

Togo

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

```
## # A tibble: 18 x 4
```

```
##   aggr.age `1970` `1981` `2010`  
## *   <dbl>   <dbl>   <dbl>   <dbl>  
## 1      0 205745. 270991. 445753.  
## 2      5 162212. 223881. 436083.  
## 3     10 104920. 164223. 370046.  
## 4     15  75497. 130977. 309693.  
## 5     20  79994. 122493. 290666.  
## 6     25  83454. 111348. 270917.  
## 7     30  72531.  90044. 229765.  
## 8     35  57568.  68593. 187312.  
## 9     40  43942.  53165. 151703.  
## 10    45  33669.  41694. 120178.  
## 11    50  25240.  30908.  92157.  
## 12    55  18557.  22256.  69045.  
## 13    60  15285.  18221.  54414.  
## 14    65  12514.  14719.  43884.  
## 15    70   9034.  10947.  33878.  
## 16    75   5962.   6866.  20370.  
## 17    80   4091.  18818.  45734.  
## 18    85   8760.    NA    NA
```

```
## [1] "Census Males"
```

```
## # A tibble: 18 x 4
```

```
##   aggr.age `1970` `1981` `2010`  
## *   <dbl>   <dbl>   <dbl>   <dbl>  
## 1      0 203979. 273552. 457477.  
## 2      5 172896. 240827. 453946.  
## 3     10 117907. 184640. 395001.  
## 4     15  74089. 132551. 318112.  
## 5     20  56943.  96868. 258958.  
## 6     25  51808.  76324. 220972.  
## 7     30  48665.  62959. 195558.  
## 8     35  44229.  51668. 168457.  
## 9     40  37863.  44478. 139836.  
## 10    45  31765.  38728. 112004.  
## 11    50  25110.  30174.  83440.  
## 12    55  18801.  22170.  59442.  
## 13    60  14915.  18389.  42713.  
## 14    65  11797.  15110.  30553.  
## 15    70   8474.  11486.  22097.  
## 16    75   5712.   7179.  13278.  
## 17    80   4154.  20772.  28018.  
## 18    85  10688.    NA    NA
```

Thiele log-Normal Hump RW

```
## Warning in fit_tmb(input.thiele.loghump.oag.vec.RW, inner_verbose = FALSE, : convergence error: false c
```

```
##      user  system elapsed
##  26.72    0.12   27.36
## [1] "false convergence (8)"
```

