DEMOGRAPHIC RESEARCH

A peer-reviewed, open-access journal of population sciences

DEMOGRAPHIC RESEARCH

VOLUME 30, ARTICLE 17, PAGES 493-534
PUBLISHED 25 FEBRUARY 2014
http://www.demographic-research.org/Volumes/Vol30/17/
DOI: 10.4054/DemRes.2014.30.17

Research Article

The historical fertility transition at the micro level: Southern Sweden 1815-1939

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This publication is part of the Special Collection on "Socioeconomic status and fertility before, during and after the demographic transition", organized by Guest Editors Martin Dribe, Michel Oris, and Lucia Pozzi.

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Abstract

BACKGROUND
We know a great deal about the historical fertility transition at the macro level. The dominating focus on the macro level in previous research on the fertility transition means, however, that to a large extent we lack knowledge about details of the decline and empirical tests of the leading explanatory frameworks.

OBJECTIVE
Our aim is to explore socioeconomic fertility differentials in an industrializing community, to gain insight about the details and discuss possible mechanisms. The study starts well before industrialization and finishes at the end of the transition.

METHOD
We use longitudinal individual-level data from the Scanian Economic-Demographic Database, which contains demographic as well as socioeconomic information, including occupation, landholding, and income. In the analysis we use hazard regressions with shared frailty at the family level.

RESULTS
The transition involved not only parity-specific stopping but also spacing. While the upper social strata had higher fertility prior to the transition, they started to control their fertility earlier, by the 1880s, and also more consistently. Farmers, the middle class, and skilled workers followed in the decades after, and unskilled workers with some additional delay.

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CONCLUSIONS
These findings are partly inconsistent with several of the major explanations in the literature, such as mortality decline, increased female labor force participation, and a quantity-quality trade-off, but consistent with an innovation process where new ideas and attitudes about family limitation spread from the elite to other social groups.

COMMENTS
Further studies are required to empirically test the innovation-diffusion theory.

1. Introduction

One of the major demographic changes during the past 200 years has been the emergence of the two-child norm as part of the creation of the modern family. In most parts of Western Europe this process started in the late nineteenth century and was completed by the 1930s. In Sweden marital fertility started to decline around 1880, and after about 50 years, total fertility had declined to below two children per woman (Hofsten and Lundström 1976). Since then completed fertility has remained quite stable at around two births per woman, despite large variations in birth rates, giving empirical support for the two-child ideal of modern families.

We know a great deal about the historical fertility transition at the macro level. It was fairly simultaneous in Western Europe, France excluded, starting in the late nineteenth century, and earlier in urban areas than in rural. At the micro level we also know a great deal about fertility before the transition, but less on the transition itself, and even less integrating the pre-transitional period with the transition. We therefore still lack a fundamental understanding of the whole process of fertility decline (cf. Guinnane 2011). There has been much theorizing and generalization of empirical evidence around the fertility transition with a number of influential explanatory frameworks emerging. In most cases, however, the empirical support is rather weak. Examples include the quantity-quality trade-off, the cost-of-time hypotheses, and the innovation-diffusion hypothesis, as well as mortality decline as the main trigger of fertility decline. Sometimes the hypothesis in itself has been used to explain other outcomes, as in the case of the quantity-quality trade-off, which has been viewed as instrumental in the transition from preindustrial economic stagnation to modern economic growth (see Galor 2011).

The aim of this paper is to look at fertility patterns by socioeconomic status before and during the fertility transition in order to gain new insights into the explanations of the transition. Rather than performing direct tests of different hypotheses about the transition, for which we lack sufficient data, we will discuss likely socioeconomic

patterns that could be derived from the standard explanations, and put these to an empirical test using high-quality individual level data with information on socioeconomic status derived from occupation and land holding. We study a changing community in southern Sweden which has developed from being a rural area to a mix of rural areas and a small town. The study covers the period 1815-1939, which encompasses the entire fertility transition, as well as a pre-transitional period of about 60 years.

The following section reviews the dominant explanations of the fertility transition, followed by a description of the context, data, methods, and the expected pattern of fertility in different socioeconomic groups according to the standard explanatory frameworks. We then chart the fertility transition in the area and analyze the evolution of the socioeconomic fertility differentials, followed by a concluding discussion.

2. Explanations of the fertility transition

It is widely believed that fertility before the transition was not controlled but 'natural', in the sense that childbearing was completely independent of the number of previous births (Henry 1961; see also, e.g., Cleland and Wilson 1985; Coale and Watkins 1986).[3] There are different views concerning whether this was a result of lack of knowledge and social acceptance about birth control within marriage, or simply the result of a high target family size, which in the face of high infant and child mortality was difficult to attain (see e.g., Coale 1973; Coale and Watkins 1986; Easterlin and Crimmins 1985). From this perspective the fertility transition started as couples began to stop having children after reaching a certain target family size (e.g., Coale and Watkins 1986). This made it crucial to look for indications of parity-specific stopping, and new measures were developed to reach this aim (e.g., Coale and Trussel 1974, 1978). However, due to a lack of information on stopping or even on age-specific marital fertility, total marital fertility, and sometimes even crude birth rates have been used as substitutes for identifying the change in behavior. This was the case in the early work on the demographic transition theory (Davis 1945; Notestein 1945), as well as in many of the analyses in the European Fertility Project (EFP) at Princeton University, which aimed at testing the theory of the demographic transition. EFP developed a set of new indices that did not require much in terms of data, which enabled them to chart the fertility decline at the regional level across Europe (see Coale and Watkins 1986 for a summary account).

[3] As discussed below, there is also a considerable amount of research stressing the importance of deliberate control before the fertility transition, but it seems mainly to have been done in a non-parity-specific way.

While the demographic transition theory stated that the decline in fertility was caused by modernization (e.g. industrialization and urbanization) and falling infant and child mortality, the EFP found no support for these claims (Coale and Watkins 1986). Instead they argued that the fertility decline was largely due to the diffusion of social acceptance of family limitation, a fundamentally new behavior which did not exist in pre-transitional society. This conclusion was based on the observation that while economic development across Europe varied a lot at the time of the fertility transition, the transition itself was fairly simultaneous. This was also demonstrated by cross-sectional modeling of the effects of economic and social factors, such as urbanization, literacy, and workforce composition, on the level of fertility. Moreover, they showed that nearby areas with similar levels of industrialization sometimes had very different timings of fertility decline, which they connected to cultural and religious factors (e.g., Lesthaeghe 1977). Also, regarding the role of mortality decline, the results were largely negative. Comparing the declines in a number of countries, Van de Walle (1986) could not find a systematic pattern where mortality decline led to fertility decline.

The EFP simply could not reject the null hypothesis that the decline was independent of modernization and drew the conclusion that diffusion of social acceptance of family limitation was the key determinant of the fertility transition. Coale (1973) proposed three necessary conditions for fertility to change, namely that people were ready, willing, and able to do so (see also Lesthaeghe and Venderhoeft 2001). By readiness is meant that families must be prepared to make rational decisions about fertility, willingness is connected to the costs and benefits of having children, and ability is related to knowledge of methods to limit fertility. The EFP interpreted the empirical evidence as indicating that while both willingness and ability existed before the transition, readiness did not. Ideational factors, or diffusion of new attitudes towards family limitation, were instrumental in producing a rapid diffusion of family limitation across Europe (see also Cleland 2001; Lesthaeghe 1980). This hypothesis was, however, never explicitly tested; the conclusion was largely based on the lack of support for the modernization theory, as well as some empirical observations about fertility differentials by language group, voting behavior, or other indicators of secularization (Lesthaeghe 1977, 1980; Lesthaeghe and Wilson 1986).

Subsequent research has tended to question most aspects of EFP: the basic empirical picture of a simultaneous decline, the methods used (Brown and Guinnane 2007), the negative results on the importance of socioeconomic change (Brown and Guinnane 2002; Dribe 2009; Galloway, Hammel, and Lee 1994; Richards 1977; Sogner, Randsborg, and Fure 1984), and on previous mortality decline (Galloway, Lee, and Hammel 1998; Reher 1999, Reher and Sanz-Gimeno 2007). There has also been questioning of the claim that families in pre-transitional Europe did not deliberately control their fertility. Studies of age-specific marital fertility in Rouen and Geneva

show that family size was controlled long before the fertility transition (Bardet 1990; Perrenoud 1990). Similarly, in several German villages couples married in the beginning of the nineteenth century practiced fertility control (Knodel 1988:289). An early rural decline, preceding neighboring cities, is also observed for Hungary (Andorka 1972). Other studies have demonstrated the existence of non-parity-specific fertility control in pre-industrial Western societies, which shows that people were acting on incentives well before the decline began (e.g., Bean, Mineau, and Anderton 1990; Bengtsson and Dribe 2006; David and Mroz 1989a, 1989b; Dribe and Scalone 2010; Van Bavel 2004). This has also led to the conclusion that birth spacing, and not only stopping, was an important component in explaining the fertility transition (Anderson 1998; Bean, Mineau, and Anderton 1990; Bengtsson and Ohlsson 1994; Crafts 1989; David and Sanderson 1986; Haines 1989; Szreter 1996). Of course, the fact that people sometimes deliberately controlled their fertility cannot be taken as evidence that people were ready to limit family size, but supports the idea of agency in reproductive decision-making long before the fertility decline (cf. Tsuya, Feng, and Lee 2010).

