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Less is more or more is more? Union dissolution and re-partnering as an engine for fertility in a demographic forerunner context – a register based completed cohort fertility approach

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Abstract

Extensive literature theorizes the role of re-partnering on cohort fertility and whether union dissolution can be an engine for fertility. A large share of higher-order unions is non-marital cohabitations. Yet, most previous completed cohort fertility studies on the topic analyze marital unions only and none have measured cohabitations using population-level data. We use Finnish register data to enumerate every birth, marriage, and cohabitation from ages 18-46 in the 1969–1972 birth cohorts, and analyze the relationship between the number of unions and cohort fertility for men and women using Poisson regression. We show that re-partnering is driven by cohabitations. Re-marriage is positively associated with cohort fertility, compared to individuals in a single intact marriage. However, when measured using marriages as well as non-marital cohabitations, re-partnering is negatively associated with fertility, compared to individuals in a single intact union. This negative association increases with socioeconomic status. "Serial cohabitation" is a strong predictor of low fertility. Men see a slight "re-marriage premium" in fertility and a (non-marital) "re-partnering penalty," compared to women. Thus, re-partnering is likely not an efficient engine for fertility. Further, marriage and cohabitation are far from indistinguishable in a country often described as a second demographic transition forerunner.

Keywords: Cohort fertility, Union dissolution, Re-partnering, Re-marriage, Serial cohabitation, Serial monogamy

Introduction

The past decades have seen a new family regime emerge across many industrialized societies in which parenthood is postponed and marriages are entered into later in life, at a lower rate, and dissolve through divorce at a higher rate (Cherlin 2016). Concomitantly, entry into cohabitations has not been postponed but do dissolve at even higher rates than marriages (Billari & Liefbroer 2010; Manning et al. 2014). Consequently, many individuals form multiple cohabiting and marital unions before and following an eventual entry to parenthood. As a higher share of individuals enters more than one union across their life course, diverse literature has explored the consequences of union dissolution and re-partnering for fertility (Sassler & Lichter 2020). At a broad theoretical level, this topic is part of the effort to understand childbearing behavior in societies characterized by “serial monogamy” (Andersson 2015; Thomson et al. 2021). This question is challenging because union dissolution and re-partnering exert opposite forces on fertility. On one hand, union dissolution forcefully decreases fertility by placing individuals outside of couple unions. On the other, union dissolution allows fertility to recuperate or even increase through births after re-partnering, and some evidence on step-family fertility suggests that parity specific births in higher-order unions are higher than in intact first unions (e.g., Griffith et al. 1985; Vikat et al. 1999).

Thus, one central question is whether union dissolution sets in motion an “engine for fertility” via higher order unions or, rather, thwarts childbearing. Moreover, knowing the association between the number of unions and childbearing is relevant for policies which allocate support targeted at children and adults in non-intact families. However, empirical research is scarce and, we argue, the research designs of existing studies are inadequate to draw substantive conclusions regarding cohort fertility across the number of unions in the 21st century. Chiefly, this is so because completed cohort fertility studies (a) place high demands on sample size and coverage and (b) existing work has focused on marital divorce and re-marriage (Jokela et al. 2010; Van Bavel et al. 2012). To use marital events only was appropriate for birth cohorts where marriage was the dominant union and childbearing context (Cohen & Sweet 1974; Lauriat 1969; Thornton 1978). However, in contemporary western contexts, where cohabitation is increasingly practiced (e.g., Perelli-Harris & Lyons-Amos 2016a), excluding cohabitation can substantially distort the relationship among union dissolution, re-partnering, and cohort fertility. Critically, non-marital cohabitation is a strong correlate to separation, and higher-order unions tend to be cohabitations (e.g., Steele et al. 2006; Zeng et al. 2012). Cohabitation is, thus, an intricate part of trajectories that involve childbearing across unions and account for a large share of incidence in re-partnering. Failing to include both cohabiting and marital unions in the context of re-partnering also undermines the understanding of the meaning of cohabitation and marriage as social institutions in contemporary societies. Second, most previous work tends to study either men or women, foregoing the opportunity to assess sex-differences in the association between partnering and fertility (but see Van Bavel et al. 2012). Finally, previous research relies on survey material that risks under-covering male fertility, selective non-response, and attrition (Juby & Le Bourdais 1999, Guzzo & Dorius 2016). Further, these sample sizes can be insufficient for reliably estimating standard error, especially when analyzing data across socioeconomic status (e.g., Forsberg & Tullberg 1995).

This study uses Finnish register data to analyze the relationship between the accumulated number unions and number of children born by age 46 of the full 1969–1972 cohorts. We ask the following questions: Do union dissolution and the number of higher-order unions have positive or negative associations with cohort fertility in Finland, and does this relationship differ for men and women? We use Poisson regression to estimate the marginal effect on fertility of cumulated union counts compared to never-separated unions, for both women and men. Our overarching aim is to provide the first comprehensive picture of cohort fertility and cohort partnering, to better understand childbearing in the context of serial monogamy.

We contribute to this endeavor in three ways. This study is the first completed cohort perspective on the number of unions and cohort fertility to use population coverage data. The material is uniquely suited for the analysis because it has total population information not only of all marriages but also all non-marital cohabitations that span the main reproductive years of the life course, as well as near-complete coverage of male and female fertility. Therefore, this study avoids measurement error and reliability uncertainty regarding standard errors prevalent in studies using surveys. Second, because we cover both marital and cohabiting unions, we provide a more appropriate measure for re-partnering in societies where cohabitation is fairly common. To understand difference in incidence as well as the qualitative roles civic status has in re-partnering, we take several steps. We compare measures based on cumulated number of marital unions with the cumulated number of "all unions" (cohabiting and marital unions) and disaggregate the total re-partnered population into categories that have conceptual precedence in the literature such as “serial cohabitation,” marriage-only, and individuals who have both marital and non-marital unions by age 46. Then, we provide a cursory description of these analyses across socioeconomic status—measured by income earnings rank quartiles and educational level around age 46—to establish whether the association between re-partnering and fertility constitute a universal pattern or differ substantially among salient social categories.

Below, we review the literature on childbearing across unions, on sex differences therein, and on completed cohort perspectives on union numbers and completed fertility. We elaborate on caveats of previous research and describe the contribution of the present study. For parsimony and ease of language, we use the terms “union count” or “number of unions” interchangeably to describe the cumulated number of unions by age 46. We use the terms “fertility” and “completed fertility” interchangeably to refer to the number of children born by age 46, unless otherwise stated.

Theory and background

Births across unions

The relationship among union dissolution, re-partnering, and fertility in contemporary societies hinges on the fact that childbearing still occurs mostly within or in transition into unions. The birth hazard is low outside of marital or cohabiting unions (Aassve et al. 2006; Thomson et al. 2020), as are childbearing intentions (Spéder & Kapitány 2009). Therefore, union dissolution can decrease the likelihood of pregnancy and reduce fertility.

Yet, separation exposes individuals to the possibility of new unions in which further childbearing is possible. A necessary condition to recuperate fertility lost to union dissolution is that the fertility among the re-partnered must non-negligible (Thomson et al. 2012). Therefore, it is important to study cohort fertility across cumulated union count. Why, then, would re-partnering increase cohort fertility?

According to the “value of children” and “commitment hypothesis,” re-partnering may drive births (Griffith et al. 1985) because a common child has value for couples as a shared commitment and is emblematic of a conventional family—a signal of particular importance for couples in a step-family context. Individuals may, therefore, be persuaded to progress to higher parities in higher-order unions than they would have within a first unions. Several studies indicate that intention and childbirth risk among the re-partnered are higher than that of women in a first union at the same parity (Griffith et al. 1985; Jefferies et al. 2000; Meggiolaro & Ongaro 2010; Vikat et al. 1999, but see Guzzo 2017).

Family dynamics also operate in the opposite direction. In higher-order unions, one or both partners may have children from previous partners (Ivanova et al. 2014). A birth in a higher-order union may mean entry to parenthood for one partner, but the birth of another child of the other partner and the motivations for entering these parities differ. Even though a common child may have value for both partners, positive fertility intentions of both partners are often necessary to favor childbearing. While the literature is inconclusive, studies suggest that the presence of step-children in the household impede childbearing (Buber & Prskawetz 2000; Kalmijn & Gelissen 2007; Stewart 2002; Vikat et al. 2004; Wineberg 1990).

Beyond family and re-partnering dynamics, selection into the stock of the ever-separated population confounds the relationship between union count and fertility. Challenging the "value of children" perspective, Guzzo (2017) shows that a significant part of fertility in US step-families is due to unintended births, arguing that childbearing across unions is explained by behavior related to selection on socioeconomic disadvantage (McLanahan & Percheski 2008). Concerning this, studies indicate that the relationship between union dissolution and fertility may differ by socioeconomic status, and average population estimates may hide substantive heterogeneity in this respect (Hopcroft 2018).

Sex differences in births across unions

Most studies find that women are less likely to re-partner (See review by Raley & Sweeney 2020) (Berger et al. 2018; Ivanova et al. 2013; Vanassche et al. 2015). It is unclear whether fertility in re-partnered unions differs for women and men. Vikat and colleagues (2004) propose that having the main residential custody of children from previous unions decreases fertility in step-families. Women are more likely than men to maintain primary custody of children from dissolved unions and bring these into higher order unions, which may impede fertility in higher-order unions more for women than for men. However, evidence is inconclusive. In the Netherlands, Ivanova et al. (2014) find that women who enter a second union as mothers did not have a lower birth risk compared to women without children from previous unions, while the opposite was the case for men, and women had overall higher odds of parity progression in higher-order unions. However, Kalmijn and Gelissen (2007) contrarily find that previous children inhibit childbearing in second unions more for women than for men. In the US, Stewart (2002) shows that the presence of children from previous unions reduces the partner's intentions to have (common) children for both women and men. While, in Belgium, Vanassche et al. (2015) find no effect for divorced men nor women of children of previous unions.

By definition, an individual's higher-order unions take place when they are older than in their first-order unions. Age negatively impacts women's fecundity. Because men and women typically have partners of somewhat similar ages, age-related infertility influences men's fertility as well. Cultural norms and practical impediments may deter parenting and childbearing when men and women are older (Beaujouan & Solaz 2013). Yet, the effects of age-related infertility are likely more palpable for women than for men; although, male infertility is understudied (Harris et al. 2011). Beaujouan and Solaz (2013) suggest that the predicted fertility-gains from second unions can be higher for women if not mitigated by fecundity. Mechanical age effects are counterbalanced by selection effects. The ever-separated tend to engage in first union and first birth at earlier ages than individuals in intact unions, prolonging exposure to higher parity progressions (Andersson 2020; Manning et al. 2014; Saarela & Finnäs 2014). This is especially true for individuals who sequence between cohabiting unions, sometimes called "serial cohabiters" (e.g., Cohen & Manning 2010). Finally, evolutionary perspectives have long maintained that men, more so than women, have evolved a predisposition toward multiple partners, although the anthropological theory is mixed as to whether this should translate to a positive relationship between the number of unions and fertility among men (See review by Borgerhoff Mulder 2020).

Completed cohort perspectives on births across unions

Most research on births across unions estimates the risk of events, such as parity-specific births, to test hypotheses about the drivers of births in higher-order unions. To study the relationship between dissolutions and re-partnering on ultimate fertility, completed fertility cohort approaches have the important basic advantage of measuring completed fertility and cumulated number of unions (van Imhoff 2001), rather than using synthetic cohorts and indirect age standardization (Hopcroft 2018). Early studies from the US suggest that remarried women fully or partially attained the fertility of those in intact unions (Cohen & Sweet 1974; Lauriat, 1969; Thornton 1978). Thomson and colleagues (2012) simulate completed family size with imputed data on birth rates across unions and found that childbearing after first unions can close to compensate for the loss of women's fertility due to union dissolution. Observational data on recent cohorts suggest that re-marriage recuperates fertility among divorced women in Italy (Meggiolaro & Ongaro 2010). Li (2006) estimates that re-married US women do not have higher fertility than never-separated women. Among studies analyzing both women and men, Van Bavel et al. (2012) pool EES data to predict the association between divorce and fertility at age 45, and find that divorce is negatively related to fertility for women but not for men. Jokela and colleagues (2010) show a positive effect of fertility on number of marriages for men but no such relationship for women and Forsberg and Tullberg (1995) find similar results for the number of cohabitations in a small Swedish sample.

