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Income, welfare, housing and the transition to higher order births in the UK

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ABSTRACT

The UK shows relatively high levels of progression to higher order birth compared to the rest of Europe. A number of explanations have been put forward to explain these patterns, including the way in which social assistance is strongly means-tested and targeted at low-income parents within the UK's liberal welfare system. It is not possible, given the recent policy context and with the available data, to identify causal associations between particular welfare policies and fertility outcomes. The aim of this paper is instead to identify the individual-level associations between household income, receipt of welfare benefits, housing, and the probability of progression to a second, third and fourth birth. We use nationally representative household panel data representative of the UK population between 2009 and 2014. Our findings highlight how the woman's age strongly mediates relationships between socio-economic status and progression to further births, highlighting the importance of the social polarisation in the timing of entry into motherhood for our understanding of socio-economic gradients in completed family size. Net of the woman's age and other controls, a positive relationship between income and progression to second and third birth emerges. Receipt of high levels of child tax credit is associated with an increased risk of third birth, but not fourth birth, whilst living in social housing shows a strong, positive association with both third and fourth birth.

KEYWORDS

EDITORIAL NOTE

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INCOME, WELFARE, HOUSING AND THE TRANSITION TO HIGHER ORDER BIRTHS IN THE UK

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1. INTRODUCTION

In liberal welfare regimes including the US, Australia and the UK, childbearing patterns are strongly differentiated by socioeconomic status; disadvantaged women enter parenthood earlier and have larger completed family sizes (Baughman and Dickert-Conlin, 2009; McDonald and Kippen, 2009; Schmitt, 2012; Balbo et al., 2013; Berrington et al., 2015). Explanations for this 'reproductive polarization' (Schulze and Tyrell, 2002) include the lack of focus in liberal welfare regimes on polices aimed at helping women combine childbearing with paid work, especially more educated women with greater opportunity costs (Sigle-Rushton, 2008; Balbo et al., 2013). Additionally, because welfare provision in the Anglo-Saxon countries is strongly means-tested, the cost associated with raising children is offset to different degrees dependent on income levels. Thus some scholars have suggested that welfare provision may encourage early childbearing, and larger families among those less well-off (Rendall et al., 2009; Balbo et al., 2013).

This paper contributes to our understanding of whether income, receipt of welfare benefits and social housing are associated with transition to higher order births, using the UK as a case study. High rates of progression to second, third and fourth birth are a key contributor to the UK's above European average completed family size (Wood et al., 2014; Sigle, 2016). The relative generosity of the UK welfare state for low income families has been previously identified by scholars as a reason why poorer couples tend to enter parenthood at an earlier age , and have more children (Rendall and Smallwood, 2003; Sigle, 2016). A pervasive discourse assumes a U-shaped distribution whereby large families are assumed to be found among "the poor" and the "very well off". This quote from the Daily Telegraph (08 July 2015) is typical: "There are only two groups of people in this country who get to choose how many children they have without worrying about the costs of raising them: the very rich, and the very poor"(The Telegraph, 2015). Priority access to state-supported housing for families with dependent children has also been held responsible by commentators and politicians for relatively high levels of teenage parenthood in the UK since the early 1990s (Selman, 2003; Mason, 2013)[1]. Despite these strong claims, there is very little empirical research

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[1] Though little evidence has been found to suggest that British teenagers intentionally become pregnant to access social housing (Ellis-Sloan, 2014).

on the way in which welfare policies are related to childbearing in the UK, with Brewer et al's (2012) assessment of the impact of the introduction of child tax credits being the most recent. In fact, in our view, it is not possible, given the recent policy context and with the available data, to identify causal associations between particular welfare policies and fertility outcomes in the UK in recent years. The aim in this paper is more modest – to investigate, at an individual level, the extent to which household income, receipt of welfare benefits and housing tenure are associated with the social polarisation in transitions to higher parities among UK women. We focus on mothers, as the determinants of higher order births are different from those influencing first births (Fiori et al., 2014). We are interested in how receipt of welfare via child allowances (which is dependent on already being a parent) and living social housing (which is uncommon among those yet to become parents) relate to ongoing fertility. Our key explanatory variables are therefore wholly or partially irrelevant to the transition to first birth. We do not attempt to evaluate the causal impact of welfare provision and housing on fertility, since our findings are based on observational data and we do not have an appropriate instrument (e.g. a recent policy change or regional differences in policy implementation), but our findings provide important new insight into the social polarisation of childbearing in Britain.

2. THEORETICAL BACKGROUND AND PREVIOUS RESEARCH

2.1. INCOME

According to the New Home Economics (NHE) framework (Becker, 1981) higher income increases demand for children, implying a positive association between income and fertility. However, evidence suggests an inconsistent association (Balbo et al., 2013), generally explained by a counteracting 'price effect', whereby higher earning women face higher opportunity costs from taking time out of the labour market to undertake family care (Willis, 1973; Sobotka et al., 2011). Opportunity costs may be mitigated however, by paid domestic help (or a partner's similarly high income) for high-earning women (Kravdal, 1994), or via access to subsidized childcare for low income women. Prior research has tended to focus on the impact of women's earnings or education as a proxy for earning potential and on the timing of entry into motherhood, with somewhat inconsistent findings (Kravdal, 1994; Kreyenfeld, 2004;

Kravdal and Rindfuss, 2008; Andersson et al., 2014). Associations between income and subsequent parity progression are more complex due to issues surrounding the selection of high income women into motherhood, but the relationship between income and higher order births appears weaker than for first births (Andersson, 2000; Vikat, 2004; Rondinelli et al., 2010; Andersson et al., 2014). High income parents may prefer to invest in fewer 'higher cost' children, thus fertility would not necessarily increase with income (Becker and Lewis, 1973).

Preferences for child investment are also discussed in social theory. Referencing the observed 'U'-shaped association between income and family size in France, Bourdieu (1984) argues that couples in routine occupations whose opportunities to accumulate economic and cultural capital are limited, prioritise social capital, and hence tend to have larger families. Middle-earners prioritise cultural capital, limiting their family size to achieve social mobility. High-income families with the economic resources to invest in cultural capital do not have the same restrictions on family size. According to both of these frameworks, we expect a 'U-shaped' association between income and fertility as people with increased income tend to 'invest' more in fewer children until they reach a certain income threshold where they are able to achieve both 'quality' and quantity.

2.2.   WELFARE AND HOUSING

State provision of welfare support for parents includes direct cash transfers, assistance with childcare costs and measures to ensure availability and affordability of housing. Policies may have an explicit pronatalist aim, or indirectly promote childbearing via, for example, facilitating work-life balance or offsetting childcare costs. In a recent review, Thevenon and Gauthier (2011) conclude that financial benefits show more impact on timing of births than on completed fertility, while state support that facilitates work/family balance has a greater influence on the transition to first birth. Research in the liberal welfare context of the US suggests that welfare reform has had rather limited impact on childbearing behaviour (Kearney, 2004; Hao et al., 2007; Baughman and Dickert-Conlin, 2009). Although much research examining the impact of welfare provision on fertility focuses on entry into parenthood, available evidence from France (Breton et al., 2005; Laroque and Salanié, 2014) and Austria (Hoem et al., 2001)

suggests that a positive relationship can also be observed for higher order parity transitions.

Housing is an important component of welfare state systems, and the extent to which governments intervene in the provision, access and affordability of housing varies cross-nationally. Housing transitions are reciprocally related to parenthood (Clark, 2012; Öst, 2012; Kulu and Steele, 2013): people may make changes in the tenure and size of their housing to adjust to the current or anticipated size of their family (Kulu and Vikat, 2007; Ermisch and Steele, 2016); whilst housing costs, especially of home ownership, compete with the costs of raising children (Murphy and Sullivan, 1985). The mechanisms underlying the relationship between housing and childbearing vary by context, particularly the access to mortgages and social norms regarding home-ownership (Mulder and Billari, 2010; Vignoli et al., 2013). Despite some research investigating home ownership and fertility, less is known about the relationship of family formation to private renting or social rented housing – both common in the UK.

2.3.   UK WELFARE POLICY CONTEXT

Social assistance in the UK is strongly means-tested and targeted at low-income parents (Van Lancker et al., 2015). Child tax credit, a child allowance for those on low income, is of key importance due to its extent and potential pronatalist effect. The number of children for whom parents can receive child tax credit is currently unlimited and the value remains the same for each subsequent child, although tapers rapidly with increasing income (Table A1). In 2009-10, parents could receive up to £2,235 per year for each child, rising to £2,750 by 2014-15. Past research on state support for childbearing in the UK provides some evidence for a positive association with family size. Ermisch (1988) analysing the UK during the 1970s-1980s suggested that more generous child allowances increased third and fourth births. The introduction in 1999 of the Working Families' Tax Credit (the precursor to the current Child Tax Credit) was also found to have a small positive effect among low income women (Brewer et al., 2012). We therefore expect receipt of child tax credit to be positively associated with transitions to higher order births.

