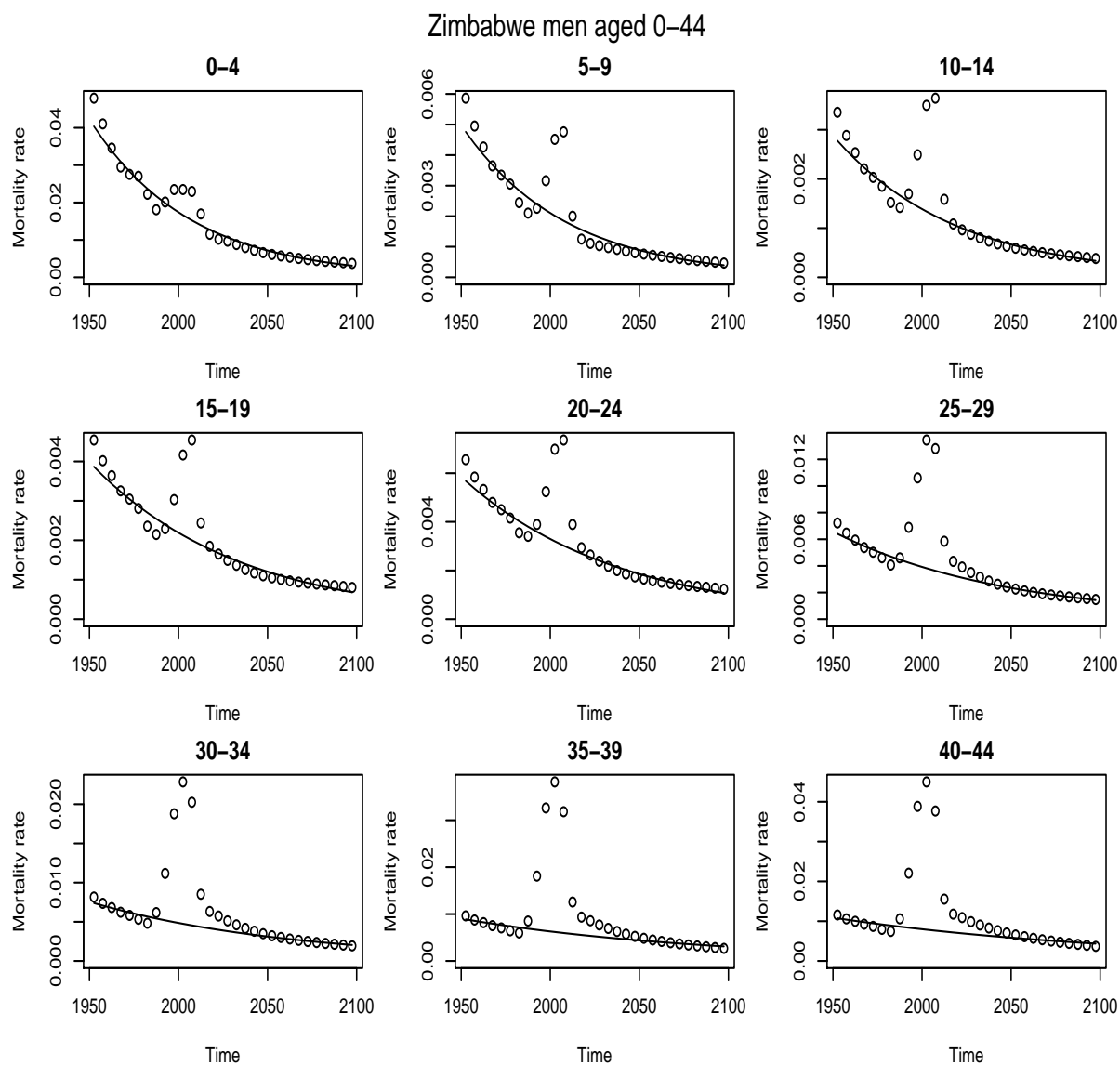# Mortality rates

NULL

NULL

Figure 1: Mortality rates for men over time by 5 year age groups. Circles show UNPD 2019 