Namibia

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

## # A tibble: 87 x 4
##      age `1991` `2001` `2011`
##    <dbl>  <dbl>  <dbl>  <dbl>
## 1      0 24851. 23909. 32157
## 2      1 21976. 23883. 28690.
## 3      2 21726. 24603. 28220
## 4      3 21259. 25041. 27500.
## 5      4 21247. 25458. 27077
## 6      5 20771. 25430. 26048.
## 7      6 20065. 25264. 24803.
## 8      7 19362. 25259. 23924.
## 9      8 18677. 25248. 23376.
## 10     9 18357. 25517. 23940.
## # ... with 77 more rows

## [1] "Census Males"

## # A tibble: 87 x 4
##      age `1991` `2001` `2011`
##    <dbl>  <dbl>  <dbl>  <dbl>
## 1      0 24861. 23791. 31976
## 2      1 21883. 24016. 28452.
## 3      2 21600. 24629. 28036.
## 4      3 21144. 24966. 27342.
## 5      4 21149. 25281. 26940.
## 6      5 20679. 25177. 25925.
## 7      6 19965. 24978. 24627.
## 8      7 19163. 24795. 23618.
## 9      8 18386. 24574. 23047
## 10     9 17972. 24684. 23621.
## # ... with 77 more rows
```

Thiele log-Normal Hump Spline

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

##           log_tau2_logpop_f          log_tau2_logpop_f
##                   6.3819610                  4.0893856
##           log_tau2_logpop_m          log_tau2_logpop_m
##                   6.4394130                  4.1790129
##                 log_tau2_fx                log_tau2_gx_f
##                   5.1275869                  3.6305660
##               log_tau2_gx_m          log_lambda_gx_age_f
##                   3.3015230                  7.8968090
##         log_lambda_gx_age_m         log_lambda_gx_time_f
##                   7.9207862                  8.1001565
##        log_lambda_gx_time_m      log_lambda_gx_agetime_f
##                   8.1891921                  7.4611406
##     log_lambda_gx_agetime_m                 log_lambda_tp
##                   6.9077507                  3.5659551
```

```
## log_lambda_tp_0_inflated_sd              log_dispersion_f
##                 0.3246860                      0.8152099
##            log_dispersion_m          log_marginal_prec_phi_f
##                 0.9745773                      4.6849502
##     log_marginal_prec_psi_f  log_marginal_prec_lambda_f
##                 4.6381213                      1.6820184
##   log_marginal_prec_delta_f log_marginal_prec_epsilon_f
##                 2.8822772                      3.4625452
##       log_marginal_prec_A_f        log_marginal_prec_B_f
##                 6.9157718                      7.0424717
##     log_marginal_prec_phi_m      log_marginal_prec_psi_m
##                 4.7171337                      4.6494609
##  log_marginal_prec_lambda_m  log_marginal_prec_delta_m
##                 1.6568263                      2.9618588
## log_marginal_prec_epsilon_m        log_marginal_prec_A_m
##                 3.2933916                      6.9173784
##        log_marginal_prec_B_m
##                 6.9307313
```
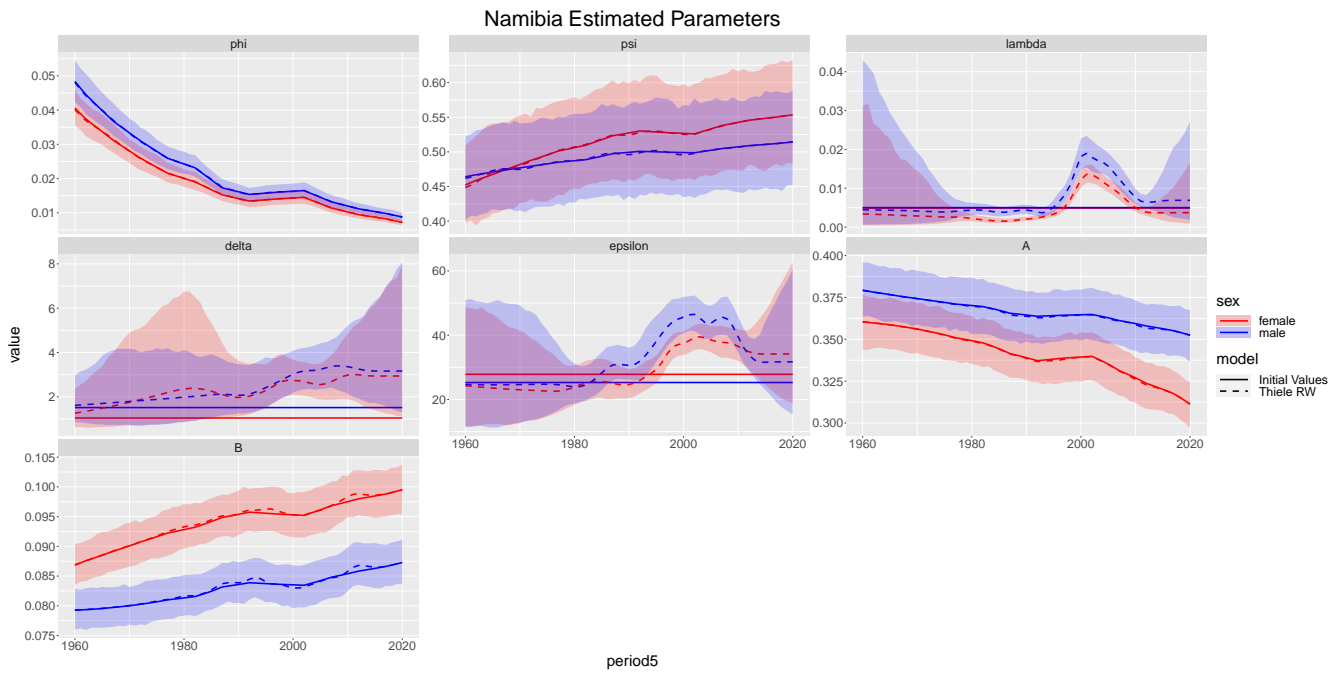

