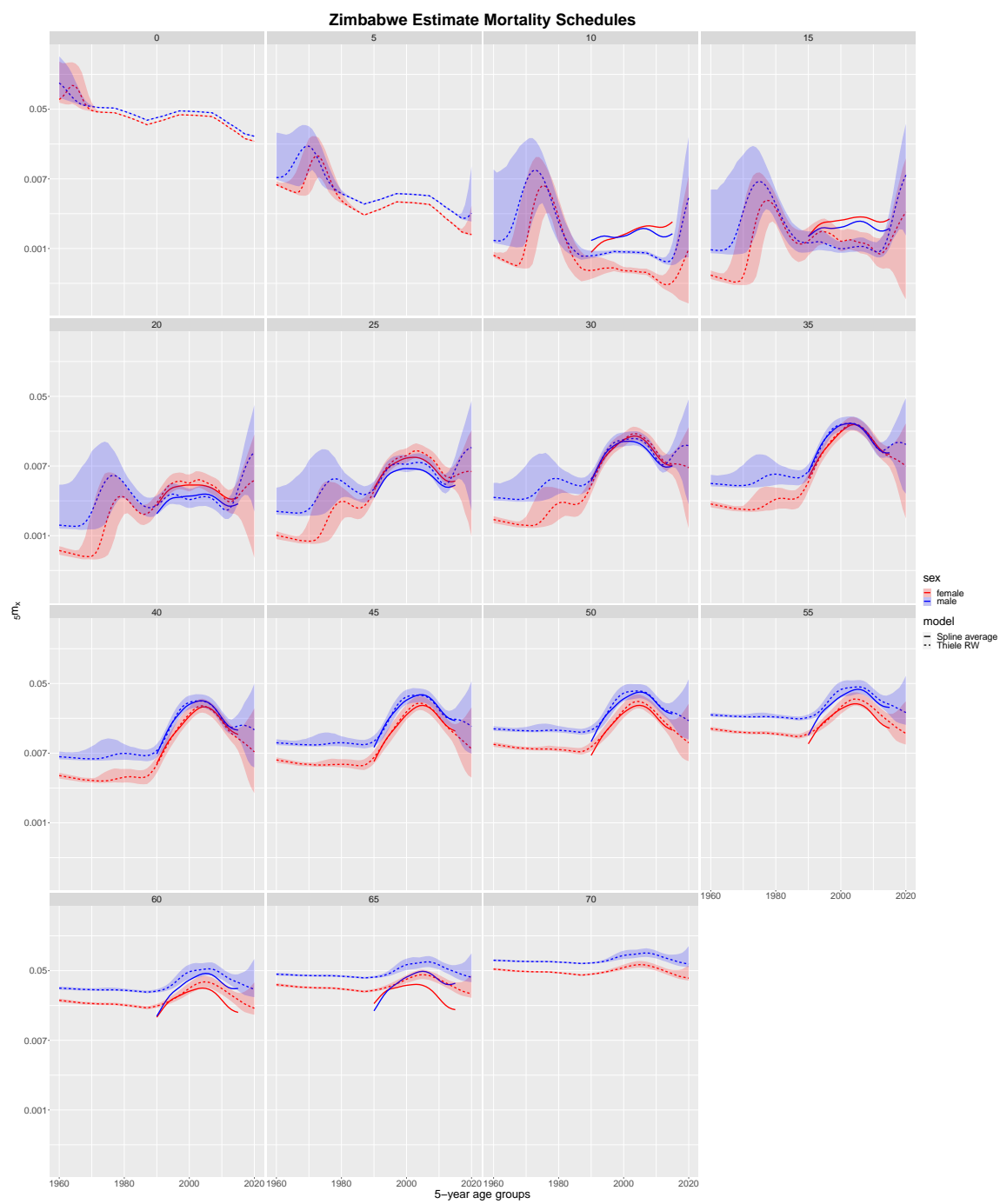Figure 6: Mortality Schedules

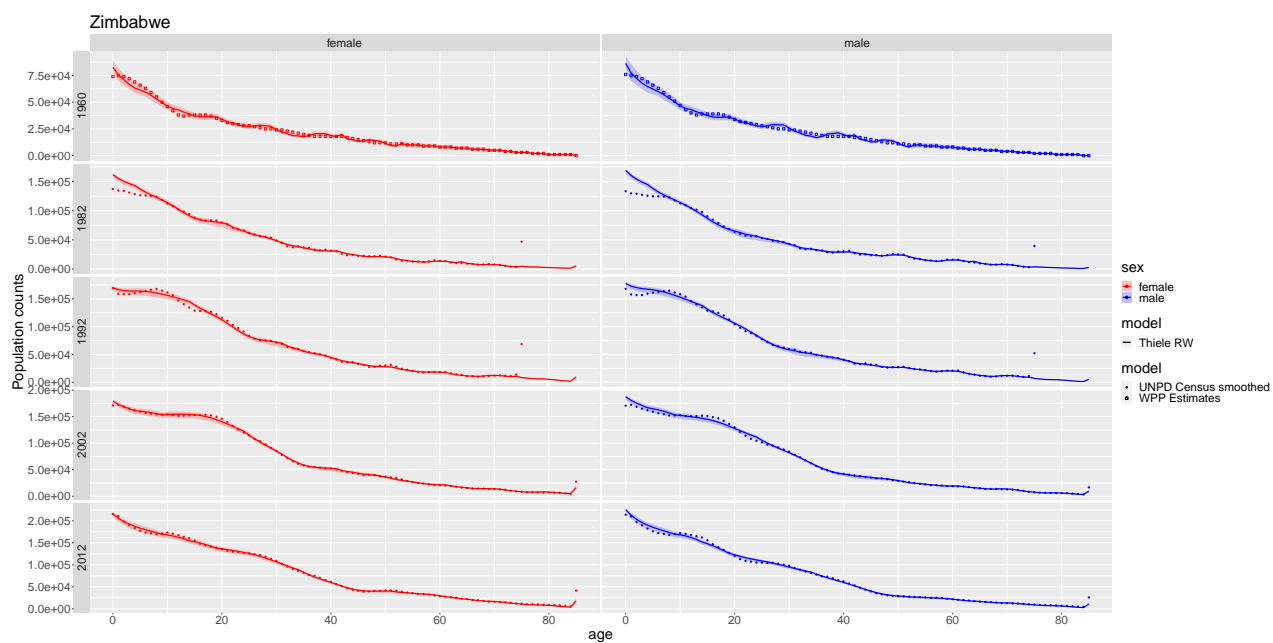Figure 7: Mortality Schedules