estimates (including HIV mortality), lines show estimate based on a log-linear model for each age group.
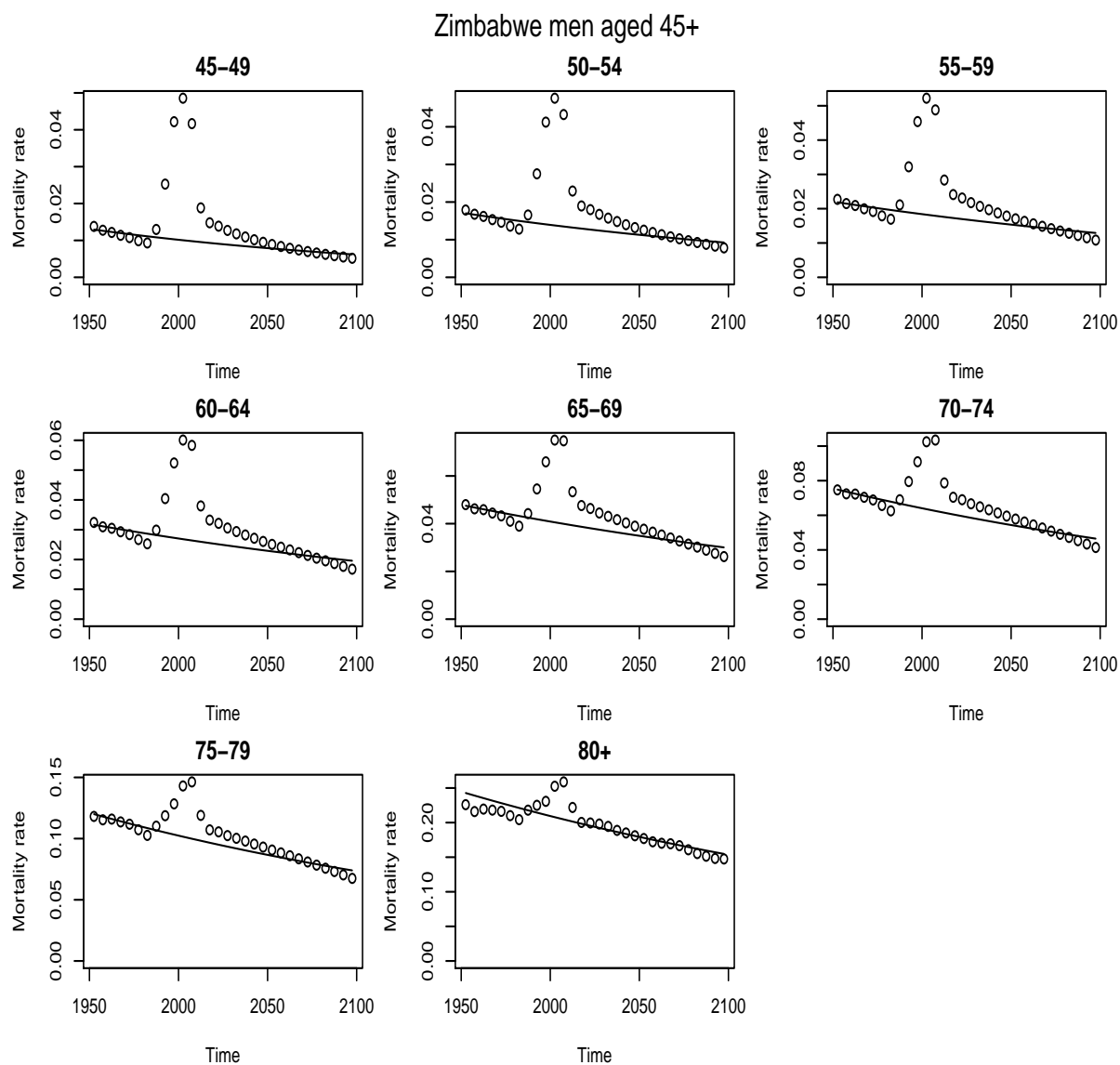
Zimbabwe men aged 45+

