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Making work pay? The labour market effects of capping child benefits in larger families

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Editorial note

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Abstract

Child benefits are typically paid on a per-child basis, without restrictions on family size. In this paper we generate unique evidence on the effects of capping child benefits by family size by examining the introduction of the UK's 'two-child limit'. Under the policy, all children born on or after 6 April 2017 are no longer eligible for means-tested child benefits if they are born into a family with two or more existing children. The UK government justified this policy on grounds that it would incentivise employment among larger families. We use mixed methods – combining quasi-experimental quantitative techniques and qualitative longitudinal research – to investigate the policy's employment effects. We find no evidence that capping child benefits increases employment. Labour market activity among larger families seem to be particularly 'sticky' in response to reductions in benefits income, likely due to parents' commitment to unpaid care, the scale of caregiving responsibilities and barriers to paid work. Our qualitative evidence also indicates that the effects of negative income shocks can render such policies counter-productive by pushing people further away from the labour market.

JEL: J08, J22, I38, H31, J13

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1. Introduction

Many countries pay child benefits to subsidise the costs of having a child and to reduce child poverty (UNICEF, 2020). These benefits are typically awarded for each and every child, such that total household benefit income increases with the number of children. While some countries have experimented with restricting child benefits to the third or fourth child, relatively few families are affected by these limits (Patrick, 2022). In April 2017, the UK government became the first country to cap a much larger set of families, by introducing a 'two-child limit' on means-tested child benefits. The policy reduces child benefits by up to 55 GBP per week (approximately 1.1 times the PPP value of the maximum child tax credit in the US) for each child beyond the second-born (OECD, 2021).

The UK government claimed that capping child benefits would incentivise employment among affected families (HM Government, 2019). The policy does not affect the marginal return to work, since it applies to all families in receipt of means-tested benefits, regardless of the work status of the household. As of 2022, most (59 percent) of the 359,000 families affected by the policy were working families (DWP and HMRC, 2022). Nevertheless, classical economic theory suggests that capping child benefits in this way would incentivise parents to increase their labour supply to compensate for lost benefits income.

Empirically, the magnitude of such income effects is contested (Giupponi, 2019). Labour market effects depend on how responsive individuals are to financial incentives, and this varies significantly across groups (Saez, 2002; Moffitt, 2003). One possibility is that larger families (those with three or more children) have lower labour elasticities because they have high childcare costs and reap greater economies of scale from having one parent stay at home to look after children (Stewart, Patrick and Reeves, 2023). Additionally, benefit cuts have been shown to have negative effects on

mental health and to increase the unpaid work associated with 'getting by' in poverty (Evans and Garthwaite, 2014; Lindahl, 2005; Patrick, 2017). This may increase barriers to participating in paid employment. Given this, we need new evidence to understand how larger families' labour supply responds to the capping of children's benefits, a need to which this paper directly responds.

In this paper we employ a multi-method approach to investigating the employment effects of the introduction of the two-child limit in the UK in 2017. Under the policy, families in receipt of benefits who gave birth to a third or subsequent child on or after 6 April 2017 do not receive means-tested child benefits for that child. We start by examining this question using the introduction of the two-child limit as a natural experiment, exploiting variation by family size, income and the date of birth of the child to isolate the causal effects of the policy on employment with a Triple Differences design. We complement this quantitative analysis by drawing on evidence from our qualitative longitudinal research with families affected by the two-child limit, who we interviewed at multiple points in time as they lived with and responded to the policy. This enables us to understand the policy's dynamic effects on individuals' attitudes and barriers to paid work.

We find no evidence that capping child benefits at two children increases employment. The qualitative longitudinal research suggests three possible explanations for this null finding. First, larger families are relatively 'sticky' in their employment preferences. Parents in larger families tend to have strong preferences to care for their own children, particularly when their children are young. Second, when parents in larger families do want to work, they face significant barriers to entering the labour market, notably childcare costs and logistics. Third, the policy increases financial strain and harms mental health, which can push parents further away from the labour market.

Our contribution is twofold. First, we fill an evidence gap on the labour market implications of capping child benefits by family size. It is widely acknowledged that demographic characteristics – including single parenthood and the age of children – are important determinants of labour elasticities (Saez, 2002; Micheltore and Pilkauskas, 2021). There is an extensive literature on the impact of similar policies, such as the Earned Income Tax Credit (EITC) in the US, which is incidentally capped at three children. However, to our knowledge no research has isolated the labour market effects of the family cap itself on larger families. Our paper redresses this gap in our knowledge by examining a standalone policy that systematically altered the labour market incentives of low-income larger families, while leaving those of smaller families and high-income larger families unchanged.

Second, we combine quasi-experimental quantitative techniques with qualitative longitudinal research, a unique and powerful combination within mixed methods approaches. Since the 1990s there have been growing calls for more mixed methods research as an attempt to combine the strengths, and mitigate against the weaknesses, of exclusively quantitative and qualitative research (Edin and Pirog, 2014; Hendren, Luo and Pandey, 2018). Despite this, mixed methods papers remain rare (Hendren, Luo and Pandey, 2018). Part of our contribution is to bring quantitative and qualitative methods into dialogue with each other and show how they can inform one another. For example, while the qualitative research findings cannot be considered as causal in the way that our quantitative analysis can, our qualitative longitudinal methods help us dig beneath the null finding from the quantitative models and understand it. In this respect, our paper not only deepens our understanding of how policies like this affect larger families but is also an example of how multi-method research can be used to evaluate policies (Edin and Pirog, 2014).

The paper is structured as follows. In Section 2 we briefly set out the background of the two-child limit and simulate the theoretical impact of the policy on a larger family's budget constraint. In Section 3, we outline our data and methods for the quantitative and qualitative analysis. In Section 4, we present results on whether there is any evidence that the two-child limit increased employment; in Section 5, we investigate possible causal mechanisms behind these effects (if any). Finally, Section 6 concludes by discussing these findings and reflecting on their policy implications.

2. Background

The main source of child benefits for low-income families in the UK is the 'child element' of Child Tax Credit (CTC) or Universal Credit (UC).¹ Both are means-tested benefits and can be claimed by out-of-work or low-earning households. Unlike the US's Earned Income Tax Credit (EITC), these UK benefits are paid monthly. Until 2017, up to 2,780 GBP per year (paid in monthly instalments) was added to the household's benefits entitlement for each child born into a household (the 'child element'), irrespective of birth order, with an additional 545 GBP for the first child (the 'family element').² Additionally, approximately 90 percent of families in the UK – all except higher rate taxpayers – are entitled to a more universal 'Child Benefit', equivalent to 1,100 GBP per year for one child and an extra 728 GBP each for second and subsequent children.³ 'Child Benefit' itself is not affected by the two-child limit.

This tapestry of child benefits was designed to provide additional support for families with children and to ensure that benefit entitlements increase in line with household needs. At the birth of a child, household consumption needs increase while work intensity tends to decrease, meaning that labour market income alone is often insufficient. A combination of universal and means-tested benefits for children historically plugged this gap.

¹ Universal Credit is the newer policy and is gradually being rolled out to replace most previous working-age benefits.

² Entitlements for other benefits that pre-date Universal Credit, including housing benefit, income-based Jobseeker's Allowance (JSA), and income support for lone parents with children under five, are also calculated based on the number of children in the household. However, in practice, vanishingly few households receive child allowances as part of JSA or IS; most claimants of these two benefits are receiving CTC to help meet the additional costs of children.

³ Child Benefit is in principle a universal cash transfer, but since 2013 it has been taxed back from earners of 50,000 GBP or more a year through the High-Income Child Benefit Charge.

2.1 The two-child limit

In 2015, the UK government radically departed from this approach by announcing the introduction of the 'two-child limit' – a policy which restricts the 'child element' of means-tested child benefits to the first two children in a family. Affecting new births from 6 April 2017, this amounts to a reduction in the amount of child benefits for low-income larger families of up to 2,845 GBP per year per child after the second child at 2021-22 benefit rates.⁴ By 2021, the two-child limit affected 1.3 million children living in 359,000 households, 59 percent of whom were in work (DWP and HMRC, 2022).

The stated aim of the two-child limit was to ensure that families in receipt of benefits face 'the same financial choices about having children as those supporting themselves in work' (HM Treasury, 2015). Implicitly, this suggests that the policy aimed to reduce fertility among families with two or more children, but this has been denied by the UK government (Reader, Portes and Patrick, 2022). Instead, the policy has been justified predominantly in terms of incentivising work, particularly among those who choose to have more than two children despite the policy (HC Debs, 2022). This paper investigates whether the policy did this in practice, by investigating the labour market effects of the two-child limit.

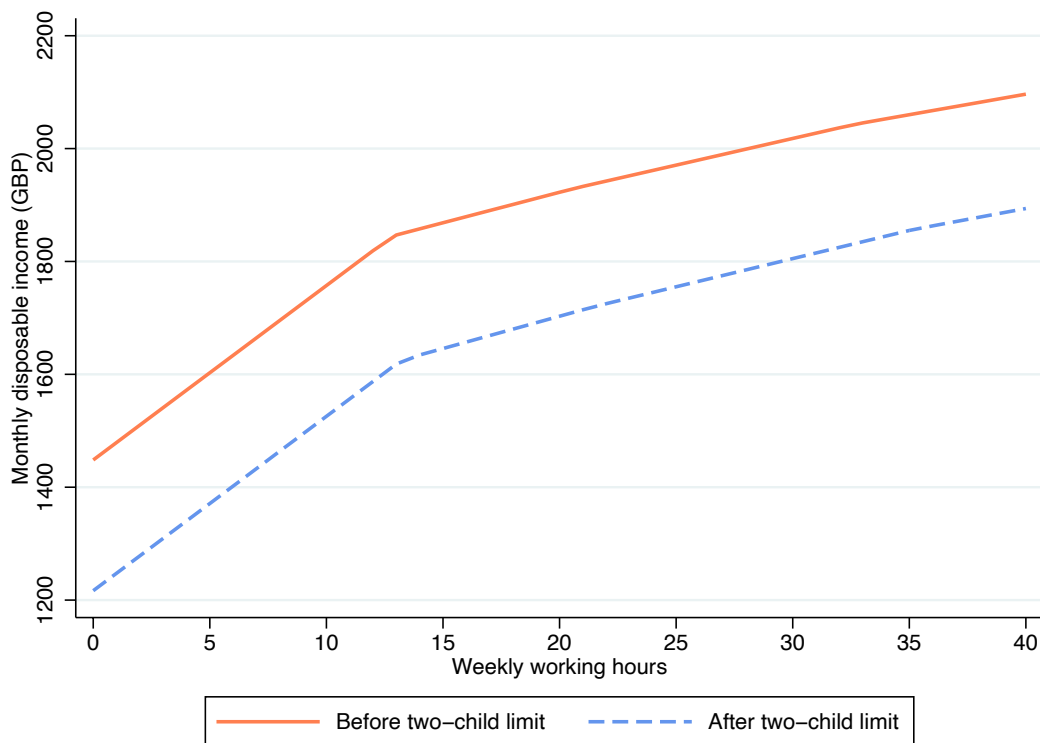
2.2 Effects on the household budget constraint

In Figure 1 we use EUROMOD's tax-benefit microsimulation model to simulate the effect of the two-child limit on the budget constraint of a

⁴ Based on the latest Universal Credit child amount rates for a second child born after 6 April 2017 (237.08 GBP a month): <https://www.gov.uk/universal-credit/what-youll-get>. For some in-work families the loss will be less than 2,845 GBP per child, as the amount of CTC and UC paid is steadily withdrawn as earnings rise above a certain income threshold. Families having a third or subsequent child since this date still receive 728 GBP of Child Benefit for their new baby, but no addition to CTC or UC.

typical larger family: a couple with three children aged 10, 7 and 0.⁵ The main effect of the two-child limit is to shift the budget constraint to the right by withdrawing eligibility for child-related benefits for the third child. This should, in theory, create a negative income effect: the family is worse-off, so parents need to work more hours to maintain the same standard of living.

Figure 1: Effect of the two-child limit on the budget constraint of a typical larger family (a couple with three children, aged 10, 7 and 0, with one earner and one parent at home)



Notes: Data using EUROMOD Hypothetical Household Tool. The figure shows simulated monthly disposable income by working hours for a couple with three children, with one parent working between 0-40 hours at £7.50 an hour (the minimum wage as of April 2017) and one parent staying at home. Housing costs are not included. Prices are in nominal terms.

⁵ As shown in Figure A1, effects on the budget constraint are very similar for single parent families.

Empirical estimates of the size of income effects are mixed (Giupponi, 2019). Some studies suggest income elasticities close to zero (Ashenfelter and Plant, 1990; Jones and Marinescu, 2018). Others using lottery wins suggest modest income effects (Imbens, Ruben and Sacerdote, 2001), while studies examining survivors' insurance find large income effects, whereby reductions in unearned income are fully offset by increases in employment (Giupponi, 2019).

In addition to uncertainty about the magnitude of income effects, labour market elasticities are contingent on the responsiveness of the group in question to financial incentives (Saez, 2002; Moffitt, 2003). There are two reasons to think that larger families may be less responsive (or 'sticky'): a selection effect and a direct effect. First, individuals with lower preferences for paid employment are likely to select into larger families: individuals with preferences for more children are likely, on average, to prioritise paid labour market activity less than individuals with preferences for fewer children. Second, the process of having a larger family increases the costs of childcare and the returns to one parent staying at home to look after children. Other things equal, a family with more children is less likely to be responsive to work incentives because the costs of entering work are larger. Relatedly, almost all of those currently affected by the two-child limit have at least one very young child (aged five or under). This may also affect affected households' labour market elasticities (Michelmore and Pilkauskas, 2021). Despite these factors, to our knowledge no research has explicitly quantified labour market elasticities for larger families as a group. It is therefore unclear how larger families will respond to a policy like the two-child limit.

3. Data and methods

3.1 Quantitative Triple Differences design

We start by using a quasi-experimental approach to identify whether the two-child limit incentivised increases in labour supply at the extensive or intensive margin. We treat the two-child limit as a natural experiment and use data from the Annual Population Survey (APS) to investigate whether there is evidence at the population level of a causal impact on employment.

We use quarterly data for 2013-2019 from the Annual Population Survey (APS), the largest household survey in the UK with a sample of approximately 80,000 responding households and 320,000 individuals each year. The APS is a version of the UK's Labour Force Survey (LFS) with a boosted sample size, making analysis of small demographic groups and local areas more feasible. The LFS, on which the APS is based, is similar to the US's Current Population Survey.

The APS contains individual-level data on employment, gross and net earnings, the number of dependent children in the family in various age categories, the age of the youngest child in the family under 19, the month and year of birth, and other demographic characteristics (including gender, ethnicity, marital status, age, tenure, region).⁶ We merge these person-level files to their respective household-level data, giving us access to data on net (family) earnings, combined (family) occupation status, and whether or not the family has a child born on or after April 2017.⁷ We use the APS

⁶ For any analysis at the individual level, the person files are the most appropriate since they include person-level weightings to adjust for non-response.

⁷ We do this because benefits receipt, and therefore the likelihood of being affected by the two-child limit, is determined at the family (benefits unit) level. Aggregating net earnings and occupation status to the family level therefore enables us to better approximate the likelihood of being in scope for the two-child limit. In a dual earner family in which the first earner has high net earnings and the second earner has low or zero net earnings, it would be misleading to take the net earnings of the second earner as a proxy for their likelihood of being on benefits. This would likely introduce bias into our estimation of the

person calibration weights to derive population-level estimates and to correct for non-response.

