

Continuity and change in spatial patterns in UK fertility: the case of London

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Much of the previous research on fertility patterns has focused on between country variation, especially when thinking about fertility variation in the last 20 years or so. Less attention has been paid to regional variation but this seems to be changing, with improved data sources and computing power and the emergence of spatial demography and spatial perspectives on demographic processes (Campisi et al. 2020; Guilmoto and Rajan 2001; Vitali and Billari 2017). However this is still generally framed in terms of urban and regional contrasts. Few studies have examined fertility variations across the urban spectrum or within a single city. In this paper, our aim is to move from cross-country and subnational approaches to understand local variation in fertility in one of the largest cities in Europe. We will examine and compare spatial patterns in fertility in London in the early 20th century with those 100 years later. What factors shaped the local variation in fertility? Do we see persistence in geography over time?

London has always been the most important centre of social, political and economic life in Britain. During the 19th century the city mushroomed to become the largest metropolis in Europe (Lees and Lees 2007). Over time the dominance of London has continued, with the UK often being presented as an increasingly divided dichotomy: London and ‘the rest’ (Dorling and Thomas 2004). Marks (1996), fittingly described London as a ‘mosaic of communities within a geographical region’, where the social, economic and ethnic composition of the population has probably never been homogeneous. These aspects of London make the city perfect for the study of sub-national fertility variations within a single urban environment that capture a full variety and complexity of experiences.

Our analysis of fertility patterns in London focuses on four different time points – two years in early 20th century and another two years a century later. Our rationale for choosing years 1901 and 1911 is that by then England and Wales, including London, were in the middle of the fertility decline that had started a few decades earlier (in the 1880s). 1901 and 1911 fall exactly a century before the more recent dates of 2001 and 2011, allowing a study of the persistence or discontinuities in local variation in fertility in one of the largest cities in Europe. Lack of available data for intervening dates means we can’t look at the spatial evolution over a continuous period. Rather the four years offer us glimpses into the changes in levels and spatial patterns of fertility in London over the past century or more.

Data and methods

Our main data sources for this study are the 1901, 1911, 2001 and 2011 censuses for England and Wales and the published reports on vital statistics surrounding the census years. For the early 20th century, we combine birth statistics from the Annual Reports of the Registrar General with the individual-level census data from an enhanced version of the Integrated Census

Microdata (I-CeM) project (Schürer and Higgs 2014).¹ For 2001 and 2011, we use aggregate-level published vital and census statistics provided by the Office of National Statistics (ONS) and Greater London Authority (GLA)².

The overall growth of London and the considerable changes in administrative geography over the last 120 years mean that it is not possible to achieve spatial consistency over time. Instead we have opted to use the finest spatial detail possible in London in both the historical and more contemporary context, as this allows consideration of spatial variation in London using the extent and granularity which is meaningful at each date. In 1901 and 1911 we use information at the registration sub-district (RSD) level. In 1901, London was divided into 114 RSDs that were combined into 29 registration districts (RDs). After numerous boundary changes in the following 10 years, in 1911 London had 100 RSDs in 30 RDs.³ For the 21st century, we use data at the ward level with 624 geographical units within 33 boroughs in both 2001 and 2011.

Our analysis of local variation in fertility uses the general fertility rate (GFR), the number of live births per 1,000 women aged 15–44, as the main measure of fertility. Previous research has often used the total fertility rate (TFR) as the main fertility indicator, but this measure is not available for contemporary London wards. These indicators measure fertility behaviour in slightly different ways, however the overall trends in England follow very similar patterns.

To consider the determinants of local variation in fertility in a metropolitan area, our modelling strategy is to estimate separate stepwise OLS regression models for each year of the analysis. Due to the limitations of applying OLS models to inherently spatial data, we also experiment with spatial regression specifications which explicitly consider the spatial relationships between different neighbouring geographical units of interest, in our case RSDs and wards. We consider how local living conditions as well as demographic, socio-economic and cultural factors determined local variations in London fertility.

Preliminary results

Figure 1 shows the spatial patterns of GFRs by RSDs and wards. First of all, the maps clearly indicate the drastic transformation of the areal extent of London over the past century. The city has more than doubled in size, meaning that the RSDs in 1901 and 1911 only covered the area of contemporary Inner London boroughs.⁴ This makes it difficult to make exact comparisons which hold geography consistent over time. However, there was a clear East-West pattern in historical London. We can observe higher levels of fertility in London's East End but also south of the river Thames in 1901 and 1911. Interestingly, the West End (Mayfair, Paddington and Kensington) was already experiencing very low levels of fertility in the early 20th century,

¹ Improvements to this enhanced version of I-CeM (I-CeM.2), produced by the members of the Fertility Atlas project and other members of the Cambridge Group for the History of Population and Social Structure, together with Kevin Schürer, mean that individuals are more accurately allocated to RSDs (Schürer et al. 2016).

² Ward atlas dataset was downloaded on July 29th, 2020 on London Datastore (<https://data.london.gov.uk/dataset/ward-profiles-and-atlas>).

³ Due to missing information we have had to exclude two registration sub-districts from the analysis: St. Mary, Marylebone in 1901 and 1911, and St. Luke, Holborn in 1911.

