Population Studies, 2017
Vol. 71, No. 1, 3–21, http://dx.doi.org/10.1080/00324728.2016.1253857

Socio-economic status and fertility decline: Insights from historical transitions in Europe and North America

Martin Dribe[1], Marco Breschi[2], Alain Gagnon[3], Danielle Gauvreau[4], Heidi A. Hanson[5], Thomas N. Maloney[5], Stanislao Mazzoni[2], Joseph Molitoris[6], Lucia Pozzi[2], Ken R. Smith[5] and Hélène Vézina[7]
[1]Lund University, [2]University of Sassari, [3]University of Montreal, [4]Concordia University, [5]University of Utah, [6]University of Copenhagen, [7]University of Quebec at Chicoutimi

The timings of historical fertility transitions in different regions are well understood by demographers, but much less is known regarding their specific features and causes. In the study reported in this paper, we used longitudinal micro-level data for five local populations in Europe and North America to analyse the relationship between socio-economic status and fertility during the fertility transition. Using comparable analytical models and class schemes for each population, we examined the changing socio-economic differences in marital fertility and related these to common theories on fertility behaviour. Our results do not provide support for the hypothesis of universally high fertility among the upper classes in pre-transitional society, but do support the idea that the upper classes acted as forerunners by reducing their fertility before other groups. Farmers and unskilled workers were the latest to start limiting their fertility. Apart from these similarities, patterns of class differences in fertility varied significantly between populations.

Keywords: fertility transition; socio-economic status; fertility; longitudinal data; innovation; adjustment

[Submitted March 2015; Final version accepted May 2016]

Introduction

Across the Western world, there were dramatic changes in family life near the turn of the twentieth century. Following sustained increases in human longevity, family size more than halved during the great fertility decline (see Coale and Watkins 1986). These changes during the demographic transition had as profound impact on the lives of ordinary people as the Neolithic and Industrial revolutions. Despite its importance, demographers still lack a clear understanding of this process and the crucial mechanisms behind this change. Many theories stress the importance of factors such as education, women's relative wages and independence, mortality decline, new attitudes and norms, and secularization, but the empirical picture is less detailed (see, e.g., Hirschman 1994; Schultz 2001; Guinnane 2011).

Crucial to understanding the fertility decline are the differences in fertility according to socio-economic status (SES) and how they evolved over the fertility transition (Dribe et al. 2014c). There is a widespread view in the literature that higher social status was associated with high fertility in pre-transitional populations, but that this situation reversed during, or even well before, the transition began (e.g., Livi-Bacci 1986; Skirbekk 2008; Clark and Cummins 2015). This change has been explained by the higher social groups acting as forerunners to the decline (Haines 1989a, 1992; Dribe et al. 2014a). However, these generalizations are based on rather thin empirical grounds. With some notable exceptions (e.g., Haines 1977, 1992), there are few studies that have examined SES differentials in fertility over the entire transition and in different countries to identify common patterns. Moreover, there is little empirical evidence based on longitudinal micro-level data from which marital fertility can be followed over time. There has been research, however, on England and Wales, using individual-level census data and indirect estimation of fertility to look at the interaction between geography and

© 2016 Population Investigation Committee

social class (Garrett et al. 2001), as well as the relationship between the number of surviving children and the wealth of parents at the time of their death (Clark 2007; Clark and Cummins 2015).

In the study reported in this paper we extended the present body of research by studying SES differentials in marital fertility in comparative perspective using micro-level economic and demographic data for five populations in Sweden, Italy, the United States, and Canada. The study covered the period from the early nineteenth to the mid-twentieth centuries, in contrast to a recent comparative study using individual-level cross-sectional data for 1900 (Dribe et al. 2014a). Using these rich data sources enabled analysis of the relationship between SES and fertility and how this evolved during the demographic transition. Better knowledge of these patterns can inform us about important determinants of the fertility transition.

The main contributions of our study were its comparative perspective, the use of longitudinal individual-level data, and the measurement of SES using identical class schemes for each population. These features allowed a detailed analysis of marital fertility, distinguishing first births and higher-order (second or subsequent) births, and thus provided a more solid knowledge base than was available from previous research. Our results offer both confirmation and refutation of previous interpretations of the relationship between fertility and SES during the fertility decline. Specifically, we show that families with higher occupations (elite groups, professionals, and managers) led the fertility decline in all the populations under analysis, but they did not universally have higher fertility to start with. Furthermore, families headed by farmers and unskilled labourers were generally laggards in the decline. These patterns were consistent across quite different contexts.

Theory and previous research

Previous research supports an interpretation that connects fertility decline with broad socio-economic changes occurring in the late nineteenth and early twentieth centuries, following the transition from an agricultural-based economy to an industrial economy (Alter 1992; Schultz 2001; Guinnane 2011). This transition was characterized by a sustained mortality decline, increasing levels of urbanization, the expansion of education, and a growing number of women in the workforce. But the question remains how these changes affected different socio-economic groups.

Considering the fertility decline in France, Germany, Britain, Norway, and the United States using cross-sectional data, mainly from censuses, Haines (1992) showed that socio-economic differentials, measured by occupation, generally widened during the transition. Fertility decline was led by the middle and upper classes in all of these countries except France, whereas the agrarian populations were slower to change. It is unclear, however, whether this pattern was the result of socio-economic changes first affecting the upper and middle classes or if it was related to a diffusion of innovations from upper to lower social strata.

European elite groups often showed declining fertility well before such change was apparent in the general population, which was connected at least partly to urban residence (Livi-Bacci 1986; Bardet 1990; Perrenoud 1990). However, it remains uncertain whether urban life created special preconditions for fertility in terms of the socio-economic or cultural environment or if the cause was something more specific to the elite groups. Similarly, Clark (2007) showed that the number of surviving children was higher among wealthier people (at the time of their death) in pre-industrial England, but that these differences diminished well before the fertility transition (see also Clark and Cummins 2009, 2015). Similar findings have been shown for France (Cummins 2013) and for England using occupational data from family reconstitutions (Boberg-Fazlic et al. 2011). In contrast, there is evidence, from other contexts, of low fertility in high-status groups relative to low-status groups in pre-transitional society (e.g., Sogner et al. 1984; Schneider and Schneider 1996). In his study of socio-economic fertility differentials in Britain during the fertility decline, which used aggregated data from the 1911 Census, Szreter (1996) stressed the interplay between geography and social class. At the same time, he downplayed the importance of socio-economic differentials in fertility during the transition, at least from the way they were represented by contemporary social class schemes (see also Barnes and Guinnane 2012; Szreter 2015 for a discussion of this interpretation). A similar argument was also made by Garrett et al. (2001) based on a more detailed analysis of SES and fertility in different British localities during the period 1891–1911. Woods (2000, pp. 116–21), on the other hand, stressed that while there were certainly class differences in marital fertility in Britain around the turn of the twentieth century, the decline occurred among the different classes at more or less the same time.

From a theoretical point of view, Coale (1973; later developed by Lesthaeghe and Vanderhoeft 2001) identified three conditions for fertility decline, namely, that people must be 'ready, willing, and able' (the RWA model). To be considered 'ready', a population must view family limitation as advantageous from both an economic and social perspective, which would lower their demand for children. Both the demand and supply of children are important in explaining both the high levels of pre-transitional fertility and the decline in fertility once the transition began (Easterlin 1975; Easterlin and Crimmins 1985).

The supply of children reflects natural fertility and child survival. High mortality in pre-transitional populations (low supply) alongside a high demand for children implies that demand may well have exceeded supply. Following the mortality decline, the supply of children increased, which contributed to the decline in fertility (Galloway et al. 1998; Haines 1998; Reher 1999; Reher and Sanz-Gimeno 2007).

A changing demand for children may have been equally important to the fertility decline (Mosk 1983; Schultz 1985; Crafts 1989; Galloway et al. 1994; Brown and Guinnane 2002; Dribe 2009). The demand for children depended on family income and the cost of children in relation to other goods that were directly related to SES. Following industrialization and urbanization, the motivation for childbearing changed, and this can be expected to have affected SES groups differently. On the one hand, higher consumption aspirations among high-status groups would have increased opportunity costs of childbearing and therefore contributed to a reduced demand for children. On the other hand, because children could help working in the fields or assisting in supplementary activities from a relatively early age, the economic benefits of children may have been higher among low and middle SES families in rural contexts (i.e., among farmers and agricultural labourers). Therefore, we would expect a delayed fertility decline among the latter groups.

To the extent that industrialization and urbanization increased returns to education, demand for child quality would also have increased (Becker 1991). This would have led families to substitute quality for quantity by having fewer children and investing more in each child. We would expect this quantity–quality trade-off to have emerged in the aspiring middle class first, partly because of higher returns to education and partly because of better knowledge and information concerning the new social and economic conditions. In the urban working class, children's labour contribution remained important for longer and may have contributed to a delay in their fertility decline. Empirical studies have also confirmed that smaller family sizes in the demographic transition became increasingly associated with socio-economic upward mobility for children (Van Bavel 2006; Bras et al. 2010; Van Bavel et al. 2011; Molitoris 2015).

The ability to control fertility requires knowledge about contraceptive methods, which most research seems to assume had existed well before the fertility decline, though it is unclear to what extent such methods were actually practised within marriage (McLaren 1990; Santow 1995; Van de Walle and Muhsam 1995; Szreter 1996; Van de Walle 2000). It is important to note, however, that the fertility transition in the Western world took place before the widespread introduction of modern contraceptives (David and Sanderson 1986; Szreter 1996, pp. 389–424; Szreter and Garrett 2000).

