**Macro-Micro interactions in fertility transitions: Differential responses in first birth behaviour to economic recession in the United Kingdom**

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The association between fertility and economic wellbeing is well established in demography. For example the Great Depression and subsequent drop in living standards in the 1930s was associated with a fall in fertility to well below replacement level. The effect of the post 2008 Great Recession, although also associated with falling living standards, is not as clear cut for a number of reasons. Fertility among women in the United Kingdom had been on an upward trend prior to the economic downturn. This mirrored overall high fertility preferences, which have been consistently above replacement level (Eurobarometer 2013)- although these ideals are rarely achieved, with considerable variation depending on individual characteristics (Berrington 2004). Further, increasing diversity in partnership and fertility patterns within the United Kingdom as well as across Europe means that responses to economic hardship are also likely to vary. The aim of this analysis therefore is to establish variation in the fertility responses between different sub-groups within the population, focussing on different socio-economic groups within the United Kingdom. This extends existing work, which has noted a fertility response to the Great Recession even with the limited time series available since 2008, but has either focussed on macro-level indicators (e.g. Goldstein *et al.* 2013), or assumed homogenous effects where individual level data have been analysed. In particular, we focus on the transition to first birth, since this birth represents a major transition in women's lives, and tends to alter most drastically in response to exogenous influences and have been shown to respond most dramatically to economic instability (e.g. Witte and Wagner 1995).

Previous analysis has concentrated on aggregate measures, and hence struggles to determine whether the response in fertility was due to individuals responding to macro-economic shocks- women delaying fertility due to anticipated future economic stress- or due to the cumulative incidence of adverse economic circumstances at individual level- such as entry into spells of unemployment. Moreover, while *prima facie* evidence is that the effect of economic recession is to depress population level period fertility rates, there is some evidence that the emergence of counter cyclical fertility patterns (Butz and Ward 1979) may hold when examining individual level data, since involuntary unemployment (particularly for women) may accelerate planned fertility preferences, due to the removal of constrains such as opportunity costs or difficulties in the combination of labour market and family roles (Brewster and Rindfuss 2000). Therefore, in determining the fertility response to economic recession, it is vital that the macro-micro relationship is correctly specified.

This paper will therefore examine the changes in fertility behaviour since the Great Recession, and disentangle the relative effect of contextual and individual economic uncertainty, recognising that the responses of individuals may depend very much on their circumstances. In particular, we focus on younger cohorts (post 1980) since these are an under-explored age group in the context and fertility (much demographic literature concentrates on 1970 birth cohort data) and also most sensitive to external economic shocks due to the preponderance of first birth transitions for these women (Witte and Wagner 1995). We extend previous work examining the correspondence between fertility preferences (e.g. Berrington 2004) and fertility outcomes by incorporating economic indicators at both macro (incidence of 2008 crash) and micro-level (e.g. unemployment). Recognising that the fertility behaviour will correspond more closely to preferences among certain

groups than others (Berrington 2004), we allow this relationship to vary by different socio-economic groupings determined by Latent Class Analysis. We are able to measure the correspondence of fertility preferences to fertility outcomes using data from the British Household Panel Survey and Understanding society surveys, which collected information for a number of waves preceding recession. The longitudinal nature of these surveys means that we can model accurately how quickly women achieve their stated fertility desires, and the extent to which macro-level trends influence this rapidity (via discontinuity analysis as well as contextual economic indicators) compared to individual level effects, such as social class and time varying influences (such as unemployment).

**Data**

Data are drawn from the combined British Household Panel Survey (BHPS) and Understanding Society longitudinal data series. The BHPS is a nationally representative household based survey which captured information from 10300 individuals in 1991, who have been followed in yearly waves since, with boost samples from Wales and Scotland, and Northern Ireland added in 1999 and 2001 respectively. In 2009, the BHPS was replaced by Understanding Society, an expanded survey of 40000 households. BHPS members were invited to join Understanding Society, and entered the survey in Understanding Society Wave 2 (2010/2011). Thus, the combination of the surveys gives a large nationally representative longitudinal series of 20 years. Fertility intention information was collected in waves B (1992), K (2002), L (2003), M (2004) and Q (2008) of the BHPS. By linking the BHPS sample with the Understanding society dataset, we are therefor able to link the fertility preferences of these years with a relatively long series of the incidence of fertility. In this manner, we are able to extend previous analyses, e.g. Berrington 2004, which have examined the correspondence between fertility preferences and fertility outcomes. A major advantage of the BHPS/US dataset is that we are able to track individuals through all of the years of the survey. This is of particular advantage when determining the differential effects of macro (i.e. incidence of recession) and individual levels influences on fertility. For instance, the BHPS and US include information pertaining to individual employment activity, and receipt of benefits and household income. We are thus able to examine the effect of individual economic trauma- for example unemployment- to determine the extent to which individual circumstances influence fertility behaviour, and obtain net influences at both macro and micro-level.

We select a sample relevant to our research question. We choose young women, focussing on those born in 1980-84, 1985-89 and 1990 and later.  This means we are able to analyse women who are largely having their first birth, and hence will be experiencing a transition which is liable to be most affected by external economic conditions. To ensure that we have a long enough time series for fertility outcome and also include data on fertility preferences, we restrict data in the Understanding Society survey to those respondents who were also present in the BHPS (some 6000 cases).

**Method and modelling strategy**

As noted already, a fundamental aim of this paper is to correctly model the relationship between macro and micro level pressures of fertility. Broadly speaking we aim to replicate the approach of Berrington (2004) in analysing the correspondence between fertility preferences and fertility outcomes. We take the fertility preferences in wave M as an index year, and compute cumulative hazard rates of first birth conditioning on a desire for more children among nulliparous women. The

wave is chosen since it afford a long time enough time series to include post 2008 recession fertility occurrences, whilst still providing relevant information to early motherhood transitions.