In the UK, the means-tested approach to welfare continues in relation to social housing, provided at affordable rents, targeted towards those most in need. Criteria for prioritization include the presence of dependent children (DCLG, 2012). Social housing provides security of tenure with (until very recently) lifetime tenancies (DCLG, 2016). Since the 1980s, the social housing sector has contracted and become marginalised as a safety net (Fitzpatrick and Pawson, 2007; Lupton et al., 2009). Owner-occupation remains out of reach for many families for whom the private rental sector remains the only option (Rugg and Quilgars, 2015; Coulter, 2016). Unlike social housing, and in contrast to the regulated, stable and high-quality private rented housing in countries such as Germany (Kemp and Kofner, 2010), private rented accommodation in the UK offers minimal security of tenure and is unattractive as a setting for childbearing (Bone and O'Reilly, 2010). We therefore expect parity progression to be least common among families living in private rented accommodation, and more likely among those in either owner occupation or social housing.

2.4.   OTHER EXPLANATIONS FOR SOCIO-ECONOMIC DIFFERENTIALS IN CHILDBEARING

Social norms regarding the 'right age' for childbearing (Liefbroer and Billari, 2010) are strongly class-based in the UK (Perrier, 2013; Berrington and Pattaro, 2014). Early entry into parenthood can be an important 'meaning-making' activity (Edin and Kefalas, 2011) for women among whom other avenues such as marriage, education or career are constrained (Duncan, 2007). According to Bourdieu (1984), women from disadvantaged positions may prioritise the accumulation of social capital, and a large family becomes a form of 'distinction'. Despite effective contraceptive methods being widely available, as many as one in six pregnancies in the UK are unplanned. Since the risk of unplanned pregnancy is negatively associated with a woman's age and level of education (Wellings et al., 2013) this also contributes to the early and higher rates of childbearing among low income groups. The early entry of more disadvantaged women into motherhood indirectly contributes to differentials in completed family size due to the timing-quantum interaction whereby the likelihood of having a subsequent birth is highly associated with age at entry to parenthood (Berrington et al., 2015).

Large families in the UK have also been explained as a consequence of high levels of immigration to the UK from source regions with high fertility, including Pakistan, Bangladeshi, Nigeria and Somalia, together with continuing raised fertility among some second generation ethnic minorities (Sobotka, 2008; Robards and Berrington, 2016). However, parity progression rates to third and fourth birth have remained stable and reasonably high for UK born women (born to UK parents) (Berrington and Stone, 2017), indicating that immigration, although an important factor, is not the main driver of large families at a population level.

3. RESEARCH QUESTIONS

Surprisingly little research across Europe has looked at the relationship between receipt of welfare benefits and childbearing at the individual level. In part this is due to the need for large-scale prospective data with detailed information on income from different sources, as well other sociodemographic variables. This paper fills this gap, addressing the following research questions:

1. How are net household income, receipt of child tax credits, and housing tenure associated with the propensity for mothers to have an additional birth in the UK?
2. How does this vary by parity?

4. DATA

4.1. UK HOUSEHOLD LONGITUDINAL STUDY (UKHLS)

We use prospective data from the UKHLS, which follows over 30,000 households annually. The sample includes women aged 20-44 present in at least two consecutive waves within the first five panel waves (2009-2014). Fertility and partnership history data are used to determine respondents' parity and the presence and number of shared/non-shared children in any current partnership. Three sub-samples are identified: 3,953 women at parity 1; 4,122 women at parity 2; and 1,782 women at parity 3. Women can be present in more than one sub-sample if they make a parity transition during follow-up and become at risk for the subsequent transition. Within the UKHLS, non-response at wave 1 and between each subsequent wave was greater for young adults, men, and associated with residential moves, but was not found to be

associated with the presence of children (Lynn et al., 2012). Attrition bias is therefore unlikely to be an issue for our sample of mothers. Parity distributions among our sample are generally comparable to estimates from England and Wales vital registration for 2012 (Dorman, 2013), apart from a slight under-representation of childless women and a slight over-representation of women with one child.

5. MEASURES

5.1. DEPENDENT VARIABLE

The dependent variable indicates whether or not the woman experiences a conception that leads to a second, third or fourth birth during each person-month of observation.

5.2. KEY EXPLANATORY VARIABLES

Respondents' net monthly *household income* (from all sources, including investment income, pension income, alimony, state benefits, as well as earnings[2]) is equivalised according to household composition using the modified OECD scale and coded into quintiles. The monthly *amount of child tax credit* received by the respondent is coded into quintiles. Women receiving no child tax credit are retained as an additional

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[2] We carried out sensitivity analyses (not shown) to separate out earnings from all other types of income and include this into the model instead of and in addition to net household income. The only notable finding was that women in highly-paid part-time work appear have substantially increased odds for a fourth birth (although not statistically significant) compared with those in highly-paid full-time work. However, we note that highly-paid part-time workers are a very select group of older, highly-educated women who may represent women particularly predisposed to combining a career with family life and who have managed to successfully achieve this. This is consistent with our other findings and we do not however, feel that this non-significant finding warrants inclusion of this variable in our models as it does not contribute any substantial additional insights.

category.[3] *Housing tenure* identifies whether the respondent owns (or is buying with a mortgage) their home, rents privately, or is in the social rented sector.

These variables are inter-related - at all parities, those in the highest income quintile are most likely to be receiving no child tax credit, while those with lower household income tend receive higher amounts of child tax credit. However, the correlation is not as strong as might be anticipated since the income threshold for eligibility for child tax credit varies depending whether formal childcare is used, and the disability status of both the parents and children. Moreover, it is possible for a family to be eligible for child tax credit even with a relatively high income (see Table A1). Women in the highest income quintile are most likely to be living in owner-occupied housing and those in the lowest income quintile most likely to be in social rented housing. However, even among women in the lowest income quintile, between 8% and 12% are living in owner-occupied housing; similarly, up to 10% of women in the highest income quintile are living in social housing. Women living in owner-occupied housing tend to be in receipt of less child tax credit and those in social housing more likely to be receiving higher levels of tax credits. However, the correlation is not absolute, for example 15% of women at parity 1 and 18% of women at parity 3 are living in social housing and receiving no child tax credit.

In summary, the key explanatory variables are related but the correlations are not as strong as might be anticipated. Given the potential for collinearity our analytical strategy first examines the relation of each key explanatory variable with transition to higher parities on its own, before looking at their effect in combination.

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[3] Child tax credit are just one aspect of welfare benefits. The other main high-value component is housing benefit, the value of which is dependent up on the size of dwelling required according to strict criteria on how many rooms are needed based on household composition. Although having additional children does not directly alter the value of housing benefit, it could have an indirect effect if additional children increased the size of dwelling for which a family would be eligible. For each parity we carried out sensitivity analysis including the amount of housing benefit received in addition to or instead of the child tax credit variable. However, this did not show any significant associations or change the direction or magnitude of the other explanatory variables (including child tax credit) for any parity. This lack of association is not unexpected given that the value of housing benefit only increases if an extra bedroom is required; given that children under the age of 10 years are expected to share a room regardless of sex and that children up to 16 are expected to share if of the same sex, in many cases an additional child would not result in eligibility for a larger property. Therefore child tax credit remain the only benefit that will increase with number of children for most families.

5.3. CONTROL VARIABLES

Current age consistently shows a strong association with transitions to higher order births and completed family size in many industrialised societies (Billari and Borgoni, 2005), including the UK (Fiori et al., 2014; Berrington et al., 2015). Age is grouped into five-year age bands, 20-44 years. Women aged under 20 are excluded due to very small numbers of teen mothers at higher parities. Couples whose children are all of the *same sex* are more likely to have, or to intend to have, a third child (Gray and Evans, 2005; Mills and Begall, 2010) and thus for the transition to third and fourth birth we identify women who currently have all boys, all girls, or at least one of each sex. Increasingly childbearing takes place following the dissolution of one or more previous partnerships, and research consistently shows a higher likelihood of progression to higher order births for mothers who have *repartnered* (Jefferies et al., 2000). We include information on whether the woman's current partner has children from previous relationships, since childless partners might be particularly likely to intend to have a child (Ivanova et al., 2014).

We might also expect that the associations between our variables of interest will vary by women's *current partnership status***,** given the impact of a dual income and co-parenting on opportunity costs of childbearing, and differential responses to welfare incentives (e.g. Brewer et al 2012). Therefore, in a further analysis (results available on request) we restricted the sample to women with a co-resident partner, and included additional variables denoting joint economic activity status and joint educational status of the couple. The results for couples were much the same as those for all women and the combined couple-level variables added little further insight over and above the individual-level variables denoting education and economic activity. We therefore report only the analyses for the larger sample including unpartnered women.

