



# Lone parents' employment policy and adolescents' socioemotional development: Quasi-experimental evidence from a UK reform

Liming Li<sup>a,\*</sup>, Mauricio Avendano<sup>a,b</sup>

<sup>a</sup> Department of Global Health & Social Medicine, King's College London, London, UK

<sup>b</sup> Center for Primary Care and Public Health (Unisanté), Department of Epidemiology and Health Systems, University of Lausanne, Lausanne, Switzerland

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## ABSTRACT

Studies suggest that welfare-to-work programmes increase lone mother's employment, but their impact on child and adolescent socioemotional development is unclear. The lone parent obligation (LPO) reform introduced a requirement for lone mothers entitled to unconditional Income Support (IS) to seek paid work actively as a condition to receive benefits. We use data from the UK Millennium Cohort Study to examine the impact of work search requirements for lone parents on child and adolescent socioemotional development. We apply a difference-in-differences approach that exploits gradual changes from 2008 to 2017 in children's maximum eligibility age to receive IS and assess effects on child and adolescent Strengths and Difficulties Questionnaire (SDQ) scores. We find that the LPO reform led to a ten-percentage point increase in lone mothers' employment but no change in the risk of family poverty. The reform led to a small but statistically significant increase in adolescents' SDQ scores, which indicated worse mental health and was largely driven by increased emotional problems. It also led to an increase in mothers' distress and poor self-rated health, and mothers' reports that time spent with children was insufficient. Our findings highlight the need to consider trade-offs between employment gains and child and adolescent socioemotional development in assessing the net impact of welfare-to-work policies targeting lone parents.

## 1. Introduction

Across OECD countries, the proportion of mothers with dependent children who are in work has risen dramatically over the last decades. In the global north, maternal employment rates in 2019 were estimated at an average of 71%, ranging from 56% in Italy to 87% in Sweden (OECD, 2019). In the UK, the largest increase in employment over the last decades has occurred among lone mothers, whose employment rate increased from 44.2% in 1999 to 52.9% in 2008 and 65.1% in 2022 (OECD, 2019; ONS, 2022). Lone parent families reached three million by 2021, which accounted for approximately 15.4% of families with children in the UK, most of which were headed by lone mothers (ONS, 2021). While increase in lone mothers' employment prior to 2008 was likely due to increases in the value of the working tax credit and better availability of childcare (Harkness, 2016), the increases from 2008 onwards is often attributed to the expansion of welfare-to-work programmes, which targeted lone mothers by conditioning the receipt of child and family benefits on work search requirements (Millar, 2019). Some studies suggest that welfare-to-work reforms increase lone

mothers' employment (Gong and Breunig, 2014; Narain et al., 2017; Redmond, McGuinness and Keane, 2020; Mogstad and Pronzato, 2012; Johnsen and Reiso, 2020; Avram et al., 2013), whereas other research suggests that they may also have negative effects on mothers' health (Katikireddi et al., 2018), young children's and adolescents' cognitive development (Løken and Reiso, 2018; Herbst, 2017) and physical development (Gennetian et al., 2010). So far, few studies have examined the impact of welfare-to-work reforms on child and adolescent socioemotional development.

Understanding the impact of welfare-to-work policies on child and adolescent socioemotional development is critical in light of recent theoretical models and empirical evidence that links children's non-cognitive, socioemotional skills to human capital formation and future labour market success and life chances (Heckman et al., 2019; Noray, 2020). An increasing literature extends the concept of human capital to include socioemotional skills such as perseverance and grit (Heckman and Rubinstein, 2001). Recent literature also links socioemotional outcomes, such as externalising behaviour, to educational and labour market outcomes (Papageorge et al., 2019). Welfare to work reforms

\* Corresponding author. Department of Global Health & Social Medicine, Bush House, Northeast Wing, 40 Aldwych, London, WC2B 4BG, UK.  
E-mail address: [liming.li@kcl.ac.uk](mailto:liming.li@kcl.ac.uk) (L. Li).

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may affect parental ability to engage with children (Reichman et al., 2020), which may have important yet unknown implications for child and adolescent socioemotional development (Dave et al., 2021).