We restrict our sample to adult respondents aged 19-45 who are living in a family with dependent children.⁸ We exclude the self-employed because no earnings data are recorded for this group. Finally, we do not use data from 2020 due to the Covid-19 pandemic, which appears to have had differential impacts by family size and income and could thereby introduce bias into our estimates (Reader and Andersen, 2022). This leaves us with a final sample of 365,366 adult respondents interviewed between 2013 and 2019.

Our main labour market outcomes are derived from the respondent's economic activity, measured in line with International Labour Organisation (ILO) definitions. A respondent is in employment if they are either an employee, self-employed or participating in a government employment and training programme. Those who are not in work fall into two categories: those who are unemployed (without a job but actively seeking work) and those who are economically inactive (without a job and not actively seeking work) (ONS, 2020). Appendix A Figure A2 gives a full breakdown of the categories of economic activity available in the APS.

The key challenge for causal identification in our context is that low-income larger families are systematically different from other groups who could provide a candidate control group. To illustrate this, Table 1 displays summary statistics for the final sample of 365,366 adult respondents, by

benefits-eligible population towards second-earners in high income families.

⁸ Dependent children are defined here as those aged under 19 living in the family; this is the closest match to the definition employed by the two-child limit, which counts all children aged 16 or under and those aged 16-19 who are in full-time education or training (the latter has been compulsory for all young people since 2015).

family size and predicted family earnings.⁹ Our group of interest – larger families with low predicted earnings – is shown in column 6. Among this group, 47.1 percent are in paid employment, 45.1 percent are economically inactive, and 7.9 percent are unemployed. Adults in this group are less likely to be in work, less highly educated, and more likely to be economically inactive or unemployed. They are also more likely to be women or non-White. Finally, they are more likely to experience mental and physical health conditions, or to report a health condition that affects the type or amount of paid work they can do.

Given these cross-sectional differences in the profile of low-income larger families relative to other families, it would not be sufficient to simply compare outcomes between low-income larger families and smaller families, for instance. Instead, we need some exogenous variation in treatment status to achieve causal identification. We therefore exploit an arbitrary rule in the design of the two-child limit, whereby only families in receipt of means-tested benefits with a third child born on or after 6 April 2017 are affected by the two-child limit. Figure 2 illustrates this by charting the probability of being affected by the two-child limit by month for a household on benefits with three or more children with at least one born after 6 April 2017. There is a sudden and plausibly exogenous increase in the probability of being affected by the two-child limit in April 2017 for larger families with a child born during or after April 2017.¹⁰

⁹ Our method for predicting family earnings is outlined in detail in Appendix B.

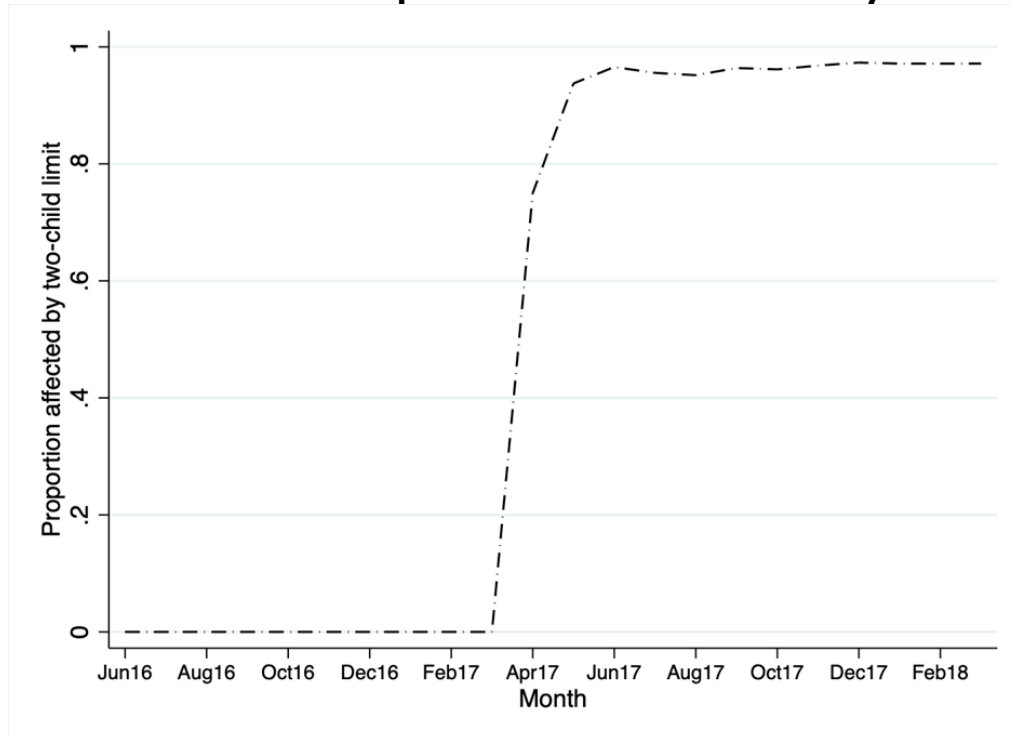
¹⁰ It does not reach one because some of the households in the treatment group are exempt from the two-child limit. Households are exempt if their third child is a multiple birth (the cap applies to the first child in a multiple birth, with the other child/children exempt), an adopted child, in a non-parental caring arrangement, or if they are the result of non-consensual conception. As of 6 April 2022, 5 percent of potentially affected households were exempt for one of these reasons, 71 percent of whom due to the multiple birth exception (DWP and HMRC, 2022). Notwithstanding these exemptions, the vast majority of those identified as our treatment group – low-income larger families with a child born during or after April 2017 – are affected by the two-child limit.

Table 1: Summary statistics for the final sample, 2013-2019

	Smaller families (1-2 children)			Larger families (3+ children)		
	All	High predicted earnings	Low predicted earnings	All	High predicted earnings	Low predicted earnings
Employment	0.771	0.876	0.667	0.601	0.734	0.471
Unemployment	0.044	0.02	0.068	0.055	0.031	0.079
Economic inactivity	0.185	0.104	0.265	0.345	0.236	0.451
Conditional working hours	34.188	35.599	32.336	32.68	34.162	30.361
Unconditional working hours	26.222	31.118	21.385	19.421	24.924	14.035
Predicted annual net family earnings (GBP)	28,995	38,212	19,918	23,677	32,077	15,441
Receives any state benefits or tax credits	0.514	0.442	0.584	0.639	0.558	0.719
Receives 2CL-relevant benefits	0.212	0.08	0.343	0.391	0.266	0.515
Number of children in family	1.496	1.496	1.495	3.383	3.391	3.374
Age of youngest child in family	6.068	4.621	7.489	4.194	3.962	4.423
Age	33.8	37.1	30.6	35.5	38.5	32.5
Single parent	0.176	0.003	0.347	0.153	0.002	0.301
Female	0.587	0.533	0.641	0.614	0.547	0.68
White	0.825	0.851	0.8	0.727	0.813	0.643
Good secondary education or above	0.844	0.976	0.715	0.744	0.942	0.549
Higher education or above	0.408	0.714	0.107	0.308	0.568	0.053
Quit last job to look after children	0.052	0.042	0.061	0.088	0.074	0.102
Depression or anxiety	0.062	0.04	0.084	0.075	0.055	0.095
Other mental illness	0.023	0.012	0.035	0.029	0.019	0.038
Physical health condition	0.185	0.173	0.197	0.212	0.206	0.219
Observations	258,163	131,233	126,371	56,154	28,736	27,277

Notes: Data from the Annual Population Survey. The table details mean values of each variable by family size and predicted earnings. A respondent is in employment if they meet the ILO definition of being an employee, is self-employed, or is in a government employment or training programme. Conditional working hours refer to the mean number of hours of paid work among those in work; unconditional working hours refer to the mean number of hours of paid work among the population as a whole. ILO unemployment measure used. Good secondary education indicates that the respondent's highest qualification is a good (A*-C) grade at the General Certificate of Secondary Education (GCSE), the UK's main examinations at age 16, or higher (including GCE, A-level or equivalent, higher education, degree or equivalent). Mental health conditions include depression, bad nerves or anxiety, or phobias, panics or other nervous conditions. Physical health conditions include problems or disabilities connected with arms or hands, legs or feet, back or neck; difficulty in seeing (while wearing spectacles or contact lenses); difficulty in hearing; severe disfigurement, skin conditions or allergies; chest or breathing problems, asthma or bronchitis; heart, blood pressure or blood circulation problems; stomach, liver kidney or digestive problems; diabetes; and epilepsy. Person-household weightings are utilised to correct for non-response.

Figure 2: Proportion of larger families on Universal Credit with at least one child born after 6 April 2017 who are affected by the two-child limit



Source: Data from a Freedom of Information request to the Department of Work and Pensions (November 2021). Note: The figure shows the probability of being affected by the two-child limit conditional on being in a household with three or more children receiving Universal Credit with at least one child born after 6 April 2017.

We leverage this to identify the employment effects of the policy within the Triple Differences design. There are three sources of variation in whether a family is ‘treated’ by the two-child limit: family size, income status, and the date of birth of the child. These three sources of variation produce eight possible groups of families. We utilise a Triple Differences methodology to compare outcomes for the treatment group – low-income larger families with a child born during or after April 2017 – with the other seven groups.

Our basic empirical specification is the following:

$$\begin{aligned}
 Employment_{it} = & \beta_0 + \beta_1 Bigfam_i + \beta_2 Lowinc_i + \beta_3 Post_t + \beta_4 (Bigfam_i * \\
 & Lowinc_i) + \beta_5 (Lowinc_i * Post_t) + \beta_6 (Bigfam_i * Post_t) + \beta_7 (Bigfam_i * Lowinc_i * \\
 & Post_t) + X_{it} + u_{it} \quad (1)
 \end{aligned}$$

$Bigfam_i$ is a dummy variable equal to one if the respondent lives in a family with three or more children and is zero if they live in a family with 1-2 children (our sample excludes those without children). $Lowinc_i$ is a dummy variable equal to one if the respondent lives in a low-income family. Since the APS does not include a direct and comprehensive measure of income, our preferred proxy is to use the sub-sample of the APS with earnings data to predict low family earnings for the rest of the sample based on demographic characteristics (Kleven, 2023). As a robustness check, we use whether the highest occupation in the family tends to be a low-income occupation¹¹, as well as self-reported receipt of benefits. We explain how we use each of these measures in detail in Appendix B.

$Post_t$ is a dummy variable equal to one if the respondent lives in a family in which a child was born during or after April 2017. Since the data is a repeated cross-section, this is only coded as 1 when the respondent is interviewed in the post period, after April 2017. $Employment_i$ is the relevant employment outcome of choice. Our coefficient of interest is β_7 , which identifies the differential effect of the two-child limit on larger families on a low-income with a child born since April 2017, after controlling for wider changes by family size, earnings potential and date of birth of the child. X_{it} is a vector of controls: a dummy variable equal to one if the respondent is a single parent and zero otherwise, age of the respondent (5 categories), age of the youngest child in the family (6 categories), education (5 categories), and ethnicity (4 categories).¹²

¹¹ As shown in Figure A3, there is a strong correlation between family occupation status and the likelihood of reporting receipt of means-tested benefits.

¹² These controls are binned as follows: age of respondent (19-25, 26-30, 31-35, 36-40, 41-45), number of children in the family (0, 1, 2, 3, 4, 5+), age of youngest child in the family (0-1, 2-3, 4-6, 7-9, 10-13, 14-18), education (higher education, degree or equivalent; GCE, A-level or equivalent; good secondary education (GCSE A*-C) or above; other qualifications; and none/did not know), and ethnicity (White, Black, South Asian, and other).

3.2 Qualitative Longitudinal Research

Qualitative methods offer a unique opportunity to generate hypotheses, probe causal mechanisms, and understand the 'meaning' of policies to people (Edin and Pirog, 2014). In our case, we combine quantitative and qualitative methods for the purpose of 'complementarity' (Greene, Caracelli and Graham, 1989). The quasi-experimental quantitative analysis provides a causal picture at the population level; the qualitative longitudinal research complements this by zooming in on a small number of affected families, enabling us to see the policy from the parents' perspective.

Qualitative longitudinal research involves repeated interviews with the same individual over time. This generates dynamic insight into how policy changes are experienced. The repeated interview encounter also enables the researcher to mine for more detail at subsequent interview waves, and to pull out themes emerging in earlier interview waves and explore them more comprehensively, and across the sample.

We restricted our qualitative sample to individuals in London (Tower Hamlets, Hackney and Greenwich) and Yorkshire in the North of England (Bradford, Leeds and York). To recruit participants, we developed partnerships with local authorities and voluntary sector organisations. These project partners helped us to reach out and contact those who were likely to be affected by the two-child limit. We developed a sampling frame of the preferred characteristics of our overall sample, which helped us ensure a diverse sample in terms of ethnicity, family size and shape, and employment status. Our qualitative sample is composed of individuals who have three or more children, are affected by the two-child limit (i.e., they had a third or subsequent child born on or after 6th April 2017), and are living in one of the research areas. A breakdown of our initial sample is included in Table 2. This paper draws on data from the first two waves of interviews. Thirty-three participants took part in the first round of

interviews (2021) and twenty-four of these participants took part in the second round (2022).

Table 2: Characteristics of the participants in the qualitative sample affected by the two-child limit

Characteristic	Number of participants
<i>Number of children</i>	
3	16
4	7
5	6
6	1
7	1
8	2
<i>Age of youngest child in years</i>	
0	5
1	8
2	11
3	6
4	3
<i>Gender</i>	
Female	30
Male	3
<i>Relationship status</i>	
Single	22
Partnered	11
<i>Ethnicity</i>	
Black African	7
Black Caribbean	1
Pakistani	6
Bangladeshi	5
Black Caribbean and White	1
White	13

Our interviews were semi-structured in nature, and we developed a flexible topic guide for each interview wave. These guides included general questions for all participants as well as specific questions for individuals where we wanted to follow up or probe deeper into an issue raised at an

earlier wave. Around 30 percent of our interviewees lived in households where at least one parent was in paid employment at the time of interview.

Due to the Covid-19 pandemic, most interviews were conducted via telephone (some using an interpreter). Interviews lasted on average 50 minutes (ranging from 15 to 80 minutes). All were recorded and transcribed verbatim. Participants are anonymised, either with the participant choosing a pseudonym for themselves or asking us to assign one for them. Transcripts were coded using NVivo, following a coding frame. We analysed the data thematically, using longitudinal analytical approaches to explore the data both cross-sectionally (synchronic analysis) and longitudinally (diachronic analysis). An ethics of care and reciprocity governed our qualitative research, which received formal ethical approval from the University of York. This included signposting individuals for further support where this was appropriate.