Figure 2: Mortality rates for men over time by 5 year age groups (cont). Circles show UNPD estimates (including HIV mortality), lines show estimate based on a log-linear model for each age group.
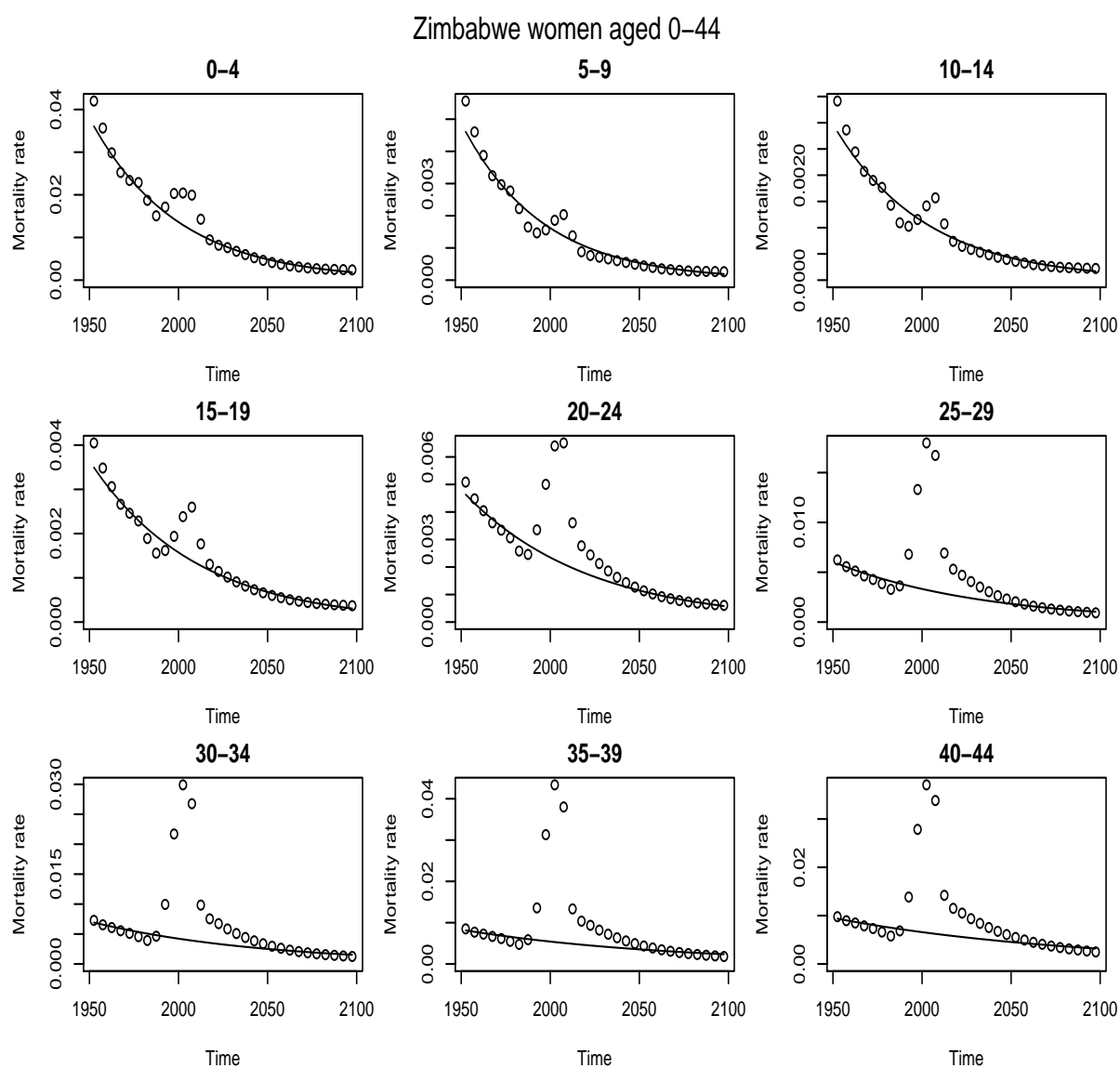
3