To control for the potential opportunity costs of childbearing, we include details of the respondents' *employment status* and level of *educational attainment*. Women's economic activity status is coded as full-time employed, part-time employed, economically inactive and unemployed. Level of education is categorized into Degree or equivalent, Advanced (A) levels or equivalent (usually gained at age 18), GCSEs or

equivalent (usually gained at the end of secondary school at age 16), and no qualifications.

Dwelling space is based on the number of available bedrooms as reported in the survey against the 'required' number of bedrooms as defined by the current UK Government rules used in determining need (Wilson and Fears, 2016)[4].

There are important *religious* and cultural factors associated with family size, and it has been a consistent finding that those who report religious affiliation have more children than those who do not (Adsera, 2006; Frejka and Westoff, 2008; Berghammer, 2009). In the UK religion is strongly correlated with country of birth such that both variables could not be included in the analyses. In particular, women who report that they are Muslim are highly likely to be migrants from Bangladesh or Pakistan – around a third of Muslim women were first generation migrants and a quarter second generation migrants. Sensitivity analyses where country of birth was included but not religion demonstrated that those born overseas were more likely to have an additional birth. However, the effect size was not as large as that for belonging to the Catholic or Muslim religion. Although we acknowledge that cultural factors unrelated to religion may play a part in determining differential fertility by country of birth (Kulu and Hannemann, 2016), we argue that qualitatively religion is the more important variable to include, in part because it helps capture second generation migrants who were born in the UK but whose fertility behaviour may resemble more closely that of their parents' country of origin, despite some convergence (Dubuc, 2012; Kulu and Hannemann, 2016).

Finally, given the strong polarisation in fertility behaviour by parental socioeconomic background in the UK (Berrington and Pattaro, 2014), we include a measure of *socioeconomic position in childhood* based on parental occupational class when the respondent was aged 14 years. We use the three-category version of the National Statistics Socioeconomic Classification (NS-SEC) that codes occupations as

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[4] One bedroom per couple; One bedroom per person aged 21 or over not in a couple; One bedroom for every two males aged 10-20, rounded down; One bedroom for every pair of males of whom one is aged 10-20 and one is aged 0-9, if there are an odd number of males aged 10-20; One bedroom for a remaining unpaired male aged 10-20 if there are no males aged 0-9 to pair him with; Repeat steps 3-5 for females; One bedroom for every two remaining children aged 0-9 (regardless of gender), rounded up.

higher managerial/professional, intermediate or routine/manual, with additional categories of 'not working' and a small group for whom parental class is classified as 'unknown'.[5]

5.4.   ANALYTICAL STRATEGY AND MODEL FITTING

We use discrete time logistic regression hazard models to estimate the likelihood of experiencing a pregnancy (that leads to a second, third or fourth birth) in each month since the previous birth, using person-months of exposure as the unit of analysis.[6] Women are censored if they are lost to follow-up or if they have a pregnancy (leading to second, third or fourth birth). Socio-economic and background characteristics are lagged by 10 months, thus covariates are measured prior to conception. Analyses are adjusted to some extent for differential non-response and panel attrition via cross-sectional weights for each panel wave.

We model the binary response y_{it}, which indicates for each interval t whether or not the ith individual has a conception leading to a birth between month t-1 and month t, given that they did not have a birth during a previous interval

$$h_{it} = \Pr(y_{it} = 1 \mid y_{is} = 0, s < t),$$

This is the usual response for a binary variable and hence can be modelled using a discrete time logistic regression hazards model (Allison 1982) of the form

$$\text{logit}(h_{it}) = \alpha(t) + \underline{x}_{it}^{T} \underline{\beta}$$

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[5] This is a relatively disadvantaged group who show similar characteristics to the group with no working parents at age 14 years; for example in the third birth sample, compared with those whose parents had higher managerial or professional occupations women in the 'unknown' parental occupational class group are more likely to report no qualifications (18% versus 2%), to be in the lowest quintile of household income (29% versus 12%) and to be living in social rented housing (43% versus 10%).

[6] Using this approach, we are only able to observe the key explanatory variables from the point at which women enter the survey and not from the point at which they have their previous birth, i.e. there is left censoring of the sample. We therefore carried out sensitivity analyses of the transition to higher order births among a sub-group of women for whom we have covariate information for the whole period since their previous birth, i.e. where their previous birth is observed within the panel. Although we were only able to run these analysis for the transition to second birth due to small numbers of higher parity transitions within the panel, we found that the results were broadly similar for the two samples. We are therefore reassured that left-censoring is not substantially biasing our results.

$\underline{x}_{it}^{T}$ is a vector of fixed and time-varying covariates, which are measured either at the start of each one-year period during which a birth can occur.

$\alpha(t)$ is the baseline logit hazard and is specified as a categorical variable indicating months since previous birth.

We account for survey design based clustering within primary sampling unit (postcode sectors) using the svy estimators in STATA.

Previous research suggests modelling parity transitions simultaneously to account for unmeasured characteristics influencing women's reproductive behaviour (Kravdal, 2001; Fiori et al., 2014). By modelling the transitions separately the results need to be interpreted in terms of the selection in to the risk set for each subsequent transition. However, we prefer to model the births separately since our research questions are only relevant to mothers. Moreover previous research for the UK has shown that associations between socioeconomic factors and higher order births remain unchanged by controlling for selection into motherhood (Fiori et al., 2014).

To answer our research questions, we begin by examining the unadjusted associations between income, child tax credit receipt, housing tenure and progression to second, third or fourth birth. We then estimate the association between the key explanatory variables and having an additional birth in a series of regression models adjusted for the control variables described in the previous section. Given the potential collinearity between the three key explanatory variables noted above, we first estimate the association between each of the three variables and the transition to second, third or fourth birth, including all control variables but not the other two key explanatory variables. We then estimate a fully adjusted model including all control variables and all three key explanatory variables.

Issues of rescaling can complicate the interpretation of nested models when using logistic regression (Mood, 2010). We therefore carried out a series of sensitivity analyses using the KHB method (Kohler et al., 2011) to adjust for rescaling. Appendix Tables A2-A4 show a comparison of the odds ratios from our original models ['unadjusted' ORs] with those adjusted for rescaling ['adjusted' ORs] using KHB. We found that this adjustment did not substantially affect the direction or magnitude of the coefficients of interest in our analyses and did not alter our substantive findings.

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6. RESULTS

6.1. DESCRIPTIVE FINDINGS

Table 1 shows distribution of each variable in person-months, and the number of births for women at risk of second, third or fourth birth. Those with three children are more likely to be in receipt of tax credits, reflecting that the income threshold for eligibility for tax credits falls as the number of children increases. This may also reflect relative disadvantage in the higher parity group: they are more likely to be in social housing than those with one or two children (33% versus 23% of women with one child), although owner-occupation is the dominant tenure across all three parities. While the educational distribution of the samples of women at parity 1 and parity 2 is similar, women at parity 3 are educationally disadvantaged, with a smaller proportion reporting that they have a degree and a larger proportion with no qualifications compared with women at lower parities.

Covariate	SECOND BIRTH			THIRD BIRTH			FOURTH BIRTH		
	Number of births	Person-months		Number of births	Person-months		Number of births	Person-months	
		Total	Weighted %		Total	Weighted %		Total	Weighted %
Time since birth of previous child									
0-23 months	287	27,634	30.1%	95	20,902	19.7%	32	8,915	19.5%
24-35 months	148	10,482	11.6%	52	9,628	8.7%	18	4,161	9.0%
36-47 months	93	7,762	8.9%	39	9,021	8.2%	10	3,957	8.5%
48-59 months	63	5,693	6.6%	29	8,451	7.6%	6	3,587	7.9%
60-71 months	40	4,426	5.3%	29	7,670	6.8%	10	3,323	7.2%
72+ months	88	32,497	37.4%	60	52,477	48.9%	21	21,797	47.8%
Equivalised household income[a]									
Quintile 1 (highest)	161	17,687	20.2%	51	21,609	21.0%	10	9,124	21.7%
Quintile 2	139	17,725	19.5%	47	21,626	20.5%	17	9,164	20.7%
Quintile 3	157	17,720	20.5%	61	21,640	20.3%	15	9,138	20.3%
Quintile 4	131	17,688	20.8%	59	21,626	19.6%	24	9,141	19.9%
Quintile 5 (lowest)	131	17,674	19.1%	86	21,648	18.5%	31	9,173	17.4%
Amount of child tax credit received									
None	296	38,848	43.0%	72	42,236	40.2%	24	14,701	32.6%
Quintile 1 (lowest)	98	9,991	11.7%	34	13,436	12.7%	5	6,301	14.7%
Quintile 2	98	10,341	11.6%	36	13,218	12.4%	13	6,218	13.3%
Quintile 3	99	10,080	11.7%	36	13,270	11.7%	17	6,159	12.7%
Quintile 4	68	9,594	11.0%	64	13,397	11.7%	24	6,207	12.8%
Quintile 5 (highest)	60	9,640	11.0%	62	12,592	11.3%	14	6,154	13.9%
Housing tenure									
Owner-occupied	404	48,251	53.0%	138	69,044	63.8%	29	24,589	52.7%
Private rented	167	19,671	23.6%	61	16,460	15.7%	17	6,625	14.4%
Social rented	148	20,572	23.4%	105	22,645	20.5%	51	14,526	32.8%
Age group									
20-24	119	10,193	13.0%	32	3,576	3.8%	5	562	1.5%
25-29	200	17,702	20.0%	94	12,609	11.7%	16	4,325	10.1%
30-34	255	22,730	24.4%	100	23,596	20.5%	37	8,567	18.5%
35-39	135	19,452	21.2%	64	32,172	29.4%	29	14,491	30.3%
40-44	10	18,417	21.4%	14	36,196	34.6%	10	17,795	39.6%
Sex of previous children									
All boys	-	-	-	79	28,133	26.1%	13	5,985	13.2%
All girls	-	-	-	87	25,100	23.3%	18	4,577	10.0%
Mixed	-	-	-	135	53,267	49.1%	53	30,098	65.5%
Unknown	-	-	-	3	1,649	1.5%	13	5,080	11.3%