Figure 1: Estimated parameters
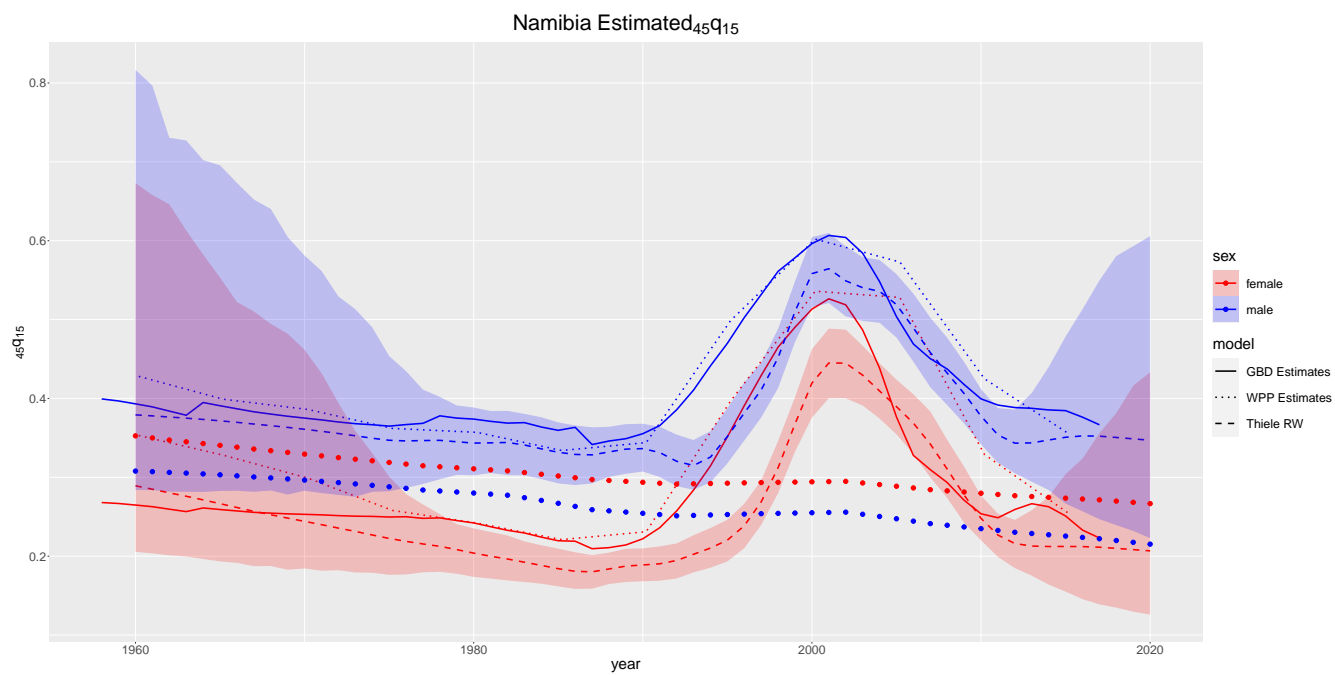
Figure 2: Estimated $_{45}q_{15}$
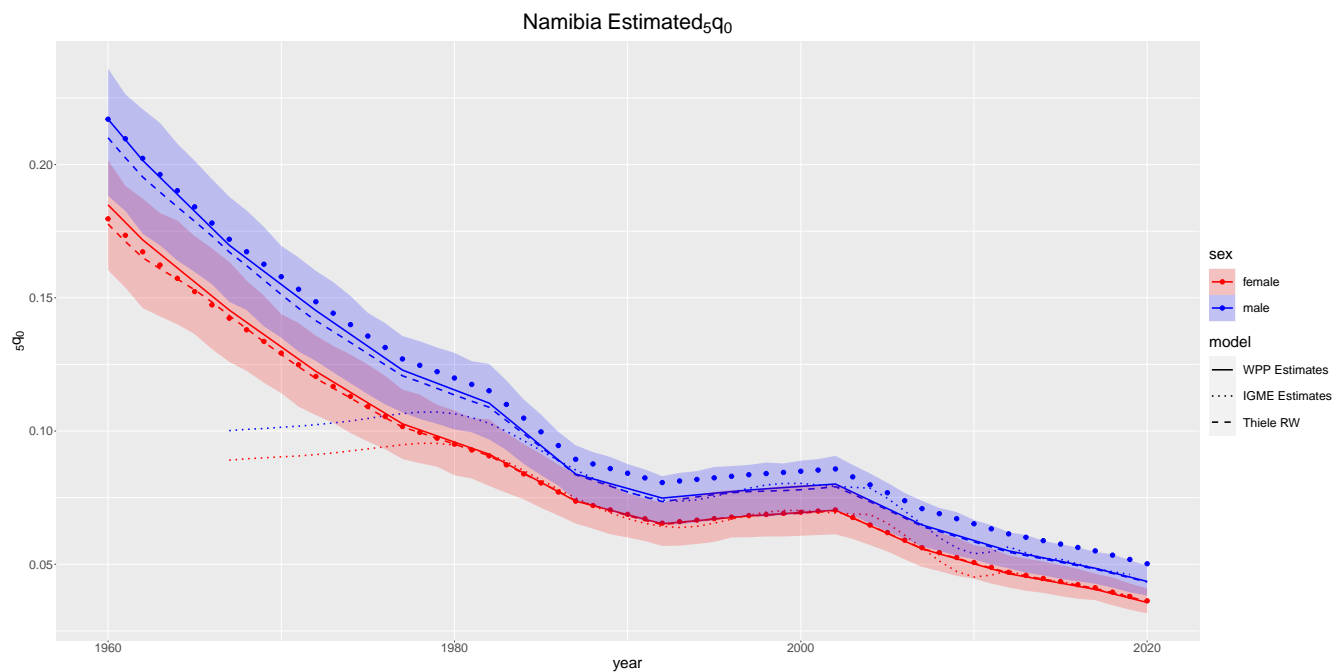
Figure 3: Estimated $_5q_0$
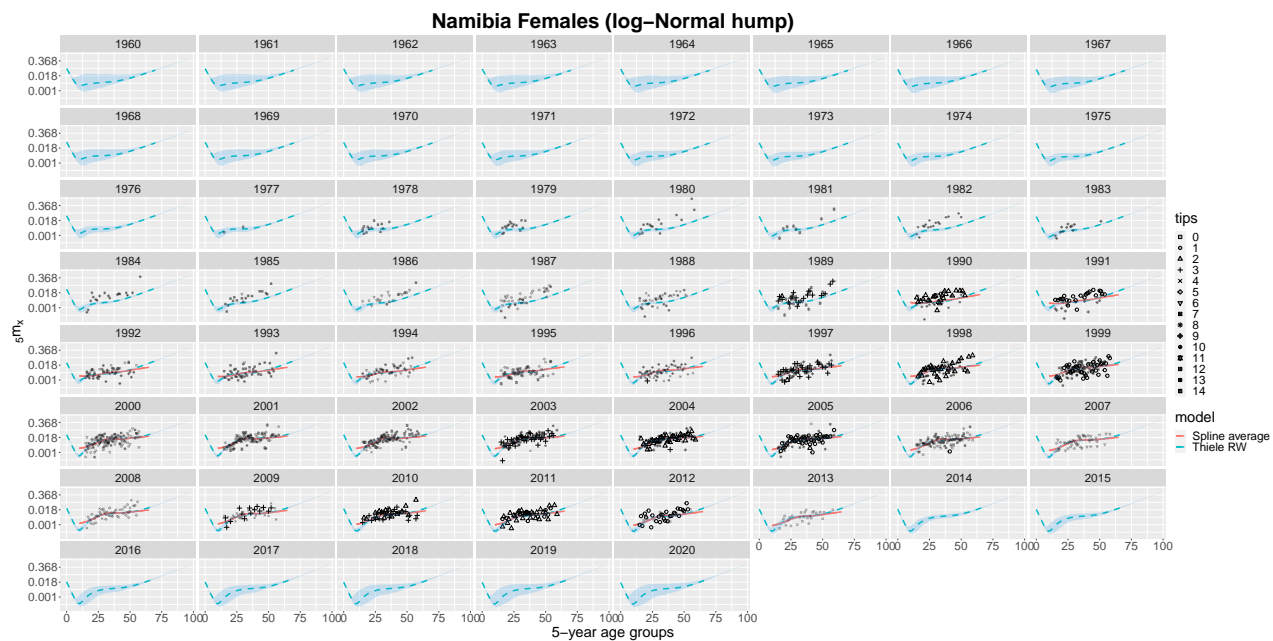
