Spatial variation in non-marital fertility across Europe in the twentieth and twenty-first centuries: recent trends, persistence of the past, and potential future pathways

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This article investigates spatiotemporal variation in non-marital fertility across Europe over the last 100 years. In the first 50 years of this period, non-marital fertility was generally declining, reaching very low levels in the mid-twentieth century. But starting in the 1960s, non-marital fertility increased strongly. The main aim of this paper is to investigate to what degree the persistence of the past might be relevant for understanding spatial aspects of the recent rise. A secondary aim is to explore how spatial non-marital fertility variation is likely to develop in the future, both between and within countries. The outcomes support the view that historical patterns are relevant for understanding current non-marital fertility variation in most parts of Europe. However, the persistence of the past varies spatially, and seems to fade over time. The analysis of current trends in spatial variation between countries suggests that an east–west dichotomy is currently emerging: i.e., countries that are not in the European Union and that have Orthodox Christian or Muslim traditions exhibit higher propensities to remain at or to revert to comparatively low levels of non-marital fertility. Within Northwestern Europe, suburban belts around big cities appear to be the last strongholds of marital fertility.

Keywords: births outside marriage; persistence of the past; spatial variation; Europe

1. Introduction

A present-day observer might be astounded by the amount of attention the topic of births outside marriage has been given – and is still being given – by researchers and statistical offices (Kiernan, 2004; Kok, 2009; Laslett, 1980; Perelli-Harris et al., 2010). In many European countries, non-marital births have become the norm, with more than 50% of all new-born children being born to non-married women. But just 50 years ago, during the Golden Age of Marriage, a non-marital birth was a rare event associated with a range of potentially negative social and legal implications for the new-born child. Today, most non-married mothers are in a stable relationship (Perelli-Harris et al., 2012), and have the option of getting married prior to childbirth. Thus, the recent increase in non-marital fertility seems to reflect the reality that the social norm that marriage should precede childbirth – which was considered very important by past populations (Kok & Leinarte, 2015; Laslett, 1980) – has far less relevance for current populations. However, studies that have looked at present-day spatial variation in non-marital fertility across Europe have found a substantial degree of variation, mostly

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between but also sometimes within countries (e.g., Klüsener, Perelli-Harris, & Sánchez Gassen, 2013). Whereas in large parts of Northern Europe marital childbirth has become the exception, there are still countries in Southeastern Europe, such as Greece and Albania, where a non-marital childbirth is still a rather rare event.

The results of existing research indicate that the observed spatial variation in non-marital fertility may be attributed in part to the persistence of the past, as these patterns can be traced back over long periods of time (e.g., Klüsener & Goldstein, 2014; Kok, 2009). In some countries the spatiotemporal pattern of the recent increases in non-marital fertility closely resembles the spatiotemporal pattern observed in the fertility decline during the demographic transition (see, e.g., Lesthaeghe & Neels, 2002, on Belgium and France). These findings suggest that some regional populations might be more receptive to new family formation trends than others, and that these differences could persist over time.

My main aim in this article is to investigate the extent to which past patterns are relevant for understanding spatial aspects of the current rise of non-marital fertility across Europe. In examining this question, I use spatially sensitive descriptive analysis techniques to compare spatial variation patterns at different points in time over the last 100 years (1910, 1960, 1975, 1990, 2007). In the first 50 years of this period, non-marital fertility was generally declining, and reached very low levels in the 1950s and 1960s. In the 50 years that followed, non-marital fertility increased sharply in most of Europe. Indeed, in many regions non-marital fertility has risen to levels that are unprecedented in the period since modern vital registration was first introduced (Klüsener et al., 2013; Kok, 2009; see also Appendix 1). A secondary aim is to explore the question of what kind of regional variation in non-marital fertility might establish itself across Europe and within European countries after the current transition to higher non-marital fertility levels has come to an end. The focus of my analysis of the future of within-country variation will be on Denmark, the first European country to have completed an s-shaped transition from low to relatively high non-marital fertility levels, with the increase in the non-marital fertility ratio levelling off at around 50% in the late 1980s. Thus, relative to countries that are still undergoing the transition, Denmark may be expected to have a rather mature spatial non-marital fertility pattern that is less affected by the spatially dependent social diffusion processes that tend to occur during the transition.1,2 As a result, the analysis of the Danish case may be expected to provide insights into the kinds of spatial variation patterns which might emerge in other countries after they have completed the transition.

2. Theoretical considerations
Whether a pregnancy results in a marital or non-marital birth can be related to both the individual-level attributes of the parents and the contextual conditions in which individuals and social groups are embedded (Cutright, 1971; Kok & Leinarte, 2015; Lesthaeghe & Neels, 2002; Shorter, Knodel, & van de Walle, 1971). The contextual conditions include, for example, the existing social norms regarding what constitutes a proper family, the economic circumstances, and the policies and laws of the country or region in which the birth takes place. The legal context is also important for the registration of a non-marital birth, as the law defines what constitutes a formal marriage. This definition allows statistical offices to determine based on the information that is available on a given birth event whether the child has been born within or outside marriage. According to Kok and Leinarte (2015), spatial and temporal variation in the
share of births that occur outside marriage can be affected by both the degree to which mothers and couples consider it desirable or acceptable for themselves and for their family to have a childbirth that is registered as either marital or non-marital, and the degree to which it is feasible for mothers and couples to marry prior to the birth of a child or to prevent a non-marital birth by induced abortion (see also Cutright, 1971).

As my goal in this paper is to provide a general overview of the spatiotemporal aspects of non-marital fertility trends across Europe over the last 100 years, the analysis that follows cannot address in detail the question of how the relative importance of specific individual and contextual determinants has varied across space and time. Yet when interpreting the findings, it is important to be aware that a non-marital birth may reflect very different motivations and circumstances.

Particularly in the past, a non-marital birth often occurred because the mother did not have the option of marrying. For example, the mother may not have been in a stable relationship, or she and her partner may have been denied the right to marry due to a lack of resources (see, e.g., Knodel, 1967; Kok, 2009). Today, job insecurity might lead cohabiting couples to postpone marriage until they have found more secure employment. Thus, it may be assumed that non-marital fertility will increase sharply during periods of economic crisis, and evidence that this is the case has been presented for both historical (Abrahamson, 2000) and more recent contexts (Perelli-Harris & Gerber, 2011). In line with the assumption that non-marital fertility is associated with a pattern of disadvantage, many studies based on individual-level data – including some recent analyses of present-day patterns – have shown a negative social status gradient in the likelihood of a birth occurring outside marriage (e.g., Perelli-Harris et al., 2010).

The analysis of non-marital fertility is, however, complicated by the fact that, particularly as societies modernise, rising non-marital fertility may also reflect an expansion of positive freedoms (Berlin, 1958; Lesthaeghe, 2010). If, for example, women become more economically independent as a result of improved access to the labour market, they may also become less dependent on kin relations and the institution of marriage to secure their own livelihood and the livelihoods of their offspring (McLaughlin & Glendinning, 1994). Secularisation trends also provide individuals with more freedom to choose family formation strategies that are not in line with those advocated by religious institutions. At least historically, all major religious institutions in Europe have taught that procreation should occur within marriage (see also Kok & Leinarte, 2015).

