Appendix A: Microsimulation: technical details

Microsimulation is a tool to model processes and sequences of events at the individual level. Whether a simulated individual experiences an event is the result of a randomized experiment. This means that at each time change a random value between 0 and 1 is compared to the (time-dependent) probability of an event, the latter being estimated from real-world data using hazard regression analysis. The event occurs if that draw falls below the relevant probability.

Following a competing risk approach, continuous-time models of multiple transitions are associated with statistical models of duration to an event. Hence, rather than evaluating the risk of the occurrence of events at each time interval, continuous-time models allow calculating precise durations before the occurrence of the competing events on the basis of given hazard functions and the random draws for each event, which is mathematically equivalent. The event with shortest duration is executed while all others are censored.

Our model is based on the assumption of piecewise constant hazard models. Let $h_i(t)$ denote the hazard rate for transition i, which is assumed to be constant over time t at rate λ_i, i.e.,

$$(1) \qquad h_i(t) = \lambda_i.$$

Then the probability that the event i has not occurred until time t is given as follows,

$$(2) \qquad S_i(t) = e^{-\int_0^t \lambda_{iu}\, du} = e^{-\lambda_i t}.$$

In the simulation, the latter probability is evaluated against a draw of a uniformly distributed random variable X_i with value $x_i \in [0,1]$. Singling out the duration t gives waiting times that follow an exponential distribution, i.e.,

$$(3) \qquad t_i = -\ln x_i / \lambda_i.$$

Hence, in the simulation we randomly draw exponential waiting times to all birth and union events of which a woman is at risk, censoring the drawing of waiting times when the first event occurs or hazard rates change. In order to reduce Monte Carlo variability, we increase simulation size to 1 million synthetic life courses of birth and union events for each cohort and country.

Appendix B: Parametrisation details

In order to precisely account for the different cultural, institutional, and legal contexts of childbearing and partnerships among the countries, we perform the parameter estimation separately for each country except Norway and Sweden.[1] Due to the smaller sample size, for the latter two countries we pool the data and include a country dummy to control for differences in the hazard rates between Norway and Sweden. Adjusting the baseline hazard rate parameters by the estimated country coefficients yields separate cohort-specific parameter sets for Norway and Sweden. The latter parameter sets are used to simulate Norwegian and Swedish cohorts separately. The simulated family life courses representing the Scandinavian setting are constructed by drawing a sample matching the relative country size of Swedish and Norwegian women in each cohort in the original pooled sample.

The following paragraphs give the main findings of hazard regression of the transition rates, and thus inform how the partnership and childbearing processes are linked and vary across age, cohort, and country in the simulation model.

Childbearing processes

Birth risks vary a lot over age: First births show the well-known hump-shaped pattern by woman's age, while second and higher-order births significantly decline by increasing mother's age and peak at 1–3 years after the previous birth (see Tables A-1–A-4). Across cohorts, first-birth rates show major reductions at (very) young ages for Italy and the two Scandinavian countries, while birth risks increase at later ages for all countries. The postponement of parenthood is associated with the emergence of a 'shoulder' pattern in the first-birth risks around

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[1] Alternatively, a pooled estimation with country interactions with all relevant variables could be performed, but this would further increase the complexity of the regression models.

the late twenties for later-born cohorts, which has even become the dominant mode in Scandinavian countries. While the two modes of first-birth risks are of almost equal height for the most recent Italian cohorts, first-birth risks for Great Britain are still marked by high rates of teenage pregnancy. By contrast, age-specific fertility change is more uniform for second and higher-order births across countries, as birth risks have significantly increased for age 30 and above in all three country settings.

Furthermore, Tables A-1–A-4 confirm the associations between childbearing and partnership trajectories postulated in section 3. First, birth risks vary with partnership status: Married women generally show higher birth rates than cohabiting women and even higher rates than women out of union. Second, the timing of parenthood and partnership formation has become less connected as the gradient of union duration in first-birth rates has lessened across cohorts. Third, repartnering indeed represents new opportunities for childbearing for both childless women and for couples with children from previous relationships: First-birth rates in higher-order unions are similar to or even surpass those in first unions, particularly for cohabitations, and, if the prospective child is the first or second birth in the partnership, women in a reconstituted partnership show the highest risk of having a (further) child.

Partnership formation and dissolution processes

Tables A-5–A-11 display well-known trends in partnering: an increasing diffusion of cohabitation and union separations in the younger cohorts and a constant retreat from direct marriage and a postponement of marriage towards older ages. The Scandinavian countries are forerunners of the observed family change, followed by Great Britain and then Italy.

As to the factors influencing partnering, we find that first union formation varies with age in a hump-shaped pattern, while union instability and repartnering decrease with age, and the age gradient in separation and divorce strengthens for recent cohorts. Separation and divorce rates also vary by union duration, where they first increase and then stabilize or decrease with increasing union duration. Moreover, separation risks are higher during the first years of cohabitation than during the first years of marriage. Regarding the presence of children, the results show, as expected, that pregnancy still hastens marriage much more than cohabitation, but, except in Italy, for single pregnant women the relative risk of marriage is declining across cohorts, while the opposite holds for cohabitation. Similarly, the elevated marriage risk of cohabiting women in the case of pregnancy declines across cohorts for all country settings.

In addition, we find that the increased partnership formation risk extends into the first year following the birth of the first child. After that the pattern is inconsistent across countries: while the results for Great Britain and Scandinavian countries mostly suggest a negative effect of the presence of children on union formation, for Italian mothers the estimated union formation risk is high.

The evidence is clear that the presence of children inhibits repartnering, except during pregnancy. Likewise, children depress the risk of marriage within cohabitation, except when they are very young or born in the current partnership in Scandinavian countries. Moreover, children in a partnership are associated with lower separation risks, particularly when the children are very young, while children born before the current partnership tend to inflate dissolution risks.

Lastly, partnership history also influences marriage stability, as first marriages preceded by a premarital cohabitation are more unstable than direct marriages. Strikingly, for higher-order unions the estimated effect is the opposite.

Table A-1:   Hazard models for conception leading to a first birth

First birth	Italy Parameter estimate	Italy 95% confidence interval		Great Britain Parameter estimate	Great Britain 95% confidence interval		Norway/Sweden Parameter estimate	Norway/Sweden 95% confidence interval	
Union status									
Never in a union	−3.395	−3.487	−3.302	−2.607	−2.674	−2.540	−2.572	−2.734	−2.410
1st union, cohabiting	−1.080	−1.172	−0.988	−1.053	−1.143	−0.962	−0.862	−0.992	−0.732
1st union, married	*ref.*			*ref.*			*ref.*		
After 1st union	−2.836	−3.044	−2.627	−2.062	−2.142	−1.983	−2.752	−2.937	−2.568
2nd union, cohabiting	−0.651	−0.887	−0.414	−0.630	−0.704	−0.557	−0.632	−0.761	−0.504
2nd union, married	−0.113	−0.527	0.301	0.380	0.289	0.470	0.125	−0.086	0.337
After 2nd union	−2.463	−3.141	−1.785	−2.269	−2.504	−2.034	−2.734	−3.196	−2.272
3rd union, cohabiting				−0.528	−0.689	−0.366	−0.525	−0.760	−0.290
3rd union, married				0.394	0.194	0.593	0.386	−0.039	0.810
After 3rd union				−1.201	−1.470	−0.932	−1.401	−1.890	−0.912
Union duration									
1st union duration spline	−1.440	−1.574	−1.306	−0.256	−0.330	−0.182	−0.760	−0.958	−0.562
2nd union duration spline	−0.867	−1.631	−0.104	−0.626	−0.824	−0.427	−1.058	−1.580	−0.536
Union rank*Cohort									
1st union*cohort 1940–1949	−0.579	−0.777	−0.382	−0.275	−0.398	−0.152	−0.482	−0.780	−0.184
1st union*cohort 1960–1969	0.463	0.272	0.654	0.076	−0.021	0.172	0.486	0.231	0.741
1st t union*cohort 1970+	0.745	0.536	0.954	0.214	0.105	0.322	0.827	0.579	1.074
2nd union*cohort 1940–1949	−3.803	−7.375	−0.231	−0.164	−0.544	0.216	−0.785	−1.794	0.225
2nd union*cohort 1960–1969	−0.617	−1.552	0.319	−0.095	−0.321	0.132	0.738	0.157	1.319
2nd union*cohort 1970+	−0.019	−1.049	1.012	0.098	−0.163	0.359	0.933	0.362	1.504
Cohort									
1940–1949	0.132	−0.254	0.518	−0.632	−0.869	−0.396	−1.069	−1.859	−0.279
1950–1959	*ref.*			*ref.*			*ref.*		
1960–1969	0.121	−0.269	0.511	−0.285	−0.486	−0.084	−0.131	−0.986	0.725
1970–1979	−0.344	−0.771	0.083	0.140	−0.043	0.323	−0.304	−1.119	0.511
1980+	−0.426	−0.878	0.026	0.077	−0.122	0.275	−0.482	−1.312	0.349
Union status*cohort									
Never in a union*cohort 1940–1949	−0.230	−0.363	−0.097	0.041	−0.062	0.143	0.299	0.085	0.514
Never in a union*cohort 1960–1969	−0.276	−0.411	−0.141	−0.114	−0.206	−0.022	−0.267	−0.509	−0.026
Never in a union*cohort 1970–1979	−0.408	−0.566	−0.250	−0.399	−0.499	−0.299	−0.567	−0.834	−0.299
Never in a union*cohort 1980+	−0.504	−0.764	−0.244	−0.343	−0.480	−0.206	−1.307	−1.709	−0.906
1st union, cohabiting*cohort 1940–1949				0.212	−0.001	0.424	0.038	−0.166	0.243
1st union, cohabiting*cohort 1960–1969				−0.061	−0.167	0.045	0.006	−0.168	0.181
1st union, cohabiting*cohort 1970–1979				−0.155	−0.264	−0.045	−0.208	−0.392	−0.025
1st union, cohabiting*cohort 1980+				0.069	−0.080	0.219	−0.272	−0.527	−0.018
Age									
15 years	*ref.*			*ref.*			*ref.*		
16 years	0.839	0.578	1.099	0.728	0.615	0.841	1.862	1.384	2.340
17 years	1.364	1.085	1.642	1.056	0.927	1.185	2.388	1.833	2.942
18 years	1.668	1.351	1.986	1.074	0.915	1.233	2.566	2.018	3.114
19 years	1.803	1.491	2.116	0.808	0.654	0.962	2.553	2.008	3.097
20 years	1.726	1.419	2.033	0.727	0.575	0.879	2.386	1.843	2.929
21 years	1.649	1.343	1.955	0.493	0.339	0.648	2.212	1.667	2.756
22 years	1.554	1.248	1.860	0.420	0.268	0.573	2.136	1.588	2.685
23 years	1.532	1.227	1.838	0.434	0.282	0.585	2.206	1.662	2.750
24–25 years	1.399	1.096	1.701	0.493	0.344	0.643	2.283	1.742	2.823
26–27 years	1.400	1.095	1.706	0.580	0.427	0.734	2.322	1.775	2.868
28–29 years	1.396	1.084	1.708	0.524	0.371	0.678	2.225	1.680	2.771
30–31 years	1.328	1.017	1.639	0.459	0.303	0.615	2.221	1.673	2.770
32–33 years	1.112	0.796	1.428	0.199	0.037	0.360	2.043	1.486	2.600
34–35 years	0.969	0.642	1.297	−0.057	−0.227	0.113	1.704	1.132	2.276
36–37 years	0.648	0.304	0.992	−0.454	−0.638	−0.270	1.316	0.719	1.912
38–40 years	0.031	−0.336	0.398	−1.138	−1.339	−0.938	0.980	0.368	1.592
41–42 years	−0.627	−1.099	−0.154	−1.982	−2.279	−1.684	−0.104	−0.916	0.709
43 years and older	−2.614	−3.368	−1.860	−3.897	−4.340	−3.454	−1.685	−2.650	−0.721
Age spline*Cohort									
Age Spline 1*cohort 1940–1949	−0.111	−0.249	0.026	0.325	0.241	0.409	0.501	0.097	0.905
Age Spline 1*cohort 1960–1969	−0.126	−0.266	0.015	0.119	0.046	0.192	−0.261	−0.706	0.183
Age Spline 1*cohort 1970+	−0.090	−0.244	0.064	0.048	−0.016	0.113	−0.257	−0.677	0.164
Age Spline 2*cohort 1940–1949	0.241	0.080	0.403	−0.284	−0.394	−0.175	−0.410	−0.835	0.014
Age Spline 2*cohort 1960–1969	0.124	−0.043	0.292	−0.066	−0.164	0.032	0.372	−0.098	0.842
Age Spline 2*cohort 1970–94	0.122	−0.063	0.307	−0.031	−0.120	0.058	0.351	−0.095	0.797
Age Spline 3*cohort 1940–1949	−0.120	−0.185	−0.054	−0.107	−0.167	−0.047	−0.165	−0.272	−0.057
Age Spline 3*cohort 1960–1969	−0.006	−0.072	0.060	−0.090	−0.145	−0.035	−0.106	−0.216	0.005
Age Spline 3*cohort 1970+	−0.005	−0.082	0.071	−0.117	−0.172	−0.062	−0.079	−0.190	0.032
Age Spline 4*cohort 1940–1949	−0.022	−0.070	0.026	0.021	−0.012	0.053	0.038	−0.047	0.123
Age Spline 4*cohort 1960–1969	0.051	0.007	0.095	0.073	0.046	0.099	−0.008	−0.084	0.069
Age Spline 4*cohort 1970+	0.031	−0.027	0.089	0.161	0.127	0.195	0.051	−0.029	0.132

Table A-1:   (Continued)

First birth	Italy			Great Britain			Norway/Sweden		
	Parameter estimate	95% confidence interval		Parameter estimate	95% confidence interval		Parameter estimate	95% confidence interval	
Country									
Norway							*ref.*		
Sweden							−0.067	−0.118	−0.016
Constant	−1.907	−2.210	−1.605	−1.929	−2.078	−1.779	−2.976	−3.521	−2.431
Subjects			30,255			61,229			11,034
Events			19,751			41,794			8,043
Log likelihood			−7,860.8			−41,892.9			−6,758.2
AIC			15,827.6			83,905.8			13,638.4
BIC			16,268.4			84,444.0			1,408.5
Age spline nodes (from age 15)									
node1			3			3			2
node2			7			6			7
node3			13			11			11