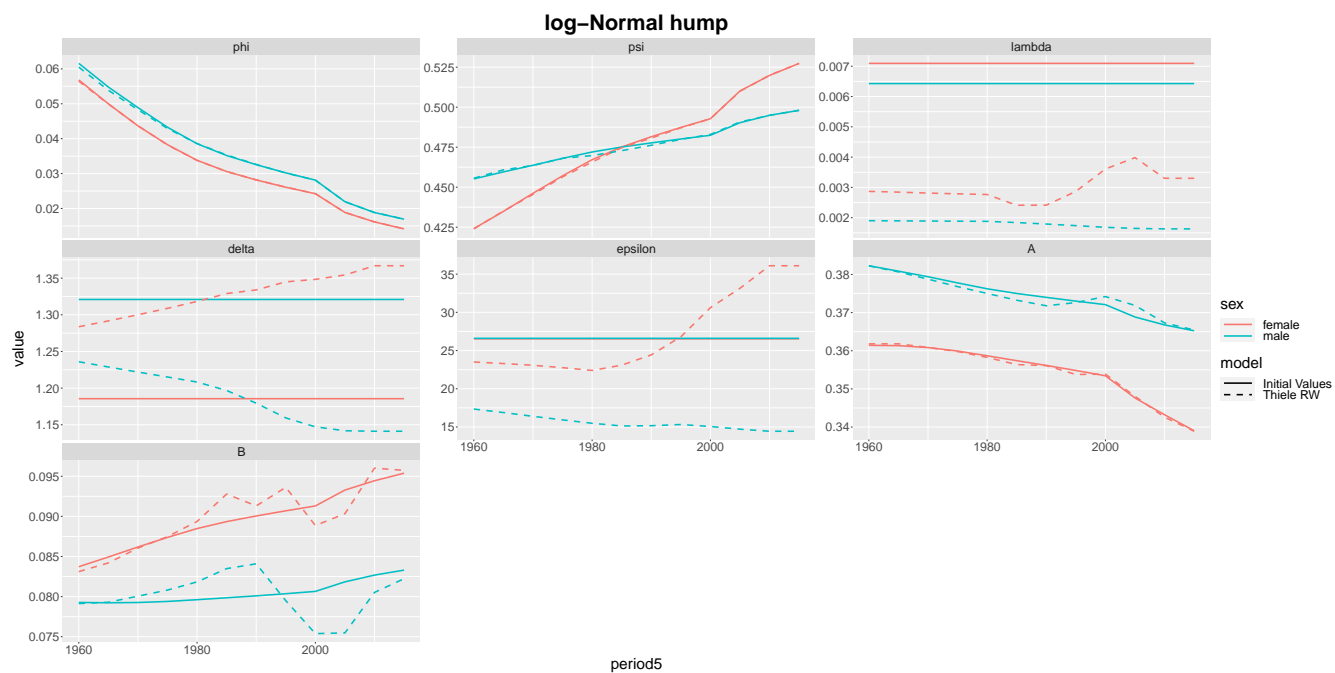


Figure 1: Estimated parameters

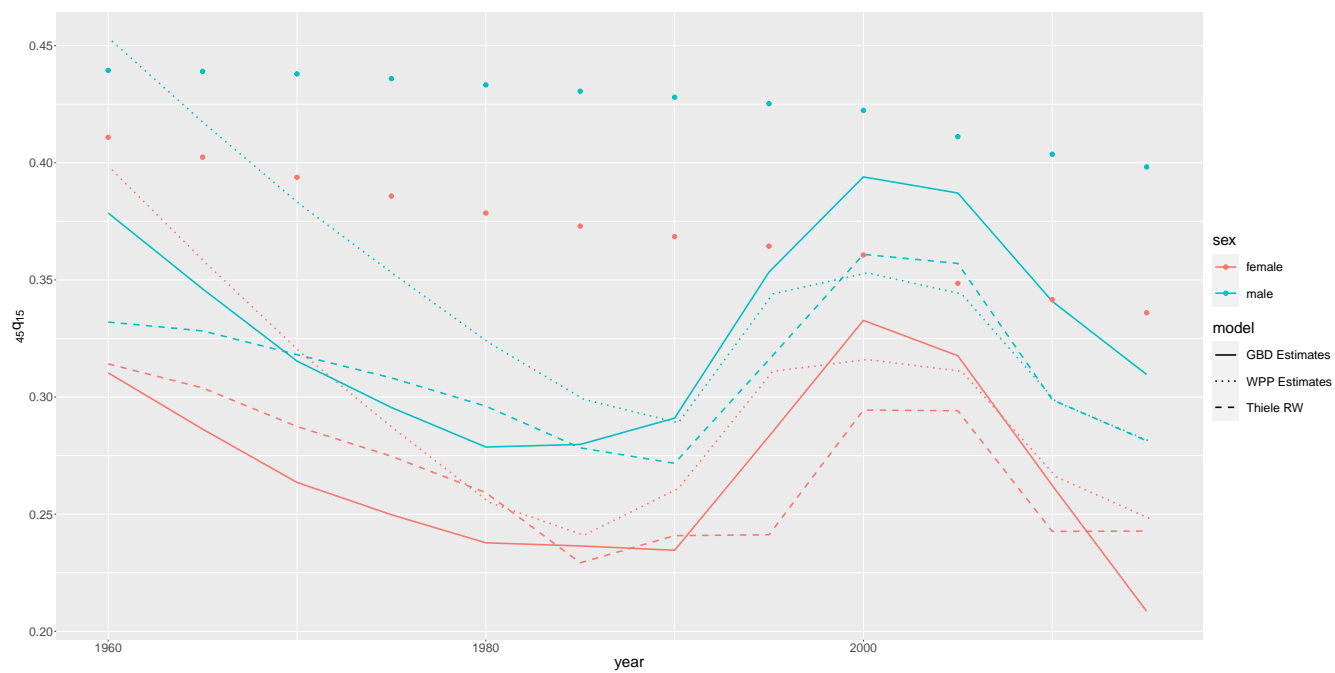


Figure 2: Estimated $45q_{15}$

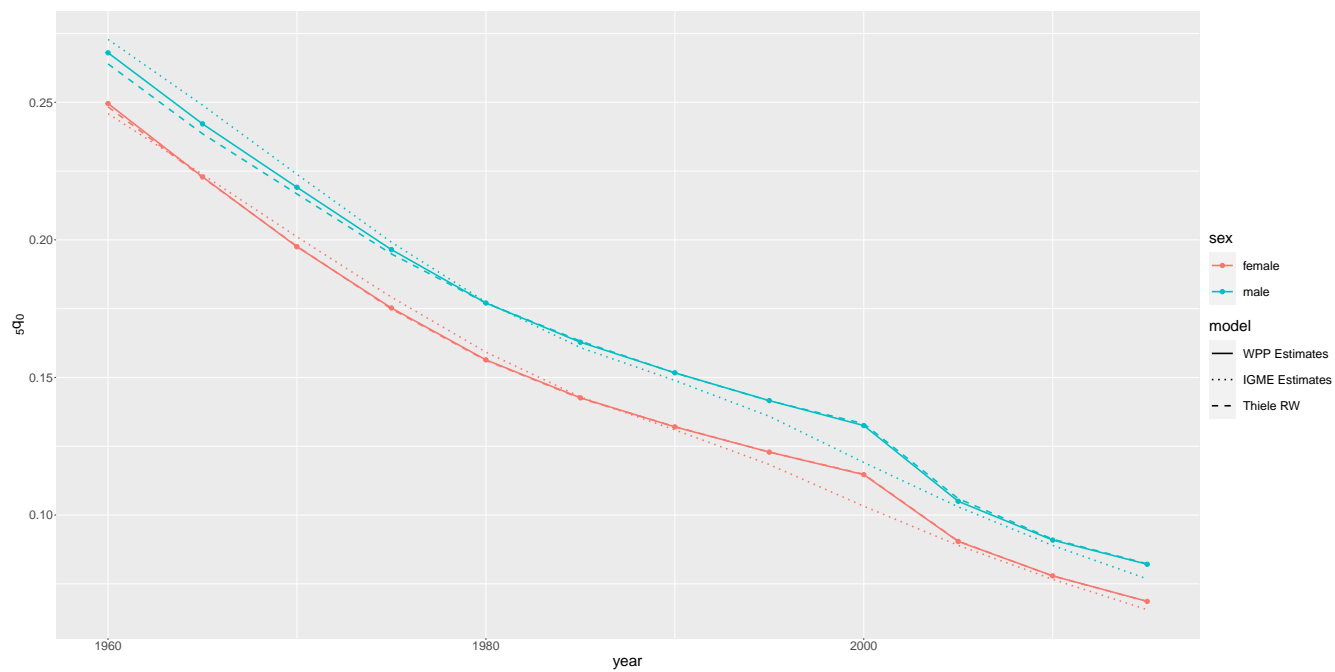