Welfare-to-work policies may impact child and adolescent socioemotional development through several mechanisms, including changes in family income, mother's mental wellbeing, the opportunity costs of time, parenting practices and work-family conflict. On the one hand, welfare-to-work programmes may increase labour income (Johnsen and Reiso, 2020) and reduce poverty (Redmond, McGuinness, and Keane, 2020), which may raise family investments in child socioemotional development (Noonan et al., 2018; McLanahan and Percheski, 2008). Working mothers may have more social contacts, skills and experience, better mental wellbeing, and be incentivised to improve quality of parenting, which in turn benefits child and adolescent socioemotional development (Harkness, 2016; Harkness and Skipp, 2013; Hsin and Felfe, 2014). On the other hand, mother's employment may increase the opportunity costs of time, reducing time spent with the child and increasing work-family conflict (Heiland et al., 2017). A significant share of the increase in employment caused by welfare-to-work reforms is in low pay, low quality jobs (Rafferty and Jay, 2017), which may lead to financial strain, psychological distress, poor parenting and child's socioemotional development outcomes (Cobb-Clark et al., 2019; Johnson et al., 2012; Herbst, 2017). For some families, welfare-to-work reform does not increase mother's employment (Gong and Breunig, 2014) and may thus reduce household income (Mogstad and Pronzato, 2012; Mari and Keizer, 2020). Welfare-to-work reforms may thus increase the risk of poverty (Johnsen and Reiso, 2020), and mental disorders for mothers (Katikireddi et al., 2018; Narain et al., 2017; Herbst, 2017) and children (Herbst, 2017; Genetian et al., 2010; Mari and Keizer, 2020).

Our study exploits a major reform in the UK to examine how welfare-to-work programmes targeted to lone parents impact the socioemotional development of children and adolescents. From November 2008, a change in policy led to the Lone Parent Obligation (LPO), which requires lone parents with older children to seek paid work. LPO transferred lone parents who were eligible for unconditional income support (IS) to Jobseeker's Allowance (JSA), an unemployment benefit that requires beneficiaries to actively seek paid work. The reform was implemented by gradually lowering the age of the youngest child that triggered a change in eligibility for unconditional IS: Prior to 2008, lone parents could receive unconditional IS until their youngest child turned 16 years. Following the LPO reform, the age threshold for unconditional IS was gradually reduced to 10 (2009), seven (2010), and five (2012) years. Once a mother's youngest child reaches the age threshold, she is no longer eligible for unconditional IS. Mothers can then claim JSA, which provides unemployment benefits under the condition that they meet work search requirements. Some evidence suggests that this reform led to an increase of about 10 percentage points in employment among lone parents (Avram et al., 2013). However, the reform also increased the probability that lone mothers moved onto health-related benefits or non-claimant unemployment (Avram, 2018).

In this paper, we use data from the Millennium Cohort Study to examine how the LPO reform affected the socioemotional development of children and adolescents. We address a gap in the literature on the intergenerational effects of mother's employment, which often focuses on very young children. Focusing on adolescents is important because approximately 50% of mental health problems have an onset around mid-adolescence (Kessler et al., 2007). Adolescent depression has been linked to higher risk of school dropout, unemployment and unplanned pregnancy (Clayborne et al., 2019). We also aim to address a key challenge in the literature on mother's employment and child outcomes, namely accounting for endogenous employment decisions, by exploiting a policy reform that incentivised mother's employment. Using a quasi-experimental design, we exploit presumably exogenous variation in employment caused by the gradual rollout of changes in unconditional IS eligibility. Our study contributes to a scientific and policy debate on the impact of maternal employment on young children's and

adolescents' socioemotional development and well-being (Cooksey et al., 2009; Verropoulou and Joshi, 2009; del Carmen Huerta et al., 2011; McMunn et al., 2012; Harkness and Skipp, 2013; Hope et al., 2014; Mendolia, 2016; Lombardi and Levine Coley, 2017).