The distinction between 'willing' and 'able' is crucial. The fact that people were able to limit fertility does not mean that they were willing to do so. What was required was a change in attitudes making it socially and culturally acceptable to practise contraception within marriage (Carlsson 1966; Lesthaeghe 1980; Cleland and Wilson 1987; Lesthaeghe and Surkyn 1988; Cleland 2001). This process necessitated considerable social interaction in communities or networks that transcended geographical boundaries (Bongaarts and Watkins 1996; Montgomery and Casterline 1996; Szreter 1996; Casterline 2001; Garrett et al. 2001; Kohler 2001; González-Bailón and Murphy 2013). In his more general theory of innovation-diffusion, Rogers (1962) identified the following five groups in the diffusion process that can be linked strongly to SES: innovators (highest SES); early adopters (high SES); early majority (average SES); late majority (below average SES); and laggards (lowest SES). Viewing deliberate family limitation in marriage as an innovation, we would expect to find a clear gradient in the decline of marital fertility going from highest to lowest SES. We would also expect that higher-status social groups would be more likely to formulate and adopt these new ideas because they were culturally more open, and they increasingly felt it important to distinguish themselves from the lower classes (Frykman and Löfgren 1987; Van de Putte 2007). The middle class and elite groups can also be expected to have been better able to acquire new knowledge concerning methods of birth control.

A crucial feature of the RWA model is that all three conditions need to be fulfilled in order to initiate fertility decline. In other words, family size is only reduced when families in a SES group perceive it as beneficial to give birth to fewer children because the costs exceed the benefits, *and* limiting family size is acceptable from an ethical, cultural, and religious standpoint, *and* families have the necessary knowledge and means to control fertility. This implies that the latest fulfilled condition would determine the start of the transition (Lesthaeghe and Vanderhoeft 2001; Lesthaeghe and Neels 2002). In relation to SES this implies that the group which first experiences the fulfilment of all conditions becomes the forerunner. It is also important to stress that all aspects of this model, including readiness, can be diffused in a population much like a contagion process (Lesthaeghe and Neels 2002; for similar views see also Bongaarts and Watkins 1996; Montgomery and Casterline 1996; Casterline 2001).

Data

The data came from five communities in Europe and North America: Scania in southern Sweden; Stockholm, the capital of Sweden; Alghero, a town on the island of Sardinia (Italy); Utah in the United States (a sample of the population); and Saguenay, a region of Quebec, Canada. These datasets have been used in a large number of previous studies. The constructions of the different datasets were not identical as they were based on different underlying sources (genealogies, population registers, or family reconstitutions). This resulted in somewhat different sampling designs, for instance, when it came to the inclusion of childless women, a group not available in Utah. This did not affect our main analysis of higher-order births, while in the case of first births it affected the population at risk. The proportion of women in first marriages who were childless at age 50 was 5 per cent in Alghero (1866–1935), 8 per cent in Scania (1815–1939), and 9 per cent in Saguenay (1840–1971).

Scania, Sweden

The data came from five rural parishes in southern Sweden, which were homogenous in terms of religion (Bengtsson and Dribe 2014). These parishes had a total of 3,900 inhabitants in 1830. By the end of 1939, this figure had increased to 6,300, suggesting approximately the same growth rate as for Sweden as a whole. The selected parishes were close in geographical location, showing the variations in size, topography, and socio-economic conditions that could occur in a community.

The dataset used was based on local population registers and church records, which included information on demographic events and migration for all household members and families in households (Bengtsson et al. 2012). The population registers also included information on occupation. Vital events were checked against birth and death registers to adjust for possible under-recording of events in the population registers. In this study, we used data from 1815, when the population registers began, to 1968, well after the fertility transition was completed. The data from the population registers were linked to poll-tax registers (*mantalslängder*) and income registers, which provided yearly information on occupation. The resulting database contained all individuals (men and women) born in the different parishes or migrating to them. Instead of sampling particular cohorts, each individual was followed from birth or time of arrival in the parishes to death or migration out of the parishes.

Stockholm, Sweden

The data came from the Roteman's Archive, a longitudinal population register maintained between 1878 and 1926 by the municipal government (Geschwind and Fogelvik 2000). At this time, Stockholm was the largest city in Sweden, with over 300,000 people by 1900. The sample contained all women between the ages of 15 and 49 and all individuals who were connected to them. Information on children, spouses, parents, lodgers, or employers was available as long as those individuals were present in Stockholm during the ledger period. The data contained information on each individual's name, legitimacy, relation to the head of household, date of birth, marital status, and occupation. Using the information on an individual's position relative to the head of household, children could be matched to their mothers (see Molitoris 2015).

The original extraction was restricted in several ways to analyse marital fertility. Though marital status was available, dates of marriage were inconsistently recorded and incomplete for many individuals. For these reasons, the data were only used to examine higher-order births. A woman was considered to be at risk under three conditions: listed as married, aged between 15 and 49, and having had at least one reported birth in the city. Individuals were censored on migration out of Stockholm, death, or the termination of marriage.

Alghero, Italy

Alghero is a coastal town in north-western Sardinia that, before national unification in 1861, formed part of the Kingdom of Sardinia together with the regions of Piedmont and Liguria. The first Italian census (1861) recorded Alghero as having 8,831 inhabitants, making it the fourth largest municipality on the island. In addition to the urban centre, the municipality included a vast area called 'Nurra' that was marshy and barely inhabited until the 1920s, resulting in Alghero's geographic isolation.

We used demographic information derived from civil records of birth, death, and marriage from 1866 to 1935. This was combined with data from the parish registers of baptisms, burials, and marriage. Cross-checking between these two sources was necessary considering the prolonged conflict between Church and State over marriage (Breschi et al. 2009; Mazzoni et al. 2013).

Birth histories were constructed based on the age of the mother and included 75 per cent of the total number of births (approximately 30,000) that occurred in Alghero from 1866 to 1935. For marriages there were two dates for many couples (72 per cent), reflecting the timings of their civil and religious ceremonies. When the dates of the two celebrations differed, the earlier date was used (see Breschi et al. 2014).

Information on occupation was derived from marriage certificates and, where missing in a few cases, was taken from other official records: birth and death certificates or census records. Occupations from marriage certificates were preferred because they were generally the most representative occupations over individuals' lives in Alghero, a community where social mobility was very low (Breschi et al. 2010).

Alghero's fertility decline was slow, and was not completed until the 1970s, much later than in the rest of the country. Our analysis examines the period from 1866 to 1935—a time when awareness of the problems of fertility decline was increasing—but, at the same time, birth control was thwarted by the fascist regime (Ipsen 1996).

Utah, USA

In the late nineteenth century, Utah in the western United States was characterized by rapid settlement, which had begun in 1847 primarily by members of the Church of Jesus Christ of Latter-day Saints (LDS). According to data from the US Census Bureau, the resident population of the state grew from just over 11,000 in 1850 to over 200,000 by 1890, then to over 500,000 by 1930, and over 1 million by 1970. This rapid rate of growth reflected both high natural increase and substantial immigration.

The data came from the Utah Population Database (UPDB) (Pedigree and Population Resource 2012). The core of the UPDB included information on over 185,000 third-generation families identified on 'Family Group Sheets' from the archives at the Genealogical Society of Utah. These genealogical records provided data on migrants to Utah and their descendants born from the early 1800s to the mid-1970s. The UPDB sample used in the analysis reported in this paper included only women born in Utah between 1850 and 1919 who were observed living in the state after age 15. We restricted the analysis to women who were married at age 14 or older, had been married only once and had at least one child (see Maloney et al. 2014). We also excluded a modest number of observations for data-consistency and link-quality reasons.

Information on occupation came from death certificates that were linked to genealogical records. The instructions for the US Standard Death Certificate stated that the usual occupation meant the type of job the individual was engaged in for most of their working life. This was not necessarily the highest paid job nor the employment considered the most prestigious but the occupation that represented the greatest number of working years.

Fertility rates in Utah were among the highest in the United States, certainly owing in part to the pro-natalist culture of the LDS church, as well as economic forces tending to increase fertility in the rural west relative to other parts of the country. However, substantial fertility decline was evident by the 1880s (Bean et al. 1990, pp. 135–6).

Saguenay (Quebec), Canada

The Saguenay region, located approximately 200 kilometres north of Quebec City, was characterized by its relative geographical isolation and cultural uniformity, despite the presence of a small Aboriginal population. The colonization of the region by French Canadians began in the 1830s and the population grew rapidly from 5,574 in 1852 to 265,642 in 1971 (see Vézina et al. 2014). The population consisted mainly of farmers, who combined farm work with logging the forests during the winter. Industrialization began slowly with the implantation of pulp industries at the turn of the twentieth century and progressed much faster with the arrival and expansion of important aluminium and hydro-electric plants before the Second World War (Igartua and de Fréminville 1983; Bouchard 1996).

All births, marriages, and deaths that occurred in Saguenay from the onset of colonization to 1971 have been digitized and linked using family reconstitution methods to form the BALSAC population database (BALSAC Project 2014). We used data on the reproductive history of all married women between 1842 and 1971. Further restrictions were applied to keep only women in first marriages and women whose birth date was known either directly through a birth certificate or indirectly when declared at another event. Finally, in the absence of information on migration, we excluded families where the existence of a child was known only by a subsequent death or marriage (no birth record).

We used information on parental occupation declared on the child's birth record, or when this was missing, on a previous birth record or the marriage certificate. Information on occupation was available from at least one of these vital event records for 60 per cent of the families. As in other rural and remote regions in Quebec, the fertility transition in Saguenay occurred later than in the rest of the province and other parts of Canada (Pouyez and Lavoie 1983; Gauvreau et al. 2007).

