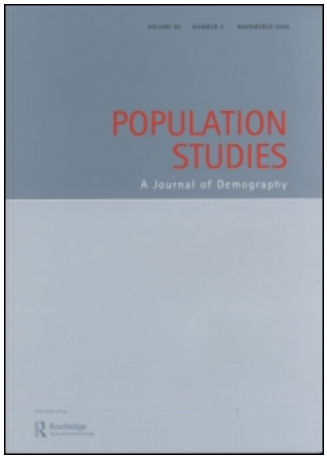

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Settlement size and fertility in the Nordic countries

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Settlement size and fertility in the Nordic countries

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While the variation in childbearing patterns across countries and between socio-economic groups within a country has been studied in detail, less is known about the differences in fertility patterns across settlements within a country. Using aggregate and individual-level register data, we examine fertility variation across settlements in Denmark, Finland, Norway, and Sweden. We observe a significant variation in fertility level by settlement size in all four of these Nordic countries—the larger the settlement, the lower the fertility. Second, the variation in fertility level has decreased over time, but significant differences in fertility between settlements of different size persist. Third, the timing of childbearing also varies across settlements—the larger the settlement, the later the peak of fertility. Fourth, our analysis of parity-specific fertility in Sweden shows that the major socio-economic characteristics of women account for only a small portion of fertility variation across settlements.

Keywords: fertility; urbanization; settlement size; event-history analysis; Nordic countries

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According to theorists of demographic transition, human societies are destined to experience transition from high mortality and fertility to low mortality and fertility, and afterwards there is only minor variation in demographic patterns between 'post-transition' countries, regions, and social groups (Notestein 1945; Vishnevsky 1991). While it is true that differences across countries, regions, and social groups that emerged in the course of transition have become smaller over time, there is still evidence of significant variation in post-transition demographic behaviour. In a study of demographic patterns in the industrialized world, Coleman (2002) shows that differences in fertility level across countries decreased until the 1970s and subsequently remained stable. Billari and Kohler (2004) show that despite some convergence in European fertility levels, significant variations in fertility-related behaviour continue to exist in present-day Europe. Several other recent studies provide evidence in support of this observation (Kiernan 1996; Prskawetz et al. 2003).

When studying sub-populations in the context of below-replacement fertility, most recent research focuses on fertility variation across countries (Frejka and Calot 2001a,b; Coleman 2002; Kohler et al. 2002; Caldwell and Schindlmayr 2003; Morgan 2003; Sobotka 2003; Billari and Kohler 2004) or between socio-economic groups within a country (Kravdal 2001; Rønsen 2004a,b; Vikat 2004; Hoem 2005; Andersson et al. 2006a; Hoem et al. 2006a, b). However, differences across regions and various settlements within a country have received relatively little attention. On the one hand, there seems to be the assumption that childbearing patterns in post-transition societies vary only negligibly across regions and settlements within a country. An even more important reason why higher fertility in some places, such as remote regions or small villages, does not receive much attention is the belief that sooner or later high-fertility (i.e., traditional) areas 'catch up' with low-fertility (modern) areas. On the other hand, the few studies that have been undertaken on the topic recently show that in fact there is significant variation in childbearing or fertility-related behaviour across various settlements, which suggests that these differences may be more persistent than is usually supposed (Glusker et al. 2000; Hank 2001; Kulu 2005, 2006; cf. Lesthaeghe and Neels 2002; Sobotka and Adigüzel 2002). Whatever the story so far, there is no doubt that fertility differentials across regions and settlements deserve attention in our endeavour to understand the causes of below-replacement fertility in post-transition societies as well as to look for factors that may be related to elevated fertility in these societies.

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In this paper, we present a study of fertility patterns across settlements of different size in four Northern European countries—Denmark, Finland, Norway, and Sweden. The objectives were, first, to outline fertility trends across settlements of various size from the mid-1970s to the present day; second, to study the extent to which variations in fertility levels result from differences in the socio-economic composition of populations of various settlements and the extent to which other factors may play a role. An important reason for choosing four Nordic countries is that the data available in the population registers of these countries allow us to study variation in fertility across settlements in detail and to follow fertility trends over an extended period of time. Further, the Nordic countries belong to the group of post-transition countries with relatively high, or 'highest-low' fertility, and they are thus of particular interest to many fertility and family researchers. (Some demographers see the Nordic countries as 'forerunners' of demographic development. In our opinion, this view is too laden with historical notions to be relevant to research on contemporary family dynamics.)

The rest of our paper is structured as follows. First, we provide an overview of previous research on childbearing across settlements in Europe and North America. We then describe the context of our study and state the hypotheses it was set up to test. Third, we introduce the data and methods used. Fourth, we present the results of our analysis. Finally, we discuss the causes of fertility variation across settlements.

Previous research on fertility across settlements

Previous studies on this topic can be divided into research on fertility variation across settlements during the (first) demographic transition in Europe and work focusing on the post-transition period. While research on the effect of urbanization on childbearing has a long history (Jaffe 1942; Goldberg 1959; Duncan 1965; Carlsson 1966), the most comprehensive treatment of historical trends in fertility across settlements comes from studies undertaken as part of the Princeton European Fertility Project (see Coale and Watkins 1986). In his path-breaking study, Knodel (1974) considered fertility transition in Germany and found, first, that urban fertility (both marital and overall fertility) was generally lower than rural fertility, and that this had been so before the transition, and second, that urban regions showed earlier fertility decline than rural areas, with the largest cities experiencing the earliest declines of all. The study also revealed that while fertility in Germany had become fairly low by the 1930s in urban as well as in rural areas, rural–urban differences were still evident (Knodel 1974, pp. 97, 102). Livi-Bacci's (1977) research on fertility dynamics in Italy showed similar patterns. More specifically, in the early and mid-nineteenth century, fertility levels in the urban areas of central and northern Italy were consistently lower than in the surrounding rural areas. In the larger urban areas, they also declined earlier and more rapidly during the subsequent demographic transition. Research by Lesthaeghe (1977) on Belgium and by Coale et al. (1979) on European Russia supported previous findings on lower marital fertility in urban regions during the transition and revealed that urban–rural fertility differences also varied across regions.

Drawing on previous studies and his analysis of fertility transition in a number of European countries, Sharlin (1986) summarized the major findings of the European Fertility Project on urban–rural fertility variation. First, urban marital fertility was lower than the rural variant before the general decline in fertility. Second, marital fertility began to decline earlier in urban areas than it did in rural areas. Third, urban fertility declined faster, thus increasing the rural–urban gap. And fourth, in the post-transition period, marital fertility in rural areas was only slightly higher than in urban regions. He studied the patterns of the three Nordic countries, Finland, Norway, and Sweden too, and found them to be in accordance with the general patterns of Europe, although clear urban–rural differences in marital fertility emerged in Norway only in the first decades of the twentieth century (Sharlin 1986, pp. 245–8). Subsequent research by Lutz (1987) on fertility dynamics in Finland again revealed the patterns previously observed, showing that reductions in parity-specific fertility began in the urban areas of that country in the last decades of the nineteenth century, whereas this behaviour spread to rural areas only later, that is, in the first decades of the twentieth century.

While most of the aforementioned studies describe the patterns of urban–rural fertility differences during the demographic transition, they do not discuss in detail the causes of fertility variation across the settlements. Sharlin (1986) concluded his study by stating that urban places were more receptive to initiating limitations on family size (for whatever reason), and that the occupational composition accounted for some but not all of the differences between urban and rural fertility. Later, Livi-Bacci and Breschi (1990) added that the costs of

children differed between urban and rural settings, and that the impact of religious and social norms on individual behaviour varied with size of settlement. Recently, Galloway et al. (1998) analysed the causes of fertility differences during the demographic transition in Prussia by level of urbanization. The authors showed that in the early twentieth century urban fertility was far lower than rural fertility because the major socio-economic characteristics of the population—especially the employment of women in non-traditional occupations—changed more rapidly in the cities and because the effect of these characteristics on fertility was also stronger there.

Turning now to research on fertility variation across settlements in the post-transition period, we first summarize the major findings of selected studies of North America and then of Europe. Kiser et al. (1968) studied variations in the fertility level of the post-war USA. Their analysis of the 1960 US census showed that women living in urban areas had fewer children than their rural counterparts, and that urban and rural women living in metropolitan areas had smaller families than those living in non-metropolitan areas. The authors concluded that fertility level tended to vary inversely with the size of settlement and that rural populations tended to be less fertile when located at the vicinity of a large city (Kiser et al. 1968, p. 130). Research by Rindfuss and Sweet (1977) supported the existence of significant urban–rural differences in US fertility. Analyses of fertility trends across settlements from the mid-1940s to the 1970s revealed systematically lower fertility in urban areas than in rural ones but showed that the changes that took place there were similar in nature: an increase in fertility levels during the 1950s and a subsequent decline in the 1960s.