There has been considerable theorizing about the fertility transition, and different explanatory frameworks have been proposed. One influential theory, already mentioned in relation to the EFP, is innovation diffusion, or, more loosely, ideational change. The basic premise of this framework is that people in the past were not completely ready to limit family size even though they might have been both willing and able, in the sense that they had economic and demographic reasons to limit family size as well as the necessary knowledge to do so. What was required was a change in attitudes making it socially acceptable to limit fertility within marriage (see Carlsson 1966; Cleland 2001; Cleland and Wilson 1987; Lesthaeghe 1980; Lesthaeghe and Surkyn 1988). In this process better knowledge about contraceptive methods may also have played a part. Even though most scholars seem to assume that knowledge of basic contraception through traditional methods were known to people, it remains uncertain to what extent they were used within marriage (McLaren 1990; Santow 1995; Van de Walle 2000; Van de Walle and Muhsam 1995). In any case, the distinction between readiness and ability is crucial. The mere fact that people were able to limit fertility does not mean that they were ready to do so. For this to happen there had to be social acceptance of limiting the number of children within marriage, and according to the innovation-diffusion paradigm this was largely not the case in pre-transitional society. Hence, diffusion of new norms, values, and attitudes towards family limitation might have been an important part of the fertility decline as it affected people's readiness to adopt new behavior. It is more difficult to find out how these new attitudes came about and spread through society. In his theory of innovation-diffusion more generally, Rogers (1962) identified five groups in the diffusion process with strong links to socioeconomic status: innovators (highest SES), early adopters (high SES), early majority (average SES), late

majority (below average SES), and laggards (lowest SES). Viewing deliberate family limitation within marriage as an innovation (e.g., Cleland 2001), we would then expect to find a clear gradient in the decline of marital fertility, going from highest to lowest socioeconomic status. What is not as clear, however, is how to explain the innovation in the first place, i.e., why the innovators suddenly decided to start to do things differently and limit their family size. One possibility, introduced by Easterlin (1975; see also Easterlin and Crimmins 1985), is to view these aspects as a cost of fertility regulation, which could delay the fertility decline because the social or emotional costs of family limitation were too high. Not until these costs declined following a universal acceptance of deliberate birth control within marriage would actual fertility be adjusted to the new circumstances. A similar view underlies Coale's (1973) formulation about people needing to be ready, willing, and able for fertility decline to commence (see also Lesthaeghe 1980; Lesthaeghe and Vanderhoeft 2001). Furthermore, it is unclear what factors explain the time lag between different groups, and whether the lag is in terms of months, years, or decades.

There are a number of theories focusing on the demand for children as crucial in explaining fertility in general and the historic decline in particular (e.g., Becker 1981; Caldwell 1982; Easterlin 1975; Easterlin and Crimmins 1985; Leibenstein 1957, 1975). The demand for children is determined both by the benefits of children and by their costs. In terms of benefits the direct productive contribution of children could have been important in agricultural and early industrial societies where children often started to work early (e.g., Humphries 2010). Legislation to limit child labor could therefore have influenced the direct costs of children, even though it seems, at least in Sweden, that child labor became unprofitable well before the change in labor laws (Olsson 1980). Regardless of the reason, a lower labor contribution by children should act to lower the demand for them.

Children could also have been a benefit to their parents as a form of social insurance and old-age support (Easterlin 1976, see also Sundstrom and David 1988). The development of welfare institutions, such as unemployment benefits and pension systems, should then have reduced these benefits, which could have contributed to a lower demand for children, and thus to fertility decline.

Turning to the cost of children, two main hypotheses have emerged from the economic fertility models, the 'cost-of-time hypothesis' and the 'quantity-quality trade-off hypothesis'. The cost-of-time hypothesis emphasizes the increasing indirect costs of children, stemming from women's employment outside the household (Mincer 1963). Increased labor force participation of married women and higher female relative wages increased opportunity costs of children and thus reduced the demand for them. The main question here is the extent to which the labor force participation of married

women really increased in the period of fertility decline. We will return to this question when discussing the context of our analysis.

The quantity-quality trade-off hypothesis emphasizes the direct costs of children related to increased demand for education as the result of a shift in consumption towards industrial goods, produced by a better-educated labor force. Assuming a budget constraint, this led families to reduce their fertility and to invest more in each child: in other words, to substitute quantity for quality (Becker 1981). This trade-off has been seen as an important cause of the transition from so-called Malthusian stagnation to modern economic growth (Galor 2005, 2011; see also Becker, Cinnirella, and Woessmann 2010).

Finally, mortality decline has often been seen as an important explanation for fertility decline, which goes back at least to the first formulations of the theory of the demographic transition (Davis 1945; Notestein 1945; see also Van de Walle 1986). In the synthetic model developed by Easterlin (1975; see also Easterlin and Crimmins 1985) mortality decline is crucial in affecting the supply of children, defined as the number of surviving children a couple would get if they made no conscious efforts to limit the size of the family. Thus it reflects natural fertility as well as child survival. High child mortality constitutes a limit on this potential supply; additionally, cultural factors outside the immediate control of the family, such as breastfeeding practices, which influence the level of natural fertility, might also impose such a limit. Declining mortality in the first phase of the demographic transition changed the supply of children, and this was one important factor in the fertility decline (see also Dyson 2010; and Reher 1999 for similar views).

Taken together, there are explanatory frameworks of varying levels of sophistication that try to explain the fertility transition by factors associated with the demand and supply of children as well as with the degree of social acceptance of family limitation. From a theoretical point of view they are complementary rather than competing, and in principle they could all contribute to the explanation (see Casterline 2001). The problem has always been to actually test them in historical contexts. As aforementioned, there is evidence from macro-level data supporting all of these explanations, but most tests are quite weak, with uncertainty as to what extent factors like expansion of education, increased female work, declining mortality, development of pension schemes, or new attitudes and better knowledge of contraception were actually important. In this study we will use the socioeconomic differences in fertility before and during the transition to gain new insights into the likely contribution of these explanations. In order to form hypotheses about the expected socioeconomic pattern, which can later be tested empirically, we first need to present the context we will be exploring.

3. The context

This paper focuses on a rural area in southern Sweden which was homogenous in terms of religion. Almost the entire population belonged to the Lutheran state church, which makes religious denomination a less likely determinant of fertility decline in this context (cf. Derosas and Van Poppel 2006). It is located about ten kilometers from the coast in the western parts of Scania, which is the southernmost province of Sweden. The five parishes we studied had 3,900 inhabitants in 1830. By the end of 1939 that figure had increased to 6,300, which implies roughly the same rate of growth as in Sweden as a whole. The growth in the five parishes was, however, very unequally distributed, as 91% took place in Kävlinge, which was transformed from a rural village to a small industrial town with several factories and railroad connections (see Dribe, Helgertz, and Van de Putte, forthcoming). Life expectancy at birth followed the same development as in Sweden as a whole, but was about one year higher (Bengtsson 2004). Fertility was also slightly higher than in Sweden as a whole but followed the same patterns over time.

The selected parishes are compact in their geographical location, showing the variations that could occur in a society with regard to size, topography, and socioeconomic conditions. The entire area was open farmland, except for parts of Kågeröd, which were more wooded. Sireköpinge, Halmstad, and Kågeröd were predominantly manorial parishes, while freehold and crown land dominated in Kävlinge and Hög.