Figure 8: Mortality Schedules

Figure 9: Population
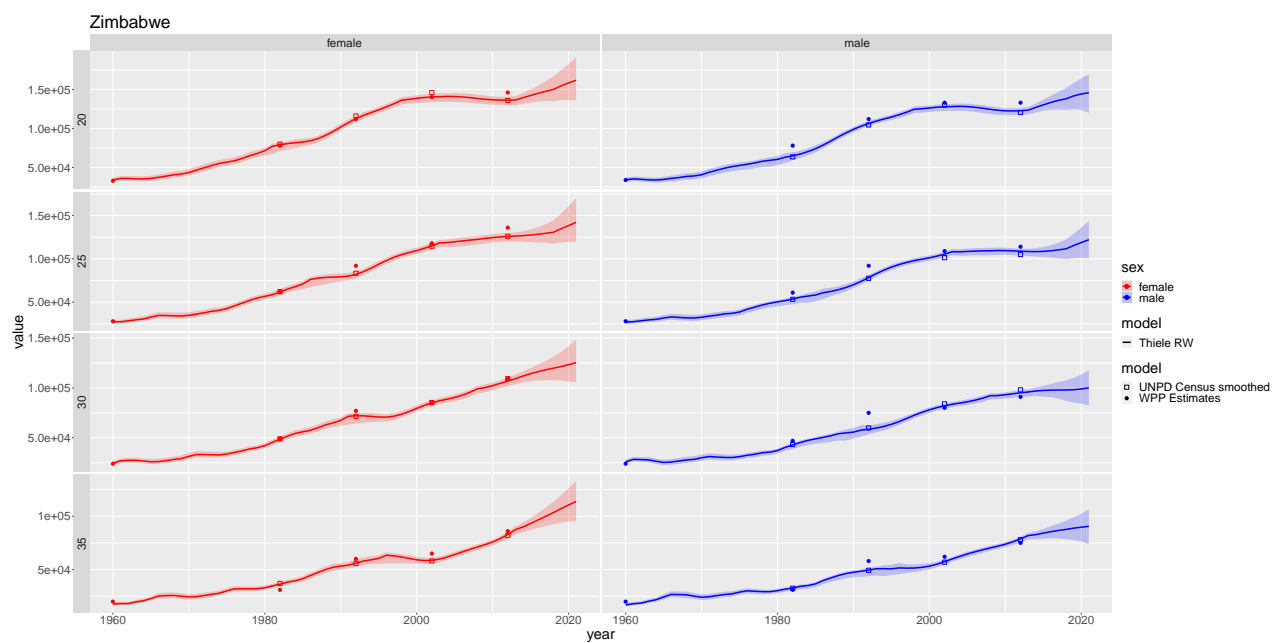

Figure 10: Population