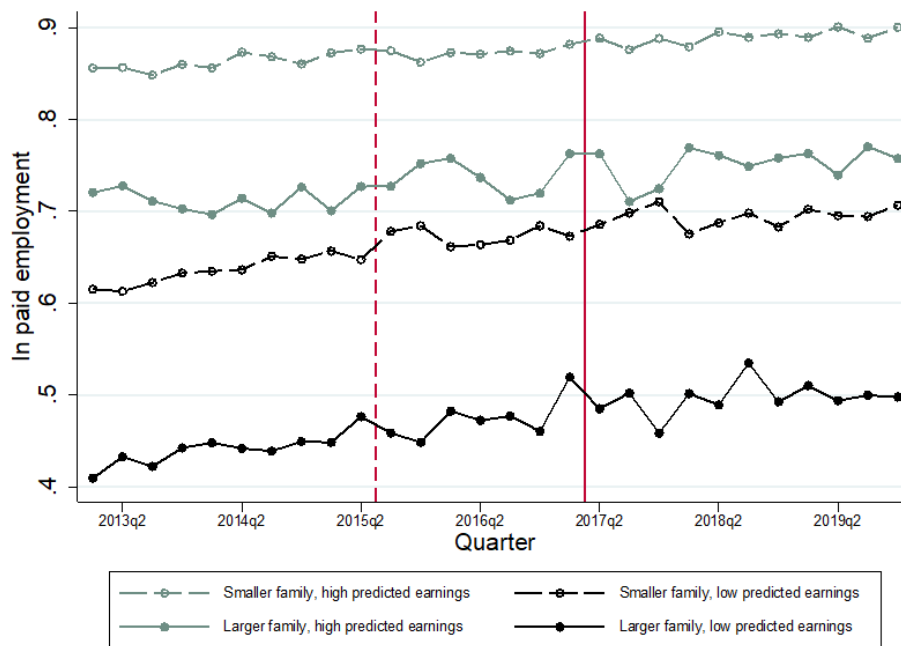
4. Did the two-child limit increase employment among affected families?

We start by using quantitative analysis to investigate whether families increased their labour market participation in response to the policy. Did affected families experience differential increases in employment after the reform, relative to other groups?

Our first step is to chart the proportion of respondents in employment among smaller families on a high-income, smaller families on a low-income, larger families on a high-income, and larger families on a low-income. Figure 3 illustrates this with our preferred measure of low-income: low predicted family earnings, while Figure A4 does the same with family occupation status. Neither graph shows any discernible increase in employment in the treatment group after the announcement of the policy

in July 2015, nor after the introduction of the policy in April 2017. Graphs for economic inactivity can be found in Figures A5 and Figure A7 in Appendix A, and for unemployment in Figure A6 and Figure A8.

Figure 3: Proportion of adults aged 19-45 in paid employment, by family size and predicted family earnings, 2013-2019



Notes: Data from the Annual Population Survey. The figure charts the proportion of adults aged 16-45 in paid employment by quarter of interview, family size and predicted family earnings. Person-household weightings are utilised to correct for non-response. The solid vertical line indicates the introduction of the two-child limit in April 2017; the dashed vertical line indicates the announcement of the two-child limit in July 2015.

We then turn to a Triple Differences approach to leverage the date of birth restriction in the policy design. Table 3 shows the main results using our preferred measure of low-income: low predicted family earnings. We focus on two changes in employment: the number of working hours of those already in employment (intensive margin, column 1) and the probability of being in employment, unemployment or economic inactivity (extensive margin, columns 2-4).

Table 3: Triple Difference estimates of the employment effects of the two-child limit: by family size and predicted family earnings

	(1)		(2)		(3)		(4)	
	Working hours		In paid employment		Unemployed		Inactive	
Bigfam	-1.367***	-1.550***	-0.140***	-0.123***	0.011***	0.010***	0.129***	0.113***
	(0.116)	(0.097)	(0.003)	(0.003)	(0.001)	(0.001)	(0.003)	(0.003)
Lowinc	-3.224***	-0.110	-0.207***	0.027***	0.048***	-0.010***	0.159***	-0.017***
	(0.066)	(0.091)	(0.002)	(0.003)	(0.001)	(0.002)	(0.002)	(0.003)
Bigfam*Lowinc	-0.678***	-1.012***	-0.055***	-0.044***	0.001	0.006*	0.054***	0.038***
	(0.193)	(0.164)	(0.005)	(0.005)	(0.003)	(0.003)	(0.005)	(0.005)
Post	1.407***	0.675***	0.010*	0.024***	-0.009***	-0.002	-0.000	-0.022***
	(0.154)	(0.145)	(0.005)	(0.005)	(0.002)	(0.002)	(0.004)	(0.004)
Bigfam*Post	-0.976*	-0.872*	-0.042**	-0.029*	-0.005	-0.004	0.047**	0.033*
	(0.456)	(0.373)	(0.015)	(0.014)	(0.004)	(0.004)	(0.015)	(0.013)
Lowinc*Post	0.209	0.314	-0.033**	0.003	-0.022***	-0.022***	0.056***	0.018
	(0.356)	(0.306)	(0.011)	(0.010)	(0.004)	(0.004)	(0.010)	(0.009)
Bigfam*Lowinc*Post	1.955*	0.507	0.015	-0.034	-0.003	-0.002	-0.012	0.036
	(0.892)	(0.729)	(0.025)	(0.022)	(0.009)	(0.009)	(0.024)	(0.022)
Constant	35.506***	39.306***	0.875***	0.785***	0.021***	0.068***	0.104***	0.147***
	(0.039)	(0.126)	(0.001)	(0.004)	(0.000)	(0.002)	(0.001)	(0.004)
Observations	229232	229232	313617	313617	313617	313617	313617	313617
Controls		X		X		X		X

Notes: Data from the Annual Population Survey. The table shows estimates of $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7$ from Equation (1) estimated with an OLS linear probability model. 'Bigfam' is a dummy variable equal to one if the respondent lives in a family with three or more children and zero otherwise. 'Lowinc' is a dummy variable equal to one if a respondent has predicted family net earnings above the median according to the specification in (2), and zero if below the median. 'Post' is a dummy variable equal to one if the respondent lives in a family in which a child was born during or after April 2017. Controls include a dummy variable equal to one if the respondent is a single parent and zero otherwise, age of the respondent (5 categories), age of the youngest child in the family (6 categories), education (5 categories), and ethnicity (4 categories). Working hours are conditional on being in paid employment. Person-household weightings are utilised to correct for non-response. Standard errors in parentheses. * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$.

In line with the descriptive figures, our estimates suggest null employment effects at both the intensive and extensive margin. The triple difference estimates are positive and significant for working hours in column 1, but when controls are added, the point estimate decreases substantially, and significance is lost. The direction of the estimates for employment and economic inactivity are sensitive to the addition of controls, and never reach statistical significance. Unemployment estimates are negative in direction but are not close to statistical significance, despite the large sample size. Taken together, these results provide no evidence that the two-child limit has increased employment. As a robustness check, Tables A1 and A2 show the results when we define low-income based on occupation and benefits receipt respectively: results are very similar.

As with any Difference-in-Differences strategy, a non-negotiable identifying assumption is the parallel trends assumption, which stipulates that the treatment group would have evolved in a similar way to the control group in the absence of the reform. In Table A3 we investigate whether there are differential changes in the pre-trends for the treatment group prior to the two-child limit by replacing the $Post_t$ dummy with dummies for each quarter of interview. There are no notable differential changes in trend prior to the policy's introduction, neither are there for key covariates (as shown in Table A4). This gives some reassurance that the parallel trends assumption is satisfied and that our identification strategy is valid (Cunningham, 2021).

5. Exploring the absence of employment effects with qualitative longitudinal research

To understand this null result, we turn to qualitative longitudinal evidence to help explain why this substantial reduction in unearned income failed to increase employment.

At the first wave of interviews, seven of 33 participants were in paid work. Four participants had a partner who was in paid work. Of the 33 participants initially interviewed, 28 had carried out paid work in the past. Many of these individuals stopped paid work after their first or a subsequent child.

To explore why the participants did not enter paid work (or increase their earnings) despite the reduction in benefit payments from the two-child limit, we explore three key themes from the data: the participants' current preferences regarding unpaid care and paid work, the barriers the participants' faced to paid work, and the direct effects of the two-child limit.

5.1 Parental preferences regarding unpaid care and paid work

While most participants had previous work histories and were planning on undertaking paid work in the future, most of them did not want to undertake paid work at the current time. This was often because they had made the active choice to prioritise unpaid care while their children were young. As Melissa and Kimberley explained:

I'm enjoying it for the moment, I'm enjoying the last few years that I've got, cos then obviously when she's in school that'll be it then, if you know what I mean.

(Melissa, single mum, four children)

I'd rather watch me kids grow up and then once she's in full-time school then, you know, just doing summat round school hours.

(Kimberley, single mum, four children)

Parents often expressed a preference to care for their children themselves and were aware of the limited amount of time they had to care for their children while they were young. As Kimberley's comment shows, even once her youngest child is in full-time school, she plans to continue to prioritise her unpaid care by fitting her paid work around school hours.

Of the 33 participants interviewed, on being asked whether the two-child limit had made any difference to whether they wanted to find paid work, only three said that it had made a difference, and a further three gave a mixed response. The others replied that the two-child limit had not made a difference. This was either because they did not want to enter paid work at the current time or because structural barriers meant this was not an option (see Section 5.2). Yalina's response clearly articulates the lack of difference the two-child limit has made to her paid work choices:

Interviewer: Has having the two-child limit made a difference as to whether or not you want to find paid work?

Yalina: Not really, cos I think my first priority is my kids, being with my kids.

(Yalina, coupled mum, three children)

The choice to prioritise unpaid care despite the two-child limit demonstrates the strength of parental preferences regarding unpaid care and paid work, referred to by Duncan and Edwards (1999) as 'gendered moral rationalities'. Even though parents face a reduction in income due to the two-child limit, they often still prefer to care for their children than enter paid work, particularly when their children are young.

5.2 Barriers to paid work

Participants who did want to enter paid work cited a range of barriers, chiefly concerning childcare and health conditions. Childcare costs and

childcare logistics were significant issues for participants, as Alisha and Aadya explained:

Even if I put this one in childcare and try to get a job, I can still only get a job three days a week while the other two are in pre-school; there isn't enough hours there, and again I still have to do the school run, if I was having to pay for childcare through the day and then childminders to pick them up and things like that, again all that money has to come out of my wage before I've got it and before they will give it back; I'd then have to send the receipts in to prove to universal credit for them to then give me that money back; and it's eighty-percent of the money so it's not all of it.

(Alisha, single mum, five children)

I did want to [enter paid work]. I was, the last couple of years actually, looking to go into employment, it just gets very difficult to try and manage three different pick-ups and then putting my youngest, which would make things easy if I could get him into like a full day kind of setting, and then the amount that they charge in the nurseries it's like, I was quite shocked, to be honest, and taken back how much they asked. I can't remember exact amount right now, but when I kind of totted it up I thought it's just really gonna take a chunk out of what I'm going to be earning, a massive chunk, on top of the fact that I have to think of somebody coming collecting them because three-thirty is quite a long time because most jobs finish at five; and for that reason I have kind of been forced to be at a little bit of a standstill at the moment.

(Aadya, coupled mum, three children)

While claimants in receipt of means-tested benefits (Universal Credit) can receive 85 percent of their childcare costs, as Alisha is aware, there are some limitations to this. The first, most obvious issue is that it does not completely cover childcare costs and therefore, as previous research has also found, childcare can remain unaffordable (Wood, 2021). Parents in larger families who need childcare for three or more children face additional difficulties with childcare costs as there is no increment for a third child (under Universal Credit, the government pays a maximum of 646 GBP per month for one child and 1108 GBP for two or more children). The second problem is that parents have to pay childcare costs upfront themselves and only receive subsidies in arrears via Universal Credit. Paying for childcare

can therefore lead to debt, or be impossible altogether if households face credit constraints (Andersen, 2023, McDonough, 2019; McKechnie, 2019).

These comments also illustrate the difficulties of arranging childcare for multiple children, highlighting the logistical difficulties of combining multiple drop-off and pick-up times with paid work. In addition to finding a nursery for their younger children, Alisha and Aadya would need to find after-school childcare for their older children.

The cost of childcare also posed a difficulty for participants who were already in paid work, as Asma, who works in three days a week doing office work in a hospital, explained:

There are things that we want to do we can't do, for example go to work or maybe study, but at the moment we'll have to wait till she's a bit more grown up. So it's just things are put on hold at the moment till we can sort ourselves out. Like I say, financial-wise we could have had a bit more extra income coming in, but we can't at the moment cos somebody needs to look after the child and, as I said it like before, if I put her in nursery it's gonna cost us, all our wages are just gonna go on childcare.

(Asma, coupled mum, five children)

Challenges related to childcare therefore seem to contribute towards the absence of employment effects at both the intensive and extensive margin.

Many participants also faced health barriers to paid work. Susie, who had started claiming benefits after her husband had committed suicide, said:

My depression doesn't help me, because some days I can be OK and some days I just don't want to talk to anybody.

(Susie, single mum, five children)

Laura became affected by the two-child limit a few years after being diagnosed with a serious health condition which required her to quit her job.

At the time of the first interview, her youngest child was also being assessed for multiple health conditions:

I mean I don't see it, I mean there's two things; one is am I gonna be healthy enough to work, and also like this kind of, things are so uncertain for my youngest at the moment, you know, they're testing him for multiple conditions and I just don't know if I'm ever gonna be able to not be caring for him full-time. So I'd love to [go] back to work, yeah so he's got suspected autism but they also think that he might have [health condition] which is like a genetic condition, which I kind of don't really understand yet. I can't, you know, what, what his needs are gonna be as he gets older but right now he's, he needs full-time care.

(Laura, single mum, three children)

At the second round of interviews, Laura's youngest child had been diagnosed with autism. Her essential caring responsibilities were recognised when she became eligible for Carer's Allowance. While the extra money was a huge help, Laura continued to struggle financially. The two-child limit makes no exemption for people with health conditions, so Laura was still missing out on nearly 3000 GBP a year in child benefits, despite being physically unable to work.

Entering or increasing paid work is the only means of making up the shortfall from the reduction in entitlement arising from the two-child limit. However, as the qualitative longitudinal research demonstrates, this is not a desirable or feasible option for many households subject to the policy. This leaves families struggling to get by on an inadequate income.

5.3 Counter-productive effects of the two-child limit

Finally, the qualitative longitudinal research suggests that capping child benefits through the two-child limit can push people further away from the labour market, for two main reasons.

First, some participants found that the income shock of the two-child limit made it harder to afford the financial costs involved in entering paid work (e.g., childcare, interview clothes and transport to work). For some, it became harder to afford training or further education. Amanda, who at the first interview had recently obtained a degree in graphic design, had to sell the equipment she had bought to establish her own business, as she did not have enough income from her benefit payments to cover her family's basic needs:

I'd started buying knitting machines, which I had to sell to basically feed the kids...I started buying equipment to make the graphic studio in the house and then when I started getting broke I sold back my Apple Mac. So all the things I tried to make myself financially secure with had to go.

(Amanda, single mum, four children)

Second, a strong theme from the qualitative longitudinal research was the negative impact of the two-child limit on parents' mental health.¹³ This had implications for the participants' ability to find or sustain employment. Existing literature provides strong evidence of a causal relationship between low-income and the probability of mothers reporting mental ill health (Cooper and Stewart, 2021; Evans and Garthwaite, 2014; Lindahl, 2005). Poor mental health has in turn been found to have a negative effect on labour market outcomes (Frijters et al, 2014; García-Gómez et al, 2010). This was evident in the qualitative interviews. Daneen talked explicitly about how her financial difficulties negatively affected her mental health. She related this specifically to the loss of money she faced due to the two-child limit and explained how this subsequently negatively impacted her ability to enter paid work:

¹³ In Figure A9 of Appendix A, we use the quantitative APS data on self-reported mental health to test the hypothesis that the two-child limit worsened mental health. There does seem to be a something of an increase in mental health difficulties at the introduction of the policy, though the data is noisy and Triple Difference estimates remain statistically insignificant (see Table A5 in Appendix A).

