

Zambia

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

## # A tibble: 86 x 6
##   age `1969` `1980` `1990` `2000` `2010`
##   <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
## 1     0 84889. 102576. 127337. 170387 220491
## 2     1 80819. 100263. 118568. 158438. 224143
## 3     2 77882. 103185. 119426. 164148. 226622.
## 4     3 75232. 104440. 119078. 165804. 221995.
## 5     4 73199. 104852. 118691. 165026. 215854.
## 6     5 71159. 104750. 117301. 160537. 210007.
## 7     6 68103. 103010. 115491. 153605. 207187.
## 8     7 64885. 100287. 113991. 147259 201344.
## 9     8 61647. 96378. 113300. 143607. 195715.
## 10    9 57518. 91975. 111701. 140017. 189090.
## # ... with 76 more rows

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

## # A tibble: 18 x 1
##   age
##   <dbl>
## 1     0
## 2     5
## 3    10
## 4    15
## 5    20
## 6    25
## 7    30
## 8    35
## 9    40
## 10   45
## 11   50
## 12   55
## 13   60
## 14   65
## 15   70
## 16   75
## 17   80
## 18   85

## [1] "Census Males"

## # A tibble: 86 x 6
##   age `1969` `1980` `1990` `2000` `2010`
##   <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
## 1     0 85555. 