Figure 3: Mortality rates for women over time by 5 year age groups. Circles show UNPD estimates (including HIV mortality), lines show estimate based on a log-linear model for each age group.
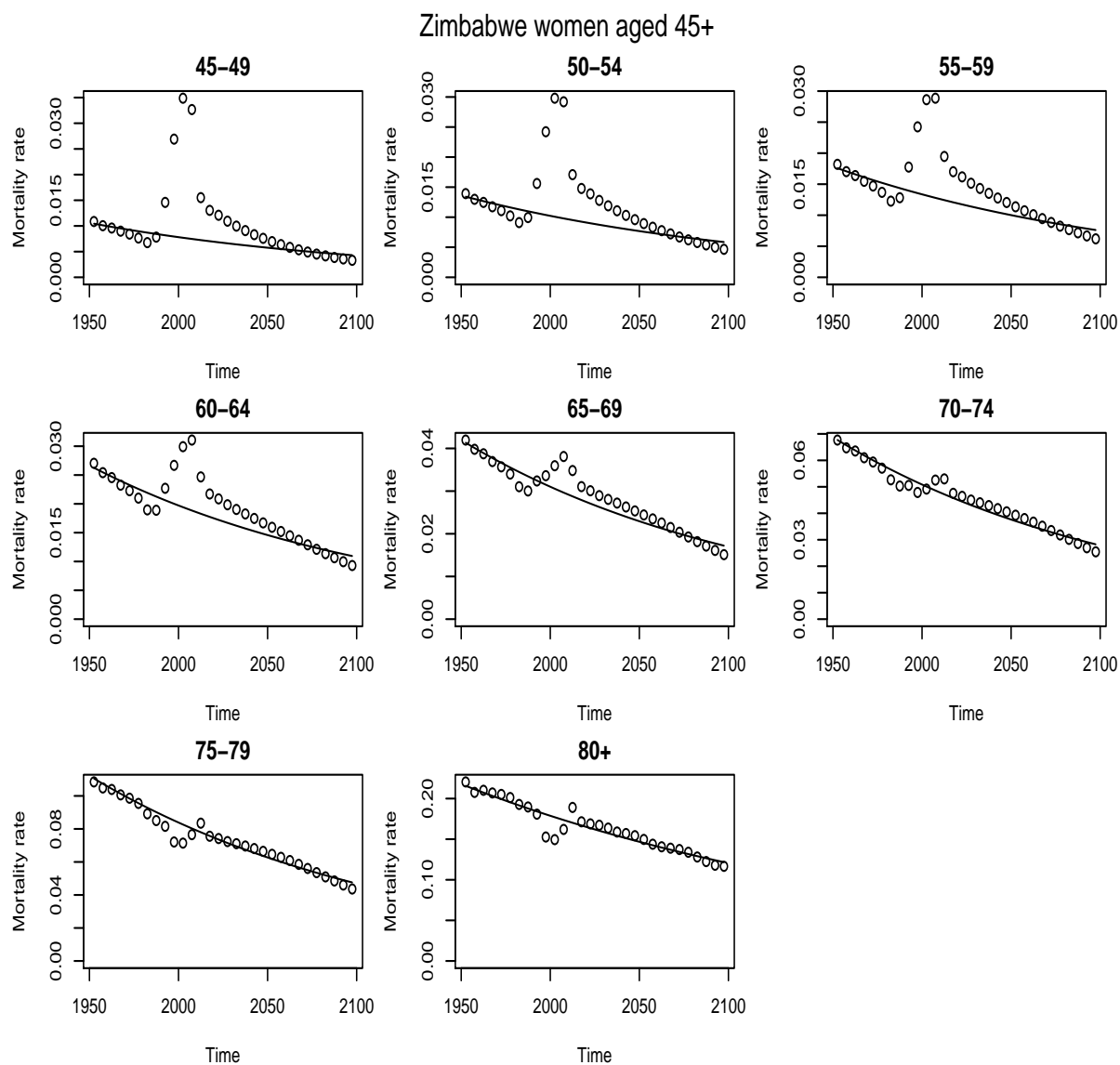
Figure 4: Mortality rates for women over time by 5 year age groups (cont). Circles show UNPD estimates (including HIV mortality), lines show estimate based on a log-linear model for each age group.

	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80+
Intercept	31.43	28.24	22.67	17.81	17.24	15.12	12.39	9.37	7.57	5.51	4.11	3.26	3.02	3.12	3.82	4.39	4.65
Coeff	-0.02	-0.02	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00

Table 1: Parameters for Zimbabwe men mortality

	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80+
Intercept	36.77	37.71	32.08	27.16	22.58	18.22	15.34	11.85	9.80	7.34	6.84	7.22	8.14	8.61	9.07	9.15	6.18
Coeff	-0.02	-0.02	-0.02	-0.02	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.00