Sweden, like the rest of Western Europe, underwent fundamental changes in economic structure from the mid-nineteenth century onwards. The manufacturing industry grew rapidly and the agricultural sector was rationalized. After about 1900 the service sector started to grow as well. This meant that the employment structure underwent large changes within a short time period, and by 1940 the number employed in industry was higher than in agriculture (Jungenfeldt 1966: Table 1). As industrialization was mainly an urban phenomenon almost all towns in Sweden grew during this period. Still, despite this economic development, the growth of the labor force was not fully absorbed and large-scale emigration, primarily to the United States, took place. In addition, both the beginning of the 1920s and the 1930s saw mass unemployment, peaking at 27% in 1921 (Silenstam 1970, Table A:19). The rural area within the study saw all parts of this development except large-scale emigration. Not only did the agricultural sector change but some industries developed as well, particularly in one of the parishes, Kävlinge, located along one of the main railroad lines.

The increasing competition from imported agricultural products made producers aware of the importance of rationalization and technical change. Mechanization was an

important way to be competitive and meetings were held to show the latest news in terms of agricultural machinery.[4] By 1900 an investigation based on estate inventories of farms throughout the country showed that, as a result of the intensive mechanization process, machinery was used in almost all parts of the production process, more so in the plain areas, including Scania (Moberg 1987:133, 1989:214-217).[5] As a consequence, the number of workers involved in vegetable production decreased despite an increase in production, the productivity increase being even higher in animal production.

The intensive development of agriculture and industrialization implied not only investments in factories and machinery but also in education. From being the responsibility of the clergymen since 1686, in 1842 it became mandatory for all communities to have a school, although schools often started well before this time. It was, however, not until 1882 that school attendance became mandatory (see Lirén 1986; Richardson 1994). By then most children in Sweden already had a basic knowledge of both reading and writing (see Nilsson and Svärd 1994; Svensson 2006). However, even after it became mandatory, school was half-time and stayed so for a long time. Many families, especially in rural areas where child labor was not abandoned until 1936 (1944 for home work) did not send their children to school as much as they were obliged too, simply because schools could be far away and child labor was a welcome supplement to the labor and income of the family (Sjöberg 1996:93). This is why, as late as the 1920s, farmers protested against the mandatory school system (Sjöberg 1996:1). This is also why even the children of the members of the school boards had a high degree of absence (Sjöberg 1996:55-56). Even though the quantitative measures of income from children are very limited, we have some examples where the share of family labor earnings coming from children varies between 4% and 62% around 1890 (von Feilitzen 1890–92, cited by Sjöberg 2004: Table 10).

In addition, secondary schooling developed in various forms (national, local community, or private). The number of local secondary schools for both boys and girls in Sweden increased from 2 in 1910 to 40 in 1918 (SOS 1919). Still, few went for any education above the basic level of 6 years of primary school. In fact only about 4% of all children were taught in secondary schools in the period 1920–1939 and in the countryside the figure was below 1.5% (Statistics Sweden 1974:4, Tables 1.6 and

[4] At the first national meeting, held in Stockholm in 1846, only 24 machines were displayed, a figure that increased rapidly; by 1881 at the meeting in Malmö the number of machines on display was 1,600.

[5] The number of workers involved in vegetable production decreased by 22% between 1876-1885 to 1930-1939, despite an increase in production of 94% (measured in calories). In animal production the number of workers decreased by 42% and production went up by 213% (SOU 1966(30):86; see also Hellström 1976: App 5).

1.6:96). As a result only 1.9% of all 19-year olds had a high school degree in 1930, and only 3.6% of 16-year olds had nine years of schooling (Stanfors 2007: 181). This is not to say that no education at all took place after the sixth school year, since there were also various forms of vocational schooling and training. This type of schooling was, however, of shorter duration and therefore less costly. Furthermore it did not give access to tertiary education. Thus the cost of education was the same for almost all parents, except perhaps in the highest social class where the budget constraint was less tight.

Child labor was common, even at very young ages, and it was not until 1833 that it was forbidden to employ children below age 9. This then changed again in 1912 to 13 years (Olsson 1980). In 1875 about 5% of the industrial labor force was below 14, including 20% of the glass manufacturing industry (Olsson 1980:50). In addition, many children worked as agricultural laborers, either on the home farm or elsewhere, and in 1913 the legal maximum number of working hours for children over 13 increased to 60 hours per week. Starting to work at age 13 was common until the school reforms of the 1950s and 60s (Orring 1967: Diagram 1). Children normally did not leave home until after age 15 or 16 (see Dribe 2000), and were under the guardianship of their fathers for much longer. While the lawful age for men was 21 years during the entire period we analyzed, it changed for women: it was not until 1863 that they became lawful, then at age 25 years and only until they married. The lawful age was changed to 21 years for women in 1884 but it was not until 1921 that they remained lawful after marriage. This means that parents (fathers) often had control of labor contracts and the income of their children for a period of eight to twelve years of their working lives. Nonetheless, it remains highly uncertain if children really were of net benefit to their parents when looking at the whole period from birth until full independence (see, e.g., Lee 2003; Sullivan Robinson, Lee, and Kramer 2008 for developing countries).

The inheritance laws also changed in this period. While sons and daughters of the bourgeoisie and the clergymen had inherited equally since the Middle Ages, the daughters' share was only one third among the farmers and lower classes. This changed with a new law in 1845 with equal inheritance between the sexes for everyone, except for children born out of wedlock (Inger 2011:254).

Turning to welfare systems, poor relief was organized by the local communities at the beginning of the period, but only a small fraction of the population received this before the national welfare system emerged (for an overview, see Bengtsson 2004). The state pension system from 1913 was the first in the world to be universal, meaning that it covered the entire working population and not only industrial workers. In the beginning the pension was very low. The benefits, which were based on contributions, gave a pension of approximately 20% of an average income for workers. It grew over time, and additional dimensions such as work injury insurance were added in the 1920s.

With the pension reform of 1946 retired workers could for the first time live on their pensions (see Bengtsson and Fridlizius 1994; Edebalk 1996).

4. Data and methods

The data used is based on local population registers in combination with church records for five parishes (Hög, Kävlinge, Sireköpinge, Halmstad, and Kågeröd), which include information on demographic events and migration for all members of households, and families within households.[6] The vital events have also been checked against the birth and death registers to adjust for possible under-recording of events in the population registers. In this paper we use data from about 1815, when the population registers begin, to 1939, when the fertility transition in Sweden was completed and a period of increasing fertility was about to begin (the baby boom). The data from the population registers have also been linked to poll-tax registers (*mantalslängder*) and income registers which provide yearly information on occupation. The resulting database contains all individuals born in the different parishes, or migrating into them. Instead of sampling any particular group (a birth cohort for example), each individual is followed from birth or time of arrival in the parish, to death or migration out of the parish.

In the first part of the analysis we chart the fertility transition in the area, looking at general marital fertility rates (for women aged 15–49), age-specific marital fertility rates, SES-specific fertility rates, and mean birth intervals over the period from 1815–1939. The rates were calculated for the entire population of married women residing in the parishes. Women are followed in-migration (as married) or marriage, until death, out-migration, or turning 50.

We then turn to a multivariate analysis mainly aimed at analyzing the development of socioeconomic differences in marital fertility in the fertility transition, controlling for a basic set of covariates. The analysis is made separately for first births and higher-order births because the timing of first births is likely to be influenced by the same factors as the marriage itself. We use piecewise constant exponential hazard models (see, e.g., Blossfeld, Golsch, and Rohwer 2007) with shared frailty at the individual (woman) level to account for repeated events for the same woman (in the analysis of higher-order births). The frailty factor is assumed to follow a Gaussian distribution. We use six-month time periods for the baseline hazard, which gives a high flexibility and thus does not impose severe restrictions on the shape of the baseline hazard function

[6] The data is maintained by the Scanian Economic-Demographic Database, which is a collaborative project between the Regional Archives in Lund and the Centre for Economic Demography, Lund University. We have used version 3.0 (Bengtsson, Dribe, and Svensson 2012).

(using three-month time periods produced practically identical results and comparisons with the Cox model also showed very similar parameter estimates). For first births the duration is time since marriage, and only women for whom we observe their first marriage are included in the sample.

When it comes to second and higher-order births we analyze all birth intervals simultaneously instead of focusing on stopping by, for example, looking only at the third or the fourth birth. This is justified from earlier results indicating that the fertility decline in Sweden was not solely a matter of stopping but more of a reduction in births over the entire reproductive period (Bengtsson and Ohlsson 1994; Dribe 2009, see also Figure 2 below). In this analysis the duration is time since last birth and in-migrating women are included in the sample from the first observed birth onwards (although this birth is of course not included in the analysis as an event). Due to the high rates of migration in the area under study (e.g., Dribe 2003) we would expect some selection bias as well as a much smaller sample size had only women who could be followed from marriage onwards been included in the analysis. However, it also means that it is impossible to include parity as a covariate because this information is lacking for in-migrants.