100973. 125548. 168841 220221
## 2     1 78711. 99404. 117337. 158084. 222980.
## 3     2 75013. 102451. 117859. 163155. 224408.
## 4     3 71853. 104159. 117375. 165029 220488.
## 5     4 70006. 104682. 116907. 164310. 214419
## 6     5 68559. 104553. 115530. 160073. 208240.
```

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## 7      6 66359. 102749. 113548. 153289. 205290.
## 8      7 64120. 100126. 111633. 146481. 199336.
## 9      8 61976.  95881. 111123. 142884. 193666.
## 10     9 58705.  91264. 110131. 139348. 186816.
## # ... with 76 more rows
```

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

```
## # A tibble: 18 x 1
```

```
##   age
```

```
##   <dbl>
```

```
## 1     0
```

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## 2     5
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## 3    10
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## 4    15
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## 5    20
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## 6    25
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## 9    40
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## 10   45
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## 15   70
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## 16   75
```

```
## 17   80
```

```
## 18   85
```

Thiele log-Normal Hump Spline

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

##	log_tau2_logpop	log_tau2_logpop	log_tau2_logpop	log_tau2_logpop
##	5.19560367	7.01618761	5.26976581	6.19560367
##	log_marginal_lambda_gx	log_dispersion	log_dispersion	log_marginal_lambda_gx
##	6.52865536	1.03854663	0.99557226	3.19560367
##	tp_params_5	tp_params_10	