Figure 4: Mortality Schedules
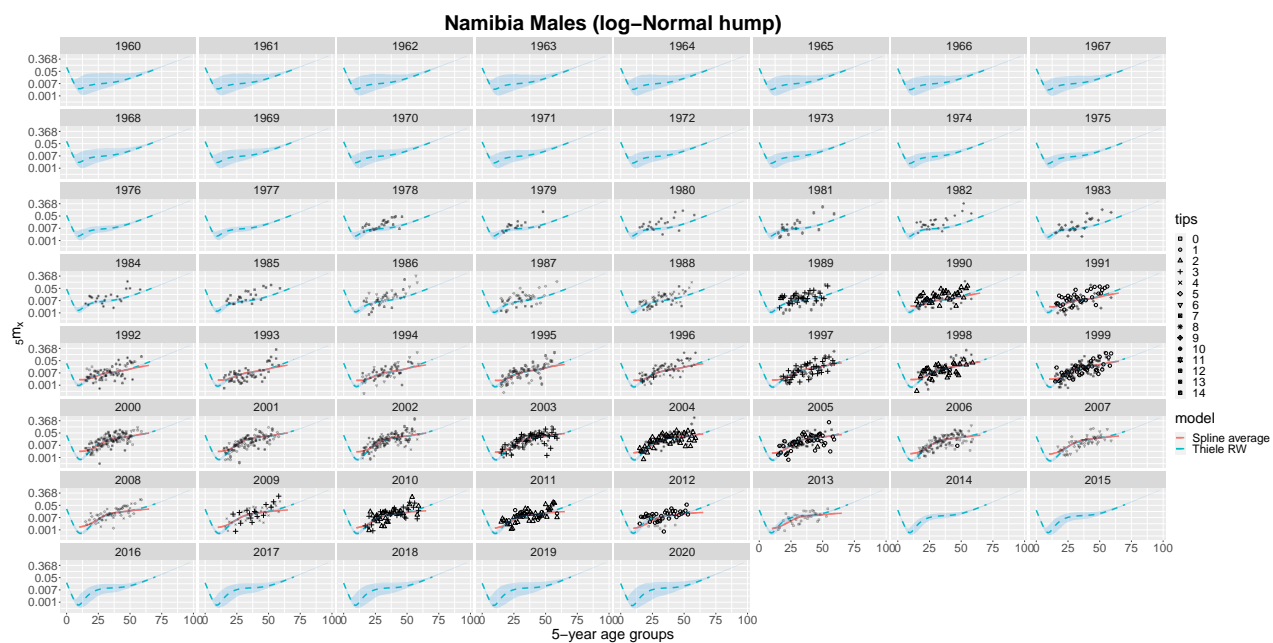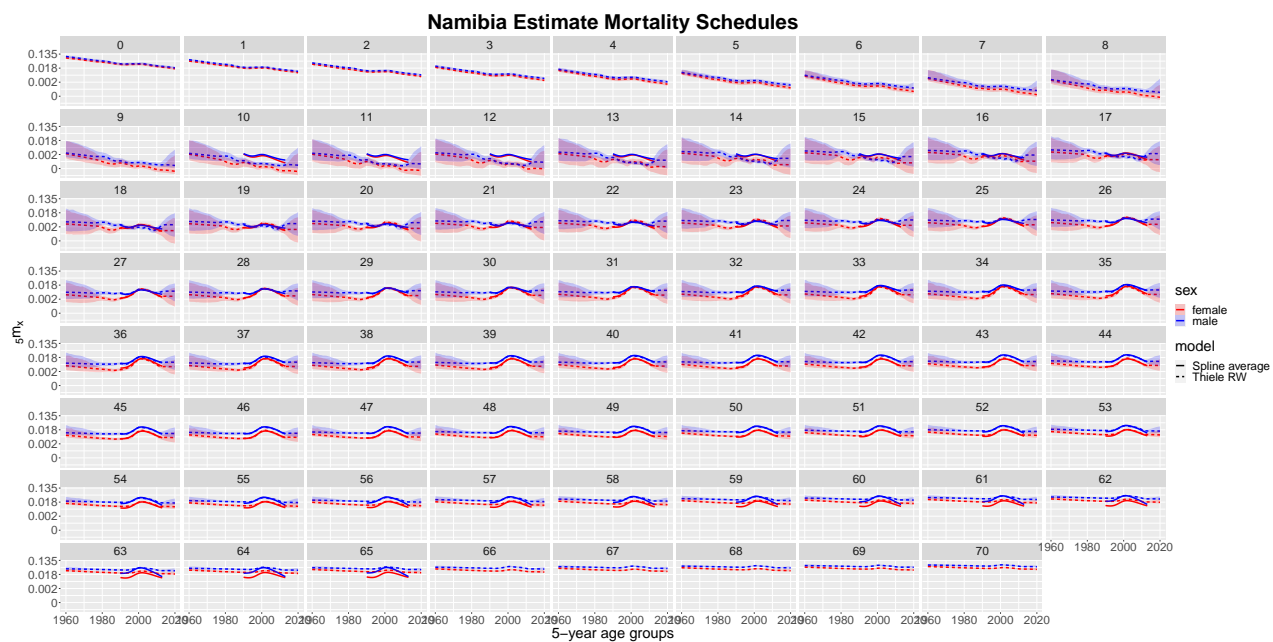
Figure 5: Mortality Schedules
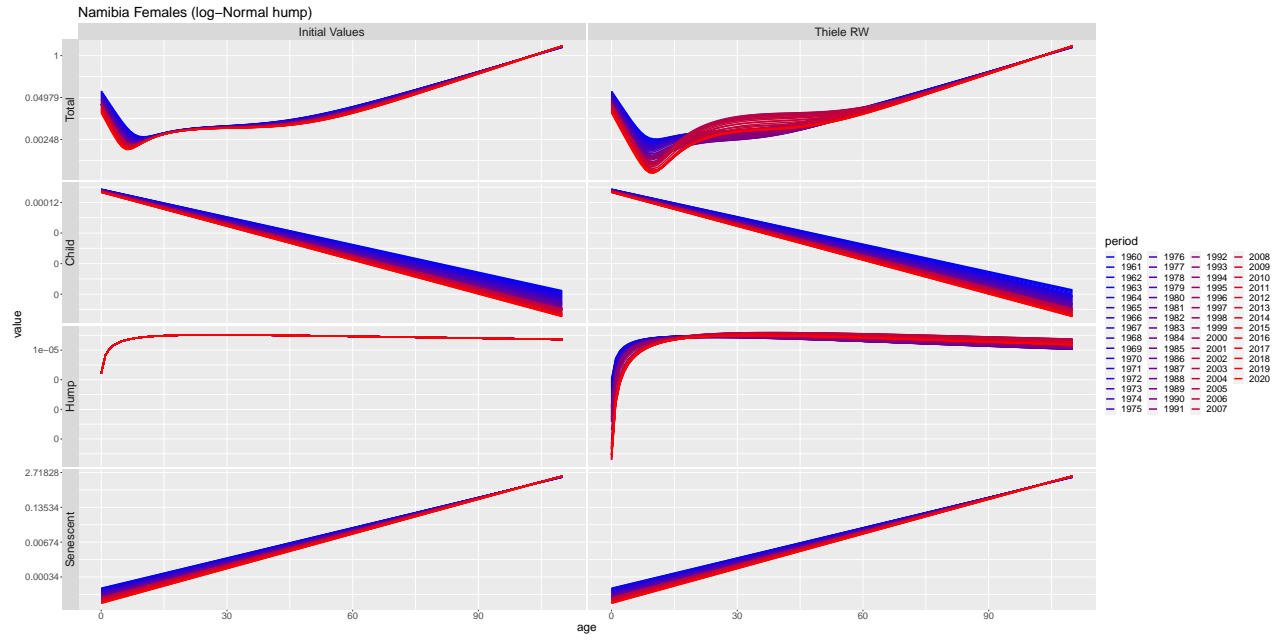