Elevated non-marital fertility levels can also result from marriage being seen as less desirable in specific regions. In Iceland and in parts of Sweden (Trost, 1978), for example, there is a long tradition of cohabitation by non-married couples. Couples who live in these regions may find it easier to choose cohabitation than couples who live in regions that lack such a tradition. Moreover, in some contexts there might be discrepancies between legal marriage as defined by the state authorities, and the types of unions the people or a specific sub-population classify as marriage. Thus, in some societies certain couples might be seen as being married, even though their union is not registered with the state authorities (see also Kok & Leinarte, 2015). In Austrian Galicia, for example, a large share of the Jewish population did not register their religious marriages with the state authorities, primarily because they wanted to avoid giving their information to the government or having to pay fees (Lowenstein, 1994). As a result, a large share of Jewish births in that region was registered as non-marital. A similar tendency to avoid registering unions with the state authorities can be observed in present-day Kosovo (see below).
When considering how spatial non-marital fertility patterns prior to the Golden Age of Marriage might help us to better understand the spatial patterns of the recent rise, the general non-marital fertility trends in Europe experienced over the past several centuries should be taken into account (see also Appendix 1). While rates of non-marital fertility appear to have been very low in early modern Europe until the early eighteenth century, these rates increased in the eighteenth and nineteenth centuries (Shorter et al., 1971). Thereafter, most European countries experienced a decrease in non-marital fertility that culminated in the Golden Age of Marriage. While these reductions started in a few countries in the nineteenth century, in the majority of the countries substantial declines did not occur until the period after World War I.

The decline in non-marital fertility in the first half of the twentieth century has been attributed to a number of factors. First, improved access to contraception made it easier for non-married women to avoid unwanted pregnancies (Shorter et al., 1971). In addition, expanding welfare states took steps to limit childbearing outside marriage, as these children were at high risk of requiring welfare support. Especially after the world economic crisis of 1929, many European countries attempted to limit unemployment by basing their labour market and social policies on a male breadwinner model. It appears that in this period many women accepted their labour market marginalisation, as the male breadwinner family was the most frequently chosen family form in the mid-twentieth century (Ruggles, 2015, on the US). In such family arrangements women were very dependent on their husbands, and were therefore likely to see marriage as an attractive strategy for securing financial support for themselves and their offspring. This changed again when the generations born after 1945 reached adulthood, as the women of these generations were less willing to limit their participation in the labour market.

If we follow this line of argumentation, we might make the claim that the very low non-marital fertility levels of the mid-twentieth century were rather exceptional. During this period, almost all European regions had low non-marital fertility levels, regardless of whether they had a tradition of childbearing outside marriage. But as the Golden Age of Marriage came to a close, these historical patterns may have re-emerged, affecting both the timing of the onset of the trend towards higher levels of non-marital fertility, and the intensity of this trend. However, a re-emergence of historical differences required that at least some of the factors that had contributed to spatial variation in non-marital fertility prior to the Golden Age of Marriage were still important in subsequent decades.

One factor that might be relevant is variation in how childbearing outside marriage was perceived. In the regions where non-marital fertility had been widespread prior to the Golden Age of Marriage, it might have been easier for this behaviour to spread again in the decades that followed. Evidence that this is the case has, for example, been presented for regional patterns in Sweden, where the vanguard regions in the 1960s and 1970s were those that also had historically high levels of non-marital fertility (Tomasson, 1976). There is also evidence that the strength of family ties has long differed in Southern and in Northern Europe (Reher, 1998). In regions with weak family ties, such as Scandinavia, lower levels of intergenerational control might have made it easier for younger generations to deviate from the behavioural patterns of their elders. Thus, in both past and present times the diffusion of deviant family formation behaviour might have occurred more quickly in Northern than in Southern Europe.

Another factor that may have contributed to the continuity in patterns is variation in secularisation levels. Secularisation processes gained momentum in the eighteenth century, with spatial variation between and within countries often displaying quite
substantial path dependencies over time (Kaufmann, Goujon, & Skirbekk, 2012; Lesthaeghe & Lopez-Gay, 2013 on Belgium; Klüsener & Goldstein, 2014 on Germany). As religious couples are less likely to have a child outside marriage (Klüsener & Goldstein, 2014; Lappegård, Klüsener, & Vignoli, 2014), temporal continuity in spatial secularisation patterns might also contribute to continuity in spatial non-marital fertility variation.

In addition, the institutional context might contribute to the persistence of historic patterns. Family law is one of the oldest areas of law, and the regulations governing families vary substantially across European countries (see Perelli-Harris & Sánchez Gassen, 2012). Most countries exhibit path dependencies in the development of their family legislation. This is also the case for the general principles of welfare state organisation, the foundations of which were first laid in many European countries in the late nineteenth century. In the German-speaking countries, for example, welfare support has long been linked to the family via the married (male) breadwinner, as, based on subsidiarity considerations, the family was seen as the principal unit for dealing with issues related to bringing up children. Scandinavian countries, by contrast, have a long history of implementing individualistic support schemes and encouraging female employment (Kolbe, 2002). These policies strengthened the economic position of women, and may have contributed to the forerunner status of Scandinavian countries in the recent increase of non-marital fertility.

In most European countries family legislation and welfare state institutions are organised at the national level. According to Watkins (1991), this has contributed to a decrease in regional differences in family formation patterns within countries in the twentieth century – an argument for which she has provided empirical support. Regional convergence in demographic behaviour within nation states was not, however, fostered only by family policies and the harmonisation of family legislation. The establishment of national education systems, which often promoted the use of a common state language, as well as investments in national transport infrastructures tended to facilitate more intense communication within countries, rather than across country borders. As a result, shifts in family formation patterns might diffuse more quickly in space and time within countries than across national borders (Decroly & Grasland, 1993).

Discontinuities in spatial patterns might occur for a number of different reasons. First, there might be dramatic changes in the composition of the population. For example, in the territory of historic Austrian Galicia the Jewish population was virtually eliminated during the Holocaust. Thus, even though this group had a higher propensity than the general population to avoid registering their marriages with the authorities, we would not expect this historic pattern to substantially affect current non-marital fertility levels in this area, which is now located in western Ukraine.

Another possible reason for these discontinuities is spatial variation in how views on childbearing outside marriage have changed over time. Stigmatisation or toleration of childbearing outside marriage has in historical studies frequently been linked to spatial variation in agricultural inheritance patterns (see, e.g., Khera, 1981; Klüsener & Goldstein, 2014; Shorter, 1978). But because the share of the population who are involved in agricultural activities is much smaller than in the past, this association may no longer have a large impact. The degree to which people perceived access to marriage as a privilege might have also varied spatially over time. In addition, discontinuities can occur as a result of policy reforms. Governments might implement reforms that create incentives for couples to abandon traditional customs, and thus make
societies more open to childbearing outside marriage. This seems to have occurred in Bulgaria, a case I will discuss in more detail below.

3. Data and methods

3.1. Data and choice of years

To investigate variation in non-marital fertility, I focus in this study on the non-marital fertility ratio, which is defined as the number of non-marital live births divided by the total number of live births. This measure is a rather crude indicator of non-marital fertility, as it does not allow me to control for age structure, migration background, educational attainment, or differences in the numbers of married and unmarried women between regions or in a region over time. The data also cannot be used to identify childbearing among non-married cohabiting couples, or to investigate how this behaviour has become more prevalent in recent decades (see Perelli-Harris et al., 2012). Yet the big advantage of using the non-marital fertility ratio is that it is available at a high degree of geographic detail for almost all European countries over long periods of time.

The data for the analysis were collected by the statistical offices of the observed countries. For the period around 2007 I obtained the data directly from these primary sources. For earlier periods some of the data were derived from secondary resources (see the ‘Demographic data’ section in the references for details). The secondary resources used in compiling the historical state-level time trends over the past several centuries (presented in Appendix 1) included a publication on international long-term trends in vital statistics by Statistics France (SGF, 1907), publications of the Office Permanent de l’Institut International de Statistique, and a data handbook edited by Flora, Kraus, and Pfenning (1987). In addition, I downloaded data from the Developed Countries Demography database (INED, 2015) and the Human Mortality Database (UCB & MPIDR, 2015).

Some of the data used for the period around 1910 were prepared by the collaborators on a project that is investigating the decline in infant mortality across Europe at a high level of geographic detail, who kindly agreed to share their data with me. The regional data for the developments since 1960 were mostly derived from a data collection compiled by the Atlas de la Population Européenne project (Decroly & Vanlaer, 1991). These data were complemented by annual country data for the period 1960 to 2007, which were obtained from Eurostat, the Demographic Yearbook of the Council of Europe (2005), and Demoskop Weekly (2015).

