DOCUMENTS DE TRAVAIL 228

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Septembre 2016

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September 21, 2016

Abstract

For children, parental separation is often accompanied by an increased risk of financial poverty and a deterioration in living standards. These effects have been studied over relatively short periods of time, and not considering the multi faceted context of childhood disadvantage. In this paper, we use the Millennium Cohort Study, a nationally representative cohort of over 18,000 British children followed from shortly after birth until age 11, to consider how parental separation affects the experience of childhood poverty and multi-domain deprivation over a relatively long period of time.

Results suggest that the decrease in income after parental separation is very large and that the long-term recovery is only partial. However, the effects of parental separation on four dimensions of childhood deprivation were mixed. We note strong long-lasting effects of parental separation on leisure deprivation; however we only see short term effects on material deprivation, and no effects on parenting involvement. This suggests that while facing strong financial constraints, separated parents cut back from normative but expensive activities such as holidays and outings, parents attempt to shield children from changes in their material circumstances and their day-to-day parenting and routines. Maternal re-partnering is the most important post-separation recovery channel, more so than maternal work status. However, heterogeneous effects exist, and the post-separation trajectories of children living with more and less educated mothers differ, suggesting that the pre-separation parental social and economic capital may play an important role.

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1 Introduction

The context within which children are born and raised is changing across Western Europe. Driven by a number of socio-demographic phenomena, children increasingly experience parental divorce or separation during their childhood; including from early childhood. In the UK, 20 percent of British children born to married or cohabiting parents at the turn of the century experienced their parents union dissolution during the first five years of life (Panico et al., 2010).

A large range of literature has concerned itself with the effects of parental divorce and, to a lesser extent, the separation of cohabiting unmarried parents on family well being, with most of the literature reporting negative effects of experiencing parental separation on both adult and child outcomes (Amato, 2005, 2001). A number of studies have shown that children growing up with two continuously married parents do better on a range of cognitive, emotional and developmental outcomes, both in childhood and adulthood. While these effects appear to be modest, they have persisted over time, even as unconventional family structures have become more common (Sigle-Rushton et al., 2005).

An important mechanism through which parental separation affects children appears to be through financial changes (Amato, 2005; McMunn et al., 2001). This literature has concentrated on studying the evolution of income and poverty around separation, however what these financial changes might entail for children's experience of deprivation in their day-to-day lives has been less explored. This may be problematic, as income has been increasingly criticized as a marker of deprivation for children, and this may be especially the case around separation, when parents may prioritize resources towards children. Multi-dimensional deprivation measures have been increasingly put forward as a tool to fully understand how economic well-being impacts individuals (Stiglitz et al., 2009), however such concepts have been less used when studying the impact of separation on children. Furthermore, most studies have been able to only explore either cross sectional or relatively short term effects of separation on poverty, telling us little about how families recover in the long-term from an initial deterioration to their financial and living standards after separation.

A richer understanding of long-term implications of parental separation on childhood poverty and deprivation can therefore be gained from including a careful consideration of multiple dimensions of childhood deprivation measured over long periods of time. Conceptualizing deprivation longitudinally for children is indeed tricky, as children's requirement and needs may change drastically over time, especially over early childhood: an infant will require different things from a school-aged child.

To deal with this issue, we propose a methodology to capture a longitudinal, age-relevant and child-centered measure of multi-domain deprivation, adapted from concepts and methods such as those presented by Bourguignon and Chakravarty (2003) and Alkire and Foster (2011). We employ a child-centered conceptualisation of deprivation to separate the experience of children from those of parents (for example, rather than looking at changes in maternal mental well being, which a child may not directly experience, one could explore parenting activities and behaviour, which children do experience first-hand, and which may change with deteriorating parental mental health). We do so to attempt capturing parents' strategies to shield children from detrimental consequences of their separation.

In this paper, we therefore propose to study the long-term effects of parental separation on children from birth to age 11, exploring both the dynamics of classic measures of financial constraint (income loss and income poverty), as well as child-centered dimensions of multi-domain deprivation. We will question whether these different measures evolve after parental separation, and through what recovery channels (if recovery happens) they improve. To do so, we use the UK Millennium Cohort Study, a nationally representative cohort of over 18,000 children born in 2000-2 and living in the UK shortly after birth, who were regularly followed from shortly after birth until (currently) age 11.

The paper is set out as follow: after a summary of the relevant literature and a presentation of our conceptual model, the data and the variables used, we first presents the methods to calculate multi-dimensional deprivation and describe our resulting indicators of deprivation; we then focus on the methods and results for our main substantive question, that is, the long-term impact of separation on financial changes and multi-dimensional deprivation.

2 Review of the literature

2.1 The impact of separation on children

In 2014, about a quarter of UK households with dependent children were headed by a single parent (ONS, 2015). Pathways into single parenthood were mostly due to divorce, but since the mid-eighties the importance of childbearing within cohabitation, and the subsequent dissolution of cohabiting relationships, has become increasingly important (Berrington, 2015). Similar trends are also observed for countries such as the US. While therefore both divorce and separation from an unmarried cohab-

itation are now important, the literature on the effects of separation on child outcomes has focused on the consequences of divorce. The experience of parental divorce has been found to be associated with a range of poor outcomes for children, including poor emotional, psychosocial and educational outcomes, while children living in intact two-biological-parent families tend to have the best outcomes (Amato, 2005; Cherlin et al., 1998). These poor outcomes appear to persist into adulthood (McLanahan and Teitler, 1999; Lacey et al., 2014). A meta-analysis by Amato and Keith (1991) showed that parental divorce affected negatively school performance, conduct, mental well-being and the ability to create bonds with peers and their kin. Replicating the same meta-analysis a decade later, Amato (2001) found that the negative effects of divorce persisted, even as divorce became more common and less stigmatised. This is supported by other studies such as Biblarz and Raftery (1999) and Sigle-Rushton et al. (2005).

A dominant pathway explored in the literature to account for the effect of divorce and separation on children is linked to the changes in financial and material conditions that family instability often entails. In the general population, a longstanding line of research has shown that divorce means a drop in income, especially for women and children (Holden and Smock, 1991; McLanahan and Sandefur, 1994; Brewer et al., 2014; Fisher and Low, 2015; Aassve et al., 2007). More recent work has shown a lessening of the loss in womens incomes following divorce as women's employment and earnings have increased, but there is still a substantial loss (McKeever and Wolfinger, 2001; Jenkins, 2008). Income drops appear to be particularly important in the first and second year post-separation and then, for women with dependent children, recover about 3 years post-separation, with however a large heterogeneity (Brewer et al., 2014).

There is little work focusing on the long term recovery channels of income post-separation for households with children. When considering women overall (whether they have co-resident children or not), re-partnering appears to be a key post-separation channel for incomes to recover. Dewilde and Uunk (2008) and Jansen et al. (2009) examine several European countries and find that repartnering has a positive effect on post-divorce incomes; Jansen finds that, particularly for mothers, the benefits of re-partnering outweigh the benefits of re-entering the labour force or increasing work hours. Focusing on young children, research based on the Millennium Cohort Study has shown that changes in income mark family transitions for households with young children (Panico et al., 2010), and the concurrent experience of poverty at age 5 was linked to previous changes in family structure (Kiernan and Mensah, 2010). Studies suggest that these financial implications may explain at least some of

the negative effects of separation on children (Amato, 2005; McMunn et al., 2001; Schoon et al., 2010).

2.2 A better understanding of the experience of childhood deprivation to better understand the impact of separations

Decades of research has shown that children growing up in deprived circumstances have poorer outcomes on a range of domains, perpetuating an inter-generational cycle of disadvantage (Atkinson et al., 1983; Brooks-Gunn and Duncan, 1997; Heckman, 2006; Blanden et al., 2013). Most work on the mechanisms through which separation impacts child outcomes focuses on financial measures such as income. While low income and poverty are indeed key measures for childhood poverty, but such measures assume that household income is a reliable guide to the resources available to the child. This assumption has been increasingly challenged (Guio et al., 2009). First, income data is not always very reliable, particularly at the poorer end of the scale where earnings can be erratic and come from multiple sources. Second, a familys financial security and disposable income are not only based on current household income but also on savings and debts, housing tenure, on financial help available from the wider family, etc. Third, different family compositions can obviously impact on the amount of financial outings a family has. Most researchers get around this by constructing equivalent individual incomes using an equivalence scale. However, scales extensively used in the literature such as the OECD modified scale are outdated and not based on a scientific understanding of household spending patterns. Fourth, some families may be better equipped than others in managing their incomes or in prioritizing them towards childrens needs; income-based indicators ignore the intra-household redistribution of resources (Ravallion, 1996), whereby a child may be in a low income household, but resources are prioritized towards the children, making the child not deprived, and vice versa. Finally, income does not take account of benefits and services such as health care, child care and schooling which may be subsidized or free for some groups. This may be particularly important when children are studied, as these services are often aimed at, or extensively used by, children.

More importantly, work over the past decades by sociologists like Peter Townsend (1979) and economists like Amartya Sen (1999) has demonstrated that poverty is about more than simply being unable to feed oneself and one's family. Those in poverty define their well-being and deprivation as multifaceted, with both financial and non-financial dimensions (such as housing quality, health etc.) regarded as important (Narayan et al., 2000). People value being able to afford participating

in a range of social activities, and social integration is known to be of major importance for health. Recognition of the importance and impact of exclusion from normative or customary social activities has led to definitions of poverty expanding to incorporate aspects of relative deprivation. However, such constructs are difficult to operationalize. For example, in order to compare across a large number of countries, Unicef measures childhood deprivation by defining a list of 14 items considered normal or essential for a child living in a developed country (such as having 3 meals a day, access to suitable books, money to participate in school activities, a quiet place to do homework, some new clothes, the opportunity to invite friends from time to time). A child is considered deprived if he or she does not have access to two or more of these items (Unicef et al., 2013).

While such constructs are useful, they run into three problems: first, while an index such as the Unicef measure may be useful when comparing children of all ages across several countries, it is less useful when comparing a specific age group, especially very young children, who have specific needs. An indicator based on age-specific needs will capture the experience of deprivation of children better and will be more useful in describing the dynamics of deprivation over time (Dickerson and Popli, 2015). Second, research suggests a number of potential dimensions matter to child health and development beyond income and material deprivation: for example poor housing, access to quality education, parental stress and skills and health, their relationships with institutions and their community, and the safety and quality of their local environment. Research is in fact switching from the idea that we should focus on childhood poverty as the best way to explain and address inequalities in child health, towards the idea of childhood disadvantage - which considers that multiple factors in childhood beyond childhood poverty - can negatively affect a childs current condition or decrease chances for positive outcomes later in life (Bradshaw et al., 2007; Tomlinson et al., 2008; Oroyemi, 2009; Nolan et al., 2011). The concept of disadvantage is both more in line with the idea that multiple dimensions of the childs environment matter to child health, but also it is a better suited concept to the idea of gradients in child outcomes as it does not use an arbitrary poverty line to define disadvantage. Third, while indicators such as Unicefs are useful for macro-level analyses across several countries, we can achieve finer and more relevant constructs when using individual-level data. Particularly, when using birth cohorts, such constructs could make better use of the interdisciplinary and longitudinal data available.