Table A-2: Hazard models for conception leading to a second birth

Second birth	Italy			Great Britain			Norway/Sweden		
	Parameter Estimate	95% Confidence Interval		Parameter Estimate	95% Confidence Interval		Parameter Estimate	95% Confidence Interval	
Births*union status									
Not in a union	−1.474	−1.628	−1.320	−1.217	−1.264	−1.170	−1.429	−1.549	−1.310
In cohabiting union with 1st birth	−0.427	−0.613	−0.240	−0.404	−0.452	−0.355	−0.340	−0.412	−0.268
In married union with 1st birth	*ref.*			*ref.*			*ref.*		
In cohabiting union, 1st birth out of union	0.003	−0.363	0.370	−0.150	−0.224	−0.077	−0.242	−0.413	−0.070
In married union, 1st birth out of union	0.239	0.105	0.373	0.254	0.181	0.327	0.337	0.100	0.573
In cohabiting union, 1st birth in previous union	0.359	0.057	0.660	0.028	−0.074	0.130	0.120	−0.064	0.303
In married union, 1st birth in previous union	1.138	0.690	1.585	0.811	0.675	0.947	0.294	−0.065	0.653
Age									
15–19 years	0.440	0.261	0.619	0.097	0.009	0.185	−0.126	−0.369	0.118
20–24 years	0.202	0.117	0.287	−0.011	−0.056	0.034	−0.088	−0.204	0.028
25–29 years	*ref.*			*ref.*			*ref.*		
30–34 years	−0.169	−0.247	−0.091	−0.178	−0.226	−0.130	−0.094	−0.208	0.020
35–39 years	−0.570	−0.716	−0.425	−0.675	−0.760	−0.590	−0.437	−0.653	−0.222
40–44 years	−1.879	−2.156	−1.602	−1.975	−2.165	−1.785	−1.861	−2.284	−1.437
45–49 years	−4.004	−5.006	−3.001	−3.980	−4.700	−3.261	−4.260	−6.326	−2.194
Cohort									
1940–1949	0.446	0.316	0.577	0.097	0.013	0.181	0.408	0.204	0.613
1950–1959	*ref.*			*ref.*			*ref.*		
1960–1969	−0.122	−0.260	0.015	−0.137	−0.217	−0.058	0.259	0.070	0.449
1970–1979	−0.151	−0.319	0.018	−0.250	−0.342	−0.158	0.272	0.072	0.473
1980+				−0.349	−0.467	−0.231			
Age spline*cohort[a]									
Age spline 1*cohort 1940–1949	−0.060	−0.279	0.160	0.322	0.197	0.446	0.460	0.160	0.760
Age spline 1*cohort 1960–1969	−0.043	−0.281	0.194	0.269	0.152	0.385	−0.241	−0.555	0.073
Age spline 1*cohort 1970+	−0.353	−0.653	−0.054	0.380	0.255	0.505	−0.302	−0.664	0.061
Age spline 2*cohort 1940–1949	0.825	0.412	1.238	0.299	0.016	0.583	0.800	0.144	1.456
Age spline 2*cohort 1960–1969	−0.493	−0.854	−0.131	−0.168	−0.385	0.049	0.419	−0.106	0.943
Age spline 2*cohort 1970+	−0.948	−1.455	−0.442	−0.360	−0.692	−0.028	−0.571	−1.171	0.028
Duration since 1st birth									
0 years	*ref.*			*ref.*			*ref.*		
1 year	0.517	0.440	0.595	1.072	1.011	1.132	1.059	0.946	1.172
2 years	0.712	0.613	0.811	0.843	0.781	0.905	1.323	1.151	1.496
3 years	0.896	0.770	1.022	0.695	0.626	0.764	1.077	0.906	1.248
4 years	0.761	0.634	0.888	0.266	0.183	0.349	0.765	0.572	0.958
5 years	0.510	0.374	0.647	−0.056	−0.156	0.044	0.553	0.330	0.776
6 years	0.420	0.271	0.569	−0.292	−0.401	−0.184	0.510	0.275	0.745
7 years	0.283	0.118	0.448	−0.472	−0.593	−0.351	0.106	−0.170	0.382
8–9 years	−0.088	−0.260	0.084	−0.753	−0.875	−0.631	−0.148	−0.417	0.121
10–14 years	−0.812	−1.014	−0.611	−1.290	−1.436	−1.145	−0.675	−0.989	−0.361
15–19 years	−1.357	−1.708	−1.006	−1.961	−2.250	−1.672	−1.213	−1.775	−0.651
20 or more years	−1.778	−2.633	−0.923	−2.339	−2.981	−1.697	−0.822	−1.855	0.211
Duration spline*cohort									
Duration spline 1*cohort 1940–1949	−0.095	−0.149	−0.040	−0.102	−0.191	−0.013	−0.241	−0.365	−0.118
Duration spline 1*cohort 1960–1969	0.056	0.000	0.112	0.031	−0.053	0.116	−0.014	−0.128	0.100
Duration spline 1*cohort 1970+	0.115	0.046	0.185	−0.178	−0.274	−0.082	−0.078	−0.199	0.043
Duration spline 2*cohort 1940–1949	0.095	0.019	0.171	0.065	−0.039	0.169	0.299	0.114	0.485
Duration spline 2*cohort 1960–1969	−0.054	−0.128	0.020	0.009	−0.088	0.106	−0.009	−0.181	0.163
Duration spline 2*cohort 1970+	−0.135	−0.239	−0.032	0.347	0.235	0.458	0.138	−0.051	0.327
Duration spline 3*cohort 1940–1949				0.013	−0.049	0.076	−0.121	−0.276	0.034
Duration spline 3*cohort 1960–1969				−0.005	−0.057	0.047	0.083	−0.052	0.218
Duration spline 3*cohort 1970+				−0.121	−0.193	−0.050	−0.001	−0.167	0.165
Country									
Norway							*ref.*		
Sweden							0.109	−0.007	0.224
Country*cohort									
Sweden*cohort 1940–1949							−0.255	−0.418	−0.092
Sweden*cohort 1960–1969							0.169	0.012	0.326
Sweden*cohort 1970+							−0.019	−0.186	0.147
Constant	−2.370	−2.475	−2.264	−1.724	−1.781	−1.668	−2.090	−2.240	−1.941
Subjects			19,232			41,149			7,905
Events			13,481			30,576			6,373
Log likelihood			−25,369.7			−47,829.6			−9,510.25
AIC			50,817.4			95,745.2			19,112.5
BIC			51,123.9			96,111.6			19,431.5
Duration spline nodes (since 1st birth)									
node1			3			1			2
node2			5			5			5

[a]Age spline 1: 15–19 (1), 20–24 (0.5), else 0; age spline 2: 30–34 (−1/4), 35–39 (−1/2), 40–44 (−3/4), 45–49 (−1), else 0

Table A-3: Hazard models for conception leading to a third birth

Third birth	Italy Parameter Estimate	Italy 95% Confidence Interval		Great Britain Parameter Estimate	Great Britain 95% Confidence Interval		Norway/Sweden Parameter Estimate	Norway/Sweden 95% Confidence Interval	
Births*union status									
Not in a union	−0.549	−0.832	−0.266	−0.116	−0.186	−0.047	−0.428	−0.622	−0.234
In union of 1st two births	*ref.*			*ref.*			*ref.*		
In 2nd birth union, 1st out of union	0.187	−0.014	0.388	0.341	0.269	0.413	0.331	0.142	0.520
In 2nd birth union, 1st birth in previous union	0.097	−0.429	0.623	0.328	0.205	0.452	0.493	0.272	0.713
In union, all < current union, 1+ births non-union	0.773	0.214	1.333	1.053	0.939	1.166	0.659	0.332	0.986
In union, all births in previous unions	1.999	1.484	2.513	1.375	1.273	1.477	1.255	1.028	1.482
Age									
15–24 years	1.119	0.905	1.334	0.783	0.679	0.886	−0.331	−0.633	−0.029
25–29 years	0.438	0.306	0.569	0.332	0.266	0.397	−0.129	−0.290	0.031
30–34 years	*ref.*			*ref.*			*ref.*		
35–39 years	−0.601	−0.777	−0.426	−0.636	−0.741	−0.530	−0.703	−0.909	−0.498
40–44 years	−1.660	−1.991	−1.328	−1.738	−1.955	−1.521	−2.316	−2.806	−1.827
45–49 years	−3.923	−5.248	−2.598	−4.043	−4.742	−3.343	−3.960	−5.069	−2.851
Age spline*cohort[a]									
Age spline 1 & cohort 1940–1949	0.352	0.079	0.626	0.463	0.309	0.616	1.031	0.644	1.417
Age spline 1 & cohort 1960–1969	−0.275	−0.597	0.046	0.088	−0.052	0.228	0.970	0.588	1.353
Age spline 1 & cohort 1970+	−0.133	−0.603	0.337	−0.132	−0.300	0.036	0.834	0.370	1.299
Age spline 2 & cohort 1940–1949	0.901	0.271	1.531	0.056	−0.392	0.504	0.588	−0.368	1.545
Age spline 2 & cohort 1960–1969	−0.192	−0.868	0.485	−0.401	−0.775	−0.027	−0.355	−1.107	0.398
Age spline 2 & cohort 1970+	−1.165	−2.636	0.307	−0.535	−1.413	0.344	−1.350	−2.540	−0.160
Cohort									
1940–1949	0.252	0.104	0.400	−0.172	−0.267	−0.077	−0.331	−0.519	−0.143
1950–1959	*ref.*			*ref.*			*ref.*		
1960–1969	0.017	−0.145	0.178	0.026	−0.055	0.108	−0.109	−0.277	0.060
1970+	0.077	−0.172	0.326	0.045	−0.065	0.155	−0.173	−0.377	0.031
Duration since 2nd birth									
0 years									
1 year	0.521	0.383	0.658	0.573	0.514	0.632	0.719	0.559	0.879
2 years	0.510	0.366	0.655	0.346	0.279	0.412	0.691	0.525	0.858
3 years	0.648	0.496	0.799	0.323	0.250	0.395	0.716	0.543	0.889
4 years	0.507	0.344	0.669	−0.086	−0.174	0.001	0.503	0.312	0.695
5 years	0.560	0.388	0.731	−0.202	−0.299	−0.105	0.411	0.203	0.620
6 years	0.345	0.145	0.545	−0.443	−0.560	−0.326	0.210	−0.028	0.447
7 years	0.386	0.179	0.592	−0.522	−0.649	−0.395	0.164	−0.091	0.419
8–9 years	0.309	0.113	0.505	−0.700	−0.816	−0.584	−0.186	−0.432	0.061
10–14 years	−0.079	−0.295	0.137	−1.183	−1.316	−1.050	−0.625	−0.912	−0.338
15–19 years	−0.904	−1.472	−0.336	−2.035	−2.343	−1.727	−1.147	−1.793	−0.501
20 or more years	−15.477	−15.911	−15.043	−2.242	−2.869	−1.615	−1.064	−2.170	0.041
Country									
Norway							*ref.*		
Sweden							−0.157	−0.249	−0.066
Constant	−3.856	−4.015	−3.697	−3.082	−3.160	−3.005	−3.040	−3.225	−2.855
Subjects		13,100			30,107			6,237	
Events		3,753			11,513			2,489	
Log likelihood		−10,989.7			−29,130.6			−6,233.3	
AIC		22,041.5			58,323.1			12,530.6	
BIC		22,272.6			58,577.7			12,744.6	

[a] Age spline 1: 15–24 (1), 25–29 (0.5), else 0; age spline 2: 35–39 (−1/3), 40–44 (−2/3), 45–49 (−1), else 0.

Table A-4: Hazard models for conception leading to a fourth birth

Fourth birth	Italy Parameter estimate	Italy 95% confidence interval		Great Britain Parameter estimate	Great Britain 95% confidence interval		Norway/Sweden Parameter estimate	Norway/Sweden 95% confidence interval	
Births*union status									
Not in a union	−0.719	−1.304	−0.133	0.031	−0.088	0.150	0.138	−0.197	0.472
In union with first 3 births	*ref.*			*ref.*			*ref.*		
In union with 2nd and 3rd birth, 1st before union	0.104	−0.269	0.476	0.084	−0.036	0.204	0.035	−0.271	0.342
In union with 3rd birth, 1st w. births before union	0.877	0.312	1.441	0.402	0.275	0.530	0.685	0.337	1.032
In union, all births before current union	1.101	0.342	1.861	1.316	1.178	1.453	1.531	1.130	1.931
Age									
15–24 years	1.618	1.299	1.938	1.116	0.998	1.234	1.097	0.633	1.562
25–29 years	0.753	0.545	0.961	0.517	0.425	0.608	0.464	0.219	0.708
30–34 years	*ref.*			*ref.*			*ref.*		
35–39 years	−0.557	−0.778	−0.335	−0.651	−0.770	−0.533	−0.549	−0.801	−0.298
40–44 years	−1.875	−2.286	−1.464	−1.716	−1.958	−1.473	−2.622	−3.265	−1.979
45–49 years	−4.044	−5.502	−2.587	−4.217	−5.239	−3.195			
Cohort									
1940–1949	0.344	0.158	0.531	−0.099	−0.196	−0.002	0.075	−0.250	0.400
1950–1959	*ref.*			*ref.*			*ref.*		
1960–1969	0.154	−0.088	0.396	−0.037	−0.128	0.054	0.233	−0.073	0.539
1970+	−0.243	−0.723	0.237	−0.009	−0.125	0.108	−0.043	−0.492	0.406
Duration since 3rd birth									
0 years	*ref.*			*ref.*			*ref.*		
1 years	0.218	−0.053	0.489	0.407	0.302	0.511	0.549	0.241	0.858
2 years	0.505	0.225	0.786	0.033	−0.089	0.156	0.282	−0.058	0.623
3–4 years	0.407	0.138	0.676	−0.116	−0.235	0.003	0.243	−0.076	0.563
5–7 years	0.353	0.061	0.646	−0.487	−0.625	−0.348	−0.138	−0.513	0.238
8–9 years	0.211	−0.180	0.602	−0.808	−1.015	−0.600	−0.366	−0.896	0.165
10–14 years	−0.446	−0.907	0.016	−1.173	−1.405	−0.941	−0.683	−1.343	−0.022
15 or more years	−0.773	−1.780	0.235	−1.533	−1.976	−1.089	−2.166	−3.600	−0.731
Country									
Norway									
Sweden							0.418	0.068	0.768
Country*cohort									
Sweden*cohort 1940–1949							−0.607	−1.139	−0.075
Sweden*cohort 1960–1969							−0.255	−0.740	0.230
Sweden*cohort 1970+							0.578	−0.032	1.189
Constant	−3.949	−4.217	−3.681	−3.088	−3.204	−2.972	−3.721	−4.078	−3.365
Subjects		3,652			11,323			2,440	
Events		840			3,565			542	
Log likelihood		−2,549.3			−9,753.6			−1747.3	
AIC		5,138.5			19,547.3			3,540.7	
BIC		5,261.5			19,692.1			3,672.8	

Table A-5: Hazard models for first union (cohabitation vs. direct marriage, competing risk)

First union	Italy			Great Britain			Norway/Sweden		
	Parameter estimate[a]	95% confidence interval		Parameter estimate	95% confidence interval		Parameter estimate	95% confidence interval	
Cohabiting union									
Births									
Childless	ref.			ref.			ref.		
Pregnant with 1st child	2.223	1.757	2.690	1.350	1.157	1.543	1.512	1.303	1.720
1 child, aged < 1y	2.053	1.701	2.405	0.983	0.902	1.064	0.579	0.365	0.792
1 child, aged 1–3y	0.526	0.226	0.825	0.232	0.136	0.328	−0.061	−0.228	0.106
1 child, aged >3y				−0.135	−0.230	−0.040			
Pregnant with 2nd child	1.941	0.703	3.179	0.627	0.460	0.794	0.037	−0.466	0.540
2 children, youngest aged < 1y	0.559	−0.204	1.321	−0.034	−0.258	0.189	−0.241	−0.822	0.341
2 children, youngest aged 1–3y				−0.506	−0.750	−0.262	−0.910	−1.307	−0.513
2 children, youngest aged >3y				−0.628	−0.838	−0.418			
Pregnant with 3rd child				−0.074	−0.459	0.311	−0.791	−1.937	0.355
3+ children, youngest aged < 1y				−0.586	−1.054	−0.119	−1.464	−2.191	−0.736
3+ children, youngest aged 1–3y				−1.126	−1.646	−0.606			
3+ children, youngest aged >3y				−0.284	−0.568	0.000			
Cohort									
1940–1949	−1.746	−3.045	−0.446	−2.041	−2.450	−1.632	−0.520	−1.153	0.113
1950–1959	ref.			ref.			ref.		
1960–1969	−0.096	−0.869	0.678	1.073	0.915	1.231	0.087	−0.396	0.570
1970–1979	−0.135	−0.877	0.606	1.331	1.183	1.480	−0.183	−0.645	0.279
1980+	0.116	−0.621	0.854	1.460	1.311	1.608	−0.321	−0.789	0.146
Age spline*cohort									
Age Spline 1*cohort 1940–1949	0.235	−0.364	0.835	0.157	0.074	0.241	−0.229	−0.599	0.141
Age Spline 1*cohort 1960–1969	0.341	0.001	0.680	−0.080	−0.114	−0.046	0.067	−0.212	0.346
Age Spline 1*cohort 1970+	0.403	0.080	0.726	−0.097	−0.129	−0.065	0.068	−0.198	0.334
Age Spline 2*cohort 1940–1949	−0.155	−1.039	0.730	−0.078	−0.201	0.045	0.212	−0.285	0.708
Age Spline 2*cohort 1960–1969	−0.676	−1.172	−0.180	0.054	−0.001	0.109	0.042	−0.323	0.408
Age Spline 2*cohort 1970–94	−0.530	−0.993	−0.066	0.103	0.050	0.156	0.167	−0.181	0.516
Age Spline 3*cohort 1940–1949	−0.098	−0.562	0.366	−0.081	−0.158	−0.005	0.112	−0.100	0.324
Age Spline 3*cohort 1960–1969	0.430	0.136	0.724	0.017	−0.025	0.058	−0.116	−0.274	0.042
Age Spline 3*cohort 1970+	0.174	−0.088	0.436	−0.060	−0.112	−0.009	−0.242	−0.390	−0.094
Age Spline 4*cohort 1940–1949	0.038	−0.158	0.234				−0.111	−0.186	−0.035
Age Spline 4*cohort 1960–1969	−0.068	−0.209	0.074				−0.006	−0.070	0.059
Age Spline 4*cohort 1970+	−0.033	−0.176	0.111				0.044	−0.034	0.122
Pregnancy*cohort									
Pregnant*cohort 1940–1949	0.186	−0.680	1.052	0.273	−0.099	0.644	−0.005	−0.323	0.314
Pregnant*cohort 1960–1969	0.461	−0.111	1.033	−0.032	−0.255	0.191	−0.009	−0.310	0.292
Pregnant*cohort 1970–1979	0.298	−0.257	0.854	0.269	0.055	0.484	0.128	−0.222	0.478
Pregnant*cohort 1980+	0.778	0.126	1.430	0.321	0.088	0.554	0.385	−0.159	0.930
Age									
15 years									
16 years	0.172	−0.352	0.696	0.991	0.865	1.117	0.745	0.429	1.061
17 years	0.253	−0.411	0.917	1.581	1.451	1.710	1.451	1.011	1.892
18 years	0.140	−0.733	1.013	2.129	1.987	2.271	1.904	1.497	2.312
19 years	0.479	−0.332	1.290	2.320	2.160	2.481	2.183	1.788	2.579
20 years	0.979	0.217	1.741	2.747	2.566	2.927	2.296	1.903	2.689
21 years	1.061	0.320	1.802	2.930	2.728	3.132	2.310	1.917	2.703
22 years	1.309	0.580	2.038	3.171	2.978	3.364	2.331	1.937	2.726
23 years	1.611	0.895	2.326	3.208	3.020	3.396	2.439	2.041	2.836
24–25 years	1.768	1.061	2.476	3.265	3.083	3.447	2.319	1.920	2.718
26–27 years	1.915	1.174	2.657	3.243	3.058	3.427	2.227	1.812	2.641
28–29 years	2.082	1.359	2.806	3.181	2.995	3.366	1.977	1.556	2.398
30–31 years	2.234	1.514	2.955	3.146	2.953	3.340	2.025	1.590	2.460
32–33 years	2.155	1.421	2.888	2.969	2.761	3.177	1.617	1.147	2.087
34–35 years	1.999	1.237	2.760	2.915	2.690	3.141	1.585	1.077	2.094
36–37 years	1.751	0.954	2.549	2.446	2.183	2.710	1.349	0.792	1.905
38–39 years	1.452	0.573	2.332	2.405	2.118	2.691	1.457	0.865	2.049
40 years and older	1.147	0.335	1.959	2.147	1.897	2.397	0.931	0.381	1.481
Country									
Norway							ref.		
Sweden							0.529	0.413	0.645
Country*cohort									
Sweden*cohort 1940–1949							0.167	−0.024	0.357
Sweden*cohort 1960–1969							−0.419	−0.572	−0.265
Sweden*cohort 1970–1979							−0.461	−0.617	−0.305
Sweden*cohort 1980+							−0.366	−0.543	−0.188
Constant	−6.408	−7.089	−5.728	−6.029	−6.196	−5.861	−4.553	−4.943	−4.163
Direct marriage									
Births									
Childless	ref.			ref.			ref.		
Pregnant with 1st child	3.050	2.966	3.133	2.579	2.511	2.647	3.249	3.055	3.443
1 child, aged < 1y	1.619	1.457	1.781	0.692	0.590	0.795	0.627	0.264	0.989
1 child, aged 1–3y	−0.053	−0.254	0.149	−0.394	−0.537	−0.250	−0.386	−0.729	−0.042
1 child, aged >3y				−0.436	−0.559	−0.313			