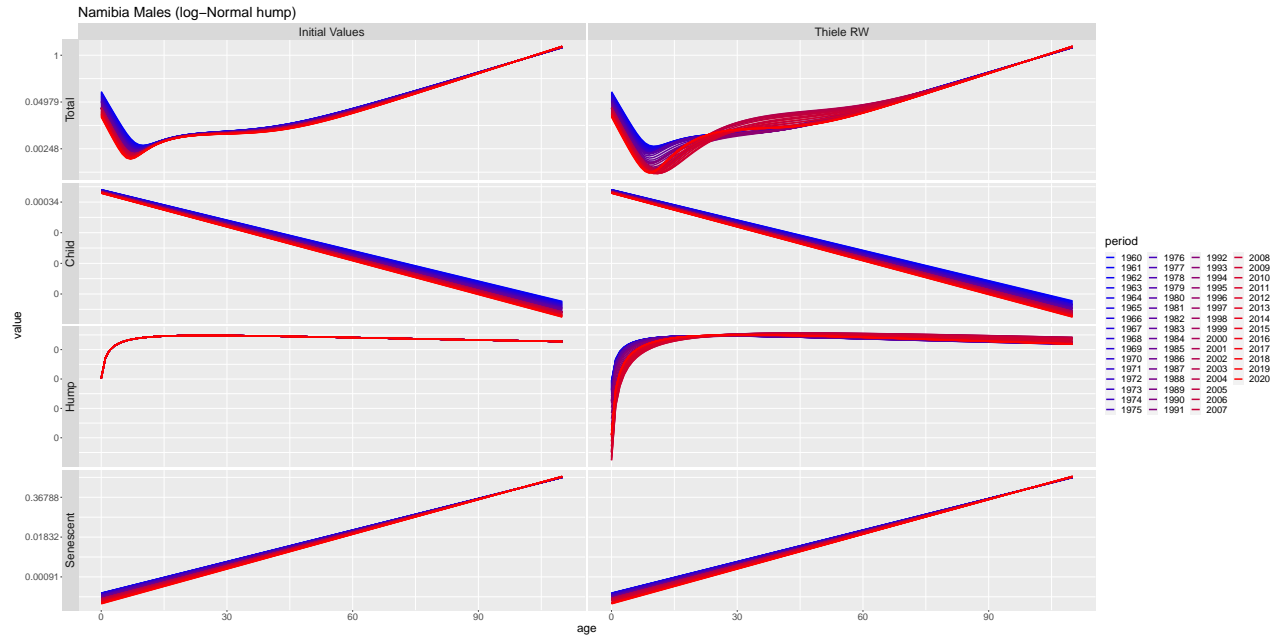
Figure 6: Mortality Schedules

Figure 7: Thiele Decomposed
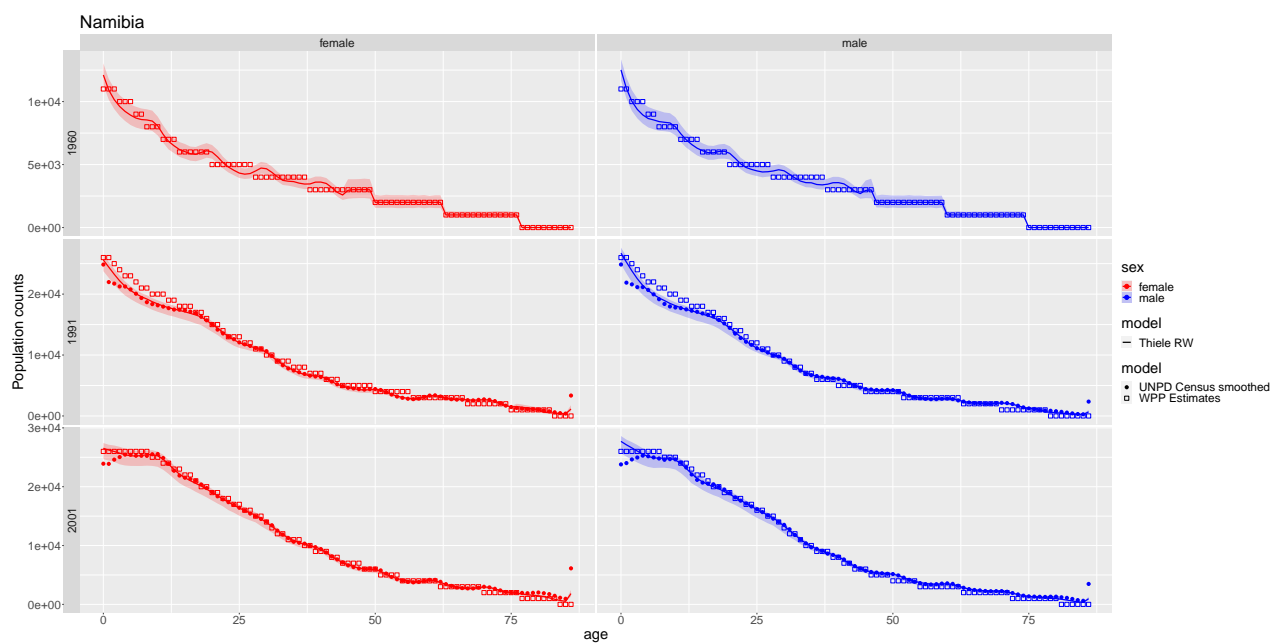

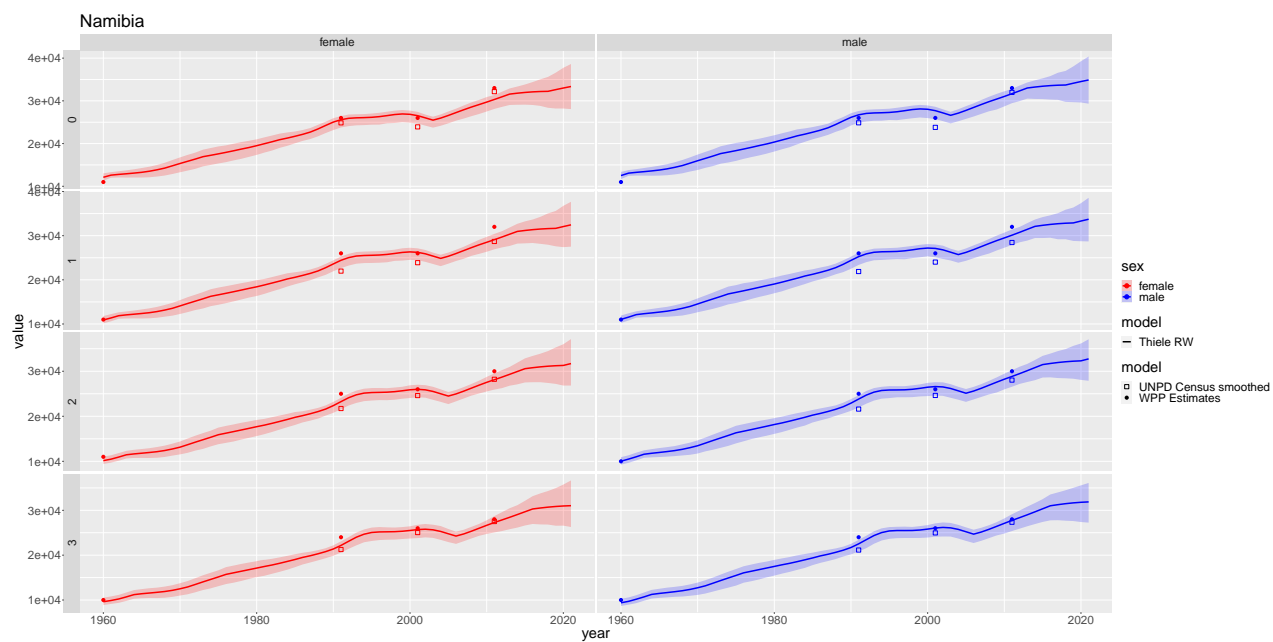Figure 8: Thiele Decomposed
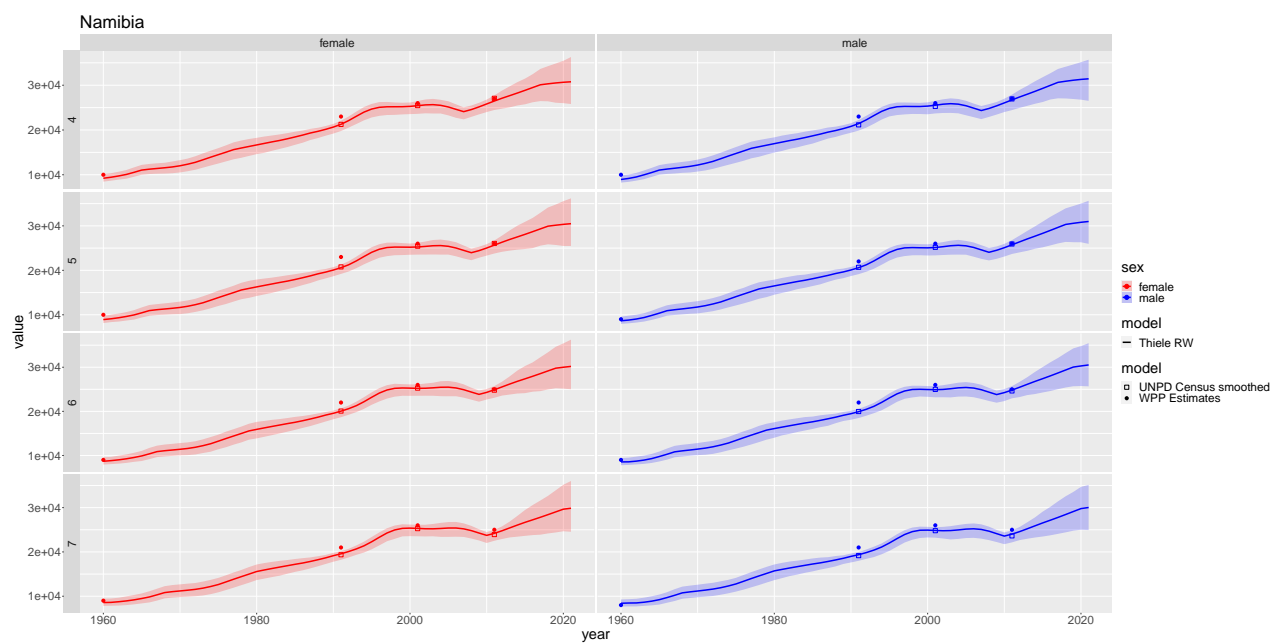
Figure 9: Population