They're telling me now to live with three [children] off that money; so it causes me worry. Like even before I get paid like I know what's going out and I know what I'm gonna be left with and I know it's gonna be a struggle again... it makes you lose everything, your motivation, your ambition, you know, your mental health; how can I even think about working when I'm constantly feeling ill, I feel sick and I feel like I haven't been able to do anything that I wanted to?

(Daneen, single mum, three children)

Similarly, Jessica explained:

I couldn't even pay my gas, electric, council tax, rent, there wouldn't be enough money a month to even pay them, and that's without food and clothes for the kids; so I've just had to make the decision of I need to feed my children, I can't pay my council tax and my bills; and that's the decision that I've had to make until hopefully I'll manage to get back to work. But, you know, that's kind of been dragged out of it because the more stressed and the worse my mental health gets, the longer I'm gonna be off work for.

(Jessica, single mum, four children)

6. Discussion and Conclusion

The total amount of financial support for households with children typically increases with the number of children in the household, irrespective of family size. Many countries (for example in Estonia, Belgium and Japan) in fact provide a higher per-child benefit as the number of children increases (UNICEF, 2020). In 2017, the UK embarked on a major departure from this convention by introducing a two-child limit on means-tested child-related benefits. On 6 April 2017, overnight the amount of child benefits for a third-born child in a low-income family was cut by 3000 GBP a year. This was a major welfare reform for larger families in receipt of benefits, and one which substantially reduced unearned income among such families. In this paper we use mixed methods to investigate the labour market effects of this policy, drawing on quantitative quasi-experimental and qualitative longitudinal techniques.

Despite a large sample size in the quantitative data and multiple methodological approaches, we do not find any evidence – even suggestive – that the policy increased employment at the intensive or extensive margin.

On one level, these results are a surprise in the sense that they challenge standard economic models of labour supply: reductions in unearned benefits income should in theory increase labour supply via an income effect. Nevertheless, our results are in line with other empirical studies – notably Ashenfelter and Plant (1990) and Jones and Marinescu (2018) – which suggest income elasticities that are close to zero. Moreover, our qualitative longitudinal research with parents in larger families sheds light on how our null results could potentially be explained by larger families’ preferences, barriers to paid work, and counter-productive effects of cutting benefit income.

First, many participants in our qualitative longitudinal sample who were affected by the two-child limit had strong feelings that they did not want to enter paid work while their children were young. The participants valued and were proud of the unpaid care work they do, seeing it as an important civic contribution to society. Many caregivers want to prioritise this care work while their children are young – they therefore have stubborn and inelastic preferences not to engage in paid employment at this time. These feelings about the value of unpaid care were not altered by the withdrawal of benefits income through the two-child limit. Most parents wanted to return to employment when their children were older, but having a number of children in the household (with at least one child under five) often meant that these parents wanted to be present for their children during this point in their lives.

Second, even where parents did want to work while their children were young, they faced significant barriers to entering and sustaining paid work. The lack of affordable childcare in the UK is one especially important barrier.

Several participants mentioned childcare costs and availability, both of which incentivise low work intensity among larger families, and particularly for second-earners. Since the late 1990s, the most common working pattern among coupled larger families has been to have one parent working full-time and one parent at home (Stewart, Patrick and Reeves, 2023). Some childcare support is offered via the benefits system, but this is limited and is paid in arrears. Some families are eligible for a specific number of hours of free childcare, but in England and Wales the full entitlement (30 hours) is conditional on both parents being in work for more than 16 hours a week on the minimum wage.¹⁴ Together, these requirements create a vicious cycle of unaffordable childcare and low work intensity for low-income larger families across the UK. This is exacerbated by the additional logistical difficulties of arranging childcare for several children, especially when nursery and school are not co-located.

Another key barrier faced by the participants in our sample was the presence of health conditions within the family. Some parents themselves had health conditions which made it very difficult or impossible for them to enter paid work. In other families, parents were unable to undertake paid work as they had children with health conditions who needed full-time care. Our sample also included families in which both parents and children had health conditions, so making up the shortfall from income shock of the two-child limit was virtually impossible. There are no exemptions to two-child limit on grounds of health conditions and the policy does not recognise the range of reasons why a parent may be unable to engage in paid work. This leaves families facing considerable financial hardship, with no ability to improve their position.

Finally, the qualitative longitudinal research indicates that wider negative effects of the two-child limit may have mitigated its ability to improve

¹⁴ Entitlements to free childcare are slightly different across the four nations of the UK (England, Scotland, Wales and Northern Ireland) (Stewart and Reader, 2021).

employment. Participants told us that the two-child limit limited their ability to undertake further education and training, to afford costs associated with entering paid work, and increased mental health difficulties. These processes seem if anything to have pushed affected households further away from the paid labour market.

There are some limitations to our analysis. First, there is no exhaustive or administrative data available in the UK on labour market activity and benefits receipt. While the APS is the largest household survey in the UK and benefits from a large sample size, it is possible that sampling error and non-response may dull our estimation of effects. However, without administrative data becoming available, sadly this limitation is not addressable. Second, unfortunately we had to exclude data from 2020 and 2021 from our quantitative analysis due to the confounding effects of the Covid-19 pandemic, which disproportionately impacted on the labour market activity of larger families (Reader and Andersen, 2022). This naturally restricts the length of our 'post' period and means that our estimates are limited to the short run. Third, our qualitative sample is relatively small and geographically focused. Nevertheless, it does include areas with very different labour market profiles (e.g., London and Bradford). Finally, it is possible that employment effects may increase over time, as children affected by the two-child limit grow older – although if the policy is maintained, it will continue to affect families with young children as well as older ones.

Our findings have three main policy implications. First, and most directly, we find that capping child benefits at two children does not yield positive employment effects, and therefore its benefits to social welfare are unclear. Recent research has indicated that the policy has had no significant effects on the fertility of third and subsequent births (Reader, Portes and Patrick, 2022). Given this lack of behavioural change in response to the policy, the primary effect of the two-child limit is to deprive larger families of 3000 GBP a year per child, at a time when child poverty among larger families is

already increasing sharply (Stewart, Patrick and Reeves, 2023). Indeed, emerging estimates from the Child Poverty Action Group suggest that the two-child limit is pushing 50,000 children into poverty every year (CPAG, 2022). This has wider implications for policymaking: if welfare reforms fail to initiate behavioural change, they simply increase poverty.

Second, and relatedly, our research suggests that larger families are particularly 'sticky' in their labour market response to financial incentives in the benefits system. The fact that we observe null employment effects in the quantitative analysis – despite the income loss of nearly 3000 GBP a year per child – suggests that the income effect for parents in low-income larger families at this stage in the life course is very weak, even when there is a large financial impact. One implication is that policymakers should think carefully about the group they are targeting and whether it is likely that they will be able to adjust their labour supply given caregiving commitments and barriers to paid work, such as childcare costs. This includes a need to understand the everyday lives of those in the welfare system before designing and predicting the effects of welfare reforms. A failure to do so can, in cases such as this, preclude the main aims of the policy from being realised, while creating significant harm to affected families.

Third, our results have implications for the role of public policy in recognising individuals' contribution to society and to the economy. The policy design of the two-child limit, and the underpinning narrative utilised to defend it, assumes paid employment to be the marker of the responsible, dutiful citizen (Patrick, 2017). The only way of making up for the shortfall of the two-child limit is to increase labour supply, but implicitly this fails to recognise the contribution of unpaid care work to society and to the economy. UK national statistics indicate that in 2016, the value of unpaid household work to the economy equated to 64 percent of GDP (ONS, 2018). One alternative policy direction would be to embed an 'ethics of care' into

public policy, in which social structures are designed to recognise care work and to make it possible (McDowell, 2004; Tronto, 2015, Patrick, 2017).

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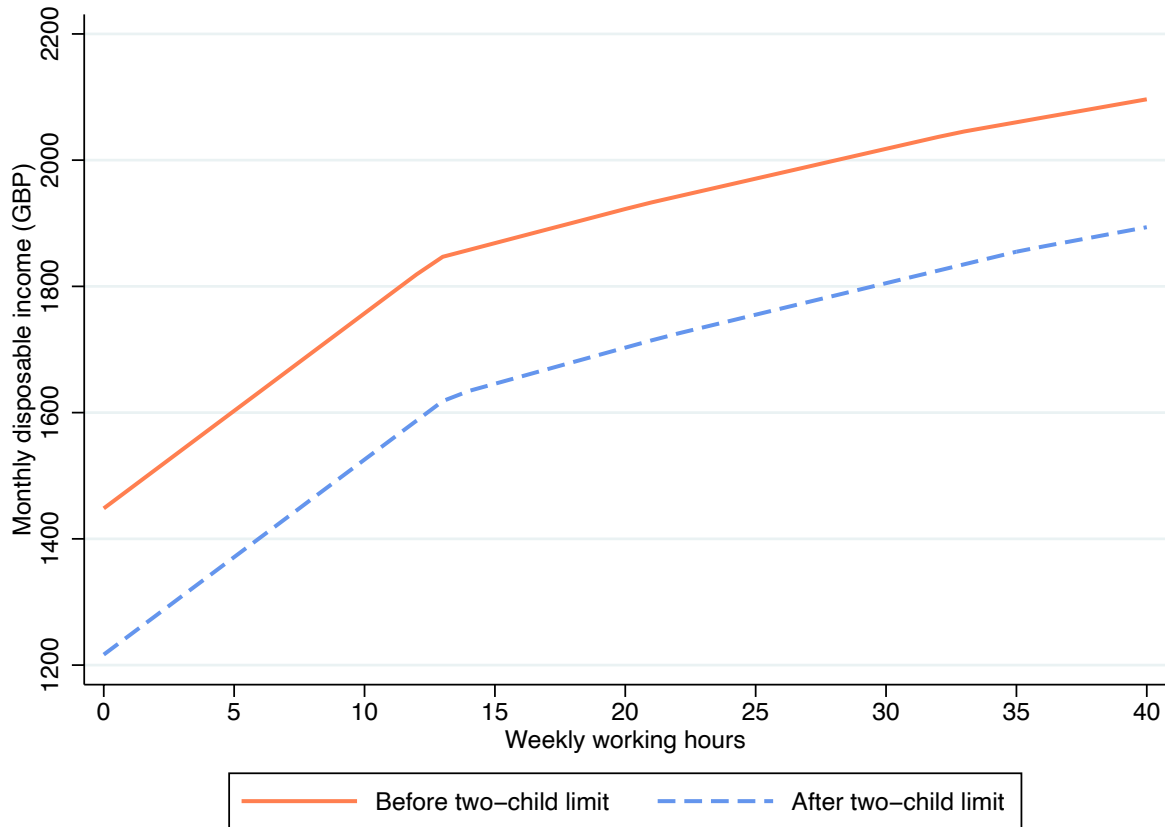
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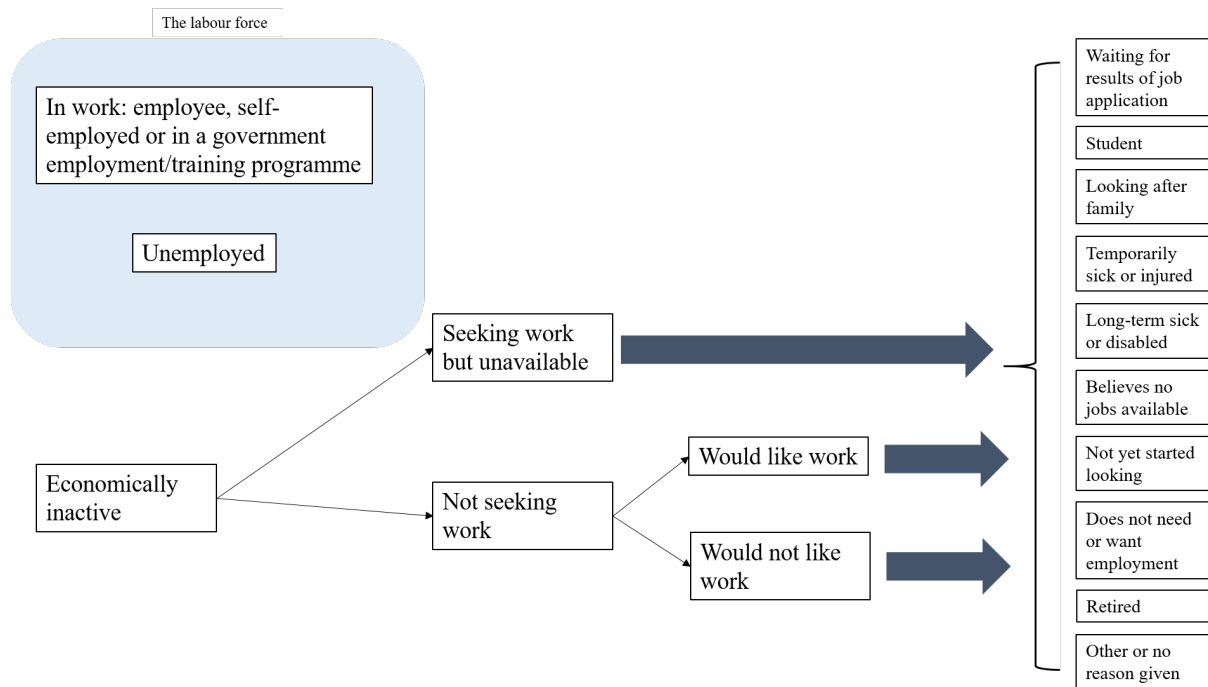
Appendix A: Supplementary figures and tables

Figure A1: Effect of the two-child limit on the budget constraint of a single parent with three children, aged 10, 7 and 0



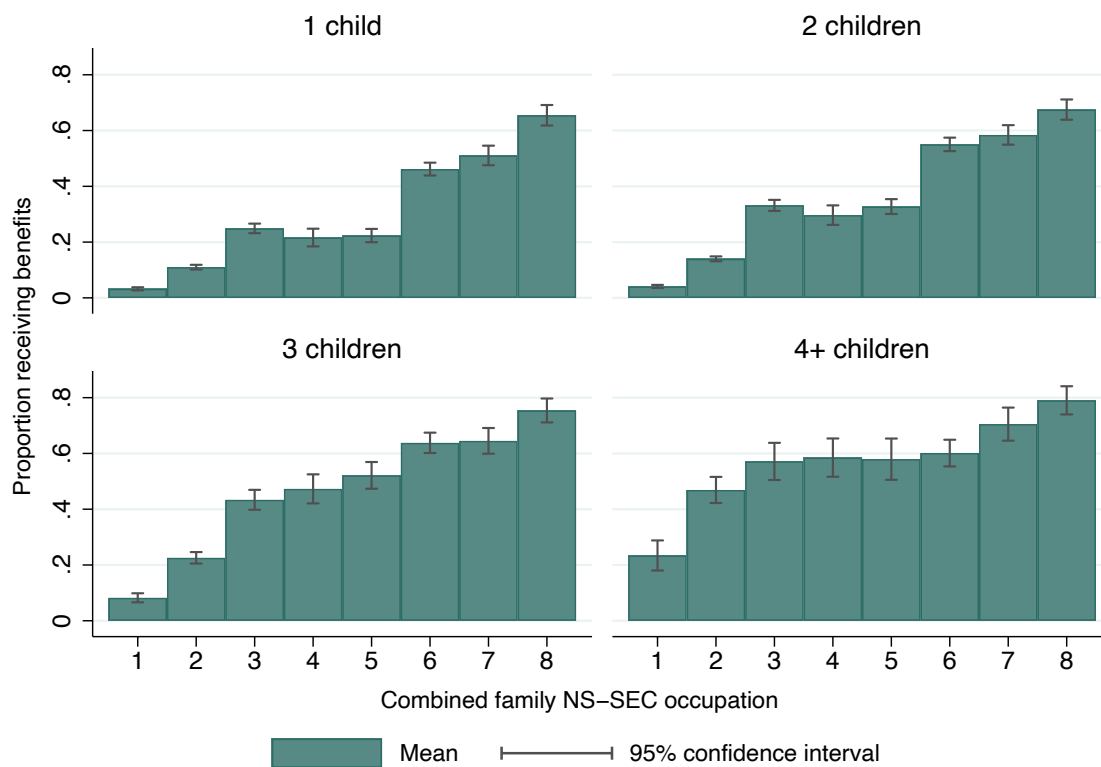
Notes: Data using EUROMOD Hypothetical Household Tool. The figure shows simulated monthly disposable income by working hours for a single parent with three children, with the parent working between 0-40 hours at £7.50 an hour (the minimum wage as of April 2017). Housing costs are not included. Prices are in nominal terms.