Table A-5: (Continued)

First union	Italy Parameter estimate[a]	Italy 95% confidence interval		Great Britain Parameter estimate	Great Britain 95% confidence interval		Norway/Sweden Parameter estimate	Norway/Sweden 95% confidence interval	
Direct marriage									
Births (continued)									
Pregnant with 2nd child	1.761	1.404	2.117	0.924	0.749	1.100	1.535	1.139	1.932
2 children, youngest aged < 1y				−0.094	−0.381	0.193	0.198	−0.559	0.956
2 children, youngest aged 1–3y				−1.194	−1.591	−0.798			
2 children, youngest aged >3y	0.326	−0.026	0.678	−0.434	−0.673	−0.194	−0.141	−0.622	0.340
Pregnant with 3rd child				−0.163	−0.671	0.345	−0.396	−2.373	1.582
3+ children, youngest aged < 1y				−0.367	−0.943	0.209			
3+ children, youngest aged 1–3y				−0.888	−1.533	−0.243			
3+ children, youngest aged >3y				−0.785	−1.257	−0.312	0.044	−0.520	0.609
Cohort									
1940–1949	−0.360	−0.689	−0.032	−0.275	−0.394	−0.157	0.809	−1.262	2.880
1950–1959	*ref.*			*ref.*			*ref.*		
1960–1969	−1.391	−1.761	−1.021	−0.811	−0.941	−0.680	0.101	−2.298	2.501
1970–1979	−1.902	−2.404	−1.399	−1.702	−1.894	−1.509	1.149	−0.862	3.160
1980+	−2.312	−2.816	−1.808	−2.126	−2.321	−1.931	0.960	−1.041	2.961
Age spline*cohort									
Age Spline 1*cohort 1940–1949	0.083	−0.044	0.210	0.098	0.072	0.124	−0.149	−1.230	0.933
Age Spline 1*cohort 1960–1969	0.354	0.212	0.495	−0.001	−0.030	0.027	−0.565	−1.831	0.702
Age Spline 1*cohort 1970+	0.240	0.051	0.428	−0.066	−0.106	−0.026	−1.733	−2.835	−0.631
Age Spline 2*cohort 1940–1949	−0.060	−0.222	0.103	−0.066	−0.111	−0.021	0.026	−1.146	1.197
Age Spline 2*cohort 1960–1969	−0.471	−0.649	−0.294	0.072	0.025	0.119	0.712	−0.718	2.141
Age Spline 2*cohort 1970–94	−0.339	−0.568	−0.109	0.379	0.315	0.443	2.205	0.892	3.518
Age Spline 3*cohort 1940–1949	0.040	−0.039	0.119	−0.052	−0.095	−0.009	0.181	−0.087	0.450
Age Spline 3*cohort 1960–1969	0.217	0.136	0.299	−0.033	−0.077	0.011	−0.111	−0.536	0.313
Age Spline 3*cohort 1970+	0.305	0.209	0.402	−0.261	−0.324	−0.199	−0.346	−0.776	0.084
Age Spline 4*cohort 1940–1949	−0.093	−0.142	−0.044				−0.169	−0.270	−0.069
Age Spline 4*cohort 1960–1969	−0.070	−0.120	−0.021				0.031	−0.100	0.162
Age Spline 4*cohort 1970+	−0.129	−0.191	−0.066				−0.043	−0.199	0.114
Pregnancy*cohort									
Pregnant*cohort 1940–1949	−0.135	−0.260	−0.010	−0.037	−0.135	0.061	−0.124	−0.359	0.110
Pregnant*cohort 1960–1969	0.289	0.167	0.411	−0.320	−0.432	−0.208	−0.652	−1.069	−0.235
Pregnant*cohort 1970–1979	0.226	0.070	0.381	−0.716	−0.900	−0.533	−0.609	−1.201	−0.017
Pregnant*cohort 1980+	0.788	0.462	1.113	−0.727	−1.088	−0.366	−0.181	−1.318	0.957
Age									
15 years	*ref.*			*ref.*			*ref.*		
16 years	0.545	0.289	0.802	1.758	1.529	1.987	2.236	0.715	3.758
17 years	1.276	1.027	1.525	2.549	2.328	2.771	3.896	2.057	5.735
18 years	1.703	1.430	1.977	3.115	2.895	3.335	4.467	2.665	6.269
19 years	2.111	1.846	2.376	3.452	3.231	3.674	4.842	3.046	6.638
20 years	2.531	2.272	2.790	3.881	3.657	4.104	5.162	3.369	6.955
21 years	2.741	2.484	2.999	3.901	3.673	4.129	5.393	3.600	7.186
22 years	2.779	2.523	3.035	3.895	3.668	4.123	5.320	3.524	7.115
23 years	2.946	2.690	3.202	3.789	3.562	4.016	5.328	3.529	7.126
24–25 years	2.862	2.607	3.117	3.644	3.418	3.870	5.151	3.353	6.949
26–27 years	2.751	2.486	3.015	3.263	3.031	3.495	4.727	2.917	6.537
28–29 years	2.482	2.218	2.746	2.955	2.718	3.191	4.415	2.596	6.234
30–31 years	2.264	1.994	2.534	2.802	2.557	3.047	4.505	2.677	6.334
32–33 years	2.071	1.788	2.354	2.567	2.308	2.827	4.219	2.369	6.069
34–35 years	1.780	1.476	2.083	2.051	1.757	2.344	4.719	2.867	6.571
36–37 years	1.361	1.012	1.711	1.914	1.593	2.234	3.716	1.759	5.673
38–39 years	0.850	0.427	1.274	1.702	1.331	2.073	3.941	1.979	5.903
40 years and older	0.498	0.131	0.864	1.207	0.881	1.533	4.248	2.376	6.120
Country									
Norway							*ref.*		
Sweden							−0.871	−1.125	−0.617
Country*cohort									
Sweden*cohort 1940–1949							0.503	0.209	0.797
Sweden*cohort 1960–1969							0.450	0.069	0.831
Sweden*cohort 1970–1979							0.778	0.350	1.205
Sweden*cohort 1980+							0.720	0.151	1.289
Constant	−4.732	−4.979	−4.484	−5.732	−5.951	−5.513	−8.128	−9.918	−6.338
Subjects	30,255			61,229			11,034		
Cohabitations	2,593			24,650			7,377		
Marriage	19,601			25,893			2,185		
Log likelihood	−26,946.7			−72,310.8			−13085.4		
AIC	54,065.5			144,809.5			26,374.7		
BIC	54,840.3			145,717.9			27,189.7		
Age spline nodes (since age 15)									
node1	3			6			2		
node2	6			11			4		
node3	11			11			11		

[a] Two and 3+ children combined

Table A-6:   Hazard models for end of first cohabitation (marriage vs. separation, competing risk)

End of first cohabitation	Italy Parameter estimate	Italy 95% confidence interval		Great Britain Parameter estimate	Great Britain 95% confidence interval		Norway/Sweden Parameter estimate	Norway/Sweden 95% confidence interval	
Marriage									
Births*union status									
Childless	ref.			ref.			ref.		
No shared births with partner	−0.417	−0.804	−0.031	−0.389	−0.482	−0.296	−0.303	−0.517	−0.089
One or more shared births with partner	−0.785	−1.529	−0.041	−0.544	−0.682	−0.405	0.010	−0.269	0.288
All births shared with partner	−0.187	−0.490	0.115	−0.510	−0.608	−0.413	−0.064	−0.232	0.104
Pregnancy									
Not pregnant	ref.			ref.			ref.		
Pregnant	1.113	0.741	1.485	1.040	0.907	1.173	1.316	1.160	1.472
Presence of young child									
No young child	ref.			ref.			ref.		
Child aged < 3 years	−0.252	−0.783	0.280	−0.003	−0.180	0.173	0.321	0.108	0.533
Age									
15–19 years	0.661	0.213	1.109	−0.066	−0.213	0.080	−0.087	−0.309	0.136
20–24 years	0.335	0.069	0.601	0.029	−0.052	0.110	0.171	0.031	0.312
25–29 years	ref.			ref.			ref.		
30–34 years	−0.121	−0.408	0.165	−0.177	−0.271	−0.083	−0.289	−0.467	−0.110
35–39 years	−0.435	−0.917	0.047	−0.474	−0.641	−0.308	−0.461	−0.783	−0.140
40–44 years	−0.814	−1.527	−0.101	−0.814	−1.062	−0.566	−0.813	−1.304	−0.322
45–49 years	−1.000	−1.839	−0.160	−0.728	−1.075	−0.381	−1.255	−1.904	−0.606
Cohort									
1940–1949	−0.023	−0.690	0.643	0.221	0.022	0.421	0.732	0.449	1.015
1950–1959	ref.			ref.			ref.		
1960–1969	−0.055	−0.483	0.373	−0.450	−0.559	−0.342	−0.745	−1.011	−0.478
1970–1979	−0.247	−0.648	0.155	−0.895	−1.009	−0.780	−0.923	−1.217	−0.630
1980+	−0.256	−0.725	0.212	−1.206	−1.350	−1.063	−1.654	−2.120	−1.188
Age spline*cohort[a]									
Age spline 1*cohort 1940–1949	0.347	−0.628	1.322	0.102	−0.242	0.445	−0.165	−0.509	0.180
Age spline 1*cohort 1960–1969	−0.389	−0.978	0.199	−0.157	−0.332	0.017	−0.491	−0.848	−0.133
Age spline 1*cohort 1970+	−0.869	−1.416	−0.323	−0.936	−1.120	−0.752	−1.334	−1.740	−0.927
Age spline 2*cohort 1940–1949	−0.217	−1.684	1.250	0.376	−0.217	0.968	−0.336	−1.125	0.453
Age spline 2*cohort 1960–1969	−0.414	−1.472	0.645	−0.564	−0.923	−0.204	−0.197	−0.969	0.574
Age spline 2*cohort 1970+	−0.781	−2.089	0.527	−1.058	−1.580	−0.537	−0.456	−1.471	0.560
Pregnancy*cohort									
Pregnant*cohort 1940–1949	−0.892	−1.729	−0.056	−0.048	−0.320	0.224	0.011	−0.233	0.255
Pregnant*cohort 1960–1969	0.071	−0.388	0.530	−0.390	−0.551	−0.228	−0.663	−0.900	−0.427
Pregnant*cohort 1970–1979	−0.272	−0.740	0.196	−0.529	−0.703	−0.356	−1.040	−1.343	−0.737
Pregnant*cohort 1980+	−0.078	−0.737	0.581	−0.891	−1.178	−0.603	−0.633	−1.203	−0.063
Presence of young child*cohort									
Child aged < 3 years*cohort 1940–1949	0.457	−0.401	1.315	0.094	−0.216	0.404	−0.316	−0.626	−0.006
Child aged < 3 years*cohort 1960–1969	0.306	−0.246	0.858	0.143	−0.039	0.325	0.069	−0.160	0.298
Child aged < 3 years*cohort 1970–1979	0.589	0.057	1.121	0.235	0.052	0.418	−0.044	−0.299	0.211
Child aged < 3 years*cohort 1980+	0.348	−0.410	1.106	0.469	0.232	0.707	0.221	−0.251	0.693
Union duration									
0 years	ref.			ref.			ref.		
1 year	−0.225	−0.483	0.033	0.227	0.169	0.285	0.005	−0.127	0.136
2 years	−0.603	−1.040	−0.166	0.045	−0.036	0.126	−0.176	−0.375	0.022
3 years	−0.641	−1.074	−0.208	−0.368	−0.479	−0.258	−0.322	−0.524	−0.120
4–5 years	−0.500	−0.919	−0.082	−0.691	−0.827	−0.555	−0.365	−0.563	−0.168
6–8 years				−1.103	−1.268	−0.937	−0.590	−0.848	−0.332
8–9 years	−0.734	−1.190	−0.278	−1.236	−1.427	−1.045	−0.779	−1.106	−0.453
10–11 years				−1.406	−1.653	−1.159	−0.821	−1.173	−0.468
12–14 years	−0.031	−0.615	0.553	−1.520	−1.823	−1.217	−1.047	−1.477	−0.617
15 or more years	−0.165	−1.061	0.732	−1.390	−1.731	−1.049	−0.959	−1.513	−0.405
Duration spline*cohort									
Duration spline 1*cohort 1940–1949	−0.144	−0.537	0.249	−0.033	−0.116	0.050	−0.170	−0.321	−0.019
Duration spline 1*cohort 1960–1969	0.286	0.028	0.543	0.124	0.086	0.162	0.280	0.140	0.421
Duration spline 1*cohort 1970+	0.498	0.248	0.748	0.290	0.251	0.330	0.215	0.056	0.373
Duration spline 2*cohort 1940–1949	0.107	−0.346	0.560	0.132	−0.008	0.271	0.078	−0.138	0.294
Duration spline 2*cohort 1960–1969	−0.420	−0.728	−0.113	−0.151	−0.218	−0.083	−0.322	−0.500	−0.144
Duration spline 2*cohort 1970+	−0.694	−1.013	−0.375	−0.377	−0.455	−0.299	−0.123	−0.320	0.075
Duration spline 3*cohort 1940–1949							0.135	−0.062	0.333
Duration spline 3*cohort 1960–1969							0.084	−0.058	0.226
Duration spline 3*cohort 1970+							−0.114	−0.285	0.056
Country									
Norway							ref.		
Sweden							−0.688	−0.829	−0.547
Country*cohort									
Sweden*cohort 1940–1949							0.185	−0.030	0.401
Sweden*cohort 1960–1969							0.297	0.106	0.488
Sweden*cohort 1970–1979							0.388	0.168	0.609
Sweden*cohort 1980+							0.909	0.478	1.340
Constant	−1.733	−2.083	(0.178)	−1.241	−1.334	−1.148	−1.473	−1.660	−1.287

Table A-6: (Continued)