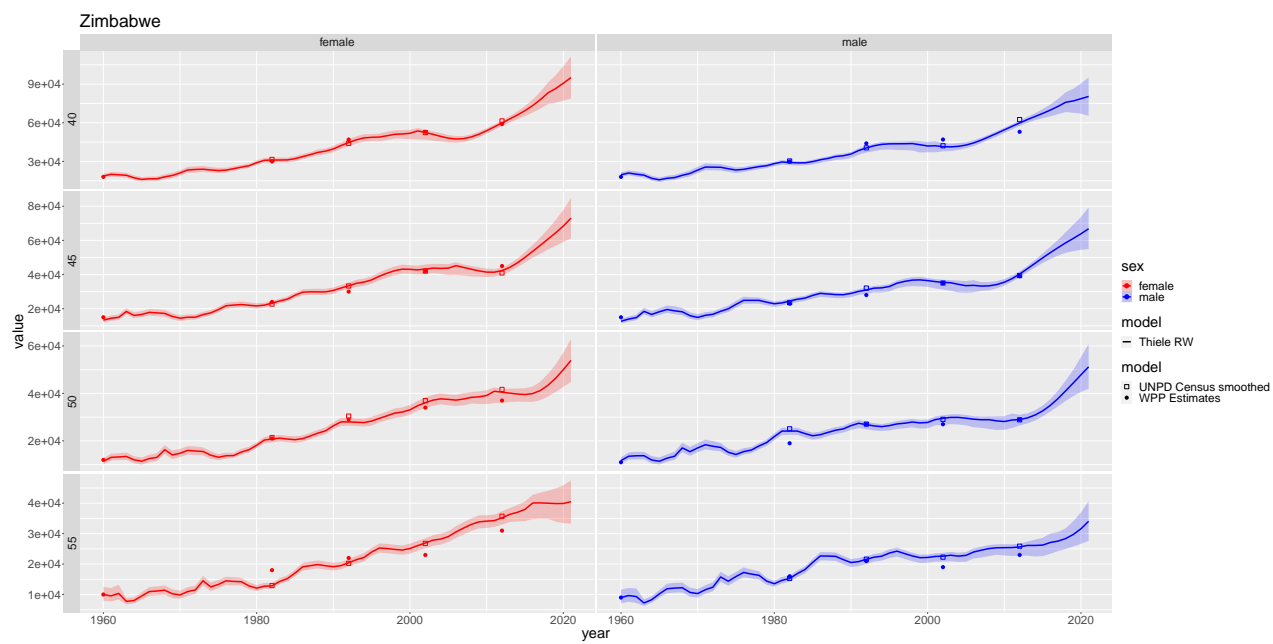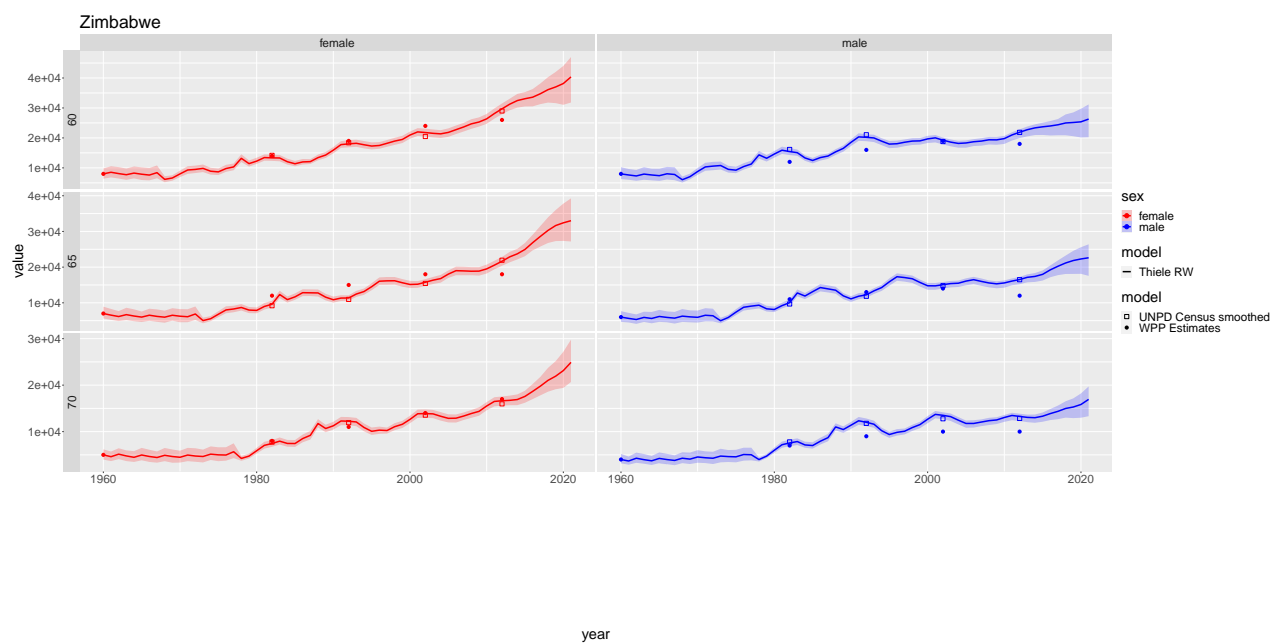
9

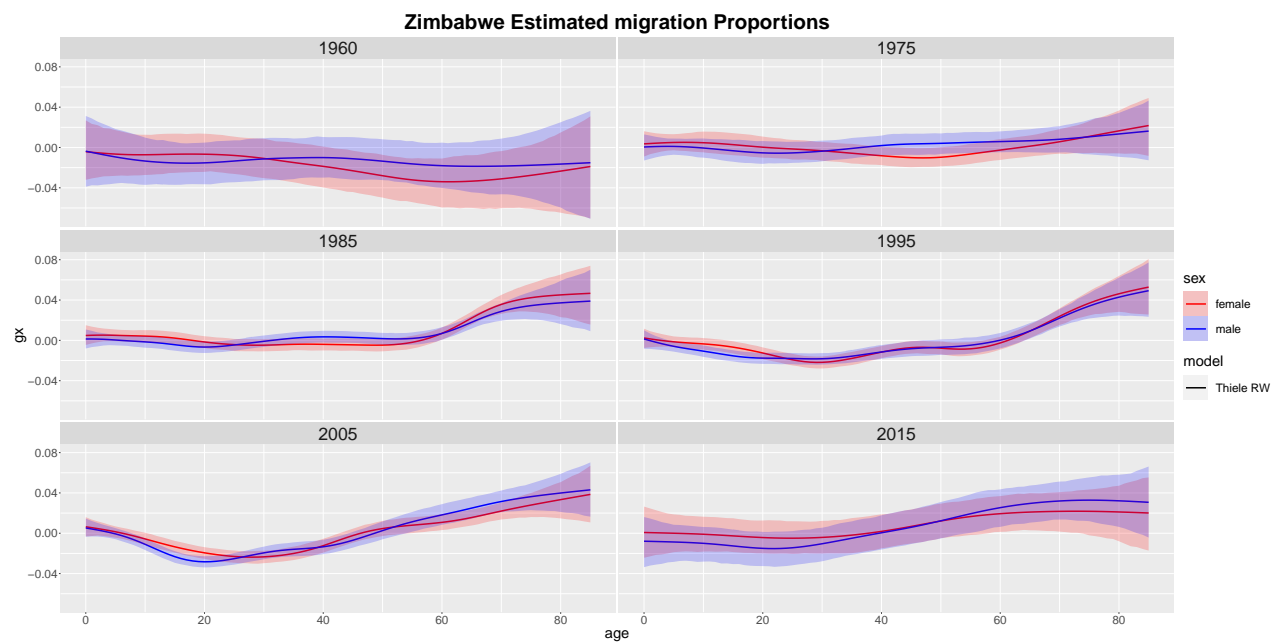Figure 11: Population