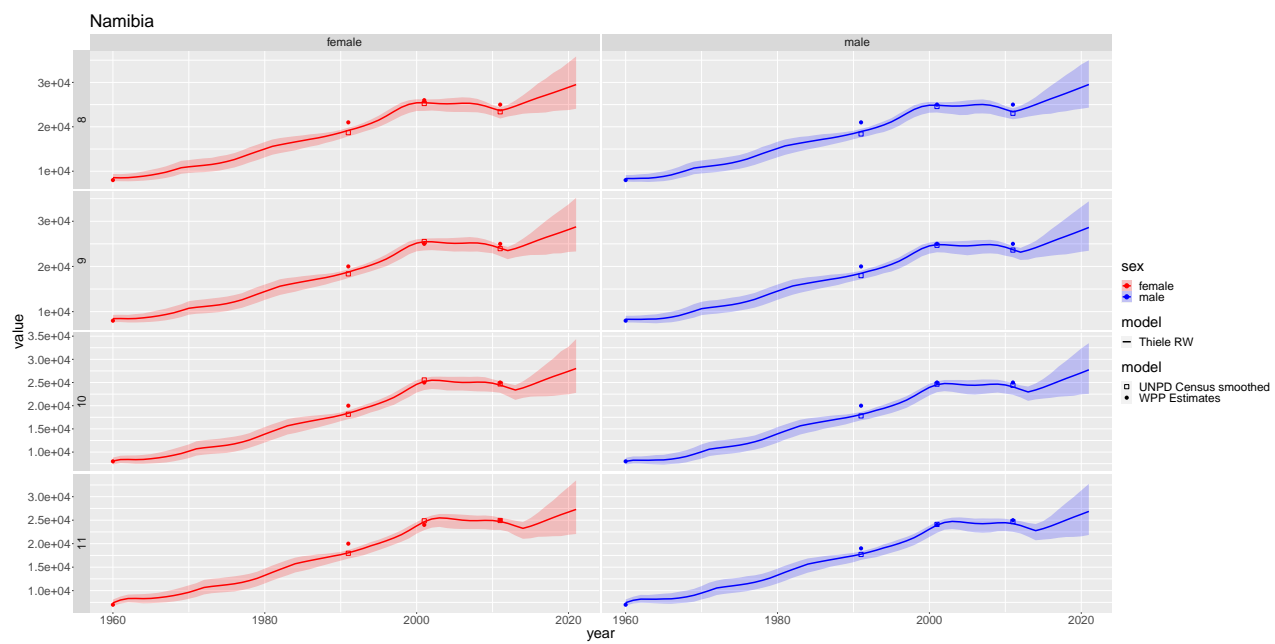Figure 10: Population

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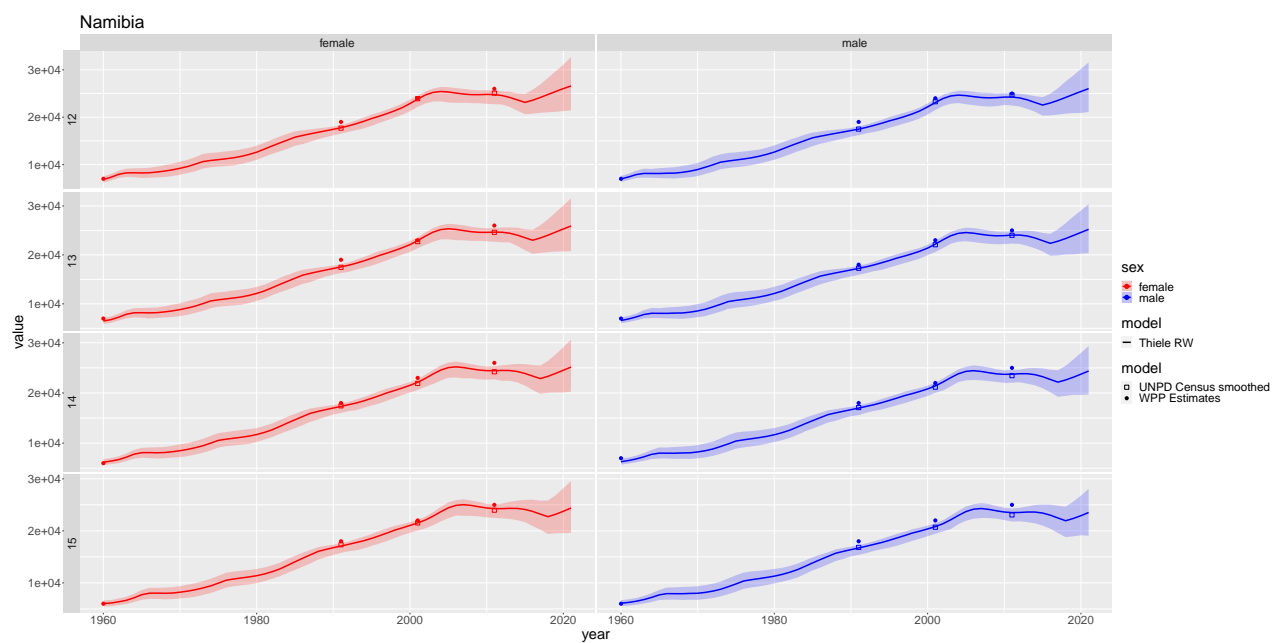Figure 11: Population