	Italy			Great Britain			Norway/Sweden		
	Parameter estimate	95% confidence interval		Parameter estimate	95% confidence interval		Parameter estimate	95% confidence interval	
End of first cohabitation									
Separation									
Births*union status									
Childless	ref.			ref.			ref.		
No shared births with partner	−0.446	−1.014	(0.290)	0.035	−0.069	0.140	0.327	0.051	0.604
One or more shared births with partner	−1.779	−3.162	(0.705)	−0.154	−0.307	−0.002	−0.240	−0.687	0.207
All births shared with partner	−0.482	−0.896	(0.211)	−0.132	−0.237	−0.027	−0.270	−0.484	−0.056
Pregnancy									
Not pregnant	ref.			ref.			ref.		
Pregnant	−0.887	−1.403	(0.263)	−0.483	−0.593	−0.372	−1.848	−2.219	−1.476
Presence of young child									
No young child	ref.			ref.			ref.		
Child aged < 3 years	0.277	−0.496	(0.394)	−0.371	−0.675	−0.068	−0.228	−0.581	0.126
Age									
15–19 years	−0.477	−1.636	(0.592)	0.106	−0.187	0.400	−0.080	−0.483	0.322
20–24 years	−0.185	−0.756	(0.291)	0.136	−0.015	0.286	0.010	−0.203	0.223
25–29 years	ref.			ref.			ref.		
30–34 years	0.019	−0.359	(0.193)	−0.055	−0.191	0.080	0.007	−0.231	0.245
35–39 years	0.188	−0.363	(0.281)	−0.157	−0.376	0.061	−0.413	−0.789	−0.037
40–44 years	−0.055	−0.809	(0.385)	−0.167	−0.448	0.115	−0.326	−0.817	0.165
45–49 years	0.275	−0.544	(0.418)	−0.462	−0.885	−0.040	−0.259	−0.898	0.380
Cohort									
1940–1949	−0.318	−1.193	(0.446)	0.399	0.116	0.682	−0.437	−0.842	−0.031
1950–1959	ref.			ref.			ref.		
1960–1969	0.251	−0.226	(0.243)	0.281	0.132	0.431	0.297	0.054	0.539
1970–1979	0.288	−0.177	(0.237)	0.359	0.209	0.509	0.419	0.183	0.655
1980+	0.072	−0.504	(0.294)	0.624	0.460	0.787	0.633	0.377	0.888
Age spline*cohort[a]									
Age spline 1*cohort 1940–1949	−0.731	−3.948	(1.642)	−1.716	−2.611	−0.821	−0.650	−1.499	0.198
Age spline 1*cohort 1960–1969	−0.394	−1.700	(0.666)	−0.236	−0.554	0.082	0.192	−0.281	0.664
Age spline 1*cohort 1970+	0.891	−0.322	(0.619)	0.397	0.090	0.705	0.723	0.284	1.162
Age spline 2*cohort 1940–1949	−0.006	−1.549	(0.787)	0.533	−0.142	1.207	−0.160	−1.016	0.696
Age spline 2*cohort 1960–1969	0.170	−1.020	(0.607)	0.129	−0.296	0.554	0.315	−0.391	1.021
Age spline 2*cohort 1970+	0.768	−1.052	(0.929)	−0.262	−0.928	0.403	1.514	0.275	2.753
Presence of young child*cohort									
Child aged < 3 years*cohort 1940–1949	−0.261	−1.726	(0.747)	−0.038	−0.675	0.599	0.239	−0.445	0.924
Child aged < 3 years*cohort 1960–1969	−0.897	−1.861	(0.492)	0.190	−0.126	0.506	−0.423	−0.817	−0.029
Child aged < 3 years*cohort 1970–1979	−0.454	−1.313	(0.438)	0.219	−0.090	0.527	−0.162	−0.549	0.224
Child aged < 3 years*cohort 1980+	−0.589	−1.833	(0.635)	0.441	0.119	0.762	−0.500	−1.041	0.041
Union duration									
0 years	ref.			ref.			ref.		
1 year	−0.141	−0.436	0.153	0.022	−0.049	0.092	0.464	0.330	0.598
2 years	0.138	−0.171	0.447	0.083	0.004	0.162	0.549	0.402	0.696
3 years	0.167	−0.182	0.515	0.081	−0.009	0.171	0.758	0.602	0.915
4–5 years	0.231	−0.083	0.545	0.057	−0.031	0.146	0.502	0.338	0.666
6–8 years				0.065	−0.047	0.177	0.492	0.281	0.703
8–9 years	−0.497	−0.926	−0.067	0.063	−0.078	0.205	0.436	0.167	0.704
10–11 years				0.025	−0.156	0.206	0.266	−0.076	0.608
12–14 years	−0.324	−0.886	0.238	−0.064	−0.258	0.131	0.178	−0.210	0.566
15 or more years	−0.420	−1.202	0.363	−0.166	−0.394	0.061	0.098	−0.307	0.504
Country									
Norway							ref.		
Sweden							0.072	−0.014	0.158
Constant	−2.739	−3.184	−2.295	−2.861	−3.005	−2.717	−3.192	−3.431	−2.953
Subjects	2,593			24,650			7,377		
Marriages	1,378			12,795			3,722		
Separations	596			7,430			2,452		
Log likelihood	−5,059.1			−44,147.8			−13,410.4		
AIC	10,270.3			88,455.6			26,998.7		
BIC	10,772.4			89,155.1			27,671.3		
Union duration spline nodes									
node1	2			5			2		
node2							8		

[a]Age spline 1: 15–19 (1), 20–24 (0.5), else 0; age spline 2: 30–34 (−1/4), 35–39 (−1/2), 40–44 (−3/4), 45–49 (−1), else 0.

Table A-7: Hazard models for separation of first marriage

Separation of first marriage	Italy Parameter estimate	Italy 95% confidence interval		Great Britan Parameter estimate	Great Britan 95% confidence interval		Norway/Sweden Parameter estimate	Norway/Sweden 95% confidence interval	
Births*union status									
Childless (ref)									
No shared births with partner	0.454	0.080	0.827	0.707	0.569	0.845	0.422	−0.016	0.860
1 birth in current union	−0.610	−0.788	−0.433	−0.052	−0.122	0.019	−0.002	−0.205	0.201
2 births in current union	−1.115	−1.325	−0.906	−0.250	−0.321	−0.179	−0.445	−0.650	−0.239
2 births, 1 in current union	−0.661	−1.225	−0.098	0.382	0.253	0.512	0.003	−0.342	0.349
3+ births in current union	−1.250	−1.547	−0.954	−0.161	−0.246	−0.077	−0.583	−0.825	−0.341
3+ births, 1 or 2 births out of union	−0.605	−1.267	0.058	0.391	0.256	0.526	0.247	−0.105	0.599
Pregnancy									
Not pregnant									
Pregnant	−0.503	−0.725	−0.280	−0.942	−1.045	−0.839	−1.589	−1.999	−1.180
Presence of young child									
No young child									
Child aged < 3 years	0.142	−0.121	0.405	−0.499	−0.591	−0.407	−0.680	−0.852	−0.507
Age									
15–19 years	0.123	−0.437	0.684	1.011	0.823	1.199	0.825	0.065	1.586
20–24 years	0.201	−0.083	0.486	0.461	0.367	0.554	0.620	0.319	0.920
25–29 years									
30–34 years	0.121	−0.080	0.322	−0.277	−0.348	−0.206	−0.298	−0.500	−0.096
35–39 years	0.231	−0.053	0.514	−0.593	−0.696	−0.491	−0.405	−0.668	−0.142
40–44 years	0.173	−0.182	0.528	−0.839	−0.967	−0.712	−0.615	−0.940	−0.290
45–49 years	0.057	−0.343	0.457	−1.152	−1.307	−0.998	−0.876	−1.252	−0.500
Cohort									
1940–1949	0.044	−0.694	0.783	−0.090	−0.281	0.102	−0.114	−0.376	0.148
1950–1959									
1960–1969	0.381	−0.125	0.888	0.276	0.159	0.392	0.330	0.072	0.588
1970–1979	0.424	−0.142	0.990	0.372	0.228	0.516	0.532	0.177	0.888
1980+	0.208	−0.943	1.360	0.328	0.017	0.640	0.529	−0.118	1.176
Direct marriage									
Premarital cohabitation									
Direct marriage	−0.974	−1.324	−0.623	−0.352	−0.435	−0.269	−0.562	−0.762	−0.362
Age spline*cohort[a]									
Age spline 1*cohort 1940–1949	−0.603	−1.569	0.363	−0.354	−0.629	−0.079	−0.142	−0.902	0.619
Age spline 1*cohort 1960–1969	−0.353	−1.017	0.311	0.147	−0.067	0.360	−0.218	−1.021	0.585
Age spline 1*cohort 1970+	0.193	−0.520	0.907	0.063	−0.221	0.347	0.386	−0.666	1.438
Age spline 2*cohort 1940–1949	0.279	−0.289	0.847	−0.045	−0.231	0.140	0.045	−0.356	0.447
Age spline 2*cohort 1960–1969	0.721	0.187	1.254	0.128	−0.075	0.332	0.381	−0.116	0.878
Age spline 2*cohort 1970+	0.842	−0.258	1.942	0.026	−0.460	0.513	1.672	0.315	3.029
Presence of young child*cohort									
Child aged < 3 years*cohort 1940–1949	−0.034	−0.497	0.430	−0.089	−0.237	0.060			
Child aged < 3 years*cohort 1960–1969	−0.263	−0.596	0.071	0.010	−0.105	0.125			
Child aged < 3 years*cohort 1970–1979	−0.576	−0.984	−0.168	0.046	−0.105	0.197			
Child aged < 3 years*cohort 1980+	−0.156	−0.984	0.672	0.138	−0.247	0.522			
Direct marriage*cohort									
Direct marriage*cohort 1940–1949	−0.669	−1.345	0.006	−0.141	−0.320	0.039	−0.098	−0.370	0.174
Direct marriage*cohort 1960–1969	0.215	−0.240	0.671	0.086	−0.021	0.194	0.031	−0.310	0.373
Direct marriage*cohort 1970–1979	0.569	0.051	1.087	0.003	−0.148	0.154	−0.118	−0.634	0.398
Direct marriage*cohort 1980+	0.950	−0.175	2.076	−0.071	−0.452	0.311	−2.519	−4.596	−0.443
Marriage duration									
0 years									
1 year	−0.386	−0.643	−0.129	0.451	0.338	0.564	0.454	0.103	0.805
2 years	−0.208	−0.475	0.059	0.735	0.619	0.850	0.874	0.524	1.224
3 years	−0.170	−0.467	0.127	0.980	0.862	1.097	1.011	0.644	1.378
4–5 years	0.065	−0.188	0.318	1.128	1.016	1.240	1.101	0.752	1.450
6–8 years	0.147	−0.117	0.411	1.192	1.074	1.310	1.179	0.807	1.550
10–14 years	0.046	−0.265	0.357	1.204	1.073	1.335	1.118	0.713	1.522
15 or more years	0.155	−0.206	0.515	1.340	1.193	1.487	1.538	1.104	1.972
Country									
Norway									
Sweden								0.029	−0.086	0.145
Constant	−3.838	−4.278	−3.399	−4.391	−4.524	−4.258	−4.266	−4.624	−3.908
Subjects		20,979			38,688			5,907	
Events		1,839			11,201			1,586	
Log likelihood		−8,396.5			−29,173.8			−4,666.2	
AIC		16,875.1			58,429.5			9,408.5	
BIC		17,201.3			58,776.5			9,661.2	

[a]Age spline 1: 15–19 (1), 20–24 (0.5), else 0; age spline 2: 30–34 (−1/4), 35–39 (−1/2), 40–44 (−3/4), 45–49 (−1), else 0.

Table A-8:   Hazard models for higher-order union (cohabitation vs. direct marriage, competing risk)

	Italy			Great Britain			Norway/Sweden		
Higher-order union	Parameter estimate	95% confidence interval		Parameter estimate	95% confidence interval		Parameter estimate	95% confidence interval	
Cohabitation									
Births									
Childless (ref)	*ref.*			*ref.*			*ref.*		
1 birth	−0.389	−0.584	−0.194	−0.373	−0.426	−0.319	−0.383	−0.490	−0.276
2 births	−0.741	−1.004	−0.478	−0.225	−0.279	−0.171	−0.170	−0.294	−0.046
3+ births	−0.886	−1.311	−0.461	−0.396	−0.464	−0.328	−0.258	−0.427	−0.089
Pregnancy									
Not pregnant	*ref.*			*ref.*			*ref.*		
Pregnant	1.481	1.141	1.821	0.694	0.604	0.785	1.301	1.118	1.485
Presence of young child									
No young child	*ref.*			*ref.*			*ref.*		
Child aged < 3 years	−0.359	−0.709	−0.010	−0.186	−0.253	−0.119	−0.250	−0.425	−0.076
Age									
15–24 years	0.103	−0.212	0.418	0.056	−0.006	0.118	0.430	0.303	0.557
25–29 years	0.326	0.103	0.549	0.163	0.109	0.217	0.373	0.258	0.487
30–34 years	*ref.*			*ref.*			*ref.*		
35–39 years	−0.293	−0.540	−0.047	−0.240	−0.303	−0.176	−0.240	−0.382	−0.098
40–44 years	−0.475	−0.787	−0.163	−0.481	−0.558	−0.403	−0.418	−0.581	−0.254
45–49 years	−0.849	−1.267	−0.431	−0.744	−0.845	−0.643	−0.935	−1.141	−0.729
Cohort									
1940–1949	−0.157	−0.445	0.131	−0.157	−0.226	−0.087	−0.122	−0.257	0.012
1950–1959	*ref.*			*ref.*			*ref.*		
1960–1969	0.212	0.006	0.418	0.077	0.029	0.126	0.175	0.067	0.282
1970+	0.527	0.290	0.765	0.106	0.051	0.161	0.236	0.127	0.345
Union rank									
One previous union	*ref.*			*ref.*			*ref.*		
Two previous unions	0.411	0.084	0.739	0.069	0.018	0.119	0.077	−0.032	0.187
Duration since end of previous union									
0 years	*ref.*			*ref.*			*ref.*		
1 year	−0.333	−0.621	−0.045	−0.376	−0.430	−0.323	0.108	0.002	0.214
2–3 years	−0.002	−0.241	0.236	−0.506	−0.558	−0.455	0.130	0.025	0.235
4–5 years	−0.126	−0.398	0.146	−0.717	−0.783	−0.650	−0.048	−0.183	0.087
6–9 years	−0.328	−0.622	−0.035	−0.923	−0.996	−0.850	−0.270	−0.423	−0.117
10–14 years	−0.422	−0.786	−0.059	−1.137	−1.246	−1.027	−0.351	−0.564	−0.137
15 or more years	−0.475	−0.995	0.045	−1.269	−1.443	−1.096	−0.344	−0.676	−0.012
Country									
Norway							*ref.*		
Sweden							0.189	0.115	0.264
Constant	−2.873	−3.158	−2.588	−1.349	−1.414	−1.284	−2.025	−2.181	−1.870
Direct marriage									
Births									
Childless	*ref.*			*ref.*			*ref.*		
Children	−0.686	−1.072	−0.300	−0.120	−0.231	−0.009	−0.019	−0.493	0.454
Pregnancy									
Not pregnant	*ref.*			*ref.*			*ref.*		
Pregnant	2.464	1.905	3.023	1.610	1.423	1.797	2.120	1.549	2.691
Presence of young child									
No young child	*ref.*			*ref.*			*ref.*		
Child aged < 3 years	0.362	−0.393	1.117	−0.034	−0.209	0.142	−0.290	−1.147	0.567
Age									
15–24 years	0.103	−0.580	0.787	0.419	0.239	0.599	−0.252	−1.019	0.515
25–29 years	−0.121	−0.680	0.439	0.410	0.270	0.549	0.250	−0.277	0.777
30–34 years	*ref.*			*ref.*			*ref.*		
35–39 years	−0.414	−0.904	0.076	−0.444	−0.603	−0.286	0.303	−0.224	0.829
40–44 years	−0.862	−1.423	−0.301	−0.820	−1.012	−0.629	−0.443	−1.058	0.172
45–49 years	−2.312	−3.207	−1.416	−1.249	−1.475	−1.022	−1.258	−2.114	−0.401
Cohort									
1940–1949	−0.274	−0.828	0.280	0.607	0.488	0.725	0.409	−0.055	0.874
1950–1959	*ref.*			*ref.*			*ref.*		
1960–1969	−0.204	−0.626	0.218	−0.652	−0.783	−0.522	−0.225	−0.722	0.271
1970+	−0.018	−0.565	0.529	−1.524	−1.724	−1.324	−0.500	−1.098	0.097
Union rank									
One previous union	*ref.*			*ref.*			*ref.*		
Two previous unions	−0.149	−1.024	0.726	−0.222	−0.387	−0.058	−0.067	−0.585	0.451
Duration since end of previous union									
0 years	*ref.*			*ref.*			*ref.*		
1 year	2.005	1.042	2.968	0.854	0.661	1.046	0.024	−0.621	0.669
2–3 years	2.067	1.163	2.971	1.022	0.841	1.203	0.346	−0.221	0.914
4–5 years	2.124	1.199	3.048	1.081	0.882	1.281	0.139	−0.513	0.791
6–9 years	2.378	1.467	3.288	1.011	0.805	1.217	0.346	−0.321	1.012
10–14 years	2.382	1.393	3.371	0.795	0.535	1.055	−0.471	−1.429	0.486
15 or more years	2.638	1.505	3.772	0.488	0.094	0.881	0.056	−0.988	1.100

Table A-8:   (Continued)

Higher-order union	Italy			Great Britain			Norway/Sweden		
	Parameter estimate	95% confidence interval		Parameter estimate	95% confidence interval		Parameter estimate	95% confidence interval	
Country									
Norway							*ref.*		
Sweden							−0.014	−0.371	0.343
Constant	−6.091	−7.035	−5.147	−4.437	−4.643	−4.232	−5.052	−5.717	−4.387
Subjects		3,166			19,549			4,167	
Cohabitations		794			12,553			3,334	
Marriages		177			1,822			151	
Log likelihood		−3,496.7			−40,050.2			−7,840.3	
AIC		7,073.5			80,180.3			15,764.5	
BIC		7,347.5			80,526.9			16,068.4	