Because of the difficulty of constructing indicators that tap into different dimensions of child deprivation in way that is relevant at different ages, and the lack of appropriate data sources to construct

such indicators, little research has been able to look longitudinally into multi-domain childhood deprivation. Notable exceptions include Dickerson and Popli (2015), who similarly use the Millennium Cohort Study to look at how dynamics of deprivation affect child cognitive skills. They construct an indicator of multi-dimensional deprivation by using two waves of data (at about age 5 and 7), therefore looking at deprivation in short term, and only choose indicators that are consistent from wave to wave, therefore not allowing indicators of deprivation to change with child's age and excluding potentially pertinent indicators from their instrument when they were not present at both waves. Their results suggest that many but not all of the children classed using an income poverty measure, and that multidimensional poverty is more persistent over time than income poverty and had a negative impact on children's cognitive skills over and above the negative impact of income poverty.

3 A conceptual framework and hypothesis

The main aim of this paper is therefore to bring together these two strands of literature: the concept of dynamic multi-dimensional deprivation, and the effect of parental separation on childhood living conditions. To our knowledge, there exists no previous study for the UK which combines these two concepts in a systematic and rigorous way.

To do so, we establish a child-centered, life course conceptualisation of childhood deprivation. Income, in a child-centered framework, is a distal factor, that is, children do not directly know or experience financial constraints per se, although they may directly experience its consequences because of the impact on more proximal factors. Different disciplines emphasise different pathways through which poverty may influence children lives. Economist tend to think in terms of parental investments, such as the purchase of goods and services that can be used to invest in the health or human capital of their children (Becker 1981; Mayer 1997; Blau 1999). In this perspective, more economic resources increases the ability to access inputs such as food, high quality schooling and after-school activities, safe housing and neighborhoods. Psychologists and social scientists might instead explore the impact of poverty on family dynamics and relationships (Kiernan and Mensah, 2009; Schoon et al., 2010). These models would suggest that fewer financial difficulties improve parents psychological well-being and therefore their ability to maintain high quality parenting interactions and family routines (Conger et al., 1992). Duncan and Magnuson (2013) bring these two strands together to suggest that poverty affects children's lives through 'what money can buy' (for example, cognitive stimulation,

school quality etc.) and 'family processes' (for example, parenting).

Several factors change around separation: drops in income, one less parent in the household, potentially having to move house and neighborhood. However, from the child's point of view , the "proximal" factors he or she experiences might not change: even in the event of a loss of income, parents might redistribute more income towards to child to keep constant their level of investment, prioritize time with the child in order to maintain the same activities and routines, new housing might be chosen to maintain living standards for the child, perhaps at the detriment of parental living standards.

In this paper we integrate life-course perspective with a child-centered, multi-dimensional deprivation perspective. We will look at how income loss and income poverty and a number of domains of childhood deprivation react to parental separation over a relatively long study period by taking account of the number of years before or after the separation of the observation. To do so, we ask the following questions: ask: How does parental separation affect the experience of childhood poverty and multi-domain deprivation over a long period of time? Do all domains of deprivation react similarly to separation? What are the post-separation channels by which recovery occurs? Do they vary across measures of poverty and deprivation? Finally, because these trajectories and processes might vary according to the pre-separation social and economic resources, we check whether the effects are similar in more and less educated groups.

We compare to children who do not experience parental separation (rather than just comparing to pre-separation income or deprivation). We include a number of socio-demographic controls, described below, in order to check that these dynamics are not driven by background characteristics of the parents and the household. In a final set of models, we include a number of potential recovery channels, such as re-partnering, the labour force participation of the partner, maternal labour force participation, the number of hours worked by mothers, to explore through what pathways the dynamics of poverty and deprivation occur.

There is evidence that children's financial poverty and multidimensional deprivation might be influenced by a number of socio-demographic characteristics which may also be important for parental separation. Thus, we include a range of variables in our empirical model. Family size and birth order has been shown to be significant in long-term outcomes for children (Black et al., 2005). Mother's

age and education are included to capture early disadvantage that the child might face, as young and less-educated mothers often come from disadvantaged backgrounds (Hawkes and Joshi, 2012). Work using the MCS has shown that non-White children are more likely to be disadvantaged across a number of domains (Panico et al., 2007), to capture these difference, we include a dummy for ethnicity. Marital status is linked to both an increased risk of separation for unmarried couples, and to different socio-economic profiles, it is therefore included here. Parenting might vary according to the child's sex and because children may not exactly the same age at each wave, we include controls for these two child characteristics.

We explore a number of potential recovery channels through which financial conditions and deprivation might improve following the shock of the separation. A rich literature mentioned above suggests that re-partnering is an important channel for women to recover from divorce's income loss (Dewilde and Uunk, 2008; Jansen et al., 2009), we therefore look at the presence of a new co-resident partner. Employment is clearly an important channel to increase revenus, we therefore look at both the labour participation of the co-resident partners, and for mothers, we explore whether a increase in working hours post-separation might be used to recover income post-separation.

4 Data

4.1 The Millennium Cohort Study

Our data were drawn from the MCS, a nationally representative prospective cohort study in the UK. The initial sample included 18,818 children in 18,552 families living in the UK at 9 months of age and born between 2000 and 2002 (Dex and Joshi, 2005). An additional 699 children in 692 families were added to the sample at wave 2, bringing the total sample size to 19,517 children in 19,244 households. Households were identified through the Department of Work and Pensions Child Benefit system and selected on the basis of where the family was residing shortly after the focal childs birth. Uptake of the UK Child Benefit is almost universal (98 percent). The sample has a probability design and was clustered at the electoral ward level. The survey design over-sampled areas with high ethnic density, areas of high child poverty, and the three smaller countries of the UK (Northern Ireland, Scotland and Wales). The study mainly consisted of interviews with the primary caregiver. This was the mother in 98 percent of cases at wave 1. Information about the primary caregivers resident partner was also collected in a separate interview with him or her. Respondents were asked about multiple

dimensions of family circumstances, socio-economic and demographic characteristics.

To date, five waves of data have been archived, when the cohort children were about 9 months of age, as well as 3, 5, 7, and 11 years old. Weights which take account of differential sampling and attrition across waves have been used (Hansen, 2012).

4.2 Selection of analytical sample and the issue of attrition

In order to observed the effect of separation on childhood poverty and deprivation, our analytical sample includes children whose parents are in a co-resident relationship at birth of the cohort child. As we assume that twins and triplets living in the same household will experience similar levels of poverty and deprivation, we keep one case per household, that, we randomly choose one child in case of multiple births. Our analytical sample is made up of 12,658 households.

In this sample, we observe the following attrition, as compared to wave 1: 19.3% of observations are not in wave 2, 21% for wave 3, 27.7% for wave 4, and 32% of observations for wave 5. We conducted two different tests to check whether this attrition is related to our outcomes, as suggested by Baulch and Quisumbing (2011). First we estimate attrition probits and test the joint significance of the estimated coefficients Fitzgerald et al. (1998); we then perform a pooling test Becketti et al. (1988). The results of these tests are contradictory, suggesting the endogeneity of attrition is not severe.

The issue of attrition when studying separation has been discussed by Jenkins (2008) and Fisher and Low (2015), both using the British Household Panel Study. In his study of the financial consequences of separations for all adults, Jenkins creates weights to deal with attrition equal to the inverse of the predicted probability of having data on household income for t+1, t+, etc.; his results were not sensitive to the use of these weights. Fisher and Low estimate the correlates of attrition using a probit model, they conclude that attrition is uncorrelated with pre-separation characteristics as this model has low explanatory power. Similarly to Jenkins, we computed inverse probability weights to correct for attrition as suggested in Fitzgerald et al. (1998); Wooldridge (2002). The weights resulting from this correction are very similar to the longitudinal weights computed by the MCS team. For ease of replication, we therefore use the MCS longitudinal weights to correct for attrition.

4.3 Variables used

To model income loss, we construct weekly equivalized weekly income for all households (including households who are not in our sub-sample) to take account of the changing family structure of households around separation. First, to calculate continous yearly income variables we use the self-reported income by the main respondent (usually the mother), which refer to the cohabiting partners earnings as well as any benefits, child maintenance and other sources of revenues generated by the co-resident partners. Income is given in brackets, we draw an income corresponding to the reported bracket, assuming that income is distributed according to a uniform distribution within the bracket. When no information on income is reported, we impute using the predicted income computed by the MCS team (multiplied by 52 to get yearly income). We then construct an equivalence scale equal to the square root of the number of persons living in the household, a method used by several users (OECD, 2009; **?**). The equivalized yearly income is therefore calculated by dividing the constructed yearly income variable by the equivalence scale. Equivalized weekly income is obtained by dividing equivalized yearly income by 52. To construct an indicator of income poverty, we class as poor households whose incomes are 60% of median equivalized weekly income. We compute this poverty line for each wave, taking account of the full MCS sample (and not just our sub-sample).

To look at separation dynamically, we construct a measure indicating, for each wave, the number of years before or after separation we are observing the household at. To do so, we consider the partner (usually the father) to be the person co-residing with the main respondent (usually the mother) at wave 1; in a small number of cases this is not the biological father of the cohort child. For each wave, we use the household grid to construct a dummy variable indicating whether the partner is still present in the household. If they are no longer living in the household and do not come back in a subsequent wave, we consider to be observing a separation. For couples who have separated, we take the date of separation to be the date the partner has left the household. When no date is indicated, we draw a date randomly (following a uniform distribution) between the 2 dates of interview. For those who will not separate over the study period, we use a weighted sum of observed income or deprivation, i.e. if households observed 4 years before separation are observed 60% in wave 1 and 40% in wave 2, the counterfactual for those who do not separate is 60% of the mean income in wave 1 plus 40% of the mean income in wave 2.

We include a number of socio-demographic controls, constructed in a time-varying manner: maternal age at interview; child's age at interview; parental education, equal to the maximum educational attainment among the co resident partners and expressed in NVQs (National Vocational Qualifications)[1]; country of residence at each wave; the number of children in household, including full, half- and step-siblings; occupational class, a binary indicator capturing whether the main respondent's occupational class is a routine or semi-routine occupation. Non time-varying controls include the child's ethnicity, a binary indicator measuring whether the child was identified by the main respondent as being from a majority-White group or not; and the child's sex. Recovery channels are entered in a time-varying manner, and include re-partnering, a binary variable indicating whether the main respondent is not currently in a co-resident relationship; marital status, a binary variable indicating whether the couple is in an unmarried cohabitation or not; whether the co-resident partner is employment; whether the main respondent is employed; whether the main respondent works more than 20 hours per week. While the main respondent could be either the mother or the father of the child, given that she is almost always the mother, for ease of readability we refer to maternal characteristics (for example, maternal employment) for the main respondent, and partner characteristics for the co-resident partner.

5 Multi-dimentional child deprivation

5.1 Methodology

To assess how a life event such as parental separation affects children's risk of multi-domain deprivation, we construct a longitudinal measure of deprivation. To do so, we draw on existing definitions and methodologies of multidimensional poverty (Bourguignon and Chakravarty, 2003; Alkire and Foster, 2011) to measure multidimensional child deprivation in our sample of young British children followed from 9 months to 11 years, allowing it to change over time to account for changing needs. To construct the deprivation index, we follow a similar methodology as in Dickerson and Popli (2015), despite some important differences. The construction of the index relies on the identification of different dimensions of childhood deprivation, which are important at all ages of childhood: material deprivation, extreme material deprivation, leisure activities and parenting involvement. Each dimension is composed of several indicators identifying the lack of a precise item or activity. As children's needs vary as they grows, we allow the indicators to vary over time in order for the dimension to

[1]Briefly, NVQ levels correspond to: NVQ5 - Higher degree, NVQ4 - First degree/diploma, NVQ 3 - A/AS levels, NVQ 2 - GCSE grades A-C, NVQ 1 - GCSE grades D-G; Overseas qualifications are classed separately

remain age-relevant.