*+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001*

Table 1: Distribution of independent variables at first observation in the sample of interest and number of births for women at risk of second, third or fourth birth. Women aged 20-44 years at parity 1 (second birth) 2 (third birth) or 3 (fourth birth), UK 2009-2014.

Notes: [a]Note that the percentage distribution of income quintiles is unequal due to adjustment via weighting.

[b]Shared child variable does not include information about partner's other children in fourth birth sample due to insufficient numbers.

Covariate	SECOND BIRTH			THIRD BIRTH			FOURTH BIRTH		
		Person-months			Person-months			Person-months	
	Number of births	Total	Weighted %	Number of births	Total	Weighted %	Number of births	Total	Weighted %
Presence of shared children[b]									
Shared child, partner has other child(ren)	67	8,459	9.3%	48	17,491	15.9%	64	32,072	69.5%
Shared child, partner has no other child(ren)	460	42,573	48.5%	170	61,398	57.0%	-		
No shared child, partner has other child(ren)	35	5,516	6.0%	17	4,540	4.5%	9	3,298	8.2%
No shared child, partner is childless	25	3,966	3.8%	5	1,112	1.1%	-		
Unpartnered	132	27,980	32.4%	64	23,608	21.5%	24	10,370	22.3%
Religion									
No religion	317	43,017	53.1%	121	43,026	45.5%	30	17,375	46.7%
Catholic	92	11,152	12.9%	45	13,046	12.5%	10	5,169	11.6%
Other Christian	219	24,158	27.2%	77	34,614	33.3%	29	13,232	31.3%
Muslim	62	5,848	3.0%	53	10,529	4.1%	24	8,141	7.4%
Other religion	29	4,319	3.8%	8	6,934	4.6%	4	1,823	2.9%
Dwelling space									
Bedrooms equal to requirement	291	35,075	41.8%	124	37,604	34.0%	60	23,348	51.3%
Has one extra bedroom	288	35,347	39.6%	118	45,653	43.9%	10	11,365	26.1%
Has more than one extra bedroom	90	12,091	13.0%	43	18,221	17.4%	5	4,238	10.2%
Needs at least one more bedroom	50	5,981	5.6%	19	6,671	4.6%	22	6,789	12.4%
Highest educational qualification									
Degree or equivalent	372	38,174	41.8%	103	45,752	41.1%	31	15,025	33.1%
A levels or equivalent	131	19,263	21.9%	60	21,669	20.3%	13	8,472	18.2%
GCSEs or equivalent	185	26,719	32.2%	118	33,747	32.8%	39	16,508	38.1%
No qualifications	31	4,338	4.1%	23	6,981	5.7%	14	5,735	10.6%
Current economic activity									
FT employed	247	35,628	40.3%	62	33,137	30.7%	16	9,907	23.0%
PT employed	208	24,762	29.0%	83	38,059	36.9%	20	13,943	32.7%
Inactive	194	20,345	21.9%	132	30,378	26.5%	50	18,582	37.3%
Unemployed	70	7,759	8.8%	27	6,575	5.9%	11	3,308	7.0%
Parental occupational class									
Higher managerial/professional	146	15,667	17.5%	44	20,162	18.0%	17	6,944	13.1%
Intermediate	149	17,200	19.1%	60	22,241	20.3%	18	8,891	18.9%
Routine/manual	297	40,455	48.4%	148	53,717	52.6%	43	23,268	56.1%
Not working	32	4,232	4.3%	28	5,364	3.9%	9	3,257	5.7%
Unknown	95	10,940	10.7%	24	6,665	5.2%	10	3,380	6.1%
TOTAL (number of births/person-months)	**719**	**88,494**	**100%**	**304**	**108,149**	**100%**	**97**	**45,740**	**100%**

*+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001*

Table 1 (continued): Distribution of independent variables at first observation in the sample of interest and number of births for women at risk of second, third or fourth birth. Women aged 20-44 years at parity 1 (second birth) 2 (third birth) or 3 (fourth birth), UK 2009-2014.
Notes: [a]Note that the percentage distribution of income quintiles is unequal due to adjustment via weighting.
[b]Shared child variable does not include information about partner's other children in fourth birth sample due to insufficient numbers.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Time since birth of previous child							
0-23 months	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24-35 months	1.31*	1.35*	1.35*	1.34*	1.38**	1.39**	1.35*
36-47 months	1.04	1.07	1.07	1.16	1.20	1.20	1.17
48-59 months	0.99	1.03	1.02	1.25	1.31+	1.30+	1.25
60-71 months	0.68*	0.72+	0.72+	0.97	1.03	1.03	0.98
72+ months				0.55***	0.58***	0.57***	0.55***
Equivalised household income							
Quintile 1 (highest)	1.00			1.00			1.00
Quintile 2	0.92			0.87			0.86
Quintile 3	0.98			0.90			0.89
Quintile 4	0.90			0.76+			0.75+
Quintile 5(lowest)	0.85			0.78			0.75+
Amount of child tax credit received							
None		1.00			1.00		1.00
Quintile 1 (lowest)		1.26+			1.21		1.24
Quintile 2		1.23			1.18		1.23
Quintile 3		1.23			1.27		1.31+
Quintile 4		0.91			0.99		1.02
Quintile 5 (highest)		0.81			0.98		0.99
Housing tenure							
Owner-occupied			1.00			1.00	1.00
Private rented			0.86			0.78*	0.80+
Social rented			1.00			1.01	1.05
Age group							
20-24				1.00	1.00	1.00	1.00
25-29				0.88	0.87	0.87	0.87
30-34				0.87	0.84	0.84	0.83
35-39				0.59**	0.56***	0.56***	0.55***
40-44				0.05***	0.05***	0.05***	0.05***
Presence of shared children							
Shared child, partner has other child(ren)				1.00	1.00	1.00	1.00
Shared child, partner has no other child(ren)				1.11	1.13	1.13	1.11
No shared child, partner has other child(ren)				0.76	0.76	0.77	0.77
No shared child, partner is childless				0.88	0.88	0.89	0.89
Unpartnered				0.53***	0.53***	0.53***	0.54***
Religion							
No religion				1.00	1.00	1.00	1.00
Catholic				1.18	1.19	1.24	1.23
Other Christian				1.26*	1.26*	1.26*	1.25*
Muslim				0.98	0.97	0.98	1.04
Other religion				0.83	0.83	0.84	0.85
Dwelling space							
Bedrooms equal to requirement				1.00	1.00	1.00	1.00
Has one extra bedroom				1.06	1.04	1.05	1.05
Has more than one extra bedroom				0.96	0.90	0.92	0.92
Needs at least one more bedroom				0.80	0.79	0.78	0.79
Highest educational qualification							
Degree or equivalent				1.00	1.00	1.00	1.00
A levels or equivalent				0.66***	0.68**	0.67**	0.68**
GCSEs or equivalent				0.75*	0.78*	0.75*	0.75*
No qualifications				0.72	0.74	0.73	0.76
Current economic activity							
FT employed				1.00	1.00	1.00	1.00
PT employed				1.40**	1.47**	1.43**	1.47**
Inactive				1.49**	1.64***	1.56***	1.65***
Unemployed				1.60**	1.80**	1.68**	1.79**
Parental occupational class							
Higher managerial/professional				1.00	1.00	1.00	1.00
Intermediate				0.82	0.84	0.82	0.82
Routine/manual				0.82	0.85	0.83	0.83
Not working				0.70	0.74	0.69	0.69
Unknown				0.92	0.94	0.89	0.91
TOTAL N (person-months)	88494	88494	88494	88494	88494	88494	88494