Figure 3: Estimated $5q_0$

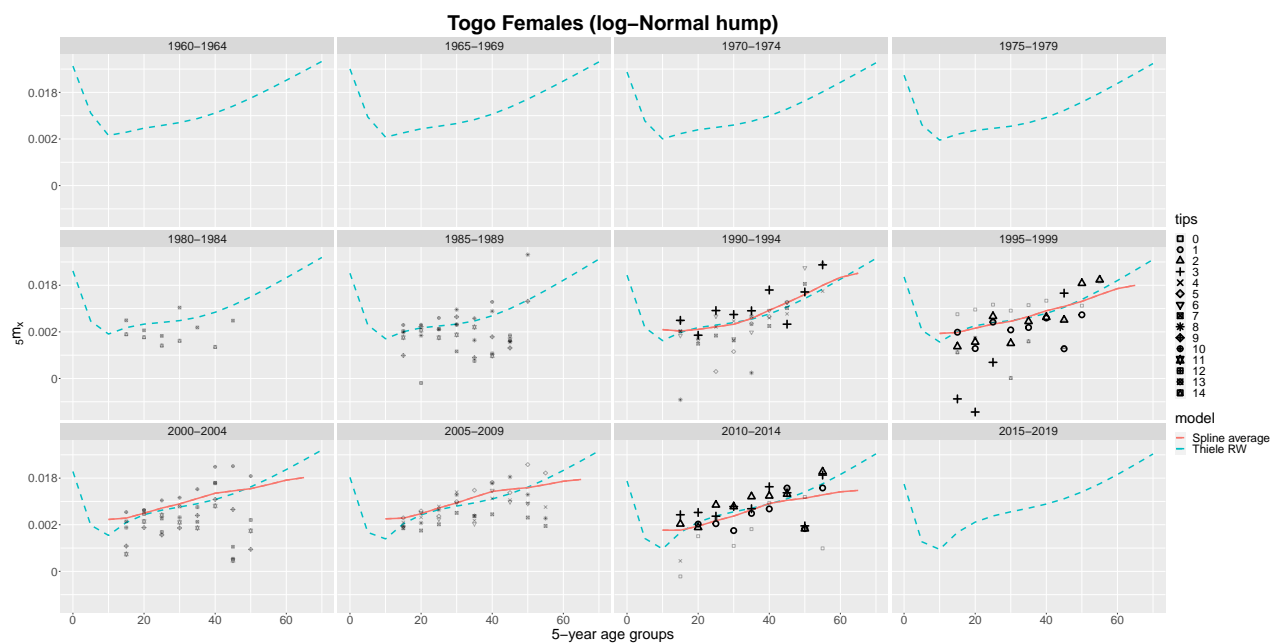


Figure 4: Mortality Schedules

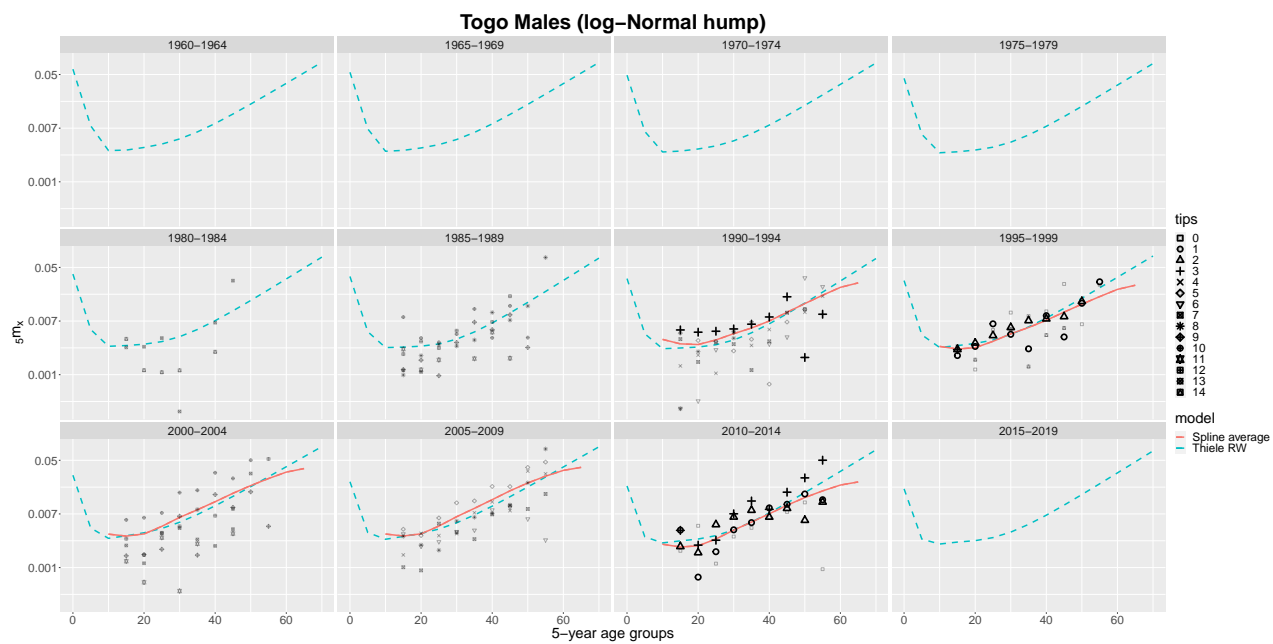


Figure 5: Mortality Schedules