Table A-9:   Hazard models for end of higher-order cohabiting union (marriage vs. separation, competing risk)

End of higher-order cohabitation	Italy			Great Britain			Norway/Sweden		
	Parameter estimate	95% confidence interval		Parameter estimate	95% confidence interval		Parameter estimate	95% confidence interval	
Marriage									
Births*union status									
Childless	*ref.*			*ref.*			*ref.*		
No shared births with partner	−0.175	−0.513	0.164	−0.050	−0.113	0.012	−0.149	−0.313	0.015
One or more shared births with partner	−0.374	−0.943	0.194	−0.168	−0.303	−0.033	−0.034	−0.304	0.237
All births shared with partner	−0.128	−0.630	0.374	−0.212	−0.355	−0.069	0.016	−0.239	0.271
Pregnancy									
Not pregnant	*ref.*			*ref.*			*ref.*		
Pregnant	0.545	−0.400	1.490	0.996	0.838	1.153	0.941	0.610	1.273
Presence of young child									
No young child	*ref.*			*ref.*			*ref.*		
Child aged < 3 years	0.057	−0.442	0.556	0.032	−0.077	0.142	0.218	0.002	0.434
Age									
15–24 years	0.154	−0.567	0.876	−0.348	−0.452	−0.244	−0.399	−0.640	−0.159
25–29 years	−0.109	−0.558	0.339	0.047	−0.025	0.119	0.063	−0.091	0.218
30–34 years	*ref.*			*ref.*			*ref.*		
35–39 years	−0.190	−0.579	0.198	−0.168	−0.250	−0.086	−0.164	−0.348	0.020
40–44 years	−0.477	−0.938	−0.017	−0.259	−0.356	−0.161	−0.525	−0.762	−0.289
45–49 years	−0.707	−1.343	−0.071	−0.272	−0.393	−0.151	−0.605	−0.900	−0.310
Cohort									
1940–1949	−0.238	−0.682	0.206	0.151	0.059	0.242	0.299	0.081	0.517
1950–1959	*ref.*			*ref.*			*ref.*		
1960–1969	0.131	−0.220	0.481	−0.176	−0.249	−0.103	−0.093	−0.267	0.080
1970+	−0.072	−0.529	0.386	−0.376	−0.469	−0.282	−0.382	−0.581	−0.184
Pregancy*cohort									
Pregnant*cohort 1940–1949	0.530	−1.067	2.127	−0.203	−0.504	0.099	0.524	−0.035	1.082
Pregnant*cohort 1960–1969	0.027	−1.173	1.227	−0.373	−0.579	−0.168	−0.763	−1.213	−0.313
Pregnant*cohort 1970+	0.412	−0.868	1.692	−0.776	−1.022	−0.529	−0.603	−1.066	−0.140
Union rank									
One previous union	*ref.*			*ref.*			*ref.*		
Two previous unions	−0.028	−0.542	0.487	−0.142	−0.219	−0.064	−0.063	−0.235	0.110
Union duration									
0 years									
1 year	0.157	−0.351	0.666	0.259	0.189	0.329	0.145	−0.030	0.321
2–3 years	0.342	−0.149	0.833	0.040	−0.033	0.113	0.059	−0.115	0.232
4–5 years	0.416	−0.101	0.934	−0.295	−0.393	−0.197	−0.239	−0.456	−0.023
6–9 years	0.589	0.052	1.126	−0.621	−0.739	−0.504	−0.468	−0.714	−0.221
10–14 years	0.751	0.035	1.466	−1.040	−1.240	−0.840	−0.916	−1.280	−0.552
15 or more years	0.545	−0.681	1.771	−1.297	−1.648	−0.947	−0.592	−1.071	−0.112
Country									
Norway							*ref.*		
Sweden							−0.225	−0.344	−0.107
Constant	−2.732	−3.249	−2.214	−1.603	−1.693	−1.513	−2.046	−2.275	−1.817
Separation									
Births*union status									
Childless	*ref.*			*ref.*			*ref.*		
No shared births with partner	−0.587	−0.978	−0.195	−0.123	−0.216	−0.030	−0.213	−0.405	−0.021
One or more shared births with partner	−1.018	−1.793	−0.243	0.054	−0.111	0.220	−0.345	−0.664	−0.026
All births shared with partner	−1.078	−1.831	−0.324	−0.217	−0.401	−0.033	−0.658	−0.980	−0.337
Pregnancy									
Not pregnant	*ref.*			*ref.*			*ref.*		
Pregnant	−1.725	−3.248	−0.201	−0.586	−0.774	−0.397	−1.923	−2.531	−1.315
Presence of young child									
No young child	*ref.*			*ref.*			*ref.*		
Child aged < 3 years	−0.338	−1.147	0.470	−0.282	−0.425	−0.139	−0.530	−0.846	−0.214

Table A-9:   (Continued)

End of higher-order cohabitation	Italy			Great Britain			Norway/Sweden		
	Parameter estimate	95% confidence interval		Parameter estimate	95% confidence interval		Parameter estimate	95% confidence interval	
Age									
15–24 years	0.159	–0.617	0.935	0.358	0.233	0.484	0.314	0.048	0.580
25–29 years	0.246	–0.238	0.730	0.064	–0.042	0.169	0.070	–0.146	0.285
30–34 years	*ref.*			*ref.*			*ref.*		
35–39 years	–0.044	–0.494	0.406	0.037	–0.086	0.160	0.004	–0.236	0.245
40–44 years	–0.788	–1.448	–0.129	–0.029	–0.183	0.124	–0.242	–0.525	0.042
45–49 years	–0.520	–1.206	0.166	–0.030	–0.226	0.165	–0.505	–0.879	–0.132
Cohort									
1940–1949	–0.227	–0.786	0.331	–0.300	–0.484	–0.117	–0.021	–0.318	0.276
1950–1959	*ref.*			*ref.*			*ref.*		
1960–1969	0.254	–0.194	0.702	0.477	0.367	0.586	0.470	0.247	0.694
1970+	0.215	–0.286	0.715	0.856	0.731	0.982	0.601	0.352	0.849
Union rank									
One previous union	*ref.*			*ref.*			*ref.*		
Two previous unions	0.294	–0.308	0.896	0.175	0.073	0.276	0.131	–0.078	0.339
Union duration									
0 years	*ref.*			*ref.*			*ref.*		
1 year	–0.209	–0.757	0.340	0.120	0.016	0.224	0.509	0.252	0.766
2–3 years	0.227	–0.264	0.718	–0.007	–0.115	0.101	0.866	0.624	1.107
4–5 years	0.033	–0.532	0.597	–0.081	–0.218	0.056	0.801	0.509	1.092
6–9 years	0.464	–0.133	1.062	0.016	–0.135	0.167	0.801	0.486	1.115
10–14 years	0.362	–0.446	1.170	–0.329	–0.561	–0.097	0.407	–0.012	0.826
15 or more years	–0.067	–1.646	1.511	–0.440	–0.826	–0.053	0.534	–0.049	1.117
Country									
Norway							*ref.*		
Sweden							–0.004	–0.148	0.140
Constant	–2.660	–3.246	–2.074	–3.015	–3.158	–2.872	–3.509	–3.845	–3.174
Subjects			743			10,857			2,816
Marriages			263			6,390			716
Separations			182			3,114			396
Log likelihood			–1,292.5			–21,769.0			–2,841.4
AIC			2,674.9			43,628.0			5,772.8
BIC			2,920.5			43,990.6			6,048.3

Table A-10: Hazard models for separation of higher-order marriage

Separation of higher-order marriage	Italy Parameter estimate	Italy 95% confidence interval		Great Britain Parameter estimate	Great Britain 95% confidence interval		Norway/Sweden Parameter estimate	Norway/Sweden 95% confidence interval	
Births*union status									
Childless	*ref.*			*ref.*			*ref.*		
No shared births with partner				0.307	0.156	0.458	0.386	−0.055	0.828
One or more shared with partner				0.124	−0.043	0.291	−0.103	−0.582	0.375
All shared with partner	−0.639	−1.396	0.119	−0.183	−0.365	−0.001	−0.512	−0.987	−0.037
Pregnancy									
Not pregnant	*ref.*			*ref.*			*ref.*		
Pregnant	−1.204	−3.233	0.825	−1.277	−1.628	−0.927	−1.111	−1.995	−0.227
Presence of young child									
No young child	*ref.*			*ref.*			*ref.*		
Child aged < 3 years	0.015	−0.840	0.870	−0.471	−0.635	−0.306	−0.665	−1.072	−0.258
Age									
15–24 years	0.303	−1.407	2.013	0.564	0.270	0.858	0.303	−0.690	1.297
25–29 years	−0.075	−1.237	1.086	0.108	−0.062	0.278	0.114	−0.345	0.572
30–34 years	*ref.*			*ref.*			*ref.*		
35–39 years	−0.720	−1.683	0.242	−0.186	−0.325	−0.047	−0.231	−0.584	0.123
40–44 years	−0.135	−1.149	0.878	−0.308	−0.470	−0.147	−0.760	−1.164	−0.356
45–49 years	−0.269	−1.644	1.106	−0.567	−0.763	−0.371	−0.877	−1.340	−0.414
Cohort									
1940–1949	−0.421	−1.528	0.687	−0.268	−0.410	−0.126	−0.529	−0.925	−0.133
1950–1959	*ref.*			*ref.*			*ref.*		
1960–1969	0.128	−0.648	0.904	0.332	0.213	0.452	0.180	−0.136	0.495
1970+	0.273	−0.788	1.335	0.460	0.276	0.644	0.270	−0.135	0.675
Direct marriage									
Premarital cohabitation	*ref.*			*ref.*			*ref.*		
Direct marriage	0.499	−0.184	1.181	0.412	0.301	0.522	0.562	0.183	0.941
Union rank									
One previous union	*ref.*			*ref.*			*ref.*		
Two previous unions	1.119	0.052	2.186	0.389	0.241	0.538	0.465	0.113	0.817
Marriage duration									
0 years	*ref.*			*ref.*			*ref.*		
1 year	−0.149	−1.168	0.871	0.276	0.057	0.495	0.482	−0.169	1.134
2–3 years	−0.314	−1.225	0.597	0.522	0.322	0.721	0.675	0.037	1.313
4–5 years	−0.776	−2.076	0.525	0.445	0.231	0.659	0.993	0.329	1.658
6–9 years	−0.420	−1.627	0.786	0.556	0.348	0.765	0.822	0.154	1.489
10–14 years	−1.037	−2.363	0.289	0.499	0.263	0.735	0.841	0.113	1.569
15 or more years	−1.868	−4.054	0.318	0.454	0.167	0.740	1.223	0.424	2.022
Country									
Norway							*ref.*		
Sweden							0.142	−0.102	0.385
Constant	−3.169	−4.497	−1.841	−4.179	−4.408	−3.949	−4.077	−4.770	−3.385
Subjects			440			8,250			1,475
Events			49			1,856			300
Log likelihood			−262.6			−4,989.3			−919.3
AIC			565.1			10,022.6			1,884.7
BIC			648.4			10,174.9			2,006.0

Appendix C: Replicative validity: supplementary heat maps

Figure A-1: **Heat map of difference in relative frequencies of birth and union status between simulated and observed female family life courses at exact ages, by 10-year cohort, Great Britain**
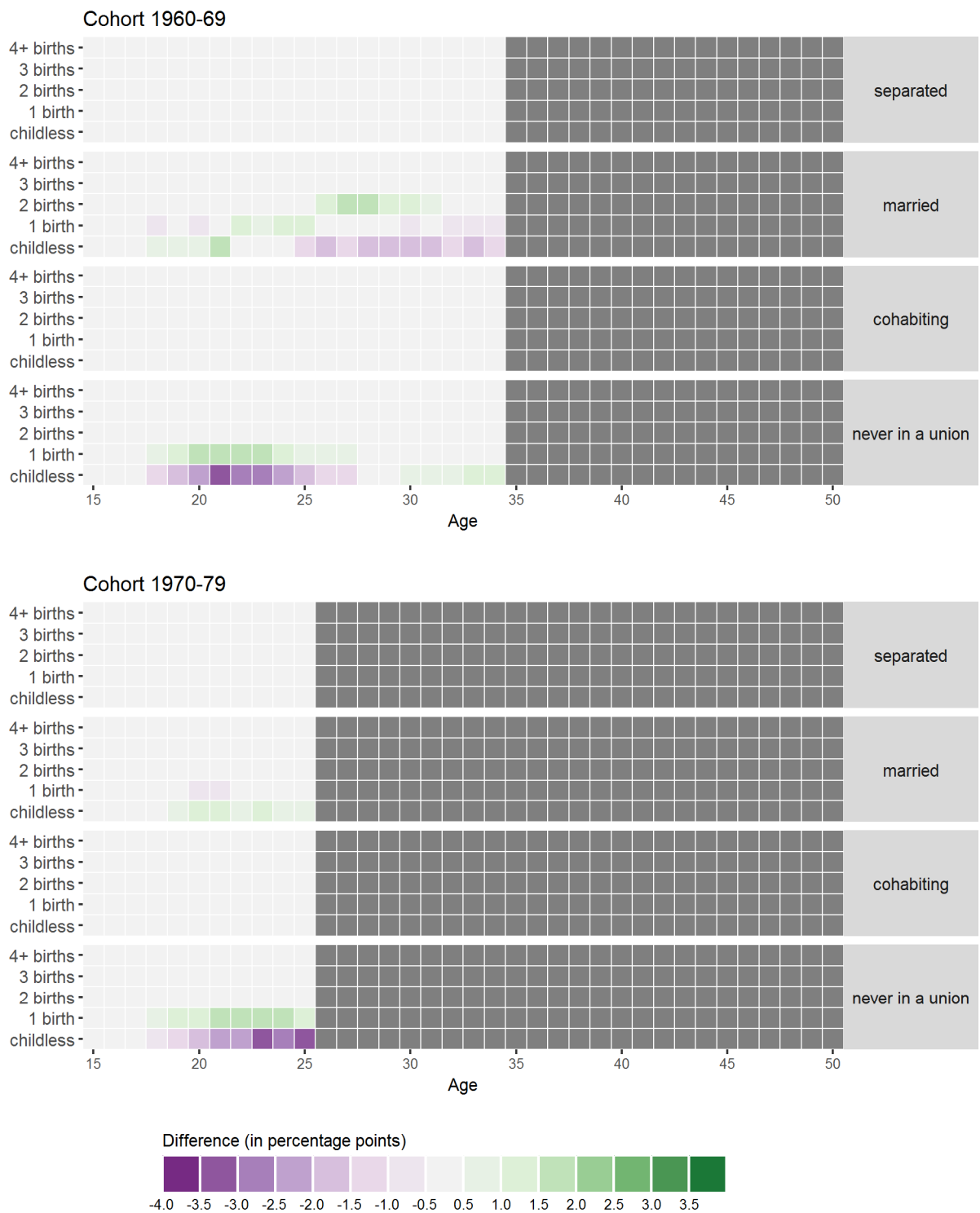
Figure A-1: **(Continued)**