*+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001*

Table 2: Discrete time hazard model of experiencing conception leading to a second birth. All women with one child, UK 2009-2014.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Time since birth of previous child							
0-23 months	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24-35 months	1.12	1.20	1.23	1.24	1.32	1.29	1.25
36-47 months	1.03	1.05	1.10	1.26	1.30	1.27	1.24
48-59 months	0.77	0.78	0.80	1.04	1.09	1.02	1.03
60-71 months	0.84	0.84	0.88	1.30	1.36	1.27	1.29
72+ months	0.21***	0.20***	0.20***	0.56**	0.59*	0.55**	0.56**
Equivalised household income							
Quintile 1 (highest)	1.00			1.00			1.00
Quintile 2	0.88			0.67+			0.66+
Quintile 3	1.14			0.74			0.73
Quintile 4	1.08			0.61*			0.59*
Quintile 5(lowest)	1.66**			0.74			0.75
Amount of child tax credit received							
None		1.00			1.00		1.00
Quintile 1 (lowest)		1.49+			1.46		1.58+
Quintile 2		1.59*			1.35		1.44
Quintile 3		1.46			1.08		1.11
Quintile 4		2.82***			1.77**		1.78*
Quintile 5 (highest)		3.00***			2.14***		2.08**
Housing tenure							
Owner-occupied			1.00			1.00	1.00
Private rented			1.44*			1.03	1.02
Social rented			2.41***			1.55*	1.45+
Age group							
20-24				1.00	1.00	1.00	1.00
25-29				0.92	0.88	0.93	0.92
30-34				0.59*	0.54*	0.59*	0.60*
35-39				0.33***	0.28***	0.32***	0.33***
40-44				0.06***	0.04***	0.05***	0.06***
Sex of previous children							
Two boys				1.24	1.27	1.27	1.25
Two girls				1.67**	1.65**	1.66**	1.69**
One boy one girl				1.00	1.00	1.00	1.00
Unknown				0.49	0.44	0.42	0.48
Presence of shared children							
Shared child, partner has other child(ren)				1.00	1.00	1.00	1.00
Shared child, partner has no other child(ren)				1.00	0.98	0.98	1.01
No shared child, partner has other child(ren)				1.25	1.35	1.33	1.23
No shared child, partner is childless				1.81	1.73	1.73	1.76
Unpartnered				0.66+	0.76	0.69	0.62*
Religion							
No religion				1.00	1.00	1.00	1.00
Catholic				1.07	1.05	1.06	1.12
Other Christian				1.06	1.04	1.04	1.07
Muslim				1.32	1.31	1.38	1.40
Other religion				0.59	0.56	0.60	0.62
Dwelling space							
Bedrooms equal to requirement				1.00	1.00	1.00	1.00
Has one extra bedroom				0.88	0.87	0.97	0.96
Has more than one extra bedroom				1.39	1.19	1.48+	1.45+
Needs at least one more bedroom				0.87	0.91	0.88	0.88
Highest educational qualification							
Degree or equivalent				1.00	1.00	1.00	1.00
A levels or equivalent				0.91	1.00	0.94	0.93
GCSEs or equivalent				1.21	1.32+	1.24	1.22
No qualifications				1.24	1.29	1.19	1.22
Current economic activity							
FT employed				1.00	1.00	1.00	1.00
PT employed				0.87	0.94	0.88	0.92
Inactive				1.02	1.18	1.03	1.04
Unemployed				1.19	1.26	1.08	1.16
Parental occupational class							
Higher managerial/professional				1.00	1.00	1.00	1.00
Intermediate				1.17	1.18	1.16	1.17
Routine/manual				1.19	1.25	1.20	1.20
Not working				1.80+	1.87*	1.73+	1.73+
Unknown				1.11	1.20	1.15	1.09
TOTAL N (person-months)	108149	108149	108149	108149	108149	108149	108149

*+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001*

Table 3: Discrete time hazard model of experiencing conception leading to a third birth. UK 2009-2014.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Time since birth of previous child							
0-23 months	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24-35 months	1.39	1.46	1.52	1.46	1.52	1.48	1.50
36-47 months	0.97	1.05	1.11	0.98	1.08	1.01	1.02
48-59 months	0.41+	0.45	0.46	0.45	0.50	0.44	0.46
60-71 months	0.86	0.90	0.95	1.03	1.10	0.97	0.99
72+ months	0.27***	0.26***	0.26***	0.51	0.54	0.46+	0.45+
Equivalised household income							
Quintile 1 (highest)	1.00			1.00			1.00
Quintile 2	2.00			1.65			1.73
Quintile 3	1.22			0.91			0.89
Quintile 4	2.03+			1.39			1.21
Quintile 5(lowest)	3.98***			2.48*			2.15+
Amount of child tax credit received							
None		1.00			1.00		1.00
Quintile 1 (lowest)		0.61			0.53		0.54
Quintile 2		1.66			1.33		1.26
Quintile 3		1.72			1.19		1.07
Quintile 4		2.36*			1.37		1.23
Quintile 5 (highest)		1.39			0.92		0.86
Housing tenure							
Owner-occupied			1.00			1.00	1.00
Private rented			1.62			1.26	1.24
Social rented			3.23***			2.57**	2.35*
Age group							
20-24				1.00	1.00	1.00	1.00
25-29				0.50	0.44	0.54	0.47
30-34				0.37+	0.32+	0.40	0.36+
35-39				0.20*	0.18*	0.22*	0.21*
40-44				0.07**	0.06***	0.09**	0.08**
Sex of previous children							
All boys				0.84	0.85	0.81	0.81
All girls				2.43**	2.37**	2.20*	2.16*
Mixed				1.00	1.00	1.00	1.00
Unknown				0.63	0.68	0.56	0.59
Presence of shared children							
No shared children (new relationship)				1.00	1.00	1.00	1.00
Shared children (not new relationship)				1.62	1.49	1.47	1.39
Unpartnered				0.91	0.79	0.79	0.69
Religion							
No religion				1.00	1.00	1.00	1.00
Catholic				1.08	1.01	1.24	1.20
Other Christian				1.56	1.45	1.57	1.61+
Muslim				1.60	1.49	2.02+	1.84
Other religion				2.66+	2.29	2.69+	2.53
Dwelling space							
Bedrooms equal to requirement				1.00	1.00	1.00	1.00
Has one extra bedroom				0.63	0.61	0.72	0.74
Has more than one extra bedroom				0.65	0.67	0.77	0.89
Needs at least one more bedroom				1.05	0.99	0.90	0.93
Highest educational qualification							
Degree or equivalent				1.00	1.00	1.00	1.00
A levels or equivalent				0.58	0.55	0.51+	0.49+
GCSEs or equivalent				0.96	0.91	0.84	0.83
No qualifications				0.96	0.85	0.73	0.75
Current economic activity							
FT employed				1.00	1.00	1.00	1.00
PT employed				0.89	0.89	0.85	0.86
Inactive				1.02	0.95	0.95	0.80
Unemployed				2.05+	1.75	1.80	1.41
Parental occupational class							
Higher managerial/professional				1.00	1.00	1.00	1.00
Intermediate				0.80	0.82	0.86	0.84
Routine/manual				0.69	0.73	0.73	0.73
Not working				0.72	0.75	0.69	0.67
Unknown				0.68	0.75	0.73	0.74
TOTAL N (person-months)				45740	45740	45740	45740

*+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001*

Table 4: Discrete time hazard model of experiencing conception leading to a fourth birth. UK 2009-2014.

6.2.   RESULTS FROM HAZARDS MODELS OF ADDITIONAL BIRTH

Tables 2, 3 and 4 show odds ratios from regression models of conception leading to a second, third or fourth birth, respectively. In each table, models 1-3 show the unadjusted association between each of the key explanatory variables and the transition to second, third or fourth birth, controlling for the baseline hazard (time since previous birth). Model 4 shows the association between household income and fertility, adjusted for all covariates but without the other two key explanatory variables. Model 5 includes amount of child tax credit as the only key explanatory variable, and model 6 includes only tenure in addition to the covariates. Model 7 includes all three key explanatory variables in a fully adjusted regression.

 Household income has little association with the odds for a second birth in the unadjusted model (Table 2, model 1). For third births, the unadjusted model (Table 3, model 1) shows a negative association with household income. However, when controlling for other covariates (models 4 and 7), women in the highest income quintile are most likely to have a second birth or third birth. In sensitivity analysis, we found that once the woman's age is accounted for in the adjusted models, the positive association between household income and second and third birth becomes apparent. This change reflects the relationship between income and age – older women are most likely to have a higher income but are also least likely to have a second or third birth. For fourth births (Table 4) there is a negative association between household income and the odds for an additional birth in both the unadjusted and fully adjusted models, with the lowest income quintile being particularly likely to have an additional child.