The years I have chosen to focus on in the analysis were selected in part based on the availability of data. It is important to note that 1910 was selected primarily because regional data for that year are available for almost all of the European countries. Data are much more difficult to obtain for the period following World War I, as, for example, the Soviet Union did not publish information on whether births occurred within or outside marriage for some time. Attempts to assess the extent to which the 1910 pattern is indicative of patterns that existed prior to the Golden Age of Marriage are complicated by the fact that, by 1910, some parts of Western and Northern Europe were already in the middle of the demographic transition, and thus were experiencing substantial fertility declines. This transition affected both marital and non-marital fertility, as well as marriage timing. Unfortunately, data limitations do not allow me to study detailed spatial patterns prior to 1910. But in Appendix 1 I provide long-term data for a large number of countries and bigger sub-regions of countries over the last three
centuries. Thus, at least at this cruder level of spatial detail, I can investigate to what degree the levels observed in 1910 are still representative of the nineteenth-century patterns in different parts of Europe.

The graphs in Appendix 1 show that in a number of countries the non-marital fertility ratio declined in the decades prior to 1910. The Western and Northern European countries where this occurred include England and Wales, Scotland, the Netherlands, and Iceland. In Central Europe, non-marital fertility decreased dramatically in a number of German states in the late 1860s, largely because marriage bans were lifted (Knodel, 1967). In Southern Europe, non-marital fertility increased in Italy in the late nineteenth century, but had returned to mid-nineteenth-century levels by 1910. This temporary increase seems to be largely a registration artefact, as a significant share of couples did not register their church marriages with the civil authorities during the conflict between the Italian state and the Vatican which occurred in this period (Kok & Leinarte, 2015). Except in England and Wales and in Scotland, the declines found in European countries prior to 1910 did not affect whether a country had a high, medium, or low level of non-marital fertility relative to other European countries. This provides me with some assurance that at least at this crude level of spatial detail, the 1910 levels capture quite well for most of Europe the degree of variation in non-marital fertility that existed prior to the Golden Age of Marriage.

When we look at the more recent years covered in the analyses, we can see that the year 1960 represents the heyday of the Golden Age of Marriage. The year 1975 constitutes an intermediate point in the departure from the Golden Age of Marriage, as some vanguard countries were already experiencing an increase in non-marital fertility. The year 1990 marks the beginning of the transition in Eastern Europe. Non-marital fertility rose rapidly in many post-communist countries in the period that followed. The year 2007 is the most recent year for which data have been obtained.

When considering the 1910 data, it is important to note that at that time the quality of population statistics varied substantially across Europe (Edge, 1928; SGF, 1907). While the countries of Northwestern Europe, including Germany, had very reliable registration systems in 1910, many countries in Eastern and Southern Europe had problems with the under-registration of vital events, especially of births in which the child died within the first days of life. Children who were born outside marriage were at higher risk of dying in infancy than children who were born within marriage. This gap might have contributed to a downward bias in the reported rates of these countries. Another challenge is variation in registration standards within Northwestern Europe: e.g., in countries such as France and the Netherlands a live birth was registered as a stillbirth if the child died before the birth was registered (Klüsener et al., 2014). These problems may also have affected the long-term time trends presented in Appendix 1.

As any attempts to correct for variation in registration standards would be based on bold assumptions, I decided to use the data without modifications, while assuming that in areas where having a childbirth outside marriage was more accepted, a non-marital birth was more likely to be reported. Nevertheless, in interpreting the outcomes it is important to keep in mind that the analysis presented in this paper examines the persistence of the past in the share of registered births that occurred outside marriage.

The demographic data were matched to GIS-shapefiles, which provide information on the administrative boundaries of the regions for which the demographic data were collected. These shapefiles were derived from the MPIDR Population History GIS Collection (MPIDR, 2014a, 2014b, 2014c), national historical GIS projects (see the ‘GIS
data’ section in the references for details), and the GADM Database of Global Administrative Areas (GADM, 2012).

3.2. Generating estimates for a time-constant regional division of Europe

When researching the persistence of past spatial variation patterns in Europe, the substantial changes in national borders and regional administrative boundaries over the last 100 years pose a major challenge. This is particularly the case for Central and Eastern Europe. To facilitate the comparison over time, efforts have been made to derive estimates for a time-constant regional division of Europe. For the period 1960–2007, this study benefits from the fact that such a data-set has already been derived by Klüsener et al. (2013) for a paper on regional aspects of non-marital fertility trends since 1960. This data-set covers for most European countries the current regional administrative divisions, while in some exceptional cases other divisions which existed at some point in time during the period 1960–2007 are used. This data-set was complemented with data for the year 1910.

In estimating the non-marital fertility levels for the time-constant regions in 1910, a simple spatial interpolation method based on area weighting is used (Goodchild & Lam, 1980). The central assumption of this method is that marital and non-marital births are homogenously distributed, both in the so-called source regions for which data are available for a given year, as well as in the time-constant target regions for which estimates have to be produced. This sounds like a strong assumption, as it is not reasonable to expect that either the population or the births were homogenously distributed across a regional territory. However, it is important to point out that the bias produced by such an estimation is largely dependent on the geographical extent of the source regions relative to the target regions. The smaller the source regions and the larger the target regions, the smaller the bias that is introduced by this spatial interpolation technique. In this case, data on live births and non-marital live births were available for more than 5000 source regions for the year 1910, and these data were used to derive estimates for 604 target regions. Thus, the bias introduced by this approach was expected to be rather low. The estimates were derived by intersecting a GIS-polygon file with the boundaries of the source regions with a GIS-file of the target regions to obtain the smallest common polygons. The area information from these polygons in turn allowed me to generate the estimates for the target regions.

3.3. Analytical strategy

The analysis is divided into three parts. In section 4.1 I provide an overview of the non-marital fertility trends in European macro regions since 1960, followed by a geographically detailed account of present spatial variation in non-marital fertility across Europe. In section 4.2 I explore to what degree the persistence of past spatial variation patterns might be relevant for understanding present-day spatial variation across Europe. To address this question, I examine how the current spatial variation patterns correspond with the patterns observed 100 years ago and at other points in time over the last 100 years. Finally, in section 4.3, I discuss potential future pathways of spatial non-marital fertility variation across Europe.

Throughout the analysis, I make use of descriptive methods and cartographic representations. In the second part of the analysis, the correlations between regional non-marital fertility levels in the years 1910, 1960, 1975, 1990, and 2007 are presented.
For the years 1960–1990 these correlations apply to a reduced sample, as I lack regional data for a number of Eastern European countries in this period. As most of the variables are positively skewed, Spearman’s rank order correlation coefficient has been chosen to derive the correlations. If the persistence of the past plays a role, it may be generally expected that a positive association would be found between past and present spatial non-marital fertility variation in different years. This part of the investigation was inspired by an analysis of temporal continuity in non-marital fertility variation at the national level by Kok (2009). In his paper, Kok used a sample that consisted primarily of Western European countries to examine non-marital fertility levels in the period 1900–2000.

As the persistence of the past is likely to vary spatially across Europe, I have also chosen to explore the statistical associations between historical and present-day patterns for different sub-regions of Europe. This analysis compares the levels of variation in 1910 and in 2007. To determine whether and to what degree the association between non-marital fertility levels in these two periods varies across different sub-regions of Europe, I use a Geographically Weighted (GW) Spearman’s rank order correlation coefficient (Fotheringham, Brunsdon, & Charlton, 2002). This implies that I will calculate the coefficient for sets of local samples. For each region i in the sample, a local Spearman’s rank order correlation coefficient is obtained, which includes values of the variables of interest for the region i itself, and for neighbouring regions j situated in the adjacency of region i. This implies that for the derived European sample of time-constant regions in 1910 and 2007, a total of 604 local correlations will be obtained. For the calculations I used the R-package GWmodel.