log_marginal_lambda_phi	log_marginal_lambda_phi
##	0.11197178	0.69468557	9.06183655	9.06183655
##	log_marginal_lambda_B	log_marginal_lambda_lambda	log_marginal_lambda_delta	log_marginal_lambda_delta
##	4.62594289	1.09166581	0.60218681	1.09166581

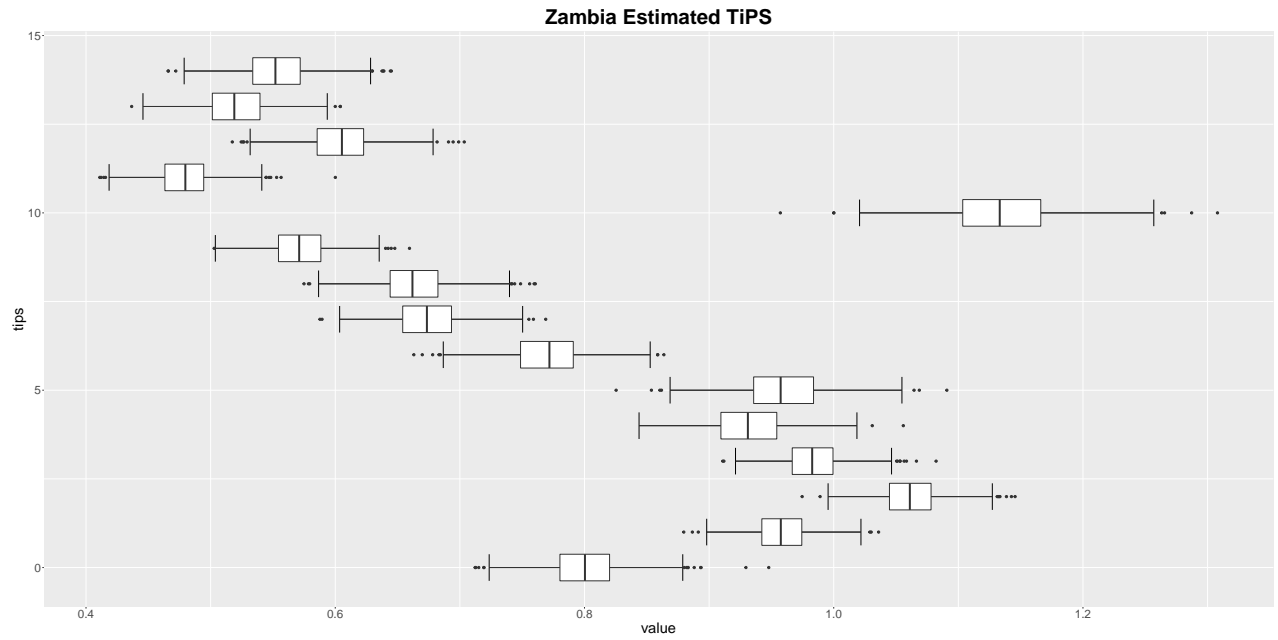


Figure 1: Estimated TiPS

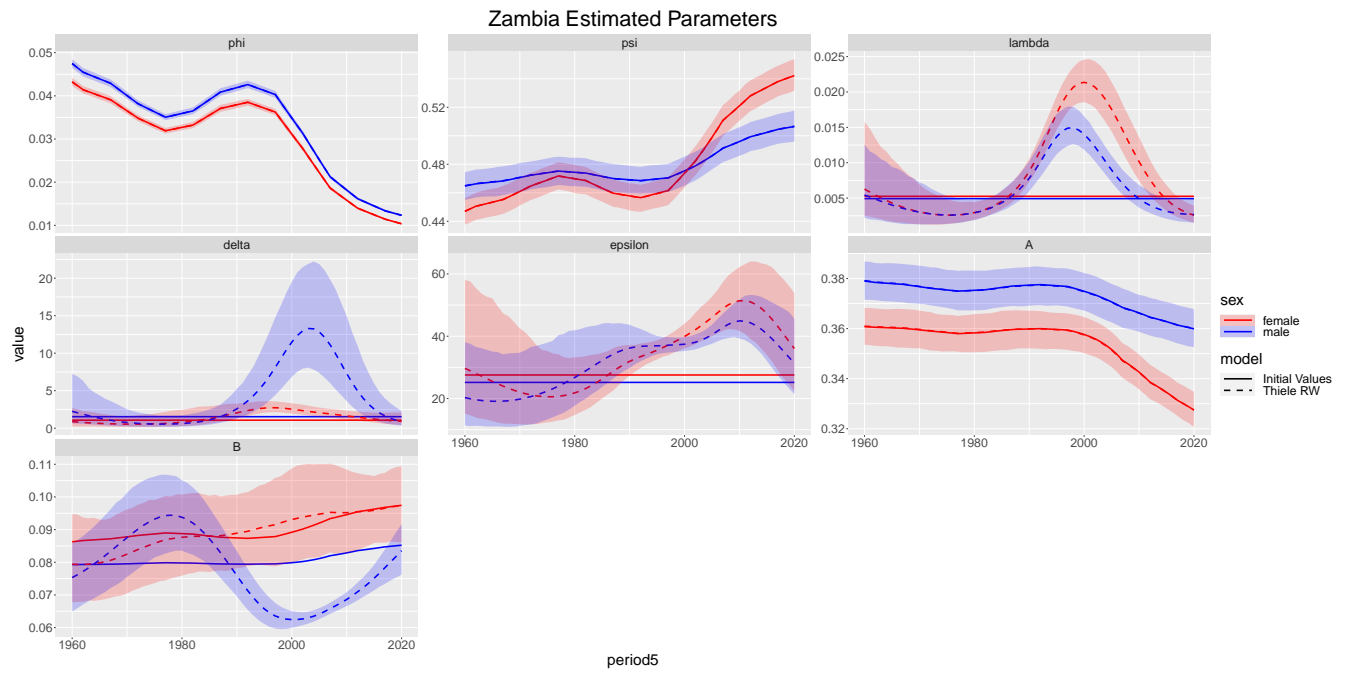


Figure 2: Estimated parameters

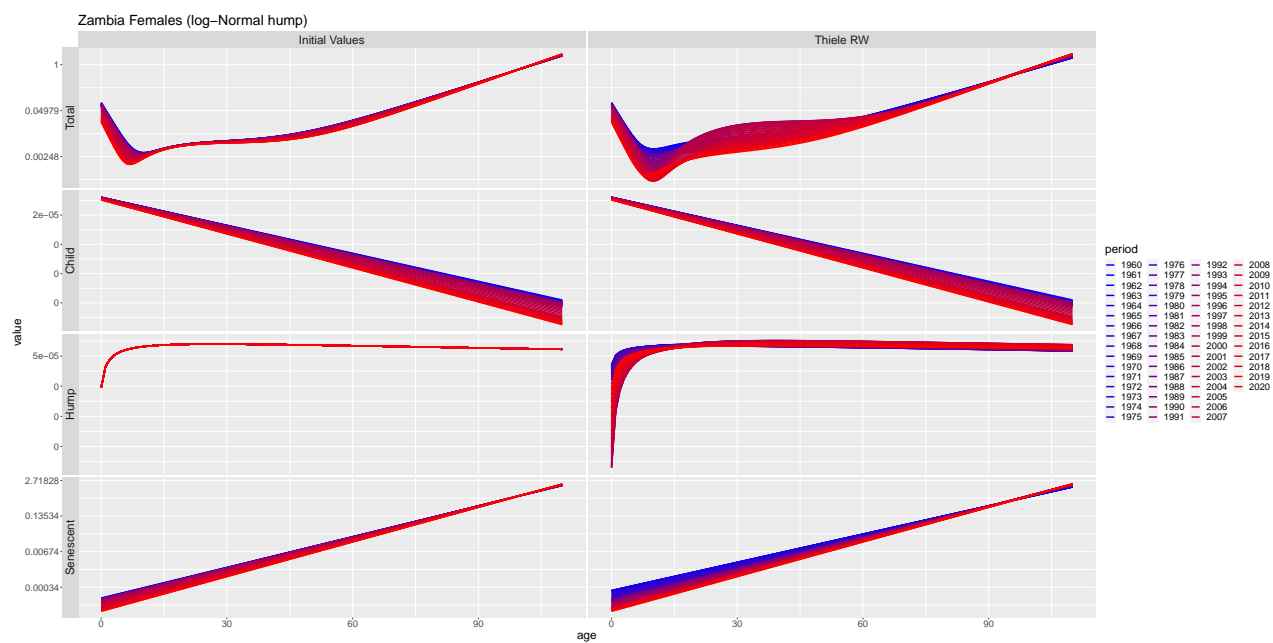


Figure 3: Thiele Decomposed

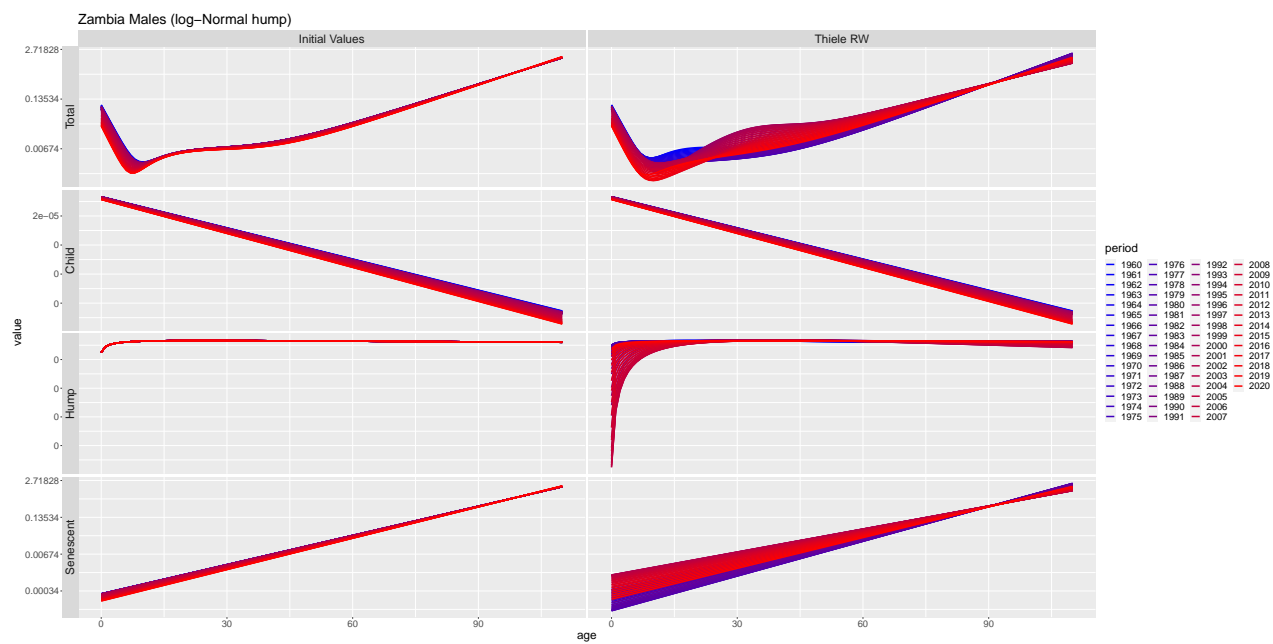


Figure 4: Thiele Decomposed

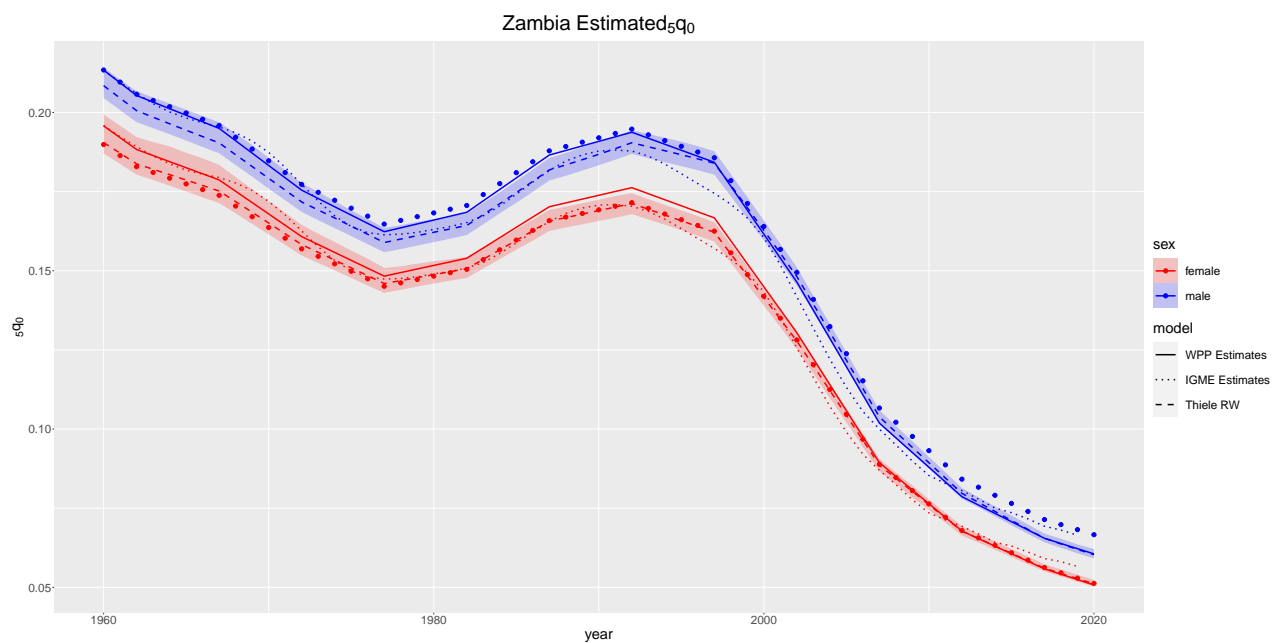