We estimate a basic model including socioeconomic status, life status of the previously born child, time period, age at marriage (first births), age of woman (higher-order births), and parish of residence. We also estimate an extended model, which includes interactions between period and socioeconomic status. These models test how socioeconomic differences evolved over time and which groups led or lagged in the decline of fertility. All covariates, except age at marriage, are time-varying. We divide the period of analysis into four distinct periods corresponding to the different phases of the fertility transition: 1815–1879 (pre-transitional), 1880-1904 (early transition), 1905-1919 (mid transition), and 1920–1939 (late transition). In addition we control for a linear trend within these periods to see if the other covariates are able to pick up the decline in fertility or not.

Socioeconomic status is measured by the occupation of the family head (the husband). We have coded all occupations in the database into HISCO (Van Leeuwen, Maas, and Miles 2002), and then classified them according to HISCLASS (Van Leeuven and Maas 2011), which is a 12-category classification scheme based on skill level, degree of supervision, whether manual or non-manual, and whether urban or rural. It 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, 12) Unskilled farm workers. These twelve classes were grouped into six: Elite (1+2), Middle class (3+4+5), Skilled workers (6+7), Farmers and fishermen (8), Lower-

skilled workers (9+10), and Unskilled workers (11+12). The elite includes occupations like higher officials and military, factory owners, bank managers, doctors, dentists, and clergymen, while the middle class includes shop owners, merchants, teachers, etc.[7]

In addition to occupational data we have used landholding information from poll-tax registers to distinguish farmers with land at or above subsistence level from smallholders. Only the former group was categorized as farmers while the latter was classified as lower-skilled workers. Similar to previous research, we used 1/16 of a *mantal* (an old land measure used in Swedish sources) as the subsistence level (see the discussion in Dribe 2000).

Table 1 shows the distribution of these classes for the full sample of married women aged 15–49. Overall there was an increase over time in the proportion of the higher classes: the elite increased from about 2.5% to 5% between the first and last period, and the middle class from 4% to 15%. The proportion of skilled workers also increased substantially, while the proportion of farmers declined from 35% to 22%. The share of lower-skilled workers (including smallholders, crofters etc.) also declined, while the proportion of unskilled workers remained quite stable.

Table 1: Distribution (%) of socioeconomic status of the family head in the full sample

	1815-1879	1880-1904	1905-1919	1920-1939
Elite	2.5	3.5	3.1	4.6
Middle class	4.1	9.6	14.4	15.3
Skilled	8.0	15.4	17.0	15.9
Farmers	35.4	22.0	17.5	22.0
Lower-skilled	31.0	24.2	24.8	23.5
Unskilled	18.0	19.7	20.9	16.4
NA	1.0	5.6	2.4	2.4
Total	100	100	100	100
Time at risk	25351	12900	10449	15422

Note: The sample contains all married women 15-49 years.

[7] The fundamental conclusions of the analysis do not depend on the choice of class scheme. Similar results were obtained using SOCPO (Van de Putte and Miles 2005).

Life status of the previous child is included to measure the impact of child death on fertility; in other words, if child deaths induced parents to compensate by having another birth (replacement). This serves to indicate the importance of infant and child mortality for fertility. If there was a clear and consistent association between the two, a decline in infant and child mortality may have contributed to fertility decline, as has been postulated in much previous research.

5. Expected fertility patterns by socioeconomic status

Based on the theories and previous empirical generalizations discussed we can form expectations about the likely socioeconomic pattern of fertility decline according to the different frameworks. We will group explanations under five different headings: benefits of children, cost-of-time, quantity-quality trade-off, mortality decline, and ideational factors.

The direct labor contribution of children was probably largest and most long-lasting in the agricultural sector and especially among the farmers, as they had a demand for the labor of their children. The gradual decline of child labor quite early on in the industrialization process made it more difficult for children to get a job, and therefore the direct benefits of children declined (Olsson 1980; see also Cunningham and Viazzo 1996). Among the elite and upper middle classes we do not expect children to have worked for wages to any greater extent, thereby not constituting economic benefits to their parents. Thus, from this perspective we would expect a later decline in fertility for farmers, and perhaps for agricultural laborers.

In terms of security in old age and in times of low income due to unemployment etc., we would expect people of lower means to have been most in need of such transfers, as they had no assets to live off. This would imply that the extent to which the emerging welfare institutions had any effect on fertility decisions in the period we are studying should mainly affect the lower classes, and only towards the very end of the transition. Hence, a late decline in fertility in the lower-status groups would be consistent with this explanation.

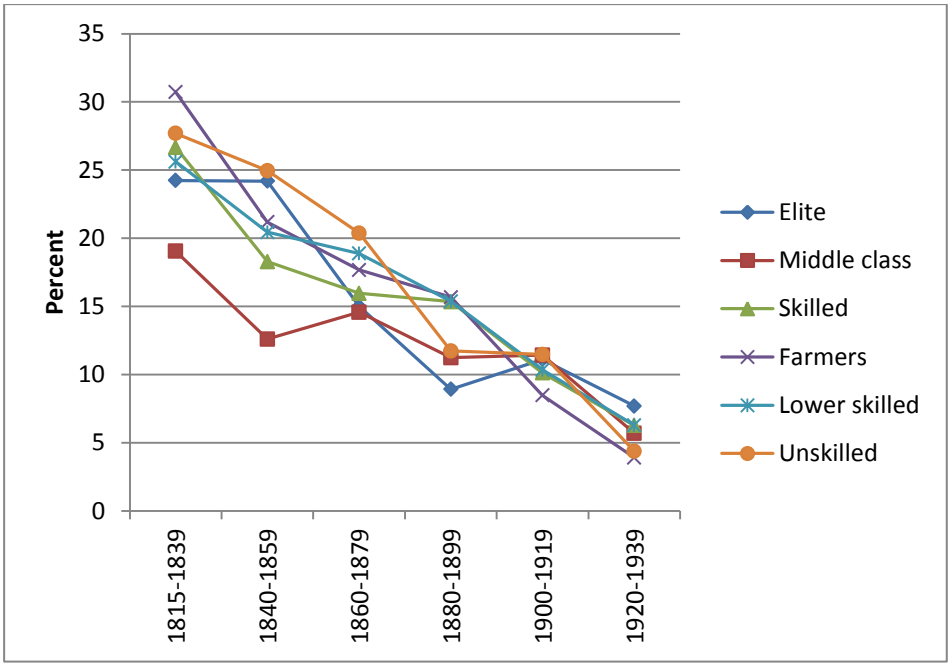
According to the cost-of-time hypothesis we expect women's work to have increased the cost of children, especially in cases where they work outside the home, where combining work with looking after children was difficult. From census data we know that the level of labor force participation among married women was very low during the period of concern; in 1920, for example, it was only 4% (Silenstam 1970:58). Most likely, however, many married women did various kinds of work to supplement family income without this being recorded in the sources, which makes the census figures gross underestimates of the extent of women's work outside the home in

this period (see Humphries and Sarasúa 2012). We can safely assume that such supplementary labor was much more frequent in the working classes, while the elite and middle class wives rarely worked for wages outside the home. Hence, from this perspective we would expect an early decline in the laboring classes, who would have been mainly affected by these increased costs.

Even though the elite groups were the first to provide their children with higher education, we do not expect them to have had a tight budget constraint, thereby not facing a strong trade-off between the quantity and quality of their offspring. In addition to an educational career, the military offered alternative career paths which came at no cost to the parents. Instead we expect the growing middle class of the nineteenth and early twentieth century to have faced the strongest trade-off. Education became an increasingly important instrument for socioeconomic advancement (see Dribe, Helgertz, and Van de Putte, forthcoming) and middle class families can be expected to have had high aspirations for their children, without having the means to provide for a large number of them. We would therefore assume that they opted for fewer children, while investing more in each of them. Hence, from this theory we would expect the middle class to have had an early fertility decline.

In order to form expectations about the impact of mortality decline on fertility we need information about socioeconomic differences in mortality in this period. While it is clear that more pronounced socioeconomic differentials in adult mortality did not appear until well after our period ends (Bengtsson and Dribe 2011) it is more unclear for children, even though estimates from the area under study point to a similar time profile in the decline of infant and child mortality in different socioeconomic groups, perhaps with a somewhat earlier decline in the elite middle class (see Figure 1). The differences were only minor, however, which leads to the conclusion that we should not expect much of socioeconomic differences in the timing of the fertility decline based on the mortality development.