In deciding which of the neighbouring regions to include in the local correlation statistics, Geographically Weighted statistical approaches provide the user with the option of working with either fixed or adaptive bandwidths. A fixed bandwidth is defined as a distance radius, while an adaptive bandwidth is based on a k-nearest neighbours approach. For my analysis, I have chosen to use an adaptive bandwidth, as it allows me to better account for the considerable variation in the sizes of the regions across the European sample. The implication of the bandwidth can differ depending on what kind of spatial weighting functions are chosen (see below). In most cases, the bandwidth implies that no information for regions beyond that bandwidth of k-nearest neighbours will be included. Geographically Weighted statistical approaches offer optimisation-based procedures for deciding how many nearest neighbours should be used as bandwidth. But as this is just an explorative analysis, I decided to keep things simple by working with arbitrarily chosen bandwidths. To show the sensitivity of the choice of the bandwidth on the outcomes, I will present the results for 20 and 30 nearest neighbours.

In addition to using a bandwidth, GW-based methods include the option to work with spatial weighting functions to give neighbouring regions j, which are closer to the region i for which a local statistic is derived, more weight than more distant regions j. Different options for deriving these weights are available. I present the outcomes for two different weights, as provided in the R-package GWmodel, which allow me to carve out different dimensions of the existing spatial variation patterns in the correlation between spatial non-marital fertility patterns in 1910 and in 2007. I will refer to them as ‘intermediate’ and ‘localised’ weighting schemes. For the intermediate scheme, which is based on a Gaussian-shaped kernel weighting function, the weights for neighbouring regions slowly decrease with distance, which allows me to look at shifts in the association at an intermediate spatial scale across Europe. By contrast, the
localised weighting scheme, which is based on a bisquare-shaped kernel weighting function, gives nearby neighbouring regions a much higher weight than more distant regions. Thus, this scheme is more sensitive to small-scale deviations in the association between past and present non-marital fertility levels from patterns that exist at higher spatial scales.\[12\]

4. Spatial variation in non-marital fertility across Europe in historical perspective

4.1. Recent trends and present variation

4.1.1. Non-marital fertility trends in European macro regions since 1960

In presenting the results, I will first discuss non-marital fertility trends for broad European macro regions over the last 50 years. This will allow me to describe regional variation in the timing and pace of the departure from the Golden Age of Marriage of the mid-twentieth century. The categorisation of European countries into macro regions was based on similarities in their welfare state systems (Esping-Andersen, 1990), and on other parallels in political developments over time. The macro region of Northern Europe represents the Nordic countries, which have extensive welfare state support systems (Esping-Andersen, 1990). The Western European region is comprised of countries that either have quite liberal welfare states (the United Kingdom, Ireland, the Netherlands), or have long provided very high levels of child care support (France and Belgium). The availability of child care may be assumed to have positive effects on the economic independence of women. The third region of Central-Western Europe includes the German-speaking countries, which, apart from the former German Democratic Republic, have rather conservative welfare states (Esping-Andersen, 1990). These conservative welfare regimes are characterised by family support geared towards married couples and a temporal delay in the implementation of policies aimed at supporting the reconciliation of family and work. The Central-Eastern and Eastern Europe categories cover all of the former communist countries except for the German Democratic Republic. All of the former Soviet republics that are not currently part of the European Union are in the Eastern Europe category, while the other post-communist countries are in the Central-Eastern Europe category. The region of Southern Europe is comprised of countries that have populations with strong family ties (Reher, 1998), and that, at least until recently, had rather conservative welfare states (Esping-Andersen, 1990). In addition to data on the non-marital fertility trends for these six macro regions, data for Europe as a whole have been derived. The resulting numbers are shown in Figure 1, in which the small map in the upper-left corner indicates which European country has been linked to which macro region.\[15\]

The time series starts in the heyday of the Golden Age of Marriage. Around 1960, all six macro regions except for Eastern Europe had a non-marital fertility ratio below 10%. The first region to report a strong increase in this ratio was Northern Europe; there the transition started in the 1960s and gained additional momentum in the 1970s. By the late 1970s, non-marital fertility had also started to rise in Western and in Central-Western Europe. But unlike in Western Europe, the increase in Central-Western Europe was initially short-lived, and was mostly driven by developments in the German Democratic Republic (GDR) and Austria. The regions that made up these two countries had historically been hot spots of non-marital fertility (see below). Thus, their populations may have been particularly susceptible to reverting to higher levels of non-marital
fertility. After rather generous support schemes for single mothers were introduced in the 1970s in the GDR and in Austria, the shares of births that occurred outside marriage started to rise in both countries. However, in the mid-1980s these support schemes were extended to married mothers (GDR) or restricted to non-married mothers without a partner (Austria). After these reforms were implemented, the increase in non-marital fertility came to a halt in both countries, at least temporarily (see also Klüsener & Goldstein, 2014; Kytir, 1992). The decline in non-marital fertility in Central-Western Europe in the 1980s and the early 1990s was also related in part to compositional factors: i.e., eastern Germany, which had rather high shares of non-marital births, went from having fertility rates which were close to replacement level in the early 1980s, to having extremely low fertility rates in the 1990s (Goldstein & Kreyenfeld, 2011). As a result of the temporary decline, Central-Western Europe went from being a forerunner in the transition to being a laggard.

In the Central-Eastern and the Eastern European regions, the average non-marital fertility levels changed very little between 1960 and the mid-1980s. Southern Europe, on the other hand, had on average the lowest non-marital fertility ratio of all of the macro regions in 1960, and the ratio continued to decline until the 1970s. But in the
1970s, the non-marital fertility ratio started to increase in Southern Europe as well, and has been rising ever since. However, the increases in the late 1970s and the 1980s were still quite small.

Thus, by the 1980s, the non-marital fertility ratios of Northern and Western Europe were on a clear upward trajectory, while the other regions were lagging behind. The economic collapse of the Eastern Bloc in the late 1980s resulted in trend changes in these countries. During the crisis period that followed, non-marital fertility started to increase substantially in Central-Eastern and Eastern Europe. In Central-Western and Southern Europe, the trend towards higher non-marital fertility ratios also accelerated in the mid- to late 1990s. In some of these countries, such as in Germany, the acceleration of the increase occurred parallel to the enactment of legislative reforms that substantially reduced the remaining legal discrimination of children born outside marriage.

In the 2000s, the developments in Eastern Europe were probably the most remarkable of the trends that were unfolding across Europe. While all of the European macro regions had rapidly increasing non-marital fertility ratios in the late 1990s and the early 2000s, Eastern Europe started to deviate from this general trend from around 2003 onwards. Since then, non-marital fertility levels have been on a downward trajectory in this macro region. This trend is detectable in Russia, Belarus, and Moldova, while Ukraine has just experienced a levelling off of increases in non-marital fertility (see Appendix 1). There seem to be two main explanations for why this trend is occurring in Eastern Europe. First, it has been argued that non-marital fertility rose in Eastern Europe in the 1990s partly in response to insecure economic conditions (Perelli-Harris & Gerber, 2011). This provides support for the view that the economic stabilisation of the 2000s might have contributed to the subsequent decrease in non-marital fertility levels. Second, scholars have observed that Eastern Europe appears to be entering a period characterised by a reversion to traditional norms. This trend is reflected in de-secularisation trends (see, e.g., Evans & Northmore-Ball, 2012, on Russia) and the enactment of legislation designed to limit non-traditional family formation behaviour (e.g., in Russia).

The countries of Northern Europe have registered smaller increases in non-marital fertility in recent years, which suggests that the transition to higher non-marital fertility levels might be close to completion in this part of Europe. In four of the other five regions, non-marital fertility ratios are continuing to rise. Thus, with the exception of Eastern Europe, a convergence of non-marital fertility levels can currently be observed across Europe. When we look for evidence of the persistence of the past in the current trends, Eastern Europe again stands out. While this part of Europe had the highest non-marital fertility ratio in the early 1960s, it had the lowest in 2012. Another region that experienced substantial shifts in its relative position is Western Europe. While this macro region was in the second-last position in 1960, current trends suggest that it will soon overtake Northern Europe to become the macro region with the highest non-marital fertility.