Figure 12: Population
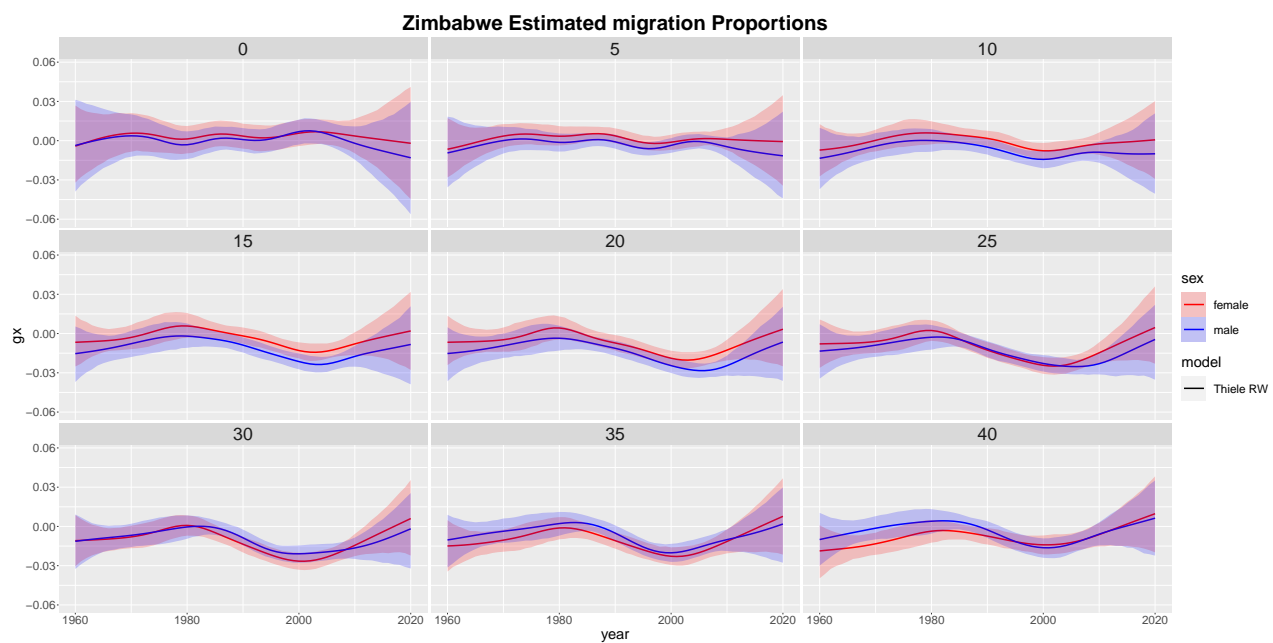
Figure 13: Population
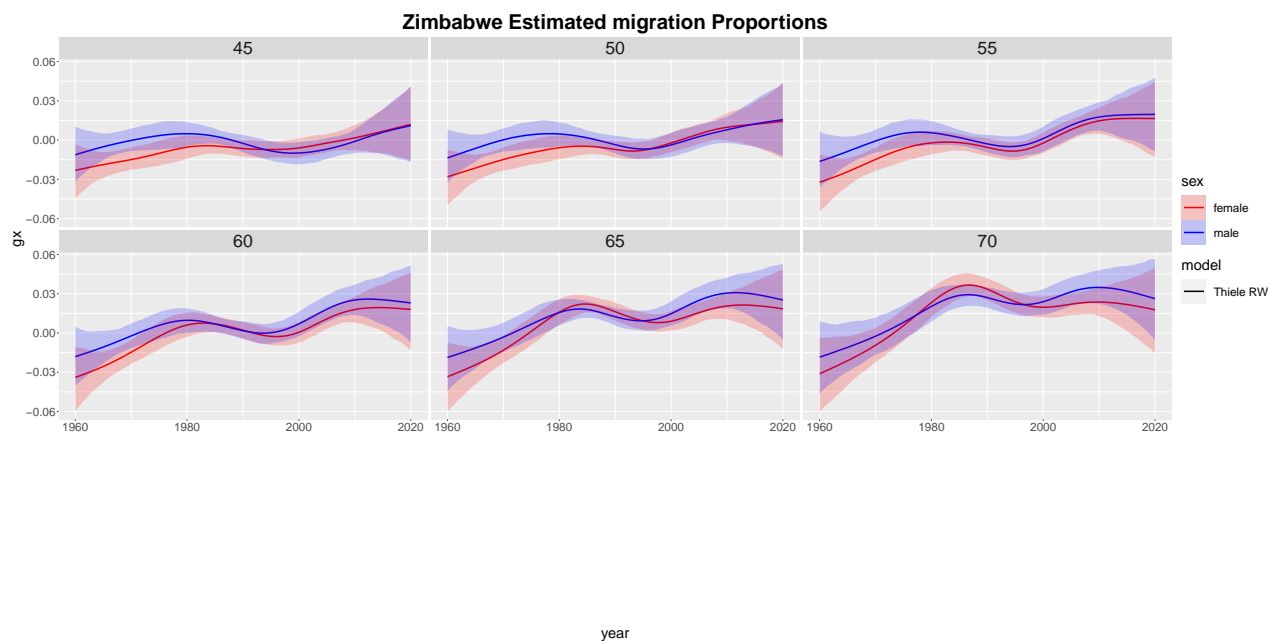