Figure 5: Estimated $_5q_0$

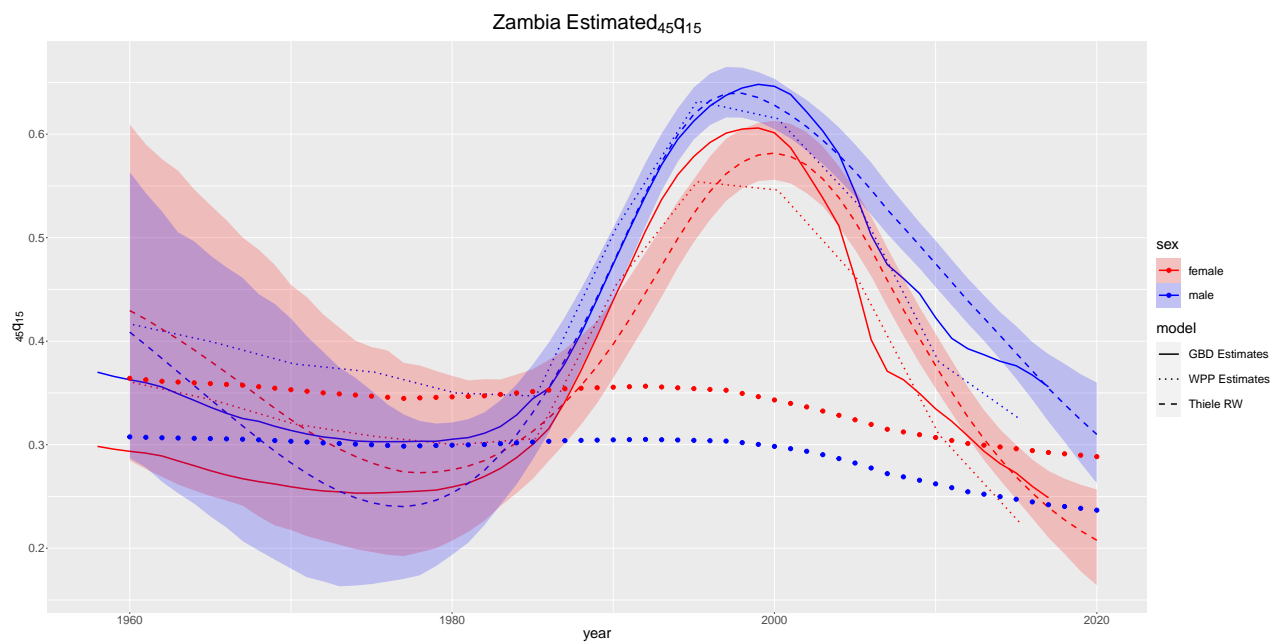


Figure 6: Estimated $_{45}q_{15}$

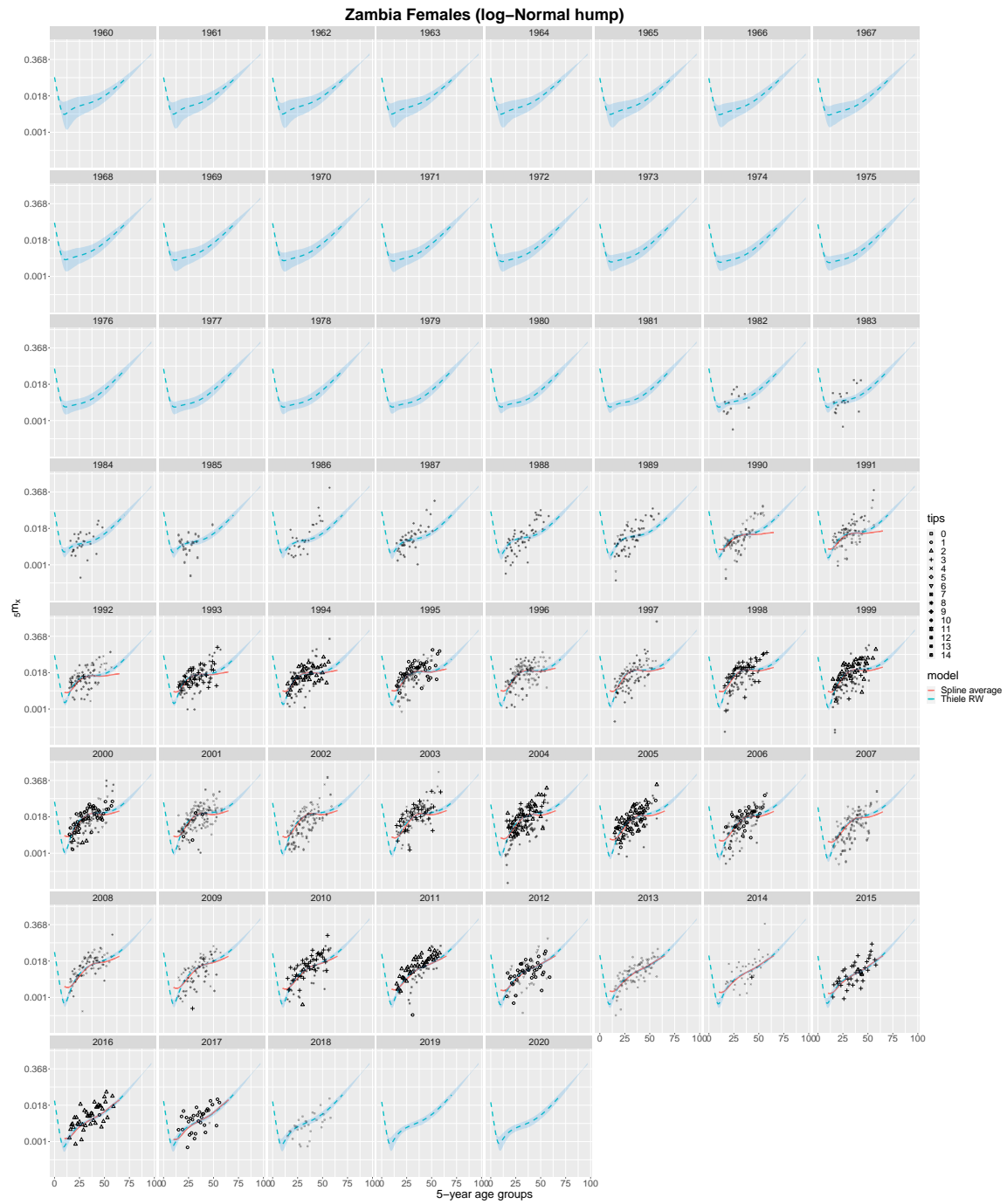


Figure 7: Mortality Schedules

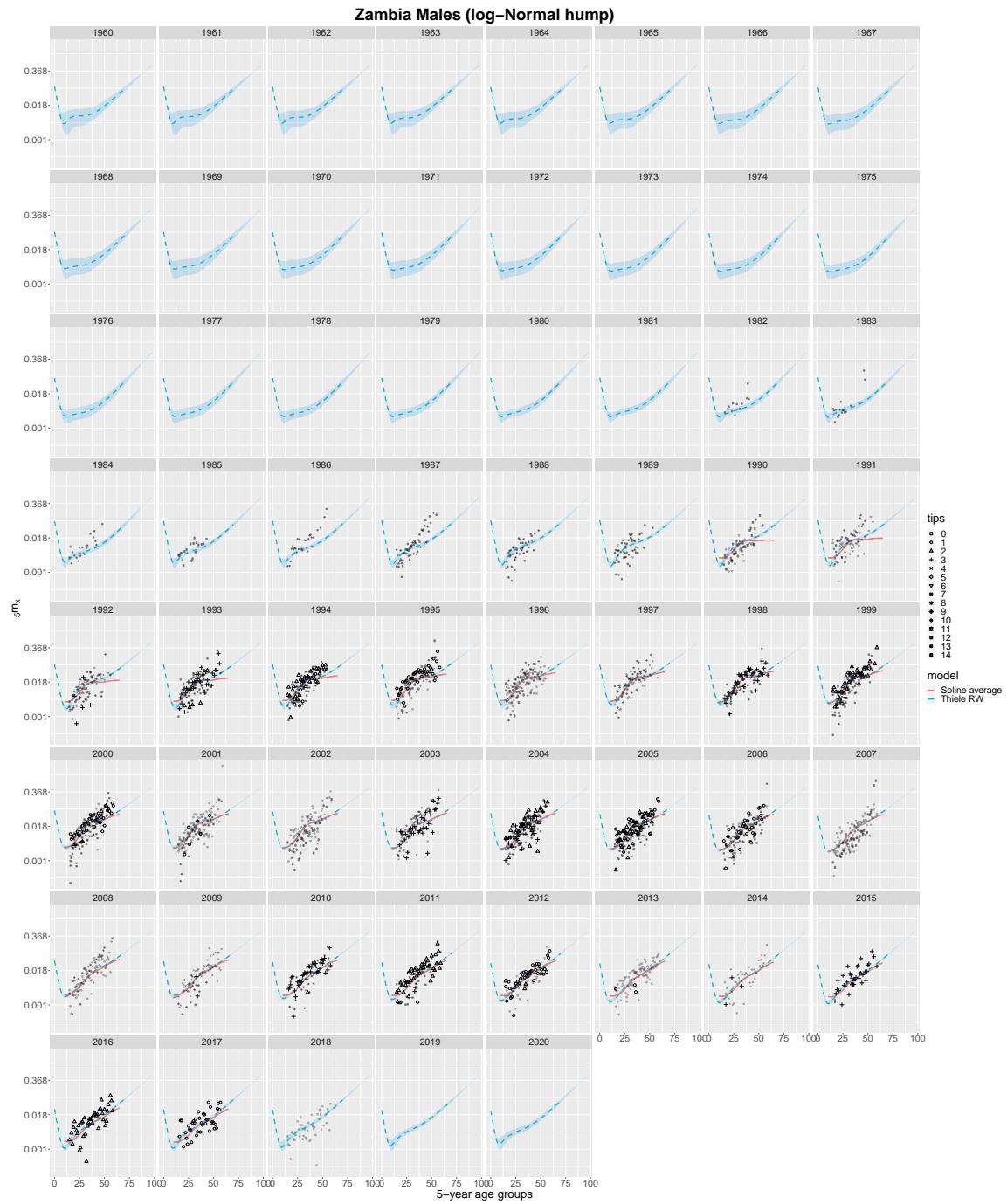


Figure 8: Mortality Schedules

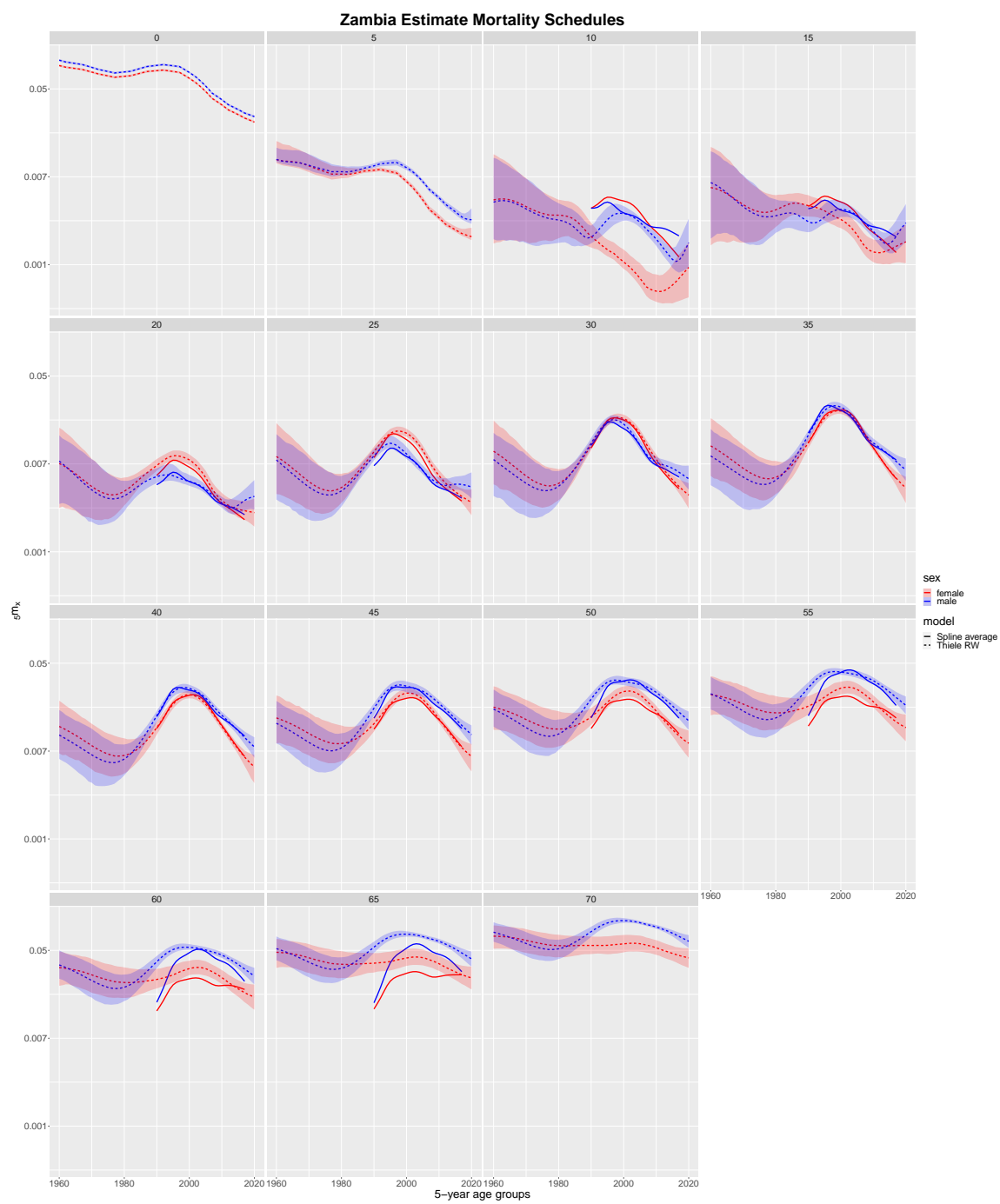


Figure 9: Mortality Schedules

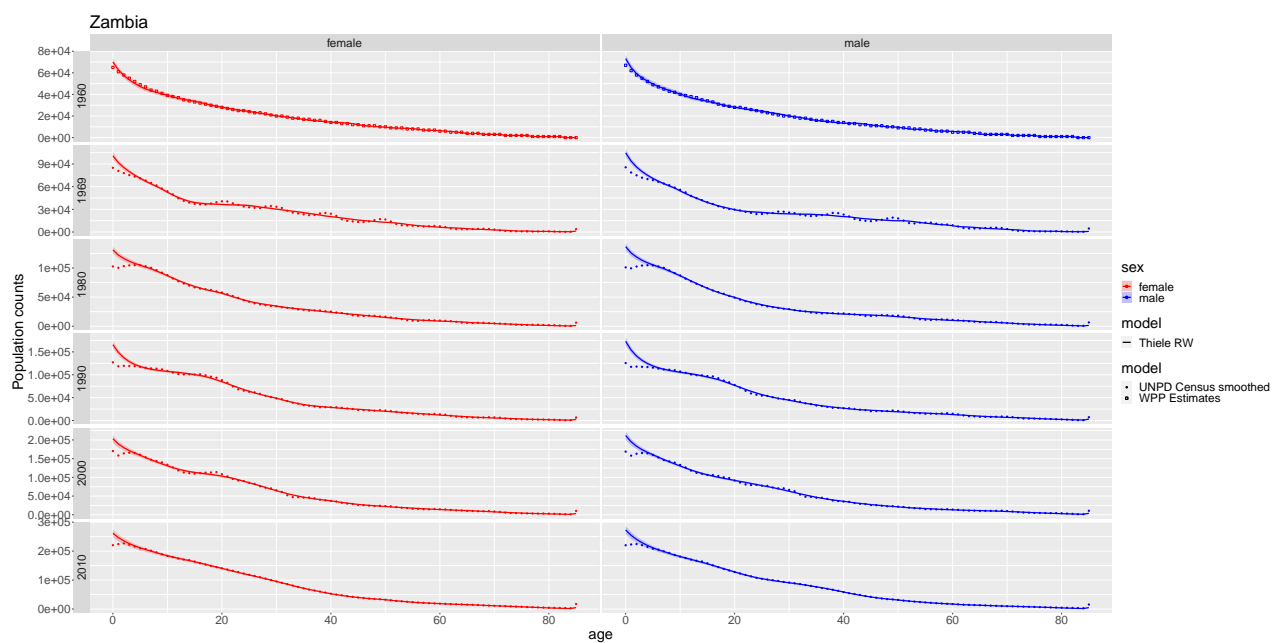


Figure 10: Population

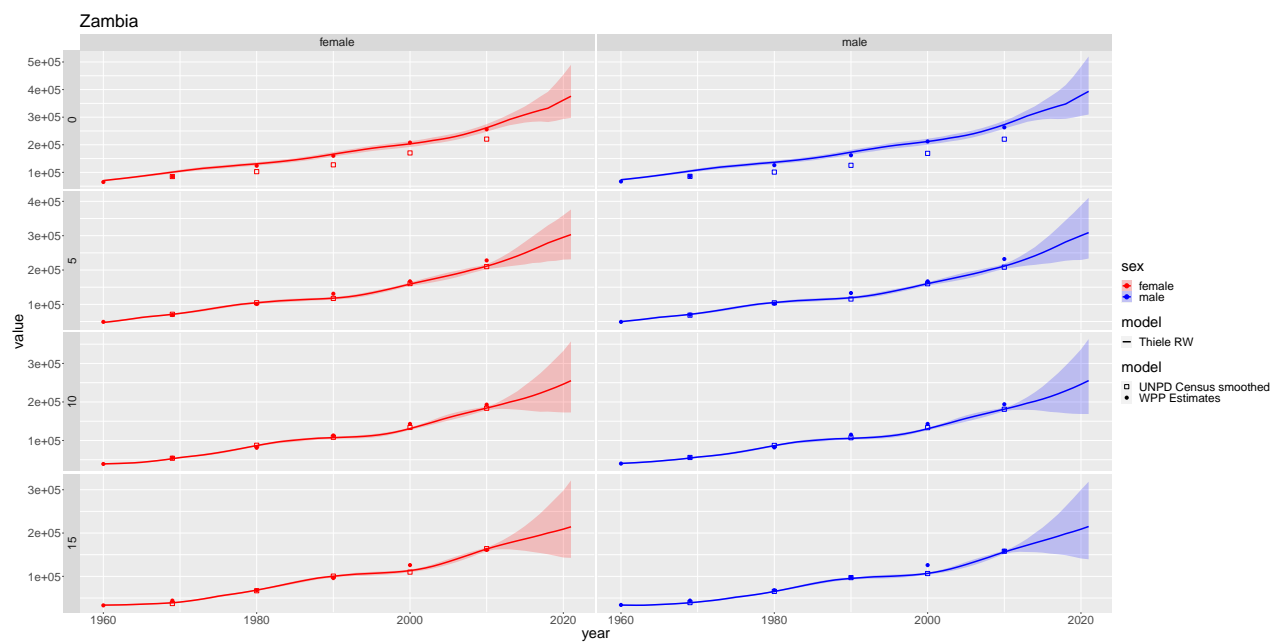


Figure 11: Population

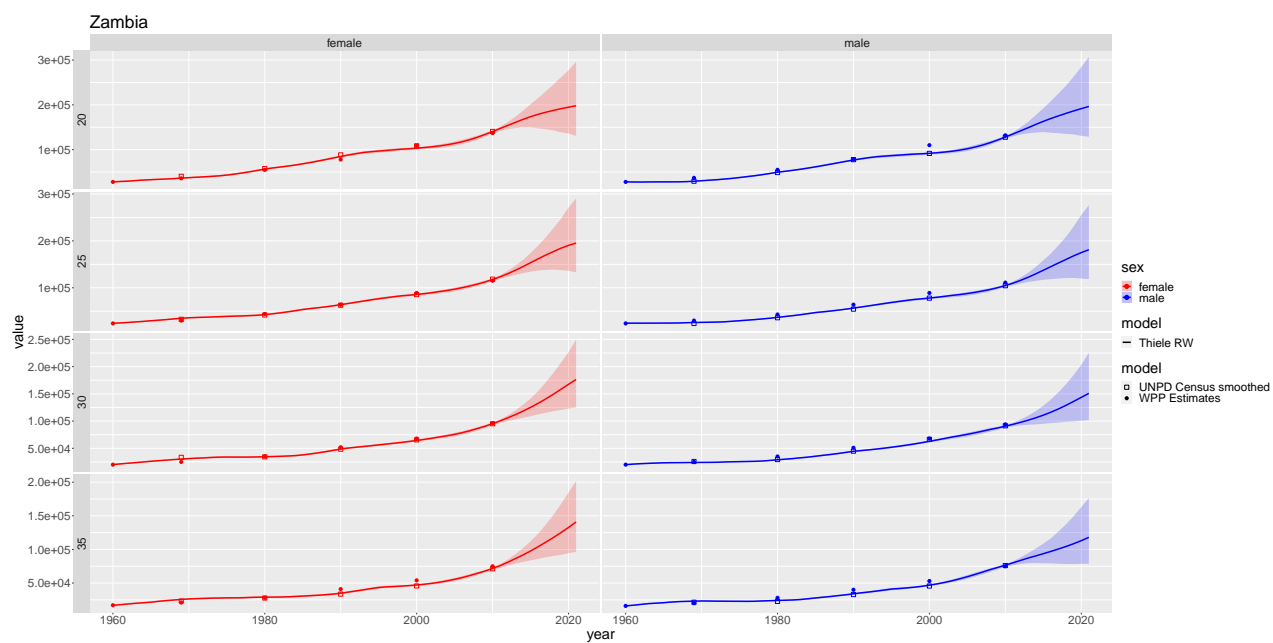


Figure 12: Population

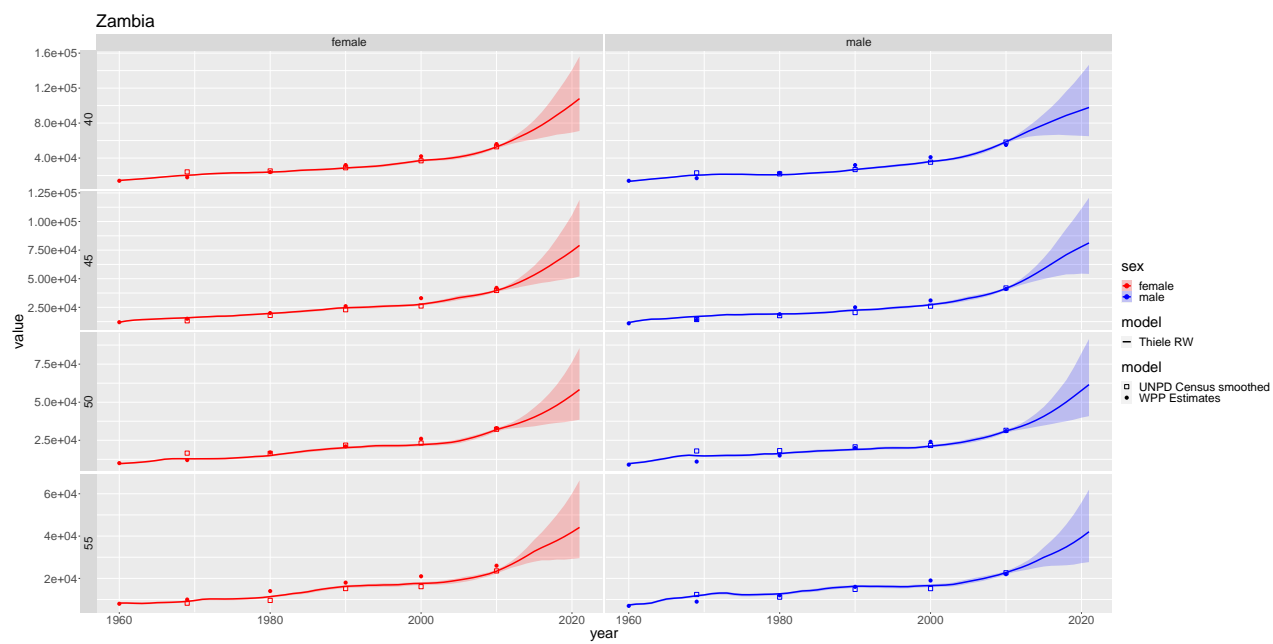