This literature has significant limitations in assessing the "engine for fertility" argument and describing the relationship between number of unions and cohort fertility. First, studies tend to analyze marital unions. In Europe and the US, cohabitation is increasingly common (Thomson 2021) and it is not rare to enter parenthood within non-marital cohabitation (Schnor & Jalovaara 2020). Simultaneously, cohabitation is associated with early entry to first union and parenthood (Jalovaara 2012; Perelli-Harris et al. 2010). Even in a "demographic forerunner" setting such as Finland and the Nordic countries (Heuveline & Timberlake 2004), non-marital unions (Finland) tend to have higher dissolution rates than marriages (Jalovaara & Kulu 2018) and higher order unions tend to be cohabitations rather than marriages, especially for serial cohabitation (Eickmeyer & Manning, 2018). Consequently, the very prevalence of re-partnering is, to a large extent, non-marital cohabitation. Because marriage is sometimes used as a cap-stone event and afforded legal benefits regarding inheritance and custodianship, some cohabiting couples marry after childbirth (Holland, 2013), making marital unions partially conditioned on childbearing. Taken together, descriptions of the relationship between re-partnering and cohort fertility will be distorted by not enumerating cohabiting unions, and substantive interpretations will be convoluted.

Previous studies rely on survey data and, thus, risk underreporting male fertility and attrition based on union dissolution (Guzzo & Dorius 2016; Juby & Le Bourdais 1999). Limited sample size—expressly prevailing after restricting samples to respondents old enough for a complete cohort analysis—complicates statistical inference and prevents detailed analysis. Finally, men and women are rarely analyzed in the same study, which limits our ability to make basic statements on similarities or discrepancies in re-partnering fertility regimes across sex. We know of only one study which includes cohabiting unions of men and women (Forsberg & Tullberg 1995) and this study drew on a total of 375 men and 492 women, lacking information on childbearing beyond third births.

Study contribution

This study seeks to contribute to the understanding of the role of union dissolution and re-partnering on fertility by addressing the above stated caveats of previous research. We are able to do so by analyzing population-wide data on both marital and cohabiting unions covering the main reproductive years of men and women, a unique feature among countries that maintain population register.

Additionally, the population scale of the data allows us to study how partnering behavior differs by socioeconomic status. Jalovaara and colleagues (2020) suggest that, because higher union instability among poor or lower educated individuals disrupts fertility, births after separation may be the only pathway to higher parities in this group. Others propose that income effects on fertility are more salient for men and that this may be particularly important for childbearing in higher order unions where financial obstacles to parity progression are, on average, stronger (Hopcroft 2018; see also Lappegård & Rønsen 2013). However, studies on the influence of re-partnering on cohort fertility often do not have adequate sample sizes to test the association between cohort fertility and re-partnering reliably (Forsberg & Tullberg 1995; Van Bavel et al. 2012). Socioeconomic variation in re-partnering and fertility is complex and should be disseminated beyond the scope of the present study. However, keeping with the overarching aim to provide a comprehensive picture, we asses whether the direction of the association between number of unions and fertility is a universal feature of the entire population, or differs across salient groups defined according to social status.

Study context

The Nordic countries are often described as forerunners in the so called second demographic transition (SDT) especially with regard to partnering behavior—with a high prevalence of separation, re-partnering, cohabitation, and non-marital childbearing (Hoem et al. 2013; Lesthaeghe 2010; Väisänen 2017). Yet, Finland is not an obscure outlier in this respect. Many countries have or are progressing towards these patterns (Cherlin 2016; Perelli-Harris & Lyons-Amos 2016b), although the causes for this development may not necessarily concur with SDT arguments (Zaidi & Morgan 2017). Hence, our study context presents a strong case study of fertility in “serial monogamy” partnering regimes. Finland has a family-friendly welfare system with subsidized childcare and enforces employment contracts that allow parental leave for both men and women (Saarela & Finnäs 2014). These gender equity policy schemas and cultural context are associated with individualized incentives for family formation that would, according to institutional theory (McDonald 2000), lessen sex differences regarding partner behavior and childbearing. Hence, the Finnish case may be considered a conservative test for disparities between men and women concerning the association among union dissolution, re-partnering, and cohort fertility.

Methods

Data

We use individual-level data from registers containing yearly documentation of births, deaths, migration, co-residential unions, and marriages. The analytical population covers the entire Finnish-born birth cohorts of 1969–1972 that were alive and registered as residing in Finland in 2018, and who had been registered as residing in Finland since the year of their 18th birthday (N = 243,471). We focus on the population who remains resident in Finland to prevent the underestimation of births and unions that may have occurred abroad. All individuals are followed until age 46. Statistics Finland maintains an unusually long comprehensive population record of co-residential unions, starting in 1987. The Finnish registers contain information on the place of residence down to the specific dwelling, enabling the linkage of different sex individuals to co-residential couples. Therefore, the analysis of both cohabitation and childbearing histories for the age span of 18–46 is possible for the 1969–1972 birth cohorts.

Union dissolution, re-partnering and the number of unions

We measure the total number of unions by age 46 in two ways. We differentiate measures of marital unions only and enumerate all unique cohabitations and marriages (all unions). The marital status of a unique couple pair is defined by the event of marriage regardless of whether the marriage occurs at the onset or after a non-marital cohabitation with the same partner. Thus, a union that is at first non-marital and thereafter becomes marital is counted as one single marital union. This operationalization is motivated by the common occurrence of pre-marital cohabitation, non-marital fertility, and marriage after childbearing in Finland and aligns with the research design to capture the number of unique unions. Practically, we pair marriage records with Statistics Finland's definition for co-residence, which considers a person to live in a union if he or she is domiciled with a different-sex individual who is not a close relative (e.g., a sibling or a parent), in the same dwelling beyond 90 days, and the age difference to the other person does not exceed 20 years. The rule on age difference does not apply if the partners have a common child. This method has been established as accurate (Jalovaara & Kulu 2018; Saarela & Skirbekk 2020) and conforms to international standards for the identification of couple households (e.g., Kennedy & Fitch 2012). Union dissolution is derived from divorces, residential moves, and death registers. Most union dissolutions (98.8%) are due to divorces/separations, and 1.2% are due to bereavement. Both types of dissolution events are used to define the ever-dissolved population as both place individuals under risk of re-partnering and further childbearing. Excluding the bereaved population had no impact on the results. Appendix Figure A1 shows the fraction of the population ever partnering and ever re-partnering, based on information on marital unions only, and marital and cohabiting unions both. Marital re-partnering incidence is about 8%; whereas marital and cohabiting re-partnering incidence is about 39%. This underscores the value of including cohabitations in re-partnering measures.

Cohort fertility

We measure the cumulated number of children born to parents who are 46 or younger, as this is the latest observation with complete union histories. Birth register is used to track the complete fertility history of each person by linking parents to their children. These records are highly reliable for covering fertility compared with self-reported information, particularly for male fertility. Paternity is established around the date of delivery if the couple is married, and by formal consent of the father if the couple is not married. If contested, social services investigate paternity. Only about 2% of the children born have no registered father. Because of sex differences in fecundity by age, the cut-off of age 46 underestimates male completed fertility to a slight degree. Sensitivity analyses using the 1963 male birth cohort show that the effect of even a 10 year longer age range (e.g., measuring cohort fertility by age 55) is small, as only about 1.8% of births occur when the father is between 46 and 55 years old (Figure A2). Male fertility likely contributes little to completed fertility partly because of dependency on female partners' age-related fecundity. Figure A3 shows that, from age 46 to 55, the share of partnered men in the 1963 cohort who had a (female) partner who is 40 years or younger (which is a crude proxy for the probability of age-related infertility) moves from low (9%) to lower (0.2%). Robustness checks of previous research that use register data on male cohort fertility by age 47 in Sweden show that such measures capture almost all fertility (Barclay & Kolk 2020). Supplementary material tables A1 and A2 describe births across the number of unions.

Social strata

We operationalize social stratification by individual's socioeconomic status, measured as disposable income rank. We aim to assess if the re-partnering and fertility association is uniform across SES and do not model theoretical pathways among income, partnering, and fertility. Conceptually, the earnings rank at age 46 is strongly predictive of steep wage trajectories, achieved wage, labor market attachment, and human capital (Björklund et al. 2012). While income rank at 46 would be inappropriate to operationalize age or union-specific hazards of childbearing, it is useful to depict an individual's overall socioeconomic position. Our measure of income rank includes yearly earnings, capital income, and employment-contingent social security transfers, subject to state taxation. We use the income quartile of the age- and period-specific income around age 46, derived from age- and year-rank centiles of the entire working-age population. We use the maximum value of the year of the 45th birthday, and the year before and the year after this calendar year, to avoid incorporating temporary fluctuations. As an alternative specification of social stratification, further described below, we analyze variations across educational level. Table A3 describes the variables used in multivariate analysis.

Analytical strategy

First, we describe the prevalence of the never-partnered, ever-partnered, ever-separated, and ever re-partnered in the full population. Second, in multivariate models, we use Poisson regressions to accommodate the count distribution of the outcome variable, that is, the number of children born.

$$y = exp(\alpha + \beta_1 UnionCount + \beta_2 Sex + \beta_3 UnionCount \times Sex + \beta_4 BirthCohort)$$

In our baseline model above, y is the Poisson incidence rate or, in our case, the number of children, α to the intercept, and β to parameters to be estimated. The regressor variables are sex, union count, the interaction of sex and a union count, and birth cohort. Union count refers to the total accumulated number of unions by age 46 and the categories include zero unions, one union that is intact, one union that has separated, two, three and more unions. Individuals with one intact union by age 46 is the reference category. We create a union count variable that counts marriages only, and one that counts marriages and cohabitations. These are used in separate models. We estimate the average marginal effects (AME) and 95 % confidence intervals (CI) for women and men of every level of union count against the reference category of one union (never-separated). This can be interpreted as the association between a specific union count and mean number of children, compared to the baseline value. Comparisons of the AME of men and women show the similarities or differences in the relationship between union counts and average fertility among men and women, compared to men and women's respective baseline of one intact union. Exponentiated coefficients and test statistics from the poisson regression models can be found in appendix tables A3–A10**.** Model 1 is estimated separately for the measure using marital unions and the measure using all unions. We build on the baseline model to assess the influence of age at first union and the cumulated yearly duration in unions by age 46, which has been shown to be a decisive proximate determinant of union and fertility trajectories (Sobotka et al. 2011). We do not estimate the influence of age at first birth because we do not want to condition parenthood. To further investigate the role of union type, we analyze a combined measure of marriages and cohabitations across union count. Specifically, we categorize individuals according to whether they had only marital unions, only cohabiting unions, or both marital and cohabiting unions by age 46.

Finally, we examine heterogeneity in the association between union dissolution, the number of unions and cohort fertility across social strata. The model corresponds to baseline model with a three-way interaction of sex, union count, and income rank. As a sensitivity analysis, we use education as an alternative measure of socioeconomic status. We measure the highest attained educational level of each person, with four categories that correspond to the ISCED codes 1–2, 3–4, 5, and 6+ (UNESCO, 2012).

Results

Incidence of union dissolution, re-partnering, and births

First, we analyze the prevalence of partnering, union dissolution and re-partnering among the cohorts born between 1968 and 1971 by age 46, based on enumerating marriages and cohabitations. Table 1, panel A, shows that about 39% the full population have had more than one union by age 46, half have had a single union, and roughly a tenth has never married or cohabited. Out of the 218,236 individuals that ever partner, 40% are still in their first union at age 46, while about 12% have dissolved the first union and have not re-partnered, and about half have re-partnered (48%). From this, it can be derived that three quarters of individuals who dissolve a union have re-partnered by age 46 (93756/122944 = 0.76). Among the re-partnered population, 66% have partnered twice, 24% three times, and 10% four times or more. Given the sizable share of births in 2nd or higher unions (see Table A1), Table 1 shows that union dissolution and re-partnering is a salient feature that likely matters for total fertility in Finland.

Cohort fertility across higher order unions

Union dissolution, number of unions, and cohort fertility. Next, we analyze whether union dissolution and subsequent re-partnering is associated with higher fertility than remaining in one single union. Figure 1 displays the AME's of the total number of unions (marriages and cohabitations) on completed fertility by age 46, compared to individuals with a total of one intact (not-separated) union. Figure 1, Model A represents the base model that only includes the interaction between the number of unions and sex while adjusting for birth cohort. Compared to the baseline of one intact union, ever re-partnered individuals have higher fertility on average than those who separate without partnering, who have -0.8 (men) and -0.65 (women) fewer children by age 46. Still, those with more than one union have substantially lower fertility compared to men and women in one intact union by age 46. This negative effect is of the magnitude of -0.2 children for men with 2, 3, 4, or more unions, and increases from -0.2 to -0.35 children at 4 or more unions for women. In sum, in contrast to previous studies on re-marriage, empirical evidence from all unions in Finland does not support the hypothesis that re-partnering can, fully or moderately, recuperate fertility lost from union dissolution. The negative effect of union dissolution is stronger for men than for women, at a magnitude of 0.01 children, whereas re-partnering somewhat less strongly compensates for this fertility deficit for women. Next, we analyze how core correlates of union dissolution and re-partnering may influence this association.