Trovato and Grindstaff (1980) took a step further by investigating the causes of urban–rural fertility differentials. Their analysis of the 1971 Canadian census showed that differences in the socio-economic characteristics of populations explained some urban–rural variations in childbearing patterns, but not all of them. The authors attributed most variation in fertility across settlements to cultural differences between urban and rural areas, and in conclusion advised against overemphasis of the role of socio-economic characteristics when explaining higher fertility in North American rural populations. Recent research by Glusker et al. (2000) supported the existence of fertility variation across settlements in North America. They studied fertility patterns in the state of Washington in the early 1980s and early 1990s and showed that women living in the metropolitan areas had lower fertility than those living in non-metropolitan counties. The differences, however, decreased during the 1980s, possibly as a result of the increasing proportions of immigrants with high fertility in the populations of the cities (Glusker et al. 2000, p. 66).

Several important contributions have also been made from research on European countries. Brunetta and Rotondi (1991) studied fertility trends in Italy from the 1960s to the 1980s and found that there existed an inverse relationship between fertility and urbanization, although urban–rural differences in fertility were smaller in the South than in the North and changed over time. Fagnani (1991) studied the childbearing patterns of French women born in the 1930s, using the 1982 census data. She found, as expected, that the average number of children declined as the size of settlement increased. More importantly, further analyses revealed that urban women in all educational and occupational groups exhibited lower fertility levels than their rural counterparts. The inverse relationship between fertility and settlement size persisted even after the partner's occupation was included as a control in the analysis (Fagnani 1991, p. 170). Research by Courgeau and Pumain (1993) confirmed the existence of significant variation in childbearing patterns across settlement size in France from the late 1960s to the early 1980s. However, their analysis also revealed decreasing fertility variation across settlements over time. Coleman (1996) reached a similar conclusion when looking at regional fertility differentials in several European countries. His study showed that regional and urban–rural variation in fertility level declined and demographic convergence increased within countries in the 1970s and early 1980s.

While most previous research demonstrated that urban–rural fertility differences in post-war European countries were gradually narrowing, recent studies have revealed that significant variations in childbearing patterns across settlements continued to persist in several countries. Hank (2001) studied regional fertility variation in West Germany in the mid-1990s and found that fertility levels in German cities were 15 per cent lower than the levels witnessed in the rural areas of the country. A further analysis showed that differences in fertility level between various districts remained even after controlling for the socio-economic characteristics of the populations (Hank 2001, p. 253). Kulu (2005, 2006) studied the childbearing patterns of Estonian, Austrian, and Polish women born between the early 1940s and the mid-1970s and demonstrated that

women in urban areas in general and in large cities in particular displayed lower fertility than their counterparts living in rural settlements. The significant variations across settlements continued to persist when the socio-economic characteristics of the populations were taken into account in the analysis. Several recent studies on Central and Eastern European countries have shown the existence of persisting urban–rural fertility differentials even after the steep declines in period fertility of the 1990s (Zakharov and Ivanova 1996; Burcin and Kučera 2000; Steshenko 2000; Vojtěchovská 2000).

To sum up, previous research has found the following. First, in most European countries, urban fertility (both marital and overall) was lower than rural fertility before the demographic transition, and during the transition it decreased earlier and more rapidly than did rural fertility. Second, a significant urban–rural variation in fertility level has been characteristic of fertility in post-transition North American and European societies, although the differences across settlements seem to have decreased over time. Third, some studies have found that socio-economic factors account for most of the variation in fertility across settlements, whereas other authors have suggested that cultural factors play a larger role.

Although existing studies have contributed to outlining and sometimes also explaining differences in childbearing patterns across settlements, these studies have shortcomings. First, most researchers on fertility variation across settlements in post-transition societies have contented themselves with the use of cross-sectional data collected at just three to four points in time to demonstrate changes over time. We believe that annual information on fertility over longer periods of time is needed to achieve the precision to detect developments satisfactorily. Second, most existing research has focused on country-specific studies. Comparative research using a common method applied to several countries is needed to advance our knowledge of the effect of residence on fertility. Third, most studies use aggregate fertility measures (period or cohort-based), whereas disaggregating them would yield deeper insight into fertility dynamics across settlements. Finally, the issue of whether or not the socio-economic characteristics of populations account for most fertility variation across settlements is in need of re-examination. Before we present the hypotheses for our study, we will briefly describe the context of our research.

Long-term fertility trends in the four Nordic countries

The Nordic transition to the 'modern fertility regime' can be traced back to the 1880s and 1890s, when fertility levels in Sweden began to decrease. This decrease was followed closely by decreases in Denmark and Norway, and later, in the 1910s, also in Finland (Lutz 1987, pp. 34–5; Chesnais 1992, pp. 133, 226–30). As early as the 1930s, period fertility in the Scandinavian countries reached below-replacement level, while in Finland it stayed above this level (Chesnais 1992, p. 123). Immediately after the Second World War, the Nordic countries witnessed a 'baby-boom' (Coleman 1996, p. 13), as did many other European nations on the Western side of the Iron Curtain. Among the Nordic countries, the highest fertility levels were reached in Finland, where total fertility peaked at 3.5 children per woman immediately after the war. In Denmark, post-war total fertility climbed to a level of 3.0; it was 2.8 in Norway and 2.6 in Sweden (Chesnais 1992, pp. 547–8). In the late 1940s, fertility decreased, and trends varied across the countries between the 1950s and the 1960s. Finland saw a continual decline in total fertility from its relatively high levels while it remained relatively stable in Denmark and Sweden. In Norway on the other hand, it climbed significantly to reach a high point of 3.0 in the mid-1960s (Chesnais 1992, p. 548).

Over the past 40 years, fertility trends have been similar in the four Nordic countries, although some variation across countries is evident. In the late 1960s and early 1970s, fertility declined in all four countries (Figure 1) owing to the postponement of childbearing and the decreasing frequency of higher order births (Hoem 1993b, pp. 21–3; Andersson 1999, pp. 7–10, 2004b, pp. 161–4). Thereafter, period fertility levelled off and remained stable until the mid-1980s (except in Denmark, where the gradual decrease continued longer than in the other countries) only to rise again in the late 1980s. Total fertility climbed for some years and then remained stable at a level of 1.7–1.8 children per woman from the early 1990s. The exception is Sweden with its 'roller-coaster' fertility (Hoem and Hoem 1996) that undulated around the fertility level of the other Nordic countries.

Rising fertility in the late 1980s can be attributed to the recuperation of first births at higher ages and to the increasing frequency of second and third births, arguably as a response to new family policies (Hoem 1990, pp. 740–5, 1993b, pp. 24–8; Vikat 2002,

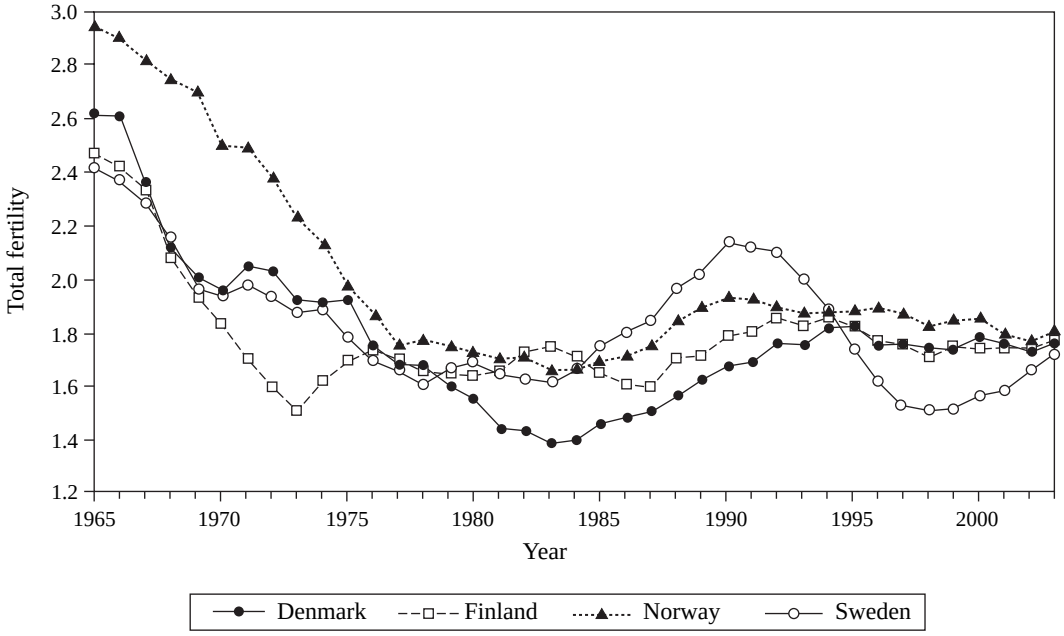


Figure 1 Total fertility in the Nordic countries, 1965–2003
Source: The population registers of Denmark, Finland, Norway, and Sweden