The association between amount of child tax credit received and the odds for an additional birth varies with parity. Among women at risk of a second birth, who are the group least likely to be receiving any child tax credit, the unadjusted analysis (model 2) suggests a weak U-shaped association with second birth. In the subsequent adjusted models (5 and 7), the amount of child tax credit received remains unrelated to the risk of second birth. In contrast, for women at risk of third birth (Table 3), the unadjusted model estimates (model 2) show a large, positive association between the amount of child tax credit received and the propensity to have a third birth. Although the magnitude of this association is reduced in the adjusted models (5 and 7), women who

are receiving the highest levels of child tax credit (quintiles 4 and 5) remain significantly more likely than those receiving no child tax credit to have a third birth. Notably, these odds ratios are very similar regardless of whether the other key explanatory variables are included in the model, suggesting that child tax credit have an association with third birth that is independent of household income and housing tenure. Table 4 shows only a weak, positive unadjusted association between child tax credit receipt and fourth birth in model 2, which disappears when other factors are controlled.

For second births, women in private rented accommodation are least likely (OR 0.80) to have a second birth (in both the unadjusted and adjusted models), with no difference for women in social housing versus owner-occupied. For third and fourth births there is a strong unadjusted association between living in social housing and having an additional birth (Tables 3 and 4, model 3), compared with owner-occupiers (OR=2.41 [third birth]; OR=3.23 [fourth birth]. For these higher parities, owner-occupiers are the least likely to have an additional birth. The lack of attenuation in effect between models 6 and 7 shows that the relationship between social housing and third and fourth births is independent of household income and child tax credit receipt.

Other important findings include the following: Demographic factors play a key role in transition to higher order births, with a strong, negative association between women's age and her odds for having an additional birth across all three parity transitions. Unpartnered women are the least likely to have an additional birth. For partnered women, the presence of shared children and/or the partner's parity do not show any significant association with the risk of second or third birth (although for third births the odds ratios are relatively large and in the expected direction). Women who have two children of the same sex – particularly girls – are more likely to have a third than those who have one boy and one girl. Compared with women reporting no religion, those who report that they are 'other Christian' (mostly Anglican/Church of Scotland but also including e.g. Methodist and Baptist) are more likely to have a second birth, while Catholic and Muslim women are more likely than women of 'no religion' to have a third birth. Women whose highest qualification is at secondary or advanced level are less likely to have a second or fourth birth than those who have a degree, but no educational differences are observed for third births. Women who are working part-

time, are economically inactive or unemployed are significantly more likely to have a second birth than women who are working full-time. However, we do not see any significant associations between economic activity and transitions to third or fourth birth.

In sum, income, welfare receipt and housing tenure show only a very weak association with second births. The propensity to have a third birth is significantly higher for those in receipt of child tax credit and living in social housing, even after controlling for demographic and other potential explanatory factors. Net of controls, fourth births were more common among those with low household income, and those living in social housing.

7. DISCUSSION

The means-tested nature of welfare support within liberal welfare regimes has been assumed in the existing literature to incentivize childbearing among low educated women who have less to gain from employment, and are likely to qualify for public assistance (Rindfuss et al., 1996; Sigle-Rushton, 2008; Rendall et al., 2010). In this paper our aim was not to directly test the role of welfare policy on fertility. Instead we used new, detailed, prospective data to examine the way in which household income, receipt of means-tested family allowances and being accommodated in government-subsidized social housing was associated with transitions to second, third and fourth births during the period 2009 to 2014.

Factors associated with second birth were somewhat different to third and fourth births, which we interpret below in terms of the strong 'two-child norm' in the UK. For third and fourth births we found evidence consistent with the hypothesis that means-tested family allowances and, in particular, provision of subsidized housing are positively associated with family size. By modelling our key variables separately and in combination we demonstrated that their associations with fertility are independent of one another. However, in interpreting our results it is important to distinguish between observed, unadjusted relationships, and adjusted relationships net of other factors – particularly women's age. Considering first the unadjusted relationship, the likelihood of having a third or fourth birth was significantly higher for low income women, those

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in receipt of means-tested family allowances, and women living in government-subsidized social housing. When other variables, particularly age, were included in multiple regression analyses, the negative gradient between our key variables and childbearing was attenuated, particularly for income, as discussed below. Nevertheless, there remained a clear tendency for those in receipt of high levels of family allowance to have a third birth, and for those accommodated in social housing to be more likely to have both a third and fourth birth. Whilst we cannot make any causal claims, our findings are consistent with the notion that means-tested welfare provision, combined with lack of state assistance to help more educated women combine careers and childbearing, correlate with large socio-economic polarisation in family building.

The paper contributes to our understanding of 'reproductive-polarization' (Schulze and Tyrell, 2002), demonstrating that low socio-economic status is associated with transition to higher order births both directly, but also indirectly through the tendency of low-earning women to start childbearing at an early age. Consistent with earlier findings (Fiori et al., 2014; Berrington et al., 2015), current age was seen to be one of the most important variables associated with parity progression. This indirect pathway through which socioeconomic circumstances relate to completed family size is particularly important in countries like the UK where age at entry into motherhood is more polarized than in other settings such as France or Norway (Rendall et al., 2005).

Our analyses provide much-needed empirical evidence to address the belief in popular discourse that there is a U-shape relationship between income and childbearing in the UK, with large families being more likely among the lowest- and highest-earning groups. We did not find support for a U-shaped relationship, although there were too few "super-rich" individuals in our dataset to identify the extremely high-earning groups, who dominate the media. We found that the relationship between income and childbearing differed by parity, and that it varied according to whether the focus is the unadjusted or adjusted relationship. Without controls, net household income had no association with the likelihood of second birth, but a large negative association with third and fourth birth. In adjusted analyses, income was positively related to the risk of second and third birth, but negatively associated with having a fourth child.

Rates of progression from first to second birth were high for all socio-economic groups. Consistent with findings from past decades (Fiori et al., 2014) we found demographic factors together with current economic activity status were the key factors associated with second birth. Net of other factors, the odds of a second birth were roughly halved for those in their late thirties as compared to women in their early twenties, and also halved for lone mothers as compared to partnered women. Mothers working part-time, or who were unemployed or inactive, were significantly more likely to have a second child than women working full-time. These relationships partly reflect anticipatory effects whereby women who intend to have further children are less inclined to work full-time. Overall, the dominance of demographic factors in predicting second birth likely reflects the strength of the 'two child family norm' in the UK. The desire among UK men and women to avoid one-child families remains visible in both fertility intentions (Berrington and Pattaro, 2014) and behaviour (Berrington et al., 2015).

Once the woman's age was taken into account, a positive relationship between income and progression to second and third birth emerged. These relationships might be explained by selection and time-squeeze effects (Kreyenfeld, 2002; Kravdal, 2008). The selection argument contends that high-earning women who enter motherhood, despite elevated economic opportunity costs, are likely to be strongly family-orientated and hence more likely to have larger families. The time-squeeze effect assumes that higher earning women will be more likely to closely space their births in order to reduce time spent out of the labour market, or speed up their births in anticipation of age-related declines in fecundity. However, for fourth births we instead saw a negative relationship with household income. It is possible that the transition to fourth birth represents a 'tipping point' at which the desire for a large family no longer outweighs the opportunity costs associated with repeated childbearing among highly paid women in the UK, where time out from the labour force for maternity leave and work-family caring responsibilities account for significant reductions in mothers life-time pay (Stewart, 2014). There remains a lack of policy and industry support for mothers in high paid jobs in the UK. Despite the introduction of the right to request flexible working, in practice this may be difficult to achieve in a professional environment where a culture of long working-hours prevails (Sigle, 2016). This incompatibility would be intensified by the need for closely spaced births among high-earning women

who start childbearing at older ages. The financial costs of childcare and the need for practical care and supervision for multiple pre-school age children would be greater than for multiple, older children. We speculate that having more than three children would not be sustainable in this context. Finally, late entry into motherhood might preclude having more than three children simply due to the biological limits of remaining years of fecundity for high earning women.

Our findings are consistent with the argument that means-tested child allowances could enable further childbearing, and previous econometric evidence which found a small pro-natalist effect of the impact of the introduction of tax credits on low income groups (Brewer et al., 2012). For most low-income couples welfare entitlements do not fully offset the costs of a child (Adam and Brewer, 2004), but for the lowest paid they can do so (Hirsch, 2013). We have already noted that, in the context of a strong two-child norm in the UK, demographic factors dominate in predicting the transition to second birth. But why are child tax credit particularly associated with the transition to third birth? The value of child tax credit tapers with household income and the absolute income thresholds that determine eligibility are lower for those with smaller families (Table A1). Therefore, mothers with only two children who are in receipt of high levels of child tax credit are likely to be relatively select group. Assuming no other change in circumstances, they are also the group most likely to be guaranteed to receive high levels of additional tax credits if they go on to have a third child. We can speculate, therefore, that the costs associated with having a third child are more likely to be offset for these families. However, for women who already have three children, the variable becomes less discriminatory as more women are eligible for child tax credit overall, while the increased income threshold for eligibility means that the financial incentive associated with having a fourth child is less selective.