The Influence of Union Duration. The separated and the re-partnered population have substantially fewer cumulated years with a partner and thus less in-union exposure, where the risk of childbearing is greatest (e.g., Hoem et al. 2013). Model B in Figure 1 depicts the relationship between the number of unions and completed fertility after accounting for group differences in union duration by age 46. The negative association previously shown in Model A is substantially reduced in Model B, to between -0.05 and -0.1 children across the number of unions for men and women, compared to individuals with one intact union. This supports the notion that union dissolution decreases fertility by reducing the total exposure to partners, also among those who eventually re-partner.

The Influence of Age at first union. Separated and re-partnered individuals start their first union at an earlier age than those who remain within a single union (Raley & Sweeney 2020), which provides time for childbirths in first and higher order unions. Model C adjusts the age at first union among those who ever-partnered (note that never-partnered individuals are excluded in Model C). The negative estimate for re-partnering is exacerbated once the difference among the intact and separated populations in the age at first union is accounted for. For example, men and women who re-partnered four or more times are estimated to have -0.6 fewer children than intact couples (about 29% of completed fertility in intact couples). In Appendix Figure A4, for commensurability to previous research which sometimes includes background characteristics in multivariate analysis (e.g., Jokela et al. 2010), we reiterate all analyses in Figure 1 A to C, after adjusting for parental socioeconomic position and regional characteristics (urban/rural). This does not alter the results in any way.

Figure 1 about here. AME (95% CIs) of the number of all unions (cohabitations and marriages) on cohort fertility by age 46 for men and women, adjusted for birth cohort (Model A, N = 243,631), adjusted for birth cohort and union duration (Model B, N = 243,631), adjusted for birth cohort and age at first union (Model C, N=218,236).

Cohort fertility across higher order marriages and cohabitation

Enumerating unions by marriage. Up until now, we have enumerated unique marriages and cohabitations without distinction. Most previous research has enumerated solely marriages (and divorce) to estimate the recuperating effect of remarriage on fertility. For comparability and to re-asses these findings on a population scale, Figure 2 repeats the exercises of Figure 1 counting only the events of marriage, divorce, and re-marriage. In sharp contrast to Model A in Figure 1, Model A in Figure 2 shows that the completed fertility for the re-married group far exceeds that of individuals in one intact marriage. Men and women who have had two marriages by 46 have, on average, 0.23 and 0.2 more children, respectively; the corresponding figures for men and women with three or more marriages are 0.5 and 0.55, respectively. The negative effect of divorce without re-partnering is substantially smaller than estimates based on all unions. In Model B in Figure 1, we see that adjusting for the difference in exposure time in marriage between the intact marital and divorced population does not weaken the positive association between cohort fertility and additional unions. Model C, which controls for age at first marriage and includes only the ever-married, shows that estimated fertility is lower among the re-married compared to intact married individuals once the earlier age at first birth of the latter group is accounted for.

Figure 2 about here. AME (95% CIs) of the number of marital unions on cohort fertility by age 46 for men and women, adjusted for birth cohort (Model A, N = 243,631), adjusted for birth cohort and marital union duration (Model B, N = 243,631), adjusted for birth cohort and age at first marriage (Model C, N=165,296).

Enumerating unions by marriage and cohabitation separately. The contrasting results of Figure 1 and 2 suggest that fertility behavior after union dissolution is heterogeneous with respect to the civil status of the first and re-partnered unions. Figure 3 shows the AME's of union counts on fertility across distinct re-partnering trajectories: the never-married (serial cohabitation), the only-married (serial marriage), and individuals who have had at least one marital and cohabiting union in any order. Individuals with one intact union by age 46 form the reference category. This reference category includes marriages (85% intact unions) as well as cohabitations (15% intact unions). For completion, Appendix figures A5 and A6 hold intact marriages or intact cohabitations, respectively, as the reference category. The only-married—individuals who re-marry but never have cohabiting unions (that do not transform to a marital union by age 46)—are the only group where multiple unions are associated with increased rather than decreased average number of children born, compared to being in a single intact union. Ever-married individuals who, in addition to this, had at least one cohabiting union all have roughly 0.25 fewer children, across union counts. Serial cohabiters—those who never married and have had multiple cohabitations by age 46—have roughly 1.0 fewer children on average. Sex differences within categories exist, but, importantly, do not follow a uniform pattern in relation to re-partnering. For example, serial cohabitation has a higher negative association for men than women (of about 0.05 children) at two unions, but a lower negative association among the population with four or more unions. Re-partnering is more strongly negatively associated with fertility for women than men among those who are ever-married, but multiple re-marriage is more positively associated for women than for men among those who only have marital unions. This underlying heterogeneity shown in Figure 3 problematizes the interpretation of previous research, which typically presents a linear association of the number of unions (or dichotomizes those ever and never re-partnered) rather than modeling counts. The fact that the married-only group is only a seventh of the ever re-partnered and the only group with a positive association with fertility underscores that union dissolution unlikely serves as an effective engine for fertility.

Figure 3 about here. AME (95% CIs) of the number of all unions (marriages and cohabitations) on cohort fertility by age 46 for men and women by civic status trajectory, adjusted for birth cohort (N = 243,631).

Cohort fertility across higher order by social strata

Analyses up to now have assumed that the association between the number of unions and fertility is homogenous across salient population subgroups. Figure 4 shows estimates from the "base model" of Model A in figures 1 and 2 which control only for birth cohort but add an interaction term to earnings income rank. The right-hand side (A1 to A4) enumerates all unions. The left-hand side (B1 to B4) enumerates marriages only.

Models A1 to A4 show that the negative association of re-partnering is weaker for men and women the lower the income rank. Men in the lowest income quartile who amassed particularly many unions have slightly higher fertility than men with one intact union by age 46. The relationship between re-partnering and fertility displays a less coherent pattern across income rank for women. Models B1 to B4 indicate that the positive association of re-marriage with fertility, compared to intact marriages, is stronger for men and women the lower the income rank. In sum, Figure 4 suggests heterogeneity in the association between union re-partnering and fertility. However, Figure 4 likewise shows that the direction of this association is fairly uniform across groups that, on average, have disparate conditions for childbearing and partnering across life-course trajectories. Appendix Figure A7 operationalizes socioeconomic status as educational level rather than income rank. Similar to Figure 4, individuals with high education show a stronger negative association between union count and mean fertility, although sex differences found in Figure 4 are less strong.

Figure 4 about here. AME (95% CIs) of the number of all unions (Models A1 – A4) and all marriages (Models B1 – B4) on cohort fertility by age 46 for men and women by earnings income rank quartiles, adjusted for birth (N = 241,780).

Summary and Discussion

In the mid-twentieth century, re-marriage from divorce or widowhood in childbearing ages was a fairly inconspicuous and yet marginal phenomenon. Today, significant proportions of individuals enter multiple unions across the life course, to a large extent through non-marital cohabitation. This is a defining characteristic of partnering regimes in many contemporary societies that likely has an impact on childbearing behavior, but it is unclear just how. Union dissolution reduces fertility because individuals effectively exit the primary context of childbearing. Simultaneously, union dissolution enables childbearing in subsequent unions via re-partnering and may serve as an engine for fertility. Hence, a first grasp of the association among union dissolution, number of unions, and cohort fertility is essential for understanding contemporary fertility regimes. Yet, ample empirical cohort fertility analysis on the issue is lacking. Despite the fact that research has long indicated that cohabitation drives much dissolution and re-partnering, studies have only examined non-marital unions, and data limitations and sample sizes have likely maintained this research gap.

This study used Finnish register data to enumerate every birth, marriage, and cohabitation occurring between ages 18 and 46 of men and women in four birth cohorts. First, we show that re-partnering is common in Finland. Among the ever-partnered by age 46, it is almost as common to have formed more than one union as it is to have formed a single union. We find that when only marriages are enumerated, the remarriage is ostensibly positively associated to cohort fertility, compared to remaining in a single intact marriage. However, when non-marital cohabiting unions and their dissolution are included in this measure, individuals with more unions have markedly fewer children compared to those in a single intact union. This relationship is strongly related to the cumulated union duration between the never-separated and partnered population. Considering that the separated and re-partnered population enter first union at an earlier age increases disparities in cohort fertility.

Further examining re-partnering trajectories, we show that individuals who only marry (and re-marry) do increase fertility, while cohabiters, particularly serial cohabiters, do not achieve levels of fertility on par with individuals in intact unions. Findings suggest that the strength of the association between union numbers differs insignificantly between men and women. At the same time, there are no uniform sex differentiated patterns across the number of re-partnered unions. The most robust differences between men and women are in the never-partnered and the separated but never re-partnered population, where men have somewhat lower fertility than women. Examining variation across income rank, we find that the negative effect of union counts increases with income category. For men in the lowest income quartile, very high union order is slightly positively related to mean fertility for men, but not for women. Likewise, the positive effect of re-marriage decreases with income.

These results have implications for (a) union dissolution and re-partnering as engines for fertility, (b) the conceptualization of multiple unions, or "serial monogamy," as a family and fertility regime, (c) the meaning of marriage and cohabitation, and (d) the interplay between sex, social stratification, and fertility.

This study shows that the negative effect of union dissolution on fertility is unlikely to be recuperated by births in subsequent re-partnered unions in Finland, contradicting the engine for fertility argument. The re-partnered population have more children than those who do not re-partner after union dissolution, but the average fertility of the re-partnered population is markedly lower than those in intact unions. Nonetheless, re-partnering may well be a pathway to higher ultimate fertility for segments of the population, and we indeed show that the fairly marginal trajectory of "serial-marriage" is associated with high fertility. Future research may investigate to what extent this is a causal effect of union dissolution. However, our results suggest that, on the aggregate, dissolution will not serve as an engine for fertility. Rather, our findings give pause to contemporary fertility theories that highlight the negative forces of union dissolution for fertility—potentially driven by imbalance in gender roles (Goldscheider et al. 2015) or value shifts more broadly construed (Zaidi & Morgan 2017).

The stark differences between our findings based on marital count versus results based on all-unions are important to consider. In terms of research design, this shows that a reliance on marital events distort a general analysis between re-partnering and fertility. However, it does not mean one should disregard civil status. Contrarily, it is indicative of both the strong selection into cohabitation and marriage among the re-partnered population, as well as the salience of marriage as a context for childbearing. Those who re-partner but never marry by age 46, sometimes called "serial cohabiters," constitute 26% of all re-partnered individuals and have markedly lower completed fertility. This is in line with arguments on selective stocks of the separated and partnered inclined to union stability, with negative implications for fertility. That the re-married-only population have higher completed fertility than the married, never-divorced suggest that marriage remains a favored union format for childbearing in Scandinavia (Lappegård & Noack 2015), a region otherwise illustrated as having deinstitutionalized marriage. This indicates that the causal order is one where birth or intention of birth begets marriage, possibly serving as a capstone to childbearing unions (Cherlin 2020; Holland 2013).

The mere prevalence of multiple unions and their relation to fertility demonstrated in the case of Finland suggest that union dissolution and re-partnering is critical to understanding fertility in the 21st century (Lichter & Qian 2019). In demographic research, there is currently an ambivalence regarding vocabulary denoting re-partnering as part of a general fertility regime. The concept of multi-partner fertility (MPF) includes reproductive unions only. However, empirical work on MPF often shows interest in union histories and partly operationalizes these in analysis when, for example, using civil status as a predictor or mediating variable (e.g., Lappegård & Rønsen 2013). The notion of serial cohabitation excludes marital unions also when a union is preceded or followed by a cohabiting union. However, we show that among the population of ever re-partnered by age 46, 61% have entered at least both marital and cohabiting unions while only 26% are serial cohabiters. "Step-family fertility" denotes a couple-perspective rather than an individual trajectory, representing a specific birth rather than the total fertility accumulated in various household constellations. It seems motivated to make use of concept such as "Serial monogamy", that denote sequences of unions not restricted by civic status or childbearing, when studying fertility in the context of re-partnering.

Demographic research on childbearing across unions has focused on sex differences in step-family childbearing owing to sex differences in time spent on childcare post-separation and age-related fecundity (e.g., Ivanova et al. 2014), and evolutionary theory on sex differences in mating strategies (Borgerhoff Mulder 2020). We find that the negative relationship between the number of unions and cohort fertility is somewhat stronger for women than for men, at a magnitude of up to 0.1 fewer children. However, the negative association cohabitation is more pronounced for men than for women, but less pronounced at four or more unions. Among those whose union trajectories include both cohabitations and marriages, the negative association is stronger for women. The positive effect among those who partner and re-partner in marital unions is stronger for women. In sum, a uniform gendered relationship between re-partnering and cohort fertility is not borne out of the data. However, we find sex-disparities in the positive effect of additional unions which is larger among low income earners. Union number is slightly positively related to mean fertility for low SES men, but not low SES women. Moreover, the "fertility premium" is greater for remarriage among low SES men and women, and the "fertility deficit" is smaller for all union partnering among low SES individuals. Rather than echoing an income effect, this is congruent with the notion of uninhibited childbearing in low socioeconomic strata (Guzzo 2017; Jalovaara et al. 2020).