Figure 1: Proportion of children dying before age 5 by year of birth and SES



Based on the theories of the diffusion of new ideas and behavior discussed previously, we expect this kind of process to have started in the upper classes, then to have gradually diffused to the middle classes, and later also to the working class (Rogers 1962; see also Lesthaeghe and Surkyn 1988; Shorter 1975). An early decline among the elite groups, followed by the middle classes, the farmers, and lastly the working classes, would clearly be consistent with this kind of diffusion process. Similarly, Szreter's (1996) idea about communicating communities, where geography and class interact to form specific fertility discourses, seems consistent with this more rapid and early diffusion among the elite groups. These groups normally interacted over longer distances, which should have increased the pace of the decline and made it less geographically constrained (see also Klüsener, Scalone, and Dribe 2013).

6. The fertility transition in the Scanian communities

Figure 2 shows the general marital fertility rate (births to married women divided by the person years at risk for married women 15–49 years) annually from 1815–1939. It is quite clear that there was not much trend in marital fertility during most of the nineteenth century. During the 1890s fertility suddenly declined, and once the decline started it continued uninterrupted until the mid-1930s. This is basically the same pattern as for Sweden as a whole, although the decline started about ten years later in Scania (see Hofsten and Lundström 1976). Fertility started to decline at about the same time for older and younger women.

Figure 2: General marital fertility rates (15-49) in the Scanian sample 1815–1939

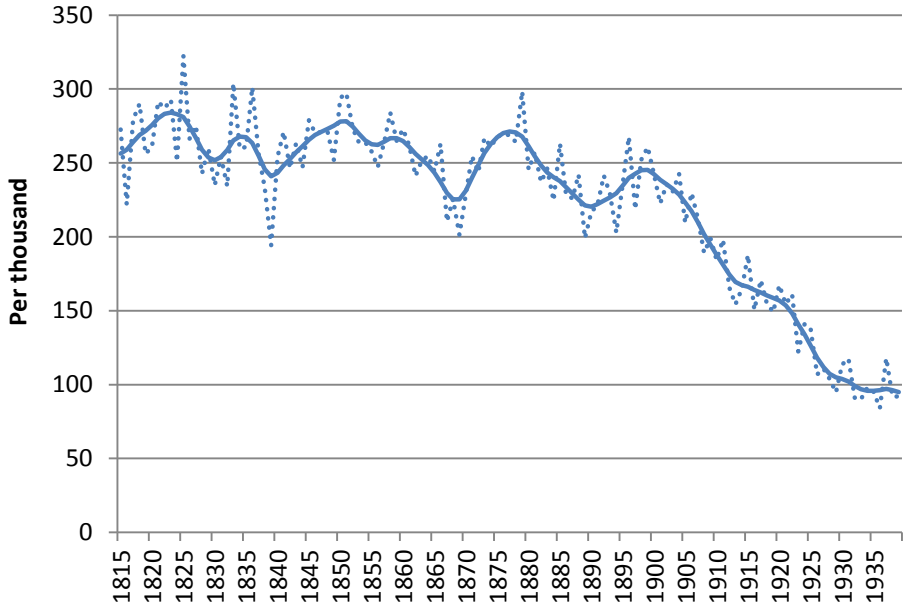
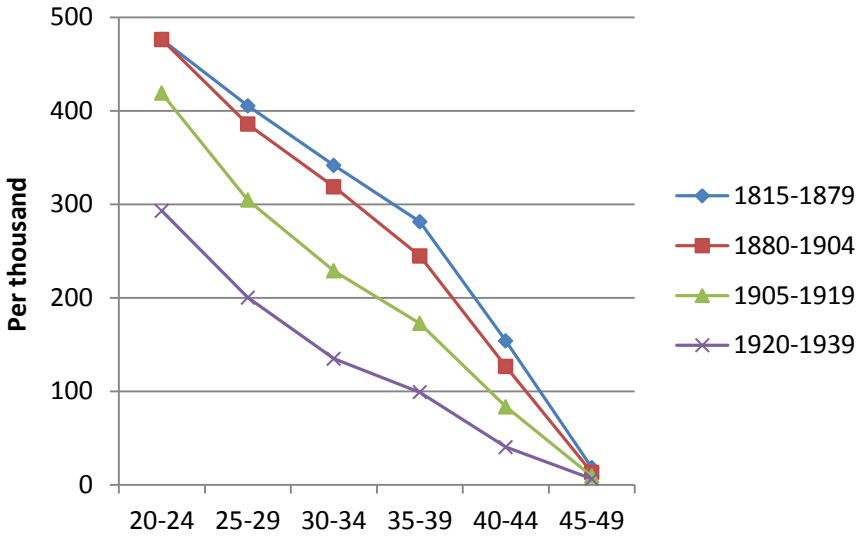


Figure 3 pictures the development of age-specific marital fertility for subsequent time periods. The fertility transition is clearly visible in the graphs, with a lowering of marital fertility in all age groups. It is difficult from only visual inspection to determine if this reduction was due to prolonged birth intervals or parity-specific stopping. A common way to indicate stopping has been to use the Coale-Trussel model (Coale and Trussel 1974, 1978).[8] Table 2 reports estimates of the m and M parameters using the age-specific schedules from Figure 3. Values of m over 0.2–0.3 are usually taken to indicate the presence of parity-specific fertility control. By this measure fertility appears to have been controlled in this way at least by the 1880s, which also accords quite well with national and regional level data (Dribe 2009).

Figure 3: Age-specific marital fertility rates by period in the Scanian sample



[8]Although there have been numerous criticisms of this way of modeling natural fertility, and although several alternative formulations and estimation techniques have been proposed and presented, it has survived to become widespread, probably because of its simplicity and thus its value for comparisons (see, e.g., Page 1977; Broström 1985; Wilson, Oeppen, and Pardoe 1988). Mainly for reasons of comparison the standard formulation devised by Coale and Trussell has been used, by which m and M are estimated by ordinary least squares regression.

Table 2: Coale-Trussel m and M in the Scanian sample by period

	M	p-value	m	p-value
1815-1879	1.00	0.960	0.13	0.054
1880-1904	1.01	0.840	0.30	0.009
1905-1919	0.84	0.043	0.44	0.001
1920-1939	0.56	0.003	0.54	0.003

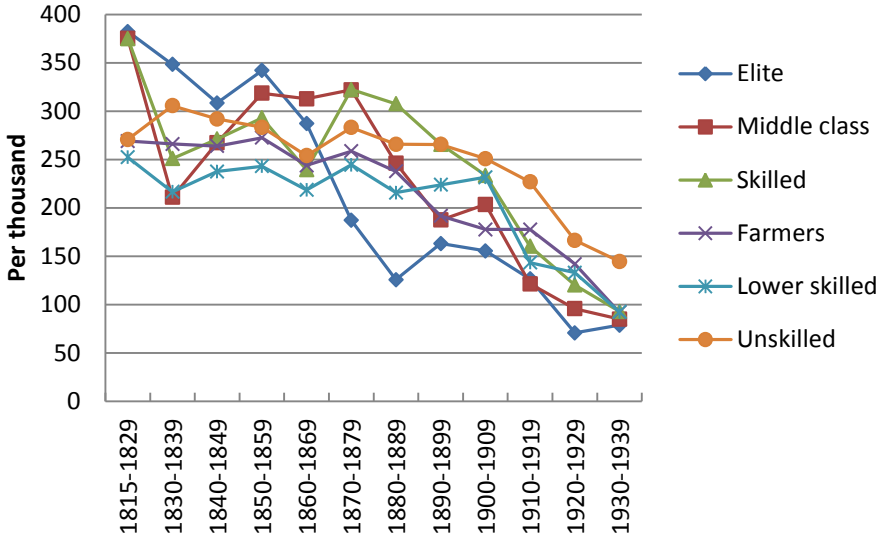
Note: Parameters estimated by OLS. P-value for M refer to the test of ln(M)=0.

The fact that parity-specific control was one mechanism in the decline should not lead us to rule out the importance of prolonged birth intervals for the decline, as previously argued. As is clear from Table 4, mean birth intervals also increased considerably in the fertility decline, pointing to the important role played by spacing in the fertility transition, something that has also been stressed for other countries (e.g., Bean, Mineau, and Anderton 1990; Szreter 1996).[9] The long-term increase is equally visible for higher-order births and from marriage to first birth. In both cases it increased by six months.