Figure 14: Migration
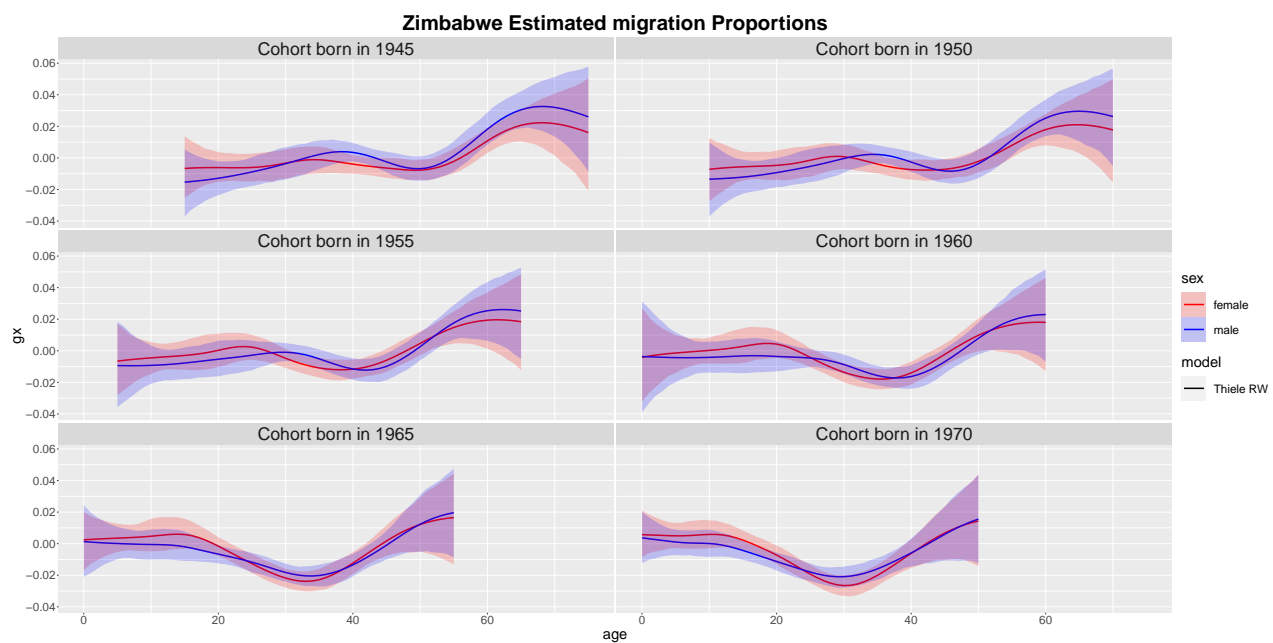
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Figure 