The identification of the deprivation status of a child at age a is computed from a vector $X_{ia} = (x_{ia1}, ..., x_{iaK_a})$. Each cell x_{iak} describes the attainment of child i at age a in the indicator k. We code x_{iak} in such a way that the lower x_{iak}, the more severe the deprivation is. Indicators are age-specific and the number of indicators considered is denoted K_a, and can change with the age of the child. Indicators reflect different dimensions d_j of childhood deprivation (material deprivation, parental involvement, etc.). We allow the number of dimensions to change over the child's life, so we denote $\bar{d_a}$ the number of dimensions for a child of age a. In wave 1, when children are infants, we consider 2 dimensions, while in wave 2 (age 3) to wave 5 (age 11) we consider 4 dimensions for each wave. As a consequence, X_{ia} can be written as a array X_{ia}, composed of different vectors so that $X_{ia} = (X_{ia1}, ..., X_{ia\bar{d_a}})$. Each vector X_{iad} is of size K_{da}, so that $\sum_{d=1}^{\bar{d_a}} K_{da} = K_a$.

We adapt the dual cut-off methodology (Alkire et al., 2014) to our framework, so we adopt a triple cut-off methodology. For each indicator x_{iak}, we define a threshold z_{ka} and a binary variable g_{iak} such that the child is considered as deprived in this indicator if $x_{iak} \geq z_{ak}$, in which case $g_{iak} = 1$ and zero otherwise. We define a score c_{ida} for each dimension d, as $c_{ida} = \sum_{k=1}^{K_{da}} g_{ika}$. For each dimension d we define a threshold $\tilde{z}_{ad}$ such that the child is considered as deprived if $c_{ida} \geq \tilde{z}_{ad}$. In other words, if the child is deprived for a number of indicators in dimension d, we consider the child as deprived on that dimension d. We denote δ_{ida} the indicator of deprivation in dimension d, so $\delta_{ida} = 1$ if $c_{ida} \geq \tilde{z}_{ad}$.

In order to define the overall deprivation status of the child, we compute a score of deprivation over dimensions C_{ia}. It is such that $C_{ia} = \sum_{d=1}^{\bar{d_a}} \delta_{ida}$. We define a threshold Z_a such that the child is considered as deprived if $C_{ia} \geq Z_a$ and we denote $D_{ia} = 1$ in this case.

Following this methodology, the identification of deprived children is based on a double counting approach, as we count the number of indicators of deprivation in each dimension and count the number of dimensions in which the child is considered as deprived to define the overall deprivation status. This double counting approach imposes the triple cut-off methodology: we need to define cut-offs to define: (1) deprivation for each indicator, (2) deprivation for each dimension, and (3) overall deprivation in each wave.

This methodology allows following children over their life-course and to make intra-individual

comparisons as we keep constant the main dimensions of deprivation. But it also allow taking into account the changing needs of children according to their age, as the indicator composition of the dimensions varies with the age of children.

5.2 Domains of child deprivation in the UK

To explore childhood deprivation beyond income poverty, we consider a number of dimensions which capture different domains of deprivation which may be faced by children. These dimensions include a range of deprivations which the literature suggests to affect child's well-being. As a child-centered measure aiming at capturing children's experience of deprivation, we focus on dimensions experienced by children, and not more distal factors not directly felt by children, such as parental occupational status or education. This paper does not aim to comprehensively describe childhood poverty and deprivation in the UK, but to provide the best indicator given the available data and our research questions. As with any secondary analysis, the number and types of variables we could include is constrained by what is available in the dataset. Key variables may be not available or describe imprecisely the concepts of interest. Furthermore, identical questions are not included in every wave in order to make the questionnaire age relevant. Therefore, our indicators are not always consistent or collected for all waves. This is however in line with our conceptual framework which states that children's needs evolve over time and the same questions may not be necessarily relevant at all ages. Because the MCS is a household based survey, we focus on deprivation as felt by children within their household, and not in their schools, neighborhoods, or other common areas. While these are important dimensions of deprivation, as depicted by Bronfenbrenner's ecological systems theory Bronfenbrenner (1986), they are not fully explorable in our dataset.

The different indicators and dimensions of deprivation are defined in table 1, they include material deprivation (mostly including housing-related variables such as whether the home is damp or cold, having some baby-safety equipment such as stair-gates, but also owning goods such as a phone, a car, and being able to replace electrical goods such as a fridge when they break); extreme material deprivation (capturing extreme living conditions: not being to afford a coat or appropriate shoes, not having a fridge or washing machine, and, for older children, not having a computer and an internet connection); leisure deprivation (not able to afford holidays, to celebrate special occasions such as Christmas or birthdays, to take part in paying activities such as cinema outings and sports, being able to have friends over); and parenting involvement deprivation (including free activities such as

reading, singing, helping with homework, going to the playground, etc., but also markers of routine such as having regular bedtimes, and for older children, attending parenting-teacher evenings and talking to their child about important things).

We construct an index of deprivation following the methodology presented in section 5. Some normative choices had to be made in order to identify indicators and dimensions of deprivation, they are described here. We first identify potential indicators that may measure child-centered deprivation. First, we couch the choice of these variables partly in the literature. For material deprivation, we aimed to capture missing key household or child items, and we distinguished that from what we termed "extreme material deprivation" to capture a group of children that seemed to be missing basic items which the majority of children their age have. For leisure activities, we chose indicators that show a household's ability to afford normative social events and activities for families and children of that age. For parental involvement, in the MCS a range of variables tap into routines and the home learning environment, which differentiates itself from the "leisure" dimension as it includes activities that can be done usually in the home for free. Second, of the variables selected in the first step, we ran a Multiple Component Analysis of the data to explore which of these potential indicators drove different axes, excluding variables which did not seem to drive any axe. Third, taking all indicators identified in the previous step, we then identified discrete dimensions of deprivation, based on our own selection and a Multiple Component approach to see which clusters of variables emerged. In this step, some variables identified in the first steps were not retained (for example, breastfeeding did not seem to cluster with any other variable).

For the first wave (when the child is 9 months old), we consider 2 dimensions of deprivation: material deprivation and extreme material deprivation. For the following waves (when the cohort child is respectively 3, 5, 7, and 11 years old), we consider 4 dimensions of deprivation: material deprivation, extreme material deprivation, leisure activity and parental involvement. We do not consider leisure activities and and parental involvement at wave 1 for data availability reasons. As a consequence, only wave 2 to wave 5 are considered in the following analysis.

Table 2 presents the proportion of children deprived on each of the indicators and dimensions over the five waves of data under consideration. The table shows that the proportion of children deprived on different dimensions does not change significantly between waves, even though each dimension is not always measured by the same indicators at each wave, and it is not necessarily the same children

who are deprived on each dimension in each sweep.

Material deprivation is described by 7 indicators in wave 1, 4 indicators in wave 2 to 4 and 6 in wave 5. We identify 11.8% of households as deprived on this dimension at wave 1, 24.6% at wave 2, 21.7% at wave 3, 24.8% at wave 4, and 18.6% at wave 5. For extreme deprivation, these indicators identify roughly 1% to 2% of deprived children at each wave. We identify 23 to 26% of children as deprived on the leisure dimensions for wave 2 to 5; and 29% to 36% of deprived children on the parenting dimension.

Figure 1 describe the proportion of children classed as deprived overall in each wave, and the number of dimensions for which they are deprived. In wave 1, we use a cut-off at 1, i.e. we use a union approach: any child being deprived in one of the two dimensions is considered as deprived. For wave 2 to 5, we use a cut-off of 2: a child is considered to be deprived overall if he is classed as deprived on at least 2 dimensions. As a consequence, there is little change in the proportion of children classed as deprived over time, ranging from 23% to 25% of children are considered as deprived in waves 1 to 5.

Table 3 presents the correlations between the four different dimensions of deprivation, both within and between waves. The first quadrant of each column shows the correlations between the different dimensions within each wave. Across all waves, the highest correlation is always between material and leisure deprivation. Parental involvement has the weakest relationship with the other dimensions. The other quadrants represent the relationship of each dimension over time. The diagonal correlations in these quadrants are all large, particularly for material and leisure deprivation, indicating a high degree of persistence in these dimensions. On the other hand, while the autocorrelation for parenting involvement across waves is not insignificant (ranging from 0,18 to 0,11), it is less strong, indicating less of a persistence for this indicator. Finally, the extreme deprivation indicator has lower correlation coefficients both in-wave with other dimensions, and over time, indicating a temporary dimension of deprivation.

Table 4 explores the relationship between different dimensions of deprivation, the overall deprivation index (OD), and income poverty (IP). Households are classed as income poor when their income is less than 60% of the median equivalised household income. The first row shows that just over 17% of MCS households were poor at each wave. Each cell in the table then cross-tabulates children in IP with each of the four dimensions of deprivation and the overall deprivation index. The largest overlap

of income poverty is however not with material deprivation but with leisure deprivation, from wave 2 onwards about 9% of children are both income poor and deprived on (paying) leisure activities. The table also highlights that income poverty does not always overlap with deprivation: children can be income poor and not be classed as deprived in one of our dimensions. For example, about 10% of children who are income poor are not materially deprived. And vice versa, children who are not classed as income poor may be classed as deprived in one of our dimensions. This is most striking for parental involvement, where, from wave 2, about 20 to 30% of children are not income poor but deprived on this dimension. Even with different indicators in each wave, the proportion of children in each cells (both income poor and deprived, not income poor but deprived, income poor but not deprived, neither poor nor deprived) is consistent over time, indicating a relative stability of our dimensions past the infant stage.

5.3 Who is identified as deprived?

Table 5 presents the odds-ratio from a logit estimation estimating who is classed as income poor, deprived in our overall index, and deprived on each dimension. Across the waves, we see an age gradient for income poverty, overall deprivation, material deprivation, and leisure deprivation, with household with younger mothers more at risk to be classed as poor or deprived. We still observe the age gradient for extreme material deprivation but it is not as strong as for other dimensions. The age gradient goes in the opposite direction for parenting involvement: children of older mothers are more at risk of deprivation in parenting involvement. There were higher levels of income poverty in Wales and Northern Ireland than in England, but fewer levels of material deprivation. Deprivation in parenting involvement seems to be stronger in Wales, Scotland and Northern Ireland than in England. Non-white cohort child as well as children in larger families are more likely to be income poor or deprived, whatever the dimension. We observe a strong educational gradient for income poverty, and while this gradient was observed across the overall and disaggregated deprivation measure, it was less pronounced. The characteristics of the child are not strongly associated to a higher risk of child deprivation, although older children tend to be slightly more deprived, and female children tend to be less deprived. We control for the wave, in order to take into account differences in the construction of the index. Children observed in wave 5 are less likely to be overall deprived and deprived in parenting involvement.

As the index of deprivation are constructed from wave-specific indicators, we also explore the characteristics of deprived children wave by wave. The results of the logit estimation are presented

in the appendix. Interestingly, the link between individual characteristics and measures of deprivation are similar for all waves.