## 2. Literature review

### 2.1. Theoretical framework

Theoretical models predict that maternal employment may affect parental investments and behaviours, which may in turn affect child and adolescent socioemotional development. The family resource model (Coleman, 1988; Thomson et al., 1994) emphasises parental investment of time and money as critical input into a child's development (Kalil and Mayer, 2016). As mothers move off benefit receipt to paid employment, family income may increase (Gornick and Meyers, 2003), which allows mothers to provide a better physical environment, nutrition, childcare and medical care services for the child (McLanahan and Percheski, 2008; Noonan et al., 2018). Mothers' involvement in paid work may enhance mother's sense of control and mental wellbeing (Harkness, 2016; Harkness and Skipp, 2013), thus benefitting the child's socioemotional development. Mothers may also improve the quality of parenting as a substitute for their reduced time with the child (Hsin and Felfe, 2014).

On the other hand, increased exposure to low-pay and inflexible jobs may also exacerbate family financial strain and reduce quality time for parenting (Heiland et al., 2017; Cobb-Clark et al., 2019). The family stress model (George, 1993; Conger et al. 1994, 2002) highlights how psychological stress associated with economic strain and unstable home environments may affect child development (Hill et al., 2013; Layte, 2017; Akee et al., 2018; Osborne et al., 2012). Low quality maternal employment may increase mother's anxiety and distress, thus negatively affecting child socioemotional development (Johnson et al., 2012).

Effects of maternal employment may be more salient for children and adolescents from lone mother families. Compared to partnered mothers, lone mothers may be more likely to benefit from a transition to paid work by experiencing greater improvements in income, social contacts, skills, experience, self-esteem, mental health, and role model effects on children (Millar and Ridge, 2013; Harkness, 2016). However, lone mothers may also be more vulnerable to negative impacts of welfare benefit conditionality, as they may struggle more in finding and maintaining adequate employment and combining work and childcare responsibilities. Lone mothers report to be less happy, more stressed, exhausted and isolated in parenting than partnered mothers (Meier et al., 2016). They are more likely to experience low quality jobs, underemployment and intensive childcare responsibilities, which may increase their financial and psychological strain (Dziak et al., 2010; Rafferty and Wiggan, 2017). Lone mothers are also more likely than partnered mothers to lack social support, experience isolation (Cairney et al., 2003), and suffer from poverty, social stigma and welfare conditionality (Park et al., 2014).

### 2.2. Empirical evidence

The impact of welfare-to-work policies on lone mothers has drawn increasing research attention (Greenberg et al., 2010). Several studies suggest that welfare-to-work policies affect lone mothers' employment, income, physical health and mental wellbeing (Gong and Breunig, 2014; Narain et al., 2017; Redmond, McGuinness and Keane, 2020; Mogstad and Pronzato, 2012; Johnsen and Reiso, 2020; Avram et al., 2013; Katikireddi et al., 2018; Fransham et al., 2020; Fok et al., 2013; Dorsett and Oswald, 2014; Knoef and Van Ours, 2016). Less is known about the effects of welfare-to-work programmes on child wellbeing (Grogger and Karoly, 2009). Exceptions are studies examining impacts on child's cognition and physical health, some of which report negative impacts on the child (Gibson et al., 2018). For instance, using administrative data from Norway, Noonan et al. (2018) find that a work-encouraging policy

targeted to lone parents significantly reduced school performance for children at age 16, due to increased working hours and reductions in the time mothers spend with their children (Løken and Reiso, 2018). Herbst (2017) exploits a 1996 welfare reform in the US, which introduced work requirements for all benefit recipients (including lone parents). He finds that the reform reduced child cognitive development, breastfeeding and time spent reading to children, while increasing mother's depressive symptoms and use of non-parental childcare arrangements (Herbst, 2017). Using exogenous changes from a welfare-to-work experiment in the US as an instrument, Gennetian et al. (2010) find that a 1% increase in maternal employment leads to 0.6% decrease in the probability of a child's having very good or excellent health (Gennetian et al., 2010). Mari and Keizer (2020) find that income losses associated with tax-benefit reform in Britain negatively influenced the socioemotional development of children, although this study did not focus exclusively on lone parent families (Mari and Keizer, 2020).