Table 2: Parameters for Zimbabwe women mortality

```
> # Writing out mortality rates:
> write.table(rbind(mortality.coeffs.men,mortality.coeffs.women),file=paste0(country.no.spaces,"_
>
```
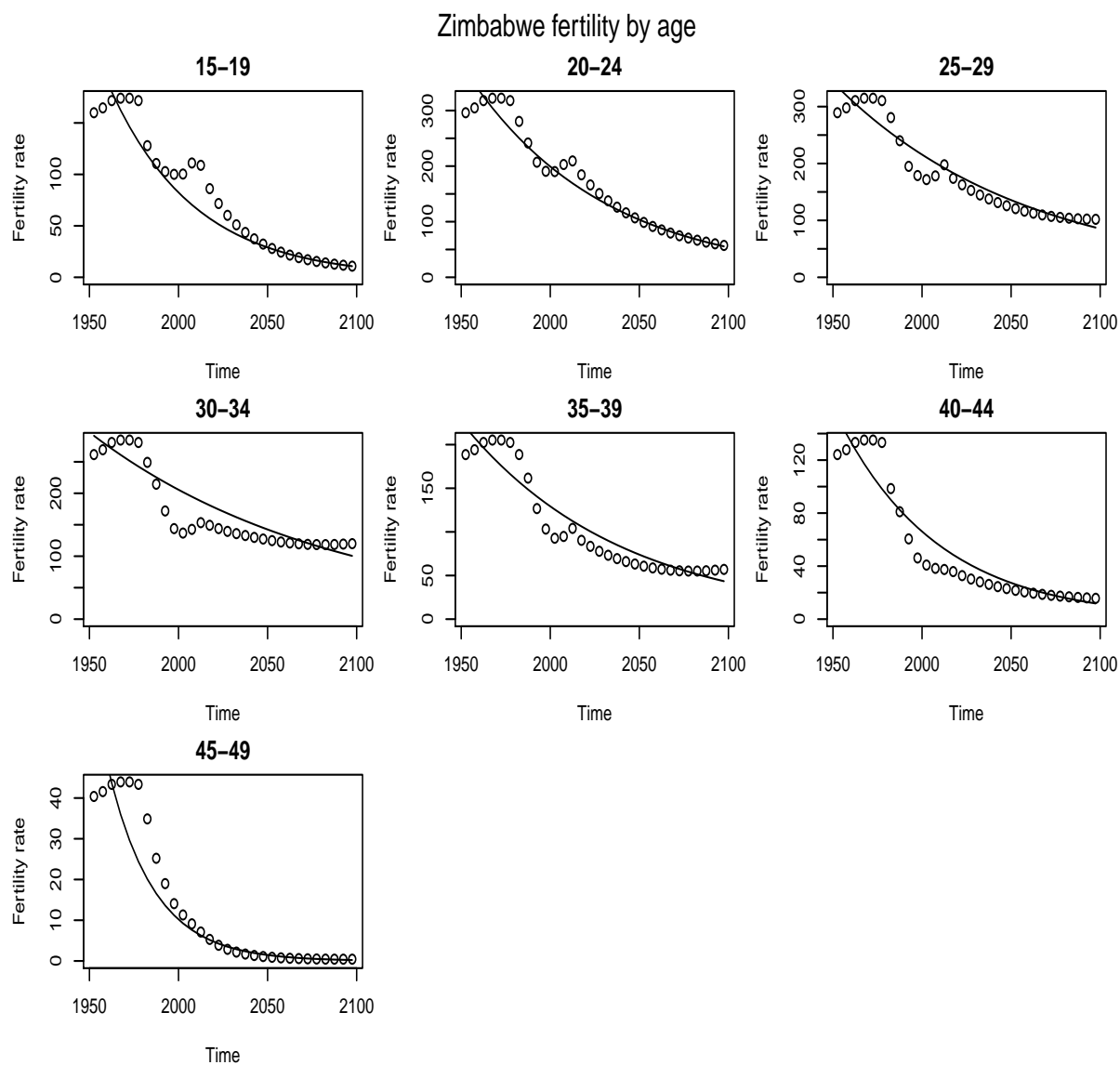
Fertility rates