6 The relationship between parental separation and poverty

6.1 Parental separation

The last panel of table 7 shows the timing of parental separation in our sample. In total, about 23% of couples in our sample will separate before the child turns 11. Only 0.2% of couples have separated by wave 1, when the child is about 9 months old. 6.3% of couples have separated by wave 2 (when the cohort child is 3 years old), 12.2% by wave 3 (5 years old), 16% by wave 4 (7 years of age), and by our last wave (age 11), all couples in our sample who separate (i.e. 23%) will have obviously done so.

Couples who will separate and those who don't over our study period will differ by a number of characteristics, as shown in table 6. Couples who will separate are less educated than those who don't separate; they are more likely to be white and more likely to have a routine or semi-routine occupation. At wave 1, couples who separate are more likely to be cohabiting rather than being married, the partner is less likely to be working and mothers are less likely to participate in the labor market than those who don't separate. Because of these crucial differences, and because these factors are also associated to poverty and deprivation (tables 5), these variables will be included as controls in our subsequent models assessing the relationship between separation and poverty and deprivation.

Descriptive analyses show that separation is associated with lower incomes, income poverty, and deprived (see table 7). However this table also shows that households who will experience parental separation were already more likely to be poor, deprived, etc. before separation occurs than those who will not separate. This pattern is consistent across waves and across domains of deprivation, although these differences (pre-post separation; pre-separation and non-separated) are much less pronounced for parenting involvement, particularly at later waves, with no difference in the proportion classed as deprived for this dimension for those who will experience separation (but are not separated yet) versus those who will not separate yet in waves 3 and 4.

6.2 Parental separation and the dynamics of poverty and deprivation

6.2.1 Estimation strategy

We conduct a fixed effect analyses by pooling all the waves and estimating the following equation:

$$y_{it} = \alpha_0 + \alpha_t + \alpha_i + \sum_{\tau} \delta_\tau \mathbb{1}\{Z_i = 1, d_i = \tau\} + \beta X_{it} + \varepsilon_{it} \quad (1)$$

where α_0 is a constant, the α_t are the wave fixed-effects, capturing the differences in deprivation across waves. These differences reflects common wave specific fixed effect but also differences in the construction of the dimensions across waves. The α_i are individual fixed effects. They control for all time-invariant characteristics of children, such as the education of mothers, the country of birth, etc. The variables d_i indicate the duration from separation for children whose parents separate during the period, i.e. children with $Z_i = 1$ where Z_i is a dummy variable for couples who separate over the period. The $\delta_{\tau t}$ measure the evolution of the propensity to be considered as deprived τ years after the separation of parents. The X_{it} is the set of time-varying demographic controls: mother's age, country, number of siblings, highest level of education among parents, routine/semi-routine occupation of the mother, age of the child.

In order to understand the potential recovery from separation, we estimate the following model:

$$y_{it} = \alpha_0 + \alpha_t + \alpha_i + \sum_{\tau} \delta_\tau \mathbb{1}\{Z_i = 1, d_i = \tau\} + \gamma W_{it} + \beta X_{it} + \varepsilon_{it} \quad (2)$$

where W_{it} is a set of time-varying variables indicating some potential recovery channels: the current relationship status as a way to measure the impact of repartnering as a recovery channel (being single as compared being in a relationship), not having a partner or a non working partner (as we control for the marital status, the coefficient indicate the marginal impact of being in a relationship with a non working partner, while the total impact of being single is equal to this coefficient plus the coefficient of being single), a dummy indicating if the mother is active on the labor market, and an additional dummy indicating whether the mother works more than 20 hours per week.

Table 8 presents the result of the estimation of eq. 1 and 2. We estimate the model for 6 outcomes. In table 8, panel A, we present the results for the propensity of being income poor (IP) and we consider the propensity of being deprived as constructed in section 5. In panel B and C, we dis-aggregate the index of deprivation and we consider the propensity of being deprived on the 4

dis-aggregated dimensions of deprivation considered. For each outcome, we present the result of the estimation of three models, derived from eq. 1 and 2. The first column presents the estimation with demographic control X_{it} but not the recovery channels W_{it}. The second, third and fourth columns present respectively the result of the estimation with both controls and the relationship status, with both controls and the labor force supply of mothers and with both controls and all recovery channels.

It is important to note that our estimation strategy allows accounting for individual fixed-effects. It means that we estimate how the situation of the same individual changes over time, around separation. Our modeling approach controls for all unobserved individual characteristics, as long as they are not time-varying characteristics.

6.2.2 Results on the main effects

Unsurprisingly, our results show that separation is associated with the risk of income poverty, especially right after separation. When controlling for demographic characteristics, the risk of income poverty is 24% higher in the short-term and it is still 10.4% higher after separation on the long-term as compared to children whose parents do not separate over the study period. When introducing potential recovery channels, the risk of income poverty decreases and is no longer significant in the long run but still low and significant in the short run. Income poverty is highly related to living in a single mother household and having a non working partner. Interestingly, the estimated coefficient is negative on the long-term, indicating mothers who separate and then re-partnered with someone in employment are better protected from income poverty in the long-term. The table shows that, even though the overall deprivation index is associated with separation, it is much more stable than the or income poverty over time. The separation of the parents is associated with a 9% increase in the risk of being deprived in the short-term, this appears to be a short-term effect that is no longer significant in the long-term. And when controlling for recovery channels, the risk of deprivation is no longer significantly related to separation in the short run either (except in the very short-run). Indeed, it is related to not having a partner or a non working partner: both being single and the absence of an additional source of income explain the deprivation status.

We now turn to the results on different dimensions of deprivation, as presented in table 8, panel B and C. Our results show that separation is associated with a higher risk of material deprivation, right after separation. This tends to recover over time (and appears to be even slightly negative

on the long-term). Interestingly, the estimated coefficient are also not strongly affected by the introduction of the recovery channels. Even though the absence of an additional source of income (through the absence of partner or of an employed partner) is associated with a higher risk of being materially deprived, and mothers working more than 20 hours per week decrease the risk of material deprivation, adding these recovery channels does not decrease the higher risk of material deprivation right after separation. For extreme material deprivation, separation is associated with a higher risk of deprivation, especially in the mid-run (2 to 7 years after separation), and does not appear to be affected by the recovery channels. Deprivation in leisure activities is strongly affected by separation, and this dynamic appears to be particularly sensitive to recovery channels, particularly maternal re-partnering (unlike models for material and income deprivation, where having an employed partner was more important than re-partnering *per se*, for leisure activities we find a smaller importance of having a partner in work). Finally, there was no association between separation and parenting involvement, suggesting that any differences between households who have or will experience separation and those who do not are included in the individual fixed effect.

6.2.3 Results on the heterogenous effects

Finally, we investigate the heterogeneity in the effect of separation on childhood poverty and deprivation by splitting our sample in two sub-samples, contrasting households were mothers had at least an A-level to those who had less than an A-level (this roughly translate into splitting the sample between mothers who had achieved an upper-secondary qualification versus those who had not).

Our results (in table 9) show interesting differences between children whose mothers had more or less educational qualifications. The pattern in the impact of separation and the role of the recovery channels for less educated mothers is consistent with the full sample effects. In the short term, children whose mothers were mother educated had an increased of being overall deprived and deprived on leisure activities post separation; there is no impact on other dimensions. However, in the long run for this more advantaged group the separation of parents is associated to a *decrease* in the risk of being deprived, especially in material deprivation and deprivation in parenting involvement.

7 Conclusion

This paper documents the long term effects of parental separation during childhood on classic dimensions of financial constraints, as well as a number of child-centered domains of deprivation. We have suggested a methodology to construct a child-centered, lifecourse, multidimensional measure of deprivation which takes account of children's changing ages and needs, based on secondary data sources. We show that, while using income is perhaps easier and more understandable, it alone does not fully described the deprivation felt by children, and the impact of separation on children's lives.

We find evidence of a very strong negative effect of parental separation on income loss and poverty, with a sharp drop in household income in the short term, and only a partial catch up in the long term. Looking at multiple dimensions of deprivation however allowed nuancing the experience of children following parental separation, highlighting potential strategies that parents might adapt post separation to ease the burden of separation on their children. While we found strong effects of parental separation on leisure deprivation (for example, being able to afford holidays), we found a much weaker effect on material deprivation, perhaps highlighting parental prioritization of reduced resources towards basic goods and living standards for their children. We also notably do not find an impact of parental separation on parental involvement, potentially showing how, during the chaotic time around separation, parents prioritize maintaining parenting activities and routines with their children. These results are average effects for our entire sample. As shown in descriptive analyses, couples who will separate are already deprived on a number of domains before separation, therefore our results point to a cumulative effect, with separation adding one more domain of deprivation to already disadvantaged households. Furthermore, heterogeneous effects exist, and the post-separation trajectories of children living with more and less educated mothers differ, suggesting that the pre-separation parental social and economic capital may play an important role.

Parental separation during childhood therefore appears not to precipitate a deterioration in parenting quality, however the financial constraints a separation involves appear to have a short term impact on material deprivation, and a more pronounced and persistent impact on families being able to afford normative, leisure activities such as taking holidays and taking part in activities which require a financial outlay. These findings therefore point towards policy avenues that support households with children financially during the time of separation.

7.1 Future work

A number of potential avenues to extend this paper will be considered. One of the strenghts of the methodology used in this paper to construct multi-dimensional deprivation is that we can also study the depth of deprivation by looking at the number of deprivations children experience. This may help better nuance whether the deprivation experienced is severe, and how the severity of deprivation reacts to parental separation. Additional recovery channels will be explored too, notably whether parents and children move in with the child's grandparent post-separation as a strategy to improve material standards of living. While in the majority of cases in the Millennium Cohort Study, mothers have custody of the cohort children post-separation, we will also pay more attention to the post-separation living arrangements of children, controlling notably for shared custody and the time spent with a non-resident parent.

Subgroup analyses are also likely to be important: (1) to capture the unequal distribution of deprivation(s) across different population groups, as different groups may experience poverty and deprivation differently; this would allow identifying which the households are most at risk of deprivation and in which dimension they are most at risk; (2) different groups may have different reactions to separation. For example, households who prior to separation were not poor may be more severally affected by income loss at separation than those who were already poor before separation, but they may be better protected from the risk of material deprivation. Other potential sub-groups we would like to analyse include migrants (if sample sizes allow), and examine separately those who will repartner after separation versus those who remain single, as the dynamics of poverty and deprivation might be quite different from these two groups.