Methods

We used episode-structured data to estimate a set of nearly identical event-history models for each community. The exception was Utah where we included a vital context-specific control, LDS church membership status, as well as somewhat differently specified controls for place of residence. All estimates were made using Cox proportional hazard models (the *stcox* command in STATA). Separate models were estimated for first births and higher-order births because first-birth risks are closely connected to union formation, especially in pre-transitional and early transitional contexts (Bengtsson and Dribe 2014). For first births, the duration was time between marriage and first birth or censoring because of death or migration. For higher-order births, the duration was time since last birth. We controlled for a woman's age and area of residence (differently defined in various contexts but typically some geographic unit). In the higher-order birth models we also controlled for the survival status of the previously born child (dead or alive). The main variables of interest were SES and the phase of the fertility transition. The following four phases were defined in each population:

P1: Pre-transition

P2: Early transition

P3: Late transition

P4: Post-transition.

Naturally, these phases corresponded to somewhat different time periods in different populations (Table 1) but indicated similar phases of the demographic transition and should therefore be broadly comparable. The transition phases were identified based on the specific periodization of the demographic transition in each setting, but were not strictly defined based on means or variations in fertility levels. The pre-transition phase was the period before any signs of a secular fertility transition. The early transition phase was when fertility decline had started but not spread to the whole population. In the late transition phase there was a general fall in fertility, and the post-transition phase began when fertility evened out at low levels, usually around replacement. We did not have data covering all four periods in all five communities, but included the phases for which data were available. For the early transition phase, data were available for all populations. For Stockholm, we used roughly the same periodization as for the Swedish province of Scania.

SES for women was measured by the occupation of their husbands. All occupations were coded in HISCO (Van Leeuwen et al. 2002), which is an internationally comparable coding scheme of occupations. Naturally, the exact meaning of different occupations differed across contexts, but the HISCO project has made a great effort in assessing the validity of the coding in different countries, and is, to our knowledge, the only available coding scheme of comparable quality. Occupations were then classified according to HISCLASS, which is a twelve-category occupational classification scheme based on skill level, degree of supervision, the manual or non-manual character of the work, and whether it took place in an urban or rural context (Van Leeuwen and Maas 2011). HISCLASS contains the following classes: (1) Higher managers; (2) Higher professionals; (3) Lower managers; (4) Lower professionals and clerical and sales personnel; (5) Lower clerical and sales personnel; (6) Foremen; (7) Medium skilled workers; (8) Farmers and fishermen; (9) Lower skilled workers; (10) Lower skilled farm workers; (11) Unskilled workers; and (12) Unskilled

Table 1 Time periods corresponding to different phases of the fertility transition in five populations (total marital fertility at ages 20–49 in parentheses)

	P1 Pre-transition	P2 Early transition	P3 Late transition	P4 Post-transition
Scania, Sweden	1815–79 (8.2)	1880–1909 (7.7)	1910–34 (4.8)	1935–68 (3.1)
Utah, USA	1850–79 (NA[1])	1880–1919 (7.8)	1920–69 (4.4)	NA
Alghero, Italy	1866–1915 (7.6)	1916–35 (6.9)	NA	NA
Saguenay, Canada	1842–1929 (8.9)	1930–59 (7.2)	1960–71 (3.7)	NA
Stockholm, Sweden	NA	1878–1909 (6.6)	1910–26 (3.8)	NA

[1]Only women born 1850 and later are included in the Utah Population Database; this does not allow for the calculation of total marital fertility in P1.
Note: NA indicates that data were not available for that transition period.
Sources: Scania: Bengtsson et al. 2012; Utah: Pedigree and Population Resource 2012; Alghero: Alghero Demographic Database, University of Sassari; Stockholm: The Roteman Archives, Stockholm City Archives; Saguenay: BALSAC Project 2014.

farm workers. Owing to a low number of observations in some classes, we grouped these twelve classes into the following five sub-classes:

Higher occupations: (1 + 2 + 3 + 4 + 5)

Skilled workers (6 + 7)

Farmers (8)

Lower skilled workers (9 + 10)

Unskilled workers (11 + 12).

Even though it did not mean exactly the same thing to be a farmer, for example, in different contexts, the basic characteristics of these classes were comparable across the five populations. In general, those in higher occupations performed highly skilled, white-collar tasks, while farmers worked land owned by themselves or rented from larger landowners or the state. Research has also shown that occupational ranking (based on prestige) is remarkably similar across countries and over time (Treiman 1977; Hout and DiPrete 2006), which seems to imply that, at least in broader terms, class schemes such as HISCLASS capture important aspects of social stratification that can be compared across populations. Having said this, however, some details and specificities are always obscured when forcing diverse contexts into a common framework like this.

In the analysis, we included interactions between transition phase and SES to obtain a better picture of how the socio-economic differentials evolved over the transition and how the fertility decline differed between socio-economic groups. SES 'unknown' was included as a separate group in the analysis, but results for this group are not shown in the figures.

Results

Basic patterns

Figure 1(a)–(e) illustrates age-specific marital fertility rates and Table 1 shows total marital fertility at ages 20–49, both by transition phase and population. Examining Scania first (Figure 1(a)), P1 shows a rather typical pre-transition pattern with fertility falling in a relatively linear fashion by age and high levels of marital fertility (approaching 500 per thousand) in the 20–24 age group. These high levels are explained by the close connection between marriage and the start of childbearing in many pre-transitional populations with high rates of pre-marital pregnancy (Dribe et al. 2014b). Total marital fertility in Scania in this phase was 8.2. In the early transition phase, the shape of the curve is similar but the level is slightly lower. In the later phases, fertility rates are much lower, and there is a decline in all age groups. In the final phase, total marital fertility has declined to 3.1. Naturally, the absolute decline is largest in the younger age groups, which is clearly visible in Figure 1(a); but in relative terms, the decline is strongest in the older age groups. For example, the fertility level in the late transition phase (P3) is approximately 40–50 per cent of its pre-transition level at ages over 30, but 75 per cent of the pre-transition level in the youngest age group. Similarly, when

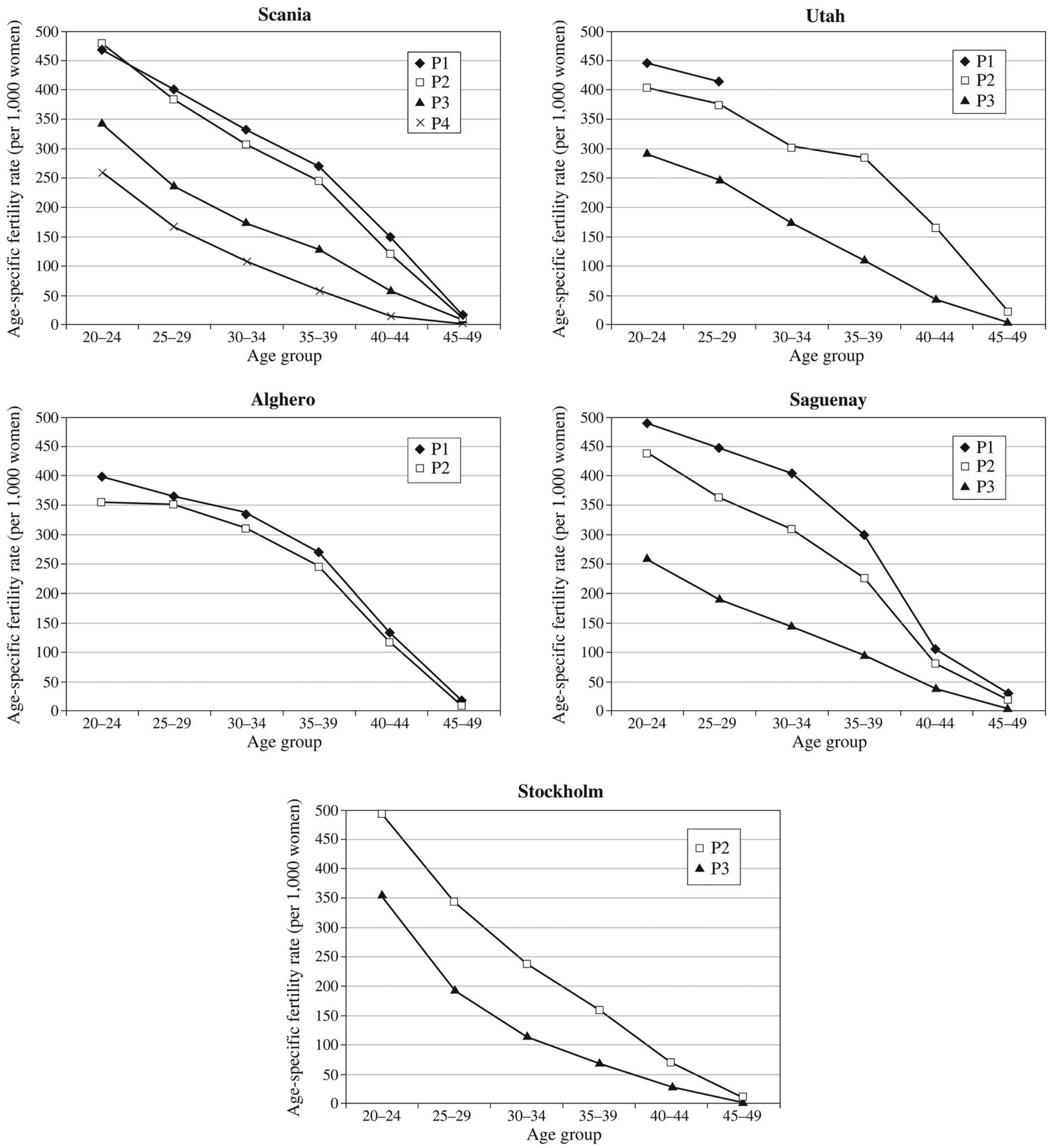

Figure 1 Age-specific marital fertility at ages 20–49 by transition phase in five populations
Source: As for Table 1.

comparing the post-transition levels, they are approximately 10 per cent of their pre-transition levels at ages over 40 and 40–50 per cent at ages below 30.