Despite marked shifts in the nature of the housing market over past 25 years, living in social housing remains strongly associated with the transition to third and fourth births, consistent with findings from the 1980s (Murphy and Sullivan, 1985). Although we cannot directly test the mechanisms underlying this association, the security of tenure provided by social housing, particularly compared with private renting might play a role. Social rent also tends to be lower than private rent, leaving more disposable income to meet the costs of having additional children. Additionally,

in the UK, housing tenure is "an indicator of differing social attitudes and normative values" (Murphy and Sullivan, 1985; p.231), over and above other social indicators such as occupational class. This, in turn, can be related back to 'habitus', and the importance of space (Boterman and Bridge, 2015). Social housing tends to be clustered geographically to a greater extent than owner-occupied or private rented accommodation, potentially reinforcing the class habitus of disadvantaged women and in turn the 'distinction' associated with large families (Bourdieu, 1984). Alternatively, higher order births may become 'contagious' in areas where large families are prevalent and more likely to be regarded as normative (Kulu, 2013; Fiori et al., 2014).

To conclude, this paper has provided much needed empirical evidence in an area of debate that tends to be based on assumptions regarding the association between socioeconomic status, welfare and family size. Our findings on the individual level factors associated with the decision to have a second, third and fourth birth indicate that the role of current age remains paramount, and much of the socio-economic gradients in completed family size observed in the UK relate to the earlier age at entry into motherhood among women from lower income backgrounds. However, net of age and other control variables, being in receipt of higher levels of family allowance and living in social housing do appear to be associated with progression to higher order births. Although it is not possible to make any inferences regarding the causal direction of these associations, the findings provide evidence that welfare receipt and fertility behaviour are inter-related in the UK.

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APPENDIX

Annual income (£)	2009-10			2010-11			2011-12			2012-13			2013-14			2014-15		
	One child	Two children	Three children	One child	Two children	Three children	One child	Two children	Three children	One child	Two children	Three children	One child	Two children	Three children	One child	Two children	Three children
Not working	2,780	5,020	7,255	2,850	5,150	7,455	3,105	5,660	8,220	3,240	5,930	8,620	3,270	5,995	8,720	3,300	6,050	8,880
5,000	2,780	5,020	7,255	2,850	5,150	7,455	3,105	5,660	8,220	3,240	5,930	8,620	3,270	5,995	8,720	3,300	6,050	8,880
8,000	2,780	5,020	7,255	2,850	5,150	7,455	3,105	5,660	8,220	3,240	5,930	8,620	3,270	5,995	8,720	3,300	6,050	8,880
10,000	2,780	5,020	7,255	2,850	5,150	7,455	3,105	5,660	8,220	3,240	5,930	8,620	3,270	5,995	8,720	3,300	6,050	8,880
15,000	2,780	5,020	7,255	2,850	5,150	7,455	3,105	5,660	8,220	3,240	5,930	8,620	3,270	5,995	8,720	3,300	6,050	8,880
20,000	1,240	3,475	5,710	1,360	3,665	5,970	1,405	3,965	6,525	1,545	4,235	6,925	1,595	4,320	7,040	1,660	4,420	7,170
25,000	545	1,525	3,765	545	1,715	4,020	545	1,915	4,475	0	2,185	4,875	0	2,270	4,990	0	2,370	5,120
30,000	545	545	1,815	545	545	2,070	545	545	2,425	0	135	2,825	0	220	2,940	0	320	3,070
35,000	545	545	545	545	545	545	545	545	545	0	0	775	0	0	890	0	0	1,020
40,000	545	545	545	545	545	545	545	545	545	0	0	0	0	0	0	0	0	0
45,000	545	545	545	545	545	545	0	0	0	0	0	0	0	0	0	0	0	0
50,000	545	545	545	545	545	545	0	0	0	0	0	0	0	0	0	0	0	0
55,000	210	210	210	210	210	210	0	0	0	0	0	0	0	0	0	0	0	0
60,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table A1: Maximum amount of child tax credit available for parents in the UK with one, two or three children by tax period and income (joint income if part of a couple).
Source: Leaflet WTC 1 – Child and Working Tax Credits (HMRC), years 2009-2014
http://revenuebenefits.org.uk/tax-credits/guidance/what-does-the-law-mean/tax-credit-leaflets-1/tax-credits-archived-leaflets

	Model 1		Model 2		Model 3	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
Time since birth of previous child						
0-23 months	1.00	1.00	1.00	1.00	1.00	1.00
24-35 months	1.34*	1.34*	1.38**	1.38**	1.39**	1.39**
36-47 months	1.16	1.16	1.20	1.20	1.20	1.21
48-59 months	1.25	1.25	1.31+	1.30+	1.30+	1.31+
60-71 months	0.97	0.97	1.03	1.03	1.03	1.04
72+ months	0.55***	0.55***	0.58***	0.58***	0.57***	0.57***
Equivalised household income						
Quintile 1 (highest)	1.00	1.00				
Quintile 2	0.87	0.87				
Quintile 3	0.90	0.90				
Quintile 4	0.76+	0.77+				
Quintile 5(lowest)	0.78	0.79				
Amount of child tax credit received						
None			1.00	1.00		
Quintile 1 (lowest)			1.21	1.21		
Quintile 2			1.18	1.19		
Quintile 3			1.27	1.27		
Quintile 4			0.99	0.99		
Quintile 5 (highest)			0.98	0.98		
Housing tenure						
Owner-occupied					1.00	1.00
Private rented					0.78*	0.77*
Social rented					1.01	1.00
Age group						
20-24	1.00	1.00	1.00	1.00	1.00	1.00
25-29	0.88	0.88	0.87	0.88	0.87	0.87
30-34	0.87	0.86	0.84	0.84	0.84	0.83
35-39	0.59**	0.58**	0.56***	0.56***	0.56***	0.55***
40-44	0.05***	0.05***	0.05***	0.05***	0.05***	0.05***
Presence of shared children						
Shared child, partner has other child(ren)	1.00	1.00	1.00	1.00	1.00	1.00
Shared child, partner has no other child(ren)	1.11	1.12	1.13	1.12	1.13	1.12
No shared child, partner has other child(ren)	0.76	0.76	0.76	0.76	0.77	0.77
No shared child, partner is childless	0.88	0.87	0.88	0.87	0.89	0.89
Unpartnered	0.53***	0.52***	0.53***	0.53***	0.53***	0.53***
Religion						
No religion	1.00	1.00	1.00	1.00	1.00	1.00
Catholic	1.18	1.19	1.19	1.20	1.24	1.23
Other Christian	1.26*	1.26*	1.26*	1.26*	1.26*	1.26*
Muslim	0.98	1.00	0.97	1.01	0.98	1.01
Other religion	0.83	0.82	0.83	0.82	0.84	0.84
Dwelling space						
Bedrooms equal to requirement	1.00	1.00	1.00	1.00	1.00	1.00
Has one extra bedroom	1.06	1.06	1.04	1.04	1.05	1.05
Has more than one extra bedroom	0.96	0.97	0.90	0.90	0.92	0.93
Needs at least one more bedroom	0.80	0.81	0.79	0.78	0.78	0.78
Highest educational qualification						
Degree or equivalent	1.00	1.00	1.00	1.00	1.00	1.00
A levels or equivalent	0.66***	0.66***	0.68**	0.68**	0.67**	0.66***
GCSEs or equivalent	0.75*	0.74**	0.78*	0.77*	0.75*	0.74**
No qualifications	0.72	0.72	0.74	0.74	0.73	0.73
Current economic activity						
FT employed	1.00	1.00	1.00	1.00	1.00	1.00
PT employed	1.40**	1.41**	1.47**	1.47**	1.43**	1.43**
Inactive	1.49**	1.51**	1.64***	1.64***	1.56***	1.57***
Unemployed	1.60**	1.63**	1.80**	1.80**	1.68**	1.70**
Parental occupational class						
Higher managerial/professional	1.00	1.00	1.00	1.00	1.00	1.00
Intermediate	0.82	0.82	0.84	0.83	0.82	0.82
Routine/manual	0.82	0.82	0.85	0.85	0.83	0.83
Not working	0.70	0.70	0.74	0.73	0.69	0.69
Unknown	0.92	0.92	0.94	0.94	0.89	0.89
TOTAL N (person-months)	88494		88494		88494	

*+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001*

Table A2: KHB models to adjust for changes in variance/rescaling in nested logistic regression models: second births.