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Figure 1: Proportion of multi-dimensional deprived children

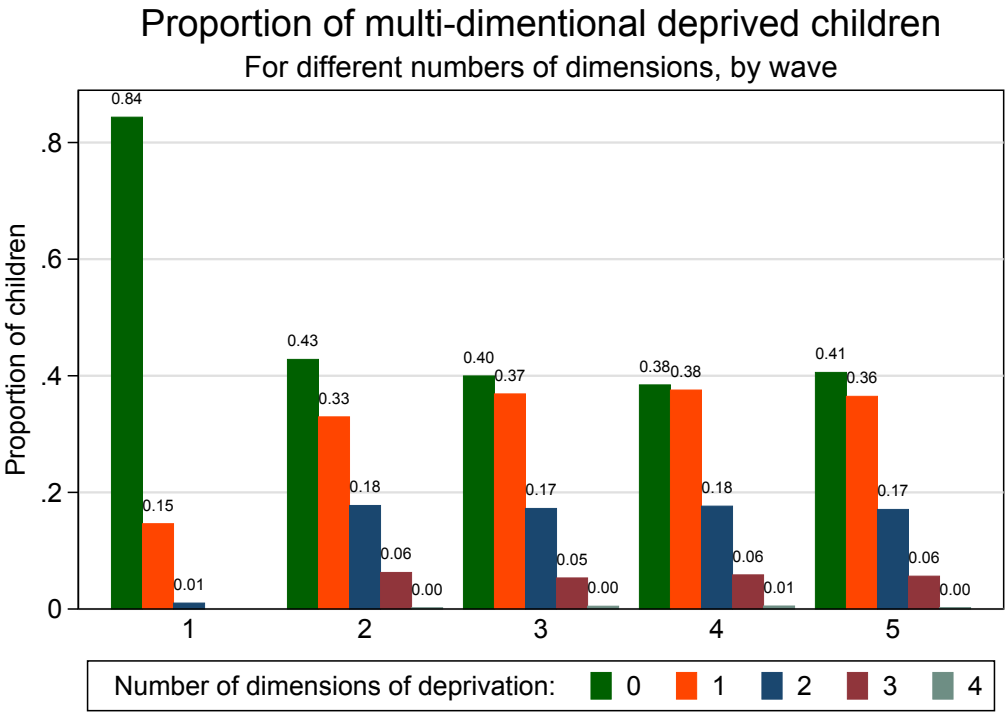

Table 1: Definition of deprivation indicators and cut-offs

	Wave 1	**Wave 2**	**Wave 3**	**Wave 4**	**Wave 5**
Material deprivation					
Phone	No phone		No phone		
Car	No car	No car		No car	No car
Replace or repair electrical goods if broken					Cannot afford it
Temperature in child's room	Cold or Very cold				
Damp in rooms (excl. Kitchen and bathroom)	Yes, there is damp	From "not much a problem" to "Great Problem"	From "not much a problem" to "Great Problem"	From "not much a problem" to "Great Problem"	From "not much a problem" to "Great Problem"
Share bedroom (not his own bedroom)					share a bedroom
Quiet place where the child is able to make his/her homework					No place
Overcrowding housing (Nb of rooms/Nb of people)	< 1	< 1	< 1	< 1	< 1
Number of child's security items	0 or 1 security item				
Central heating (or: No heating, Coal fires, Wood fires or stoves, Gas fires, Electric fires, Paraffin heaters)	No central heating	No central heating	No central heating	No central heating	
Number of indicators	7	4	4	4	6
Cut-off	2	1	1	1	2
Extreme materiel deprivation					
Fridge	No fridge				
Washing machine	No washing machine				
Weatherproof coat		Cannot afford it	Cannot afford it	Cannot afford it	
2 pairs of weatherproof shoes			Cannot afford it	Cannot afford it	
Fitted shoes		Cannot afford it			
Computer					No computer
Internet					No internet at home
Number of indicators	2	2	2	2	2
Cut-off	1	1	1	1	2
Leisure activities					
Number of activities (go to: play, museum, zoo, cinema, funpark, sport)			Did 0 or 1 type of leisure activity over the past 12 months	Did 0 or 1 type of leisure activity over the past 12 months	
Go on holiday once a year not staying with relatives		Would like to, but cannot afford it	Would like to, but cannot afford it	Would like to, but cannot afford it	Would like to, but cannot afford it
Have celebration on special occasions, such as birthdays, Christmas or other religious festivals		Did not do anything special on third birthday	Would like to, but cannot afford it	Would like to, but cannot afford it	Would like to, but cannot afford it
Does [child name] have friends around for tea or a snack once a fortnight?					Would like to, but cannot afford
Visit, or had not been visited by, friends who have young children in the last month		Did not			
Number of indicators		3	3	3	3
Cut-off		1	1	1	1
Parenting involvement					
How often read to child		less than once a week	Less than once a week	Less than once a week	
How often teach child songs/poems/rhymes		Less than twice a week			
Number of skills child is being helped to learn among: alphabet, counting and sport		0 or 1			
Help with reading, writing, maths (incl. homework for W3, excl. homework for W4)			None or less than twice a week in at least 2 activities	Nobody at home	
How often does anyone at home help with [child name]'s homework					Nobody at home
How often does anyone at home make sure [child's name] has finished [his/her] — homework before doing other things such as watching TV, going out with friends					Nobody at home
Number of activities with parents among : telling stories, music, painting or drawing, go to the park			Do 0 or 1 activity once a month	Do 0 or 1 activity once a month	
Number of activities with parent among: active games, in-door games			0 activity	0 activity	0 activity
Regular bedtime		Never	Never	Never	Never
Regular mealtime		Never or Sometimes			
Attend parents' evening			No	No	No
Talk with the child about important things to him/her					Less than twice a week
Number of indicators		5	6	6	6
Cut-off		1	1	1	1
Overall deprivation					
Number of dimensions	2	4	4	4	4
Cut-off for overall deprivation	1	2	2	2	2

Table 2: Proportion of children deprived on different indicators, by dimensions

	W1 (age 9m.)	W2 (age 3)	W3 (age 5)	W4 (age 7)	W5 (age 11)
Material deprivation					
No central heating	7.0	5.1	4.6	4.0	.
No phone	1.7	.	3.7	.	.
No car	8.6	7.0	.	6.4	6.4
Temperature in child's room	5.4	.	.	.	.
Damp	12.3	12.7	11.1	13.1	15.0
Overcrowding	8.2	6.3	6.5	7.3	16.5
Security	7.7	.	.	.	.
Repair elec. goods	.	.	.	.	8.6
Own bedroom	.	.	.	.	19.9
Quiet place homework	.	.	.	.	3.0
Deprived on MD	11.8	24.6	21.7	24.8	18.6
Extreme material deprivation					
No fridge	0.5	.	.	.	.
No washing machine	1.5	.	.	.	.
Cannot afford fitted shoes	.	0.7	.	.	.
Cannot afford all weather shoes	.	.	1.5	1.6	.
Cannot afford waterproof coat	.	0.2	0.5	0.4	.
No computer	.	.	.	.	2.0
No internet	.	.	.	.	1.8
Deprived on EMD	1.7	0.9	1.8	1.8	0.8
Deprivation in leisure					
Cannot afford holidays	.	19.7	21.7	21.1	22.3
Cannot afford birthdays	.	2.0	1.1	0.9	1.3
No visit to young children	.	7.0	.	.	.
0 or 1 activity	.	.	5.4	2.9	.
Cannot afford inviting friends	.	.	.	.	3.8
Deprived on Leisure	.	25.6	24.6	22.6	23.9
Deprivation in parenting involvement					
Teach songs	.	14.5	.	.	.
Help with alphabet, sport, counting	.	5.9	.	.	.
Read to child	.	4.3	3.9	3.7	.
Few parental activities	.	.	3.0	7.7	.
Help with reading/writing/math	.	.	25.2	21.9	.
Help with homework	.	.	.	.	8.5
Check homework	.	.	.	.	5.6
No usually bedtime	.	5.6	3.6	3.1	2.6
No usually mealtime	.	6.4	5.0	.	.
Never go to parent evening meeting	.	.	4.1	2.5	2.3
No active or in-door game with child	.	.	3.0	7.2	17.4
Talk $\leq$ once/week about important things	.	.	.	.	11.5
Deprived on parenting	.	29.4	34.5	35.4	36.6
Observations	12,658	10,211	9,997	9,155	8,609

Source: Millennium Cohort Study
Sample includes children whose parents are in couple at birth

Table 3: Correlation between dimensions of deprivation

		Wave 2 (age 3)				Wave 3 (age 5)				Wave 4 (age 7)				Wave 5 (age 11)			
		MD	EMD	LD	PI	MD	EMD	LD	PI	MD	EMD	LD	PI	MD	EMD	LD	PI
Wave 2 (age 3)	MD	1.00															
	EMD	0.05	1.00														
	LD	0.27	0.11	1.00													
	PI	0.10	0.02	0.13	1.00												
Wave 3 (age 5)	MD	0.37	0.06	0.17	0.08	1.00											
	EMD	0.09	0.06	0.11	0.04	0.10	1.00										
	LD	0.25	0.08	0.41	0.12	0.18	0.18	1.00									
	PI	0.07	0.03	0.09	0.18	0.07	0.04	0.09	1.00								
Wave 4 (age 7)	MD	0.40	0.07	0.22	0.10	0.40	0.12	0.27	0.06	1.00							
	EMD	0.09	0.07	0.14	0.06	0.08	0.34	0.16	0.05	0.12	1.00						
	LD	0.22	0.10	0.36	0.10	0.17	0.16	0.49	0.07	0.26	0.20	1.00					
	PI	0.00	0.02	0.05	0.11	0.01	0.02	0.03	0.17	0.03	0.03	0.05	1.00				
Wave 5 (age 11)	MD	0.31	0.08	0.25	0.12	0.26	0.12	0.30	0.07	0.35	0.11	0.30	0.03	1.00			
	EMD	0.06	0.02	0.05	0.03	0.05	0.05	0.06	0.05	0.08	0.10	0.11	0.02	0.10	1.00		
	LD	0.22	0.09	0.31	0.10	0.16	0.10	0.38	0.07	0.22	0.14	0.41	0.05	0.31	0.08	1.00	
	PI	0.05	0.01	0.08	0.12	0.04	0.02	0.06	0.15	0.05	0.04	0.07	0.18	0.08	0.03	0.08	1.00

Source: Millennium Cohort Study

Sample includes children whose parents are in couple at birth

Table 4: Relationship between income poverty and deprivation on different dimensions

	Wave 2 (age 3)			Wave 3 (age 5)			Wave 4 (age 7)			Wave 5 (age 11)		
		IP = 0	IP = 1		IP = 0	IP = 1		IP = 0	IP = 1		IP = 0	IP = 1
		82.1	17.9		82.6	17.4		81.8	18.2		82.1	17.9
OD = 0	79.0	70.5	8.5	79.7	70.2	9.5	79.3	70.1	9.1	80.2	70.7	9.5
OD = 1	21.0	11.7	9.3	20.3	12.4	7.9	20.7	11.7	9.1	19.8	11.4	8.4
MD = 0	75.4	67.2	8.3	78.3	68.0	10.3	75.2	66.9	8.4	81.4	71.1	10.3
MD = 1	24.6	15.0	9.6	21.7	14.6	7.1	24.8	15.0	9.8	18.6	11.0	7.6
EMD = 0	99.1	81.7	17.4	98.2	81.8	16.4	98.2	81.1	17.1	99.2	81.8	17.4
EMD = 1	0.9	0.4	0.5	1.8	0.8	1.0	1.8	0.7	1.1	0.8	0.3	0.6
LD = 0	74.4	66.5	7.9	75.4	67.9	7.5	77.4	68.9	8.5	76.1	67.6	8.5
LD = 1	25.6	15.7	9.9	24.6	14.7	9.9	22.6	13.0	9.6	23.9	14.5	9.4
PI = 0	70.6	60.2	10.4	65.5	55.0	10.5	64.6	53.3	11.4	63.4	53.5	10.0
PI = 1	29.4	22.0	7.5	34.5	27.6	6.9	35.4	28.6	6.8	36.6	28.6	8.0