Utah shows a slightly different pattern from Scania. In the pre-transition phase, fertility rates in the youngest age groups are slightly lower, which may be attributed to differences in marriage patterns and a weaker connection between marriage and the start of childbearing through, for example, lower prevalence of pre-marital conception. During the transition, fertility levels decline considerably, but the overall shapes of the curves remain similar. Total marital fertility is 7.8 in the early transition phase and 4.4 in the late transition phase. As is the case in Scania, fertility rates decline relatively more among the older age groups, but all age groups join the transition essentially from the beginning.

Turning to the Sardinian town of Alghero, fertility does not decline much between the pre-transition and early transition phases. Total marital fertility is 7.6 in the first phase and 6.9 in the second. In fact, when looking at the total population there is no indication of family limitation, that is, parity-specific control (Breschi et al. 2012). Instead, the population of Alghero controls marriage behaviour (late marriages and high levels of celibacy among both men and women) to limit the total number of births and adapt this number to the available resources (Corridore 1902; Breschi et al. 2012).

Pre-transitional Saguenay resembles southern Sweden the most in terms of levels, with marital fertility in the lowest age group approaching 500 per thousand, but the shape is not as linear as in Scania. There is a pronounced decline in all age groups across the different transition phases, with the largest relative change in the older age groups. Total marital fertility declines from almost nine in the pre-transition phase to less than four in the late transition phase (a level more similar to that seen in the post-transition phase in Scania than the late transition phases in Scania or Utah).

Finally, examining Stockholm, the age pattern in the early transition phase is somewhat different from the other populations, as it is concave rather than convex or linear. The level of marital fertility is lower than in Scania in the same period (6.6 compared with 7.7). There is a marked decline between the early and late transition phases, with the greatest reduction in relative terms in the 30–44 age groups. In the late transition phase the age pattern is more similar to the Scanian one. Previous work using aggregated data has shown that Stockholm's population was among the first in Sweden to practise birth control (Dribe 2009), and the speed with which fertility declined was also substantially greater than in the rest of the country, cementing the capital as a forerunner of the overall Swedish decline (Molitoris and Dribe 2016).

Table 2 shows mean intervals from marriage to first birth and between higher-order births, across transition phases and populations. Stockholm is excluded from the first-birth analysis because of missing information on age at marriage for many observations. In the pre-transition phase, the first interval is the shortest in Scania (approximately 1 year), slightly longer in Saguenay and Utah (approximately 1.2 years), and the longest in Alghero (approximately 1.4 years). In all four populations, we see that the time between marriage and first birth increases during the fertility transition. Similarly, higher-order birth intervals become longer during the transition, from approximately 2.0–2.7 to 3.0 years or more. This result points to spacing of births as an important part of the fertility transition, a finding which has also been stressed in previous research (David and Sanderson 1986; Crafts 1989; Haines 1989b; Bean et al. 1990; Szreter 1996; Anderson 1998), though failed stopping may also have been partially responsible for the increased length of higher-order birth intervals.

Event-history analysis

The percentage distributions for the main variables are shown in Table 3. Clearly, there are large differences between the five populations, both in terms of the social structure and the distribution of the sample across transition phases. Table 4 displays the overall hazard ratios (relative risks) in the different transition phases for first births and higher-order births separately, using the early transition phase (P2) as the reference category. The models control for SES, age of woman, place of residence, survival of previous child (higher-order births), and in the case of Utah, LDS church membership status. Evidently, the patterns in the transition are highly similar across populations with significant, sharp declines in the risks of both first and higher-order births between P2 (early transition) and P3 (late transition). Fertility levels are approximately 30–50 per cent lower in P3 compared with P2, with the larger drops for higher-order births.

Figures 2 and 3 show hazard ratios by SES and transition phase across the five populations, including 95 per cent confidence intervals. These results are net effects from interaction models, with the unskilled in P2 serving as the reference category to which all other estimates are compared. In this way, we can examine both differences between SES groups across populations in a given transition phase, and within SES groups between transition phases. First births and higher-order births are analysed separately in Figures 2 and 3, respectively.

First births. In the pre-transition phase (Figure 2 (a)), first-birth risks by occupation group vary across populations. In Utah, unskilled families have relatively long intervals from marriage to birth (low first-birth risk), compared with short intervals in Scania and Alghero (high first-birth risk). In Alghero, the longest intervals are seen among the higher-status occupations. Farming families are prominent with short intervals in Alghero and long intervals in Scania, while in Saguenay first-birth risks are very similar across SES groups. Therefore, it is difficult to find a consistent SES pattern in risk of first births in the pre-transition phase. This can most likely be attributed to differences among populations in the degree to which entry into parenthood was immediately connected to marriage through premarital pregnancy.

Table 2 Mean birth intervals (in years) by transition phase in five populations

(a) Marriage to first birth

	Scania	Utah	Alghero	Saguenay
Pre-transition	1.06	1.21	1.41	1.22
Early transition	1.18	1.47	1.64	1.25
Late transition	1.34	2.14	NA	1.41
Post-transition	2.24	NA	NA	NA

(b) Inter-birth intervals

	Scania	Utah	Alghero	Saguenay	Stockholm
Pre-transition	2.69	2.01	2.45	1.98	NA
Early transition	2.60	2.58	2.55	1.87	2.26
Late transition	3.05	3.46	NA	2.25	2.81
Post-transition	3.86	NA	NA	NA	NA

Note: NA indicates that data were not available for that transition period. Stockholm is not included in the marriage to first birth table because of missing data on age at marriage (see text).
Source: As for Table 1.

In the early transition phase (P2 in Figure 2(b)), the higher occupations group emerges with the longest first-birth intervals (lowest birth risks) in all populations. Farming families have the shortest intervals (highest birth risks) in all populations except Scania. Apart from these results, there is not much difference by SES in most populations. Similarly, in the late transition phase (Figure 2(c)), long first-birth intervals among higher occupation families are clear in all three populations for which we have data, though the difference with the other groups is small in Scania. In Utah and Saguenay there are clear SES gradients where lower SES is associated with higher first-birth risks in both populations, if farmers are removed. Farming families are prominent with the highest first-birth risks in these two populations.

In the post-transition phase (Figure 2(d)), we only have data for Scania, and they show a similar pattern

Table 3 Percentage distribution of main variables used in event-history models for the five populations

	Scania		Utah		Alghero		Stockholm		Saguenay	
	FB	HOB	FB	HOB	FB	HOB	FB	HOB	FB	HOB
Socio-economic status of husband										
Higher occupations	15.5	14.7	23.1	19.7	14.9	6.0	NA	26.9	14.3	12.1
Skilled workers	17.7	15.6	12.2	11.5	11.5	9.5	NA	28.1	10.4	10.2
Farmers	19.9	24.8	23.8	30.1	36.2	46.7	NA	NA	25.4	27.3
Lower skilled workers	29.0	27.2	8.4	7.6	15.6	13.5	NA	20.8	6.9	6.9
Unskilled workers	15.3	15.9	4.2	4.5	21.7	24.3	NA	23.1	23.6	26.1
Unknown	2.6	1.8	28.3	26.7	0.0	0.0	NA	1.1	19.5	17.4
Transition phase										
Pre-transition	27.1	37.6	4.0	3.3	65.2	71.5	NA	NA	23.9	21.8
Early transition	13.6	19.0	50.4	54.0	34.8	28.5	NA	59.5	58.3	45.1
Late transition	16.0	16.6	45.6	67.5	NA	NA	NA	40.5	17.7	33.0
Post-transition	43.3	26.7	NA	NA	NA	NA	NA	NA	NA	NA
Age of woman										
15–24	29.4	7.3	42.1	5.7	43.8	14.8	NA	6.1	77.6	26.2
25–29	31.3	18.8	36.2	14.2	21.3	21.8	NA	20.1	16.8	27.9
30–34	16.7	23.5	14.5	18.3	12.7	21.9	NA	26.7	4.1	21.7
35–39	8.8	22.3	5.4	19.5	8.3	18.4	NA	23.3	1.2	15.4
40–49	13.7	28.1	1.7	42.2	13.9	23.1	NA	23.7	0.2	8.8
Time at risk (person years)	4,814	55,473	142,530	1,862,992	11,691	63,625	NA	548,701	60,292	714,209
Births	2,000	9,569	80,118	319,079	3,797	18,366	NA	91,695	43,925	258,765

Notes: FB, women at risk of first births; HOB, women at risk of higher-order births. NA indicates that data were not available for that transition period. Stockholm does not have data for first births because of missing data on age at marriage (see text).
Source: As for Table 1.

Table 4 Hazard ratios of birth by transition phase in five populations

(a) First births

	Scania	Utah	Alghero	Saguenay
Pre-transition	1.06	1.07***	1.20***	1.02
Early transition	1.00	1.00	1.00	1.00
Late transition	0.67***	0.77***	NA	0.93***
Post-transition	0.53***	NA	NA	NA
Log likelihood	−13,696	−826,236	−29,182	−430,838
LR chi^2	566***	3,068***	606***	821***

(b) Higher-order births

	Scania	Utah	Alghero	Saguenay	Stockholm
Pre-transition	0.99	1.19***	0.97	1.03***	NA
Early transition	1.00	1.00	1.00	1.00	1.00
Late transition	0.55***	0.56***	NA	0.53***	0.56***
Post-transition	0.30***	NA	NA	NA	NA
Log likelihood	−82,941	−3,863,337	−165,816	−2,481,106	−1,024,195
LR chi^2	4,676***	109,816***	5,157***	70,672***	32,439***

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.
Notes: Models include controls for socio-economic status, age of woman, place of residence, survival status of previous child (higher-order births), and, in the case of Utah, LDS church membership status. NA indicates that data were not available for that transition period. Stockholm is not included in table (a) because of missing data on age at marriage (see text).
Source: As for Table 1.

to the late transition phase (Figure 2(c)). There is no clear SES gradient, with lower skilled workers and higher occupation families being at lowest risk of a first birth, whereas first-birth risks in the other groups are similar (the differences between SES groups are not statistically significant). Taken together, it seems clear that although there are considerable variations across populations in the SES differences in first-birth risks in all periods, families with higher occupations are always involved in fertility decline through relatively longer intervals between marriage and first birth.