Figure A2: Employment categories in the Annual Population Survey



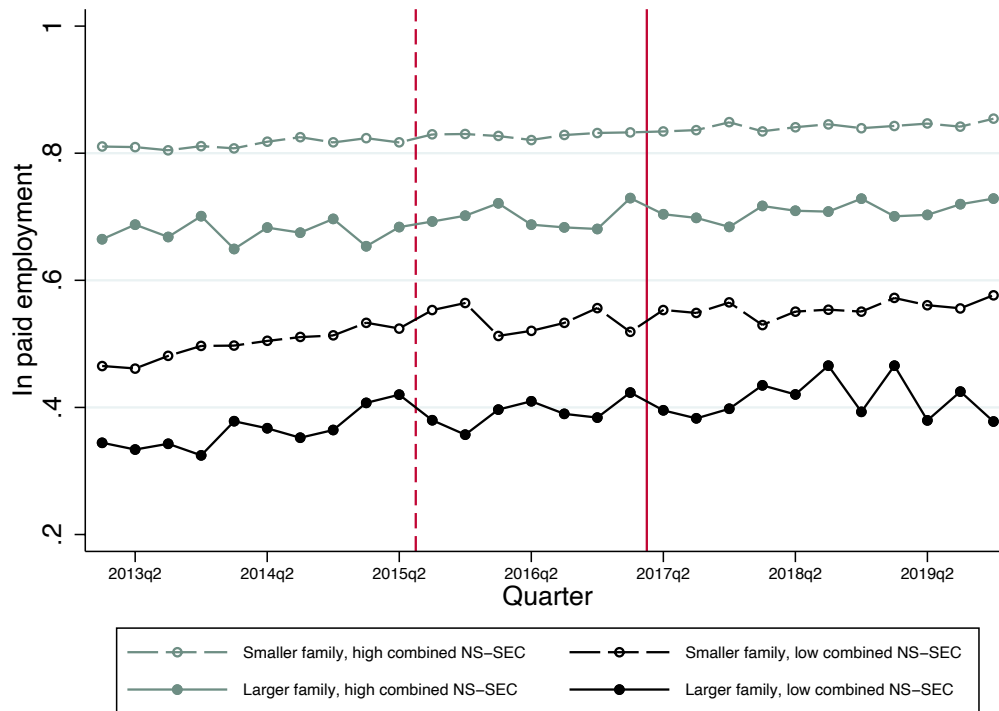
Notes: The figure describes the key employment categories in the Annual Population Survey, including the reasons given for economic inactivity.

Figure A3: NS-SEC occupation and the probability of benefits receipt, 2017



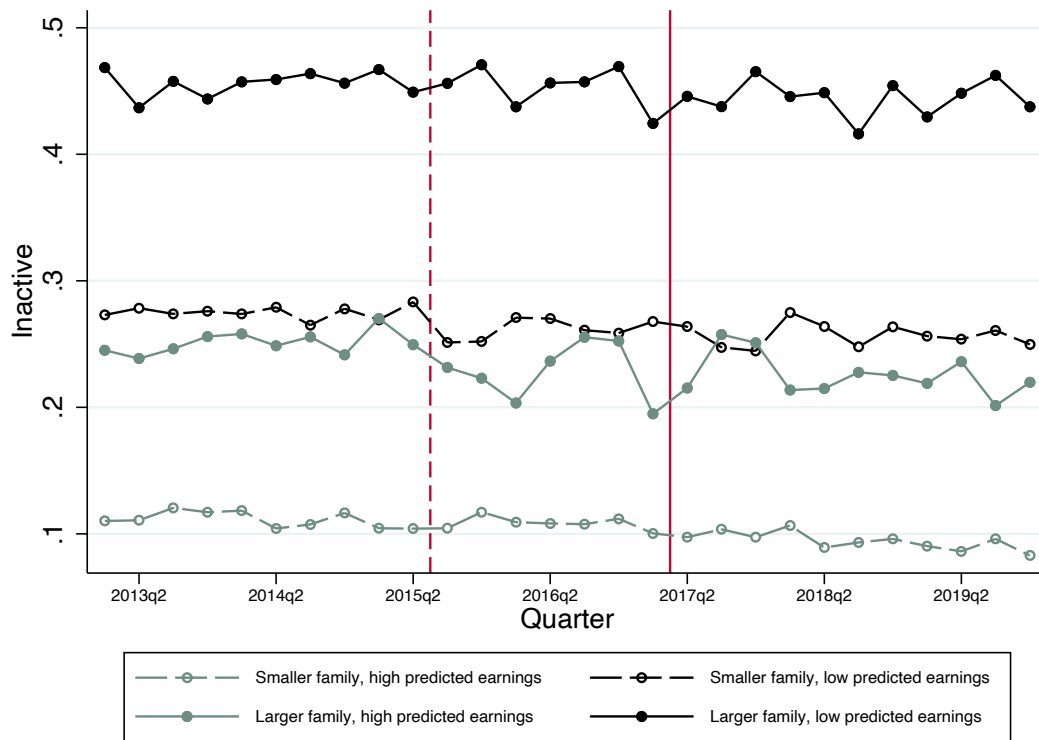
Notes: Data from Annual Population Survey. The bar chart shows the proportion of adult respondents aged 16-45 who are in receipt of means-tested benefits, by combined family NS-SEC occupation and by the number of children in the family. The sample is adult respondents aged 19-45 in 2017 (N=42,463). NS-SEC occupation categories are as follows: 1=Large employers, higher management and higher professional; 2=Lower management and professional; 3=Intermediate; 4=Small employers and own-account; 5=Lower supervisory and technical; 6=Semi-routine; 7=Routine; 8=Never worked, long-term unemployed, or not classified. Person-household weightings are utilised to correct for non-response. The number of children refers to the number of dependent children under-19 reported in the family unit. Error bars indicate 95 percent confidence intervals.

Figure A4: Proportion of adults aged 19-45 in paid employment, by family size and family occupation, 2013-2019



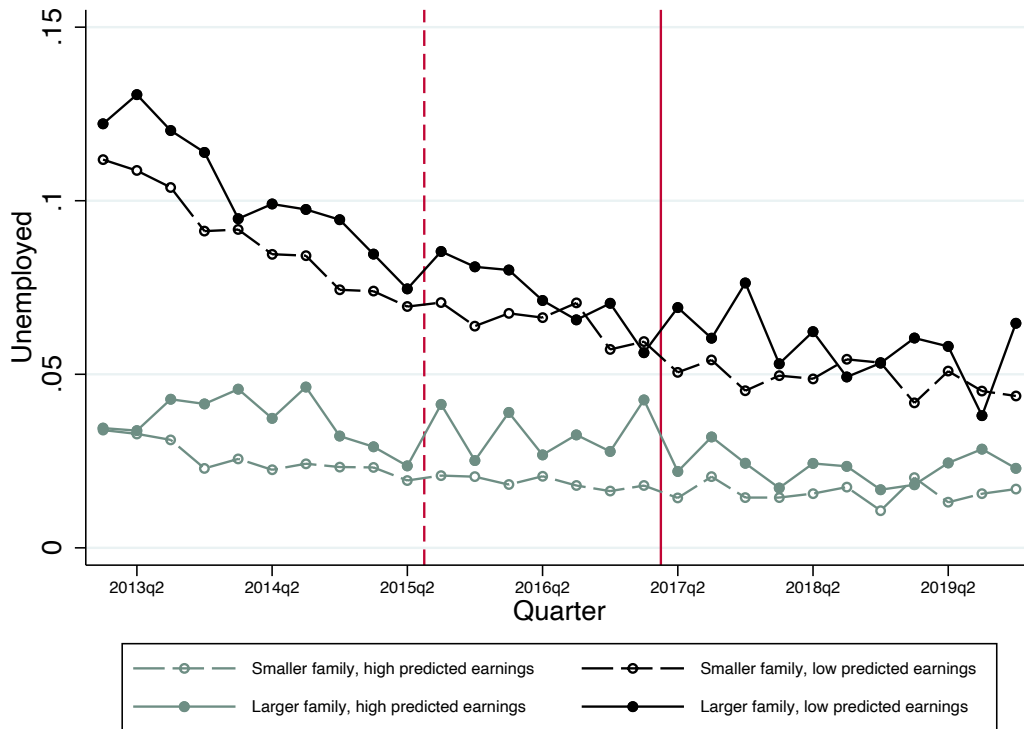
Notes: Data from the Annual Population Survey. The figure charts the proportion of adults aged 16-45 in paid employment by quarter of interview, family size and family occupation status. Person-household weightings are utilised to correct for non-response. The solid vertical line indicates the introduction of the two-child limit in April 2017; the dashed vertical line indicates the announcement of the two-child limit in July 2015.

Figure A5: Proportion of adults aged 19-45 who are economically inactive, by family size and predicted family earnings, 2013-2019



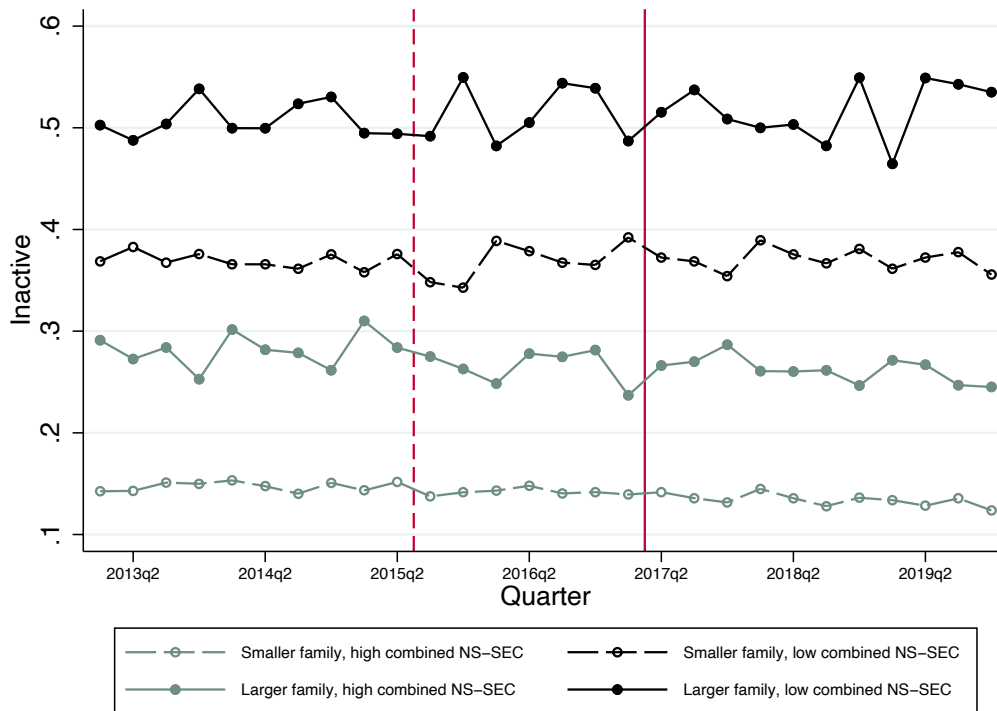
Notes: Data from the Annual Population Survey. The figure charts the proportion of adults aged 16-45 who are economically inactive by quarter of interview, family size and predicted family earnings. Person-household weightings are utilised to correct for non-response. The solid vertical line indicates the introduction of the two-child limit in April 2017; the dashed vertical line indicates the announcement of the two-child limit in July 2015.

Figure A6: Proportion of adults aged 19-45 who are unemployed, by family size and predicted family earnings, 2013-2019



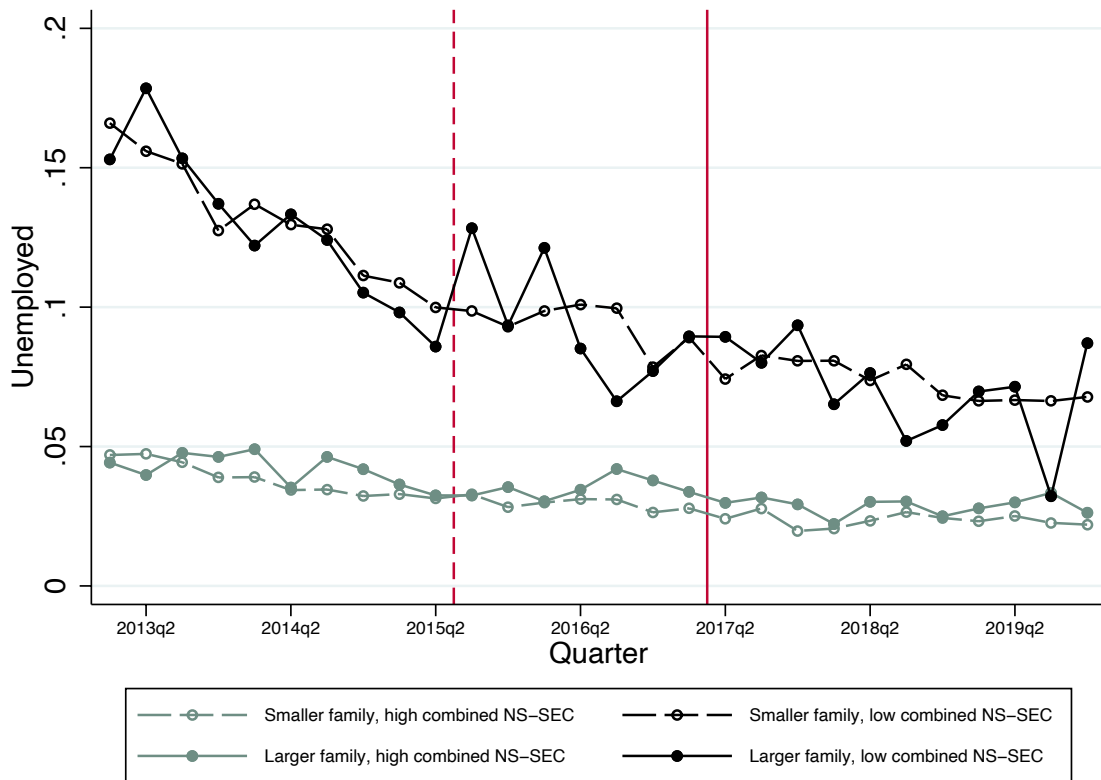
Notes: Data from the Annual Population Survey. The figure charts the proportion of adults aged 16-45 who are unemployed by quarter of interview, family size and predicted family earnings. Person-household weightings are utilised to correct for non-response. The solid vertical line indicates the introduction of the two-child limit in April 2017; the dashed vertical line indicates the announcement of the two-child limit in July 2015.