Figure 4 displays the marital fertility rates (15–49) by socioeconomic status of the family head by time period. Looking at the pre-transitional period as a whole (before 1860), the elite had high fertility, and the lower-skilled had the lowest. From the 1860s onwards fertility dropped quickly among the elite, and from about 1880 also among the middle class and skilled workers, while it remained stable for the lower classes and farmers. From 1900 onwards fertility declined in all socioeconomic groups. The pattern over time indicates a period of widening socioeconomic differences during the initial period of the decline, from about 1880 to 1910–1920. From then on the decline was fairly simultaneous, in which the temporal decline common to all groups was much more pronounced than the socioeconomic differentials. Thus, the fertility transition started among the elite and then spread to the middle class and skilled workers, and finally to the rest of the groups. Once it had started, the pace of change was similar for different socio-economic groups.

[9] An increase in the intensity and length of breastfeeding could potentially be part of the prolongation of birth intervals. Breastfeeding was, however, already common in in our study area, as well as throughout most of the country, before the fertility transitions started (Brändström 1984: Figure 32). Thus it cannot be a major factor in explaining the fertility decline.

Figure 4: Marital fertility by SES in the Scanian sample 1815–1939



Mean birth intervals by socioeconomic status, reported in Table 3, show a considerable increase not only in the length of higher birth intervals but also in the interval from marriage to first birth in all groups, with temporal intermissions only for certain socioeconomic groups. Although some of the increase for higher-order births could be connected to failed stopping (couples having unplanned children after deciding to limit family size), the highly similar pattern for first births points to prolonged birth intervals ('spacing') as an important aspect of the fertility transition in all social groups and in all age groups (cf. Bean, Mineau, and Anderton 1990; Szreter 1996).

These kinds of aggregated measures are difficult to interpret, however, as socioeconomic differentials might be concealed by compositional effects in terms of age, proportions childless, etc. Factors affecting first births are likely to differ from factors affecting higher-order births, due to differences in frequencies of pre-nuptial pregnancies, or the relation between the marriage decision and the decision to enter into parenthood more generally. Hence, in the analysis we distinguish between the first birth interval (marriage to first birth) and higher-order intervals.

Table 3: Mean previous birth interval (years) by period and socioeconomic status

A: First Births

	1815-1879	1880-1904	1905-1919	1920-1939	1815-1939	N
Elite	0.84	1.25	0.85	0.77	0.92	36
Middle class	1.95	1.10	1.14	2.28	1.71	108
Skilled	1.12	1.10	0.91	1.27	1.12	207
Farmers	1.21	1.80	1.23	1.99	1.44	367
Lower-skilled	1.28	0.88	1.33	1.59	1.27	402
Unskilled	0.58	1.06	0.87	1.27	0.79	375
All	1.06	1.18	1.13	1.61	1.19	
N	778	285	165	267	1495	

B: Higher-order births

	1815-1879	1880-1904	1905-1919	1920-1939	1815-1939	N
Elite	2.24	3.34	2.75	3.01	2.57	229
Middle class	2.42	2.67	2.79	3.54	2.76	622
Skilled	2.70	2.31	3.04	3.40	2.72	1073
Farmers	2.61	2.60	2.66	3.00	2.65	2691
Lower-skilled	2.80	2.60	2.85	3.33	2.81	2277
Unskilled	2.78	2.70	2.74	3.36	2.83	1547
All	2.68	2.58	2.82	3.27	2.74	
N	4701	1808	1060	870	8439	

7. Event-history analysis of birth intervals

Table 4 reports the distribution of the covariates used in the hazard models, and Table 5 displays the relative risks estimated separately for first births and higher-order births. The two samples look fairly similar in terms of the distribution of socioeconomic status.

Table 4: Distribution of covariates (based on population at risk)

	First births	Higher-order births
SES		
Elite	0.03	0.03
Middle class	0.09	0.09
Skilled	0.14	0.13
Farmers	0.26	0.29
Lower-skilled	0.30	0.28
Unskilled	0.19	0.18
Period		
1815-1879	0.41	0.47
1880-1904	0.17	0.20
1905-1919	0.12	0.15
1920-1939	0.30	0.18
Life status of previous child		
Alive	---	0.91
Dead	---	0.09
Age of woman		
15-24	0.23	0.06
25-29	0.34	0.17
30-34	0.19	0.23
35-39	0.11	0.22
40-44	0.14	0.19
45-49	*	0.12
Parish		
Hög	0.09	0.09
Kävlinge	0.28	0.23
Halmstad	0.13	0.15
Sireköpinge	0.18	0.21
Kågeröd	0.32	0.32
Time at risk	2951.3	41640.1
Events	1479	8367

*40-44 refer to 40-49.

Table 5: Relative risks of birth from piecewise constant exponential hazard model

	Basic model				Interaction model			
	First births		Higher-order		First births		Higher-order	
	RR	p	RR	p	RR	p	RR	p
SES								
Elite	1	rc	1	rc	1	rc	1	rc
Middle class	1.15	0.468	1.04	0.740	0.94	0.820	1.15	0.398
Skilled	1.25	0.217	1.19	0.116	1.07	0.786	0.87	0.352
Farmers	0.99	0.945	1.18	0.101	0.65	0.079	0.87	0.309
Lower-skilled	1.13	0.488	1.03	0.781	0.82	0.400	0.76	0.057
Unskilled	1.39	0.064	1.01	0.957	1.16	0.531	0.66	0.005
Period								
1815-1879	1	rc	1	rc	1	rc	1	
1880-1904	0.93	0.479	1.02	0.792	0.39	0.029	0.66	0.095
1905-1919	0.81	0.168	0.71	0.000	0.69	0.562	0.42	0.002
1920-1939	0.53	0.000	0.39	0.000	0.58	0.270	0.18	0.000
Age of woman								
15-24	1	rc	1	rc	1	rc	1	
25-29	0.81	0.000	0.69	0.000	0.80	0.000	0.70	0.000
30-34	0.63	0.000	0.50	0.000	0.62	0.000	0.50	0.000
35-39	0.35	0.000	0.35	0.000	0.33	0.000	0.35	0.000
40-44	0.10	0.000	0.15	0.000	0.10	0.000	0.15	0.000
45-49	---	---	0.02	0.000	---		0.02	0.000
Parish								
Hög	0.96	0.685	0.99	0.836	0.91	0.385	0.96	0.537
Kävlinge	1	rc	1	rc	1	rc	1	
Halmstad	1.22	0.035	1.36	0.000	1.17	0.103	1.33	0.000
Sireköpinge	1.08	0.352	1.42	0.000	1.03	0.741	1.38	0.000
Kågeröd	1.19	0.024	1.46	0.000	1.13	0.124	1.43	0.000
Year	1.00	0.903	1.00	0.193	1.00	0.524	1.00	0.140
Life status of prev. ch.								
Alive	---	---	1	rc	---	---	1	
Dead	---	---	2.50	0.000	---	---	2.49	0.000

Table 5: (Continued)

	Basic model				Interaction model			
	First births		Higher-order		First births		Higher-order	
	RR	p	RR	p	RR	p	RR	p
Interactions								
Middle cl*1880-1904	---	---	---	---	2.15	0.130	0.91	0.727
Middle cl.*1905-1919	---	---	---	---	1.47	0.568	0.85	0.603
Middle cl.*1920-1939	---	---	---	---	0.73	0.555	1.36	0.336
Skilled*1880-1904	---	---	---	---	2.14	0.095	1.83	0.022
Skilled*1905-1919	---	---	---	---	1.25	0.733	1.56	0.140
Skilled*1920-1939	---	---	---	---	0.66	0.419	1.93	0.037
Farmers*1880-1904	---	---	---	---	2.86	0.019	1.53	0.091
Farmers*1905-1919	---	---	---	---	2.05	0.267	1.67	0.081
Farmers*1920-1939	---	---	---	---	1.51	0.406	2.50	0.002
Lower sk.*1880-1904	---	---	---	---	3.04	0.012	1.54	0.087
Lower sk.*1905-1919	---	---	---	---	1.31	0.679	1.72	0.061
Lower sk.*1920-1939	---	---	---	---	0.95	0.913	2.05	0.018
Unskilled*1880-1904	---	---	---	---	2.08	0.101	1.63	0.058
Unskilled*1905-1919	---	---	---	---	0.62	0.465	2.55	0.001
Unskilled*1920-1939	---	---	---	---	0.97	0.950	3.27	0.000
Frailty variance	---	---	0.58	0.000	---	---	0.550	
Individuals	1987		13631		1987		13631	
Events	1479		8367		1479		8367	
Time at risk	2951.3		41640.1		2951.3		41640.1	
Chisq	906.2	0.000	9316.5	0.000	942.8	0.000	9406.5	0.000