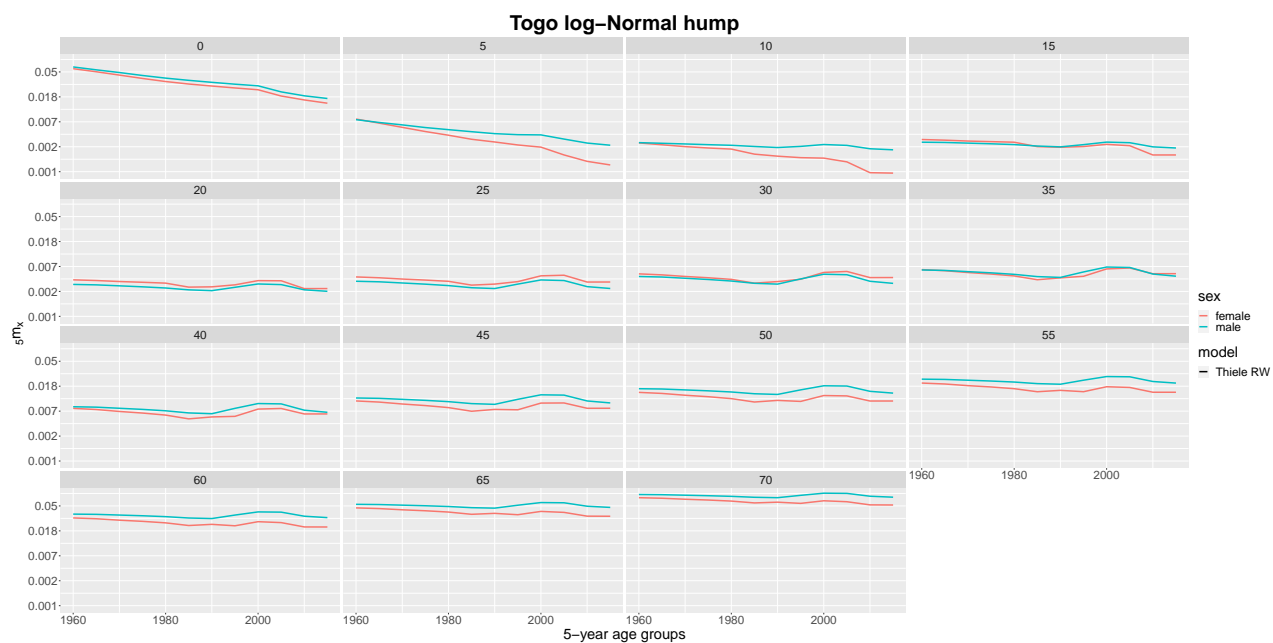


Figure 6: Mortality Schedules

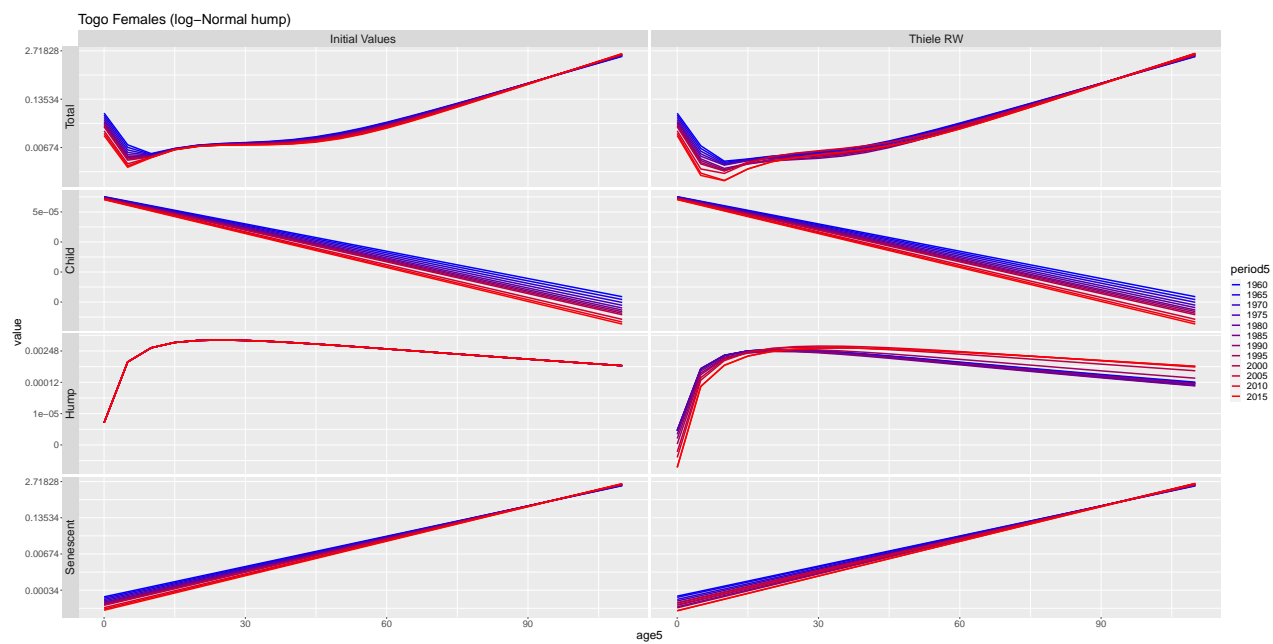


Figure 7: Thiele Decomposed