15: Migration
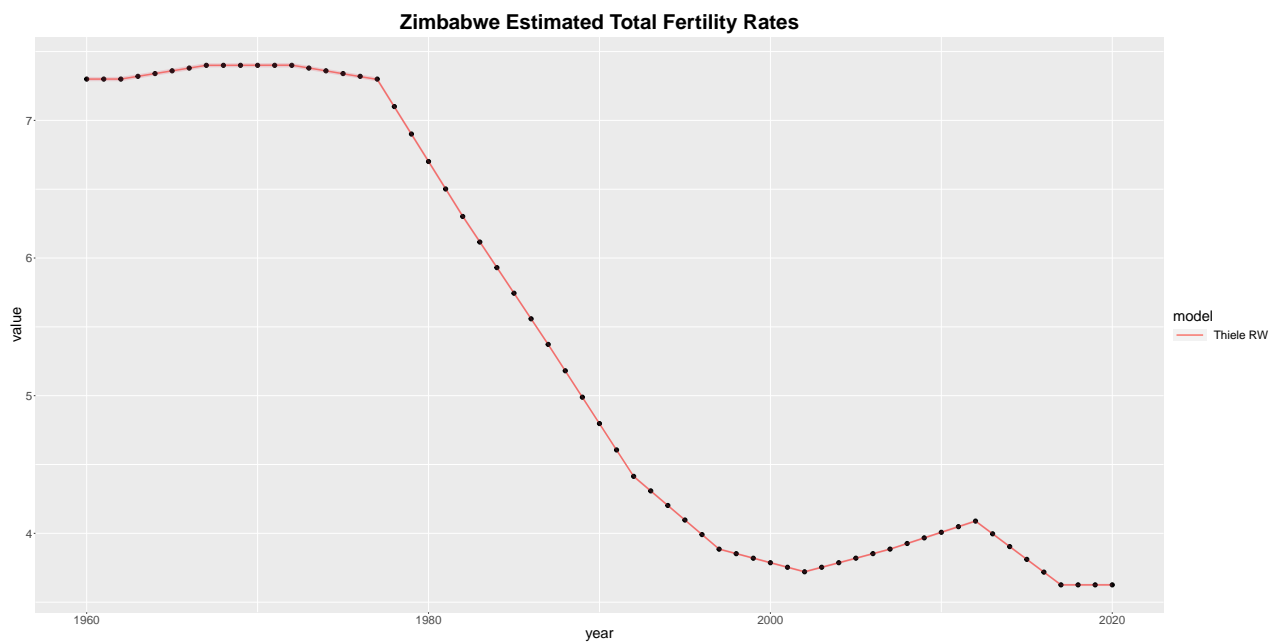

Figure 16: Migration

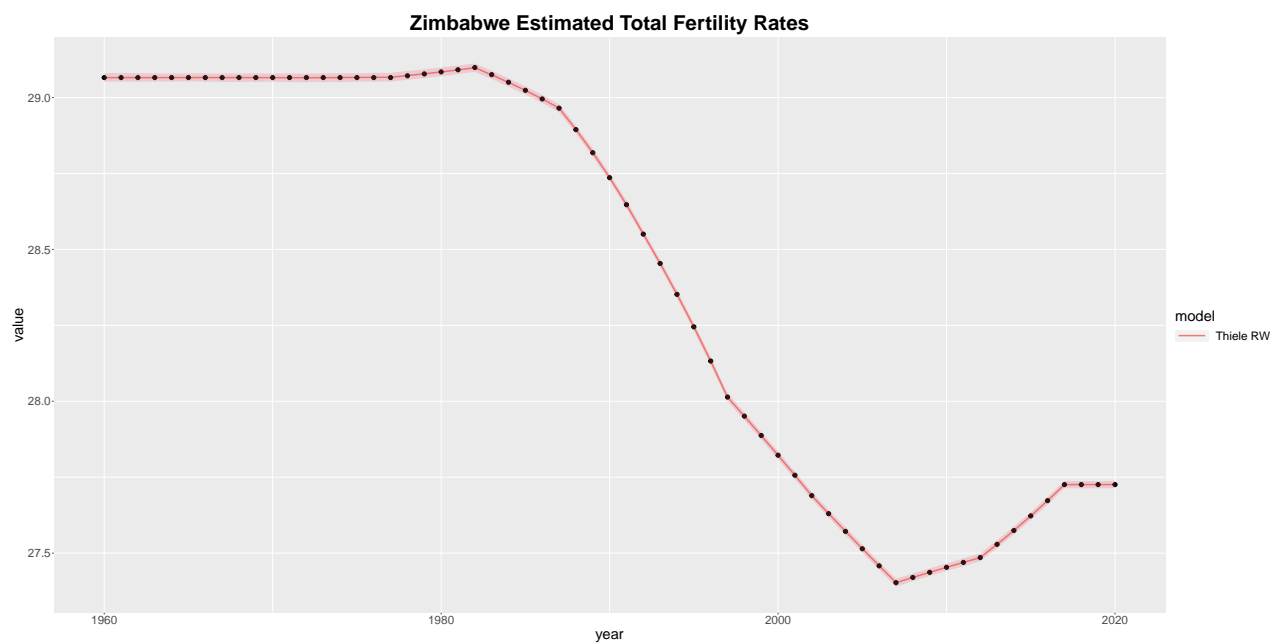Figure 17: Migration