The findings should also be considered in light of the limitations and scope of the study. It is worth repeating that we looked at fertility of formed unions and, so, condition our analysis on the occurrence of re-partnering. Again, this design is congruent with our aim to show how completed fertility differs across union count compared to those who remain in intact unions, and to assess the possibility of union dissolution as an engine for fertility. Nevertheless, future research on the topic should integrate the role of re-partnering to study, for example, sex and socioeconomic patterns in relation to completed fertility. Second, it is not straightforward to construe a concept of completed fertility for men. However, we showed that our data-driven cut-off point at age 46 vastly captured men's completed fertility and its impact on dissolution as an engine for fertility at the population level. Sex differences may still emerge at the tails of the distribution due to the continued childbearing of older men who may also have had multiple unions. Answering how male fertility and re-partnering at ages beyond female infertility contribute to sex differences in fertility provides an intriguing venue for future research. Third, we have focused our analysis on those with at least one union, whereas fertility also takes place outside of unions. Recent research suggests that having a first birth outside of a cohabiting or marital union likely boosts childbearing across unions (Thomson et al. 2021). This study only assessed the prevalence of non-union births (e.g., Table A1) and the dynamics of non-union births deserve further attention. Fourth, union formation, union separation, and fertility are deeply interdependent in that the anticipation or failure of childbearing impacts union formation and dissolution. Numerous causal pathways operate here. Revealing these processes is not the aim of the paper, however, we begin to fill the empirical gap in the core association of the issue, a task that arguably should be allowed to precede analysis on causal inference. Finally, the presented patterns may reflect the particular context of the Nordic countries, characterized by dual-earner households, shared parental investment, and social security schemas promoting this behavior. It is good practice to avoid hastily generalizing from studies without a cross-comparative design. Simultaneously, the spread of non-marital cohabitation, childbearing, and re-partnering, as well as the high female labor market participation in Finland, does reflect the direction in which most Western and several non-Western industrialized countries have been heading for decades. We believe that our study will resonate with future ventures to understand fertility in the context of serial monogamy across societies (Cherlin 2016; Perelli-Harris & Lyons-Amos 2016b).

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Tables

Table 1. Prevalence of partnering and re-partnering by age 46, total population. All marital and cohabiting unions.

	Total population (%)		Ever-partnered (%)	Re-partnered (%)
Never partnered	25,395 (10)			
Partnered, never re-partnered	124,471(51)	*Intact*	95,283 (40)	
		Separated	29,188 (12)	
Ever Re-partnered	93,756 (39)	*2 unions*	62,056 (25)	(65)
		3 unions	22,345 (9)	(25)
		4+ unions	6,864 (3)	(7)
		5+ unions	2,500 (1)	(3)
Total	243,631 (100)		218,236 (100)	93,756 (100)

Note. Percentage points rounded to nearest integer.

Figures

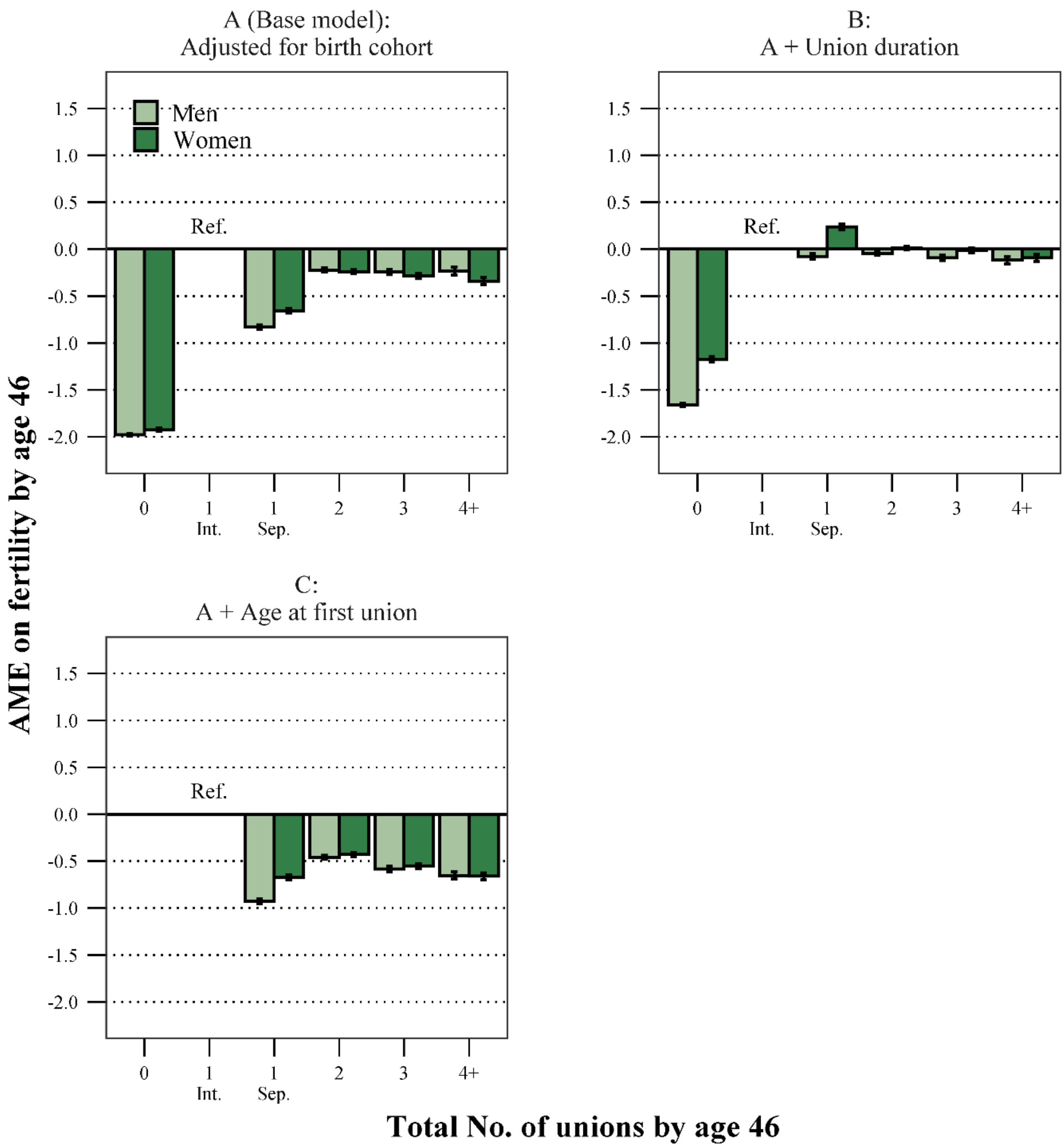

Figure 1. AME (95% CIs) of the number of all unions (cohabitations and marriages) on cohort fertility by age 46 for men and women, adjusted for birth cohort (Model A, N = 243,631), adjusted for birth cohort and union duration (Model B, N = 243,631), adjusted for birth cohort and age at first union (Model C, N=218,236).

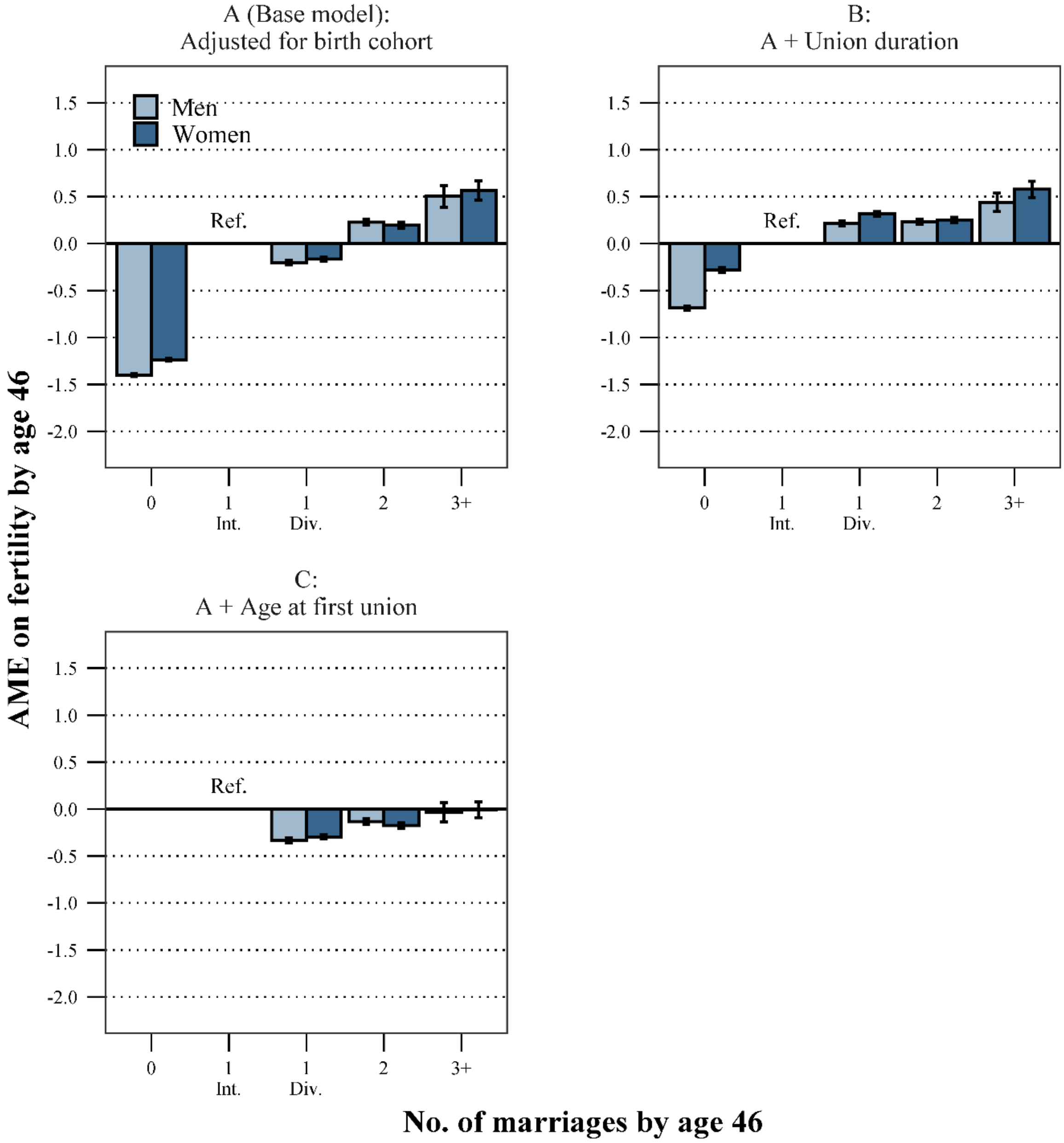

Figure 2. AME (95% CIs) of the number of marital unions on cohort fertility by age 46 for men and women, adjusted for birth cohort (Model A, N = 243,631), adjusted for birth cohort and marital union duration (Model B, N = 243,631), adjusted for birth cohort and age at first marriage (Model C, N=165,296).

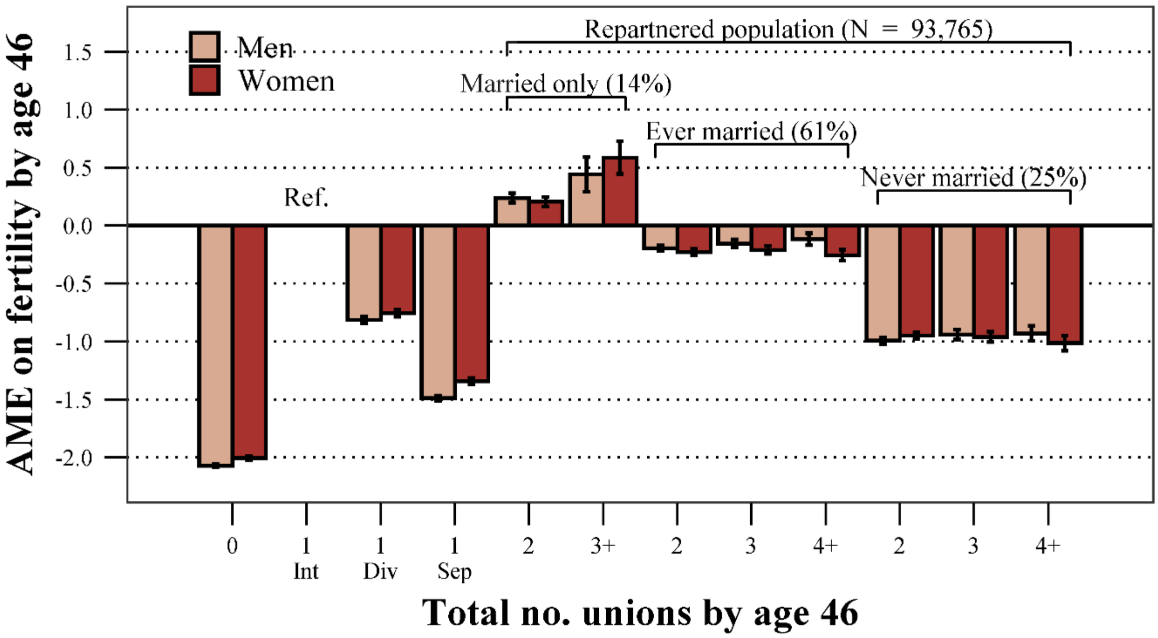

Figure 3. AME (95% CIs) of the number of all unions (marriages and cohabitations) on cohort fertility by age 46 for men and women by civic status trajectory, adjusted for birth cohort (N = 243,631).