Figure 5: Fertility rates for women over time by 5 year age groups. Circles show UNPD estimates (which are adjusted for the effects of HIV), lines show estimate based on a log-linear model for each age group.
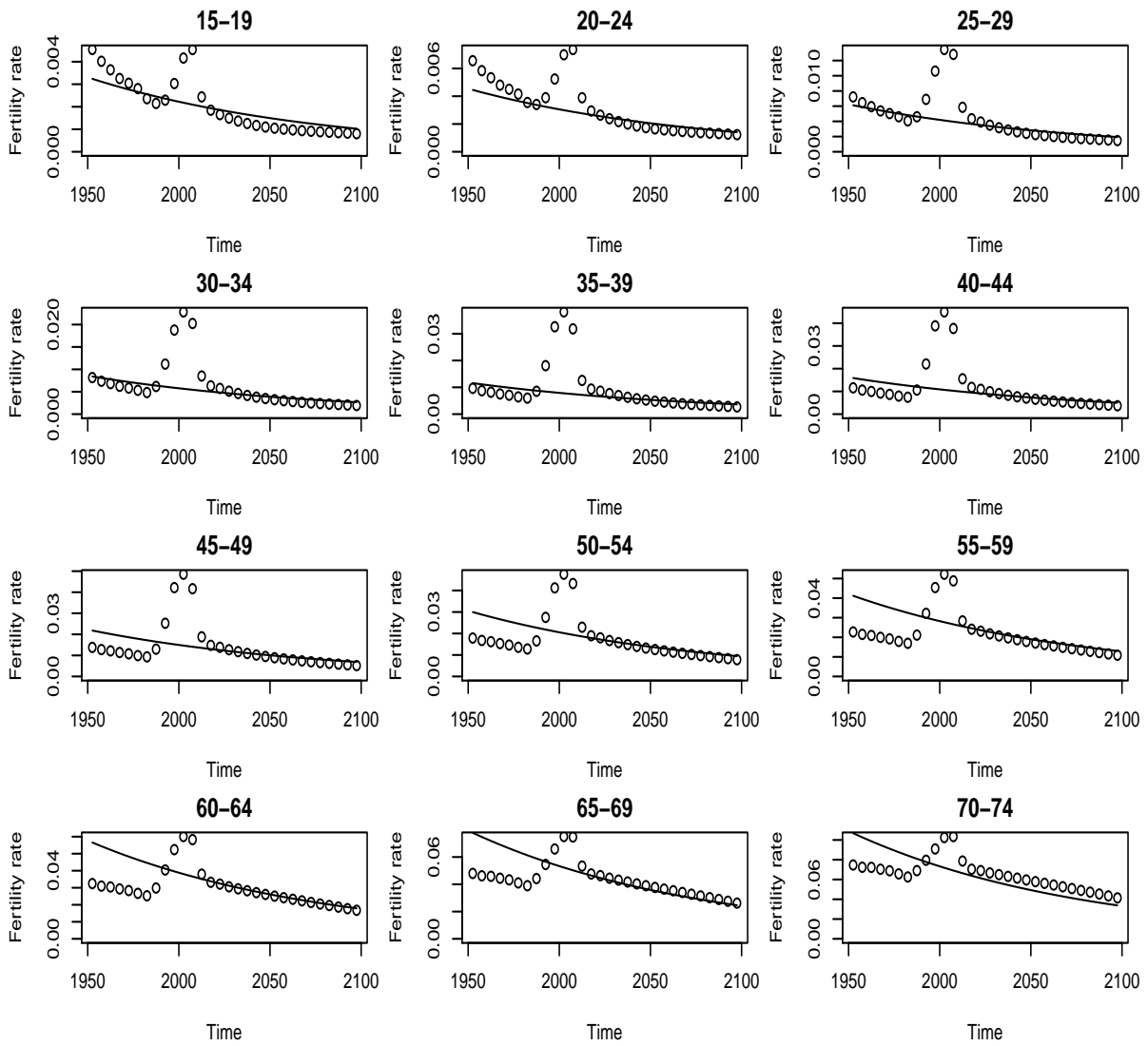
Experiments

Figure 6: Experiment for men to see if we can fit a 2d function - ie a single regression by age group and time for each gender and country - well for mortality. For now I think we should stick with the different regressions for each age group.

Discussion

For mortality rates we need to have some way of discounting HIV mortality. I think that fitting a function separately to each age group - and ignoring the periods when HIV mortality is high - gives an OK fit. It seems to me that we can't fit a 2d model by age and time (assuming independence between the 2) as well. As mortality is something in the background, validated against age distribution at different time points, I think we can ignore the parametric complexity and just input them as fixed quantities.

For fertility it is not clear that any function will fit this well. For now we can use the UNPD numbers directly.