pp. 169–73; Andersson 2004b, pp. 160–6). Hoem (1990, 1993b) has, for example, shown that the rising rates of second and third births in Sweden were related to shortened birth intervals, and that this change in childbearing behaviour was a direct response to new family policies that added a 'speed premium' to the Swedish parental leave system. Cohort fertility shows similar completed fertility levels for the birth cohorts born between the 1940s and the 1960s (Frejka and Calot 2001b, pp. 143–86; Hoem 2005, p. 562; Björklund 2006). Thus the post-war cohorts in the Nordic countries have so far been successful in compensating at older ages for their low fertility at younger ages (Frejka and Calot 2001b, p. 137).

Recent research on fertility differentials in the Nordic countries has focused on variations across socio-economic groups in general and by educational level in particular. Studies of cohort fertility have shown that childbearing patterns in the Nordic countries vary across educational groups, but that the variation in completed fertility is smaller than in other post-transition societies (Rønsen 2004a, p. 277; Hoem 2005, p. 565; cf. Frejka 2004, p. 91). Research has also revealed some fertility variation across regions and highlighted the effect of local labour market conditions on childbearing patterns (Hoem 2000; Kravdal 2002b; Thygesen et al. 2005). However, the recent demographic literature has not addressed the possible differences in fertility across settlements of different size in the Nordic countries. Studies of post-war fertility patterns have shown that significant urban–rural variation continued to exist in the 1950s and 1960s (Carlsson 1966, p. 153; Sharlin 1986, pp. 247–8; Lutz 1987, p. 43). Data published by the UN (1999) support this finding. In 1969, total fertility in Denmark was 1.8 and 2.2 in urban and rural areas, respectively. The corresponding figures for Finland were 1.7 and 2.0, while for Norway they were 2.4 and 2.9. For later periods, only the figures for Finland show that fertility in urban areas has constantly been 10–20 per cent lower than in rural areas (UN 1999).

Hypotheses about fertility across settlement size

Our hypotheses are derived from the previous two sections, and are as follows. First, we assume that fertility varies across settlement size in all four Nordic countries. More specifically, fertility levels are expected to decrease as the size of settlement increases (UN 1999; Hank 2001; Kulu 2005, 2006). There is also reason to assume that the timing of childbearing varies across settlements: fertility in urban areas may be significantly lower at younger ages, while the differences are expected to vanish at older ages (Rindfuss and Sweet 1977, p. 170). We believe that parity-specific fertility rates will provide further insight into childbearing differentials across settlements. Second, we assume that differences in fertility levels across settlements have decreased over time (Coleman 1996), although the data from

Finland (UN 1999) suggest that the convergence may not be as large as one might assume, drawing from classical demographic transition theory, evidence from some other European countries, or the equalizing influence of the Nordic welfare state.

Next, we believe that the findings will not be very different between countries with a similar history and institutional background. Some differences certainly exist, but their nature is difficult to predict. Research has shown on the one hand that fertility variation across educational groups is smaller in Sweden and Finland than in Denmark and Norway (Andersson et al. 2006b; cf. Rønsen 2004a, p. 277; Hoem 2005, p. 565). Differences across settlements may thus be smaller in Sweden and Finland too. On the other, variation may turn out to be the smallest in Denmark, as the area is small and population density is high, although some other factors, such as the existence of isolated islands, may have the opposite effect (Thygesen et al. 2005). Finally, we assume that differences in the socio-economic characteristics (educational enrolment and level, labour-force participation and earnings, etc.) of population subgroups account for some, but not all variations in fertility levels and dynamics across the settlement hierarchy (Trovato and Grindstaff 1980; Fagnani 1991; Kulu 2005, 2006).

Data, methods, and definitions

Our data come from the population registers of the four Nordic countries. For each country, we have access to the annual number of births by age of mother across municipalities (by single-year age groups for Denmark, Norway, and Sweden, and by 5-year age groups for Finland) and to the female populations by age at the beginning of each year over the period 1975–2003 (since 1976 for Finland). The data enabled us to calculate annual age-specific fertility rates and total fertility for various types of municipality for each country over about a quarter of a century. In addition, we have access to anonymized individual childbearing records from Swedish population registers for all women born in Sweden in 1945 and later. These data allowed us to take our analysis a step further in order to calculate parity-specific occurrence-exposure fertility rates across various municipalities with and without controlling for a number of socio-economic variables.

First, we computed annual parity-specific fertility rates for the Swedish-born women, by settlement size standardized for age of woman and time since any previous birth. Thereafter, we standardized these fertility rates for a set of socio-economic characteristics (educational enrolment and educational level and earnings of a woman in a given year) to reveal the extent to which variation in socio-economic composition accounted for possible differences in fertility level across settlements. For educational attainment we used the following categories: primary, secondary, and tertiary level. For earnings, the women were divided into three categories: those with low earnings (first to third deciles of the relative earnings distribution of women and the few women without own earnings); medium earnings (fourth to seventh deciles); and high earnings (eight to tenth deciles). When calculating parity-specific fertility rates, we used the method developed and implemented by Jan Hoem (1987, 1993a).

Because existing comparative research on parity-specific fertility in the Nordic countries reveals that the role of socio-economic factors is very similar across the countries we studied (Andersson et al. 2005b), we can assume that the patterns observed for Sweden apply more generally to Nordic countries. In our event-history analyses, we estimated models for each parity progression separately and did not consider joint modelling of these processes (cf. Kravdal 2001, 2002a for a discussion of the latter approach). We modelled all three births jointly in our previous studies of Austria, Estonia, and Poland (Kulu 2005, 2006). The effect of settlement was similar in single-process and multiprocess models.

Our major explanatory variable of interest is the size of settlement. We have gone beyond the traditional urban–rural dichotomy and distinguished six types of municipality as categories of settlement size according to the size of the resident population in the period 1999–2001: (i) Copenhagen (the capital city), Helsinki, Oslo, and Stockholm, with 500,000 and more inhabitants; for Sweden, the category also includes the second largest city, Gothenburg; (ii) other cities with a population of 100,000–500,000; (iii) towns with 50,000–100,000 inhabitants; (iv) towns with 10,000–50,000 inhabitants; (v) small towns with 5,000–10,000 inhabitants; and (vi) rural municipalities with fewer than 5,000 inhabitants. Our data are thus based on information on the municipality of women's residence. In the Nordic countries, a municipality usually consists of a city or town with its nearest hinterland or of some economically and culturally linked smaller rural settlements.

We assumed that all cities and many towns extend beyond their administrative borders and therefore treated suburban municipalities of cities and towns

with more than 50,000 people as part of the urban region. We used commuting data from 1998 to 2000 to assign a municipality to an urban region if at least 20 per cent of its employed population commuted to work in the neighbouring city or town. The use of commuting data to define urban or labour-market regions is standard in migration and urbanization research, although the threshold used varies across studies (see Champion 2001; Hugo et al. 2003). We have chosen the 20-per-cent threshold as this has been used by several studies on internal migration in the Nordic countries (Kupiszewski et al. 2001a, b).

Table 1 shows the distribution of the population of women aged 15–49 across settlement groups for the four countries. The data from the most recent period show that about 25 to 30 per cent of women in reproductive ages live in the major cities or adjacent suburbs. Another large group is composed of women living in towns of 10,000–50,000 people (medium-sized towns). The relative size of the female population in the smallest municipalities varies across countries. In Finland and Norway, about one-fifth of women aged 15–49 live in municipalities with fewer than 10,000 residents (small towns and rural areas). This share is markedly smaller in Denmark and negligible in Sweden, indicating that municipality structure varies across the Nordic countries.

We see that the relative distribution of women across settlement groups has been relatively stable over time. Nevertheless, the share of women living in small towns and rural areas seems to have decreased slightly over time in most countries, while the proportion of women in cities has increased in Finland and Sweden.