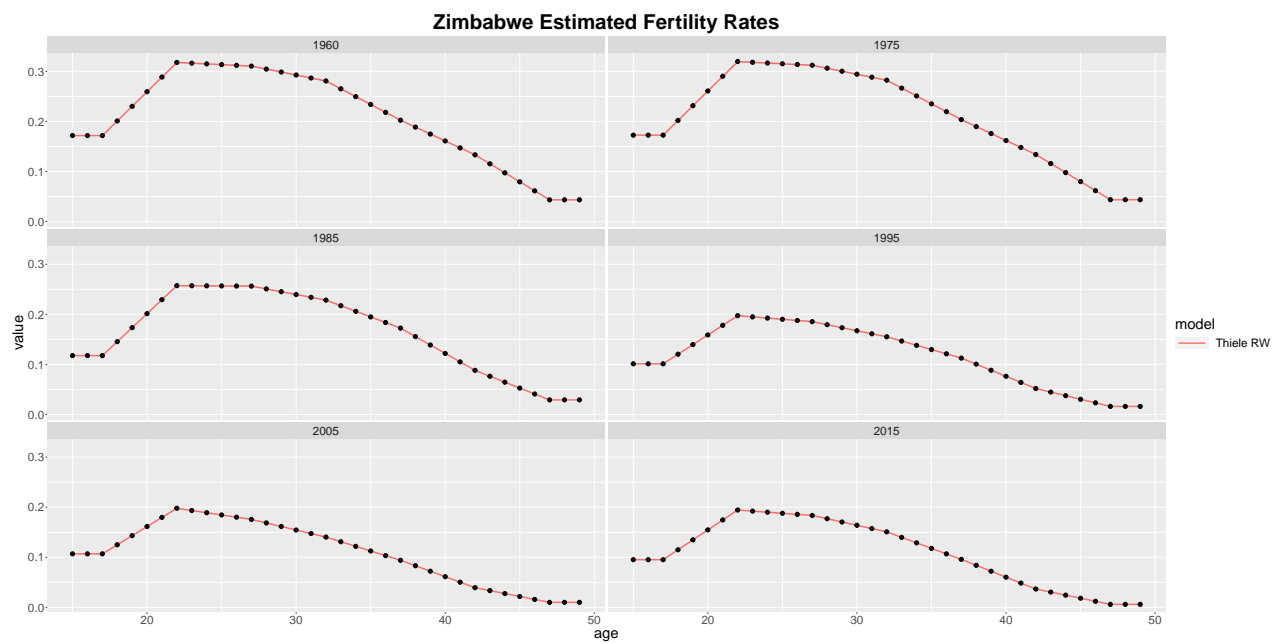

Figure 18: Total Fertility

Figure 19: Mean age at births