	Model 1		Model 2		Model 3	
	Unadjusted	**Adjusted**	**Unadjusted**	**Adjusted**	**Unadjusted**	**Adjusted**
Time since birth of previous child						
0-23 months	1.00	1.00	1.00	1.00	1.00	1.00
24-35 months	1.24	1.23	1.32	1.29	1.29	1.28
36-47 months	1.26	1.24	1.30	1.28	1.27	1.25
48-59 months	1.04	1.02	1.09	1.07	1.02	1.02
60-71 months	1.30	1.27	1.36	1.34	1.27	1.28
72+ months	0.56**	0.55**	0.59*	0.57*	0.55**	0.54**
Equivalised household income						
Quintile 1 (highest)	1.00	1.00				
Quintile 2	0.67+	0.70				
Quintile 3	0.74	0.78				
Quintile 4	0.61*	0.64*				
Quintile 5(lowest)	0.74	0.80				
Amount of child tax credit received						
None			1.00	1.00		
Quintile 1 (lowest)			1.46	1.46		
Quintile 2			1.35	1.34		
Quintile 3			1.08	1.06		
Quintile 4			1.77**	1.75*		
Quintile 5 (highest)			2.14***	2.07**		
Housing tenure						
Owner-occupied					1.00	1.00
Private rented					1.03	1.01
Social rented					1.55*	1.50*
Age group						
20-24	1.00	1.00	1.00	1.00	1.00	1.00
25-29	0.92	0.90	0.88	0.88	0.93	0.92
30-34	0.59*	0.57*	0.54*	0.54*	0.59*	0.57*
35-39	0.33***	0.32***	0.28***	0.28***	0.32***	0.31***
40-44	0.06***	0.05***	0.04***	0.05***	0.05***	0.05***
Sex of previous children						
Two boys	1.24	1.25	1.27	1.27	1.27	1.25
Two girls	1.67**	1.67**	1.65**	1.67**	1.66**	1.65**
One boy one girl	1.00	1.00	1.00	1.00	1.00	1.00
Unknown	0.49	0.49	0.44	0.44	0.42	0.42
Presence of shared children						
Shared child, partner has other child(ren)	1.00	1.00	1.00	1.00	1.00	1.00
Shared child, partner has no other child(ren)	1.00	1.00	0.98	1.00	0.98	0.99
No shared child, partner has other child(ren)	1.25	1.25	1.35	1.34	1.33	1.30
No shared child, partner is childless	1.81	1.83	1.73	1.83	1.73	1.76
Unpartnered	0.66+	0.65+	0.76	0.78	0.69	0.70
Religion						
No religion	1.00	1.00	1.00	1.00	1.00	1.00
Catholic	1.07	1.08	1.05	1.08	1.06	1.09
Other Christian	1.06	1.05	1.04	1.06	1.04	1.07
Muslim	1.32	1.36	1.31	1.37	1.38	1.40
Other religion	0.59	0.60	0.56	0.59	0.60	0.61
Dwelling space						
Bedrooms equal to requirement	1.00	1.00	1.00	1.00	1.00	1.00
Has one extra bedroom	0.88	0.92	0.87	0.91	0.97	0.97
Has more than one extra bedroom	1.39	1.48+	1.19	1.27	1.48+	1.48+
Needs at least one more bedroom	0.87	0.90	0.91	0.92	0.88	0.89
Highest educational qualification						
Degree or equivalent	1.00	1.00	1.00	1.00	1.00	1.00
A levels or equivalent	0.91	0.91	1.00	0.98	0.94	0.92
GCSEs or equivalent	1.21	1.19	1.32+	1.30	1.24	1.22
No qualifications	1.24	1.24	1.29	1.30	1.19	1.17
Current economic activity						
FT employed	1.00	1.00	1.00	1.00	1.00	1.00
PT employed	0.87	0.88	0.94	0.98	0.88	0.93
Inactive	1.02	1.04	1.18	1.17	1.03	1.05
Unemployed	1.19	1.22	1.26	1.26	1.08	1.12
Parental occupational class						
Higher managerial/professional	1.00	1.00	1.00	1.00	1.00	1.00
Intermediate	1.17	1.15	1.18	1.18	1.16	1.16
Routine/manual	1.19	1.19	1.25	1.25	1.20	1.19
Not working	1.80+	1.75+	1.87*	1.82+	1.73+	1.70+
Unknown	1.11	1.11	1.20	1.19	1.15	1.12
TOTAL N (person-months)						

*+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001*

Table A3: KHB models to adjust for changes in variance/rescaling in nested logistic regression models: third births.

	Model 1		Model 2		Model 3	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
Time since birth of previous child						
0-23 months	1.00	1.00	1.00	1.00	1.00	1.00
24-35 months	1.46	1.44	1.52	1.52	1.48	1.49
36-47 months	0.98	0.95	1.08	1.04	1.01	1.00
48-59 months	0.45	0.43+	0.50	0.48	0.44	0.43
60-71 months	1.03	0.94	1.10	1.06	0.97	0.97
72+ months	0.51	0.49+	0.54	0.52	0.46+	0.46+
Equivalised household income						
Quintile 1 (highest)	1.00	1.00				
Quintile 2	1.65	1.68				
Quintile 3	0.91	0.92				
Quintile 4	1.39	1.35				
Quintile 5(lowest)	2.48*	2.38*				
Amount of child tax credit received						
None			1.00	1.00		
Quintile 1 (lowest)			0.53	0.54		
Quintile 2			1.33	1.34		
Quintile 3			1.19	1.17		
Quintile 4			1.37	1.36		
Quintile 5 (highest)			0.92	0.90		
Housing tenure						
Owner-occupied					1.00	1.00
Private rented					1.26	1.27
Social rented					2.57**	2.47**
Age group						
20-24	1.00	1.00	1.00	1.00	1.00	1.00
25-29	0.50	0.49	0.44	0.44	0.54	0.55
30-34	0.37+	0.34+	0.32+	0.31+	0.40	0.40
35-39	0.20*	0.20*	0.18*	0.18**	0.22*	0.23*
40-44	0.07**	0.07**	0.06***	0.06***	0.09**	0.09**
Sex of previous children						
All boys	0.84	0.81	0.85	0.84	0.81	0.83
All girls	2.43**	2.32**	2.37**	2.28**	2.20*	2.18*
Mixed	1.00	1.00	1.00	1.00	1.00	1.00
Unknown	0.63	0.62	0.68	0.66	0.56	0.58
Presence of shared children						
No shared children (new relationship)	1.00	1.00	1.00	1.00	1.00	1.00
Shared children (not new relationship)	1.62	1.62	1.49	1.57	1.47	1.49
Unpartnered	0.91	0.87	0.79	0.85	0.79	0.78
Religion						
No religion	1.00	1.00	1.00	1.00	1.00	1.00
Catholic	1.08	1.11	1.01	1.05	1.24	1.19
Other Christian	1.56	1.52	1.45	1.48	1.57	1.56
Muslim	1.60	1.64	1.49	1.53	2.02+	2.04+
Other religion	2.66+	2.33	2.29	2.12	2.69+	2.53
Dwelling space						
Bedrooms equal to requirement	1.00	1.00	1.00	1.00	1.00	1.00
Has one extra bedroom	0.63	0.64	0.61	0.63	0.72	0.72
Has more than one extra bedroom	0.65	0.70	0.67	0.75	0.77	0.83
Needs at least one more bedroom	1.05	1.02	0.99	1.01	0.90	0.91
Highest educational qualification						
Degree or equivalent	1.00	1.00	1.00	1.00	1.00	1.00
A levels or equivalent	0.58	0.55	0.55	0.52	0.51+	0.51+
GCSEs or equivalent	0.96	0.93	0.91	0.89	0.84	0.86
No qualifications	0.96	0.92	0.85	0.86	0.73	0.76
Current economic activity						
FT employed	1.00	1.00	1.00	1.00	1.00	1.00
PT employed	0.89	0.86	0.89	0.86	0.85	0.87
Inactive	1.02	0.98	0.95	0.95	0.95	0.94
Unemployed	2.05+	2.02	1.75	1.80	1.80	1.79
Parental occupational class						
Higher managerial/professional	1.00	1.00	1.00	1.00	1.00	1.00
Intermediate	0.80	0.85	0.82	0.87	0.86	0.87
Routine/manual	0.69	0.74	0.73	0.76	0.73	0.73
Not working	0.72	0.74	0.75	0.79	0.69	0.71
Unknown	0.68	0.83	0.75	0.82	0.73	0.78
TOTAL N (person-months)	45740		45740		45740	

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table A4: KHB models to adjust for changes in variance/rescaling in nested logistic regression models: fourth births.

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