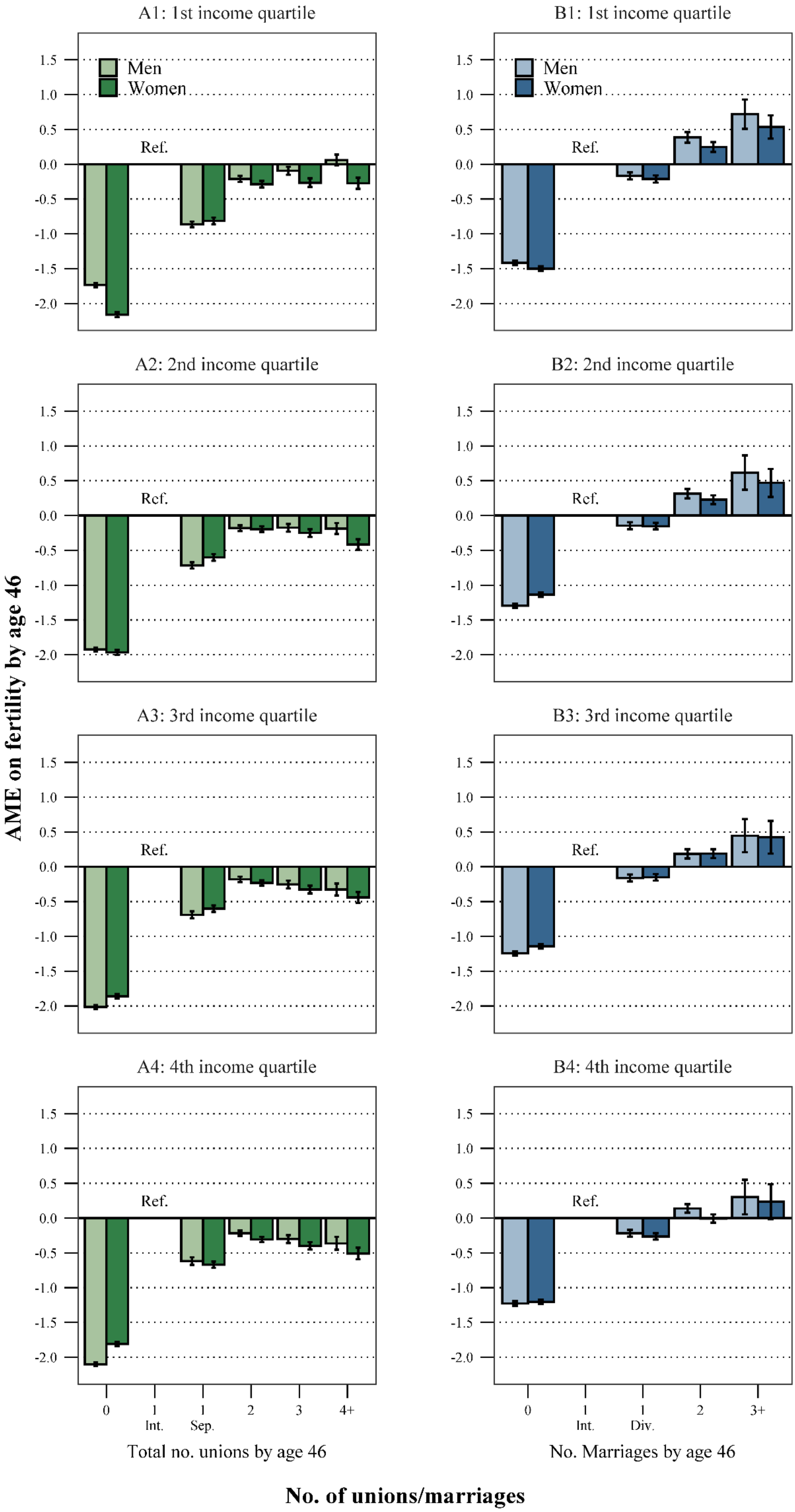
A1: 1st income quartile
B1: 1st income quartile
A2: 2nd income quartile
B2: 2nd income quartile
A3: 3rd income quartile
B3: 3rd income quartile
A4: 4th income quartile
B4: 4th income quartile
Men
Women
Ref.
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
-2.0
AME on fertility by age 46
0
1 Int.
1 Sep.
2
3
4+
Total no. unions by age 46
0
1 Int.
1 Div.
2
3+
No. Marriages by age 46
No. of unions/marriages

Figure 4. AME (95% CIs) of the number of all unions (Models A1 – A4) and all marriages (Models B1 – B4) on cohort fertility by age 46 for men and women by earnings income rank quartiles, adjusted for birth (N = 241,780).

Appendix

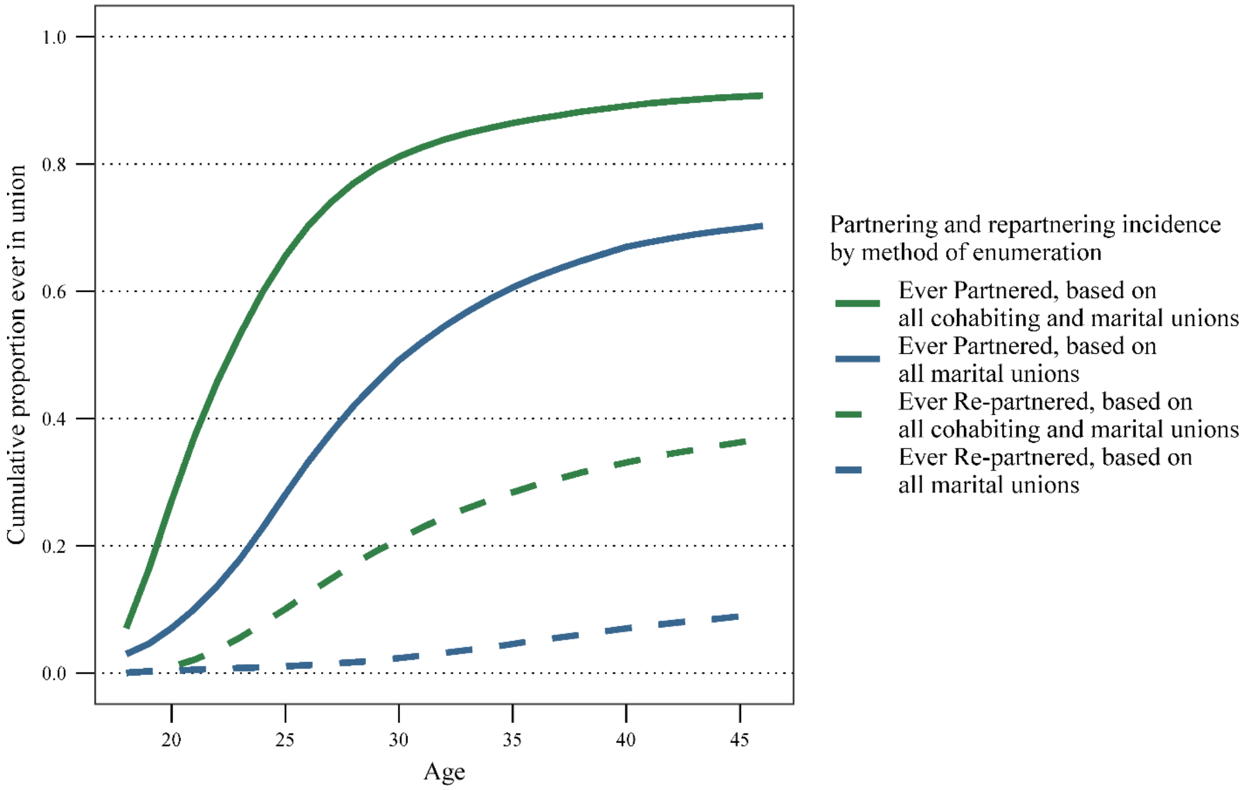

Figure 1A. Cumulative fraction ever partnered and ever re-partnering age 18 to 46, as estimated from marriages versus from marriages and cohabiting unions

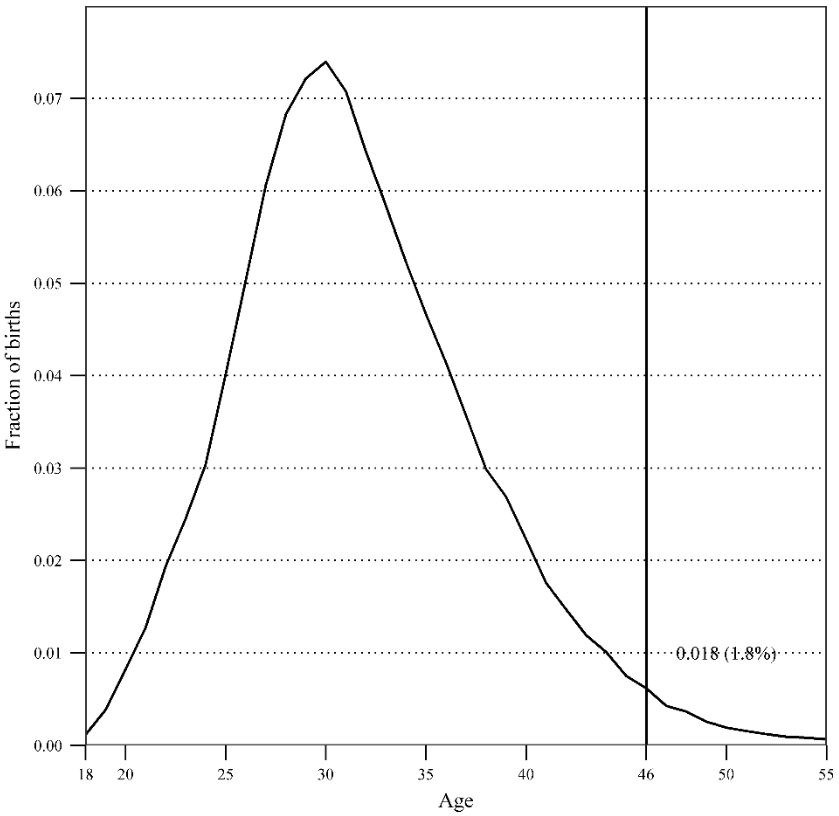

Figure 2A. Cumulative fertility age 18‒55, 1963 male birth cohort.

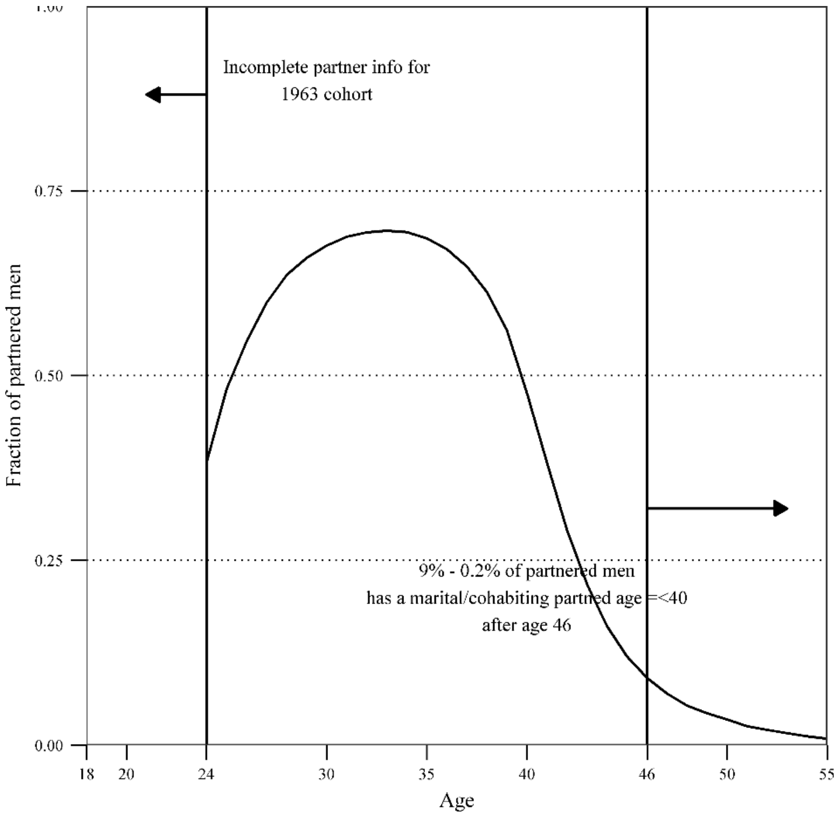

Figure 3A. Cumulative fraction of (female) partners age 40 or younger from age 24–55, 1963 married or cohabiting male birth cohort.