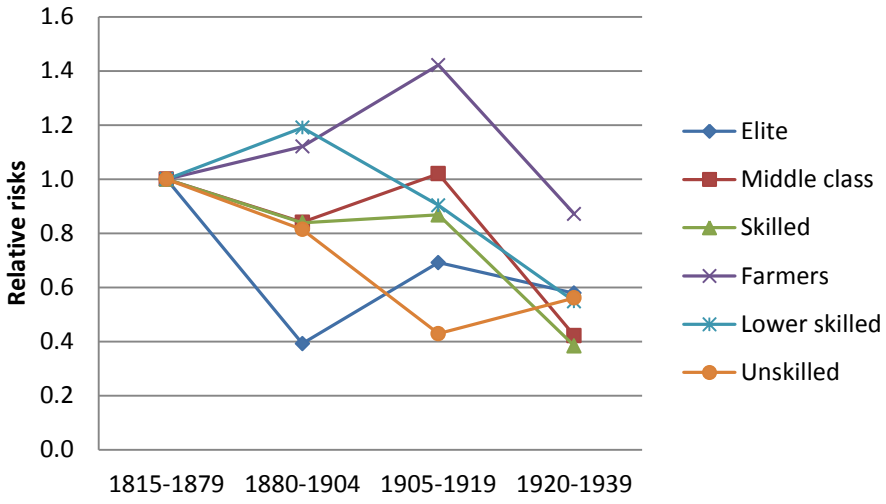
Looking first at the interval between marriage and first birth in the basic model in Table 5, unskilled workers had higher risks (shorter first interval) than all other groups. Skilled workers showed similar relative risks to the unskilled, while the elite had lower risks relative to the unskilled (about 0.7). For higher-order births the pattern resembled an inverse U, with the longest intervals for the unskilled and the elite, and the shortest for skilled workers and farmers. Looking at period effects, there was a clear indication of longer birth intervals from 1905 onwards, while there seems to have been little change before this. It should be noted that the length of the first interval is as much related to marriage and prenuptial pregnancies as to overall fertility. In a situation where parity-specific control (stopping) is getting increasingly important it is not obvious that the first interval needs to be prolonged as fertility goes down, but apparently this happened in the final stages of the decline. It is clear that the death of the previously born child considerably increased the risk of childbirth, which shows that a decline in infant and child mortality might have had an impact on the fertility decline.

Turning to the socioeconomic pattern of the decline as such, Figure 5 shows the net effects of period by socioeconomic status calculated from the interaction models in Table 5. The pre-transitional period (1815-1879) is used as the reference category in all comparisons. For unskilled workers relative risks refer to the main effects of period in the regressions, while for the other groups it is net effects of period and the interaction between period and socioeconomic status. Looking first at the interval between marriage and first births, all groups except farmers had considerably longer first birth intervals in the final period than in in the first, pointing to the increased importance of spacing in the transition. Some groups, for example the elite and the unskilled, experienced a decline in first-birth risks for most of the period, while other groups showed a marked increase in the middle period before a pronounced decline began. In the final period the risk of first birth was more than 40% lower than in the pre-transitional period for all groups except the farmers.

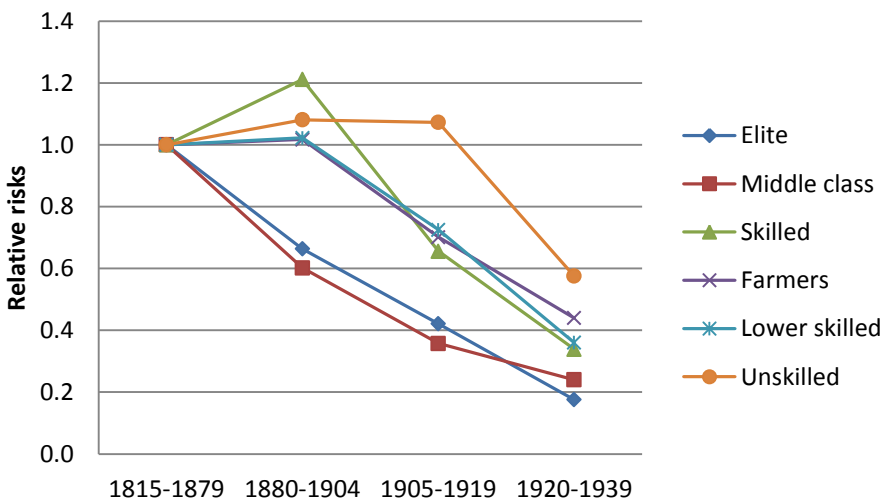
For higher-order births the decline in births risks (due to longer intervals and/or more stopping) had already started in the 1880s with the elite and the middle class, followed by the skilled and the lower-skilled workers and the farmers in the subsequent period (1905-1919), and the unskilled in the last period (1920-1939). The pattern is similar to the development of the overall marital fertility rates shown in Figure 4 above. Thus is seems quite clear that higher-order fertility started to decline earlier in the higher socioeconomic groups, even in this geographically confined and rather homogenous area. Similar early fertility declines of high status (wealthy) groups have been found for England and France (see Clark and Cummins 2009; Cummins 2013; see also Livi-Bacci 1986, on the divergence of elite groups in Europe).

Figure 5: Net effects of period on fertility outcomes by socioeconomic status

A: First births



B: Higher-order births



Note: Calculations based on Table 6, p-values for main effects and interaction effects in Table 6

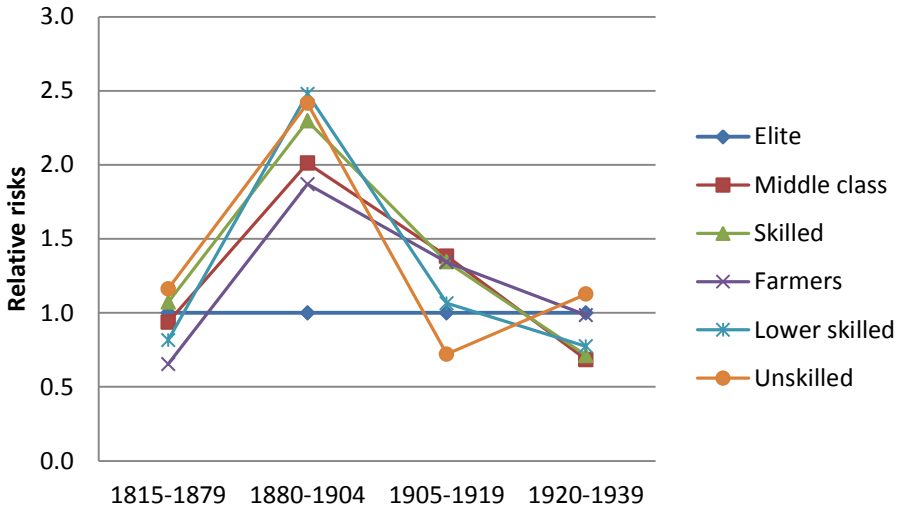
A different aspect of the socioeconomic pattern in the fertility decline concerns how the socioeconomic differentials evolved as a result of the group-specific period trends. Figure 6 reports the net effects of socioeconomic status by period. These net effects were calculated from Table 6, and the difference from those in Figure 5 is that in this case the elite is the reference category in all periods and the relative risks and p-values for the first period (1815-1879) refer to the base effects of socioeconomic status in the regression, while figures for the other periods are net effects of socioeconomic status and the interaction between socioeconomic status and period.

For first birth intervals there was no clear gradient in the pre-transitional period. Farmers appear to have had slightly longer first birth intervals, but none of the coefficients were statistically significant. In the early transition the pattern is similar, except for the much lower first-birth risks of the elite. Apparently they prolonged their intervals relative to all other groups as they started to reduce their fertility. Again, this points to the important role played by spacing. In the third period there was massive convergence in first-birth risks as the elite shortened their intervals back to their pre-transitional levels (see Table 3). In the final period the pattern looks quite similar to the pre-transitional period. Taken together, the socioeconomic differentials in first-birth risks were similar throughout the transition, and the only dramatic change was for the elite. We should remember, however, that this is quite a small group, and that random variation due to small numbers probably explains the pattern.