Figure 13: Population

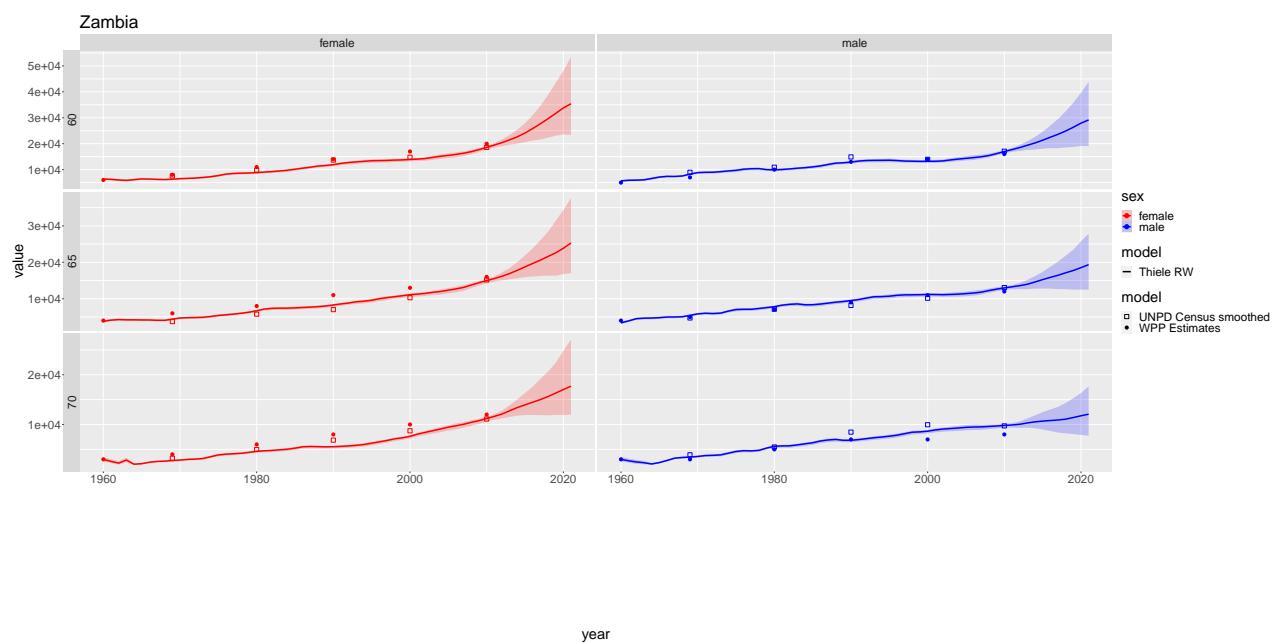


Figure 14: Population

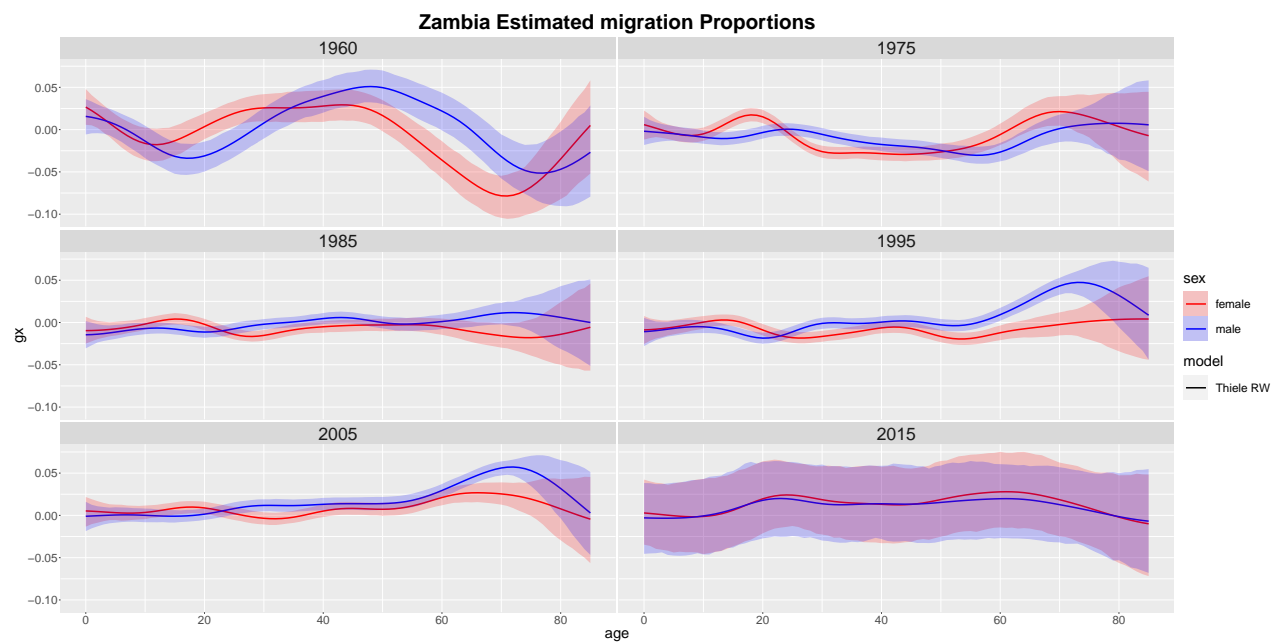


Figure 15: Migration

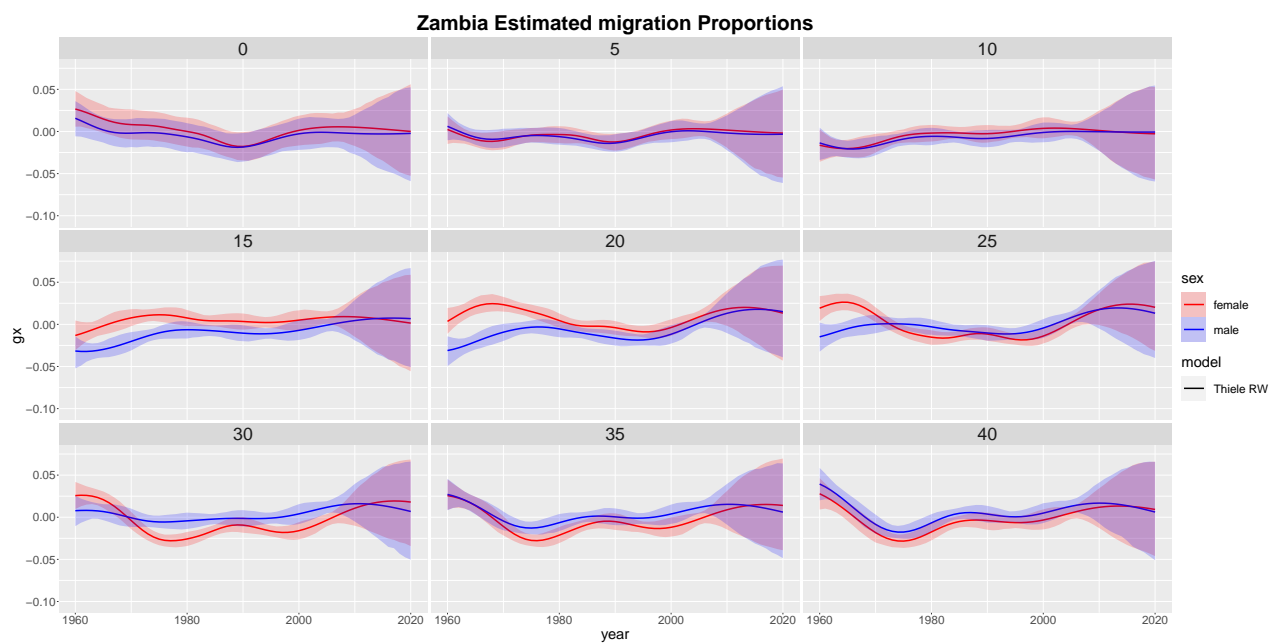


Figure 16: Migration

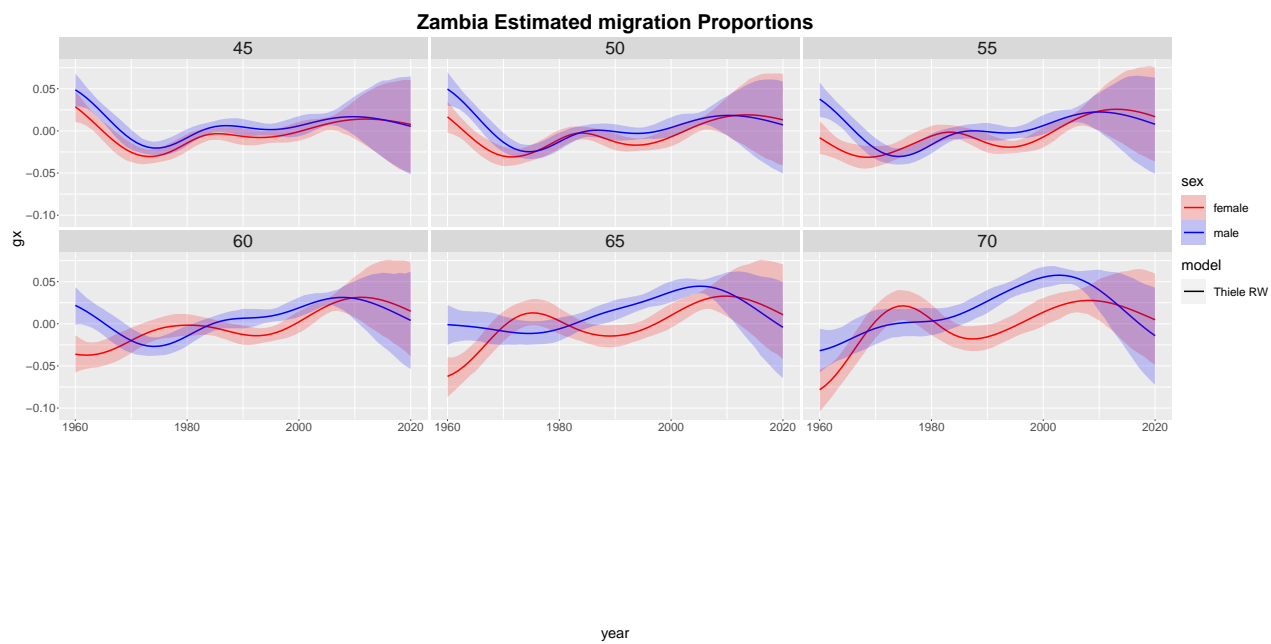


Figure 17: Migration

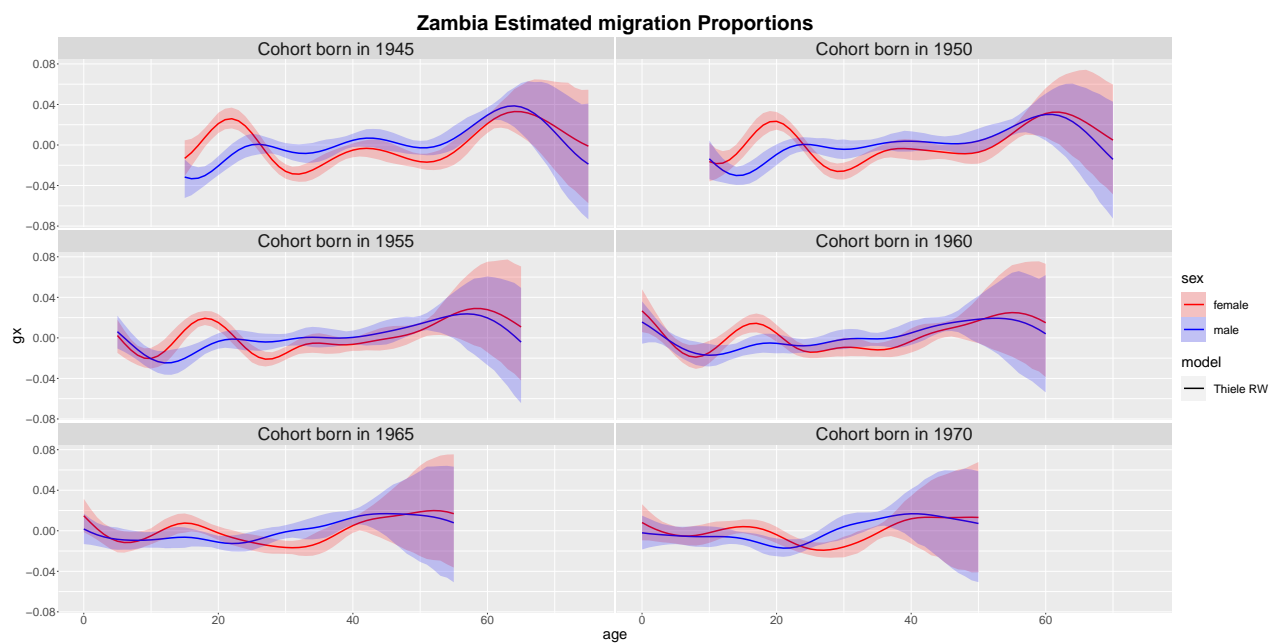


Figure 18: Migration

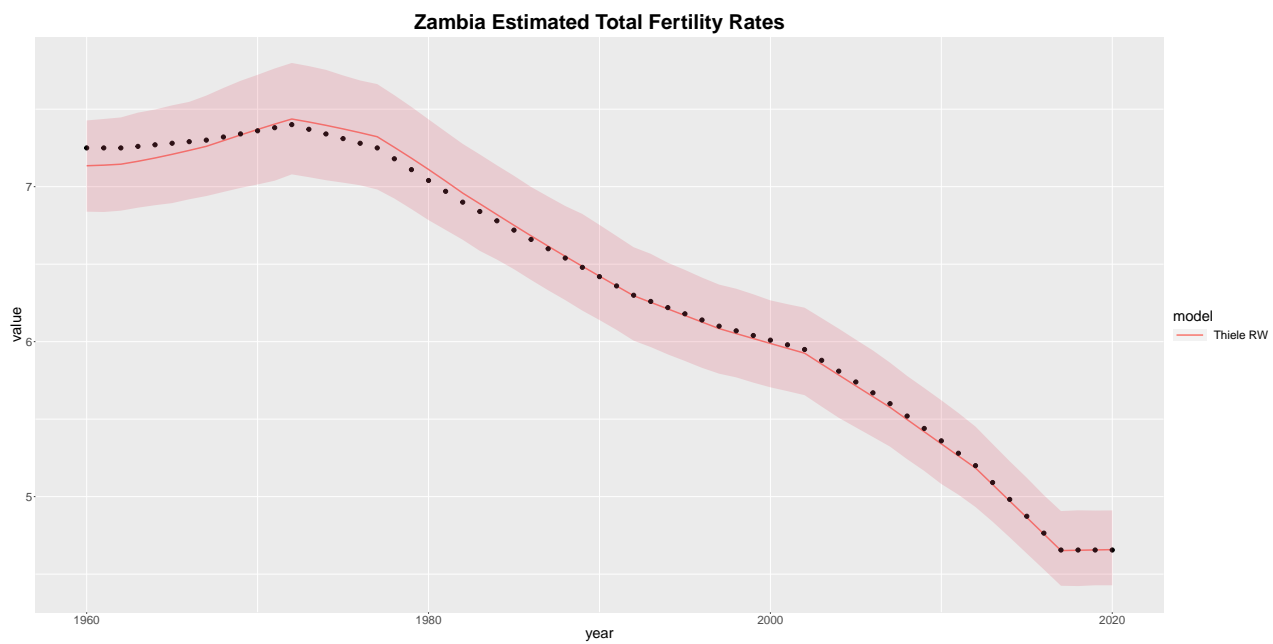


Figure 19: Total Fertility

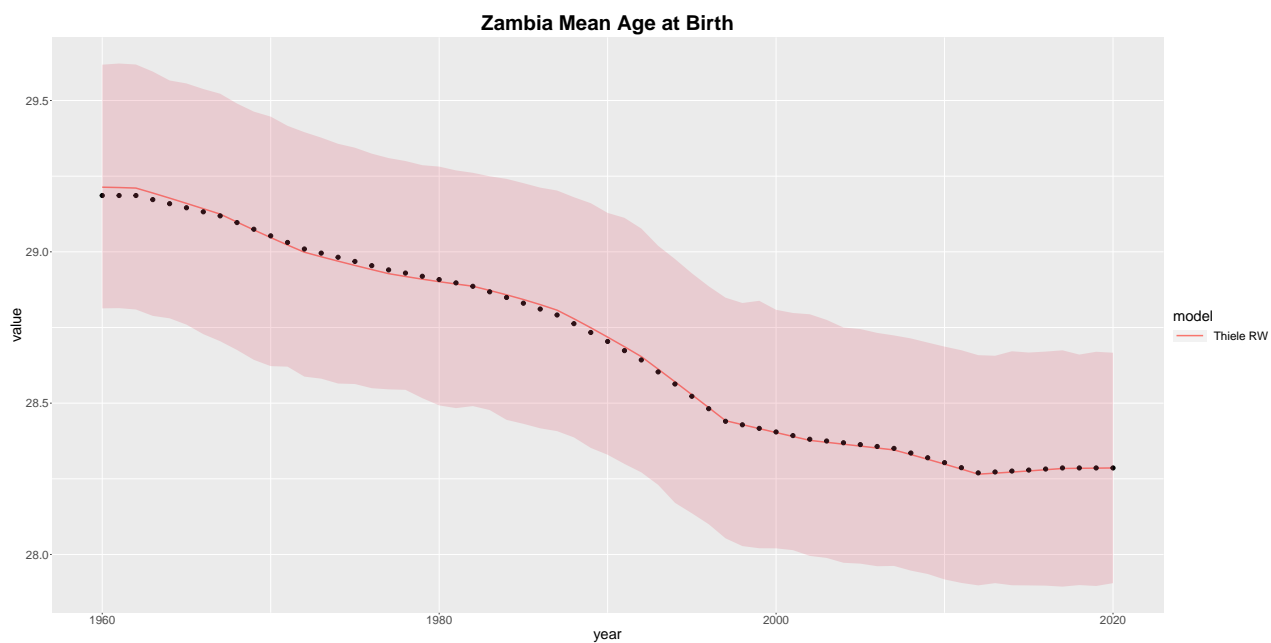


Figure 20: Mean age at births

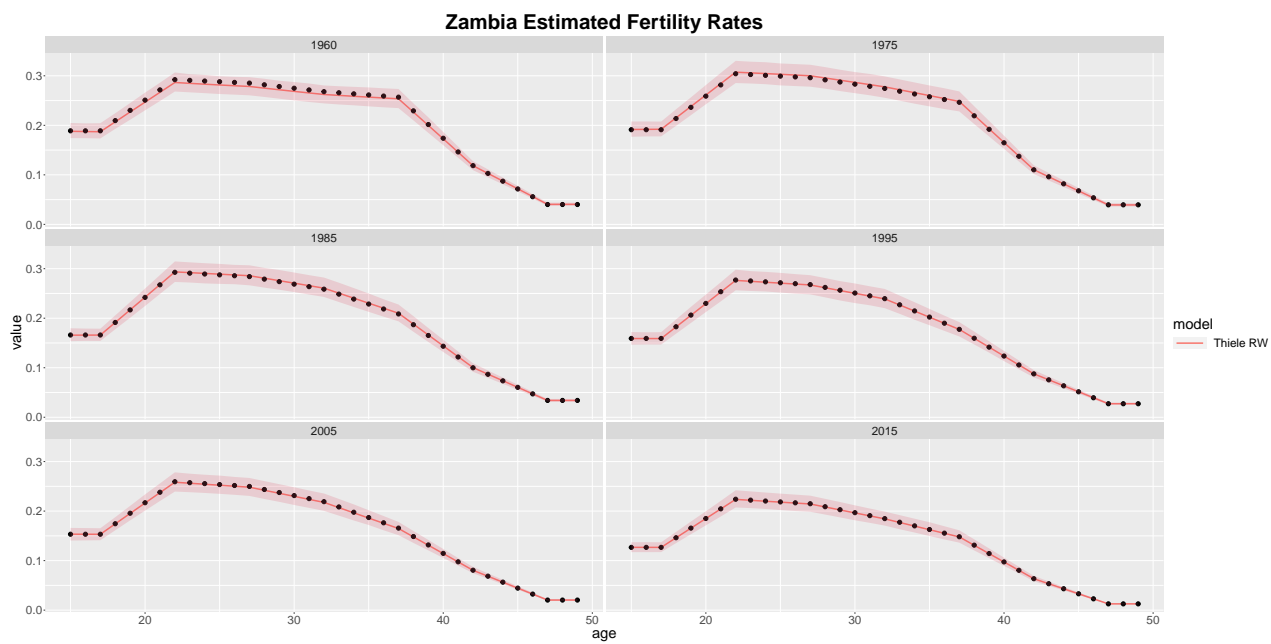


Figure 21: Fertility



Figure 22: Fertility