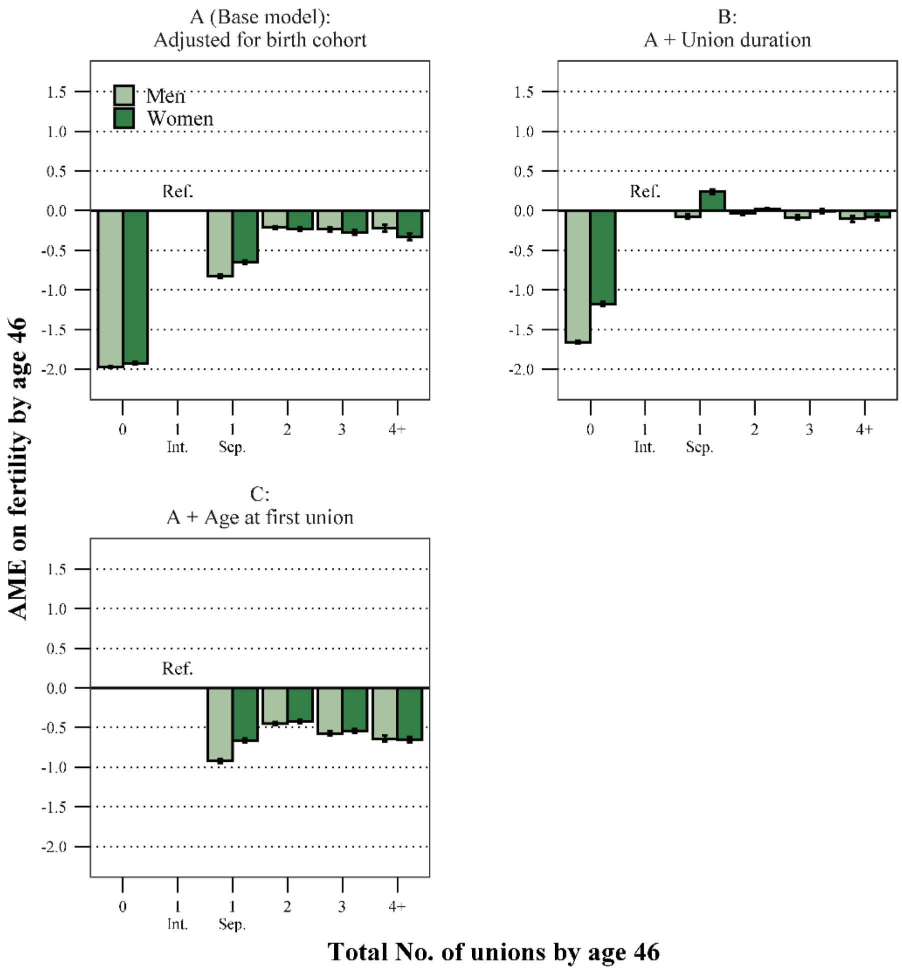

Figure A4. AME (95% CIs) of the number of all unions (cohabitations and marriages) on cohort fertility by age 46 for men and women, adjusted for birth cohort, parents socioeconomic position, and a dummy for urban/rural region of upbringing (Model A, N = 243,631), adjusted for birth cohort and union duration (Model B, N = 243,631), adjusted for birth cohort and age at first union (Model C, N=218,236). Note: parent's socioeconomic position: EGP occupational class code schema using a dominance approach (takes the highest ranking position of the mother or father). Urban/rural region of upbringing uses Statistics Finland's schema for population density and is measured at age 18.

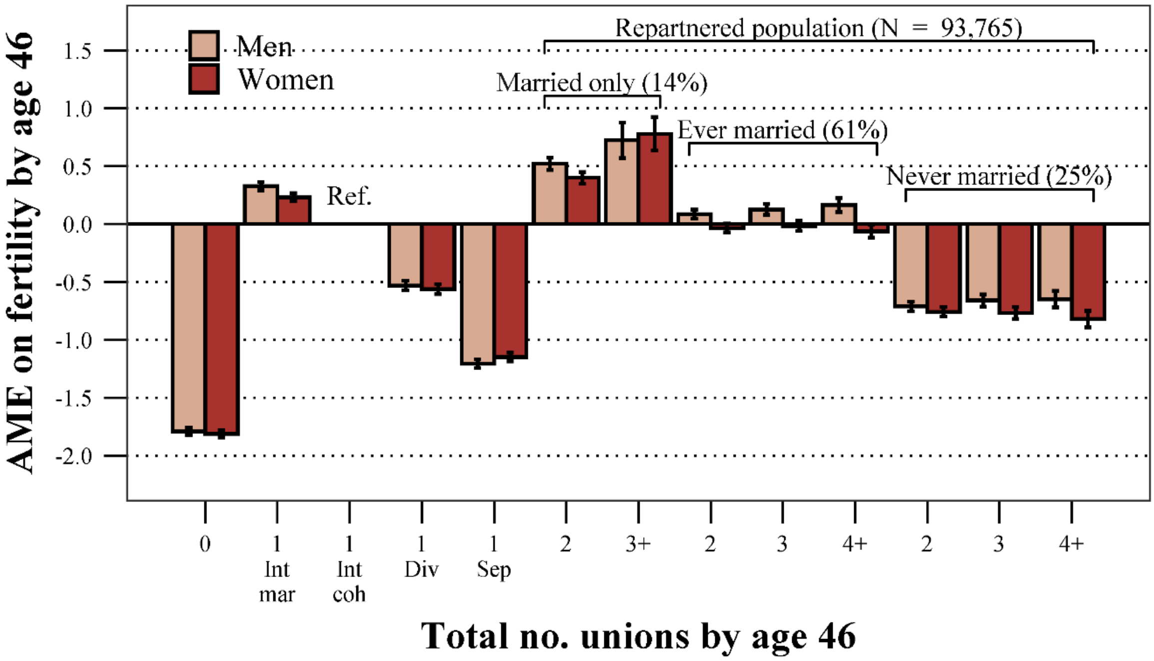

Figure A5. AME (95% CIs) of the number of all unions (marriages and cohabitations) on cohort fertility by age 46 for men and women by civic status trajectory, adjusted for birth cohort (N = 243,631). Reference category is intact cohabiting unions.

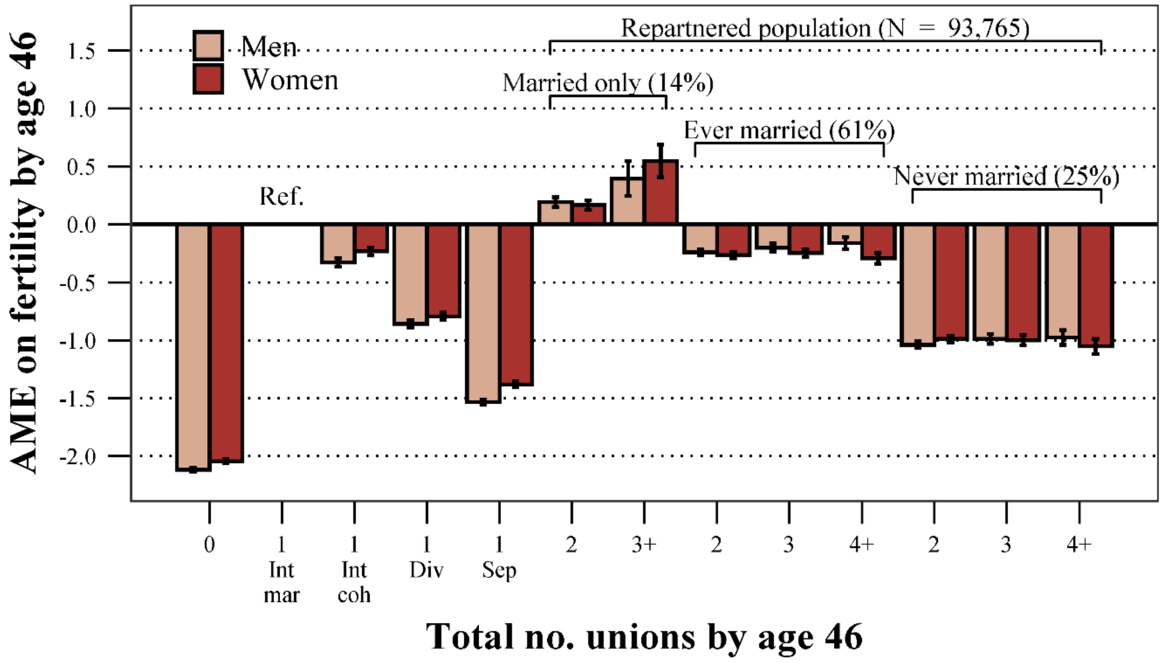

Figure A6. AME (95% CIs) of the number of all unions (marriages and cohabitations) on cohort fertility by age 46 for men and women by civic status trajectory, adjusted for birth cohort (N = 243,631). Reference category is intact marital unions.

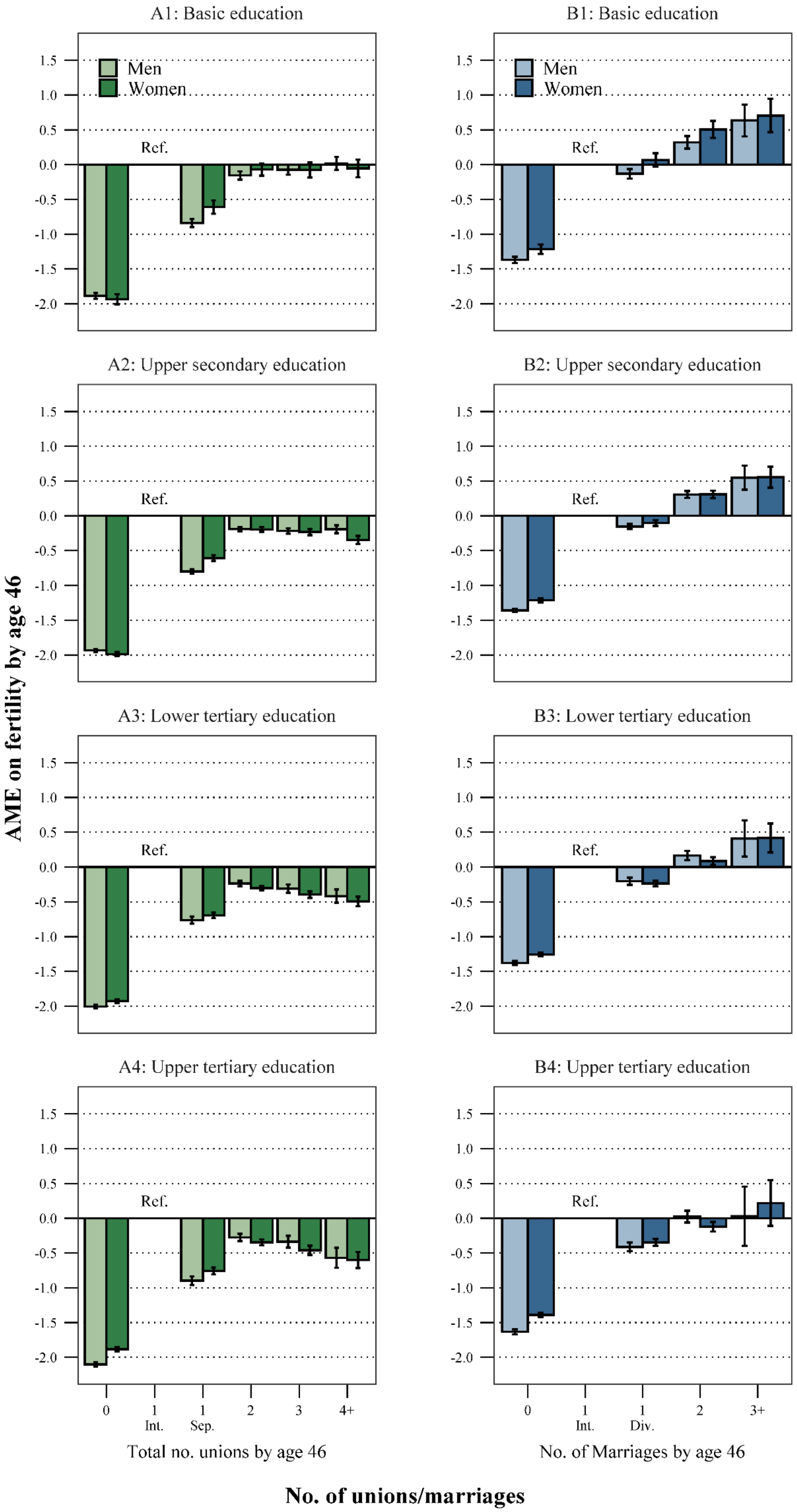
A1: Basic education
B1: Basic education
A2: Upper secondary education
B2: Upper secondary education
A3: Lower tertiary education
B3: Lower tertiary education
A4: Upper tertiary education
B4: Upper tertiary education
Men
Women
Ref.
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
-2.0
AME on fertility by age 46
0
1
Int.
1
Sep.
2
3
4+
Total no. unions by age 46
0
1
Int.
1
Div.
2
3+
No. of Marriages by age 46
No. of unions/marriages