### 3. The Lone Parent Obligation policy (LPO)

Prior to November 2008, lone parents who were not at work and had no income were entitled to unconditional Income Support (IS) until their youngest child turned 16 years of age. The LPO gradually lowered the maximum age of the youngest child that rendered lone parents eligible for IS. From November 2009, lone parents who were eligible for IS lost their entitlement to the unconditional IS if their youngest child was older than 10 years. In subsequent years, the youngest child age threshold for IS eligibility was further reduced to age seven (October 2010), five (May 2012), and three (April 2017). Parents affected by the reform were required to either seek employment or transit to other benefit programmes (Avram et al., 2013). If lone parents remained unemployed or worked less than 16 hours per week when their eligibility to IS expired, they could apply for Jobseeker's Allowance (JSA). JSA offers a similar level of benefit support than IS, and lone parents claiming JSA were subject to the same work requirements of JSA claimants. This means that they had to be available for work and take 'reasonable steps' to look for work as agreed during mandatory JSA interviews with a work coach. Reasonable steps may include registering with recruitment agencies, writing a CV, and spending a specified number of hours each week looking for work. What each individual is required to do depends on their health, their home responsibilities and the amount of help they need to get work or increase their income. Lone parents with health conditions could also move to health-related benefits, particularly the Employment and Support Allowance (ESA). The LPO reform did not affect lone parents' eligibility to other welfare benefits or tax credit, including the Child Tax Credit, Housing Benefit and Council Tax Benefit (Avram, 2018).

## 4. Methods

### 4.1. Data and sample

This study uses data from the UK Millennium Cohort Study (MCS), a nationally representative and longitudinal study of children born in the UK around the turn of the Millennium. A random two-stage sample of infants born between September 2000 and January 2002 and resident in the UK at 9 months was drawn from Child Benefit Registers, with a response rate of 72% (Plewis et al., 2007). Data were primarily collected through interviews at home with the main carer, usually the mother. We focus on children's outcomes from early childhood to adolescence (aged 3, 5, 7, 14 and 17 years; data collection carried out in 2004, 2006, 2008, 2015 and 2018, respectively). We do not use data from waves 1 (2001), because measurements of child's socioemotional outcomes differed from those in other waves. In addition, data from wave 5 (2012) are also excluded, as the parent-reported socioemotional outcomes for the children were unavailable in public use data files.

We select the sample in several steps. First, from the 2004 survey, we

select a sample of families in which the natural mother was both the main carer of the MCS cohort child (aged 4 years on average) and the main respondent of the survey (to avoid potential reporting bias and errors). We include two specific types of families: lone mother families (i.e., mothers who were never married, legally separated, divorced, or widowed) and partnered families (i.e., mothers who were married including civil partnership). This gives us an initial sample of 14,677 children from both lone mother and partnered families. We then exclude families in which the MCS cohort child was not a singleton ( $n = 210$ ); the mother was younger than 16 or older than 45 years at the time of cohort child's birth ( $n = 44$ ); the mother was claiming unemployment or health-related benefits ( $n = 424$ ) as they wouldn't be eligible for IS at the same time; or the cohort child had incomplete information on mental health and key health covariates ( $n = 888$ ). These reduce the initial sample to 13,111 children. Further, to assess longitudinal changes in individual outcomes across waves, we retain families observed in at least one wave prior to the reform and at least one wave after the reform and with complete follow-up information on mother's partnership status and child's mental health as well as health covariates. We obtain a final sample of 11,142 children (with 48,375 observations).

### 4.2. Measurement

*Mother's employment.* We measure maternal employment using a dichotomous variable, with 1 indicating the mother being in paid work in the past week (including on maternity leave) and 0 otherwise. We also capture the intensity of employment using the logged value of weekly work hours (capped at 70 hours).