⁴ City of London, Camden, Greenwich, Hackney, Hammersmith and Fulham, Islington, Kensington, Lambeth, Lewisham, Southwark, Tower Hamlets, Wandsworth, Westminster.

similar to the values common in the later period. By 2001 and 2011, the spatial patterns of fertility in London appear less clear. The local variation in fertility rates within London wards is particularly low in 2001. Interestingly, the areas that continue to exhibit the lowest fertility remain the same as the century before – in Mayfair, Marylebone and Paddington (now Bloomsbury, the West End, Belgravia and King’s Cross). Increasing fertility in Outer London boroughs between 2001 and 2011 means that for 2011 we can observe higher levels of fertility in pockets of north London (Enfield), the very west of London (Hounslow) and again in the eastern part of the city (Hackney). However, the areas of higher GFRs in east London have shifted considerably further east from the City of London than was seen in historical London (to Barking and Dagenham).

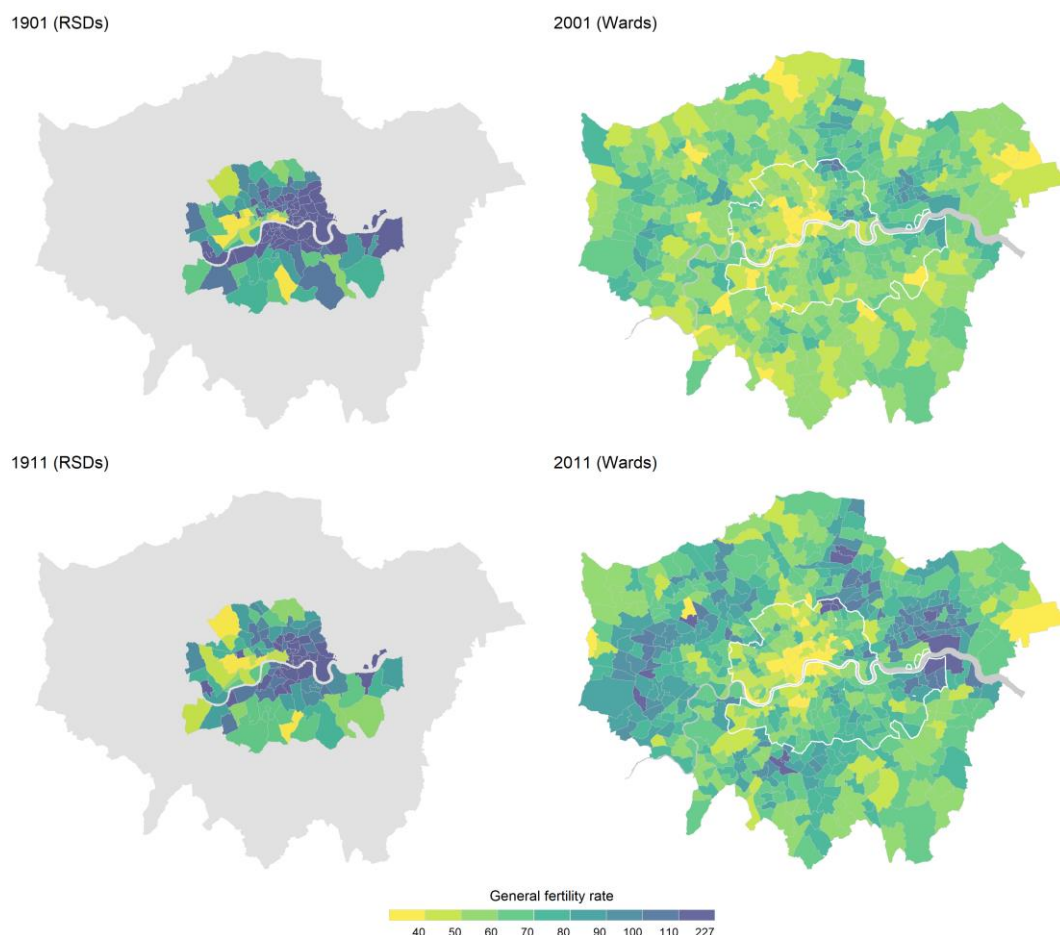


Figure 1. Local variation of general fertility rate (GFR) in London, 1901–2011
Source: Registrar General’s Census and Annual Reports, ICeM, GLA, own calculations.
Base Maps: Day 2016, Statistical GIS Boundary Files for London.

Our preliminary modelling results indicate that population density in London has a positive relationship with local fertility – more densely populated districts had higher fertility. This finding is contrary to much of the previous literature on regional fertility variation that has focused on urban-rural differences and highlighted a consistently negative relationship between

population density and fertility. It is clear that this negative relationship might not hold in a highly urbanized context where every region is already densely populated.

We also find that a higher share of elementary occupations, foreign born population and married women in the district or ward is associated with higher fertility in both historical and contemporary context. However, some of the variables included in the models have curvilinear (quadratic) relationships with GFR.

Our spatial regression approach applies spatial lag models. Those models include an additional explanatory variable, capturing the values of the GFRs of the surrounding areas of each district or ward. The preliminary results show that in all years there is considerable spatial dependence in levels of fertility between neighbouring areas, in other words an increase in GFR in one sub-district or ward is strongly associated with an increase in fertility in a neighbouring area.

Our full paper will compare in more detail the correlates of fertility differences in the late nineteenth and the early twenty-first centuries. It will reflect on the challenges of comparative work over such a long time period, considering factors such as whether variables used to represent the influences on fertility are really capturing the same thing at different time points, and the extent to which the scale of measurement affects results.

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