Cohort 1960-69

Cohort 1970-79
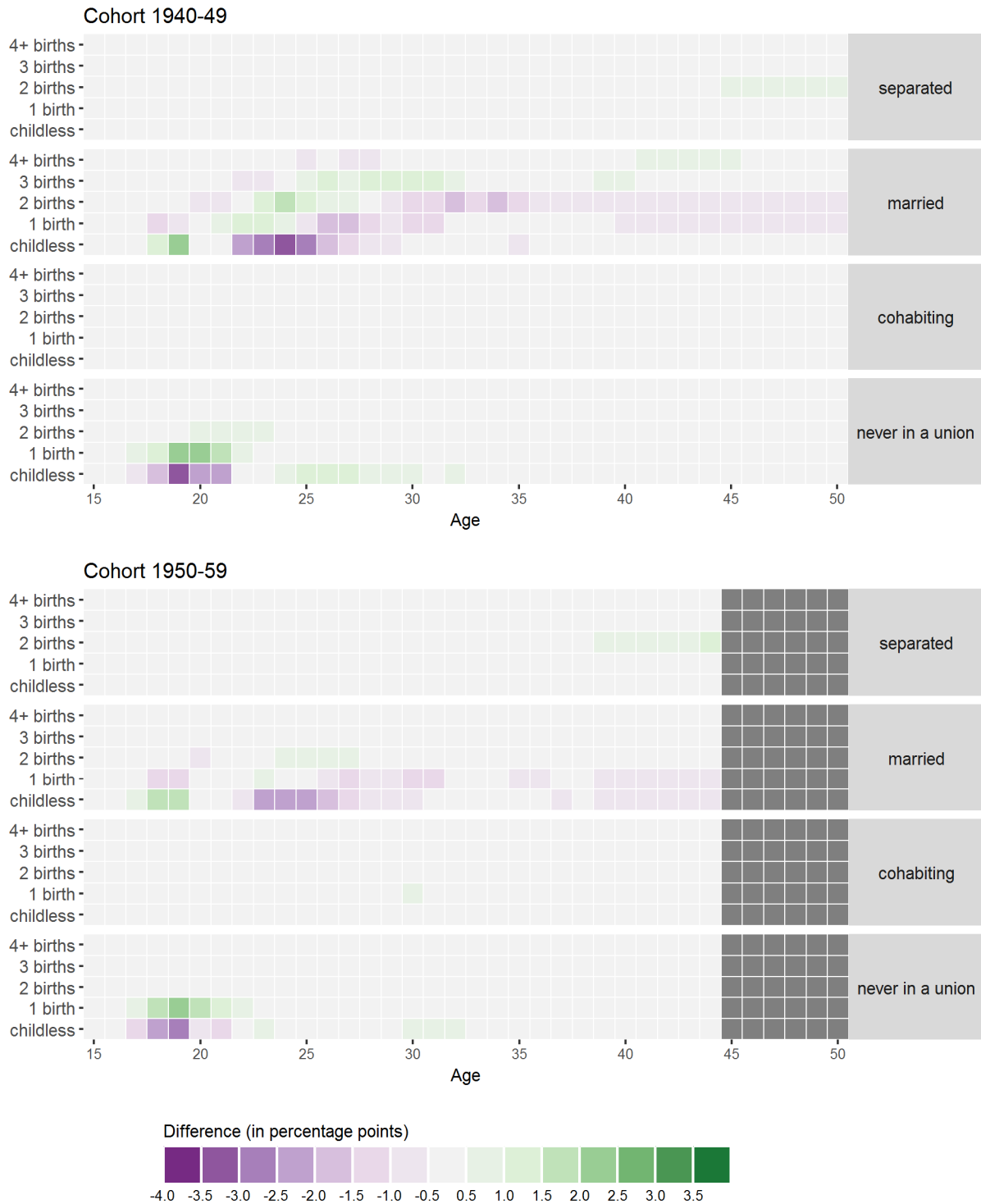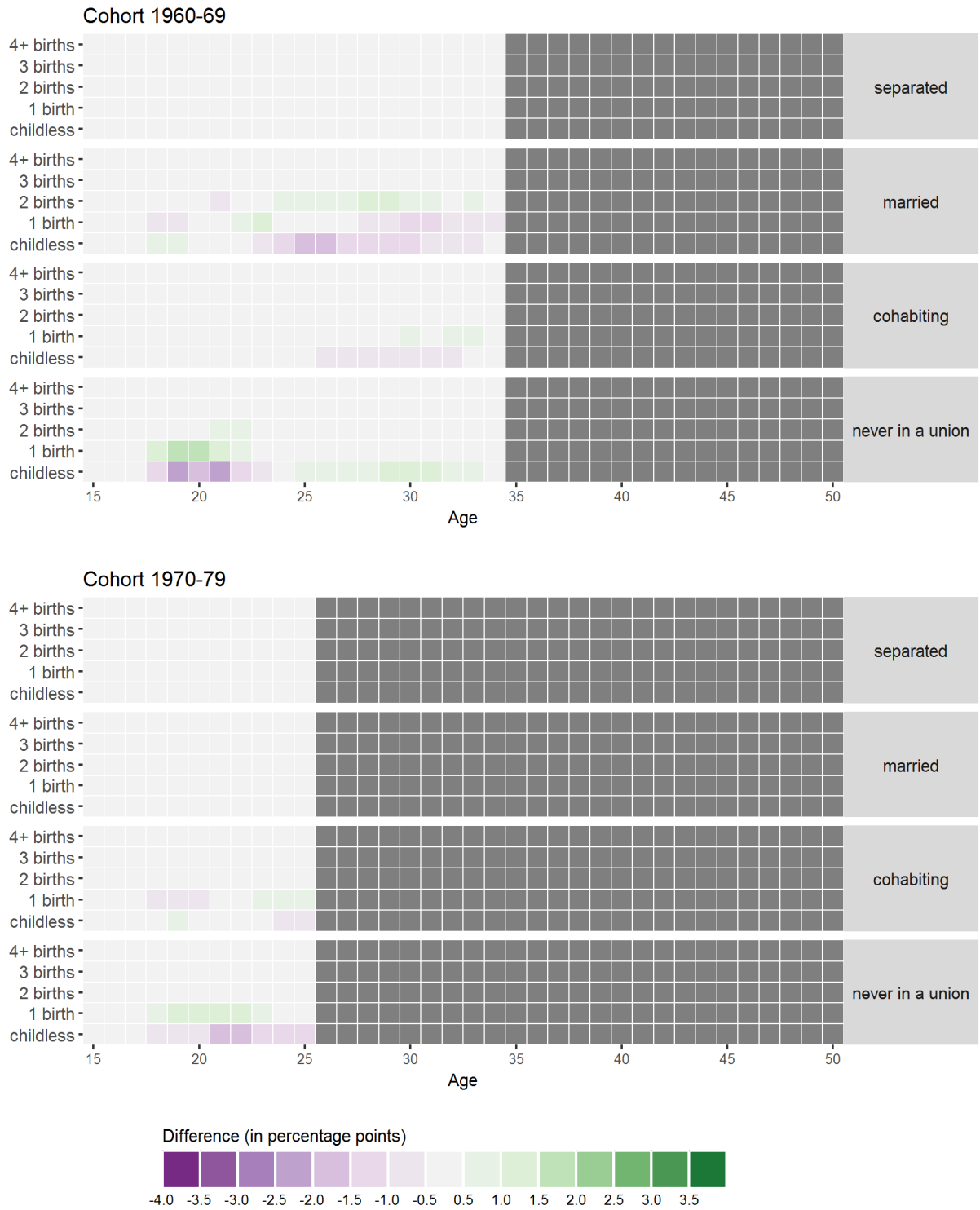
Figure A-2: **Heat map of difference in relative frequencies of birth and union status between simulated and observed female family life courses at exact ages, by 10-year cohort, Italy**

Figure A-2: **(Continued)**

Cohort 1960-69

Cohort 1970-79
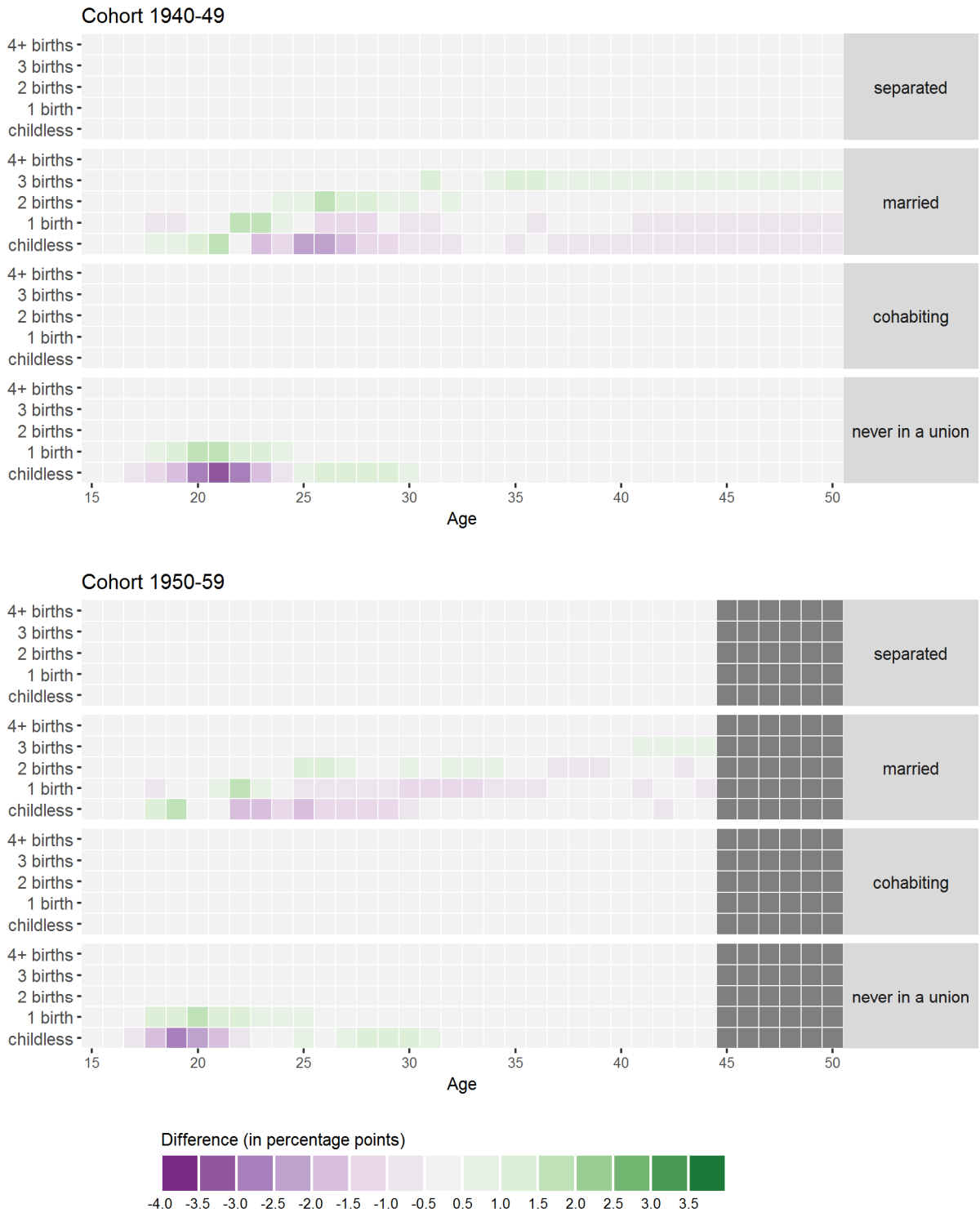
Appendix D: Replicative and predictive validity: Comparison to national statistics

The following paragraphs discuss in detail the comparison of simulated fertility, marriage, and divorce indicators with national statistics, and data availability issues of the latter.

Cohort fertility by parity

For British parity-specific cohort fertility, we have to draw on estimated cohort distributions of women by age and parity for England and Wales, as in the U.K. information on birth order has only been collected for all births since 2012, in contrast to only on marital births previously. The Office of National Statistics estimated the true birth order for England and Wales using supplementary information from the General Household Survey (for more information see Office of National Statistics 2018a).

Overall, we find that the simulated cohort proportions of women with at least one birth for Great Britain are very close to the respective cohort shares for England and Wales for all cohorts, and even predict cohort progression to motherhood beyond the ages included in the survey very well (see Figure 3). It is just for the 1960–1969 cohort that the numbers for England and Wales are slightly lower than for the simulated and observed survey data.

For higher birth orders the comparison is even more limited, as national data are only available for selected birth cohorts. Hence, we chose the middle single-year birth cohorts as reference for the surrounding 10-year birth cohorts; i.e., 1945 for 1940–1949, 1955 for 1950–1959, etc. Note that fertility by mother's year of birth has declined for higher birth orders. If the decline had not been gradual, the experience of the middle single-year birth cohort might not be representative for the whole 10-year cohort. Despite the limitations, the simulated fertility indicators also approximate quite closely those obtained from national statistics (cf. Figures 4–6), with slightly smaller values for the simulated cohort fertility, particularly for third and fourth births, consistent with our restricting the observed samples to native-born women.

Appendix Figures A–3 to A–12 display corresponding validation results for Norwegian, Swedish, and Italian data. Despite the pooled estimation of the two Scandinavian countries, the single-country simulation results for Norway and Sweden very closely approximate their respective national cohort proportions for women with at least one, two, three, or four children over age, with slightly more differences in the Swedish case. For Italy, there is an almost perfect match between the simulated fertility indicators for the first and second births and their real-world equivalents, for both the observed survey data and the national statistics. However, national cohort fertility estimates for third and higher-order births were not further disaggregated to allow a comparison with the simulation results at these birth orders.

Cohort proportions ever married

The comparability of cohort proportions ever married and ever divorced to national vital statistics was even more limited, as national indicators were only available for England and Wales from nuptiality tables (Office of National Statistics 2018b, 2019). In the user guide to marriage statistics it is noted that the computations only include marriages contracted in England and Wales and thus may underestimate the true proportions of men and women married by certain ages.[2] Nonetheless, the simulation approximates the cohort proportion ever married for England and Wales very well (cf. Figure 7). Yet there seems to be a slight difference in timing of marriages for early ages, with simulated and reported ages of marriage about a year earlier than in nuptiality tables based on civil registers. For the British 1970–1979 cohort, the simulation rather over-predicts the proportion ever married compared to the estimates from vital statistics in England and Wales, though the gap seems to shrink at later ages. This suggests that part of the differences for the most recent cohort may be due to changes in marriage timing, which have not yet been observed in the survey data on which the simulations are based.

For Sweden, we could use analyses of age at first marriage in the 1950–1979 birth cohorts from Swedish register data for comparison (Thomson 2018). Similarly, the cohort quantum of Swedish marriages is replicated closely in the simulation, but the earlier marriage timing in comparison to register data is also evident in the Swedish case (cf. Figure A–13). In the latter case, part of the timing difference may be due to the pooled estimation with Norway.

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[2] For further information see
 https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/marriagecohabitationandcivil partnerships/methodologies/userguidetomarriagestatistics.

Cohort proportions ever divorced

The Office for National Statistics also estimates cohort proportions of women ever divorced for England and Wales using life table methodology (Office of National Statistics 2018b).[3] However, apart from the geographical coverage, the comparison is further limited by differences in the dissolution event considered. In our analysis we used the reported date of separations in order to avoid overlapping partnerships in the respondents' family life courses. By contrast, the divorce statistics are built on legal divorce dates, which occur, if at all, inherently after de facto separation. Moreover, married couples that separate but do not divorce are not included in the divorce statistics for England and Wales. Overall, the simulated cohort proportions of women dissolving a marital union is slightly above the national cohort proportions ever divorced for England and Wales, with a small timing difference, consistent with the difference in dates as laid out before (cf. Figure 8).

However, for the two most recent cohorts the simulation predicts substantially higher shares of marital unions dissolved than national divorce statistics, particularly at older ages (cf. Figure 8). For the 1970–1979 cohort, the simulated cumulative proportion ever married also exceeds corresponding values from vital statistics in England and Wales, thus likewise implying elevated numbers of ever divorced among all women in a cohort.

Furthermore, the difference may be due to parameter uncertainty for the separation hazards at older ages for younger British cohorts. Indeed, the estimated hazard rates for divorce significantly decline over age for Great Britain and the Scandinavian countries (see Appendix Tables A-7 and A-11). But whereas in the recent cohorts the divorce rates for Norway and Sweden are further depressed for higher ages, the estimated cohort–age interaction is not significant for British data. Possibly, the estimated separation risks of married unions do not decline enough at later ages, so that the simulation predicts inflated cumulated separation for the most recent cohorts. In fact, a sensitivity analysis of the estimated cohort–age interaction shows that the simulated cohort proportion ever separated from a marriage by age 50 would decline to about 32.2% and 26.8% for the 1960–1969 and 1970–1979 cohorts respectively, if the lower confidence limit of the estimate of separation hazard were used instead of the estimate itself.

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[3] For further information see https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/divorce/methodologies/userguidetodivorcestatistics.