*Child's socioemotional development.* We measure child's socioemotional development using the Strengths and Difficulties Questionnaires (SDQ). The SDQ is a behavioural screening questionnaire designed to measure psychological adjustment in children aged 3 to 17 (Goodman, 1997; 2001), validated and widely used in research (Stone et al., 2010; Croft et al., 2015). The questionnaire comprises 25 items, covering internalising problems (emotional symptoms and peer problems), externalising problems (hyperactivity and conduct problems), and pro-social behaviour. Each item includes three response categories: 'not true' (= 1), 'somewhat true' (= 2), or 'certainly true' (= 3), and responses are scored so that higher scores indicate more problematic behaviours. A total difficulties score is calculated from the addition of the scores for the first four domains, excluding pro-social behaviour, which is considered conceptually different (Goodman, 1997). The Total Difficulty Score varies between 0 and 40, with higher scores indicating worse outcomes. We use the standardised SDQ score and sub-scores in our analysis, along with a dichotomous SDQ score using a cut-off score of 17 to indicate abnormal or problematic behaviour (Goodman, 1997).

*Mother's mental health.* Mother's psychological distress is measured by the K6 Distress Scale (Kessler et al., 2002), which asks respondents how often over the last 30 days they felt depressed, hopeless, restless or fidgety, that everything they did was an effort, worthless and nervous. For each item, the respondent indicates whether they felt this way 'none', 'a little', 'some', 'most', or 'all of the time', with scores ranging from 0 to 4, respectively. The questions form a 24-point scale, and we code mothers with a score of 13 or above as having poor mental health (Prochaska et al., 2012).

*Mother's self-rated health.* The MCS respondents were asked to report their general health, and the responses range from 1 to 5 representing 'excellent, good, fair to poor, poor, very poor', respectively. We combine the answers using a dichotomous variable that takes value 1 to indicate poor health (including 'poor' and 'very poor') and 0 otherwise.

*Family Income.* We measure income using a continuous variable that captures the logged value of OECD equivalised annual family income (adjusted for household composition but not inflation).

*Social housing.* We use a dichotomous variable that takes the value of 1 if the family was living in social housing (renting from local authority or housing association) and 0 otherwise.

**Poverty.** We measure poverty using a dichotomous poverty indicator taking the value of 1 if household income level is below 60% of median income (Ketende et al., 2008) and 0 otherwise.

**Childcare time insufficiency.** Mothers were asked to report their satisfaction with the amount of time they spend with their children. Answers were recoded from 1 to 5 indicating ‘plenty of time, just enough time, not quite enough, nowhere near enough, and not sure’. We generate a dichotomous variable with 1 indicating ‘not quite enough’ or ‘nowhere near enough’ time, and 0 ‘plenty of’ or ‘just enough’ time.

**Control variables.** We control for a set of time-varying characteristics, including: child’s age (continuous), number of siblings (0, 1, 2, 3+); mother’s age (continuous), mother’s educational level (no more than GCSE or equivalent, A-level or equivalent, university education or more, overseas education and other), survey wave (categorical) and region of residence (London, Northeast, Northwest, Yorkshire, East Midlands, West Midlands, Southeast, Southwest, East of England, Wales, Scotland, and Northern Ireland).

#### 4.3. Empirical strategy

We implement a difference-in-differences (DiD) approach to investigate the impact of the LPO policy on child and adolescent socioemotional outcomes. We define the treatment group as lone mother households, as they were ‘potentially’ affected by the LPO reform. As control group, we use households in which mothers are in a partnership and therefore ineligible to IS and unaffected by the LPO reform. Our definition of treatment is strongly associated with the probability of receiving IS benefit: among lone mothers with valid information on IS benefit claim receipt in 2004, 44% reported receiving IS benefit. By contrast, less than 4% of partnered mothers reported receiving IS benefits the same year. Previous research evaluating welfare-to-work programmes has also used comparisons between lone mothers and partnered mothers (Johnsen and Reiso, 2020; Narain et al., 2017). We use mothers’ partnership status at the time of the survey and allow mothers to switch between ‘treatment’ and ‘control’ groups during episodes of partnership dissolution and re-partnering. In sensitivity analysis, we replicate the results using a subsample of mothers with no change in partnership status across waves and obtain consistent results. Children from treatment and control families differ along several characteristics, which precludes a direct comparison of their post-reform outcomes. A difference-in-differences approach aims to control for these underlying differences by comparing trends rather than levels in the observed outcomes. The DiD estimate is thus the difference in pre-vs post-reform changes in outcomes between treatment and control.