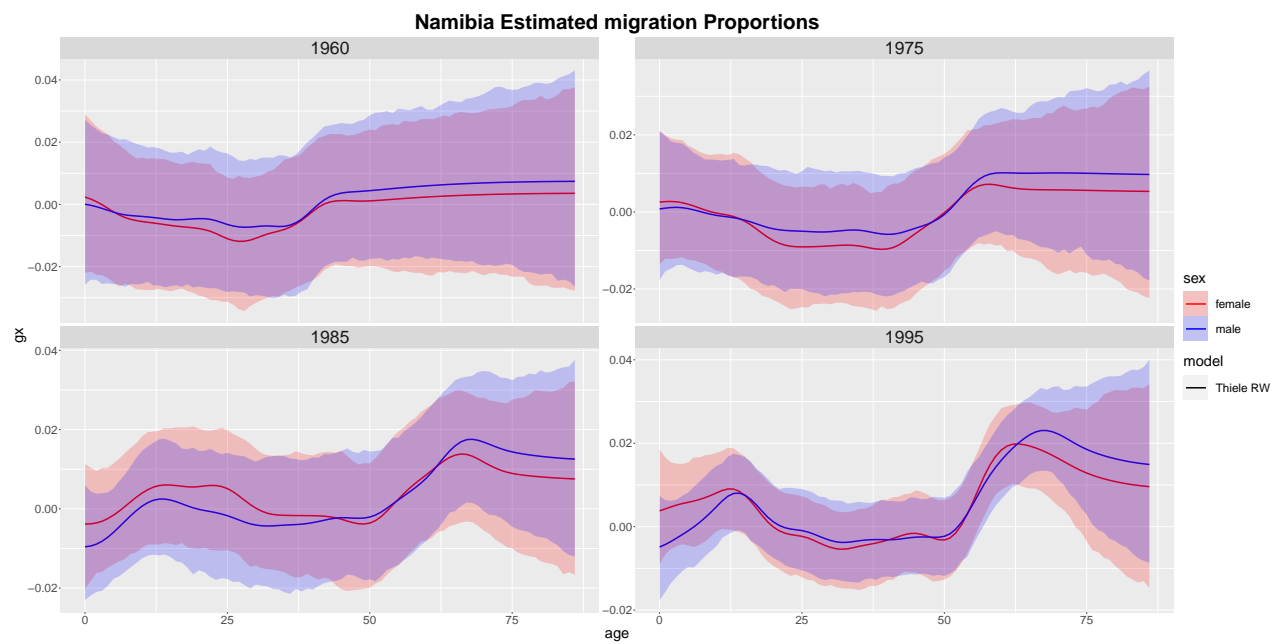Figure 12: Population
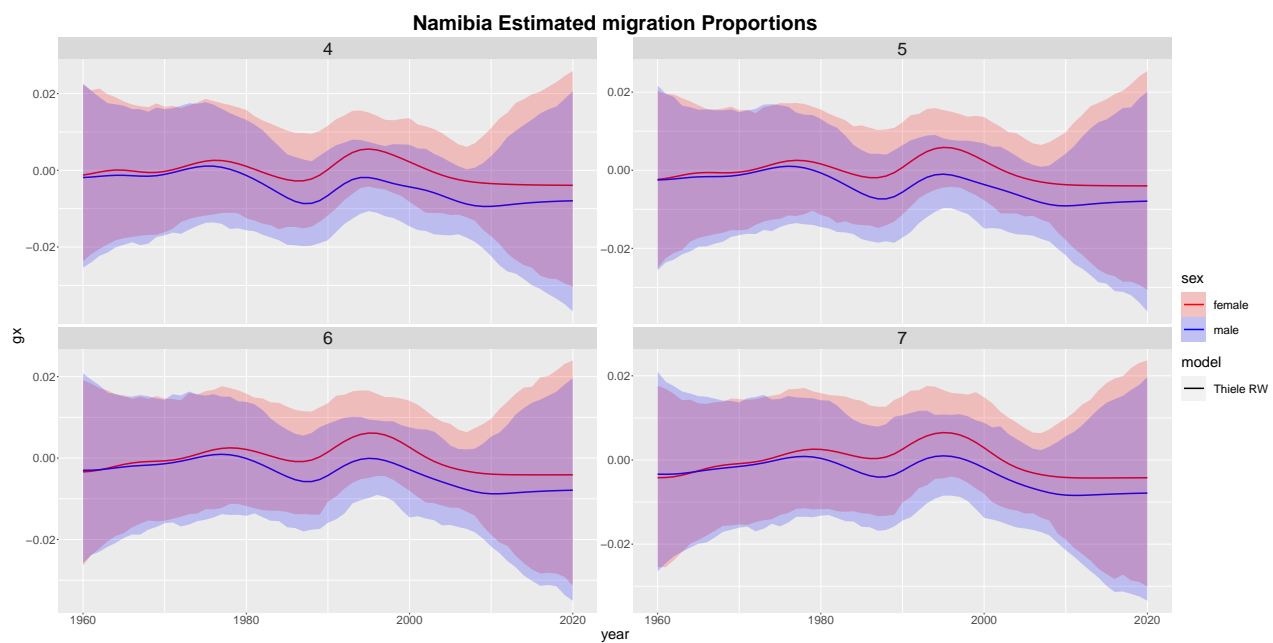
Figure 13: Population