4.1.2. A geographically detailed view of non-marital fertility variation across Europe in 2007

In order to study present-day variation in non-marital fertility levels at a high level of geographic detail, I compiled information on the non-marital fertility ratio for more than 2300 European regions and localities for the period around 2007. The resulting
map is displayed in Figure 2. When interpreting the map, it is important to keep in mind that the level of spatial detail varies across countries, as I tried to obtain for each country the information with the highest level of detail available.\textsuperscript{18}

The map shown in Figure 2 also supports the view that the spatial variation in non-marital fertility levels across Europe is far from random. In Northern Europe, hot spots with very high levels include Iceland and large parts of Sweden and Norway. Within Central-Eastern Europe, Estonia is by far the country with the highest non-marital fertility levels. In Western Europe, France reports the highest levels, with relatively little internal variation across its subnational regions. Other hot spots include the territory of the former German Democratic Republic in eastern Germany, and an area encompassing the southern part of Austria and eastern Slovenia. In Southeastern Europe, Bulgaria has exceptionally high non-marital fertility levels.

In many instances the patterns appear to be closely linked to national borders, even though in recent decades regional non-marital fertility variation has become less associated with the territories of nation states (Klüsener et al., 2013). There is, for example, a strong dividing line in non-marital fertility between France and Switzerland, despite the fact that the populations east and west of the border speak the same language. Existing research suggests that the non-marital fertility divide along this border is largely a result
of differences in the family policies and the family legislation of France and Switzerland (Le Goff & Ryser, 2010; Perelli-Harris & Sánchez Gassen, 2012).

A number of countries exhibit a significant degree of internal regional variation in non-marital fertility levels. Some of these patterns appear to have first emerged long ago. In Germany, for example, Klüsener and Goldstein (2014) showed that differences in non-marital fertility levels between the eastern and western parts of Germany can be traced back to the eighteenth century. Poland is also an interesting case, as large parts of the regions of the country that were part of Germany until World War II, and that were resettled after the war, today have much higher non-marital fertility levels than the other regions of Poland (see also Brzozowska, 2011). In Slovakia, there are stark differences between the northern and the southern parts of the country, even though the north-south stretch of this country is quite small: along Slovakia’s border with Poland, the levels of non-marital fertility are, at 7% to 20%, rather low; whereas in the southern part of Slovakia, the non-marital fertility ratios are, at 35% to 55%, quite high. Another country with clear regional differences is Serbia: in that country, non-marital fertility levels are lowest in the mountain areas of the western Balkans along the border with Bosnia-Herzegovina and Montenegro, and are highest in the Danube region along the borders with Romania and Bulgaria (Stanković & Penev, 2012).

In Kosovo, the area populated by the Serbian minority stands out from the rest of the territory. However, the high levels of non-marital fertility reported in the Muslim-dominated part of Kosovo appear to be an artefact, as a large number of the births in this area are to couples who are perceived as being married within their community, but who have not officially registered their marriage (see Klüsener et al., 2013; for details). This tendency to avoid the civil registration of marriage seems to have emerged in the second half of the twentieth century, when Kosovo was still part of Serbia (see Appendix 1). If only the births for which the father could not be determined are treated as non-marital (classified as illegitimate by Statistics Kosovo), the non-marital fertility ratio in Kosovo is as low as the ratio in neighbouring Albania. Some minority regions in other countries also stand out. In Italy, for example, South Tyrol exhibits levels that are very similar to those observed in neighbouring Austrian Tyrol.

There are also a number of clusters with similar non-marital fertility levels that extend across country borders. For example, there is an area with rather low non-marital fertility levels which stretches across the southeastern part of Poland and the western parts of Belarus and Ukraine. This area of quite low levels roughly corresponds to the state boundaries of interwar Poland. Historical boundaries also seem to show up in other cases. In Italy, the areas with rather low levels of non-marital fertility are concentrated within the boundaries of the former Kingdom of Naples. These findings lend support to the argument that we should seek to determine to what degree current spatial variation patterns correspond with past patterns.

### 4.2. Persistence of the past?

In examining the potential *longue durée* of regional patterns, I compare the spatial variation in 2007 with the patterns that existed around 1910. Figure 3 provides a geographically detailed view of non-marital fertility variation in 1910, based on data for 5000 historical regions and localities. The spatial patterns in 1910 were also far from random. However, in virtually all of Europe, the non-marital fertility ratios were much lower in 1910 than in 2007. In line with the theoretical considerations of Watkins (1991), we can see that the state borders in the 1910 map are less meaningful than
those of the 2007 map for explaining the spatial patterns, because in the early twentieth century nation states were just starting to have a significant influence on the demographic map of Europe. Thus, specific patterns are often not aligned with the boundaries of empires or nation states. This is, for example, the case for an area with rather low non-marital fertility levels which covered the Netherlands, the adjacent territories in western Germany, and, to some degree, Belgium. Similarly, there was a hot spot of non-marital fertility in Central Europe which covered southern Bavaria and the neighbouring territories of today’s Austria. In these two territories high non-marital fertility was linked to inheritance practices and accompanying legislation (Khera, 1981; Shorter, 1978). While Austria of today is also a non-marital fertility hot spot, the level of non-marital fertility in Bavaria has ‘converged’ towards the levels reported in other parts of western Germany (see Figure 2). It is likely that this convergence trend was fostered by discontinuities in Bavarian civil legislation that resulted from the introduction of a unified civil code in Germany in 1900. While Bavarian civil legislation had given children born outside marriage quite substantial rights, the German civil code explicitly

Figure 3. Non-marital fertility ratio 1910.
Note: The regional boundaries considered for this map are shown in Appendix 3. The density curve in the upper-right corner provides additional information to the legend given in the lower-right corner by showing how the chosen colour categories relate to the distribution of the mapped variable.
Source: Statistical offices; Ekmper and van Poppel (2008); Devos (2014); Klüsener et al. (2014), own calculations.
Base Map: MPIDR (2014a, 2014b, 2014c), partly based on EuroGeographics for the administrative boundaries; National Historical GIS projects: Boonstra (2007); Dansk Center for Byhistorie (2008); Gregory, Bennett, Gilham, & Southall (2002); Guttormsson & Gardarsdóttir (2002); Historical Database of Local Statistics [Lokstat] (2014); Norwegian Social Science Data Services [NSD] (2013); Riksarkivet (2013); da Silveira, Alves, Lima, Alcântara, & Puig (2011).
stated that a child born outside marriage was not related to the father (see Klüsener & Goldstein, 2014).

In the map of 1910, in a number of countries those areas that include capitals or other big cities stand out as non-marital fertility hot spots within the country. Among these hot spots are Madrid in Spain, St. Petersburg and Moscow in Russia, and Rome in Italy. It seems that particularly in conservative countries such as those mentioned above, (reported) non-marital fertility was largely restricted to the relatively anonymous large urban centres.

I will now compare the non-marital fertility levels for the 604 time-constant regions for which I obtained published data and/or estimates of non-marital fertility levels for 1910 and 2007. For a reduced sample of 482 regions, which excludes a number of Eastern European countries, estimates for the years 1960, 1975, and 1990 are also available (Appendix 4 provides an overview which regions are included in the full and the reduced sample).

The obtained global (i.e., not spatially weighted) Spearman’s rank order correlation coefficients are displayed in Table 1. The table provides correlations for regional non-marital fertility variation in 1910 and 2007 for the full sample, and a matrix of correlations of variation for the reduced sample in 1910, 1960, 1975, 1990, and 2007. The table shown here was constructed in a manner similar to that of a table presented by Kok (2009), in which he displayed the outcomes of a correlation analysis of non-marital fertility in 15 (mostly Western) European countries in 1870, 1900, 1930, 1960, and 2000. Kok also used Spearman’s correlation coefficient. Although the correlations presented here cover a much larger part of Europe at a higher level of detail than those of Kok (2009), the obtained coefficients and trend patterns have many similarities. All of the correlation coefficients in Table 1 are in the expected positive direction. However, the correlation between 1910 and 2007 is rather low, with the obtained correlation coefficients being 0.29 for the full sample and 0.30 for the reduced sample.