If we instead examine changes over time, that is, across transition phases, first-birth risks decline sooner (between P1 and P2) and faster among higher occupation families in all populations. In Scania, for example, the hazard ratio for higher occupations declines from 1.08 in P1 to 0.68 in P2. Unskilled workers also experience considerable decline in first-birth risks both in Scania and Alghero, but it is a decline from initially higher levels than other groups. Among farming families, there is not much change between the pre-transition and early transition phases. With the exception of farmers in Saguenay, there is a pronounced decline in first-birth risk in all SES groups between the early and the late transition phases (P2–P3), though at somewhat different paces, which gives rise to the clear SES gradient in Utah and Saguenay when farmers are excluded.

Higher-order births. Second and subsequent births may be considered the main interest when examining fertility decline, because the latter was more about a decline in the number of births than changes in marriage or transition to parenthood (Coale and Watkins 1986). Figure 3 shows SES differences across populations by transition phase. In the pre-transition phase (Figure 3(a)), Scania is unusual in that the risk of a higher-order birth is greatest among higher occupation families, whereas the risk is lowest among the unskilled. However, in no other population can the higher occupations be characterized by particularly high fertility in the pre-transition period. Thus, there is only very limited support for the idea that higher SES groups universally have high marital fertility before the fertility transition, as only Scania conforms to this theory. In Utah, the highest fertility levels are seen among families headed by skilled workers and farmers, while in Saguenay the lower skilled workers and farmers have the highest fertility during the pre-transition phase. In Alghero, SES differences are small overall except for somewhat lower birth risks among the higher occupations. It is nevertheless possible that marital fertility in higher SES groups was higher in these populations further back in time (before our study period) and that an early fertility decline occurred in these higher SES groups, leading to a convergence to majority levels.

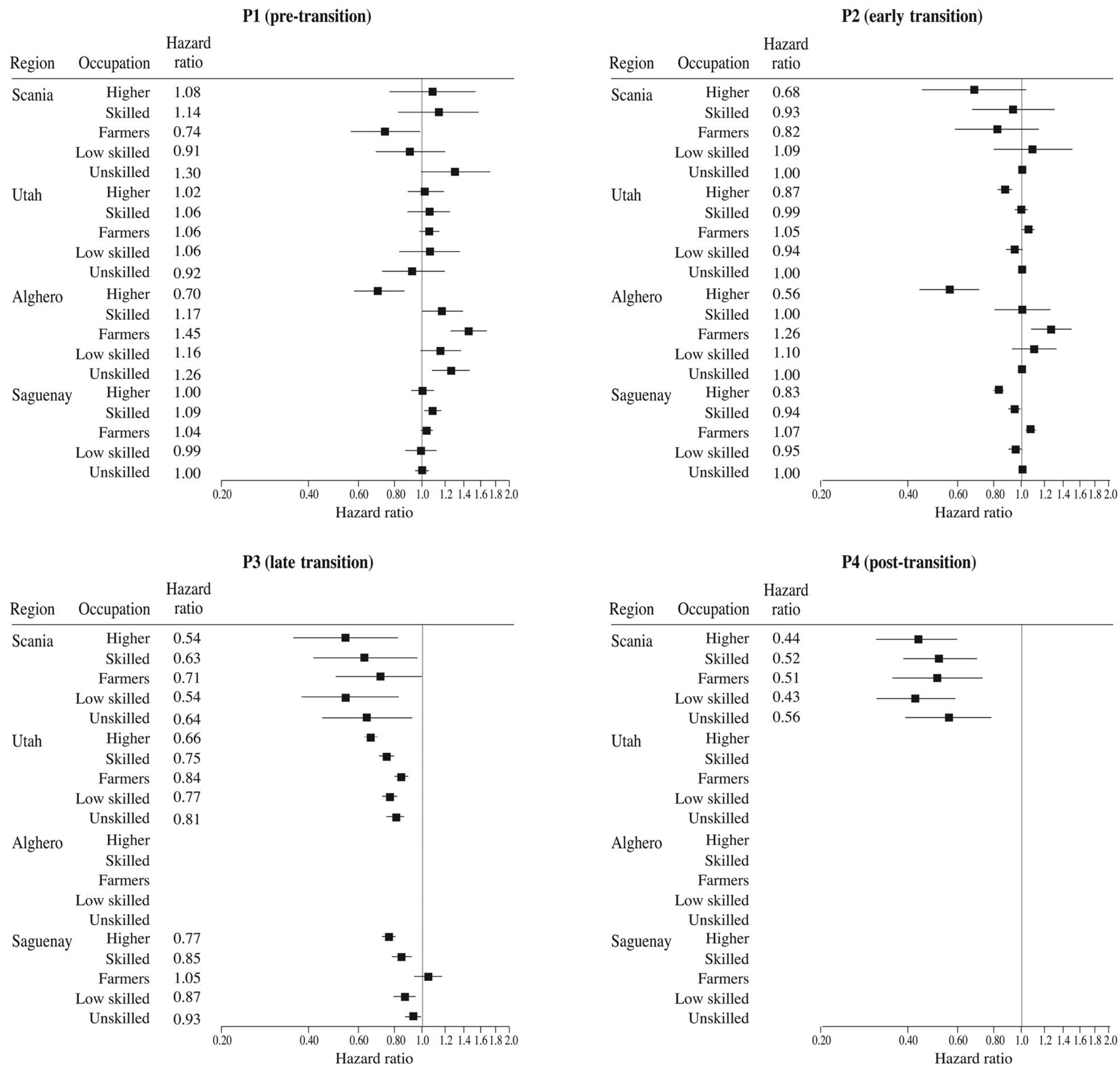

Figure 2 Hazard ratios of first birth by transition phase and socio-economic status. Net effects from interaction models with unskilled in P2 (early transition) as the reference category (hazard ratio = 1)
Note: Net effects from interaction models (hazard ratios and 95 per cent confidence intervals) include controls for socio-economic status of husband, age of woman, place of residence, and in the case of Utah, LDS church membership status. Stockholm is not included in this analysis due to missing data on age at marriage (see text).
Source: As for Table 1.

In the early transition phase (Figure 3(b)), higher occupation families show the lowest marital fertility (that is, the lowest risk of a higher-order birth) of all populations. Clearly, this supports the idea that higher SES groups are forerunners in the decline and early adopters of family limitation. Stockholm and Saguenay show clear SES gradients where higher SES is associated with lower fertility, when farmers are excluded. By the late transition phase (Figure 3(c)), there has been a decline in the risk of a higher-order birth in all SES groups. Although farmers and unskilled worker families still have the highest fertility, some convergence occurs among other groups.

Considering changes over time, the early decline in fertility among the higher occupations is even more striking. Between the pre-transition and early transition phases, when only a limited fertility decline occurs overall (Table 4), higher-order birth risks in the highest SES group declined substantially (hazard ratios in the early transition phase are about 60–80 per cent of their pre-transition level,