Figure 14: Migration
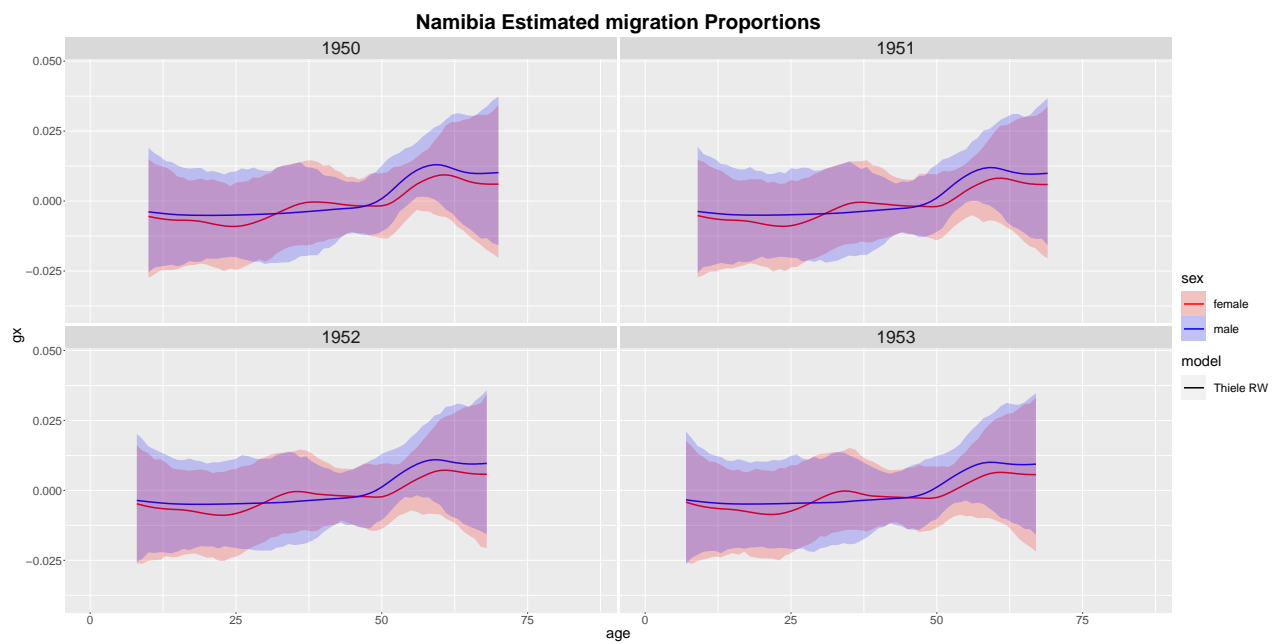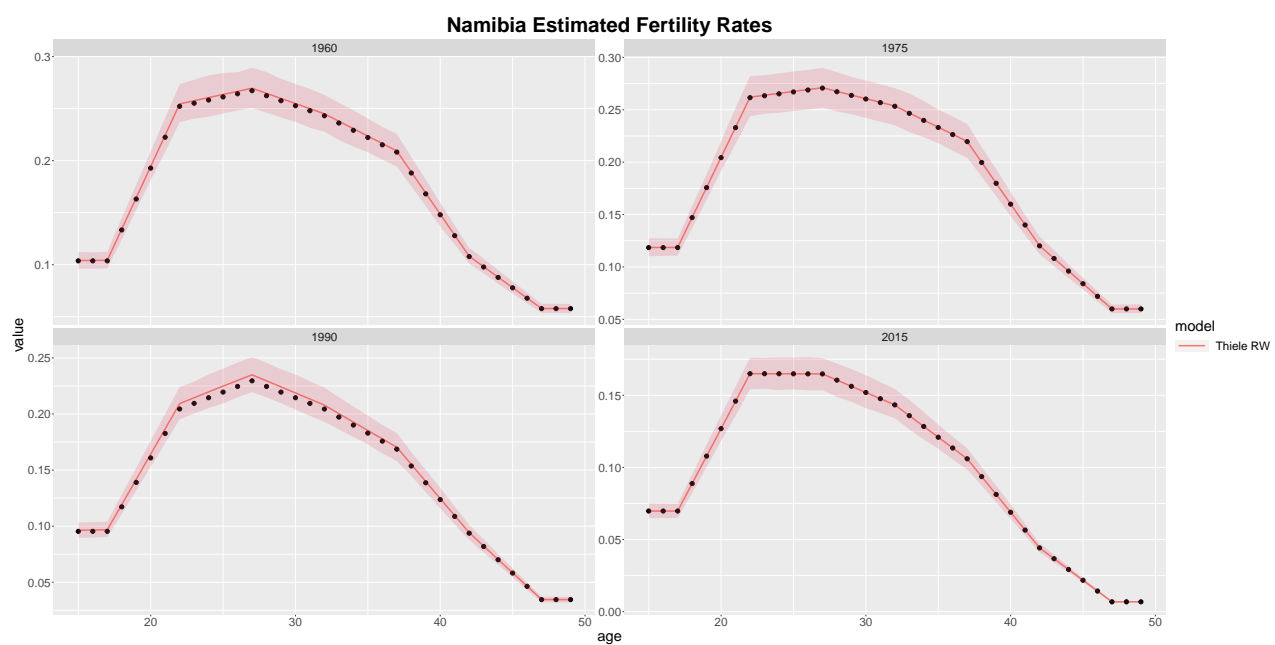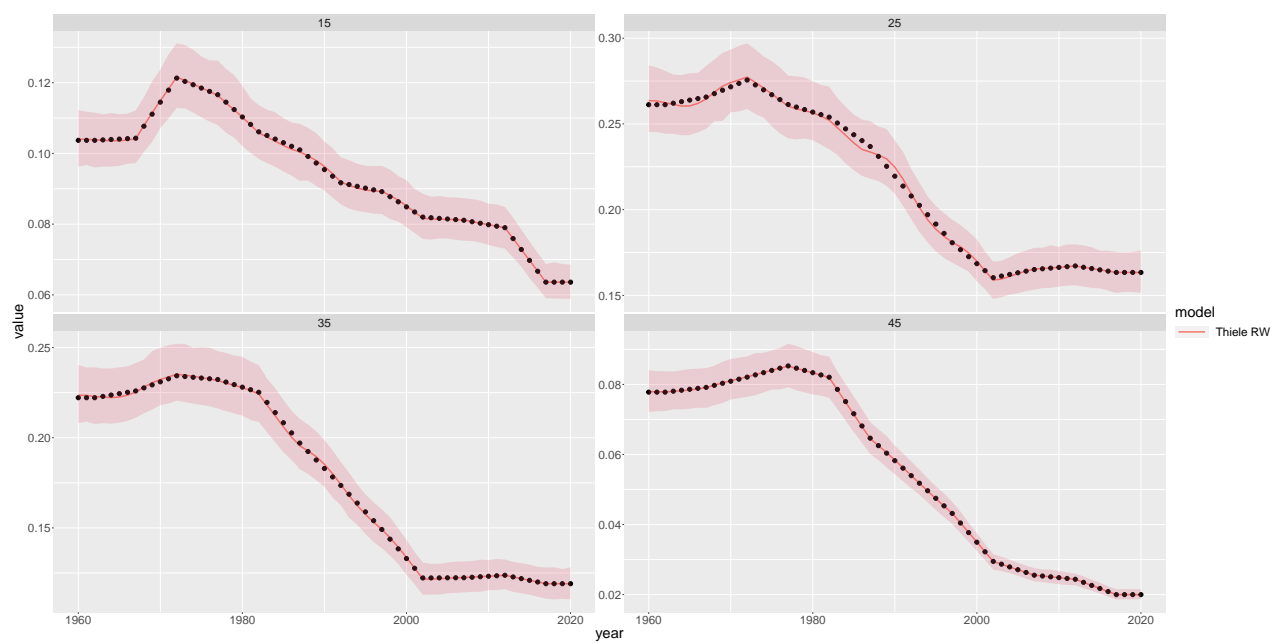