Table 1. Rank order correlation (Spearman’s rho) of regional non-marital fertility ratio (NMFR) in 1910, 1960, 1975, 1990, and 2007.

| NMFR    | N = 482 | NMFR | N = 482 | NMFR | N = 482 | NMFR | N = 482 | NMFR | N = 604 |
|---------|---------|-------|---------|-------|---------|-------|---------|-------|---------|
| NMFR 1910 | 0.59    | 0.51  | 0.43    | 0.30  | 0.29    |
| NMFR 1960 | –       | 0.80  | 0.53    | 0.40  | –       |
| NMFR 1975 | –       | –     | 0.83    | 0.69  | –       |
| NMFR 1990 | –       | –     | –       | 0.89  | –       |

Note: The reduced sample excludes Belarus, Romania, Russia, and Ukraine, for which no regionally detailed data are available for the years 1960, 1975, and 1990. Both the full and the reduced sample exclude an area in Southeastern Europe which is today covered by the countries Albania, Greece, Kosovo, the former Yugoslav republic of Macedonia, Montenegro, and Turkey; as no data on the non-marital fertility ratios in this area are available for 1910 (see also Figure 4). For the same reason some regions in the east and southeast of European Russia also had to be excluded from the full sample. All of the European micro states – such as Andorra, Monaco, Liechtenstein, and San Marino – are also excluded.

Source: Statistical offices; Eurostat; UN statistical yearbooks; Decroly and Vanlaer (1991); Council of Europe (2005); Ekamper and van Poppel (2008); Devos (2014); Klüsener et al. (2014), own calculations.
The comparison of the correlations that were obtained between the regional non-marital fertility levels in 1910 and the years 1960, 1975, 1990, and 2007 for the reduced sample show that the correlation with the 1910 values decreased over time. Similar trends of declining correlations are observable for the correlations of the regional levels in 1960 and 1975 on the one hand, and the levels in later periods on the other. These trends, which are also visible in the numbers presented by Kok (2009), suggest that the patterns of the past persist, but are fading over time.

The correlations for Europe as a whole might hide large- and small-scale variations in the association between non-marital fertility levels in 1910 and 2007 in different sub-regions of Europe, which I will now explore with the Geographically Weighted Spearman’s rank order correlation coefficient. The input data and main outcomes of the Geographically Weighted correlation analysis are displayed in Figure 4. Figure 4a shows the non-marital fertility ratio in 2007; and Figure 4b displays the log-transformed values of the non-marital fertility ratio in 1910. Unlike the maps in Figures 2 and 3, these maps display the non-marital fertility ratio for the 604 time-constant regions. This method of presentation lacks spatial detail, but might facilitate the comparison of the regional levels in 1910 and 2007.

Figures 4c–f show the outcomes of the Geographically Weighted correlation analysis. In Figures 4c and 4d I present the results obtained with the ‘intermediate’ spatial weighting function, which allows me to study shifts in the association between past and present patterns across Europe on a broader spatial scale for both a smaller and a larger bandwidth (20 vs. 30 nearest neighbours). Figures 4e and 4f display the outcomes based on a more ‘localised’ spatial weighting function that is more sensitive to small-scale deviations from larger-scale patterns. The results for the 20 and the 30 nearest-neighbours bandwidths are also compared in these figures. Figures 4c–f demonstrate that the choice of weights and the number of neighbours change the outcomes considerably. Nevertheless, the four maps have many similarities.

When we look at the outcomes for spatial shifts in the correlation between non-marital fertility levels in 1910 and 2007 at an intermediate level of spatial detail across Europe (Figures 4c and d), we can see that also at this scale the analysis returned a positive association in almost all of the regions. However, some areas deviate from this pattern. The most prominent exceptions are found in Southeastern Europe. Bulgaria has shifted from having extremely low to having extremely high non-marital fertility levels, while the regions that today make up Romania had comparatively high levels in the past and quite low levels today. A second area for which negative correlations are obtained is England and Wales: in 2007 the low values were centred on London in the southeast, whereas in 1910 they were more dispersed.

Studies that have attempted to explain the large discontinuities in Southeastern Europe have noted that Bulgaria has a long tradition of government intervention in family formation patterns. This tradition started after Bulgaria became independent in the late nineteenth century. At that time, legislators did not develop civil legislation based on existing customs. Instead, for various reasons, they directly transferred legal norms from western civil legislation to the Bulgarian legal code (see Todorova, 2000; for details). During the communist era as well civil legislation had a substantial influence on family formation patterns. For example, in an effort to preserve traditional family formation behaviour and to incentivise marriage, the government imposed a bachelor tax on non-married individuals (see also Brunnbauer & Taylor, 2004). As a result of these policies, the decision to marry may have become decoupled from social norms, and more closely linked with economic considerations. These developments might have contributed to the sharp
increase in non-marital fertility in Bulgaria during the economic instability of the 1990s and the 2000s, when the bachelor tax was no longer in effect.

Parts of Southeastern Europe and England and Wales also show negative associations in Figures 4e and f, which display the outcomes for the more localised weighting function. However, the obtained negative coefficients are even higher than those shown in Figures 4c and d. Other regions with negative coefficients also show up. In Western
Europe, these areas include large parts of France and parts of northwestern Spain and Portugal. The more localised analysis of Eastern Europe indicates that there is a rather big area with negative correlations covering the central part of European Russia, substantial parts of western and central Ukraine, and southern Belarus. In the Ukrainian and the Belarusian territories in particular, this negative association might be linked to the drastic changes in the composition of the population as a result of the Jewish Holocaust. Another difference in the maps with the more localised pattern is that the negative correlations in the border region between Hungary and Romania are more pronounced. Last but not least, there is also a small area with negative coefficients in Central Europe that covers parts of eastern Germany and the Czech Republic.

While the more localised weighting function returns negative correlations for a larger number of regions, it also provides much higher positive correlation coefficients for many regions. First, however, I will discuss the areas that show high positive associations in the analyses based on the intermediate weighting scheme (Figures 4c and d). One hot spot with high positive correlations can be observed around the Baltic Sea. In this area, the regions with predominantly Catholic populations (Poles and Lithuanians) had comparatively low levels of non-marital fertility in both 1910 and 2007. By contrast, many of the Baltic Sea regions with mainly Protestant populations, such as Sweden, Finland, and the territory of present-day Estonia, had much higher levels. This broader area with very high positive correlations extends west to include Denmark, the Netherlands, Belgium, Switzerland, large parts of Germany, northeastern France, and western Austria.

When we look at the outcomes for the more localised weighting scheme, we can see that the picture changes (Figures 4e and f). For the Baltic Sea region, the areas with high positive associations are now concentrated in Poland, Lithuania, and Latvia, as well as in a border zone between Sweden, Norway, and Finland. In Germany, the areas with high positive associations are mainly found in the border zone between eastern and western Germany. The long-standing non-marital fertility divide between east and west in that country has been described by Klüsener and Goldstein (2014). In France, the zones with high positive associations are mainly clustered along the regions bordering Spain in the southwest and Belgium, Germany, Switzerland and Italy in the east. In both 1910 and 2007, these French border regions tended to have higher levels of non-marital fertility than the adjacent regions in neighbouring countries. The outcomes for the French border zones are in line with the findings of Bocquet-Appel and Jakobi (1996, p. 121) who showed that these borders constituted at least temporary barriers to the spatial diffusion of the fertility decline as part of the demographic transition. The fact that these boundaries also show up in my analysis seems to underline their importance as demarcations between distinct zones that differ in terms of their family formation behaviour patterns and the timing of their transitions to new patterns. Other areas that are shown to have a pronounced positive correlation in the more localised analysis include Ireland, Iceland, an area comprising southern Portugal and southern Spain, the eastern part of European Russia, and a rather large area stretching from southeastern Germany to the western Balkans.