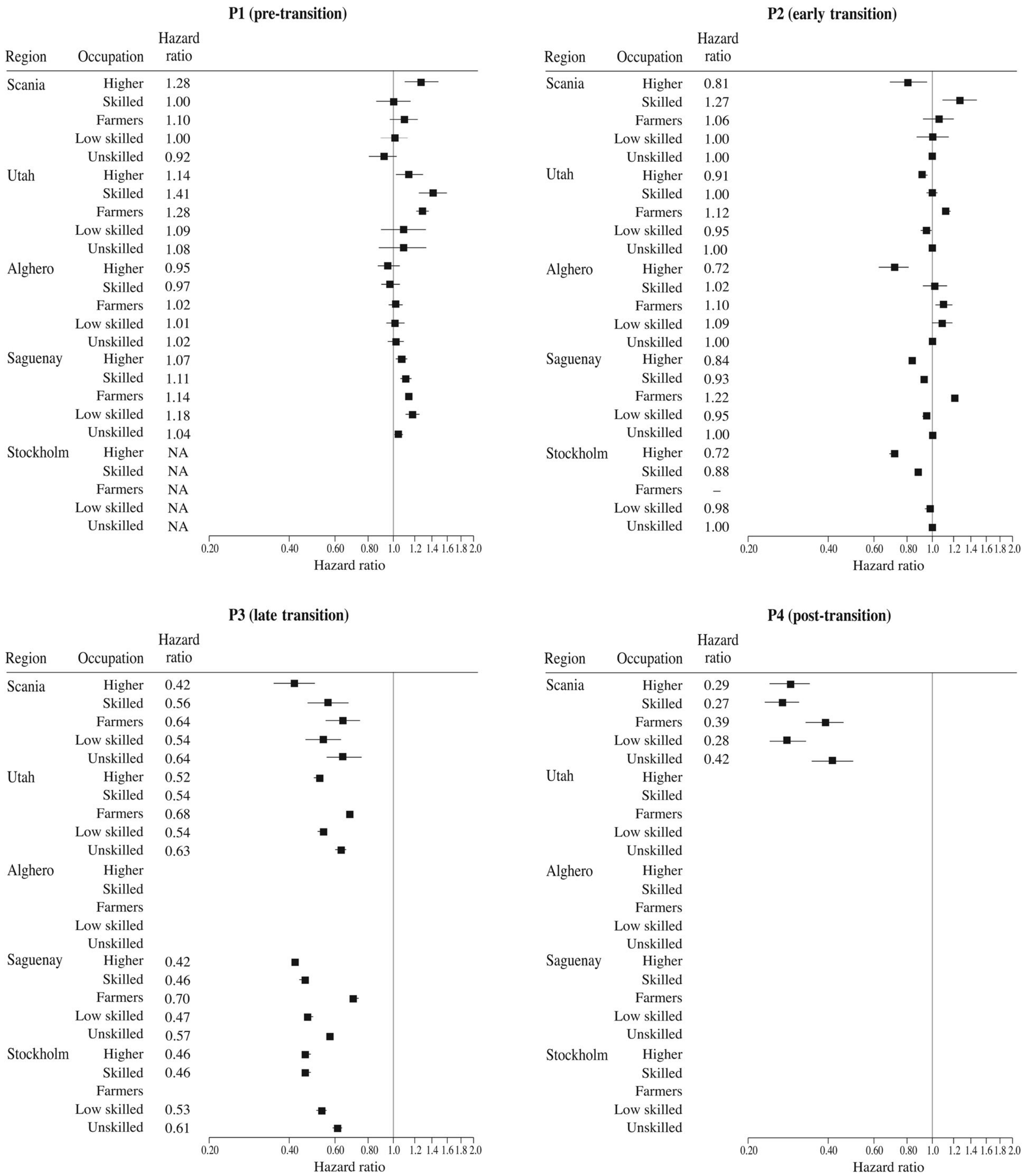

Figure 3 Hazard ratios of higher-order births by transition phase and socio-economic status. Net effects from interaction models with unskilled in P2 (early transition) as the reference category (hazard ratio = 1)
Note: Net effects from interaction models (hazard ratios and 95 per cent confidence intervals) include controls for socio-economic status of husband, age of woman, place of residence, survival status of previous child (higher-order births), and in the case of Utah, LDS church membership status.
Source: As for Table 1.

and the changes are statistically significant). Although we lack data for pre-transitional Stockholm, the SES pattern in the early transition phase is consistent with a similar change occurring there. Between the early and late transition phases, all SES groups experience declining fertility, and there is some convergence in higher-order fertility across SES groups in the five populations. Thus, higher occupation families emerge early in the transition as a low fertility group to which other groups converge. Farmers and unskilled worker families are clear laggards in the process, and even in the post-transition period (Figure 3(d)) in Scania, they still exhibit considerably higher fertility than other groups.

Discussion

The findings of the analysis reported in this paper can be summarized as showing substantial variety in historical patterns of fertility by SES in the different populations of Europe and North America that we studied. This result seems to contradict the generalizations often made in the literature. The most consistent pattern was found for higher-order births, whereas for first births the heterogeneity between populations was larger. We might expect this result because entry into parenthood was as much related to fertility as to marriage and establishing a household. It is also well known from previous research that the historic fertility decline was mainly caused by a reduction in marital fertility, as more people began to reduce family size, rather than being a by-product of changing marriage patterns. This makes higher-order fertility more relevant than time to first birth when studying factors related to the fertility transition.

It is clear, however, that lengthening intervals between marriage and first birth were also a notable aspect of the fertility decline in most of our populations. Similarly, longer inter-birth intervals were crucial in the transition and indicated the spacing of births as important in the transition, in addition to parity-specific stopping which has always been the main focus in the literature. This is in line with other research highlighting the role of spacing as an important aspect of the fertility transition (Bean et al. 1990; Szreter 1996; Szreter and Garrett 2000; Garrett et al. 2001).

Turning to SES differences, which was the main focus of our analysis, we found only very limited support for the hypothesis that the higher SES groups had higher fertility than other groups before the fertility transition. In fact, only in one of our studied populations, Scania in southern Sweden, did we find this pattern. Previous findings about high fertility among various elite groups were often based on analyses of net fertility (surviving children rather than births), implying that changing marriage patterns may have been driving much of the early decline in higher SES fertility (e.g., see Cummins 2013). Therefore, based on the evidence from these different contexts, we found neither support for the generalization of higher marital fertility among the upper classes nor for the opposite claim of low fertility in this group before the transition. Instead, families headed by farmers had high fertility in some contexts and those headed by workers (skilled or unskilled) had high fertility in other contexts. This does not rule out the possibility that the higher-status groups experienced an earlier fertility decline, and converging levels of marital fertility long before the time when rates of overall marital fertility declined secularly. It appears that SES differences in fertility in pre-transitional societies were highly dependent on local contexts and conditions for childbearing; something that was stressed by Szreter in his model of 'communicating communities', in which SES and geography (as well as gender) interacted in determining fertility outcomes through social influence and interaction during the British fertility decline (Szreter 1996; Garrett et al. 2001). Further research is required to study these context-specific conditions and how they interact with SES in these populations.

We found much more support for the idea that high-status groups acted as forerunners in the transition once it began. Overall, the highest SES group was first not only to reduce its fertility, especially higher-order fertility, but also first to increase the intervals between marriage and first birth. In some cases, the differences in timing of the decline were not that significant between classes, whereas in other cases they were prominent. However, in all cases the high SES families were among the first to change their behaviour. As the transition progressed, more groups joined the transition, leading to at least some convergence between SES groups. However, in most cases, farmers and unskilled worker families continued to exhibit relatively high fertility late in the transition.

Considering Scania, where we had data for all four transition phases, this pattern was very clear. Those in higher occupations were forerunners in the process of declining higher-order birth risks, followed by all other groups in the subsequent period. However, because of different starting points and different paces of the decline, families headed by farmers and unskilled workers also had much higher fertility in the post-transition phase (based on higher-order births) than the other groups (a difference of approximately 30 per cent).

There were, of course, some limitations of the analysis reported in this paper. We did not have identically structured data in all populations, and the contexts also forced us to modify the models somewhat, which meant that they were not completely identical. However, compared with previous research in this field, we went to great lengths to make our analysis as comparable as possible, using individual-level longitudinal data and an identical class scheme. In addition, we did not have data covering the entire transitions for all study populations, which implies that results especially for the post-transition phase are rather tentative.

It is difficult to link our results fully to the major theoretical explanations previously discussed. Clearly, the observed higher fertility of farming families in many contexts made good economic sense in a society where manual labour at the farm was important and where productive and reproductive work were localized close to one another. It is less clear why unskilled workers also had more children after marriage than other SES groups. Instead, the rather large differences in SES patterns across populations indicate a significant role played by local contextual factors in explaining these patterns.

The early fertility decline of the highest SES group seemed much more general across all populations but is also difficult to reconcile with several explanations advanced in the literature. It seems highly unlikely that this early decline could be explained by the increased labour force participation of married women and thus higher opportunity costs of children because women in these groups rarely worked for pay. Moreover, we have no indication of a change in labour force participation among the women in this group. Similarly, it appears unreasonable that the fertility decline among those in higher occupations could be explained by declines in the benefits of children, stemming from either less child labour input or increased intergenerational transfers through the market or state. Children in these families did not work in factories or as farm servants, and the transfers from the state did not begin until later and, even then, would have been more important to the living standards of the lower-status groups. Considering the quantity–quality trade-off, at least part of the highest SES group, as defined in this paper, should have had the economic means to invest in their children's education without limiting the quantity of children. Moreover, at least in some of our study contexts, it is questionable how important educational investments were to parents during this period (see Bengtsson and Dribe 2014; Molitoris and Dribe 2016).

The earlier decline in infant and child mortality among the high SES group may have reduced their fertility to some extent, but its effect seems far too small to explain the entire SES difference in the decline. Furthermore, mortality change in the higher-status groups did not always differ from that of the working classes (Bengtsson and Dribe 2014), although clear SES differences in child mortality were present, for instance, in Stockholm (Burström and Bernhardt 2001; Molitoris 2015). Another possible factor, which has been discussed in relation to the declining fertility of higher SES groups in other contexts, is changes in inheritance laws, affecting the possibilities for the elite to transfer enough resources to their children to safeguard their social standing (Bardet 1990; Perrenoud 1990). As far as we know, there were no such changes in inheritance laws affecting any of our populations at the time of the fertility transition. In addition, we have no evidence of other societal changes during this period that would have made social reproduction in high-status groups more difficult or that could have provided new incentives to limit fertility.

The innovation-diffusion theory is clearly consistent with an early fertility decline among the upper classes (Rogers 1962; Haines 1989a). Higher social status is usually associated with the early adoption of new behaviour, and the almost universal pattern of early decline among the upper classes corresponds to this idea. Aside from this early adoption of family limitation in the high SES group however, there was no consistent SES gradient in the decline that could be expected from an innovation-diffusion perspective, where we would expect the innovation to spread from early adopters (high SES) to early majority (middle SES) and later to the laggards (low SES). Moreover, the fact that the empirical pattern is consistent with predictions of a theory does not prove the theory correct. Therefore, we still have much to learn in terms of how the new fertility behaviour spread in these societies and the factors that explained the beginning of the process.

Even though the focus has been on SES differentials, what was striking in all our populations was that all groups participated in the fertility transition. This result clearly shows that the changes occurring in society at this point in history affected all groups in society, although with forerunners and laggards.

Notes

1 Martin Dribe is at the Center for Economic Demography and the Department of Economic History, Lund University, PO Box 7083, 22007 Lund, Sweden. E-mail: Martin.Dribe@ekh.lu.se. Marco Breschi, Stanislao Mazzoni and Lucia Pozzi are at the Department of Economics and Business, University of Sassari, Italy. Alain Gagnon is at the Department of Demography,

University of Montreal, Canada. Danielle Gauvreau is at the Department of Sociology & Anthropology, Concordia University, Canada. Heidi A. Hanson and Ken R. Smith are at the Huntsman Cancer Institute, University of Utah, USA. Thomas N. Maloney is at the Department of Economics, University of Utah, USA. Joseph Molitoris is at the Department of Sociology, University of Copenhagen, Denmark. Hélène Vézina is at the Department of Humanities, University of Quebec at Chicoutimi, Canada.