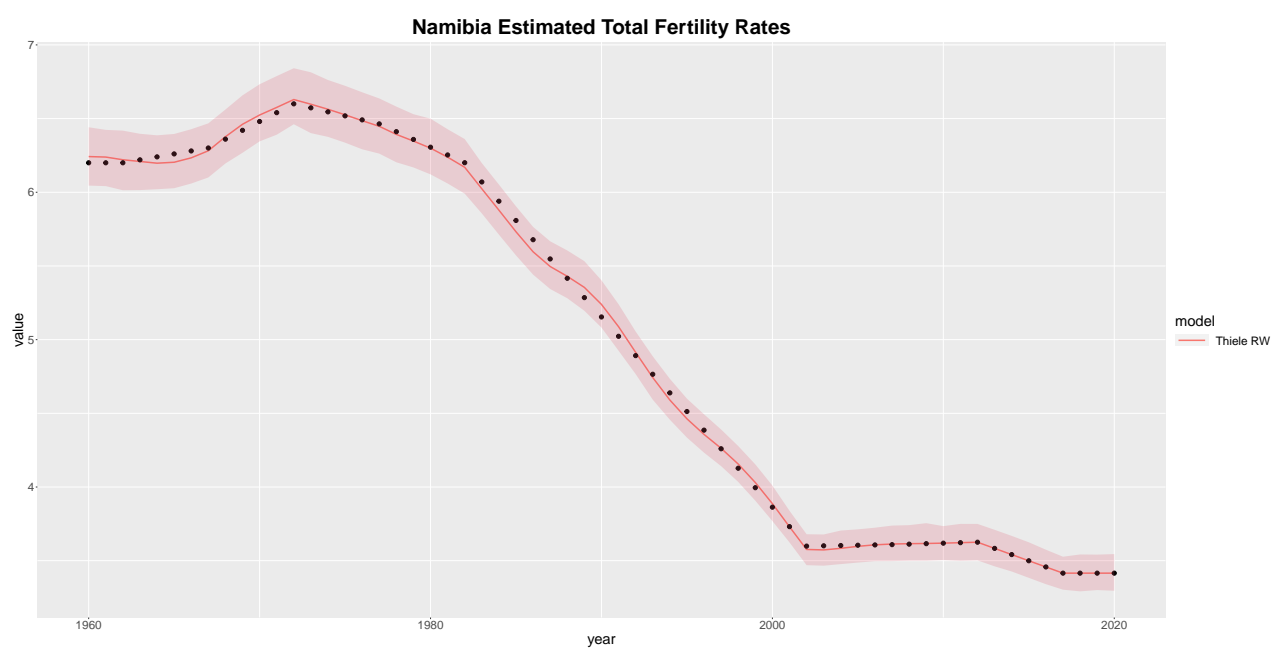
Figure 15: Migration

Figure 16: Migration

Figure 17: Fertility

Figure 18: Fertility

Figure 19: Total Fertility