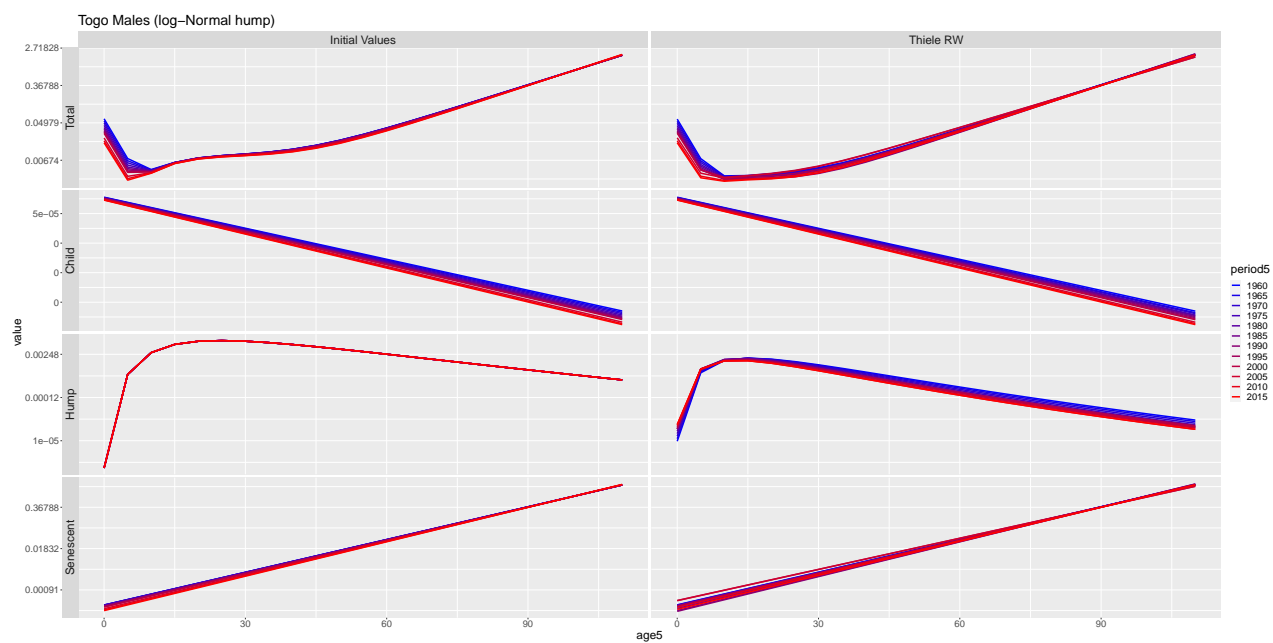


Figure 8: Thiele Decomposed

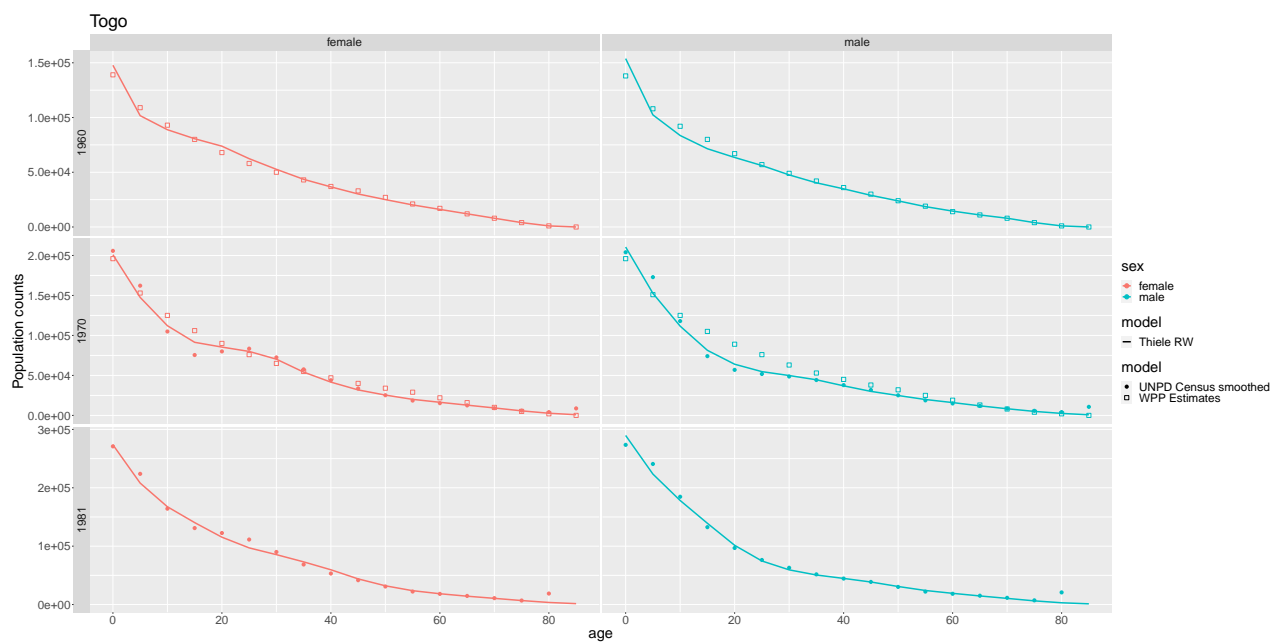


Figure 9: Population

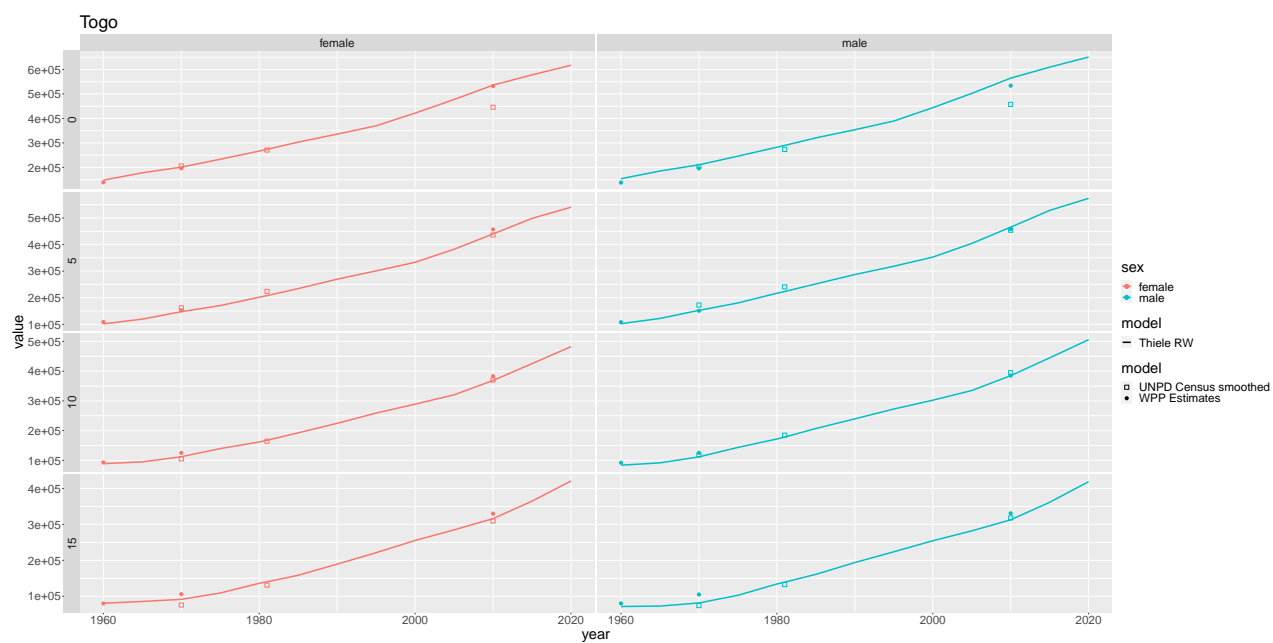


Figure 10: Population