2 The study forms part of the project 'Towards the modern family. Socio-economic stratification, family formation and fertility in a historical perspective', funded by the Swedish Research Council. We are grateful to Michael Haines for constructive comments on a previous version of this paper.

3 Ken Smith and Heidi Hanson were supported by R01AG022095 (Early Life Conditions, Survival, and Health: A Pedigree-Based Population Study) (PI Smith). We thank the Pedigree and Population Resource of the Huntsman Cancer Institute, University of Utah (funded in part by the Huntsman Cancer Foundation) for its role in the ongoing collection, maintenance and support of the Utah Population Database (UPDB). We also acknowledge partial support for the UPDB through grant P30 CA2014 from the Huntsman Cancer Foundation, University of Utah and from the University of Utah's Program in Personalized Health and Center for Clinical and Translational Science.

References

Alter, George. 1992. Theories of fertility decline: A non-specialist's guide to the current debate, in J. R. Gillis, L. A. Tilly and D. Levine (eds), *The European Experience of Declining Fertility, 1850–1970. The Quiet Revolution*. Cambridge, MA: Blackwell, pp. 13–27.

Anderson, Michael. 1998. Highly restricted fertility: Very small families in the British fertility decline, *Population Studies* 52(2): 177–199.

BALSAC Project. 2014. Available: http://balsac.uqac.ca/english/ (accessed: April 2016).

Bardet, Jean-Pierre. 1990. Innovators and imitators in the practice of contraception in town and country, in A. Van der Woude, J. De Vries, and A. Hayami (eds), *Urbanization in History: A Process of Dynamic Interactions*. Oxford: Clarendon Press, pp. 264–281.

Barnes, Geoffrey A. and Timothy W. Guinnane. 2012. Social class and the fertility transition: A critical comment on the statistical results reported in Simon Szreter's *Fertility, class and gender in Britain*, 1860–1940, *Economic History Review* 65(4): 1267–1279.

Bean, Lee L., Geraldine P. Mineau, and Douglas L. Anderton. 1990. *Fertility Change on the American Frontier: Adaptation and Innovation*. Berkeley: University of California Press.

Becker, Gary S. 1991. *A Treatise on the Family*. Cambridge, MA: Harvard University Press.

Bengtsson, Tommy and Martin Dribe. 2014. The historical fertility transition at the micro level: Southern Sweden 1815–1939, *Demographic Research* 30(17): 493–534.

Bengtsson, Tommy, Martin Dribe, and Patrick Svensson. 2012. *The Scanian Economic Demographic Database. Version 3.0 (Machine-readable database)*. Lund: Lund University, Centre for Economic Demography.

Boberg-Fazlic, Nina, Paul Sharp, and Jacob Weisdorf. 2011. Survival of the richest? Social status, fertility and social mobility in England 1541–1824, *European Review of Economic History* 15(3): 365–392.

Bongaarts, John and Susan Cotts Watkins. 1996. Social interactions and contemporary fertility transitions, *Population and Development Review* 22(4): 639–682.

Bouchard, Gérard. 1996. *Quelques Arpents d'Amérique. Population, économie, famille au Saguenay, 1838–1971* [A few acres of America. Population, economy, and family in the Saguenay region, 1838–1971]. Montréal: Boréal.

Bras, Hilde, Jan Kok, and Kees Mandemakers. 2010. Sibship size and status attainment across contexts: Evidence from the Netherlands, 1840–1925, *Demographic Research* 23(4): 73–104.

Breschi, Marco, Matteo Manfredini, Stanislao Mazzoni, and Lucia Pozzi. 2009. Fertility and socio-cultural determinants at the beginning of demographic transition. Sardinia, 19th and 20th centuries, in A. Fornasin and M. Manfredini (eds), *Fertility in Italy at the Turn of the Twentieth Century*. Udine: Forum, pp. 63–78.

Breschi, Marco, Matteo Manfredini, and Stanislao Mazzoni. 2010. Health and socio-demographic conditions as determinants of marriage and social mobility, *Demographic Research* 22(33): 1037–1056.

Breschi, Marco, Massimo Esposito, Stanislao Mazzoni, and Lucia Pozzi. 2012. The Sardinian experience of the lowest Italian infant mortality at the turn of the 20th century. True or false empirical evidences? *Annales de Démographie Historique* 2012(1): 63–94.

Breschi, Marco, Massimo Esposito, Stanislao Mazzoni, and Lucia Pozzi. 2014. Fertility transition and social stratification in the town of Alghero, Sardinia (1866–1935), *Demographic Research* 30(28): 823–852.

Brown, John C. and Timothy W. Guinnane. 2002. Fertility transition in a rural, Catholic population: Bavaria, 1880–1910, *Population Studies* 56(1): 35–49.

Burström, Bo and Eva Bernhardt. 2001. Social differentials in the decline of child mortality in nineteenth century Stockholm, *European Journal of Public Health* 11(1): 29–34.

Carlsson, Gösta. 1966. The decline of fertility: Innovation or adjustment process, *Population Studies* 20(2): 149–174.

Casterline, John B. (ed). 2001. *Diffusion Processes and Fertility Transition: Selected Perspectives*. Washington, DC: National Research Council.

Clark, Gregory. 2007. *A Farewell to Alms. A Brief Economic History of the World*. Princeton, NJ: Princeton University Press.

Clark, Gregory and Neil Cummins. 2009. Urbanization, mortality, and fertility in Malthusian England, *American Economic Review: Papers & Proceedings* 99 (2): 242–247.

Clark, Gregory and Neil Cummins. 2015. Malthus to modernity: Wealth, status, and fertility in England, 1500–1879, *Journal of Population Economics* 28(1): 3–29.

Cleland, John. 2001. Potatoes and pills: An overview of innovation-diffusion contributions to explanations of fertility decline, in J. B. Casterline (ed.), *Diffusion Processes and Fertility Transition: Selected Perspectives*. Washington, DC: National Research Council, pp. 39–65.

Cleland, John R. and Chris Wilson. 1987. Demand theories of the fertility transition: An iconoclastic view, *Population Studies* 41(1): 5–30.

Coale, Ansley J. 1973. The demographic transition reconsidered, *International Population Conference, Liège 1973* 1: 53–57. Liège: International Union for the Scientific Study of Population.

Coale, Ansley J. and Susan Cotts Watkins (Eds). 1986. *The Decline of Fertility in Europe*. Princeton, NJ: Princeton University Press.

Corridore, Francesco. 1902. *Storia documentata della popolazione di Sardegna (1479–1901)* [Documented history of Sardinian population (1479–1901)]. Torino: C. Clausen (Bologna: Forni ristampa anastatica 1990).

Crafts, N. F. R. 1989. A time series study of fertility in England and Wales, 1877–1938, *Journal of European Economic History* 13(3): 571–590.

Cummins, Neil. 2013. Marital fertility and wealth during the fertility transition: Rural France, 1750–1850, *Economic History Review* 66(2): 449–476.

David, Paul A. and Warren C. Sanderson. 1986. Rudimentary contraceptive methods and the American transition to marital fertility control, 1855–1915, in S. L. Engerman and R. E. Gallman (eds), *Long-term Factors in American Economic Growth*. Chicago, IL: The University of Chicago Press, pp. 307–390.

Dribe, Martin. 2009. Demand and supply factors in the fertility transition: A county-level analysis of age-specific marital fertility in Sweden, 1880–1930, *European Review of Economic History* 13(1): 65–94.

Dribe, Martin, J. David Hacker, and Francesco Scalone. 2014a. The impact of socio-economic status on net fertility during the historical fertility decline: A comparative analysis of Canada, Iceland, Sweden, Norway and the USA, *Population Studies: A Journal of Demography* 68(2): 135–149.

Dribe, Martin, Matteo Manfredini, and Michel Oris. 2014b. The roads to reproduction: Comparing life course trajectories in pre-industrial Eurasia, in C. Lundh and S. Kurosu (eds), *Similarity in Difference. Marriage in Europe and Asia, 1700–1900*. Cambridge, MA: MIT Press, pp. 89–120.

Dribe, Martin, Michel Oris, and Lucia Pozzi. 2014c. Socioeconomic status and fertility before, during, and after the demographic transition: An introduction, *Demographic Research* 31(7): 161–182.

Easterlin, Richard A. 1975. An economic framework for fertility analysis, *Studies in Family Planning* 6(3): 54–63.

Easterlin, Richard A. and Eileen C. Crimmins. 1985. *The Fertility Revolution: A Supply-Demand Analysis*. Chicago, IL: University of Chicago Press.

Frykman, Jonas and Orvar Löfgren. 1987. *Culture Builders: A Historical Anthropology of Middle-Class Life*. New Brunswick: Rutgers University Press.

Galloway, Patrick R., E. A. Hammel, and Ronald D. Lee. 1994. Fertility decline in Prussia, 1875–1910: A pooled cross-section time series analysis, *Population Studies: A Journal of Demography* 48(1): 135–181.

Galloway, Patrick R., Ronald D. Lee, and E. A. Hammel. 1998. Infant mortality and the fertility transition: Macro evidence from Europe and new findings from Prussia, in M. R. Montgomery and B. Cohen (eds), *From Death to Birth: Mortality and Reproductive Change*. Washington, DC: National Research Council, pp. 182–226.

Garrett, Eilidh, Alice Reid, Kevin Schürer, and Simon Szreter. 2001. *Changing Family Size in England and Wales. Place, Class and Demography, 1891–1911*. Cambridge: Cambridge University Press.