Figure A7: Proportion of adults aged 19-45 who are economically inactive, by family size and family occupation, 2013-2019



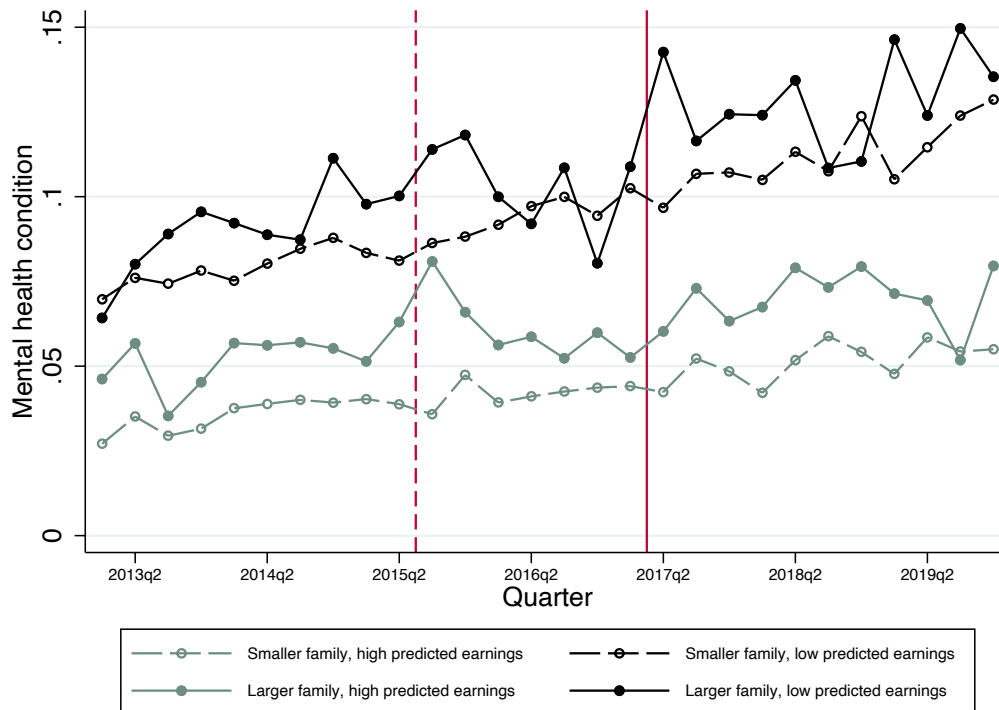
Notes: Data from the Annual Population Survey. The figure charts the proportion of adults aged 16-45 who are economically inactive by quarter of interview, family size and family occupation status. Person-household weightings are utilised to correct for non-response. The solid vertical line indicates the introduction of the two-child limit in April 2017; the dashed vertical line indicates the announcement of the two-child limit in July 2015.

Figure A8: Proportion of adults aged 19-45 who are unemployed, by family size and family occupation, 2013-2019



Notes: Data from the Annual Population Survey. The figure charts the proportion of adults aged 16-45 who are unemployed by quarter of interview, family size and family occupation status. Person-household weightings are utilised to correct for non-response. The solid vertical line indicates the introduction of the two-child limit in April 2017; the dashed vertical line indicates the announcement of the two-child limit in July 2015.

Figure A9: Proportion of adults aged 19-45 reporting a mental health condition, by family size and predicted family earnings, 2013-2019



Notes: Data from the Annual Population Survey. The figure charts the proportion of adults aged 16-45 reporting mental health problems (depression, bad nerves or anxiety, and other mental illness, phobias or panic attacks) by quarter of interview, family size and predicted family earnings. Person-household weightings are utilised to correct for non-response. The solid vertical line indicates the introduction of the two-child limit in April 2017; the dashed vertical line indicates the announcement of the two-child limit in July 2015.

Table A1: Triple Difference estimates of the employment effects of the two-child limit: by family size and family occupation

	(1)		(2)		(3)		(4)	
	Working hours		In paid employment		Unemployed		Inactive	
Bigfam	-1.220***	-1.635***	-0.131***	-0.124***	0.005***	0.009***	0.126***	0.115***
	(0.103)	(0.086)	(0.003)	(0.003)	(0.001)	(0.001)	(0.003)	(0.003)
Lowinc	-4.893***	-3.159***	-0.299***	-0.184***	0.073***	0.049***	0.226***	0.134***
	(0.105)	(0.096)	(0.003)	(0.003)	(0.002)	(0.002)	(0.003)	(0.003)
Bigfam*Lowinc	0.313	-0.729***	-0.006	-0.020***	-0.006	-0.001	0.012*	0.021***
	(0.245)	(0.205)	(0.006)	(0.006)	(0.003)	(0.003)	(0.006)	(0.006)
Post	1.794***	0.676***	0.027***	0.022***	-0.017***	-0.003	-0.010*	-0.019***
	(0.145)	(0.136)	(0.005)	(0.004)	(0.002)	(0.002)	(0.004)	(0.004)
Bigfam*Post	-0.523	-0.507	-0.057***	-0.037**	0.003	-0.001	0.054***	0.038**
	(0.422)	(0.344)	(0.014)	(0.012)	(0.004)	(0.004)	(0.014)	(0.012)
Lowinc*Post	0.550	0.641	-0.034*	0.010	-0.032***	-0.038***	0.066***	0.028*
	(0.564)	(0.476)	(0.015)	(0.014)	(0.007)	(0.007)	(0.015)	(0.014)

	(1)		(2)		(3)		(4)	
	Working hours		In paid employment		Unemployed		Inactive	
Bigfam*Lowinc*Post	-0.425	-1.165	0.014	-0.026	-0.011	-0.006	-0.003	0.031
	(1.172)	(0.957)	(0.029)	(0.026)	(0.012)	(0.012)	(0.029)	(0.026)
Constant	34.736***	39.464***	0.828***	0.810***	0.031***	0.061***	0.141***	0.130***
	(0.033)	(0.122)	(0.001)	(0.004)	(0.000)	(0.002)	(0.001)	(0.003)
Observations	229639	229232	314317	313617	314317	313617	314317	313617
Controls		X		X		X		X

Notes: Data from the Annual Population Survey. The table shows estimates of $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7$ from Equation (1) estimated with an OLS linear probability model. 'Bigfam' is a dummy variable equal to one if the respondent lives in a family with three or more children and zero otherwise. 'Lowinc' is a dummy variable equal to one if a respondent's combined (highest) family occupation is NS-SEC 6-8, and zero if it is NS-SEC 1-5. 'Post' is a dummy variable equal to one if the respondent lives in a family in which a child was born during or after April 2017. Controls are a dummy variable equal to one if the respondent is a single parent and zero otherwise, age of the respondent (5 categories), age of the youngest child in the family (6 categories), education (5 categories), and ethnicity (4 categories). Working hours are conditional on being in paid employment. Person-household weightings are utilised to correct for non-response. Standard errors in parentheses. * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$.

Table A2: Triple Difference estimates of the employment effects of the two-child limit: by family size and benefits receipt

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Working hours		In paid employment		Unemployed		Inactive	
Bigfam	-0.608***	-1.279***	-0.122***	-0.115***	0.008***	0.011***	0.114***	0.104***
	(0.109)	(0.093)	(0.003)	(0.003)	(0.001)	(0.001)	(0.003)	(0.003)
Lowinc	-8.334***	-4.771***	-0.251***	-0.158***	0.071***	0.061***	0.180***	0.096***
	(0.084)	(0.090)	(0.003)	(0.003)	(0.002)	(0.002)	(0.003)	(0.003)
Bigfam*Lowinc	0.811***	-0.201	0.000	-0.017**	-0.025***	-0.018***	0.025***	0.035***
	(0.200)	(0.172)	(0.006)	(0.005)	(0.003)	(0.003)	(0.006)	(0.005)
Post	1.549***	0.656***	0.042***	0.032***	-0.017***	-0.000	-0.026***	-0.031***
	(0.145)	(0.136)	(0.004)	(0.004)	(0.002)	(0.002)	(0.004)	(0.004)
Bigfam*Post	-0.467	-0.611	-0.036*	-0.019	-0.003	-0.005	0.039**	0.024
	(0.429)	(0.351)	(0.014)	(0.013)	(0.005)	(0.005)	(0.014)	(0.013)
Lowinc*Post	-0.646	-0.300	-0.138***	-0.064***	-0.029***	-0.045***	0.167***	0.109***
	(0.508)	(0.458)	(0.015)	(0.014)	(0.007)	(0.007)	(0.015)	(0.014)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Working hours		In paid employment		Unemployed		Inactive	
Bigfam*Lowinc*Post	0.204	-0.073	0.031	-0.016	0.008	0.014	-0.039	0.002
	(1.010)	(0.875)	(0.027)	(0.025)	(0.011)	(0.011)	(0.027)	(0.025)
Constant	35.417***	38.949***	0.823***	0.785***	0.030***	0.067***	0.147***	0.148***
	(0.034)	(0.122)	(0.001)	(0.004)	(0.000)	(0.002)	(0.001)	(0.003)
Observations	229639	229232	314317	313617	314317	313617	314317	313617
Controls		X		X		X		X

Notes: Data from the Annual Population Survey. The table shows estimates of $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7$ from Equation (1) estimated with an OLS linear probability model. 'Bigfam' is a dummy variable equal to one if the respondent lives in a family with three or more children and zero otherwise. 'Lowinc' is a dummy variable equal to one if a respondent reports receiving one or more of the benefits affected by the two-child limit: Universal Credit, tax credits, income-based Jobseeker's Allowance, Income Support for lone parents, or Housing Benefit. 'Post' is a dummy variable equal to one if the respondent lives in a family in which a child was born during or after April 2017. Controls are a dummy variable equal to one if the respondent is a single parent and zero otherwise, age of the respondent (5 categories), age of the youngest child in the family (6 categories), education (5 categories), and ethnicity (4 categories). Working hours are conditional on being in paid employment. Person-household weightings are utilised to correct for non-response. Standard errors in parentheses. * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$.

Table A3: Parallel trends test

	(1)		(2)		(3)		(4)	
	Working hours		In paid employment		Unemployed		Inactive	
Bigfam*Lowinc*2013 Q2	0.291 (1.444)	0.448 (1.188)	0.019 (0.036)	0.022 (0.034)	0.011 (0.021)	0.013 (0.021)	-0.030 (0.035)	-0.035 (0.032)
Bigfam*Lowinc*2013 Q3	-0.382 (1.462)	0.424 (1.202)	0.008 (0.036)	0.019 (0.033)	-0.005 (0.021)	-0.007 (0.021)	-0.003 (0.036)	-0.012 (0.032)
Bigfam*Lowinc*2013 Q4	-0.380 (1.432)	-0.517 (1.173)	0.037 (0.036)	0.041 (0.034)	-0.006 (0.021)	-0.008 (0.020)	-0.032 (0.035)	-0.033 (0.033)
Bigfam*Lowinc*2014 Q1	-1.265 (1.423)	-0.896 (1.220)	0.044 (0.036)	0.051 (0.033)	-0.027 (0.020)	-0.029 (0.020)	-0.017 (0.035)	-0.022 (0.032)
Bigfam*Lowinc*2014 Q2	-0.383 (1.390)	-0.394 (1.159)	0.035 (0.036)	0.042 (0.033)	-0.010 (0.020)	-0.012 (0.020)	-0.025 (0.035)	-0.030 (0.033)
Bigfam*Lowinc*2014 Q3	-1.866 (1.437)	-1.437 (1.213)	0.029 (0.036)	0.044 (0.034)	-0.019 (0.021)	-0.021 (0.021)	-0.010 (0.035)	-0.023 (0.032)
Bigfam*Lowinc*2014 Q4	0.690 (1.442)	-0.028 (1.190)	0.006 (0.037)	0.005 (0.034)	0.002 (0.020)	0.002 (0.020)	-0.007 (0.036)	-0.007 (0.033)
Bigfam*Lowinc*2015 Q1	0.569 (1.435)	1.075 (1.201)	0.034 (0.037)	0.043 (0.034)	-0.005 (0.020)	-0.006 (0.019)	-0.029 (0.036)	-0.038 (0.033)
Bigfam*Lowinc*2015 Q2	-1.296 (1.434)	-0.610 (1.177)	0.049 (0.036)	0.062 (0.033)	-0.009 (0.019)	-0.011 (0.019)	-0.040 (0.036)	-0.051 (0.032)
Bigfam*Lowinc*2015 Q3	-2.135 (1.470)	-1.965 (1.212)	-0.002 (0.037)	0.003 (0.034)	-0.016 (0.021)	-0.017 (0.020)	0.017 (0.036)	0.014 (0.033)
Bigfam*Lowinc*2015 Q4	-0.720 (1.460)	-0.622 (1.219)	-0.055 (0.037)	-0.038 (0.034)	0.003 (0.020)	0.003 (0.020)	0.052 (0.037)	0.035 (0.034)
Bigfam*Lowinc*2016 Q1	-2.010 (1.442)	-1.296 (1.185)	0.006 (0.037)	0.029 (0.034)	-0.018 (0.020)	-0.018 (0.020)	0.012 (0.036)	-0.011 (0.033)
Bigfam*Lowinc*2016 Q2	-1.998 (1.434)	-1.587 (1.211)	0.014 (0.037)	0.015 (0.034)	-0.011 (0.019)	-0.009 (0.019)	-0.003 (0.036)	-0.007 (0.033)
Bigfam*Lowinc*2016 Q3	-0.849 (1.458)	-0.512 (1.236)	0.041 (0.038)	0.041 (0.035)	-0.029 (0.020)	-0.029 (0.019)	-0.012 (0.037)	-0.012 (0.034)