Figure A–3: **Cumulative proportion of women with at least one birth, by age, for simulated, observed data and vital statistics for Italian women, by 10-year birth cohort**
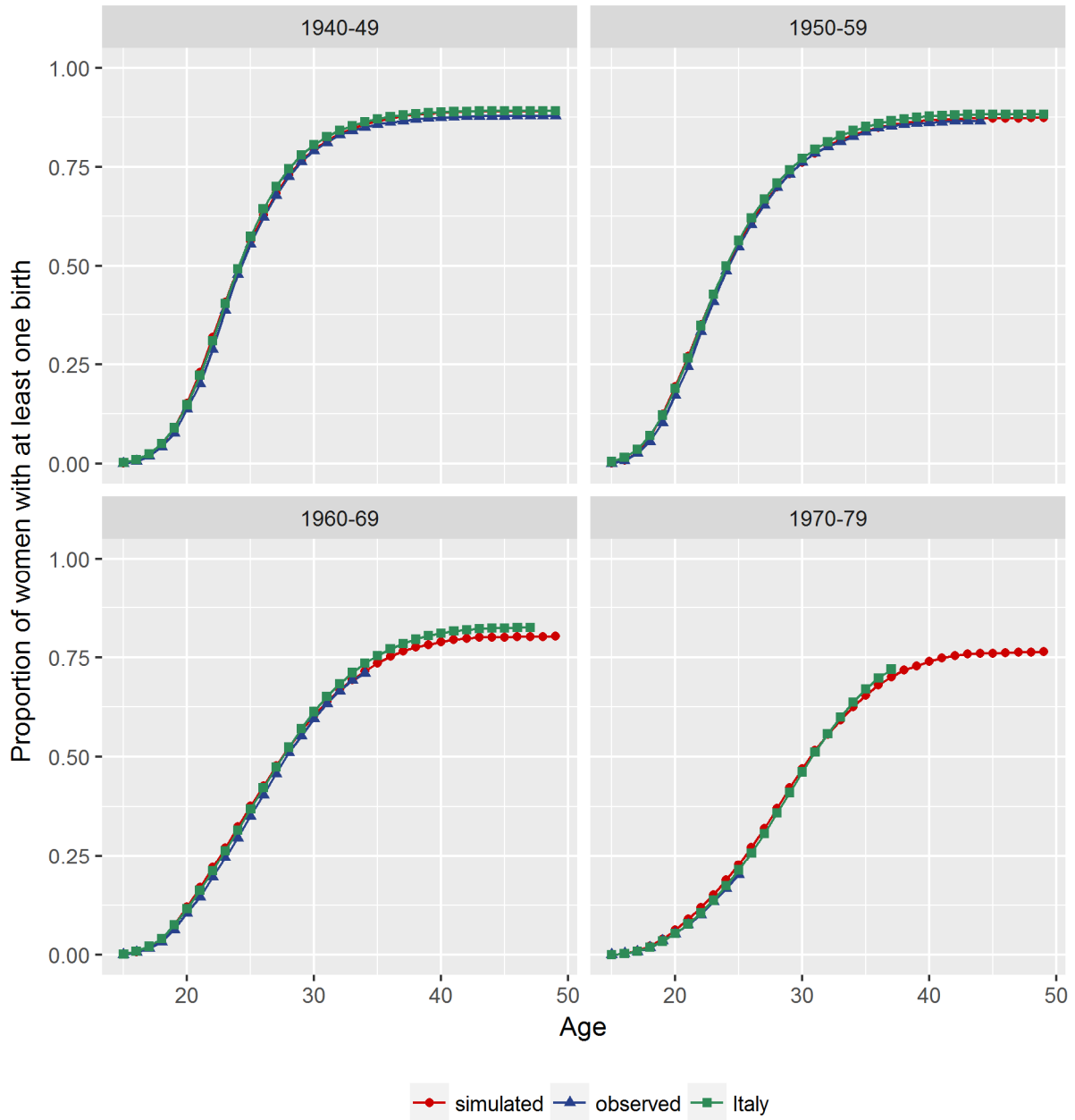
Figure A-4: **Cumulative proportion of women with at least two births, by age, for simulated, observed data and vital statistics for Italian women, by 10-year birth cohort**
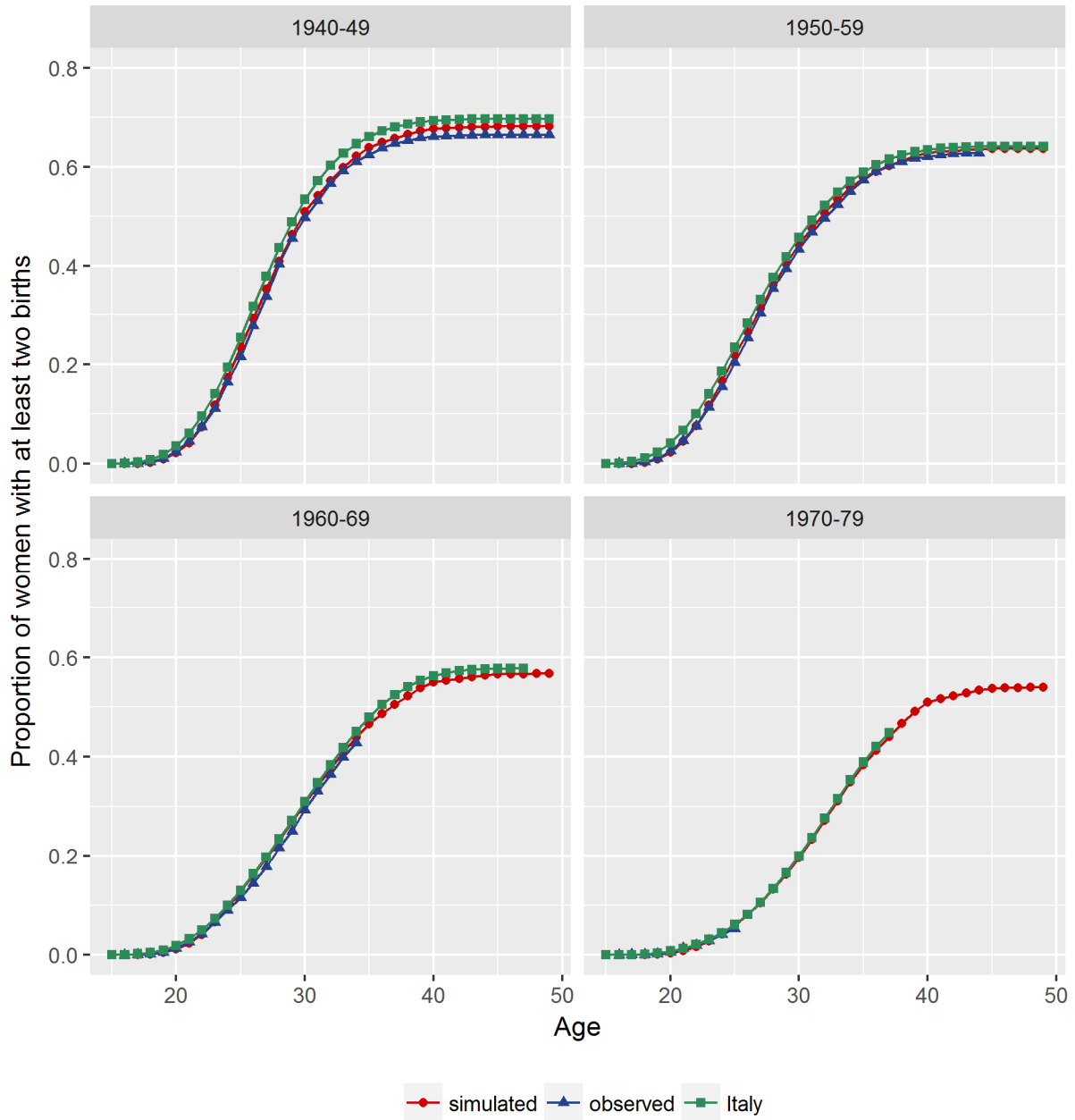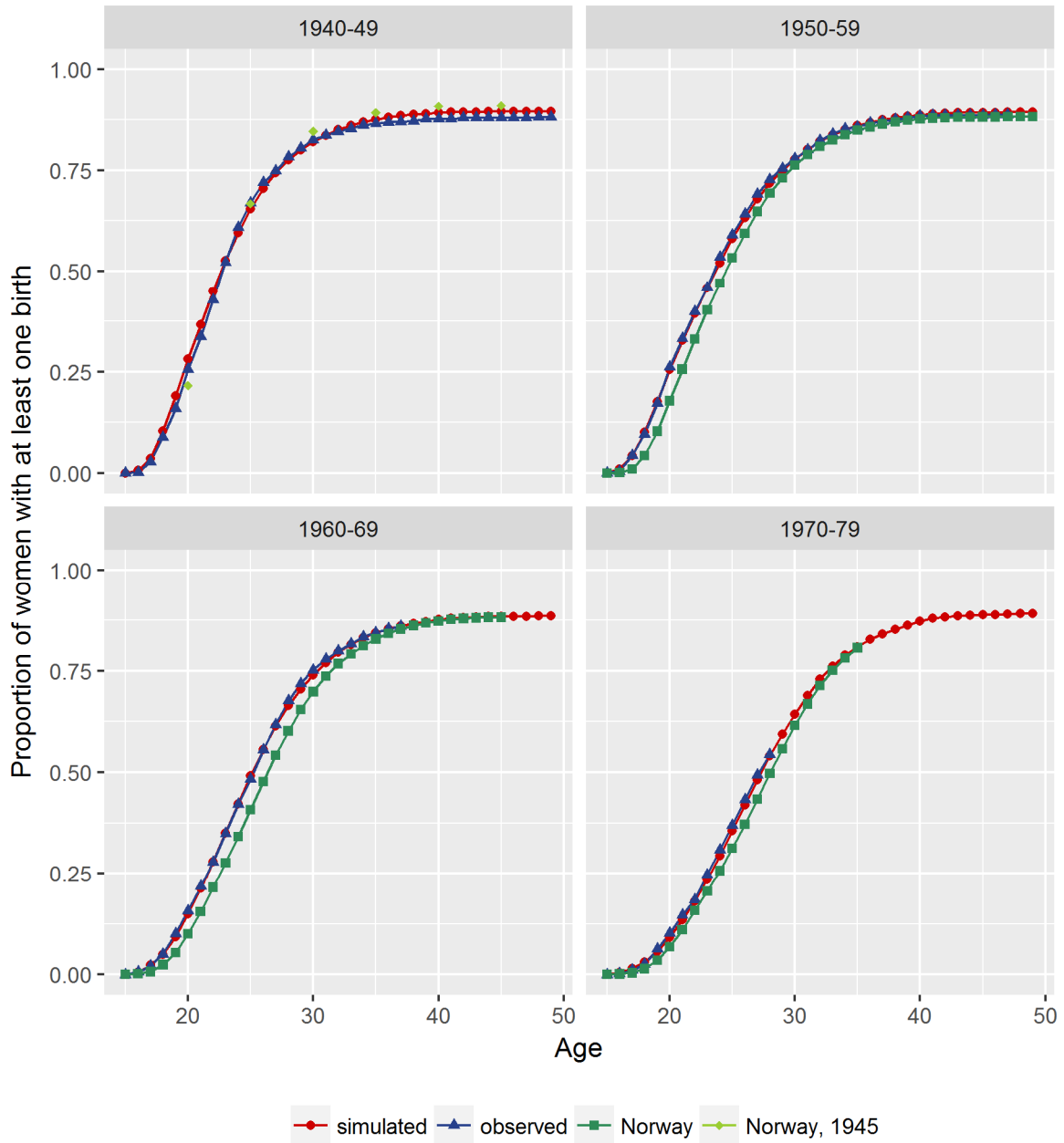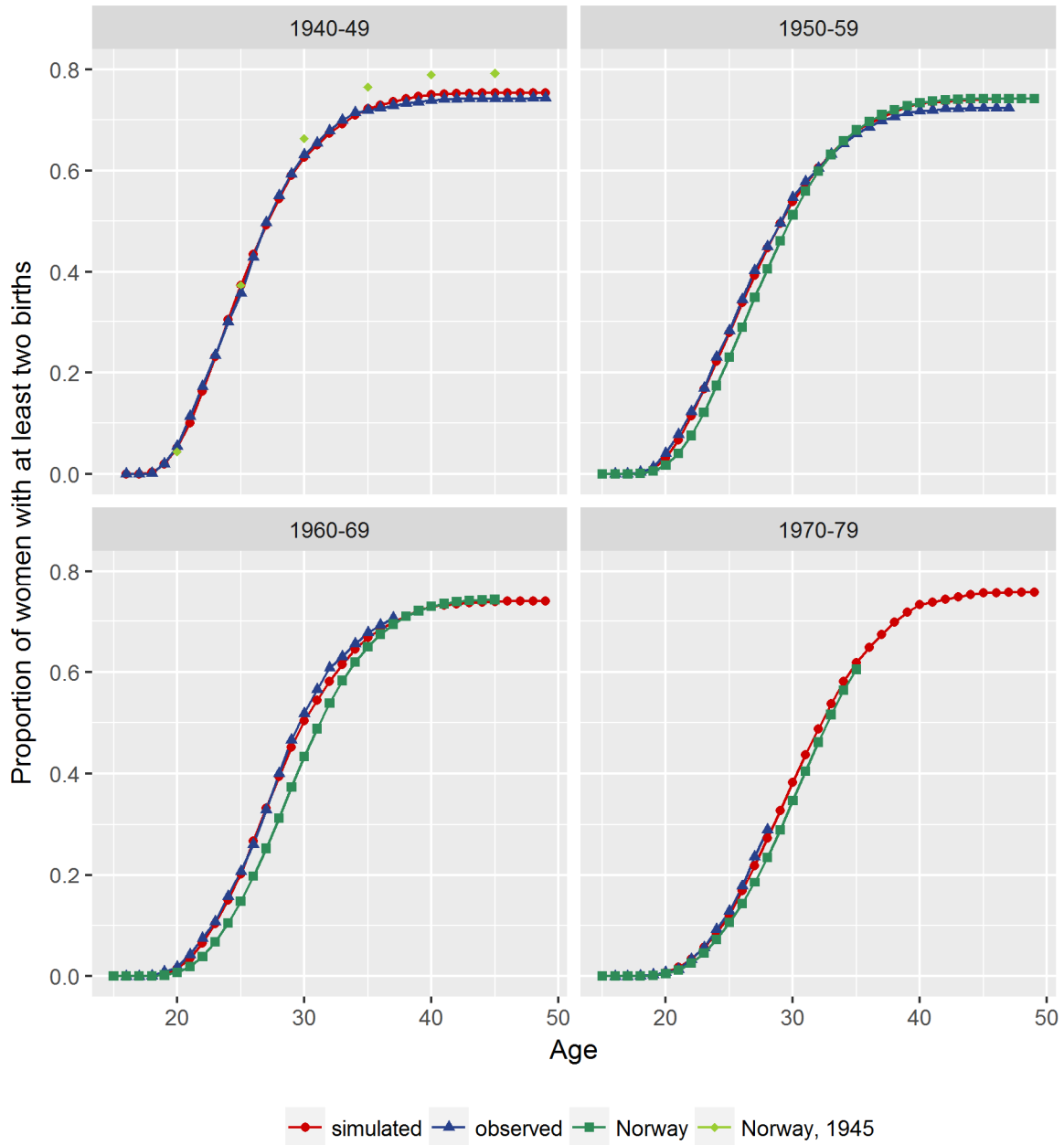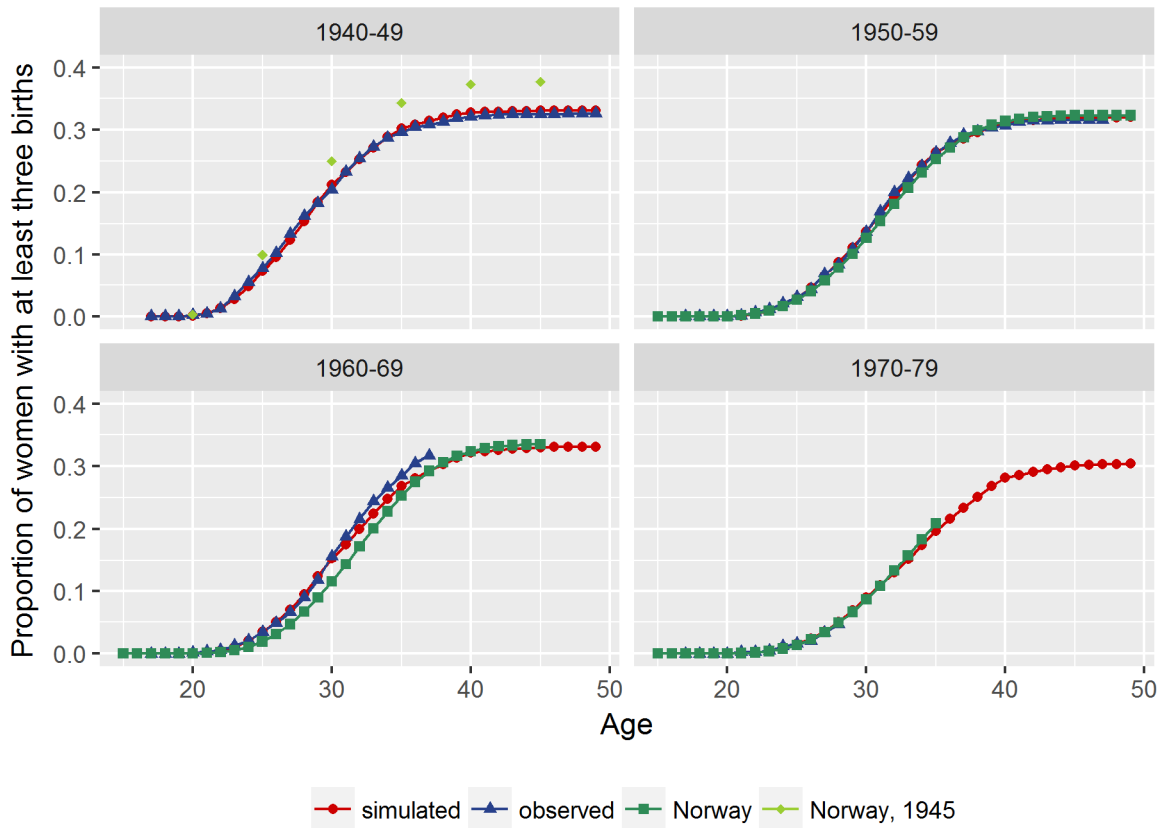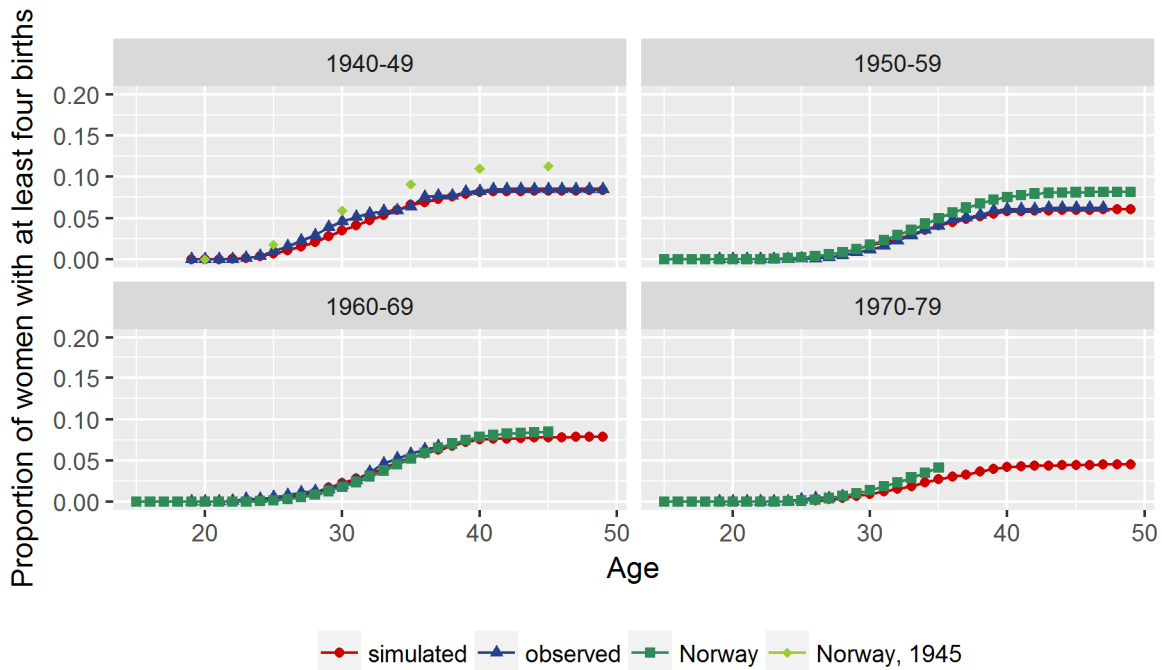
Figure A-5: **Cumulative proportion of women with at least one birth, by age, for simulated, observed data and vital statistics for Norwegian women, by 10-year birth cohort**
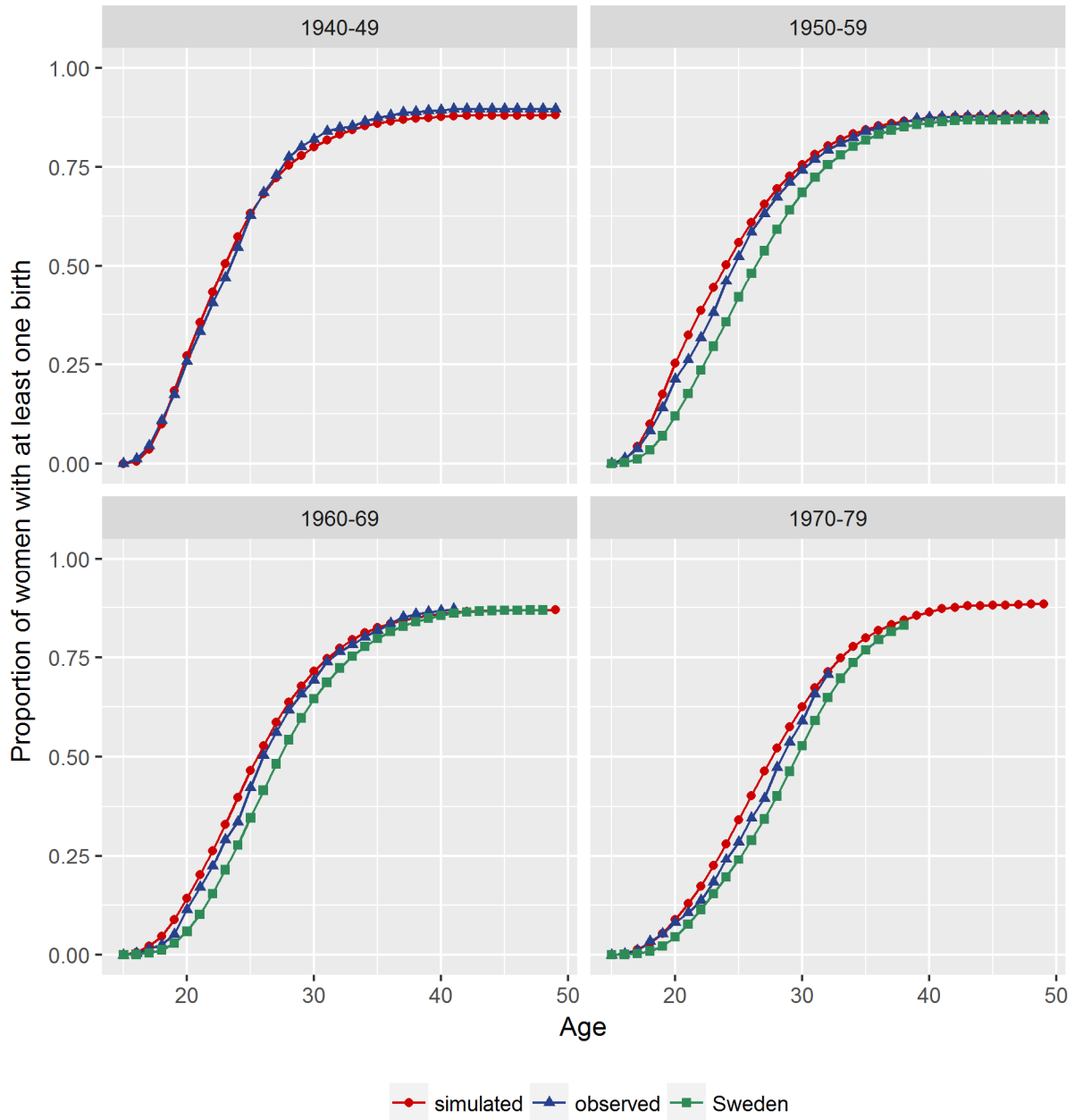
Figure A-6: **Cumulative proportion of women with at least two births, by age, for simulated, observed data and vital statistics for Norwegian women, by 10-year birth cohort**