Gauvreau, Danielle, Diane Gervais, and Peter Gossage. 2007. *La fécondité des Québécoises, 1870–1970. D'une exception à l'autre* [The fertility of Quebec women, 1870–1970. From one exception to the other]. Montréal: Boréal.

Geschwind, Agneta and Stefan Fogelvik. 2000. The Stockholm historical database, in P. K. Hall, R. McCaa, and G. Thorvaldsen (eds), Handbook of International Historical Microdata for Population Research. Minneapolis: Minnesota Population Center, pp. 207–231.

González-Bailón, Sandra and Tommy E. Murphy. 2013. The effects of social interactions on fertility decline in nineteenth-century France: An agent-based simulation experiment, *Population Studies: A Journal of Demography* 67(2): 135–155.

Guinnane, Timothy W. 2011. The historical fertility transition: A guide for economists, *Journal of Economic Literature* 49(3): 589–614.

Haines, Michael R. 1977. *Fertility and Occupation. Population Patterns in Industrialization*. New York: Academic Press.

Haines, Michael R. 1989a. Social class differentials during fertility decline: England and Wales revisited, *Population Studies: A Journal of Demography* 43(2): 305–323.

Haines, Michael R. 1989b. American fertility in transition: New estimates of birth rates in the United States, 1900–1910, *Demography* 26(1): 137–148.

Haines, Michael R. 1992. Occupation and social class during fertility decline: Historical perspectives, in J. R. Gillis, L. A. Tilly, and D. Levine (eds), *The European Experience of Changing Fertility*. Cambridge, MA: Blackwell, pp. 193–226.

Haines, Michael R. 1998. The relationship between infant and child mortality and fertility: Some historical and contemporary evidence for the United States, in M. R. Montgomery and B. Cohen (eds), *From Death to Birth: Mortality and Reproductive Change*. Washington, DC: National Research Council, pp. 227–253.

Hirschman, Charles. 1994. Why fertility changes, *Annual Review of Sociology* 20(1): 203–233.

Hout, Michael and Thomas A. DiPrete. 2006. What we have learned: RC28's contributions to knowledge about social stratification, *Research in Social Stratification and Mobility* 24(1): 1–20.

Igartua, José E. and Marine de Fréminville. 1983. Les origines des travailleurs de l'Alcan au Saguenay, 1925–1939 [The origins of the Alcan workers in Saguenay, 1925–1939], *Revue d'histoire de l'Amérique française* 37(2): 291–308.

Ipsen, Carl. 1996. *Dictating Demography: The Problem of Population in Fascist Italy*. Cambridge: Cambridge University Press.

Kohler, Hans-Peter. 2001. *Fertility and Social Interaction. An Economic Perspective*. Oxford: Oxford University Press.

Lesthaeghe, Ron. 1980. On the social control of human reproduction, *Population and Development Review* 6 (4): 527–548.

Lesthaeghe, Ron and Karel Neels. 2002. From the first to the second demographic transition: An interpretation of the spatial continuity of demographic innovation in France, Belgium and Switzerland, *European Journal of Population/Revue Européenne de Démographie* 18(4): 325–360.

Lesthaeghe, Ron and Johan Surkyn. 1988. Cultural dynamics and economic theories of fertility decline, *Population and Development Review* 14(1): 1–45.

Lesthaeghe, Ron and Camille Vanderhoeft. 2001. Ready, willing, and able: A conceptualization of transitions to new behavioural forms, in J. B. Casterline (ed), *Diffusion Processes and Fertility Transition: Selected Perspectives*. Washington, DC: National Research Council, pp. 240–264.

Livi-Bacci, Massimo. 1986. Social-group forerunners of fertility control in Europe, in A. J. Coale and S. C. Watkins (eds), *The Decline of Fertility in Europe*. Princeton, NJ: Princeton University Press, pp. 182–200.

Maloney, Thomas N., Heidi Hanson, and Ken R. Smith. 2014. Occupation and fertility on the frontier: Evidence from the state of Utah, *Demographic Research* 30(29): 853–886.

Mazzoni, Stanislao, Marco Breschi, Massimo Esposito, and Lucia Pozzi. 2013. Veuvage et remariage en Sardaigne, Alghero 1866–1925 [Widowhood and remarriage in Sardinia, Alghero, 1866–1925], *Population* 68(2): 273–302.

McLaren, Angus. 1990. *A History of Contraception: From Antiquity to the Present*. Oxford: Basil Blackwell.

Molitoris, Joseph. 2015. *Life and Death in the City: Demography and Living Standards during Stockholm's Industrialization*. PhD dissertation, Lund University. Lund Studies in Economic History 73.

Molitoris, Joseph and Martin Dribe. 2016. Ready to stop: Socioeconomic status and the fertility transition in Stockholm, 1878–1926, *Economic History Review* 69 (2): 679–704.

Montgomery, Mark R. and John B. Casterline. 1996. Social learning, social influence, and new models of fertility, *Population and Development Review* 22(Suppl): 151–175.

Mosk, Carl. 1983. *Patriarchy and Fertility: Japan and Sweden, 1880–1960*. New York: Academic Press.

Pedigree and Population Resource. 2012. *Utah Population Database*. Salt Lake City: Huntsman Cancer Institute, University of Utah. Available: http://healthcare.utah.edu/huntsmancancerinstitute/research/updb/ (accessed: July 2014).

Perrenoud, Alfred. 1990. Aspects of fertility decline in an urban setting: Rouen and Geneva, in A. Van der Woude, J. De Vries, and A. Hayami (eds), *Urbanization in History: A Process of Dynamic Interactions*. Oxford: Clarendon Press, pp. 243–263.

Pouyez, Christian and Yolande Lavoie. 1983. *Les Saguenayens. Introduction à l'histoire des populations du Saguenay XVIe-XXe siècles* [The Sagueneans: an introduction to the history of the Saguenay populations, from the XVIth to the XXth centuries]. Sillery: Presses de l'Université du Québec.

Reher, David S. 1999. Back to the basics: Mortality and fertility interactions during the demographic transition, *Continuity and Change* 14(1): 9–31.

Reher, David S. and Alberto Sanz-Gimeno. 2007. Rethinking historical reproductive change: Insights from longitudinal data for a Spanish town, *Population and Development Review* 33(4): 703–727.

Rogers, Everett M. 1962. *Diffusion of Innovations*. Glencoe: Free Press.

Santow, Gigi. 1995. Coitus interruptus and the control of natural fertility, *Population Studies: A Journal of Demography* 49(1): 19–43.

Schneider, Jane C. and Peter C. Schneider. 1996. *Festival of the Poor. Fertility Decline and the Ideology of Class in Sicily 1860–1980*. Tucson: The University of Arizona Press.

Schultz, T. Paul. 1985. Changing world prices, women's wages, and the fertility transition: Sweden, 1860–1910, *Journal of Political Economy* 93(6): 1126–1154.

Schultz, T. Paul. 2001. Fertility transition: Economic explanations, in N. J. Smelser and P. B. Baltes (eds), *International Encyclopedia of the Social and Behavioral Sciences*. New York: Elsevier, pp. 5578–5584.

Skirbekk, Vegard. 2008. Fertility trends by social status, *Demographic Research* 18(5): 145–180.

Sogner, Solvi, Hege B. Randsborg, and Eli Fure. 1984. *Fra stua full til tobarnskull* [From a full house to a two-child family]. Oslo: Universitetsforlaget.

Szreter, Simon. 1996. *Fertility, Class and Gender in Britain 1860–1940*. Cambridge: Cambridge University Press.

Szreter, Simon. 2015. Fertility, social class, gender, and the professional model: Statistical explanation and historical significance, *Economic History Review* 68(2): 707–722.

Szreter, Simon and Eilidh Garrett. 2000. Reproduction, compositional demography, and economic growth: Family planning in England long before the fertility decline, *Population and Development Review* 26(1): 45–80.

Treiman, Donald J. 1977. *Occupational Prestige in Comparative Perspective*. New York: Academic Press.

Van Bavel, Jan. 2006. The effect of fertility limitation on intergenerational social mobility: The quantity-quality trade-off during the demographic transition, *Journal of Biosocial Science* 38(4): 553–569.

Van Bavel, Jan, Sarah Moreels, Bart van de Putte, and Koen Matthijs. 2011. Family size and intergenerational social mobility during the fertility transition: Evidence of resource dilution from the city of Antwerp in nineteenth century Belgium, *Demographic Research* 24 (14): 313–344.

Van de Putte, Bart. 2007. The influence of modern city life on marriage in Ghent at the turn of the twentieth century: Cultural struggle and social differentiation in demographic behaviour, *Journal of Family History* 32 (4): 433–458.

Van de Walle, Etienne. 2000. 'Marvellous secrets': Birth control in European short fiction, 1150–1650, *Population Studies* 54(3): 321–330.

Van de Walle, Etienne and Helmut V. Muhsam. 1995. Fatal secrets and the French fertility transition, *Population and Development Review* 21(2): 261–279.

Van Leeuwen, Marco H. D. and Ineke Maas. 2011. *HISCLASS. A Historical International Social Class Scheme*. Leuven: Leuven University Press.

Van Leeuwen, Marco H. D., Ineke Maas, and Andrew Miles. 2002. *HISCO. Historical International Standard Classification of Occupations*. Leuven: Leuven University Press.

Vézina, Hélène, Danielle Gauvreau, and Alain Gagnon. 2014. Socioeconomic fertility differentials in a late transition setting: A micro-level analysis of the Saguenay region in Quebec, *Demographic Research* 30(38): 1097–1128.

Woods, Robert. 2000. *The Demography of Victorian England and Wales*. Cambridge: Cambridge University Press.