Source: Millennium Cohort Study

Sample includes children whose parents are in couple at birth

Table 5: Odds-ratio from logit estimation

	(1) IP		(2) OD		(3) MD		(4) EMD		(5) LD		(6) PI	
main												
Mother's age: 20-24	7.173**	(0.525)	3.779**	(0.264)	4.055**	(0.277)	1.743**	(0.376)	3.104**	(0.210)	1.063	(0.071)
Mother's age: 25-29	3.050**	(0.145)	2.005**	(0.090)	2.003**	(0.086)	1.958**	(0.264)	1.976**	(0.083)	0.915*	(0.036)
Mother's age: 30-34	1.479**	(0.060)	1.328**	(0.048)	1.307**	(0.045)	1.357*	(0.170)	1.343**	(0.045)	0.890**	(0.026)
Mother's age: 40-44	0.846**	(0.039)	0.939	(0.037)	0.891**	(0.033)	1.221	(0.168)	0.865**	(0.032)	1.151**	(0.034)
Mother's age: 45-49	0.901	(0.060)	0.849**	(0.051)	0.749**	(0.044)	1.061	(0.236)	0.809**	(0.045)	1.164**	(0.051)
Mother's age: $\geq$ 50	1.416**	(0.183)	0.715*	(0.101)	0.526**	(0.079)	1.370	(0.632)	0.885	(0.106)	1.452**	(0.138)
Wales	1.346**	(0.084)	0.957	(0.058)	0.975	(0.056)	0.777	(0.169)	0.953	(0.053)	1.015	(0.048)
Scotland	1.025	(0.055)	1.094+	(0.052)	1.103*	(0.049)	0.832	(0.146)	0.985	(0.044)	1.146**	(0.042)
Nothern Ireland	1.351**	(0.101)	0.806**	(0.061)	0.623**	(0.048)	0.453*	(0.152)	0.866*	(0.060)	1.319**	(0.075)
Has two children	1.044	(0.048)	1.086+	(0.047)	1.058	(0.043)	1.143	(0.179)	0.889**	(0.033)	1.279**	(0.043)
Has three children or more	2.052**	(0.096)	2.439**	(0.106)	2.632**	(0.109)	2.003**	(0.307)	1.440**	(0.056)	1.618**	(0.057)
Non white	3.184**	(0.151)	2.513**	(0.110)	2.077**	(0.089)	1.120	(0.156)	2.391**	(0.101)	1.397**	(0.055)
Routine/semi routine occ.	0.844**	(0.033)	1.069+	(0.038)	1.024	(0.036)	0.541**	(0.075)	1.077*	(0.036)	1.073*	(0.032)
None or overseas	13.294**	(0.844)	6.408**	(0.380)	4.397**	(0.258)	9.917**	(1.553)	6.052**	(0.355)	2.027**	(0.111)
NVQ 1	7.304**	(0.481)	4.049**	(0.257)	2.809**	(0.178)	8.836**	(1.501)	4.009**	(0.248)	1.680**	(0.101)
NVQ 2	3.460**	(0.130)	2.535**	(0.087)	1.840**	(0.061)	4.632**	(0.599)	2.420**	(0.077)	1.429**	(0.041)
NVQ 3	2.051**	(0.088)	1.513**	(0.060)	1.323**	(0.050)	2.155**	(0.346)	1.663**	(0.060)	1.126**	(0.036)
NVQ 5	0.457**	(0.031)	0.653**	(0.034)	0.827**	(0.037)	0.420**	(0.126)	0.621**	(0.030)	0.901**	(0.030)
Child age (in years)	1.110+	(0.062)	1.153**	(0.059)	1.008	(0.050)	1.122	(0.190)	0.976	(0.047)	1.144**	(0.047)
Female child	1.013	(0.030)	0.901**	(0.024)	0.936**	(0.024)	1.009	(0.088)	1.022	(0.025)	0.845**	(0.018)
Wave 3 (age 5)	0.928	(0.115)	0.765*	(0.087)	0.883	(0.097)	1.687	(0.629)	1.114	(0.118)	0.909	(0.083)
Wave 4 (age 7)	0.994	(0.233)	0.662+	(0.142)	1.161	(0.241)	1.499	(1.057)	1.180	(0.238)	0.692*	(0.120)
Wave 5 (age 11)	0.808	(0.367)	0.414*	(0.172)	0.890	(0.359)	0.479	(0.657)	1.675	(0.654)	0.405**	(0.136)
Observations	37972		37972		37964		37972		37972		37972	

Exponentiated coefficients; Standard errors in parentheses

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

Data: Millennium Cohort Syrvey - Sample includes children whose parents are in couple at birth

Table 6: Descriptive statistics at wave 1

Prop. whose partner leaves	19.3%			
	Not separated	Separated	Diff	
Mean age at MC birth	30.9	28.5	-2.4	[0.000]
Educ.: None or oversea (in%)	4.9	6.3	1.4	[0.005]
Educ: NVQ1	3.5	5.1	1.6	[0.000]
Educ: NVQ2	21.7	30.4	8.8	[0.000]
Educ: NVQ3	16.0	19.6	3.6	[0.000]
Educ: NVQ4	44.6	34.1	-10.5	[0.000]
Educ: NVQ5	9.4	4.6	-4.8	[0.000]
England (in%)	81.0	84.7	3.7	[0.000]
Wales (in%)	5.2	5.1	-0.0	[0.960]
Scotland (in%)	10.0	7.8	-2.3	[0.001]
North. Ireland (in%)	3.8	2.3	-1.4	[0.001]
No child at MC birth (in%)	40.9	42.4	1.5	[0.176]
One child at MC birth (in%)	38.5	35.4	-3.1	[0.005]
Two children or more at MC birth (in%)	20.6	22.2	1.6	[0.086]
White (in%)	90.4	94.2	3.7	[0.000]
Routine/Semi-routine occupation (in%)	12.2	15.1	2.9	[0.000]
Female child	48.9	49.3	0.4	[0.718]
Cohabiting couple (W1)	24.3	46.2	21.9	[0.000]
No or non working partner (W1)	7.6	13.5	5.9	[0.000]
Mother works $\geq$ 20h/week (W1)	36.0	31.5	-4.4	[0.000]
Mother active (W1)	62.5	58.8	-3.6	[0.001]
MC's age at separation	-	5.2		
N	10,244	2,414		

Data: Millinnium Cohort Study - Waves 1 to 5. P-values into brackets.

Table 7: Income and deprivation measures around separation

	Wave 1 (age 9m)	Wave 2 (age 3)	Wave 3 (age 5)	Wave 4 (age 7)	Wave 5 (age 11)
Equivalized weekly income					
Child bef. parents' sep.	220.3	254.5	280.4	317.8	.
Child aft. parents' sep.	188.1	144.4	172.0	198.3	224.1
Child whose parents don't sep	279.2	312.0	326.0	370.2	393.1
Child bef. parents' sep.	22.5	20.5	17.8	17.5	.
Child aft. parents' sep.	30.1	60.5	50.5	47.5	38.3
Child whose parents don't sep	13.9	14.0	12.2	12.2	11.9
Overall deprivation					
Child bef. parents' sep.	18.7	26.7	23.7	23.2	.
Child aft. parents' sep.	29.1	48.4	35.3	37.4	33.2
Child whose parents don't sep	11.3	17.8	17.5	17.1	15.8
Material deprivation (MD)					
Child bef. parents' sep.	17.2	30.9	24.1	25.7	.
Child aft. parents' sep.	26.9	49.8	28.2	39.3	29.0
Child whose parents don't sep	10.5	21.5	20.4	21.7	15.5
Extreme Material deprivation (EMD)					
Child bef. parents' sep.	2.3	1.3	2.2	1.9	.
Child aft. parents' sep.	6.5	3.1	3.8	3.8	2.3
Child whose parents don't sep	1.5	0.6	1.4	1.4	0.4
Leisure deprivation (LD)					
Child bef. parents' sep.	.	32.3	31.8	26.0	.
Child aft. parents' sep.	.	54.9	46.6	43.6	40.2
Child whose parents don't sep	.	22.1	20.3	18.0	19.0
Parenting involvement (PI)					
Child bef. parents' sep.	.	33.0	34.1	35.1	.
Child aft. parents' sep.	.	36.5	38.1	34.7	40.4
Child whose parents don't sep	.	28.2	34.0	35.6	35.4
Timing of separation					
Parents don't separate	80.7	79.5	78.2	78.2	77.0
8 to 11 years bef. sep.	3.8	1.1	0.0	0.0	0.0
5 to 7 years bef. sep.	5.2	4.4	2.4	0.0	0.0
3 or 4 years bef. sep.	4.4	3.8	3.3	2.4	0.0
1 or 2 years bef. sep.	5.6	4.9	3.9	3.4	0.0
0 or 1 year aft. sep.	0.2	5.0	5.0	4.2	2.9
2 or 3 years aft. sep.	0.0	1.3	5.8	5.0	3.9
4 to 7 years aft. sep.	0.0	0.0	1.4	6.8	9.4
8 to 11 years aft. sep.	0.0	0.0	0.0	0.0	6.8
N	12,658	10,211	9,997	9,155	8,609

Source: Millennium Cohort Study
Sample includes children whose parents are in couple at birth