Table 1 Female population at reproductive age by settlement size in the Nordic countries, 1975, 1985, 1995, and 2003 (per cent)

	1975	1985	1995	2003
Denmark				
Capital city region	29	27	27	28
City regions	17	17	18	18
Towns	13	14	14	14
Medium-sized towns	29	29	29	28
Small towns	11	12	12	11
Rural areas	1	1	1	1
Total	100	100	100	100
Finland				
Capital city region	21	22	24	26
City regions	14	14	15	17
Towns	16	16	16	16
Medium-sized towns	25	25	24	23
Small towns	13	13	12	11
Rural areas	10	9	9	8
Total	100	100	100	100
Norway				
Capital city region	24	24	23	24
City regions	17	16	16	17
Towns	6	6	7	8
Medium-sized towns	26	27	30	29
Small towns	12	13	12	11
Rural areas	14	14	12	11
Total	100	100	100	100
Sweden				
Large city regions	26	27	28	30
City regions	18	18	19	20
Towns	20	20	20	19
Medium-sized towns	31	31	29	27
Small towns	4	4	3	3
Rural areas	1	1	0	0
Total	100	100	100	100

Source: The population registers of Denmark, Finland, Norway, and Sweden.

Fertility across settlements in the four Nordic countries

Figures 2(a)–(d) present total fertility across settlement groups for the four countries over a period stretching from the mid-1970s to 2003. We see that total fertility varied significantly across settlements in all four Nordic countries. Moreover, we observe a relationship between fertility level and size of settlement that is more or less systematically inverse—the larger the settlement, the lower the fertility, and this relationship persisted over time. We note also that in the past decade total fertility in rural settlements and small towns stayed close to replacement level in all countries except Sweden, while in the capital city regions it remained at levels between 1.5 and 1.7 children per woman.

Figure 3 provides further information on fertility variation and change over time. In the late 1970s and early 1980s, fertility levels were significantly lower in the large cities than they were in the rural municipalities and small towns: by 30 per cent in Denmark and by 20–25 per cent in Finland, Norway, and Sweden. In the late 1980s and early 1990s, however, fertility differences between the largest and smallest settlements decreased in all four countries. From the mid-1990s, the differences remained stable in the three Scandinavian countries, but increased in Finland. The most recent figures show that the fertility of women in major cities in Norway and Sweden was lower by 10–15 per cent than that of women in small towns and rural areas, while in Denmark and Finland this difference was between 20 and 25 per cent. Our analysis thus shows that the fertility variation across settlements decreased in the Nordic

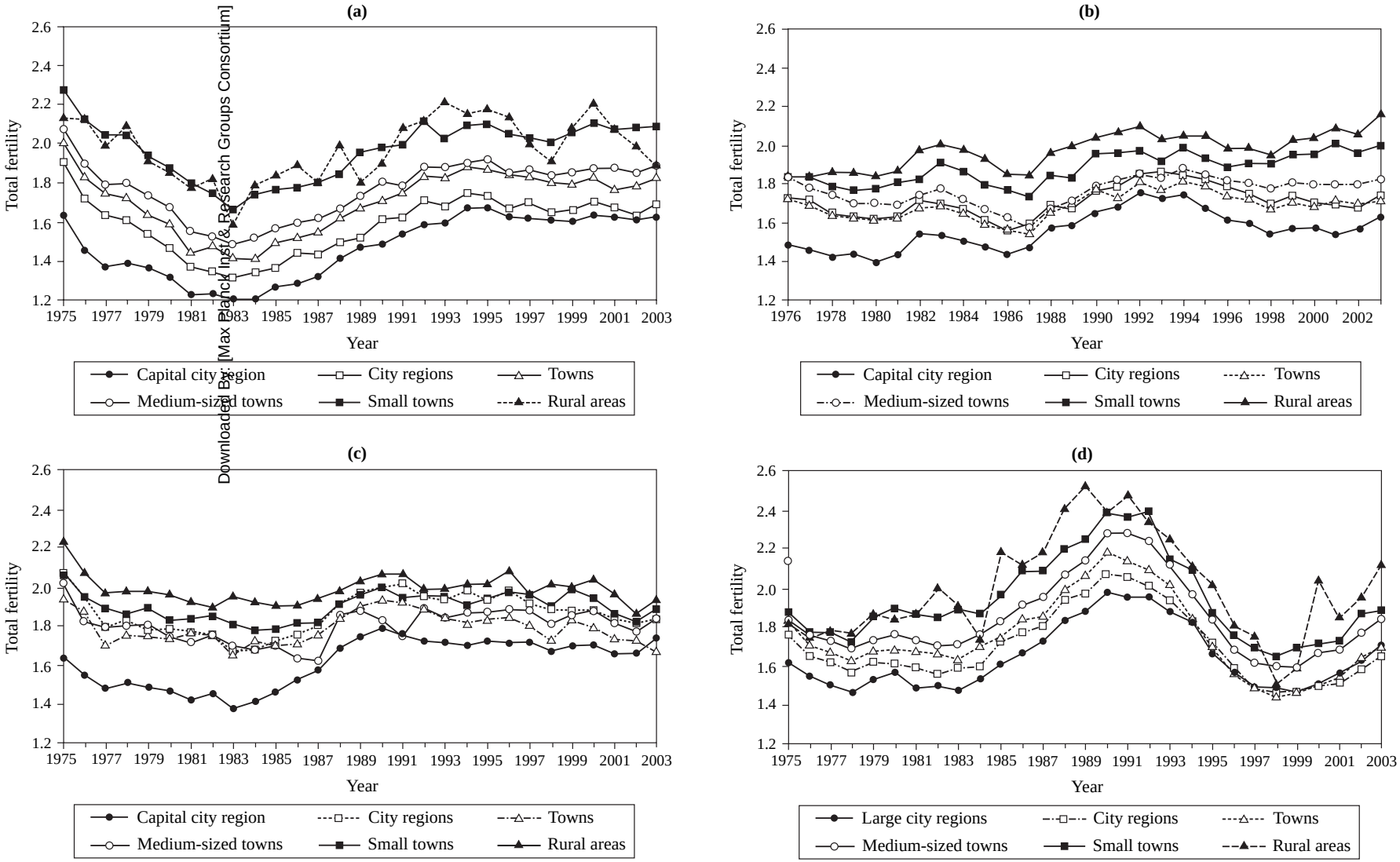


Figure 2 Total fertility by settlement size in: (a) Denmark, 1975–2003; (b) Finland, 1976–2003; (c) Norway, 1975–2003; (d) Sweden, 1975–2003
Source: As for Figure 1

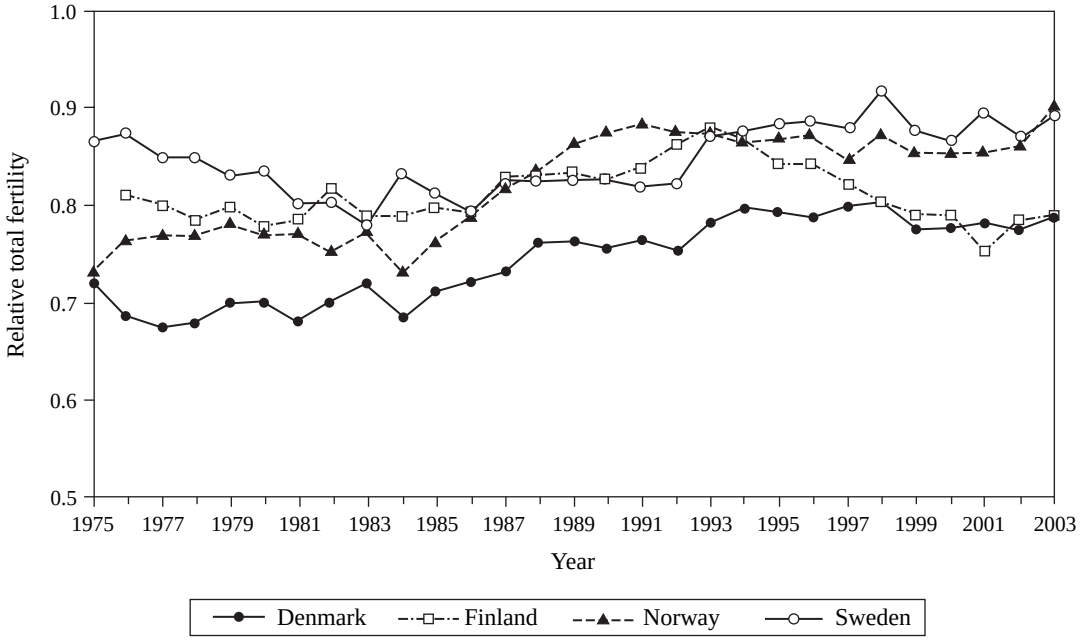


Figure 3 Total fertility in large city regions relative to total fertility in small towns and rural areas, 1975–2003
Source: As for Figure 1