Figure A7. AME (95% CIs) of the number of all unions (Models A1 – A4) and all marriages (Models B1 – B4) on cohort fertility by age 46 for men and women by highest educational level, adjusted for birth (N = 243,631)

Table 1A. Births across unions by age 46, men and women and measure of enumeration

All unions		**0 unions**		**1 union**		**2 unions**		**3 unions**		**4 unions**		**5+ unions**	
	parity	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*
Men	0	14525	95	12027	19	5518	18	2049	19	577	18	231	20
	1	478	3	9241	15	5985	20	2440	23	796	24	318	27
	2	172	1	23797	38	10451	35	3478	32	987	30	316	27
	3	53	0	11996	19	5366	18	1728	16	520	16	181	15
	4	15	0	3105	5	1856	6	742	7	246	8	72	6
	5+	4	0	2122	3	881	3	390	4	131	4	55	5
Women	0	8643	85	9600	15	4936	16	1977	17	692	19	289	22
	1	950	9	8716	14	5837	19	2371	21	785	22	322	24
	2	387	4	25207	40	11602	37	3793	33	1073	30	347	26
	3	125	1	13415	21	6039	19	2096	18	659	18	220	17
	4	38	0	3698	6	2039	6	783	7	253	7	92	7
	5+	15	0	2278	4	938	3	378	3	132	4	57	4
Marriages		**0 unions**		**1 union**		**2 unions**		**3 unions**		**4+ unions**			
sex	*parity*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*		
Men	0	26007	62	8107	11	770	8	39	6	4	7		
	1	6524	15	11053	16	1548	17	127	19	6	10		
	2	6694	16	29272	41	3037	33	185	27	13	22		
	3	2280	5	15260	22	2138	23	150	22	16	28		
	4	562	1	4298	6	1077	12	96	14	3	5		
	5+	207	0	2633	4	640	7	87	13	16	28		
Women	0	17928	50	7285	10	863	8	56	6	5	4		
	1	7002	19	10386	14	1467	14	114	13	12	10		
	2	7586	21	31178	42	3393	33	228	26	24	20		
	3	2626	7	17030	23	2611	26	259	29	28	23		
	4	671	2	4894	7	1190	12	121	14	27	22		
	5+	248	1	2734	4	676	7	114	13	26	21		

Table A2. Descriptive statistics.

	Men (N=122849)	Women (N=120782)	Total (N=243631)
Age at first union			
Mean	25.4	23.3	24.3
Median	24.0	22.0	23.0
Q1, Q3	22.0, 28.0	20.0, 25.0	21.0, 27.0
Age at first marriage			
Mean	30.1	28.0	29.0
Median	29.0	27.0	28.0
Q1, Q3	26.0, 34.0	24.0, 32.0	25.0, 33.0
Union duration			
Mean	18.1	19.7	18.9
Median	20.0	22.0	21.0
Q1, Q3	14.0, 23.0	16.0, 25.0	15.0, 24.0
Marriage duration			
Mean	4.2	4.5	4.3
Median	4.0	5.0	5.0
Q1, Q3	3.0, 5.0	4.0, 6.0	3.0, 5.0
Birth cohort			
1969	32188 (26.2%)	31573 (26.1%)	63761 (26.2%)
1970	31200 (25.4%)	30876 (25.6%)	62076 (25.5%)
1971	30072 (24.5%)	29917 (24.8%)	59989 (24.6%)
1973	29389 (23.9%)	28416 (23.5%)	57805 (23.7%)
Income quartile			
1st	31186 (25.5%)	29259 (24.5%)	60445 (25.0%)
2nd	29398 (24.1%)	31047 (26.0%)	60445 (25.0%)
3rd	29913 (24.5%)	30532 (25.5%)	60445 (25.0%)
4th	31687 (25.9%)	28758 (24.0%)	60445 (25.0%)
Educational level			
Basic	17816 (14.5%)	8976 (7.4%)	26792 (11.0%)
Upper secondary	57690 (47.0%)	43924 (36.4%)	101614 (41.7%)
Lower tertiary	28704 (23.4%)	42974 (35.6%)	71678 (29.4%)
Higher tertiary	18639 (15.2%)	24908 (20.6%)	43547 (17.9%)

Table A3. Poisson regression of completed fertility on total number of unions (marriages and non-marital cohabitations). Corresponds to Figure 1, models A, B and C.

	Model A		Model B		Model C	
	b	se	b	se	b	se
Sex (Ref. = Men)	1.053***	(0.005)	0.949***	(0.004)	0.949***	(0.004)
Number of unions (Ref. = 1 intact union)						
0 unions	0.034***	(0.001)	0.093***	(0.003)		
1 union, separated	0.594***	(0.005)	0.957***	(0.008)	0.594***	(0.005)
2 unions	0.892***	(0.005)	0.976***	(0.005)	0.799***	(0.004)
3 unions	0.881***	(0.007)	0.950***	(0.007)	0.745***	(0.006)
4+ unions	0.885***	(0.010)	0.937***	(0.011)	0.714***	(0.008)
Sex × no. of unions						
Women × 0 unions	3.130***	(0.117)	3.473***	(0.130)		
Women × 1 union, separated	1.171***	(0.013)	1.188***	(0.013)	1.163***	(0.013)
Women × 2 unions	0.997	(0.007)	1.032***	(0.008)	1.003	(0.007)
Women × 3 unions	0.985	(0.011)	1.044***	(0.011)	1.001	(0.011)
Women × 4+ unions	0.951**	(0.015)	1.011	(0.016)	0.975	(0.016)
Birth year (Ref. = 1969)						
1970	0.993	(0.004)	0.991*	(0.004)	0.992	(0.004)
1971	0.997	(0.004)	0.993	(0.004)	0.996	(0.004)
1972	0.997	(0.004)	0.990*	(0.004)	0.993	(0.004)
Cumulated union duration			1.050***	(0.000)		
Age of first union					0.953***	(0.000)
Observations	243631		243631		218220	
Pseudo R^2	0.095		0.130		0.034	
chi2	75928.6		104837.6		24027.3	

Exponentiated coefficients, standard errors in brackets, * p<0.05, * p<0.01, * p<0.001

Table A4. Poisson regression of completed fertility on the number of marriages. Corresponds to Figure 2, models A, B and C.

	Model A		Model B		Model C	
	b	se	b	se	b	se
Sex (Ref. = Men)	1.033***	(0.004)	0.972***	(0.004)	0.967***	(0.004)
Number of marriages (Ref. = 1)						
0 marriages	0.337***	(0.002)	0.615***	(0.006)		
1 marriage, divorced	0.905***	(0.006)	1.122***	(0.008)	0.853***	(0.005)
2 marriages	1.109***	(0.008)	1.132***	(0.008)	0.941***	(0.007)
3 marriages	1.238***	(0.028)	1.247***	(0.029)	0.984	(0.023)
Sex × no. of marriages						
Women × 0 marriages	1.284***	(0.011)	1.364***	(0.012)		
Women × 1 marriage, divorced	1.022*	(0.009)	1.055***	(0.009)	1.014	(0.009)
Women × 2 marriages	0.983	(0.010)	1.013	(0.010)	0.976*	(0.010)
Women × 3+ marriages	1.017	(0.030)	1.070*	(0.032)	1.013	(0.031)
Birth year (Ref. = 1969)						
1970	0.993	(0.004)	0.993	(0.004)	0.999	(0.005)
1971	0.996	(0.004)	0.995	(0.004)	1.008	(0.005)
1972	0.997	(0.004)	0.994	(0.004)	1.008	(0.005)
Cumulated marriage duration			1.031***	(0.000)		
Age of first marriage					0.967***	(0.000)
Observations	243631		243631		165214	
Pseudo R^2	0.080		0.092		0.025	
chi2	64243.4		74203.9		13203.1	

Exponentiated coefficients, standard errors in brackets, * p<0.05, * p<0.01, * p<0.001

Table A5. Poisson regression of completed fertility on total number of unions (marriages and non-marital cohabitations) Corresponds to Figure A4, models A, B and C.

	A		B		C	
	b	se	b	se	b	se
Sex (Ref. = Men)	1.053***	(0.005)	0.949***	(0.004)	0.949***	(0.004)
Number of unions (Ref. = 1 intact union)						
0 unions	0.034***	(0.001)	0.093***	(0.003)		
1 union, separated	0.596***	(0.005)	0.961***	(0.008)	0.597***	(0.005)
2 unions	0.895***	(0.005)	0.980***	(0.005)	0.803***	(0.004)
3 unions	0.885***	(0.007)	0.955***	(0.008)	0.750***	(0.006)
4+ unions	0.892***	(0.010)	0.945***	(0.011)	0.720***	(0.008)
Sex × no. of unions						
Women × 0 unions	3.115***	(0.119)	3.453***	(0.132)		
Women × 1 union, separated	1.172***	(0.013)	1.186***	(0.013)	1.163***	(0.013)
Women × 2 unions	0.997	(0.007)	1.031***	(0.008)	1.003	(0.007)
Women × 3 unions	0.985	(0.011)	1.045***	(0.011)	1.001	(0.011)
Women × 4+ unions	0.949**	(0.015)	1.010	(0.016)	0.974	(0.016)
Birth year (Ref. = 1969)						
1970	0.992	(0.004)	0.990*	(0.004)	0.990*	(0.004)
1971	0.995	(0.004)	0.991*	(0.004)	0.993	(0.004)
1972	0.996	(0.004)	0.988**	(0.004)	0.989*	(0.004)
Urban/Rural residence at age 18 (Ref.=Urban)	0.951***	(0.003)	1.045***	(0.004)	1.059***	(0.004)
Parental socioeconomic position (EGP)						
II	0.993	(0.005)	0.981***	(0.005)	0.976***	(0.005)
IIIa	0.999	(0.008)	0.985*	(0.008)	0.974***	(0.008)
IIIb	1.012	(0.006)	0.978***	(0.006)	0.969***	(0.006)
IVb	0.996	(0.007)	0.978**	(0.007)	0.962***	(0.007)
IVc	1.020*	(0.008)	1.022**	(0.008)	1.016*	(0.008)
V	1.066	(0.097)	1.015	(0.092)	0.986	(0.090)
VI	0.996	(0.007)	0.959***	(0.007)	0.947***	(0.007)
VIIa	0.996	(0.007)	0.968***	(0.007)	0.948***	(0.007)
VIIb	1.027	(0.027)	1.003	(0.027)	0.980	(0.026)
Unknown	0.978***	(0.006)	0.964***	(0.006)	0.941***	(0.006)
Cumulated union duration			1.050***	(0.000)		
Age of first union					0.952***	(0.000)
Observations	240844		240844		216267	
Pseudo R^2	0.094		0.130		0.034	

chi2	74322.1	102941	24373.7

Exponentiated coefficients, standard errors in brackets, * p<0.05, * p<0.01, * p<0.001. Note: (II): Lower service, (IIIa):Higher routine non-manual, (IIIb):Lower routine non-manual, (IVb): Small proprietors, no employees, (IVc). Self-employed farmers, (V): Lower technicians, (VI): Skilled manual, (VIIa): Semi-/unskilled manual, (VIIb): Agricultural workers.