	(1)		(2)		(3)		(4)	
	Working hours		In paid employment		Unemployed		Inactive	
Bigfam*Lowinc*2016 Q4	-1.500 (1.493)	-1.355 (1.246)	-0.002 (0.037)	-0.003 (0.034)	-0.008 (0.019)	-0.005 (0.019)	0.009 (0.036)	0.008 (0.033)
Bigfam*Lowinc*2017 Q1	-0.551 (1.454)	-0.487 (1.206)	0.036 (0.037)	0.049 (0.035)	-0.038 (0.019)	-0.038* (0.019)	0.001 (0.036)	-0.011 (0.033)
Bigfam*Lowinc*2017 Q2	-0.079 (1.424)	0.309 (1.194)	-0.005 (0.037)	0.005 (0.034)	0.001 (0.019)	0.002 (0.019)	0.003 (0.036)	-0.007 (0.033)
Bigfam*Lowinc*2017 Q3	-0.973 (1.501)	0.132 (1.249)	0.039 (0.038)	0.065 (0.035)	-0.015 (0.019)	-0.017 (0.019)	-0.024 (0.037)	-0.048 (0.034)
Bigfam*Lowinc*2017 Q4	-1.533 (1.521)	-1.362 (1.273)	-0.018 (0.037)	-0.015 (0.034)	0.011 (0.019)	0.011 (0.019)	0.006 (0.036)	0.004 (0.033)
Bigfam*Lowinc*2018 Q1	-0.317 (1.465)	-0.758 (1.214)	0.006 (0.038)	-0.001 (0.035)	-0.009 (0.018)	-0.011 (0.018)	0.003 (0.038)	0.012 (0.035)
Bigfam*Lowinc*2018 Q2	-0.908 (1.429)	0.121 (1.200)	0.006 (0.038)	0.010 (0.035)	-0.005 (0.019)	-0.006 (0.019)	-0.002 (0.037)	-0.004 (0.035)
Bigfam*Lowinc*2018 Q3	0.397 (1.426)	0.557 (1.199)	0.048 (0.037)	0.042 (0.034)	-0.021 (0.019)	-0.023 (0.019)	-0.027 (0.036)	-0.019 (0.033)
Bigfam*Lowinc*2018 Q4	-2.246 (1.478)	-0.953 (1.236)	0.015 (0.038)	0.037 (0.036)	-0.016 (0.019)	-0.018 (0.018)	0.001 (0.038)	-0.019 (0.035)
Bigfam*Lowinc*2019 Q1	-0.318 (1.449)	-0.609 (1.210)	0.005 (0.038)	0.001 (0.035)	0.011 (0.019)	0.009 (0.019)	-0.016 (0.037)	-0.010 (0.034)
Bigfam*Lowinc*2019 Q2	-0.622 (1.437)	0.244 (1.219)	0.030 (0.038)	0.039 (0.035)	-0.014 (0.019)	-0.015 (0.019)	-0.016 (0.038)	-0.024 (0.035)
Bigfam*Lowinc*2019 Q3	-0.654 (1.439)	-0.347 (1.192)	-0.006 (0.038)	-0.007 (0.035)	-0.030 (0.019)	-0.027 (0.019)	0.036 (0.037)	0.033 (0.034)
Bigfam*Lowinc*2019 Q4	-1.783 (1.460)	-1.007 (1.236)	0.005 (0.039)	0.014 (0.036)	0.005 (0.020)	0.004 (0.019)	-0.010 (0.038)	-0.017 (0.035)
Observations	229232	229232	313617	313617	313617	313617	313617	313617
Controls		X		X		X		X

Notes: Data from the Annual Population Survey. The table reports estimates of β_7 from Equation (1), where the Post variable is replaced with a dummy variable for each quarter of birth. An OLS

linear probability model is used. 'Bigfam' is a dummy variable equal to one if the respondent lives in a family with three or more children and zero otherwise. 'Lowinc' is a dummy variable equal to one if a respondent has predicted family net earnings above the median according to the specification in (2), and zero if below the median. 'Post' is a dummy variable equal to one if the respondent lives in a family in which a child was born during or after April 2017. Controls are a dummy variable equal to one if the respondent is a single parent and zero otherwise, age of the respondent (5 categories), age of the youngest child in the family (6 categories), education (5 categories), and ethnicity (4 categories). Working hours are conditional on being in paid employment. Person-household weightings are utilised to correct for non-response. Standard errors in parentheses. * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$.

Table A4: Parallel covariate trends test

	(1)	(2)	(3)	(4)	(5)	(6)
	Single parent	White	Female	Good secondary education	Higher educated	Age of youngest child
Bigfam*Lowinc*2013 Q2	0.009 (0.027)	0.040 (0.033)	0.044 (0.038)	-0.022 (0.030)	-0.019 (0.029)	0.133 (0.476)
Bigfam*Lowinc*2013 Q3	0.014 (0.026)	0.030 (0.033)	0.045 (0.039)	-0.031 (0.031)	0.004 (0.029)	0.446 (0.475)
Bigfam*Lowinc*2013 Q4	-0.010 (0.026)	0.002 (0.032)	-0.003 (0.038)	-0.022 (0.030)	-0.033 (0.029)	0.487 (0.479)
Bigfam*Lowinc*2014 Q1	-0.013 (0.025)	-0.024 (0.032)	0.033 (0.038)	-0.024 (0.030)	0.027 (0.029)	-0.210 (0.474)
Bigfam*Lowinc*2014 Q2	0.019 (0.026)	0.010 (0.033)	0.022 (0.038)	-0.025 (0.030)	-0.003 (0.029)	-0.019 (0.476)
Bigfam*Lowinc*2014 Q3	0.022 (0.026)	-0.008 (0.033)	0.064 (0.039)	-0.019 (0.030)	-0.006 (0.029)	0.112 (0.474)
Bigfam*Lowinc*2014 Q4	-0.011 (0.026)	0.033 (0.033)	-0.005 (0.039)	-0.048 (0.030)	-0.018 (0.030)	0.549 (0.482)
Bigfam*Lowinc*2015 Q1	0.011 (0.026)	-0.068* (0.034)	0.052 (0.039)	-0.036 (0.031)	-0.005 (0.030)	1.287** (0.476)
Bigfam*Lowinc*2015 Q2	0.010 (0.026)	-0.026 (0.033)	0.047 (0.039)	-0.020 (0.031)	-0.001 (0.029)	0.344 (0.490)
Bigfam*Lowinc*2015 Q3	0.036 (0.027)	-0.022 (0.035)	0.055 (0.039)	0.008 (0.031)	-0.006 (0.031)	0.621 (0.482)
Bigfam*Lowinc*2015 Q4	0.004 (0.027)	0.049 (0.034)	0.052 (0.040)	-0.056 (0.031)	-0.006 (0.031)	0.326 (0.485)
Bigfam*Lowinc*2016 Q1	0.018 (0.026)	-0.014 (0.034)	0.091* (0.039)	0.014 (0.030)	-0.026 (0.030)	0.069 (0.485)
Bigfam*Lowinc*2016 Q2	-0.017 (0.026)	-0.017 (0.034)	0.053 (0.040)	-0.032 (0.031)	0.011 (0.031)	0.782 (0.472)
Bigfam*Lowinc*2016 Q3	0.016 (0.027)	0.002 (0.035)	0.023 (0.040)	0.013 (0.030)	-0.044 (0.031)	0.104 (0.492)

	(1)	(2)	(3)	(4)	(5)	(6)
	Single parent	White	Female	Good secondary education	Higher educated	Age of youngest child
Bigfam*Lowinc*2016 Q4	-0.028 (0.026)	0.027 (0.035)	0.061 (0.040)	-0.000 (0.031)	0.005 (0.030)	0.728 (0.487)
Bigfam*Lowinc*2017 Q1	0.024 (0.027)	-0.001 (0.034)	0.057 (0.040)	-0.026 (0.031)	-0.025 (0.031)	0.580 (0.483)
Bigfam*Lowinc*2017 Q2	0.035 (0.027)	0.039 (0.035)	0.067 (0.040)	0.002 (0.030)	-0.031 (0.031)	0.321 (0.486)
Bigfam*Lowinc*2017 Q3	0.034 (0.027)	-0.007 (0.035)	0.069 (0.040)	-0.035 (0.031)	-0.015 (0.030)	0.662 (0.500)
Bigfam*Lowinc*2017 Q4	0.010 (0.026)	0.035 (0.034)	0.069 (0.039)	-0.010 (0.031)	0.034 (0.031)	0.715 (0.482)
Bigfam*Lowinc*2018 Q1	0.040 (0.028)	0.020 (0.036)	-0.018 (0.042)	-0.009 (0.033)	-0.031 (0.032)	0.477 (0.506)
Bigfam*Lowinc*2018 Q2	0.046 (0.027)	0.026 (0.037)	0.054 (0.041)	0.021 (0.032)	-0.001 (0.032)	-0.274 (0.528)
Bigfam*Lowinc*2018 Q3	0.021 (0.027)	0.033 (0.035)	0.015 (0.040)	-0.008 (0.031)	0.009 (0.030)	0.162 (0.505)
Bigfam*Lowinc*2018 Q4	0.053 (0.028)	0.009 (0.037)	0.105* (0.041)	-0.009 (0.032)	0.011 (0.032)	0.220 (0.498)
Bigfam*Lowinc*2019 Q1	0.029 (0.027)	0.006 (0.036)	0.000 (0.041)	-0.021 (0.032)	0.019 (0.032)	0.561 (0.506)
Bigfam*Lowinc*2019 Q2	0.061* (0.028)	-0.001 (0.036)	0.068 (0.041)	-0.009 (0.032)	-0.006 (0.032)	0.322 (0.505)
Bigfam*Lowinc*2019 Q3	0.028 (0.028)	0.104** (0.037)	0.055 (0.041)	-0.013 (0.032)	- 0.095** (0.030)	0.675 (0.494)
Bigfam*Lowinc*2019 Q4	0.026 (0.029)	0.008 (0.037)	0.058 (0.042)	0.017 (0.032)	0.003 (0.033)	-0.369 (0.517)
Observations	313617	313617	313617	313617	313617	313617

Notes: Data from the Annual Population Survey. The table reports estimates of β_7 from Equation (1), where the Post variable is replaced with a dummy variable for each quarter of birth. Each column includes these estimates for a different covariate as the outcome variable. An OLS linear probability model is used. 'Bigfam' is a dummy variable equal to one if the respondent lives in a family with three or more children and zero otherwise. 'Lowinc' is a dummy variable equal to one if a respondent has predicted family net earnings above the median according to the specification in (2), and zero if below the median. 'Post' is a dummy variable equal to one if the respondent lives in a family in which a child was born during or after April 2017. Person-household weightings are utilised to correct for non-response. Standard errors in parentheses. * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$.

Table A5: Triple Difference estimates of the health effects of the two-child limit

	(1)		(3)		(5)		(7)	
	Mental health condition		Of which: depression or anxiety		Of which: other mental illness		Physical health condition	
Bigfam	0.017***	0.015***	0.015***	0.012***	0.008***	0.008***	0.032***	0.023***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.003)	(0.003)
Lowinc	0.052***	-0.003	0.044***	-0.001	0.023***	-0.005***	0.023***	-0.003
	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.003)
Bigfam*Lowinc	-0.005	0.003	-0.004	0.003	-0.005*	-0.001	-0.010*	0.002
	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.005)	(0.005)
Post	-0.001	0.011***	-0.002	0.010***	-0.002	0.002	-0.042***	-0.008
	(0.003)	(0.003)	(0.003)	(0.003)	(0.001)	(0.001)	(0.005)	(0.005)
Bigfam*Post	0.008	0.009	0.012	0.013	-0.005	-0.005	0.007	-0.000
	(0.008)	(0.008)	(0.008)	(0.008)	(0.004)	(0.004)	(0.013)	(0.013)
Lowinc*Post	0.011	0.019**	0.009	0.017**	0.001	0.006	-0.006	0.004
	(0.007)	(0.006)	(0.006)	(0.006)	(0.004)	(0.004)	(0.008)	(0.009)
Bigfam*Lowinc*Post	0.002	-0.009	-0.005	-0.015	0.009	0.005	0.014	0.002
	(0.015)	(0.015)	(0.014)	(0.014)	(0.008)	(0.008)	(0.020)	(0.019)

	(1)		(3)		(5)		(7)	
	Mental health condition		Of which: depression or anxiety		Of which: other mental illness		Physical health condition	
Constant	0.043***	0.009***	0.040***	-0.001	0.012***	0.010***	0.176***	0.072***
	(0.001)	(0.002)	(0.001)	(0.002)	(0.000)	(0.001)	(0.001)	(0.003)
Observations	313617	313617	313617	313617	313617	313617	313617	313617
Controls		X		X		X		X

Notes: Data from the Annual Population Survey. The table shows estimates of $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7$ from Equation (1) estimated with an OLS linear probability model. 'Bigfam' is a dummy variable equal to one if the respondent lives in a family with three or more children and zero otherwise. 'Lowinc' is a dummy variable equal to one if a respondent has predicted family net earnings above the median according to the specification in (2), and zero if below the median. 'Post' is a dummy variable equal to one if the respondent lives in a family in which a child was born during or after April 2017. Controls are a dummy variable equal to one if the respondent is a single parent and zero otherwise, age of the respondent (5 categories), age of the youngest child in the family (6 categories), education (5 categories), and ethnicity (4 categories). Working hours are conditional on being in paid employment. Physical health conditions include problems or disabilities connected with arms or hands, legs or feet, back or neck; difficulty in seeing (while wearing spectacles or contact lenses); difficulty in hearing; severe disfigurement, skin conditions or allergies; chest or breathing problems, asthma or bronchitis; heart, blood pressure or blood circulation problems; stomach, liver kidney or digestive problems; diabetes; and epilepsy. Mental health conditions include depression, bad nerves or anxiety, and other mental illness, phobias or panic attacks. Person-household weightings are utilised to correct for non-response. Standard errors in parentheses. * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$.

Appendix B: Supplementary methodological detail

1. Definition of low-income families

Our identification strategy requires us to identify families who are on a low income and therefore likely to be affected by the two-child limit. Unfortunately, the Annual Population Survey (APS) does not include a direct and comprehensive measure of income for the whole sample. We therefore adopt an ‘intention to treat’ approach and proxy low-income in three ways.

Our main measure follows Kleven (2023) in using the earnings sample in the APS to predict earnings for the whole sample, based on a rich set of demographic characteristics. We estimate the following model of net family earnings for all respondents with positive family earnings in the pre-reform period:

$$\begin{aligned} Earnings_i = & \beta_0 + \beta_1 Age_i + \beta_2 Education_i + \beta_3 Kids_i + \beta_4 Ethnicity_i \\ & + \beta_5 Single_i + u_{it} \end{aligned}$$

$Earnings_i$ is net annual family earnings (in GBP), Age_i is the age of the respondent (5 categories), $Kids_i$ is the number of dependent children under 19 in the respondent’s family (5 categories), $Ethnicity_i$ is the respondent’s reported ethnicity (4 categories), and $Single_i$ is a dummy variable equal to one if the respondent reports being in a single parent family and zero otherwise.

We use this model to predict net annual family earnings for the whole sample. For each year and family size, we create a dummy variable which categorises respondents by whether their predicted net family earnings are above or below the median. In combining these dummy variables across years and family sizes, we approximate the relative earnings potential of all respondents in the APS, and thereby their likelihood of receiving benefits.

As Table 1 shows, those with low predicted earnings are much more likely to receive state benefits or tax credits than those with high predicted earnings. Our main results using this measure are shown in Table 3 of the main paper.

Our second measure of low-income is family occupation, which can be ascertained from the APS by coding the highest status occupation of any adult in the family. Figure A3 in the Supplementary Material shows the correlation between family occupation and benefits receipt. Those with a family occupation of NS-SEC 6-8 are significantly more likely to be in receipt of means-tested benefits than those with occupations of 1-5. We therefore create a 'lower family occupation' dummy variable equal to 1 if a family's highest occupation is NS-SEC 6-8, and zero if it is NS-SEC 1-5. Results using this measure are shown in Table A1 of Appendix A. The limitation of this measure is that it is a relatively crude proxy for family income and earnings (manual builders can earn more than professional interns).

Our final measure of low-income is a measure of benefit receipt using self-reported data, which is equal to one if the respondent reports being in receipt of one or more of the following: Universal Credit, tax credits, income-based Jobseeker's Allowance, Income Support for lone parents, or Housing Benefit. Results using benefits receipt are shown in Table A2 in Appendix A. This gives a useful approximation of the proportion of the population who receive benefits, but it has some key limitations. First, self-reported measures of benefit receipt can contain significant measurement error (Meyer, Mok and Sullivan, 2015; Bruckmeier, Riphahn and Wiemers, 2020). Second, even if this were stable over time, the composition of the people claiming benefits has changed over time largely due to greater restrictions on eligibility for tax credits and to the roll-out of Universal Credit since 2013.