Overall, the analysis of the persistence of past non-marital fertility variation patterns suggests that while there is some degree of continuity from a pan-European perspective and at an intermediate level of spatial detail, the outcomes become more nuanced if approaches are used that are more sensitive to local deviations from the general patterns. However, even in the analysis that returns the highest number of negative correlations (the one presented in Figure 4e), for the majority of regions a positive
Geographically Weighted correlation coefficient is obtained (62%); and the share of regions with correlations above 0.3 (40%) is far larger than the share of regions with a correlation below –0.3 (19%).

4.3. Potential future pathways

4.3.1. Future patterns of between-country variation

The discussion of future pathways is divided into two parts: potential variation across countries, and potential variation within countries. Existing research by Lappegård et al. (2014) provides support for the view that between-country variation of childbearing in cohabitation across Europe is linked to secularisation processes, as well as to the economic autonomy of women. Patterns of disadvantage seem to be more relevant for understanding variation between individuals and across subnational regions (Lappegård et al., 2014). Projections by Kaufmann et al. (2012) indicate that the secularisation process has levelled off in the predominantly Protestant countries that were the forerunners in this development, and is continuing in the predominantly Catholic countries. Thus, the secularisation levels of European countries with Protestant and Catholic traditions are currently converging, and this process may in turn contribute to a convergence in the levels of non-marital fertility. However, as was mentioned above, the situation is different in a number of Eastern European countries with an Orthodox tradition. Since these countries broke with their secular communist past, religiosity has grown (see, e.g., Evans & Northmore-Ball, 2012, on Russia). If this tendency towards increasing religiosity prevails in Eastern Europe, the already visible trend towards a divergence of non-marital fertility levels in Eastern Europe on the one hand and the rest of Europe on the other might continue into the future.

The economic autonomy of women is heavily influenced by welfare state institutions (McLaughlin & Glendinning, 1994). Societies in Northern and Western Europe seem to have been forerunners in providing women with higher levels of autonomy through legislative action. There are indications that other countries are currently enacting similar measures (Ostner, 2006), in part because autonomy for women is supported by European institutions such as the European Court of Human Rights (Goldhaber, 2007) and the European Union. In the future, this trend might contribute to a convergence in the economic status of women across Europe. However, the non-EU part of Eastern Europe might again constitute an exception to this general trend. In the development of their welfare state and family policies, these countries seem to be less influenced than other countries by European institutions, although they may be affected to some extent via their membership in the Council of Europe. In general, it appears that the non-EU part of Eastern Europe is the area of the continent which is least likely to follow the trend towards convergence in family legislation and welfare state development. Thus, current indications that Eastern Europe is no longer making the general transition towards high non-marital fertility ratios are, perhaps, not so surprising. There is also no evidence that non-marital fertility is increasing strongly in European countries with a Muslim tradition. The only exception is Kosovo, but, as discussed above, the increase there appears to be a statistical artefact. Thus, the non-EU countries with an Orthodox or a Muslim tradition seem to be the European countries that are most likely to revert to or to continue to have rather low non-marital fertility levels.
4.3.2. Future patterns of within-country variation

As I noted in the introduction, the exploration of potential future within-country variation patterns will focus on Denmark, which was the first European country to complete the transition from having rather low to having high levels of non-marital fertility. Figure 5 displays the non-marital fertility ratio for the 99 Danish municipalities in the period 2007–2010. Interestingly, the highest non-marital fertility ratios were registered in the most central and the most marginal areas of Denmark. The first group of areas with high levels of non-marital fertility consists of the municipalities in the centre of the metropolitan area of Copenhagen, while the second group is made up of the small Danish islands and the northern part of Jutland, which constitutes the continental part of Denmark. In both clusters of municipalities, more than 50% of all births were to non-married mothers. Meanwhile, the lowest levels of non-marital fertility were reported in the outer core and suburban belt of the Copenhagen metropolitan area.

For the island of Zealand, on which Copenhagen is located, and the smaller islands to the south of Zealand, the non-marital fertility patterns are reminiscent of those of

![Figure 5. Non-marital fertility ratio in Danish municipalities (2007–2010).](image)

Note: The non-marital fertility ratio was derived based on the birth counts for the period 2007–2010. The scatter plot displays the non-marital fertility ratio of regions within a distance of 120 km around the city of Copenhagen by the distance to the geographical centre of the city of Copenhagen. The fitted line is a polynomial regression line obtained with a locally weighted scatterplot smoother (LOWESS) (Cleveland, 1979); the density curve in the upper-right corner provides additional information to the legend given in the lower-right corner by showing how the chosen colour categories relate to the distribution of the mapped variable.

Source: Statistics Denmark, own calculations.
Base Map: Dansk Center for Byhistorie (2008); MPIDR (2014a), partly based on EuroGeographics for the administrative boundaries.
classical spatial distribution models, such as the land use model suggested by Thünen (1826) or the city model by Burgess (1925): i.e., the non-marital fertility levels seem to vary systematically with the distance to the centre of the Copenhagen metropolitan area. To show this pattern more clearly, a scatter plot has been added to the upper-right corner of Figure 5 that displays the non-marital fertility ratios for areas within a distance of 120 km around Copenhagen by the distance to the centre of the city of Copenhagen. This plot benefits from the fact that the Copenhagen metropolitan area is made up of several independent municipalities. Through these observations, a polynomial regression line was fitted using the locally weighted scatterplot smoother (LOWESS) as suggested by Cleveland (1979). This line exhibits a steep negative gradient, from the rather high non-marital fertility levels in and around the city of Copenhagen, to the substantially lower levels in the outer core and suburban belt of the metropolitan area. However, starting at a distance of around 20 km from the city centre of Copenhagen, the levels increase. At around 60 km from centre, levels similar to those in the city of Copenhagen are reached.

Around Aarhus, the second biggest Danish city, the municipalities in the suburban belt around the city again tend to have lower levels of non-marital fertility than the city of Aarhus itself or the more peripheral areas. A challenge I faced in assessing whether this pattern is specific to Denmark was the fact that most of the other countries either have not completed the transition to high non-marital fertility levels, or do not provide the kind of fine-gridded data needed to distinguish between the inner and the outer cores of large cities and their suburban belts. However, it is possible to observe that in, for example, the United Kingdom and France, the metropolitan areas of London and Paris are among the regions with the lowest non-marital fertility ratios in an intra-country comparison (see Figure 4). At least for Paris and its surrounding regions, the pattern was the exact opposite in 1910.

The low non-marital fertility levels in the outer cores of the city centres of metropolitan areas and their suburban belts are probably to some degree the result of selective migration processes. Research has shown that metropolitan areas attract people with high levels of educational attainment (Buch, Hamann, Niebuhr, & Rossen, 2014), who often have a lower propensity to have a child outside marriage (Perelli-Harris et al., 2010). The outer core of the city centre is also frequently an in-migration destination for foreigners. Members of these groups tend to have a lower tendency to give birth to a child outside marriage (see, e.g., Klüsener & Goldstein, 2014; for Germany). This may be partly because a large share of the people who migrate to Europe are from regions with more conservative social norms regarding family formation behaviour, and partly because family reunion migration is facilitated in some European countries if a couple were married (for an overview, see Wray, Agoston, & Hutton, 2014). Moreover, the social values of individuals might affect their migration decisions. For individuals who care about the traditional family formation norms which were most prominent during the Golden Age of Marriage in the 1950s and 1960s, suburbia – which tends to be associated with access to well-paying jobs in the city and comparatively low housing prices – might provide the ideal spatial context for living in accordance with these family ideals (see also Fagnani, 1991; Kulu, 2013). Meanwhile, people who favour alternative, non-traditional lifestyles, including childbearing outside marriage, might prefer to live in the city centre.
5. Conclusion

In this article, I explored the continuities and discontinuities in spatial variation in non-marital fertility across Europe over the last 100 years. Non-marital fertility has increased substantially since the temporal minimum in the Golden Age of Marriage in the 1950s and 1960s. The comparison of the spatial variation patterns in 1910 and 2007 suggests that the persistence of the past is relevant for understanding today’s spatial variation in non-marital fertility levels. This is particularly the case when we look at variation across all of Europe or at an intermediate level of spatial detail. However, the outcomes are more mixed in my analyses that are capable of carving out local deviations from these general patterns. In addition, the results indicate that the persistence of the past not only varies spatially; it also seems to fade over time.