Table 8: Results from fixed-effect regression

Panel A														
	Income Poverty								Overall Deprivation					
0 or 1 year aft. sep.	0.236**	(0.014)	0.038*	(0.018)	0.237**	(0.014)	0.037*	(0.018)	0.086**	(0.015)	0.036+	(0.019)	0.086**	(0.015)	0.036+	(0.019)
2 or 3 years aft. sep.	0.219**	(0.015)	0.032+	(0.018)	0.218**	(0.015)	0.030+	(0.018)	0.052**	(0.016)	0.005	(0.020)	0.052**	(0.016)	0.005	(0.020)
4 to 7 years aft. sep.	0.165**	(0.016)	0.004	(0.018)	0.164**	(0.016)	0.001	(0.018)	0.049**	(0.017)	0.009	(0.020)	0.049**	(0.017)	0.008	(0.020)
8 to 11 years aft. sep.	0.104**	(0.024)	-0.039	(0.025)	0.101**	(0.024)	-0.044+	(0.025)	0.015	(0.025)	-0.020	(0.027)	0.015	(0.025)	-0.021	(0.027)
No partner			0.280**	(0.016)			0.282**	(0.016)			0.068**	(0.015)			0.069**	(0.015)
Non working partner			0.201**	(0.011)			0.204**	(0.011)			0.035**	(0.011)			0.035**	(0.011)
Mother works $\geq$ 20h/week					-0.067**	(0.006)	-0.074**	(0.006)					-0.014*	(0.007)	-0.015*	(0.007)
Mother in labor market					-0.040**	(0.007)	-0.036**	(0.007)					-0.009	(0.008)	-0.008	(0.008)
Panel B														
	Material Deprivation								Extreme Material Deprivation					
0 or 1 year aft. sep.	0.047**	(0.015)	0.038+	(0.019)	0.048**	(0.015)	0.038+	(0.019)	0.011*	(0.005)	0.007	(0.008)	0.011*	(0.005)	0.007	(0.008)
2 or 3 years aft. sep.	-0.005	(0.016)	-0.013	(0.020)	-0.005	(0.016)	-0.014	(0.020)	0.017**	(0.006)	0.014+	(0.008)	0.017**	(0.006)	0.014+	(0.008)
4 to 7 years aft. sep.	0.015	(0.016)	0.007	(0.019)	0.015	(0.016)	0.007	(0.019)	0.020**	(0.006)	0.018*	(0.008)	0.020**	(0.006)	0.018*	(0.008)
8 to 11 years aft. sep.	-0.054*	(0.024)	-0.062*	(0.026)	-0.055*	(0.024)	-0.063*	(0.026)	0.006	(0.009)	0.003	(0.010)	0.006	(0.009)	0.003	(0.010)
No partner			0.016	(0.016)			0.017	(0.016)			0.004	(0.007)			0.004	(0.007)
Non working partner			0.035**	(0.010)			0.036**	(0.010)			0.000	(0.004)			0.000	(0.004)
Mother works $\geq$ 20h/week					-0.020**	(0.007)	-0.021**	(0.007)					-0.003	(0.002)	-0.003	(0.002)
Mother in labor market					-0.006	(0.008)	-0.005	(0.008)					0.002	(0.003)	0.002	(0.003)
Panel C														
	Leisure Deprivation								Parental involvement Deprivation					
0 or 1 year aft. sep.	0.120**	(0.016)	0.032	(0.020)	0.120**	(0.016)	0.032	(0.020)	0.005	(0.016)	-0.013	(0.021)	0.005	(0.016)	-0.013	(0.021)
2 or 3 years aft. sep.	0.085**	(0.016)	0.002	(0.020)	0.084**	(0.016)	0.001	(0.020)	-0.002	(0.018)	-0.019	(0.021)	-0.002	(0.018)	-0.018	(0.021)
4 to 7 years aft. sep.	0.062**	(0.017)	-0.009	(0.020)	0.062**	(0.017)	-0.010	(0.020)	-0.017	(0.019)	-0.031	(0.021)	-0.017	(0.019)	-0.031	(0.021)
8 to 11 years aft. sep.	0.091**	(0.026)	0.029	(0.027)	0.090**	(0.026)	0.028	(0.027)	-0.014	(0.028)	-0.026	(0.030)	-0.014	(0.028)	-0.026	(0.030)
No partner			0.118**	(0.016)			0.119**	(0.016)			0.025	(0.017)			0.024	(0.017)
Non working partner			0.041**	(0.011)			0.042**	(0.011)			0.011	(0.012)			0.010	(0.012)
Mother works $\geq$ 20h/week					-0.021**	(0.007)	-0.023**	(0.007)					0.012	(0.009)	0.012	(0.009)
Mother in labor market					-0.009	(0.008)	-0.008	(0.008)					-0.008	(0.010)	-0.008	(0.010)
Observations	37972		37972		37972		37972		37972		37972		37972		37972	

Clustered standard errors in parentheses
+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$
Data: Millennium Cohort Study - Sample includes children whose parents are in couple at birth
Control for: mother's age, country, number of siblings, non-white, routine/semi routine occupation, highest level of education among parents, sex of child, age of child

Table 9: Results from fixed-effect regression - Heterogenous effect

Panel A : Children whose mothers has a lower than A-level degree												
	IP		OD		MD		EMD		LD		PI	
0 or 1 year aft. sep.	0.252**	0.049*	0.103**	0.056*	0.066**	0.051*	0.013+	0.009	0.121**	0.031	0.016	0.014
	(0.018)	(0.021)	(0.019)	(0.024)	(0.019)	(0.024)	(0.008)	(0.011)	(0.020)	(0.024)	(0.020)	(0.025)
2 or 3 years aft. sep.	0.244**	0.050*	0.068**	0.024	0.015	0.000	0.023**	0.019+	0.091**	0.005	0.014	0.013
	(0.020)	(0.023)	(0.021)	(0.025)	(0.020)	(0.024)	(0.009)	(0.011)	(0.020)	(0.025)	(0.023)	(0.026)
4 to 7 years aft. sep.	0.194**	0.019	0.070**	0.031	0.031	0.018	0.029**	0.025*	0.071**	-0.006	0.023	0.022
	(0.021)	(0.023)	(0.022)	(0.025)	(0.021)	(0.024)	(0.008)	(0.010)	(0.022)	(0.025)	(0.024)	(0.026)
8 to 11 years aft. sep.	0.130**	-0.021	0.041	0.006	-0.043	-0.055+	0.016	0.013	0.108**	0.043	0.030	0.028
	(0.031)	(0.031)	(0.031)	(0.033)	(0.030)	(0.032)	(0.012)	(0.013)	(0.033)	(0.034)	(0.035)	(0.037)
No partner		0.314**		0.069**		0.026		0.006		0.131**		0.004
		(0.019)		(0.019)		(0.019)		(0.009)		(0.020)		(0.020)
Non working partner		0.233**		0.038**		0.038**		0.000		0.051**		0.006
		(0.014)		(0.014)		(0.013)		(0.006)		(0.014)		(0.015)
Mother works $\geq$ 20h/week		-0.096**		-0.013		-0.022*		-0.006+		-0.018+		0.018
		(0.009)		(0.010)		(0.009)		(0.003)		(0.010)		(0.012)
Mother in labor market		-0.045**		-0.021+		-0.009		0.004		-0.014		-0.018
		(0.010)		(0.011)		(0.011)		(0.004)		(0.011)		(0.013)
Observations	21819	21819	21819	21819	21813	21813	21819	21819	21819	21819	21819	21819
Panel B : Children whose mothers has a A-level or more degree												
	IP		OD		MD		EMD		LD		PI	
0 or 1 year aft. sep.	0.207**	0.028	0.056*	-0.012	0.011	0.008	0.007	0.007	0.118**	0.038	-0.005	-0.072+
	(0.024)	(0.034)	(0.023)	(0.033)	(0.023)	(0.033)	(0.006)	(0.011)	(0.025)	(0.034)	(0.027)	(0.039)
2 or 3 years aft. sep.	0.169**	0.002	0.026	-0.036	-0.042+	-0.045	0.004	0.004	0.068*	-0.006	-0.009	-0.070+
	(0.023)	(0.030)	(0.023)	(0.032)	(0.023)	(0.032)	(0.006)	(0.008)	(0.026)	(0.034)	(0.029)	(0.038)
4 to 7 years aft. sep.	0.108**	-0.026	0.004	-0.046	-0.025	-0.027	0.002	0.003	0.037	-0.022	-0.075*	-0.125**
	(0.024)	(0.029)	(0.023)	(0.029)	(0.024)	(0.031)	(0.006)	(0.008)	(0.027)	(0.032)	(0.031)	(0.037)
8 to 11 years aft. sep.	0.060	-0.067	-0.050	-0.096*	-0.095*	-0.099*	-0.013	-0.013	0.038	-0.016	-0.094+	-0.139**
	(0.038)	(0.042)	(0.041)	(0.043)	(0.040)	(0.044)	(0.008)	(0.011)	(0.044)	(0.046)	(0.049)	(0.051)
No partner		0.219**		0.080**		0.007		-0.001		0.094**		0.078*
		(0.028)		(0.027)		(0.028)		(0.009)		(0.028)		(0.032)
Non working partner		0.147**		0.029+		0.031+		0.000		0.020		0.019
		(0.018)		(0.017)		(0.017)		(0.004)		(0.018)		(0.022)
Mother works $\geq$ 20h/week		-0.047**		-0.016+		-0.017+		0.000		-0.029**		0.004
		(0.008)		(0.009)		(0.010)		(0.002)		(0.009)		(0.013)
Mother in labor market		-0.021*		0.011		0.003		-0.001		-0.001		0.007
		(0.009)		(0.010)		(0.011)		(0.002)		(0.011)		(0.015)
Observations	16153	16153	16153	16153	16151	16151	16153	16153	16153	16153	16153	16153

Clustered standard errors in parentheses
+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$
Data: Millennium Cohort Survey - Sample includes children whose parents are in couple at birth
Control for: mother's age, country, number of siblings, non-white, routine/semi routine occupation, highest level of education among parents, sex of child, age of child

A Odds ratio by wave

Table 10: Odds-ratio from logit estimation in wave 2

	(1) IP		(2) OD		(3) MD		(4) EMD		(5) LD		(6) PI	
main												
Mother's age: 20-24	8.480**	(0.915)	4.317**	(0.423)	5.195**	(0.491)	2.666*	(1.031)	2.792**	(0.257)	1.048	(0.095)
Mother's age: 25-29	3.029**	(0.265)	1.973**	(0.154)	2.026**	(0.147)	2.907**	(0.912)	1.609**	(0.114)	0.904	(0.061)
Mother's age: 30-34	1.363**	(0.110)	1.211**	(0.083)	1.231**	(0.077)	1.302	(0.410)	1.078	(0.065)	0.854**	(0.046)
Mother's age: 40-44	1.189	(0.144)	1.263*	(0.126)	1.089	(0.102)	1.696	(0.695)	1.239*	(0.110)	1.014	(0.081)
Mother's age: 45-49	2.406**	(0.625)	1.414	(0.351)	1.283	(0.299)	.	.	1.501+	(0.329)	0.966	(0.204)
Wales	1.461**	(0.175)	0.865	(0.101)	0.781*	(0.086)	0.074+	(0.110)	1.001	(0.103)	0.998	(0.095)
Scotland	1.011	(0.107)	1.094	(0.099)	0.922	(0.079)	1.018	(0.363)	1.132	(0.091)	0.920	(0.071)
Nothern Ireland	1.277	(0.192)	0.649**	(0.101)	0.480**	(0.074)	0.371	(0.317)	0.791+	(0.107)	1.025	(0.122)
Has two children	1.423**	(0.115)	1.033	(0.071)	1.062	(0.068)	1.940+	(0.660)	0.978	(0.059)	1.188**	(0.067)
Has three children or more	3.116**	(0.269)	2.239**	(0.165)	2.379**	(0.164)	3.379**	(1.173)	1.539**	(0.103)	1.498**	(0.095)
Non white	3.672**	(0.340)	2.764**	(0.233)	1.848**	(0.151)	0.376*	(0.181)	2.483**	(0.198)	1.544**	(0.119)
Routine/semi routine occ.	0.707**	(0.060)	1.013	(0.074)	1.045	(0.072)	0.729	(0.232)	0.978	(0.066)	1.156*	(0.073)
None or overseas	16.749**	(2.159)	6.546**	(0.758)	4.385**	(0.497)	6.772**	(2.576)	4.656**	(0.520)	3.108**	(0.332)
NVQ 1	6.770**	(0.863)	4.280**	(0.513)	2.863**	(0.337)	5.469**	(2.225)	3.558**	(0.411)	1.919**	(0.219)
NVQ 2	3.586**	(0.267)	2.499**	(0.163)	1.806**	(0.111)	3.230**	(0.942)	2.016**	(0.120)	1.734**	(0.097)
NVQ 3	2.041**	(0.176)	1.526**	(0.116)	1.329**	(0.093)	1.929+	(0.675)	1.592**	(0.107)	1.304**	(0.083)
NVQ 5	0.521**	(0.084)	0.624**	(0.076)	0.817*	(0.081)	0.597	(0.413)	0.605**	(0.062)	0.835*	(0.069)
Child age (in years)	1.343*	(0.182)	1.422**	(0.174)	1.136	(0.135)	0.321+	(0.203)	1.369**	(0.156)	0.965	(0.108)
Female child	0.919	(0.053)	0.834**	(0.043)	0.880**	(0.042)	1.414+	(0.294)	0.951	(0.044)	0.758**	(0.032)
Observations	10211		10211		10211		10109		10211		10211	