Table A6. Poisson regression of completed fertility on union trajectory. Corresponds to Figure 3.

	b	se
Sex (Ref. = Men)	1.043***	(0.005)
Union trajectory (Ref. = 1 intact union)		
0 unions	0.032***	(0.001)
1 marriage, divorced	0.621***	(0.006)
1 cohabitation, separated	0.305***	(0.004)
2 marriages (marriage only)	1.111***	(0.010)
3+ marriages (marriages only)	1.206***	(0.036)
2 ever married (at least one cohabitation & one marriage)	0.908***	(0.006)
3 ever married (at least one cohabitation & one marriage)	0.927***	(0.008)
4+ ever married (at least one cohabitation & one marriage)	0.945***	(0.012)
2 Never married (serial cohabitation)	0.536***	(0.006)
3 Never married (serial cohabitation)	0.560***	(0.010)
4+ Never married (serial cohabitation)	0.566***	(0.015)
Sex × union trajectory		
Women × 0 unions	3.160***	(0.118)
Women × 1 marriage, divorced	1.066***	(0.016)
Women × 1 cohabitation, separated	1.308***	(0.026)
Women × 2 marriages (marriage only)	0.983	(0.012)
Women × 3+ marriages (marriages only)	1.046	(0.041)
Women × 2 ever married (at least one cohabitation & one marriage)	0.988	(0.009)
Women × 3 ever married (at least one cohabitation & one marriage)	0.977	(0.012)
Women × 4+ ever married (at least one cohabitation & one marriage)	0.937***	(0.016)
Women × 2 Never married (serial cohabitation)	1.071***	(0.016)
Women × 3 Never married (serial cohabitation)	1.017	(0.025)
Women × 4+ Never married (serial cohabitation)	0.965	(0.036)
Birth year (Ref. = 1969)		
1970	0.993	(0.004)
1971	0.997	(0.004)
1972	0.998	(0.004)
Observations	243631	
Pseudo R^2	0.120	
chi2	96281.5	

Exponentiated coefficients, standard errors in brackets, * p<0.05, * p<0.01, * p<0.001

Table A7. Poisson regression of completed fertility on union trajectory. Corresponds to Figure A5.

	b	se
Sex (Ref. = Men)	1.039***	(0.005)
Union trajectory (Ref. = 1 intact non-marital cohabitation)		
0 unions	0.037***	(0.001)
1 intact marriage	1.176***	(0.011)
1 marriage, divorce	0.715***	(0.010)
1 cohabitation, separated	0.351***	(0.006)
2 marriages (marriages only)	1.280***	(0.016)
3+ marriages (marriages only)	1.389***	(0.043)
2 ever married (at least one cohabitation & one marriage)	1.046***	(0.011)
3 ever married (at least one cohabitation & one marriage)	1.068***	(0.013)
4+ ever married (at least one cohabitation & one marriage)	1.089***	(0.017)
2 Never married (serial cohabitation)	0.617***	(0.009)
3 Never married (serial cohabitation)	0.645***	(0.013)
4+ Never married (serial cohabitation)	0.651***	(0.018)
Sex × union trajectory		
Women × 0 unions	3.004***	(0.117)
Women × 1 Intact marriage	0.947***	(0.012)
Women × 1 marriage, divorced	1.014	(0.019)
Women × 1 cohabitation, separated	1.244***	(0.028)
Women × 2 marriages (marriages only)	0.934***	(0.016)
Women × 3+ marriages (marriages only)	0.995	(0.041)
Women × 2 ever married (at least one cohabitation & one marriage)	0.940***	(0.013)
Women × 3 ever married (at least one cohabitation & one marriage)	0.929***	(0.015)
Women × 4+ ever married (at least one cohabitation & one marriage)	0.891***	(0.019)
Women × 2 Never married (serial cohabitation)	1.018	(0.019)
Women × 3 Never married (serial cohabitation)	0.967	(0.026)
Women × 4+ Never married (serial cohabitation)	0.918*	(0.036)
Birth year (Ref. = 1969)		
1970	0.994	(0.004)
1971	0.997	(0.004)
1972	0.998	(0.004)
Observations	243631	
Pseudo R^2	0.120	
chi2	96741.5	

Exponentiated coefficients, standard errors in brackets, * p<0.05, * p<0.01, * p<0.001.

Table A8. Poisson regression of completed fertility on union trajectory. Corresponds to Figure A6.

	b	se
Sex (Ref. = Men)	1.039***	(0.005)
Union trajectory (Ref. = 1 intact marriage)		
0 unions	0.032***	(0.001)
1 Intact cohabitation	0.850***	(0.008)
1 marriage, divorced	0.608***	(0.006)
1 cohabitation, separated	0.298***	(0.004)
2 marriages (marriages only)	1.088***	(0.010)
3+ marriages (marriages only)	1.181***	(0.035)
2 ever married (at least one cohabitation & one marriage)	0.889***	(0.006)
3 ever married (at least one cohabitation & one marriage)	0.908***	(0.008)
4+ ever married (at least one cohabitation & one marriage)	0.925***	(0.012)
2 Never married (serial cohabitation)	0.525***	(0.006)
3 Never married (serial cohabitation)	0.548***	(0.010)
4+ Never married (serial cohabitation)	0.554***	(0.015)
Sex × union trajectory		
Women × 0	3.172***	(0.119)
Women × 1 Intact cohabitation	1.056***	(0.014)
Women × 1 marriage, divorced	1.070***	(0.016)
Women × 1 cohabitation, separated	1.314***	(0.026)
Women × 2 marriages (marriages only)	0.987	(0.012)
Women × 3+ marriages (marriages only)	1.051	(0.041)
Women × 2 ever married (at least one cohabitation & one marriage)	0.992	(0.009)
Women × 3 ever married (at least one cohabitation & one marriage)	0.981	(0.012)
Women × 4+ ever married (at least one cohabitation & one marriage)	0.941***	(0.017)
Women × 2 Never married (serial cohabitation)	1.075***	(0.017)
Women × 3 Never married (serial cohabitation)	1.021	(0.025)
Women × 4+ Never married (serial cohabitation)	0.969	(0.036)
Birth year (Ref. = 1969)		
1970	0.994	(0.004)
1971	0.997	(0.004)
1972	0.998	(0.004)
Observations	243631	
Pseudo R^2	0.120	
chi2	96741.5	

Exponentiated coefficients, standard errors in brackets, * p<0.05, * p<0.01, * p<0.001.

Table A9. Poisson regression of completed fertility on income quartile and total number of unions (marriages and non-marital cohabitations) (Model A), and the number of marriages (Model B). Corresponds to Figure 4, models A and B.

	A		B	
	b	se	b	se
Sex (Ref. = Men)	1.349***	(0.015)	1.279***	(0.013)
Number of unions (Ref. = 1 intact union)				
0 unions	0.038***	(0.002)		
1 union, separated	0.521***	(0.009)		
2 unions	0.883***	(0.012)		
3 unions	0.948**	(0.016)		
4+ unions	1.034	(0.022)		
Income rank (Ref. = 1st quartile)				
2nd quartile	1.103***	(0.012)	1.073***	(0.011)
3rd quartile	1.154***	(0.012)	1.099***	(0.011)
4th quartile	1.200***	(0.012)	1.123***	(0.011)
Sex x no. of unions x income				
Women × 0 unions × 2nd quartile	2.522***	(0.168)		
Women × 0 unions × 3rd quartile	1.947***	(0.135)		
Women × 0 unions × 4th quartile	1.318***	(0.102)		
Women × 1 union, separated × 2nd quartile	1.162***	(0.032)		
Women × 1 union, separated × 3rd quartile	1.003	(0.028)		
Women × 1 union, separated × 4th quartile	0.843***	(0.024)		
Women × 2 unions × 2nd quartile	0.857***	(0.020)		
Women × 2 unions × 3rd quartile	0.741***	(0.017)		
Women × 2 unions × 4th quartile	0.639***	(0.015)		
Women × 3 unions × 2nd quartile	0.777***	(0.022)		
Women × 3 unions × 3rd quartile	0.655***	(0.019)		
Women × 3 unions × 4th quartile	0.562***	(0.016)		
Women × 4+ unions × 2nd quartile	0.652***	(0.023)		
Women × 4+ unions × 3rd quartile	0.561***	(0.020)		
Women × 4+ unions × 4th quartile	0.479***	(0.019)		
Birth year (Ref. = 1969)				
1970	0.993	(0.004)	0.992	(0.004)
1971	0.996	(0.004)	0.994	(0.004)
1972	0.997	(0.004)	0.994	(0.004)
Number of marriages (Ref. = 1 marriage)				
0 marriage			0.269***	(0.004)
1 marriage, divorced			0.914***	(0.013)
2 marriages			1.199***	(0.021)

3+ marriages		1.371***	(0.056)
Sex x no. of marriages x income			
Table A9 continued.			
Women × 0 marriages × 2nd quartile		1.580***	(0.037)
Women × 0 marriages × 3rd quartile		1.292***	(0.031)
Women × 0 marriages × 4th quartile		1.015	(0.025)
Women × 1 marriage, divorced × 2nd quartile		0.869***	(0.021)
Women × 1 marriage, divorced × 3rd quartile		0.778***	(0.019)
Women × 1 marriage, divorced × 4th quartile		0.668***	(0.016)
Women × 2 marriages × 2nd quartile		0.782***	(0.021)
Women × 2 marriages × 3rd quartile		0.698***	(0.019)
Women × 2 marriages × 4th quartile		0.586***	(0.016)
Women × 3+ marriages × 2nd quartile		0.750***	(0.043)
Women × 3+ marriages × 3rd quartile		0.673***	(0.043)
Women × 3+ marriages × 4th quartile		0.576***	(0.042)
Observations	241780	241780	
Pseudo R^2	0.095	0.083	
chi2	75462.2	65904.3	

Exponentiated coefficients, standard errors in brackets, * p<0.05, * p<0.01, * p<0.001

Table A10. Poisson regression of completed fertility on highest attained educational level and total number of unions (marriages and non-marital cohabitations) (Model A), and the number of marriages (Model B). Corresponds to Figure 7A, models A and B.

	A		B	
	b	se	b	se
Sex (Ref. = Men)	1.115***	(0.021)	1.057**	(0.018)
Number of unions (Ref. = 1 intact union)				
0 union	0.051***	(0.003)		
1 union, separated	0.578***	(0.012)		
2 unions	0.921***	(0.014)		
3 unions	0.963	(0.019)		
4+ unions	1.009	(0.024)		
Educational level (Ref. = basic)				
Upper secondary	1.005	(0.012)	0.985	(0.011)
Lower tertiary	1.038**	(0.013)	0.992	(0.011)
Higher tertiary	1.085***	(0.014)	1.034**	(0.012)
Sex x no. of unions x education				
Women × 0 unions × Upper secondary	2.081***	(0.144)		
Women × 0 unions × Lower tertiary	1.742***	(0.128)		
Women × 0 unions × Higher tertiary	1.757***	(0.137)		
Women × 1 union, separated × Upper secondary	1.254***	(0.043)		
Women × 1 union, separated × Lower tertiary	1.080*	(0.037)		
Women × 1 union, separated × Higher tertiary	0.964	(0.035)		
Women × 2 unions × Upper secondary	0.988	(0.029)		
Women × 2 unions× Lower tertiary	0.861***	(0.026)		
Women × 2 unions × Higher tertiary	0.791***	(0.025)		
Women × 3 unions × Upper secondary	0.927*	(0.031)		
Women × 3 unions × Lower tertiary	0.783***	(0.027)		
Women × 3 unions × Higher tertiary	0.708***	(0.026)		
Women × 4+ unions × Upper secondary	0.834***	(0.031)		
Women × 4+ unions × Lower tertiary	0.704***	(0.028)		

Women × 4+ unions × Higher tertiary	0.617***	(0.032)		
Birth year (Ref. = 1969)				
1970	0.994	(0.004)	0.994	(0.004)
1971	0.998	(0.004)	0.998	(0.004)
1972	0.999	(0.004)	0.999	(0.004)
Number of marriages (Ref. = 1 marriage)				
0 marriages			0.353***	(0.006)
1 marriage, divorced			0.938***	(0.016)
2 marriages			1.152***	(0.023)
3+ marriages			1.300***	(0.056)
Sex x no. of marriages x education				
Table 10A continued.				
Women × 0 marriages × Upper secondary			1.351***	(0.039)
Women × 0 marriages × Lower tertiary			1.141***	(0.033)
Women × 0 marriages × Higher tertiary			0.890***	(0.028)
Women × 1 marriage, divorced × Upper secondary			1.047	(0.031)
Women × 1 marriage, divorced × Lower tertiary			0.920**	(0.027)
Women × 1 marriage, divorced × Higher tertiary			0.816***	(0.026)
Women × 2 marriages × Upper secondary			1.014	(0.032)
Women × 2 marriages × Lower tertiary			0.876***	(0.028)
Women × 2 marriages × Higher tertiary			0.749***	(0.026)
Women × 3+ marriages × Upper secondary			0.985	(0.055)
Women × 3+ marriages × Lower tertiary			0.891	(0.057)
Women × 3+ marriages × Higher tertiary			0.778**	(0.067)
Observations	243631		243631	
Pseudo R^2	0.096		0.082	
chi2	76927.6		65694.8	

Exponentiated coefficients, standard errors in brackets, * p<0.05, * p<0.01, * p<0.001