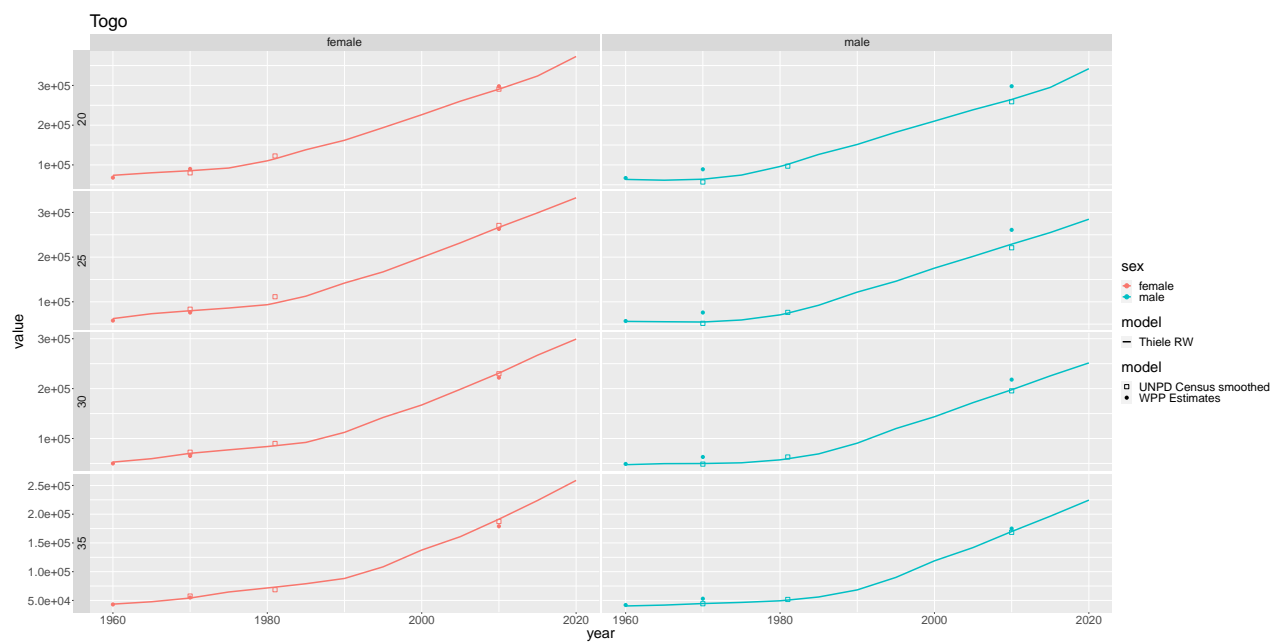


Figure 11: Population

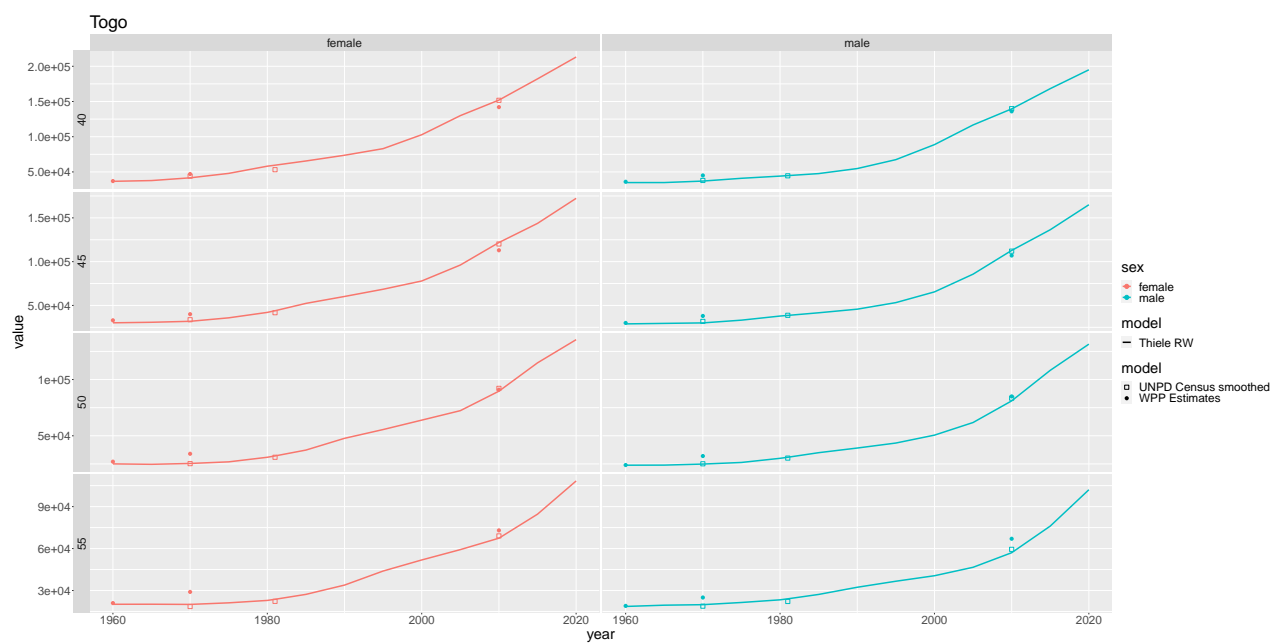


Figure 12: Population

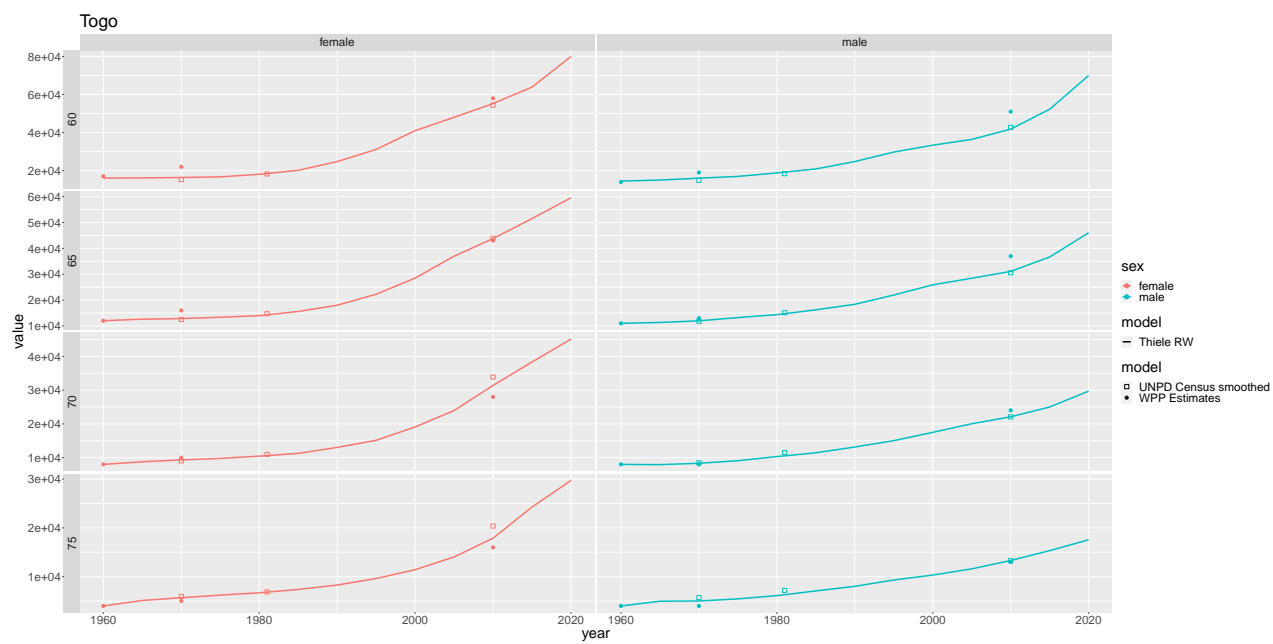