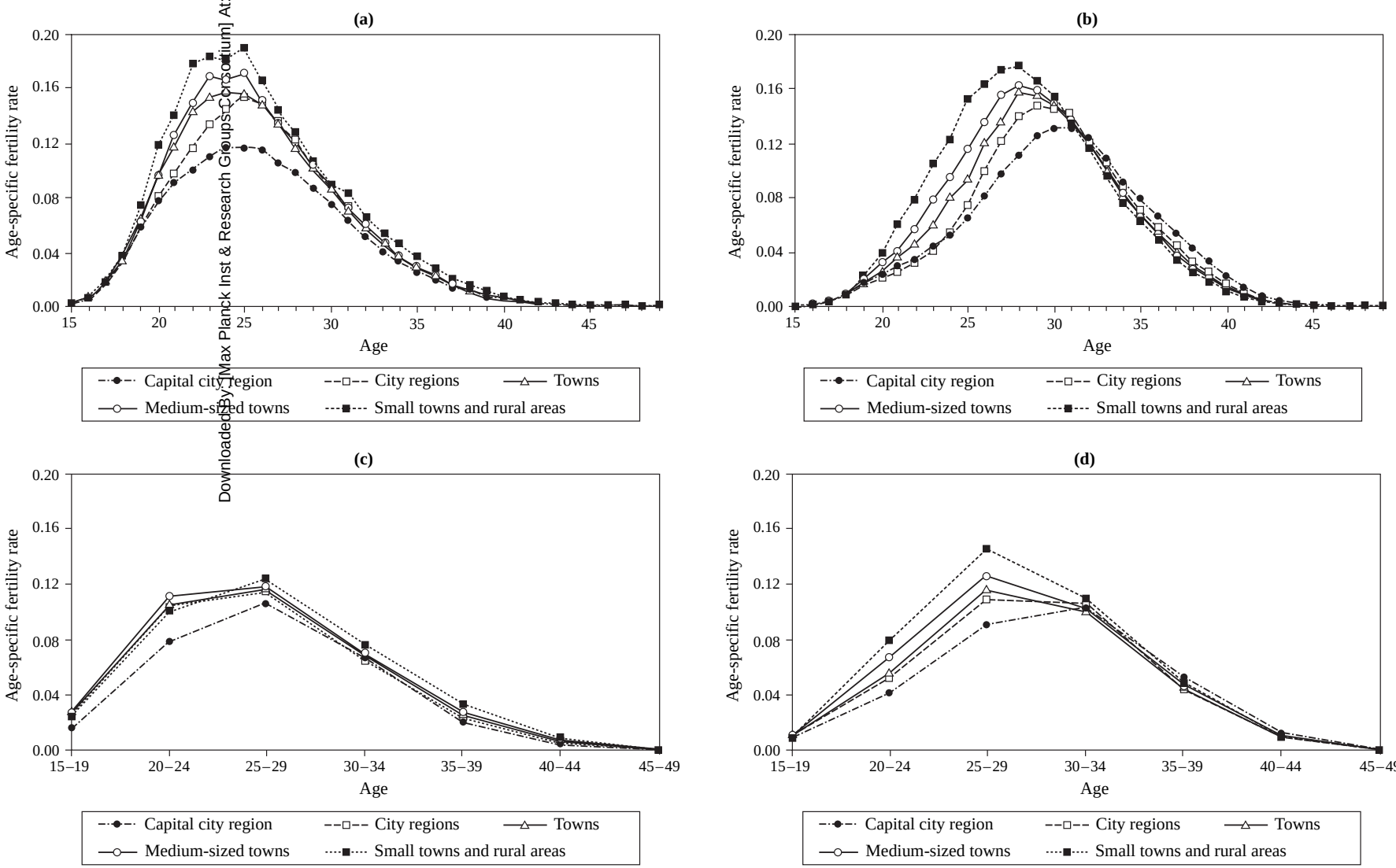
countries during the last quarter of the past century, but that significant variations remained in all four countries.

Figures 4(a)–(h) present the age-specific fertility rates (ASFR) for various sizes of settlement by country and period in order to gain further insight into fertility patterns and changes in these patterns across settlements over time. To eliminate the effect of random annual fluctuations, we calculated the average ASFR for various settlement groups for two 3-year periods: one for the second half of the 1970s (1975/76–77/78) and another for the early twenty-first century (2001–2003). We see that from the middle to the late 1970s, the timing of childbearing was relatively similar in the various settlements of the Nordic countries, perhaps with some exception for Norway, but that fertility levels tended to decrease as the size of settlement increased. The patterns of the early 2000s reveal that interesting changes had taken place: as expected, the fertility levels of women in the large cities were still lower than in the smaller municipalities, but fertility now peaked at relatively late ages. Thus, while the postponement of childbearing was a common trend in all settlements, it was much more pronounced in the cities, particularly in the capital city regions.

Next, we extended our analysis by analysing parity-specific fertility behaviour across settlement groups, using data from Sweden over the 1981–99 period. Figures 5(a)–(d) present the annual parity-specific fertility rates for five settlement groups (municipalities with less than 10,000 people have been combined into one category), standardized for age of woman and time since any previous birth. First-birth rates were calculated separately for childless women in the age group 15–29 and for childless women at ages 30–45. All rates are given relative to the rate in the largest cities in 1981 (see also Andersson 1999, 2004a, b). We see that for younger women, first-birth rates increase as the size of settlement declines, and that significant differences of this kind persisted over the two decades as first-birth rates first rose during the 1980s and then dropped during the 1990s. The patterns for older women are the opposite: first-birth rates were the highest in Stockholm and Gothenburg and the lowest in rural areas and small towns, reflecting the selectivity of older childless populations in different settlements. But fertility for older women in the two major cities was not high enough to compensate for the relatively low fertility of these women at younger ages (Figure 4(h)).

The patterns for second and third births are also interesting. Again, the fertility levels were highest for women in rural areas and small towns and smallest for women in large cities. However, the variation decreased substantially in the 1990s when fertility in Sweden declined. All in all, while the fertility variation across settlements decreased in Sweden over time, differences remained, especially in first-birth rates and between the smallest and the largest settlements.

Now, as a final step, we study the extent to which socio-economic characteristics may account for