While we report effects using both family occupation and benefits receipt in Table A1 and Table A2 in Appendix A, for these reasons they are not our preferred estimates.

2. Interaction between the two-child limit and the benefit cap

One potential complication for our analysis is that a second policy change affected some larger families on benefits from November 2016. The ‘benefit cap’ was introduced in 2013 and sets an arbitrary limit on the benefits that households can receive if no-one in the household is in paid work equivalent to 16 hours per week at minimum wage (with exemptions for disability). The cap was lowered in November 2016, resulting in a steep rise in the number of capped households (Reeves et al., 2022).¹⁵ When the benefit cap was lowered, affected households faced a sharply increased incentive to find work at least 16 hours per week.

Some families are affected both by the two-child limit (introduced in 2017) and the benefit cap (introduced in 2013) (Stewart et al, 2022). For families who are affected by both policies, the two-child limit effectively reduces the ‘bite’ of the benefit cap because it means households are eligible for less support to start with (Stewart et al, 2022). We illustrate this in Figure B1 and Figure B2, which show the effect of the lowering of the benefit cap (in 2016) and the introduction of the two-child limit (in 2017) on the budget constraint for a coupled and single parent household respectively. The lowering of the cap in November 2016 led to a significant sharpening of work incentives for both types of household. However, when the two-child limit was introduced in April 2017, capped families who had an additional child did not experience any income loss compared to families having a child before the cut-off: they would not have had the money anyway

¹⁵ The benefit cap was reduced from £26,000 per year to £23,000 per year in London (£15,410 for single people) and to £20,000 (£13,400 for single people) elsewhere. This includes housing support through Housing Benefit or UC.

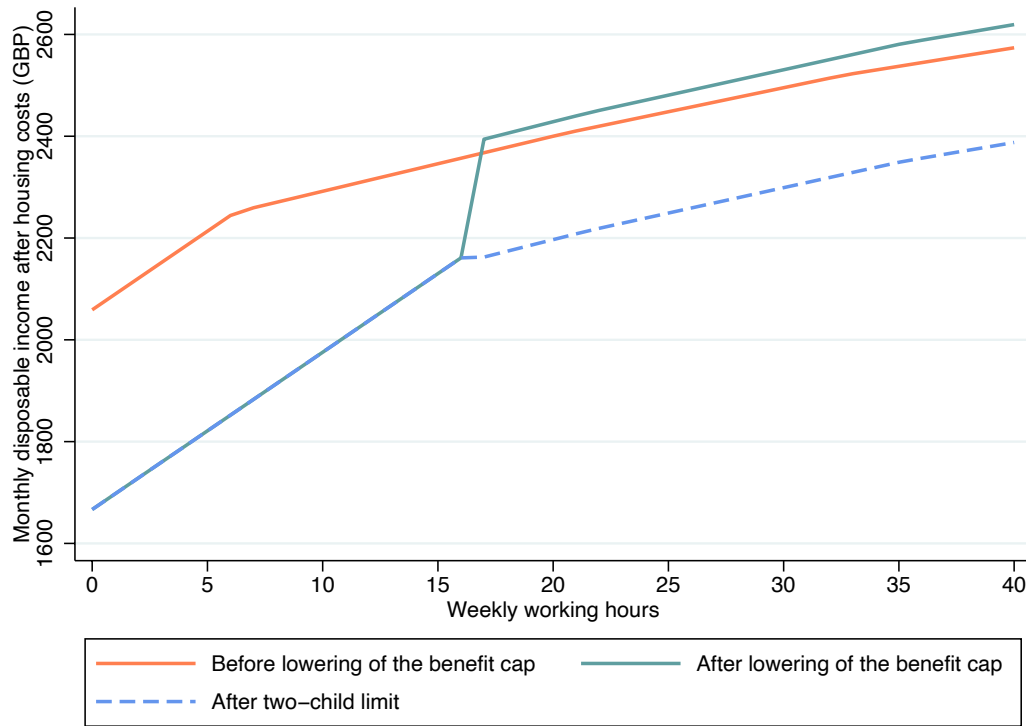
because they were already capped through the benefit cap. Indeed, for families considering whether to increase their labour supply from 15 to 16 hours a week, the two-child limit reduced work incentives. After the introduction of the benefit cap and prior to the two-child limit, increasing labour supply from 15 to 16 hours a week led to a £234.76 increase in disposable income; after the two-child limit, this was just £30.90. While the number of people at this margin is small, it is possible that this effect could attenuate positive employment effects in our main analysis.

We test whether the null employment effects can be explained by the two-child limit's interaction with the lowered benefit cap from November 2016 in three ways. First, we drop observations in our sample from the period between the lowering of the cap in November 2016 and the introduction of the two-child limit in April 2017. This effectively means that we are narrowing our 'pre' period to the period prior to the lowering of the benefit cap, and thereby considering the shift in the budget constraint from Figure 1 of the main paper in isolation. As Table B1 below shows, our results are almost identical when we exclude the lowered benefit cap period.

Second, we exclude respondents who are at a higher risk of being affected by the benefit cap: those living in London and those living in private rented accommodation (both of whom have higher housing costs and therefore an inflated risk of being capped) (Reeves et al, 2022). Our results are unchanged when we do this, as shown in Table B2.

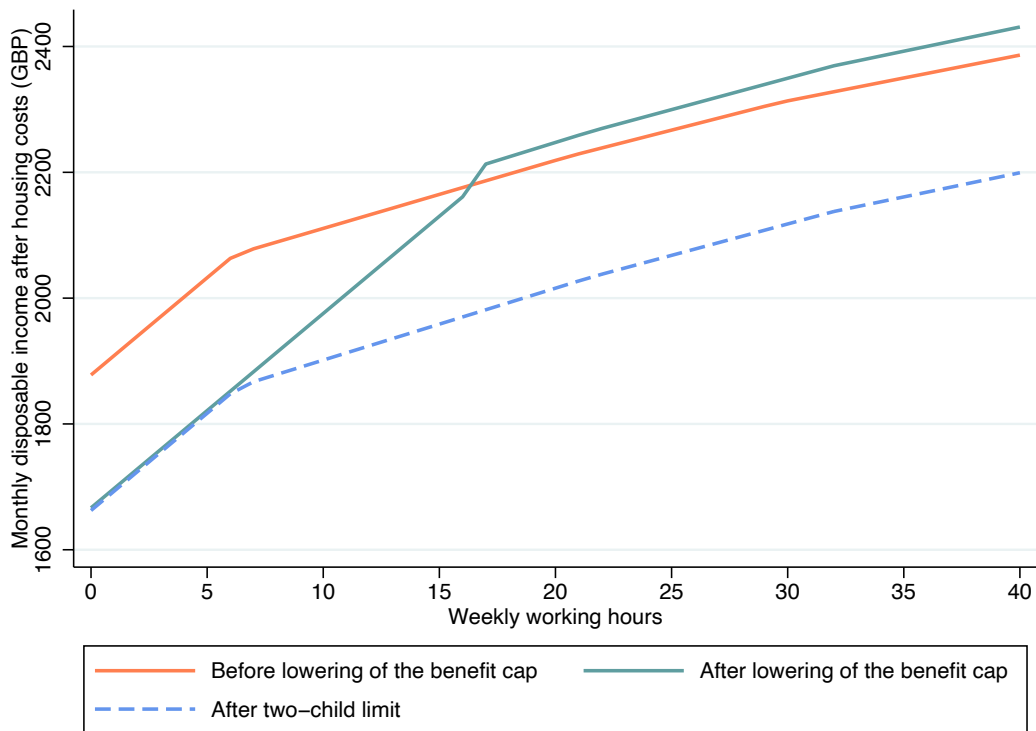
These tests suggest that the overall impact of the interaction between the benefit cap and two-child limit on work incentives is negligible. This is plausible given that a relatively small proportion of families affected by the two-child limit are affected by the benefit cap (Stewart et al, 2022). We can therefore be confident that the null employment effects are the reflection of the two-child limit, rather than the unique interaction of these two welfare reforms.

Figure B1: Effect of the benefit cap and the two-child limit on the budget constraint of a typical larger family (couple with three children, aged 10, 7 and 0, one earner), after housing costs



Notes: Data using EUROMOD Hypothetical Household Tool. The figure shows simulated monthly disposable income (after housing costs) by working hours for a couple with three children, with one parent working between 0-40 hours at £7.50 an hour (the minimum wage as of April 2017) and one parent staying at home. Housing costs of £900 a month (the lower quartile of private rents in England, April 2017 to March 2018) have been deducted from monthly disposable income. Prices are in nominal terms.

Figure B2: Effect of the benefit cap and the two-child limit on the budget constraint of a single parent with three children, aged 10, 7 and 0, after housing costs



Notes: Data using EUROMOD Hypothetical Household Tool. The figure shows simulated monthly disposable income (after housing costs) by working hours for a single parent with three children, with the parent working between 0-40 hours at £7.50 an hour (the minimum wage as of April 2017). Housing costs of £900 a month (the lower quartile of private rents in England, April 2017 to March 2018) have been deducted from monthly disposable income. Prices are in nominal terms.

Table B1: Triple Difference estimates, excluding the period of the lowered benefit cap (November 2016-March 2017) prior to the two-child limit

	(1)		(2)		(3)		(4)	
	Working hours		In paid employment		Unemployed		Inactive	
Bigfam	-1.339***	-1.527***	-0.140***	-0.123***	0.010***	0.009***	0.130***	0.113***
	(0.119)	(0.099)	(0.003)	(0.003)	(0.001)	(0.001)	(0.003)	(0.003)
Lowinc	-3.253***	-0.126	-0.207***	0.027***	0.049***	-0.011***	0.159***	-0.017***
	(0.068)	(0.094)	(0.002)	(0.003)	(0.001)	(0.002)	(0.002)	(0.003)
Bigfam*Lowinc	-0.676***	-0.966***	-0.055***	-0.044***	0.002	0.007**	0.053***	0.036***
	(0.200)	(0.170)	(0.005)	(0.005)	(0.003)	(0.003)	(0.005)	(0.005)
Post	1.415***	0.680***	0.010*	0.025***	-0.009***	-0.002	-0.000	-0.023***
	(0.154)	(0.146)	(0.005)	(0.005)	(0.002)	(0.002)	(0.005)	(0.004)
Bigfam*Post	-1.004*	-0.894*	-0.042**	-0.029*	-0.004	-0.003	0.046**	0.032*
	(0.457)	(0.374)	(0.015)	(0.014)	(0.004)	(0.004)	(0.015)	(0.014)
Lowinc*Post	0.238	0.331	-0.033**	0.004	-0.023***	-0.022***	0.056***	0.018
	(0.356)	(0.306)	(0.011)	(0.010)	(0.004)	(0.004)	(0.010)	(0.009)
Bigfam*Lowinc*Post	1.953*	0.486	0.015	-0.034	-0.004	-0.003	-0.011	0.037
	(0.894)	(0.730)	(0.025)	(0.022)	(0.009)	(0.009)	(0.024)	(0.022)

	(1)	(2)	(3)	(4)				
	Working hours	In paid employment	Unemployed	Inactive				
Constant	35.498*** (0.041)	39.350*** (0.131)	0.875*** (0.001)	0.783*** (0.004)	0.021*** (0.000)	0.070*** (0.002)	0.104*** (0.001)	0.146*** (0.004)
Observations	213704	213704	292574	292574	292574	292574	292574	292574
Controls		X		X		X		X

Notes: Data from the Annual Population Survey. The table shows estimates of $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7$ from Equation (1) estimated with an OLS linear probability model. 'Bigfam' is a dummy variable equal to one if the respondent lives in a family with three or more children and zero otherwise. 'Lowinc' is a dummy variable equal to one if a respondent has predicted family net earnings above the median according to the specification in (2), and zero if below the median. 'Post' is a dummy variable equal to one if the respondent lives in a family in which a child was born during or after April 2017. Controls are a dummy variable equal to one if the respondent is a single parent and zero otherwise, age of the respondent (5 categories), age of the youngest child in the family (6 categories), education (5 categories), and ethnicity (4 categories). Working hours are conditional on being in paid employment. Person-household weightings are utilised to correct for non-response. Standard errors in parentheses. * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$.

Table B2: Triple Difference estimates, excluding those in London or private rented sector

	(1)		(2)		(3)		(4)	
	Working hours		In paid employment		Unemployed		Inactive	
Bigfam	-1.204***	-1.423***	-0.132***	-0.114***	0.011***	0.010***	0.121***	0.104***
	(0.131)	(0.107)	(0.004)	(0.003)	(0.001)	(0.001)	(0.003)	(0.003)
Lowinc	-2.662***	-0.241*	-0.210***	0.023***	0.048***	-0.010***	0.162***	-0.013***
	(0.077)	(0.103)	(0.002)	(0.003)	(0.001)	(0.002)	(0.002)	(0.003)
Bigfam*Lowinc	-0.306	-0.670***	-0.071***	-0.059***	0.004	0.010**	0.066***	0.049***
	(0.231)	(0.194)	(0.006)	(0.006)	(0.003)	(0.003)	(0.006)	(0.006)
Post	1.421***	0.764***	0.010*	0.024***	-0.007***	-0.002	-0.002	-0.022***
	(0.166)	(0.158)	(0.005)	(0.005)	(0.002)	(0.002)	(0.005)	(0.005)
Bigfam*Post	-0.955	-1.056*	-0.056***	-0.048**	-0.003	-0.001	0.060***	0.049**
	(0.526)	(0.412)	(0.017)	(0.016)	(0.005)	(0.005)	(0.017)	(0.015)
Lowinc*Post	0.021	0.340	-0.027*	0.013	-0.020***	-0.022***	0.047***	0.009
	(0.445)	(0.377)	(0.013)	(0.012)	(0.006)	(0.006)	(0.012)	(0.011)
Bigfam*Lowinc*Post	1.546	0.414	0.007	-0.038	-0.005	-0.004	-0.003	0.042
	(1.096)	(0.855)	(0.030)	(0.027)	(0.011)	(0.011)	(0.029)	(0.027)

	(1)	(2)	(3)	(4)				
	Working hours	In paid employment	Unemployed	Inactive				
Constant	35.149*** (0.044)	38.881*** (0.150)	0.900*** (0.001)	0.785*** (0.004)	0.016*** (0.000)	0.069*** (0.003)	0.084*** (0.001)	0.146*** (0.004)
Observations	175034	175034	230228	230228	230228	230228	230228	230228
Controls		X	X		X			X

Notes: Data from the Annual Population Survey. The table shows estimates of $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7$ from Equation (1) estimated with an OLS linear probability model. 'Bigfam' is a dummy variable equal to one if the respondent lives in a family with three or more children and zero otherwise. 'Lowinc' is a dummy variable equal to one if a respondent has predicted family net earnings above the median according to the specification in (2), and zero if below the median. 'Post' is a dummy variable equal to one if the respondent lives in a family in which a child was born during or after April 2017. Controls are a dummy variable equal to one if the respondent is a single parent and zero otherwise, age of the respondent (5 categories), age of the youngest child in the family (6 categories), education (5 categories), and ethnicity (4 categories). Working hours are conditional on being in paid employment. Person-household weightings are utilised to correct for non-response. Standard errors in parentheses. * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$.

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