Exponentiated coefficients; Standard errors in parentheses

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

Sample includes children whose parents are in couple at birth

Table 11: Odds-ratio from logit estimation in wave 3

	(1) IP		(2) OD		(3) MD		(4) EMD		(5) LD		(6) PI	
main												
Mother's age: 20-24	6.644**	(0.875)	3.068**	(0.390)	2.370**	(0.299)	1.797+	(0.579)	3.656**	(0.450)	0.974	(0.118)
Mother's age: 25-29	3.261**	(0.279)	2.050**	(0.164)	1.805**	(0.140)	1.836**	(0.398)	2.377**	(0.179)	0.994	(0.069)
Mother's age: 30-34	1.459**	(0.112)	1.326**	(0.089)	1.216**	(0.077)	1.057	(0.225)	1.557**	(0.097)	0.838**	(0.045)
Mother's age: 40-44	0.899	(0.088)	1.182*	(0.093)	1.141+	(0.083)	1.247	(0.301)	0.988	(0.076)	1.193**	(0.070)
Mother's age: 45-49	1.366+	(0.259)	1.219	(0.201)	0.960	(0.154)	2.006+	(0.849)	1.198	(0.189)	1.378*	(0.172)
Wales	1.199	(0.152)	1.197	(0.134)	1.158	(0.124)	0.928	(0.335)	0.979	(0.108)	1.229*	(0.111)
Scotland	1.116	(0.116)	1.078	(0.098)	1.243**	(0.103)	1.199	(0.321)	1.080	(0.093)	0.854*	(0.064)
Nothern Ireland	1.154	(0.174)	0.729*	(0.109)	0.671**	(0.098)	0.457	(0.270)	0.903	(0.120)	0.855	(0.098)
Has two children	0.899	(0.081)	1.221*	(0.103)	1.065	(0.084)	1.789*	(0.511)	0.907	(0.066)	1.318**	(0.086)
Has three children or more	1.988**	(0.181)	2.503**	(0.214)	2.235**	(0.178)	2.513**	(0.718)	1.479**	(0.112)	1.708**	(0.116)
Non white	3.273**	(0.307)	2.627**	(0.221)	2.044**	(0.167)	1.758**	(0.380)	2.645**	(0.221)	1.375**	(0.106)
Routine/semi routine occ.	0.753**	(0.060)	1.049	(0.073)	0.934	(0.064)	0.403**	(0.109)	1.111	(0.072)	1.009	(0.059)
None or overseas	12.634**	(1.541)	4.628**	(0.517)	2.711**	(0.298)	7.529**	(2.041)	6.615**	(0.757)	1.885**	(0.198)
NVQ 1	6.461**	(0.830)	3.271**	(0.400)	2.013**	(0.248)	8.044**	(2.359)	3.639**	(0.434)	1.468**	(0.170)
NVQ 2	3.531**	(0.265)	2.151**	(0.142)	1.440**	(0.094)	4.742**	(1.021)	2.509**	(0.156)	1.296**	(0.072)
NVQ 3	2.113**	(0.182)	1.273**	(0.099)	1.178*	(0.086)	1.950*	(0.534)	1.631**	(0.115)	1.019	(0.064)
NVQ 5	0.399**	(0.062)	0.679**	(0.069)	0.905	(0.077)	0.401+	(0.211)	0.645**	(0.063)	0.931	(0.063)
Child age (in years)	1.119	(0.134)	0.963	(0.102)	0.965	(0.097)	0.770	(0.237)	0.799*	(0.080)	0.973	(0.084)
Female child	1.053	(0.061)	0.836**	(0.043)	0.959	(0.047)	0.813	(0.122)	1.033	(0.050)	0.784**	(0.032)
Observations	9997		9997		9989		9997		9997		9997	

Exponentiated coefficients; Standard errors in parentheses

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

Sample includes children whose parents are in couple at birth

Table 12: Odds-ratio from logit estimation in wave 4

	(1) IP		(2) OD		(3) MD		(4) EMD		(5) LD		(6) PI	
main												
Mother's age: 20-24	10.015**	(3.156)	3.330**	(0.936)	4.752**	(1.349)	1.699	(1.149)	5.556**	(1.637)	0.631	(0.190)
Mother's age: 25-29	3.358**	(0.313)	2.240**	(0.200)	2.705**	(0.230)	1.767*	(0.440)	2.325**	(0.204)	0.740**	(0.063)
Mother's age: 30-34	1.591**	(0.127)	1.455**	(0.107)	1.256**	(0.087)	1.879**	(0.406)	1.603**	(0.113)	0.933	(0.057)
Mother's age: 40-44	0.904	(0.075)	0.948	(0.068)	0.931	(0.061)	1.427	(0.320)	0.940	(0.066)	1.223**	(0.065)
Mother's age: 45-49	0.869	(0.119)	1.013	(0.117)	0.983	(0.104)	1.693	(0.548)	0.915	(0.107)	1.137	(0.100)
Mother's age: ≥ 50	2.603**	(0.746)	1.545	(0.438)	1.270	(0.346)	3.757*	(2.176)	1.474	(0.413)	1.120	(0.267)
Wales	1.515**	(0.189)	0.910	(0.113)	1.108	(0.122)	0.659	(0.264)	0.909	(0.109)	0.860	(0.086)
Scotland	1.136	(0.122)	1.281**	(0.118)	1.185*	(0.102)	0.534+	(0.192)	0.896	(0.087)	1.842**	(0.133)
Nothern Ireland	1.339+	(0.203)	0.949	(0.140)	0.633**	(0.095)	0.360	(0.236)	0.825	(0.122)	2.296**	(0.259)
Has two children	1.065	(0.116)	1.016	(0.099)	0.920	(0.082)	0.800	(0.237)	0.731**	(0.065)	1.364**	(0.106)
Has three children or more	1.962**	(0.211)	1.928**	(0.187)	1.862**	(0.165)	1.755*	(0.492)	1.177+	(0.104)	1.645**	(0.130)
Non white	3.341**	(0.325)	1.917**	(0.176)	1.896**	(0.164)	1.211	(0.287)	2.253**	(0.204)	1.267**	(0.103)
Routine/semi routine occ.	0.965	(0.073)	0.932	(0.066)	0.900	(0.060)	0.468**	(0.117)	1.057	(0.071)	1.005	(0.059)
None or overseas	14.280**	(1.901)	7.648**	(0.944)	5.563**	(0.685)	7.778**	(2.117)	7.677**	(0.957)	1.327*	(0.155)
NVQ 1	9.193**	(1.268)	4.325**	(0.570)	2.966**	(0.389)	7.800**	(2.285)	5.322**	(0.699)	1.426**	(0.183)
NVQ 2	3.635**	(0.276)	2.622**	(0.180)	1.977**	(0.129)	3.996**	(0.857)	2.567**	(0.171)	1.308**	(0.077)
NVQ 3	1.921**	(0.168)	1.377**	(0.111)	1.204*	(0.091)	1.922*	(0.516)	1.595**	(0.121)	1.040	(0.068)
NVQ 5	0.501**	(0.064)	0.646**	(0.064)	0.889	(0.072)	0.293*	(0.157)	0.498**	(0.052)	0.952	(0.061)
Child age (in years)	1.016	(0.122)	1.322**	(0.143)	1.121	(0.113)	2.268**	(0.697)	1.059	(0.112)	1.431**	(0.125)
Female child	1.059	(0.063)	0.985	(0.053)	0.985	(0.049)	0.804	(0.124)	1.045	(0.054)	0.928+	(0.040)
Observations	9155		9155		9155		9155		9155		9155	

Exponentiated coefficients; Standard errors in parentheses

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

Sample includes children whose parents are in couple at birth

Table 13: Odds-ratio from logit estimation in wave 5

	(1) IP		(2) OD		(3) MD		(4) EMD		(5) LD		(6) PI	
main												
Mother's age: 25-29	2.529**	(0.492)	2.206**	(0.437)	1.213	(0.262)	2.528*	(1.161)	2.074**	(0.388)	1.347+	(0.244)
Mother's age: 30-34	1.809**	(0.168)	1.547**	(0.142)	2.048**	(0.191)	1.308	(0.415)	1.351**	(0.115)	1.051	(0.086)
Mother's age: 40-44	0.679**	(0.054)	0.729**	(0.055)	0.686**	(0.053)	0.774	(0.243)	0.645**	(0.043)	1.112+	(0.065)
Mother's age: 45-49	0.734**	(0.067)	0.691**	(0.061)	0.615**	(0.057)	0.414+	(0.191)	0.625**	(0.049)	1.181*	(0.078)
Mother's age: ≥ 50	1.071	(0.159)	0.558**	(0.095)	0.400**	(0.079)	0.419	(0.354)	0.690**	(0.095)	1.560**	(0.172)
Wales	1.226	(0.158)	0.870	(0.117)	0.903	(0.127)	1.985+	(0.810)	0.912	(0.108)	0.976	(0.096)
Scotland	0.815+	(0.094)	0.916	(0.100)	1.108	(0.123)	0.417	(0.267)	0.774*	(0.078)	1.182*	(0.091)
Nothern Ireland	1.723**	(0.253)	0.953	(0.148)	0.778	(0.130)	0.919	(0.616)	0.951	(0.137)	1.557**	(0.183)
Has two children	0.655**	(0.065)	1.135	(0.130)	1.755**	(0.260)	0.372**	(0.139)	0.824*	(0.074)	1.351**	(0.105)
Has three children or more	1.090	(0.107)	3.423**	(0.383)	8.015**	(1.155)	0.777	(0.260)	1.324**	(0.118)	1.737**	(0.138)
Non white	2.561**	(0.249)	2.737**	(0.256)	2.686**	(0.259)	0.667	(0.263)	2.124**	(0.188)	1.409**	(0.114)
Routine/semi routine occ.	0.980	(0.077)	1.375**	(0.103)	1.356**	(0.107)	0.724	(0.221)	1.202**	(0.083)	1.171*	(0.072)
None or overseas	9.144**	(1.170)	7.683**	(1.002)	6.935**	(0.943)	92.896**	(62.299)	5.396**	(0.665)	2.132**	(0.249)
NVQ 1	6.923**	(0.962)	4.532**	(0.646)	4.319**	(0.648)	59.198**	(41.150)	3.631**	(0.490)	2.039**	(0.264)
NVQ 2	2.881**	(0.223)	3.032**	(0.231)	2.486**	(0.200)	21.816**	(14.337)	2.639**	(0.182)	1.423**	(0.088)
NVQ 3	2.013**	(0.175)	1.962**	(0.169)	1.664**	(0.152)	8.532**	(6.119)	1.783**	(0.138)	1.167*	(0.080)
NVQ 5	0.434**	(0.051)	0.695**	(0.068)	0.724**	(0.072)	2.100	(1.892)	0.746**	(0.063)	0.849**	(0.053)
Child age (in years)	1.073	(0.097)	1.060	(0.093)	0.816*	(0.076)	1.069	(0.366)	0.950	(0.075)	1.160*	(0.078)
Female child	1.023	(0.061)	0.982	(0.057)	0.921	(0.056)	1.842*	(0.447)	1.074	(0.056)	0.927+	(0.041)
Observations	8609		8609		8609		8609		8609		8609	

Exponentiated coefficients; Standard errors in parentheses

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

Sample includes children whose parents are in couple at birth