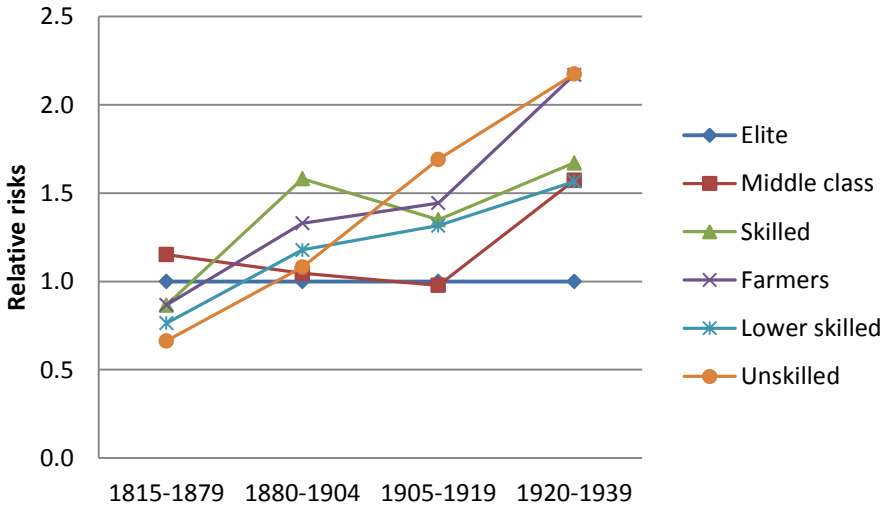
Turning to higher-order births, the pattern of the socioeconomic differentials is entirely different from that for first births. In the first, pre-transitional, period the unskilled had considerably lower fertility than the other groups, while the middle class and the elite had the highest. This indicates a pre-transitional pattern of higher rates of childbearing among the wealthier groups in society (what Clark and Hamilton (2006) famously labeled the "survival of the richest", see also Clark and Cummins 2009; Cummins 2013). During the transition the socioeconomic pattern changed as different groups experienced somewhat different transitions, as we saw previously. In the early transition (1880-1904) skilled workers and farmers had highest first-birth risks and the elite, middle class, and unskilled the lowest. In the final period the unskilled and farmers had more than twice as high first-birth risks as the elite, while middle class, skilled, and lower-skilled workers had about 50% higher risks than the elite. In other words, late in the transition the elite had long first-birth intervals and unskilled workers and farmers had the shortest.

Figure 6: Net effects of socioeconomic status on fertility outcomes by period

A: First births



B. Higher-order births



Note: Calculations based on Table 6, p-values for main effects and interaction effects in Table 6.

8. Concluding discussion

We started this analysis with an overview of the dominant explanations of the historic fertility transition and a discussion about what could be expected in terms of socioeconomic differentials in the transition based on these explanations. The findings from the geographically and culturally homogenous area under study gave several valuable insights into the process of fertility decline.

First we demonstrated that the fertility transition involved not only parity-specific stopping but also prolonged birth intervals, which has also been highlighted in other Western fertility transitions (Anderson 1998; Bean, Mineau, and Anderton 1990; Crafts 1989; David and Sanderson 1986; Haines 1989; Szreter 1996). This means that even newly married couples controlled fertility. This is consistent with the observation that the change in behavior was proportional to the level of fertility in all age groups for Sweden (Bengtsson and Ohlsson 1994). Second, we showed that the interval between marriage and first birth initially was shorter for lower socioeconomic strata, implying that the marriage and first birth decisions were tightly interlinked in this group. This is also found in other populations (Bengtsson and Dribe 2010), and implies that first births need to be analyzed separately from second and higher-order births. Third, turning to second and higher-order births, we showed that while elite and middle class families had higher fertility prior to the fertility transition, already in the 1880s it declined earlier than in lower status groups, and also more consistently. Skilled laborers and farmers followed the decades after, and low and unskilled laborers yet another few decades later. Thus, while fertility initially diverged in absolute terms by socioeconomic status, it converged somewhat at the end of the transition. In relative terms, however, a similar convergence did not take place, especially for higher-order births. The elite group and middle class were the first to start to limit their fertility, followed by skilled workers and farmers, and finally unskilled workers. Overall this pattern is similar to the one found for Sweden as a whole based on census data (Dribe and Scalone, 2014), as well as for the city of Stockholm in the same period (Molitoris and Dribe, forthcoming). We now turn to the discussion of how these findings agree with the expectations we formed, based on existing theories and major empirical generalizations.

The early decline of the elite seems difficult to reconcile with several of the explanations. It seems highly unlikely that it could be explained by increased labor force participation of married women, and thus higher indirect costs of children, as women in these groups rarely worked for pay, and we have in any case no indication of a change in this variable for the women of this group. Similarly, it appears unreasonable that it could be explained by lower benefits of children stemming from either less labor input or increased intergenerational transfers through market or state. Children of the elite did not work in factories or as farm servants, and the transfers from the state did

not begin until later and were then of greater importance to the lower classes. Also, in terms of the quantity-quality trade-off, we did not expect the elite to have been most strongly affected, because of their greater wealth and the possibility of investing in their children's education without having to limit fertility.

There might have been some effect of an earlier decline in infant and child mortality in the middle class, but it seems far too small to account for the fertility decline, and the mortality development of the elite did not differ from that of the working classes. Another possible factor, which has been discussed in relation to declining fertility of the elite in other contexts, is changes in inheritance laws affecting the possibilities for the elite to transfer enough resources to their children in order to safeguard their social standing (e.g., Perrenoud 1990). In the Swedish case, however, there were no changes in this regard affecting the elite or the middle class, and we have no evidence of other societal changes in this period which would have made social reproduction among the elite more difficult, and which could have provided new incentives to limit fertility. Hence, the only explanation fully consistent with the pattern of early elite decline, followed by the other social groups in a more or less hierarchical order, is innovation-diffusion. Even though we cannot test in a more rigorous way the factors explaining the decline and why some are so early and some so late, or specify in any greater detail what was actually diffused, the socioeconomic pattern is consistent with standard innovation-diffusion, where new ideas spread from the top down between social groups.

Turning to the middle class, which experienced a decline somewhat later than the elite, the quantity-quality trade-off could potentially have been important in this group, which had high aspirations for children without the wealth of the elite. However, the actual importance of educational investments early in the transition can be questioned, as previously discussed, making the relevance of this hypothesis unclear for the early part of the decline. In a study of social mobility and attainment in the same area we found no pronounced increase in middle class attainment in the educational, white collar, sector until the post-WWII period, which points to the late educational expansion in Sweden (Dribe, Helgertz and Van de Putte forthcoming).

The later fertility decline among farmers, which is also evident from nation-wide data from micro-censuses (Dribe and Scalone 2014), could possibly be related to the comparatively high benefits of children working on the family farm. However, starting already in the second quarter of the nineteenth century, it became increasingly difficult for farmer children to retain their social status, as shown by increasing downward social mobility in this group (Dribe, Helgertz, and Van de Putte forthcoming; Dribe and Svensson 2008). In addition, the inheritance law of 1845, which gave equal inheritance to all children regardless of sex, changed the situation for farmers. Having many children made it difficult, if not impossible, for parents to secure a good start for them.

The mechanization process during the second half of the nineteenth century and concentration of land also put pressure on investment, both among landowners and tenants. Taken together, this would have created incentives to limit family size among peasants. It could possibly explain why this process started earlier among peasants than workers, who rarely had anything left for their children to inherit.

The late decline of the working class is according to expectations, as we do not expect educational investment to have mattered a great deal in this group, where sons usually aimed for similar jobs as their fathers. As workers increasingly started to work in the factories, and with women also increasingly working for pay (although we do not know exactly to what extent) the costs of bearing and rearing children increased. Together with a quite strong neo-Malthusian campaign from the liberal and social democratic elite to get the working class to limit their fertility in order to improve their living conditions (e.g., Levin 1994), this development might have been instrumental in finally also changing fertility in this group.

In conclusion, the socioeconomic pattern of the fertility transition does not appear fully consistent with several of the major explanations, such as mortality decline, increased female labor-force participation, and a quantity-quality trade-off. Even though the latter two may have started to play more of a role in the later stages of the transition, it was not until the post-transitional period that they became really important, when the educational system and married women's labor force participation really expanded (see Dribe and Scalone, 2014). Mortality decline, on the other hand, might have been of some importance to the overall fertility decline, but cannot explain much of the SES-specific pattern. The socioeconomic pattern observed is, however, consistent with an innovation process where new ideas and attitudes about family limitation spread from the elite to other social groups. If this really was the explanation for the pattern observed is of course impossible to ascertain, but there is clearly no reason to rule it out. High benefits of children and comparatively low costs could also help to explain the lag in the decline among farmers and laborers.

9. Acknowledgements

We use data from the Scanian Economic-Demographic Database, which is a collaborative project between the Regional Archives in Lund and the Centre for Economic Demography at Lund University funded by the Swedish Research Council. We are grateful for financial support from the Linnaeus Centre for Economic Demography, Lund University as well as from the Swedish Research Council for the project "Towards the modern family. Socioeconomic stratification, family formation and childbearing in a historical perspective".

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