Figure 13: Population

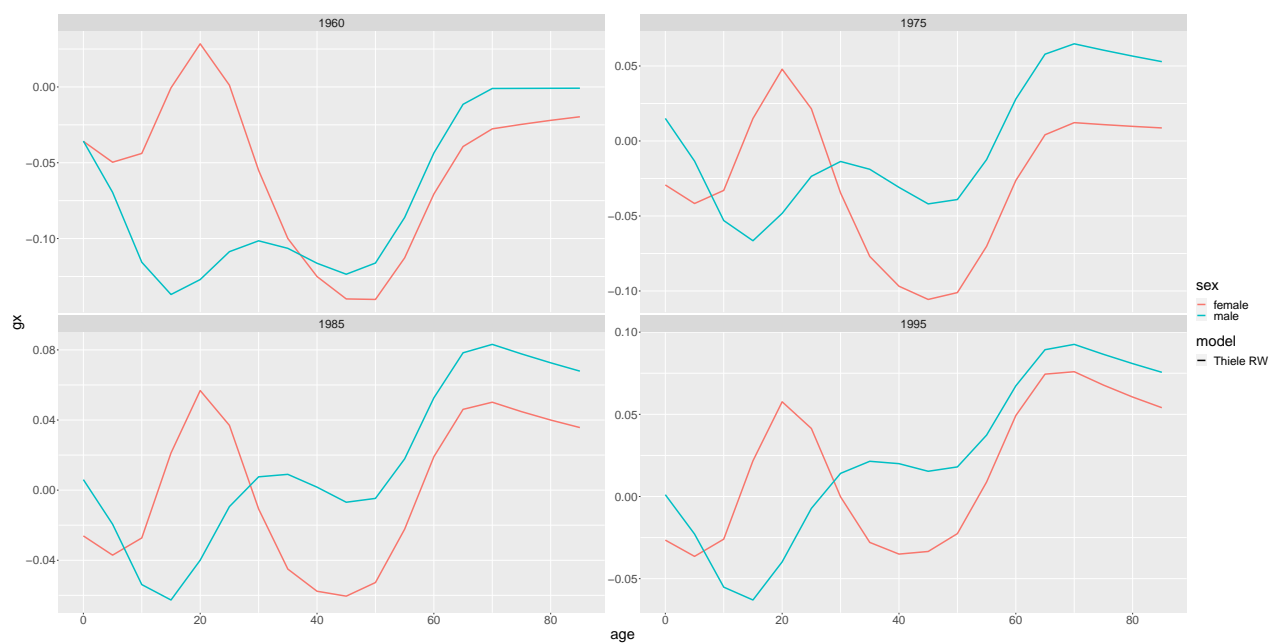


Figure 14: Migration

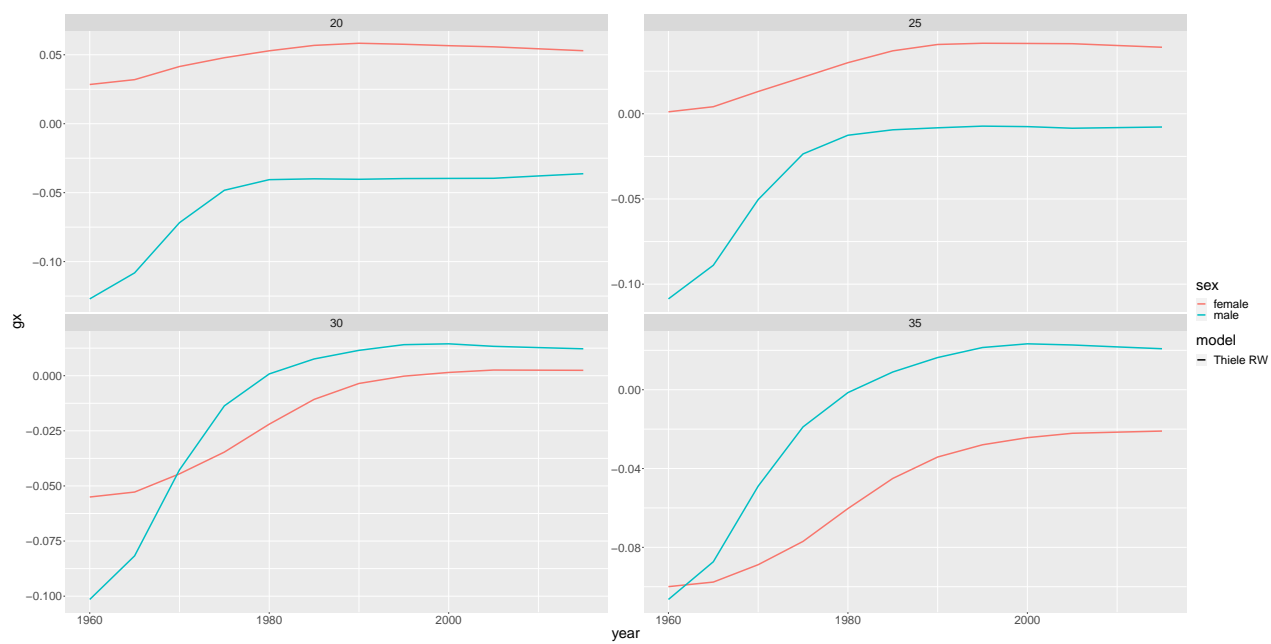


Figure 15: Migration