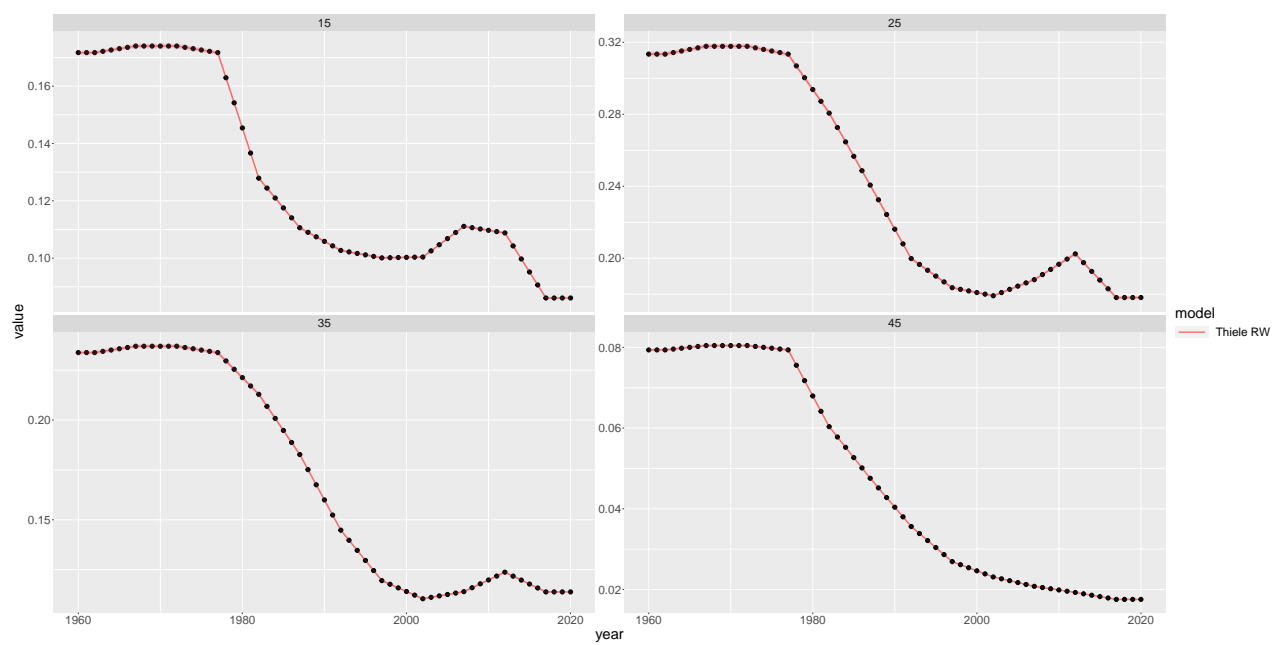

Figure 20: Fertility

Figure 21: Fertility

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