In terms of the future pathways of between-country variation, both the theoretical considerations and the observed trends suggest that most European countries will converge at rather high levels of non-marital fertility. The European integration process may be expected to contribute to this convergence, as it tends to promote the harmonisation of family legislation and the elimination of any remaining legal discrimination of children born outside marriage. However, the non-EU part of Eastern Europe might constitute an outlier in this convergence trend, as it is currently the only European region that has declining non-marital fertility ratios. This development reflects a reactionary trend in the non-EU former Soviet republics: in these countries, religiosity has been rising and many people appear to be rejecting a wide range of family formation behaviours that are not in line with traditional norms. Another group of potential outliers might be the European countries with a Muslim tradition, as non-marital fertility levels in these countries have so far been very low – with the exception of the statistical artefact in Kosovo, which was discussed above. Thus, a dichotomy in non-marital fertility levels might emerge between the non-EU countries with Orthodox Christian or Muslim traditions on the one hand, and the rest of Europe on the other. However, it is also likely that different levels will continue to exist between EU countries even after they have completed the transition. For example, in Finland the process levelled off in the early 2000s at a non-marital fertility ratio of around 40%, while in France the transition is not yet complete, but is currently at a level of 56% (see Appendix 1). Within countries, it seems that in the future the outer cores and suburban belts of big metropolitan areas might become the last strongholds of marital fertility. Tendencies in this direction are already visible in a number of countries in Northwestern Europe, including in Denmark, as was shown in this paper.

Disclosure statement

No potential conflict of interest was reported by the author.

Notes

1. See Hägerstrand (1965) and González-Bailón and Murphy (2013) for general considerations.
2. Since 2011, Denmark has again registered an increase in the non-marital fertility ratio (see Appendix 1). However, this has no impact on my analysis of the spatial non-marital fertility pattern as I focus on the period 2007–2010.
3. In 1895, for example, the share of births in Austrian Galicia that were outside marriage was 78.92% among the Jewish population, but just 12.98% among the non-Jewish population (Nathansohn, 1910; cited by Lowenstein, 1994, p. 170).
4. See Klüsener et al. (2014) for detailed source information.
5. The shapefiles and the data are available on the following webpage: http://www.demogr.mpg.de/de/ausbildungkarriere/was_ist_demografie_1908/kinder JA_ehe_nein_daten_3010/default.htm.
6. At either the NUTS-2 or the NUTS-3 level, depending on which division is historically and/or politically more meaningful (see Klüsener et al., 2013, for details).
7. Klüsener et al. (2013) used the same approach to derive the data-set for the period 1960–2007.
8. However, in the 1910 file the geographic detail varies to some degree across countries. Thus, the estimates are better for some parts of Europe than for others. I will come back to this issue in the presentation of the results.
9. Details will be given when the results are presented.
10. The spatial distances between regions are derived by calculating the spherical distances between the regional geographical centroids.
11. The Gaussian-shaped weighting function is in the GWmodel package specified as a continuous weighting function, which implies that observations beyond the bandwidth are also included. Thus, the bandwidth choice just affects the shape of the weighting function. This property of the Gaussian-shaped weighting function contributes to make the outcomes less localised.
12. For details on the weighting functions, see Gollini, Lu, Charlton, Brunsdon, and Harris (2014).
13. The latter has been included in the Central-Western Europe region, as its territories became part of the Federal Republic of Germany in 1990.
14. The numbers for Russia cover all of Russia, including the Asian part.
15. See also the annotations to Figure 1. National-level trends can be obtained from Appendix 1.
16. When I point in this paper to the temporal coincidence of legislative reforms and trend changes in non-marital fertility in specific countries, this does not imply that the trend changes are caused by these legislative reforms. Causality can also exist in the opposite direction, as shifts in family formation strategies can lead to the adoption of legislation that conforms to the newly emerging patterns of behaviour.
17. Interestingly, in France as well the increase in non-marital fertility gained momentum in the 1970s after a substantial support scheme for single mothers had been introduced (Knijn, Martin, & Millar, 2007). However, unlike the GDR and the Austrian governments, the French government did not later enact legislation designed to limit the increases in non-marital fertility.
18. As including the boundaries of the regions in the maps shown in Figure 2 and Figure 3 would have substantially affected their readability, I decided to display in the maps only the country boundaries, and to include maps with the regional boundaries in Appendices 2 and 3.
19. See annotations to Table 1 for additional details.
20. The log-transformation accounts for the fact that the 1910 data are positively skewed. Using this transformation allows me to take the same categorisation (standard deviation categorisation centred on the mean) for the 1910 and 2007 maps in order to carve out variation in terms of the rank in 1910 that will be considered by Spearman’s rank order correlation coefficient.
21. The estimation of non-marital fertility levels in 1910 for the time-constant regions in those areas that already belonged to Romania in 1910 was limited by the fact that the available data for the source regions only allowed me to distinguish between Bucharest and the rest of the country. Thus, the rather homogenous 1910 estimates in southern and eastern Romania are an artefact of this limitation. However, as the discontinuity in the trend patterns is mainly driven by the developments in Bulgaria, this should not affect the general outcomes of the Geographically Weighted correlation analysis for this Southeastern European area.
22. Salles (2006) argued in a similar vein with regard to the German Democratic Republic.
23. France also belonged to this group of forerunners, even though it was predominantly Catholic. This pattern is linked to early secularisation trends resulting from the French Revolution (Lesthaeghe & Neels, 2002).
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Appendix 1. Long-term trends in the non-marital fertility ratio for European countries and regions

![Non-marital fertility ratio trends](image)

- Iceland
- Norway
- Sweden
- Denmark
- Finland

![Non-marital fertility ratio trends](image)

- France
- Belgium
- Scotland
- United Kingdom
- England and Wales
- Netherlands
- Northern Ireland
- Luxembourg
- Ireland
- Ireland (pre-1922)
Note: Lines represent countries and subnational regions in the existing boundaries of the specific times. For historical periods, in which boundaries differed significantly from present-day boundaries, separate lines are drawn. For some of the historical data it was not clearly stated in the source whether the data cover live births only, or all births including stillbirths. The data for Austria (Cisleithania) refer until 1855 to the period 1 November of preceding year – 31 October; the data for Bavaria refer until 1870 to the period 1 October of preceding year – 30 September. Russian Empire (European part) includes the European part of the Russian Empire without the Kingdom of Poland and the Grand Duchy of Finland.

Source: Statistical offices; Eurostat; UN statistical yearbooks; publications of the Office Permanent de l’Institut International de Statistique; SGF (1907); Flora et al. (1987); Decroly and Vanlaer (1991); Council of Europe (2005); Klüsener et al. (2014); INED (2015); UCB and MPIDR (2015), own calculations.
Appendix 2. Administrative boundaries 2007

Base Map: MPIDR (2014a), partly based on EuroGeographics for the administrative boundaries; GADM (2012).
Appendix 3. Administrative boundaries 1910

Base Map: MPIDR (2014a, 2014b, 2014c), partly based on EuroGeographics for the administrative boundaries; National Historical GIS projects (see also the ‘GIS data’ section in the references for details).
Appendix 4. Time-constant boundaries 1910–2007

Note: The reduced sample used in the correlation analysis excludes the regions that are highlighted with shadowlines.
Base Map: MPIDR (2014a, 2014b, 2014c), partly based on EuroGeographics for the administrative boundaries.