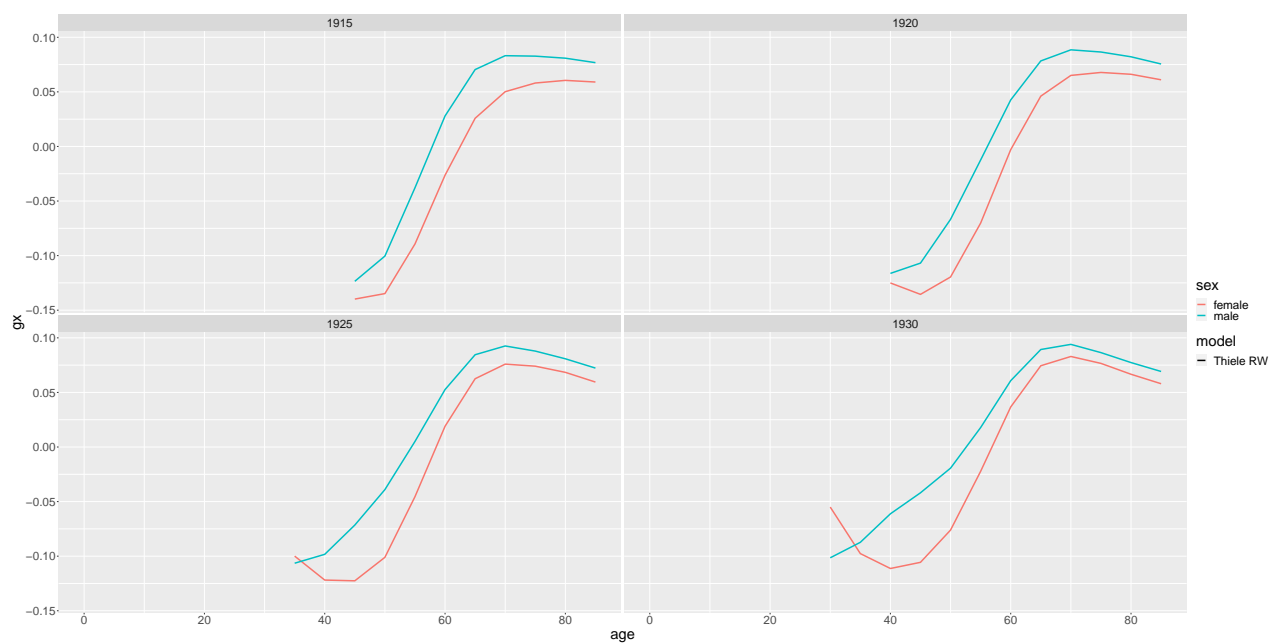


Figure 16: Migration

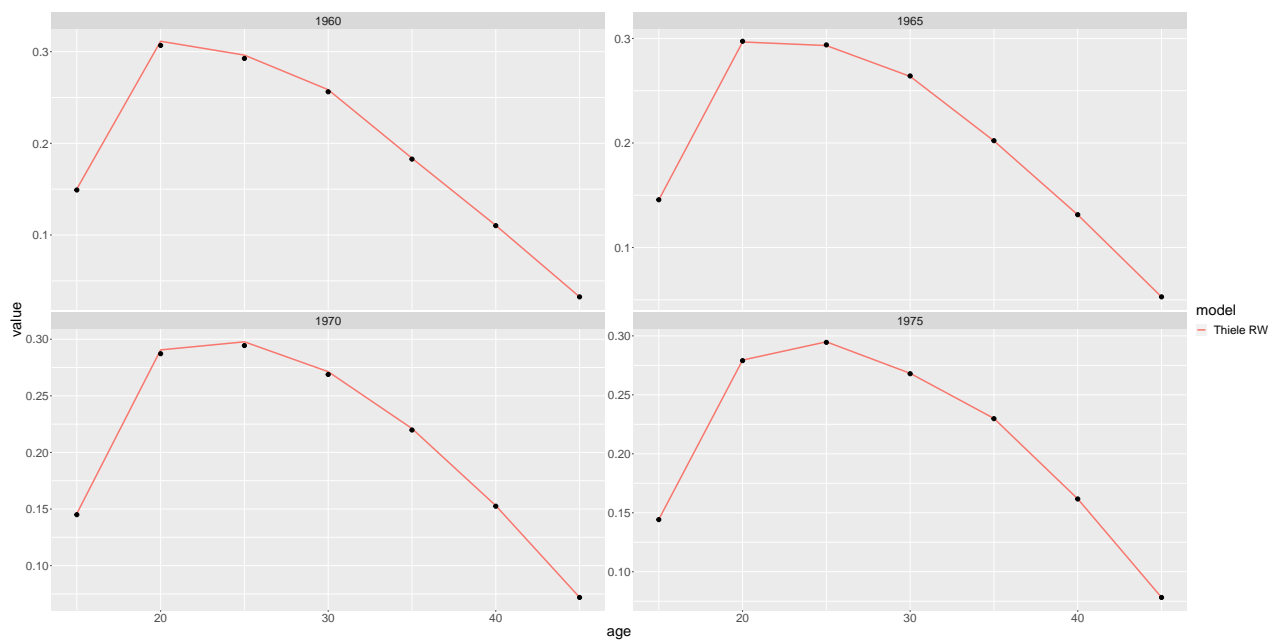


Figure 17: Fertility

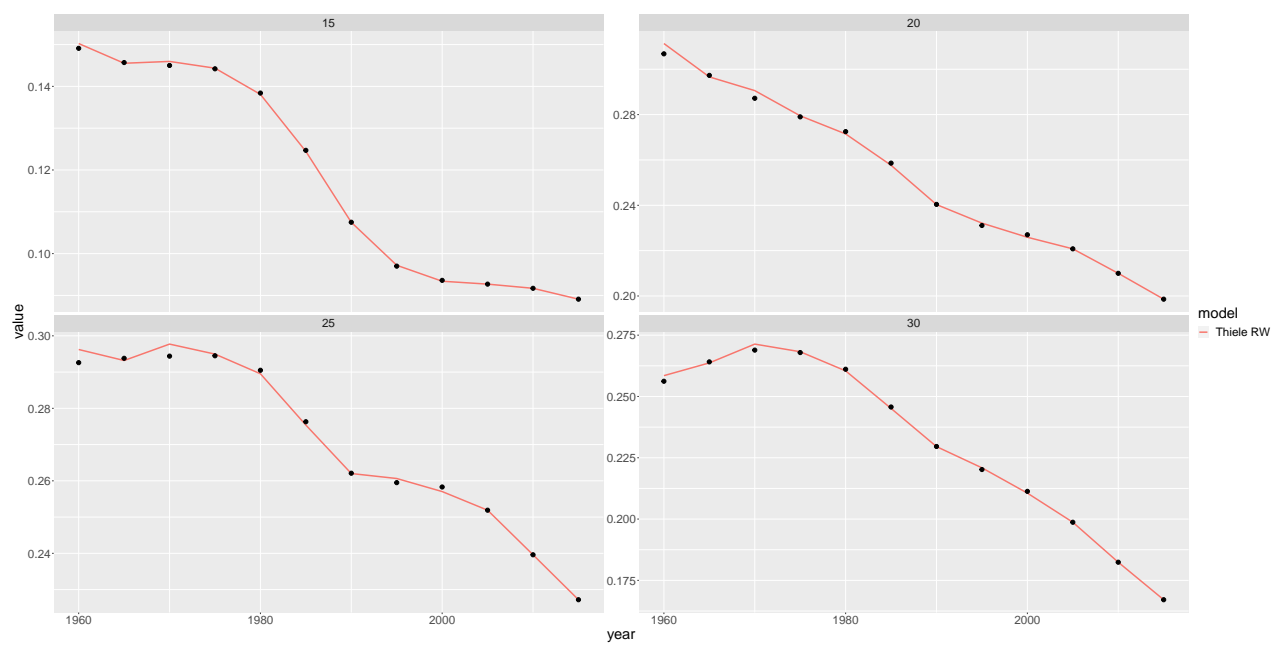


Figure 18: Fertility