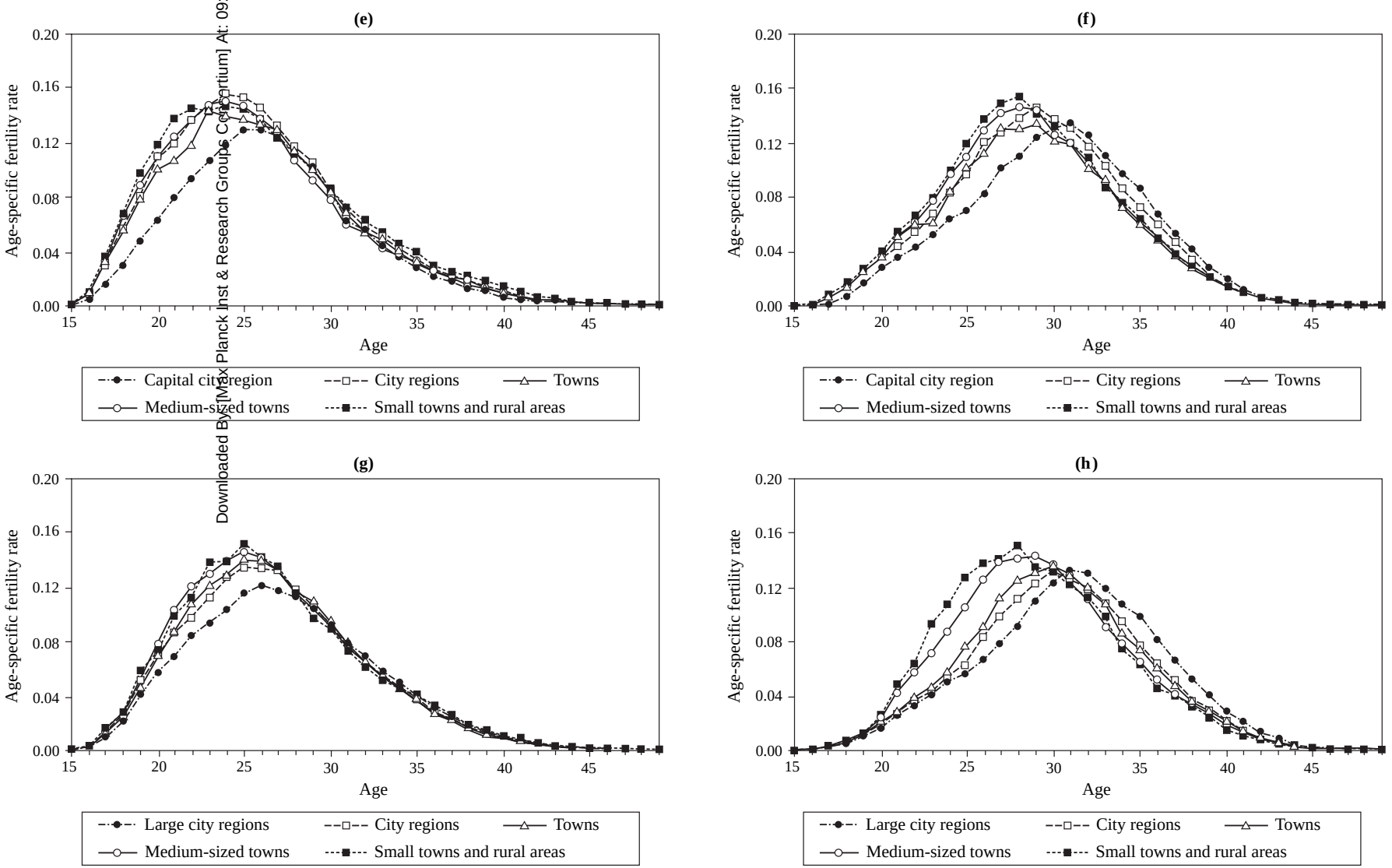


Figure 4 Age-specific fertility rate by settlement size in: (a) Denmark, 1975–77; (b) Denmark, 2001–2003; (c) Finland, 1976–78; (d) Finland, 2001–2003; (e) Norway, 1975–77; (f) Norway, 2001–2003; (g) Sweden, 1975–77; (h) Sweden, 2001–2003

Source: As for Figure 1

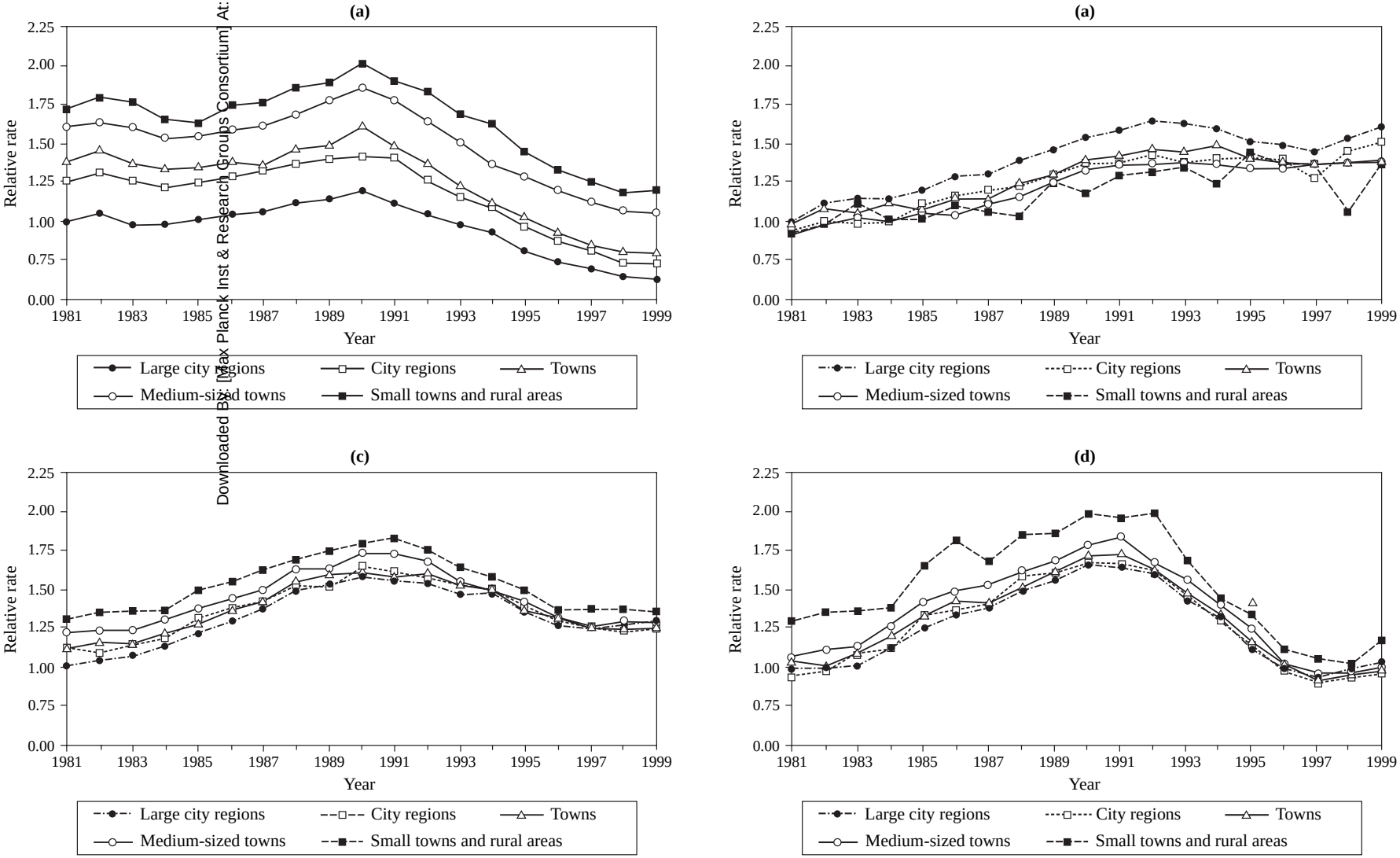


Figure 5 (a) Relative rate of first births at ages 15–29 by settlement size in Sweden (large city regions in 1981 = 1), 1981–99. (b) Relative rate of first births at ages 30–45 by settlement size in Sweden (large city regions in 1981 = 1), 1981–99. (c) Relative rate of second births by settlement size in Sweden (large city regions in 1981 = 1), 1981–99. (d) Relative rate of third births by settlement size in Sweden (large city regions in 1981 = 1), 1981–99

Source: As for Figure 1

fertility variation across settlements. We computed parity-specific fertility rates standardized for the following socio-economic characteristics of women: educational enrolment, educational attainment, and earnings in a given year. In order to get a better overview of possible changes in patterns across models, we collapsed the annual data and calculated parity-specific fertility rates with and without socio-economic controls for the 1980s and the 1990s separately. The results are presented in Table 2. As shown in Figures 5(a) and (b), we see that first-birth rates for younger women are inversely related to settlement size, while for older women the relationship is positive. Interestingly, for younger childless women the relative differences between the cities on the one hand, and rural areas and small towns on the other increased from the 1980s to the 1990s, which is something that was not immediately evident in Figure 5. Controlling for socio-economic characteristics does not produce much change in the pattern of childbearing patterns by settlement size for younger women (although previously observed variation over time disappears), but it removes the differences in fertility across settlements for older women. Further analyses show that the higher fertility of older women in the large cities is mostly the result of the larger proportion of highly educated women in the population there, many of whom first gave birth in their 30s.