We extend this analysis to incorporate both micro and macro level sources of variation.  Micro-level variation is captured in two ways. Principally, we divide women into different socio-economic strata using economic data available from survey wave M (i.e. prior to their fertility outcomes). We achieve this using Latent Class Analysis across a number of economic domains, including income based measures but also including other measures of disadvantage relevant to the UK such as housing tenancy and measures of labour force disengagement.  This has the advantage of being able to explore different effects across different dimensions of socio-economic disadvantage- for instance we are able to identify risk inconsistencies such as high educational attainment but low income. We calculate differing hazard profile for each Latent Class, to accommodate differential fertility behaviour. Secondly, we include time varying indicators of economic stress at an individual level, such as the loss of employment for the respondent (or other household member) or reduced income (either benefits or usual weekly income). We are able to achieve this accurately due to the person centred longitudinal nature of our dataset. Similar accuracy extends to relevant control variables which may influence the probability of childbearing e.g. union status.

The macro level effect of economic recession in handled primarily through the use of discontinuity analysis. The 2008 crash is a good candidate for discontinuity analysis since the incidence was broadly speaking unpredictable, and hence fits well with the criterion of a random discontinuity required to avoid contamination by anticipatory effects. This is included as a time varying covariate when analysing the hazard of first birth. Clearly for different birth cohorts, the onset of the Great Recession will occur at different ages within the time series.  We allow the effect of the discontinuity to vary between the latent classes at the individual level to capture differential effects of recession of different groups. We allow our model to include other significant macro-economic indicators, primarily the GDP growth rate and unemployment rate, to reflect changing economic circumstances even after the initial crash.

**Preliminary results**

Figure 1 presents smoothed age specific first birth rates for 5 year birth cohort. In general there is a fall in the overall cohort first birth rate, indicating a fall in the fertility (although later cohorts are censored by the final survey date, and as such recuperation cannot be observed at older ages. Of relevance to this study however, is the increased diversity of the fertility in the early 20s. All pre 1980s birth cohorts exhibit relatively homogenous patterns during the early 20s, with roughly comparable fertility rates before age 22. However, for birth cohorts 1980-84, 1985-89 and post-1990, the pattern of early fertility varies considerably. Whilst there is a slight elevation in the level of teen fertility for the 1980-84 cohort, in general these cohort exhibit considerably lower fertility in the early parts of their lives than older cohorts. This effect is particularly marked for the post-1990 birth cohort, where teenage births correspond directly with post-2008 economic trauma.

We examined the effect of economic recession at a macro level thorough the discontinuity analysis presented in Table 1. Note that this model is preliminary, and is intended to test only whether there is a discontinuity of the overall fertility level post-2008. In this case, the knot point for the discontinuation is specified such that the 2007 survey is considered to be pre-recession and the 2008 survey post-recession. Overall, there is an improvement in model fit after the addition of a

discontinuity, albeit significant only at the 5% level. This indicates that there is weak evidence of a changing trajectory of fertility in the post-recessional era.

*Figure 1: Smoothed Age-specific fertility rates by 5 year birth cohort*
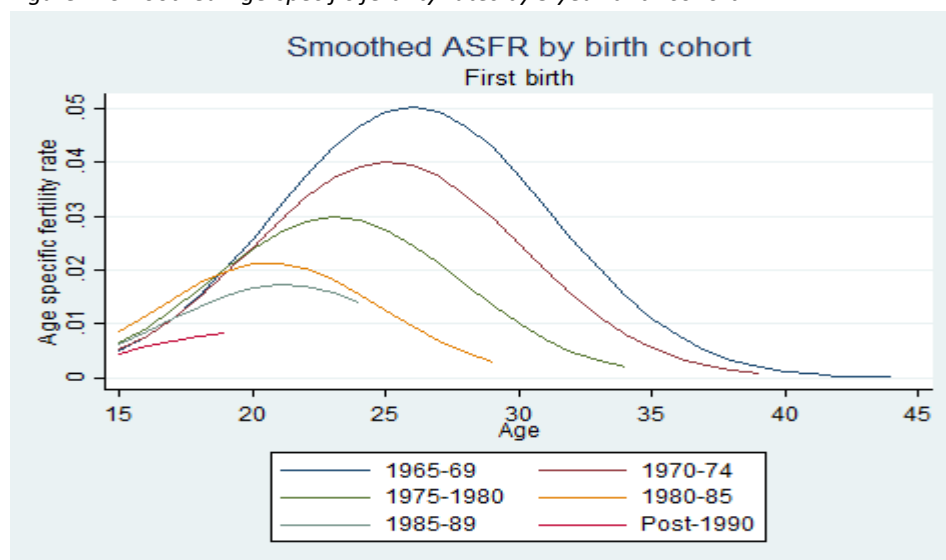


*Source: Authors' analysis of BHPS consistent sample, Understanding Society Wave 2*

*Table 1: Regression model testing overall significance of discontinuity in fertility series*

| Parameter | Model 1: No discontinuity | Model 2: Discontinuity |
|---|---|---|
| Constant | -7.19 | -7.29 |
| | | |
| Year | 0.33 (0.03) | 0.05 (0.03) |
| Year$^2$ | -0.01 (0.00) | -0.02 (0.00) |
| | | |
| Post-2008 (ref= No) | - | 0.62 (0.42) |
| Post-2008 x Year | - | -0.09 (0.08) |
| Post-2008 x Year$^2$ | - | 0.01 (0.00) |
| | | |
| $\Delta - 2LogLikelihood$ (3 df) | | 11.02, p=0.01 |

*Source: Authors' analysis of BHPS consistent sample, Understanding society wave 2*

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