Figure A-7: **Cumulative proportion of women with at least three births, by age, for simulated, observed data and vital statistics for Norwegian women, by 10-year birth cohort**

Figure A-8: **Cumulative proportion of women with at least four births, by age, for simulated, observed data and vital statistics for Norwegian women, by 10-year birth cohort**

Figure A-9: **Cumulative proportion of women with at least one birth, by age, for simulated, observed data and vital statistics for Swedish women, by 10-year birth cohort**
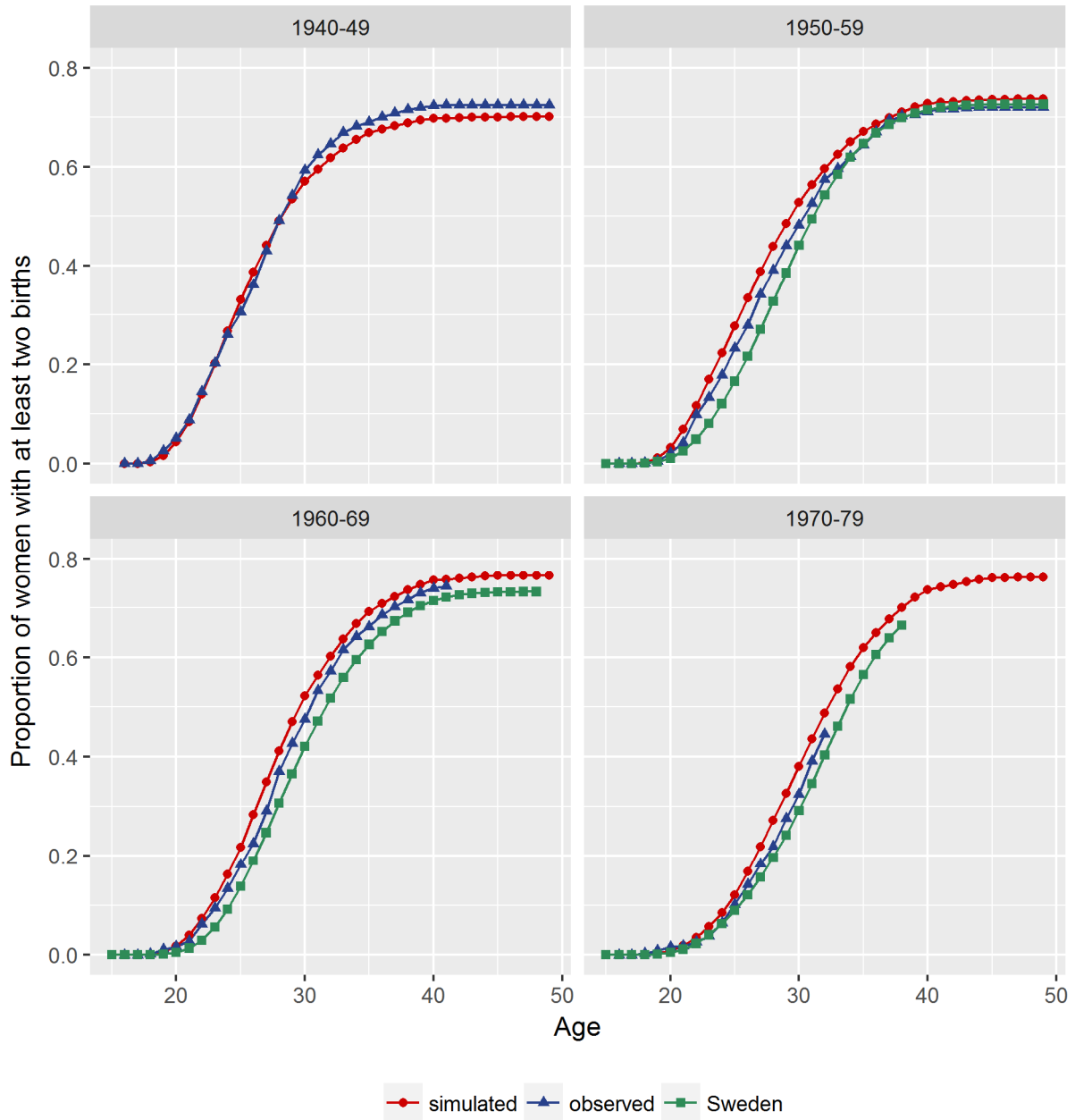
Figure A-10: Cumulative proportion of women with at least two births, by age, for simulated, observed data and vital statistics for Swedish women, by 10-year birth cohort

Figure A-11: Cumulative proportion of women with at least three births, by age, for simulated, observed data and vital statistics for Swedish women, by 10-year birth cohort
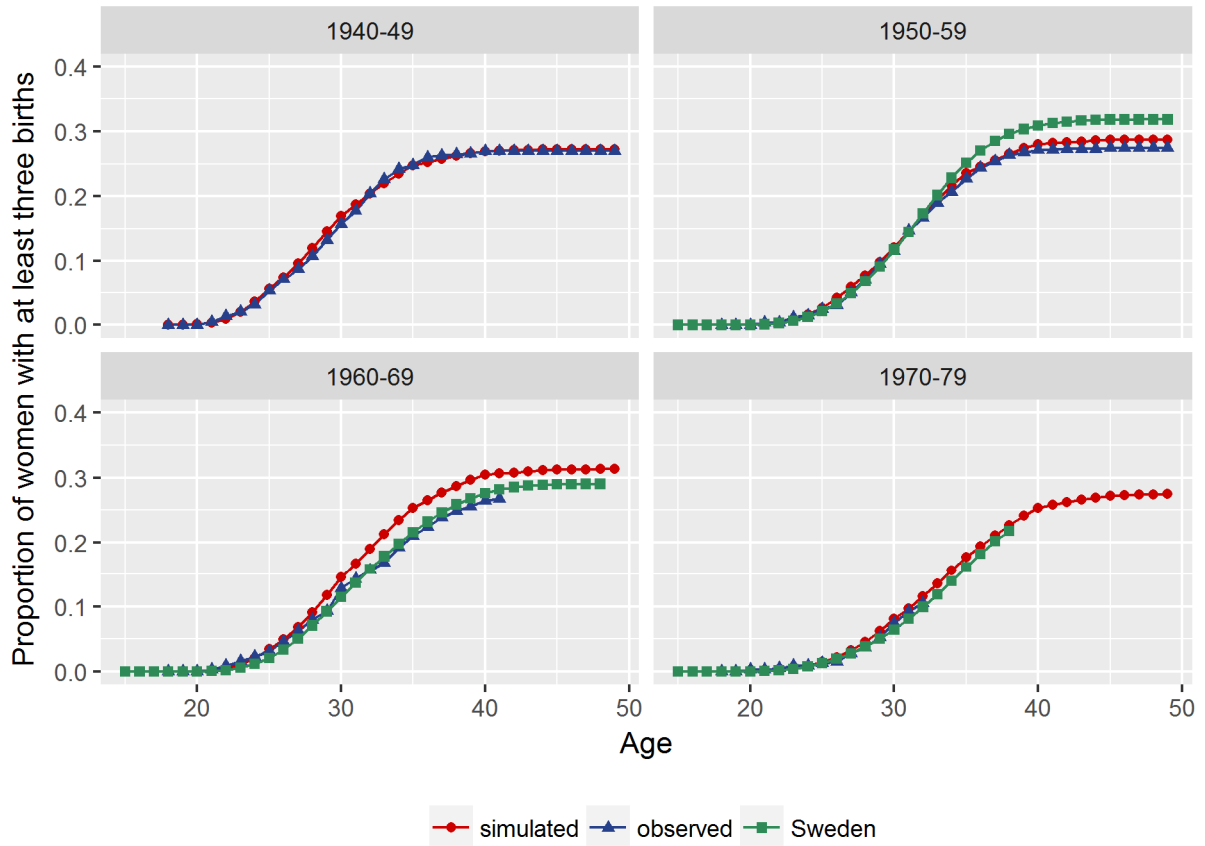

Figure A-12: Cumulative proportion of women with at least four births, by age, for simulated, observed data and vital statistics for Swedish women, by 10-year birth cohort
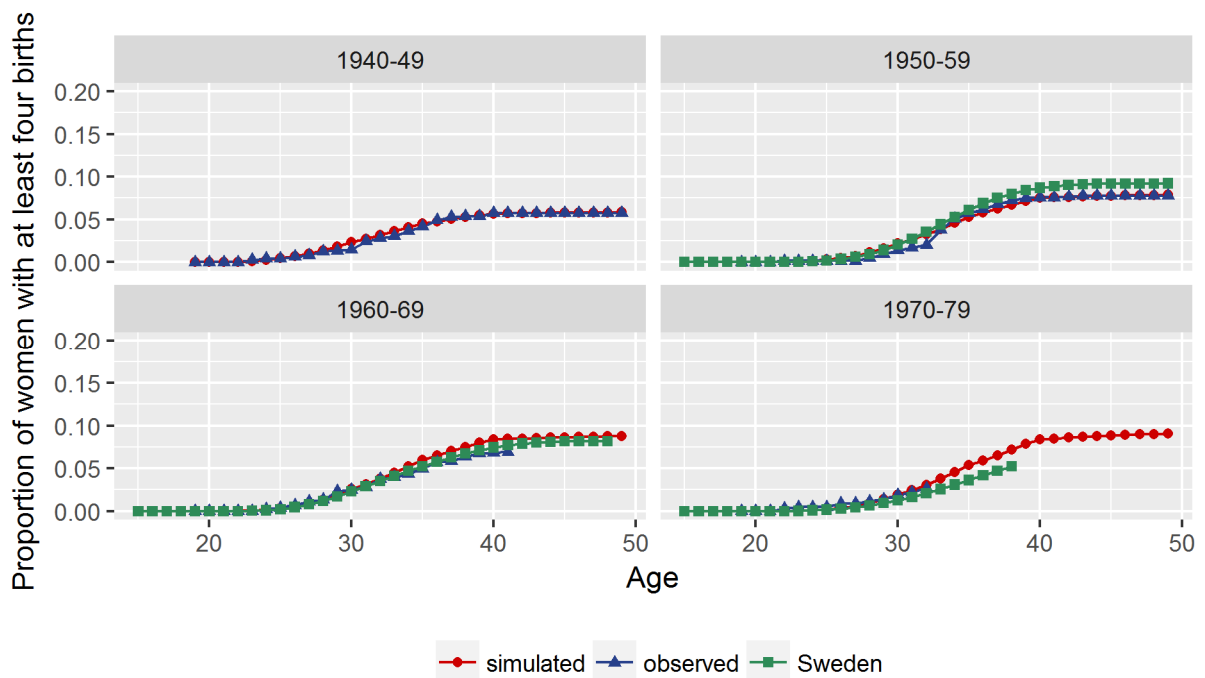
Figure A-13: Cumulative proportion of women with ever–married, by age, for simulated, observed data and national registers for Swedish women, by 10-year birth cohort