The results for second-birth and third-birth rates repeat the patterns observed in Figure 5(c) and (d): fertility levels were highest in rural areas and small towns, and the variation slightly decreased over time. Controlling for the socio-economic characteristics of women does not change the patterns much: women in rural areas and small towns still exhibited 15–30 per cent higher second-birth and third-birth rates than their counterparts in the major cities. To sum up, our analysis of the Swedish data shows the following features: first, all three parity-specific fertility rates varied across settlements in Sweden; second, the differences in second-birth and third-birth rates decreased over time while variations in first-birth rates were fairly stable; third, the

Table 2 Relative rates of first, second, and third births by age group and settlement size in Sweden, 1981–89 and 1990–99

	Model 1[1]		Model 2[2]	
	1981–89	1990–99	1981–89	1990–99
First births at ages 15–29				
Large city regions	1	1	1	1
City regions	1.22	1.20	1.25	1.26
Towns	1.32	1.29	1.35	1.32
Medium-sized towns	1.52	1.62	1.54	1.56
Small towns and rural areas	1.65	1.82	1.68	1.75
First births at ages 30–45				
Large city regions	1	1	1	1
City regions	0.90	0.90	0.94	0.95
Towns	0.92	0.90	0.98	0.97
Medium-sized towns	0.87	0.87	1.00	1.00
Small towns and rural areas	0.85	0.84	1.03	0.99
Second births				
Large city regions	1	1	1	1
City regions	1.04	1.02	1.04	1.02
Towns	1.05	1.02	1.05	1.02
Medium-sized towns	1.11	1.05	1.13	1.07
Small towns and rural areas	1.18	1.12	1.21	1.14
Third births				
Large city regions	1	1	1	1
City regions	1.01	1.00	1.02	1.00
Towns	1.03	1.02	1.05	1.03
Medium-sized towns	1.08	1.07	1.12	1.10
Small towns and rural areas	1.25	1.18	1.29	1.21

[1]Model 1: birth rates are standardized for age of woman and time since any previous birth.
[2]Model 2: first-birth rates are additionally standardized for educational enrolment and attainment, and for earnings; second-birth and third-birth rates are standardized for educational attainment (earnings were excluded from the final models as their effect was not important).
Source: As for Table 1.

socio-economic characteristics of women accounted for only a negligible, if any, part of the fertility variation across settlements.

When interpreting these results for Sweden it is important to bear in mind that the population of the country's small municipalities (small towns and rural areas) with its distinctive high fertility forms a relatively small share of the Swedish population. However, we believe the findings about fertility levels in small Swedish municipalities are likely to apply also to the many other smaller places in the country that are embedded in larger municipalities, and to the many smaller municipalities in the other Nordic countries (cf. Kulu and Boyle forthcoming).

Summary and discussion

In this study we examined fertility variation across settlement type in four Nordic countries: Denmark, Finland, Norway, and Sweden. We used register data of the four countries, which allowed us to study variation in childbearing patterns in detail across settlements and to follow trends in these patterns over an extended period of time. There were six noteworthy results. First, there was significant fertility variation across settlement size in all four Nordic countries—the larger the settlement, the lower the fertility. Second, the variation in fertility had decreased over time, but significant differences between settlement types remained. Third, the timing of childbearing also varied across settlements—the larger the settlement, the later the peak of fertility. This was a relatively recent development, however, indicating that postponement of childbearing has been more pronounced in larger settlements. Fourth, the overall fertility patterns were relatively similar in all four countries. Fifth, our further analysis of Swedish data showed that parity-specific fertility varied across settlements. The variation in second-birth and third-birth levels had decreased over time, while the differences in first-birth fertility had remained stable. Sixth, the major socio-economic characteristics of women accounted for only a small portion of fertility variation across settlements.

Overall, our analysis supported the hypotheses espoused in previous research, but our focus on fertility variation over an extended period of time and a close look at parity-specific fertility enabled us to gain further insight into childbearing dynamics across settlements. Two issues are particularly intriguing, and need further discussion: the persistent variation itself in fertility level across settlements and the differences in fertility timing, a recent development.

So why do fertility levels decrease as settlement size increases, even after controlling for the major demographic and socio-economic characteristics of individuals? It is possible that some potentially observable characteristics of women or couples account for the fertility variation. We will now consider some of these characteristics.

We controlled for woman's education and income in the analysis of the Swedish data, but not for the characteristics of any partner of hers. However, we are confident that the inclusion of data on any partner's education and income would not change the patterns we observe. Previous research for Sweden has shown that the effect of socio-economic characteristics on fertility is very similar for women and men and that there are no important interaction effects between parents' socio-economic characteristics and their joint childbearing dynamics (Andersson et al. 2005a).

Secondly, fertility variation across settlements might be explained by differences in partnership status—people are more likely to live as couples or to be married in smaller settlements and thus also more likely to have children. Our previous studies on Austria, Estonia, and Poland showed that married couples were indeed over-represented in rural settlements and small towns, and this explained some but far from all of the variation in first-birth risks across settlements in these countries (Kulu 2005, 2006). But the direction of causality remained far from clear—people might have decided to form a union or marry because they wished to have children (see Baizan et al. 2004).

Thirdly, selective internal migration could be an important factor, because women and couples who wish to have larger families are more likely to move from large cities to small towns or rural areas, while those who opt for a lifestyle without children tend to move from rural to urban areas. Again, our previous studies on several European countries did not support the selection hypothesis. Rather, they showed that migrants adopt the fertility behaviour dominant in the destination environment (Kulu 2005, 2006). Our recent study of suburban fertility showed that many couples leave the central city to go to suburbs when intending to have a child, but these moves are over short distances and within the area of a labour market (Kulu and Boyle forthcoming).

Fourthly, the confounding effect of international migration needs to be considered. Immigrants predominantly live in cities and typically have elevated

fertility shortly after migration (Andersson 2004c; Milewski 2006), suggesting that for the native-born, fertility variation across settlements may be even larger than that observed in our data. However, the effects of immigrants on total fertility tend to be rather small, and in our analyses of parity-specific fertility in Sweden, which is the Nordic country with the highest share of immigrants, we chose to base our estimation on Swedish-born women only.

Finally, part of the variation in total period fertility can be attributed to the fact that postponement has been much more pronounced in the larger than in the smaller settlements.

Perhaps the differences can be explained by contextual and cultural factors. At least five partly competing, partly complementary explanations of this kind can be offered for the varying fertility levels across settlements. First, the sex structure varies significantly across settlements. Studies of internal migration show that females are more likely than men to move to an urban centre with a modern service-centred economy, leaving behind an excess of males in remote areas with more traditional economies (Kupiszewski et al. 2001a). Consequently, women in small towns and rural areas are more likely than women in the cities to find a partner and form a family, resulting in higher fertility in the rural areas if fertility measures are based on the number of women rather than on men. Second, the cost of child-rearing varies across settlements, being highest in the large cities and lowest in rural areas (Livi-Bacci and Breschi 1990). Opportunity costs also differ: in urban areas, especially in large cities, wider work-related or leisure-related opportunities open up (Michielin 2004). Having children sometimes means that the possibility of taking advantage of these opportunities is relatively small. Third, in large cities, working mothers face the problem of reconciling work with family, partly because of time and space constraints. Long journeys to and from work can make it hard for women with small children to manage a family (Fagnani 1991).

Fourth, housing type and size vary across settlements. While many families in rural areas and small towns live in single-family houses, high population density and housing costs in the cities make flats in multi-storey dwellings the dominant type of housing there (cf. Lutz and Qiang 2002; Kulu 2003). Single-family houses are generally larger than apartments. They also have a garden, which is extremely important for families with small children. The smaller size of apartments and their less family-friendly layout may thus lead to lower fertility there (Kulu and Vikat 2007). Furthermore, apartments may create a feeling of 'subjective crowding' even when the size is not different from that of a single-family house (Felson and Solauns 1975). Differences in the type and size of housing may thus account for varying fertility levels across settlements (Courgeau 1989; Kulu and Boyle forthcoming). Thus the housing argument is based on the assumptions that fertility is density-dependent and that occupants attach importance to their perception of living space and environment (Lutz and Qiang 2002, p. 1209).

Finally, the role of varying social and religious norms and values across settlements needs to be considered. Research has shown that there is considerable uniformity in rural settlements and small towns in the extent to which people retain traditional attitudes and lifestyles, a value orientation towards large families, and a preference for extended families (Trovato and Grindstaff 1980; Heaton et al. 1989). A rural and small-town population can be considered a 'family-oriented' sub-culture within a country, clearly distinct from city sub-cultures, with the latter displaying higher heterogeneity in childbearing (cf. Lesthaeghe and Neels 2002; Sobotka and Adigüzel 2002).

We now turn to a consideration of the factors responsible for the fact that women in urban areas, and particularly in the major cities, increasingly start their childbearing considerably later than their counterparts living in small towns and rural settlements. We do not regard the structural–economic factors mentioned above as important in explaining the emergence of pronounced variation in fertility timing, because the differences mentioned in sex structure, costs, housing, and time–space constraints across settlements have existed for a long time and have not obviously changed during the past quarter of a century. Instead the following (complementary) explanations seem more plausible. First, late fertility in cities, especially the largest ones, reflects the changing norms and values of a preferred lifestyle in these settlements. Secondly, labour markets have become more competitive over the past two decades, and nowadays it takes much longer to become established in the labour market, particularly in the large cities as competition there is highest.

All in all, our analysis shows that, on the one hand, variation in fertility level across settlements decreased slightly over time, and on the other, that differences in fertility timing increased, indicating

growing heterogeneity across settlements as to how people structure their family lives. These results are consistent with recent studies that show significant variation in fertility-related behaviour in present-day Europe (Kiernan 1996; Prskawetz et al. 2003; Billari and Kohler 2004). It will be interesting to see whether current differences in fertility timing across settlements in the Nordic countries continue to exist or whether trends in fertility postponement will resemble developments in overall fertility during the demographic transition: initial urban–rural differences emerge when new behavioural patterns are adopted in the cities, but these differences subsequently decrease when the new behaviour spreads to the more rural population.

Despite substantial postponement of childbearing, overall fertility in the Nordic cities did not decrease, but remained stable or even increased over recent decades. This allows us, with some caution, to conclude that, at least in the Nordic context, late childbearing does not necessarily mean fewer children. Instead, we observe a significant restructuring of the individual life course and family-related behaviour, the pace of which seems to vary spatially.

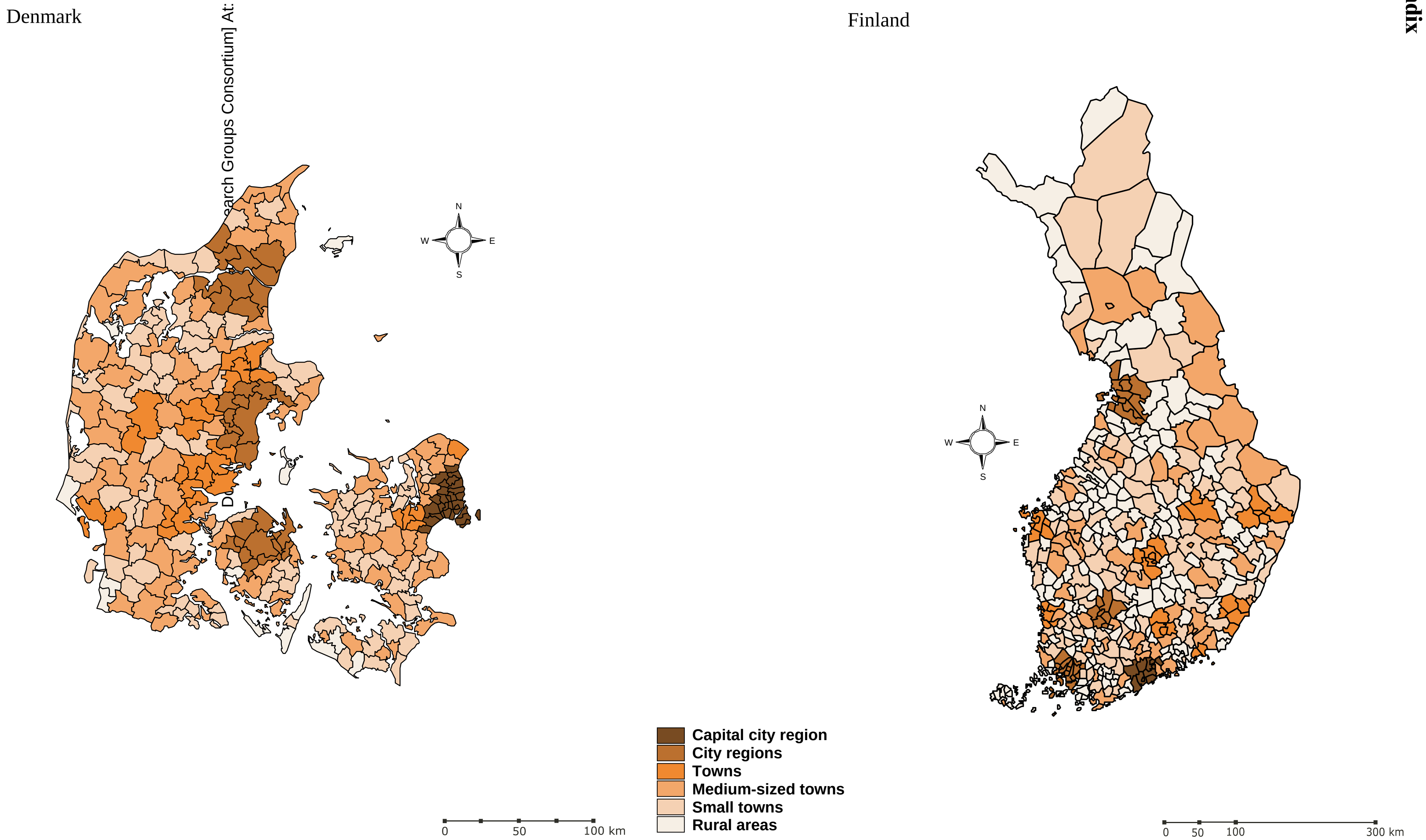


Figure A1 Municipalities of Denmark and Finland by type

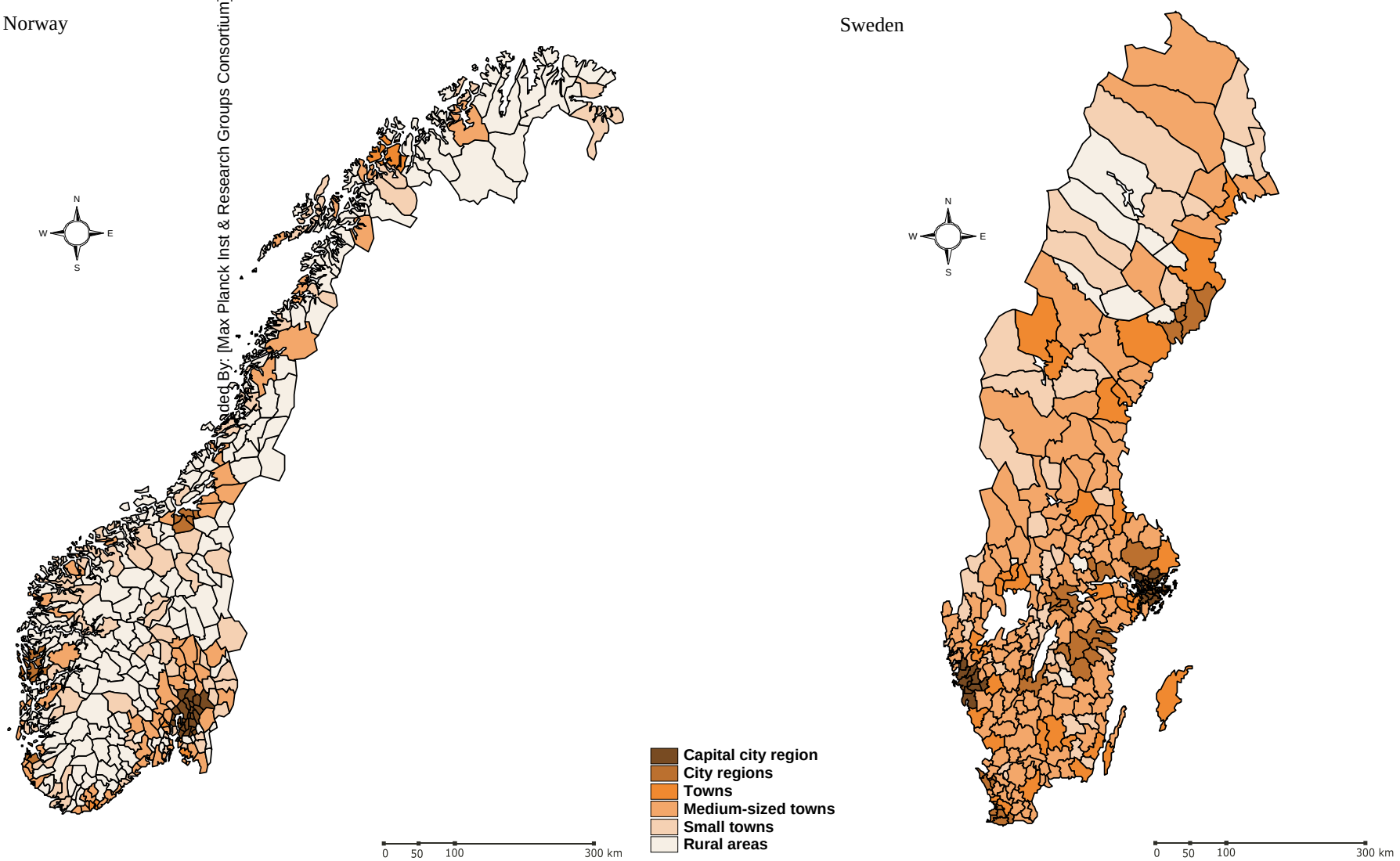


Figure A2 Municipalities of Norway and Sweden by type

Notes

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