To define exposure to the LPO reform in the treatment group, we use age eligibility rules for the IS each year linked to information on the age of the youngest member of the household (which could be the MCS cohort member, or a younger child in the household). Up to 2008, lone mother households were eligible to receive IS if they had a child that was below the age of 16. Age thresholds for eligibility were then gradually reduced to 10 (2009), seven (2010), five (2012), and three (2017) years. In waves 2004–2008, MCS members were all below 10 years and therefore always potentially eligible for IS. We therefore consider 2004–2008 as the pre-reform period. By waves 2015 and 2018 (when MCS members reached ages 14 and 17 years, respectively), lone mother households were no longer eligible to IS, unless a younger child aged below five in 2015 or three in 2018 was present in the household (in line with IS eligibility rules). By contrast, partnered families remained ineligible to IS throughout the follow-up period. We therefore define 2015 and 2018 as the post-reform period. A small number of lone mother households had a younger child below the IS age threshold in the post-reform period (when their MCS child was 14 or 17). These mothers were assigned to the control group, as they were eligible to IS benefits. In sensitivity analysis, we show that our results are robust to the exclusion of these households.

We estimate individual fixed effects linear regression models using

the following equation:

$$Y_{it} = \beta_0 + \beta_1 treatment_{it} + \beta_2 postreform_{it} + \beta_3 postreform_{it} * treatment_{it} + \beta_4 X_{it} + \varepsilon_{it}$$

Where Y refers to the socioemotional outcomes for child *i* at time *t*, including either a continuous SDQ score, a dichotomous SDQ score (score 17 as cutoff), or continuous SDQ sub-scores (emotional symptoms, peer problems, hyperactivity, and conduct problems). *Treatment* takes value 1 for children from lone mother families and value 0 for children from partnered families. *Postreform* is a dichotomous variable with 1 denoting the post-policy period (2015–2018) and 0 the pre-policy period (2004–2008). The coefficient  $\beta_3$  is the double difference computed at the mean value of the outcomes. X is a vector of time-variant individual (including the mother and child) and family characteristics, including child’s age and number of siblings, mother’s age and education, year and region of residence.

Similarly, we use the above equation to estimate impact of the LPO policy on mother’s employment status. Following Bettendorf et al. (2015), we estimate linear models with the same sample of mothers for both employment rate and weekly work hours. As potential mechanisms, we also examine the impact of the LPO reform on household income, poverty, housing, mother’s self-rated health, mother’s psychological distress, and mother’s perceptions of sufficiency of time spent with child.

Our statistical analyses include several steps. First, we replicate previous studies on maternal employment and child SDQ outcomes, using ordinary least squares estimates. We also show descriptive evidence on trends of maternal employment before and after the LPO reform. Second, we obtain DiD estimates of the impact of the LPO reform on mother’s employment and adolescents’ SDQ outcomes. We also look into potential heterogeneous effects of the reform on adolescents from different family characteristics. Third, we conduct a series of sensitivity analyses to verify the robustness of the main results. Finally, we explore potential mechanisms through which the LPO reform may have affected adolescents’ outcomes. Statistical analyses were carried out using Stata MP (version 17.0).

## 5. Results

Table 1 reports sample descriptives. Compared to partnered mothers (the control group), lone mothers (the treatment group) reported significantly lower employment rates and less weekly work hours both before and after the reform. Lone mothers had also less income, higher rates of living in social housing and in poverty, poorer self-rated overall health and higher psychological distress scores. Lone mothers were also younger and less educated, and they were more likely to have a single child. Children from lone mother families had poorer socioemotional development outcomes as measured by SDQ scores and sub-scores, relative to children from partnered mother families. On the other hand, lone mothers were less likely to perceive the time spent with their children as insufficient relative to partnered mothers.

### 5.1. Mother’s employment, IS benefit receipt and adolescents’ SDQ scores

For comparison with prior studies, we first estimate OLS models of the relationship between mother’s employment and adolescents’ SDQ scores, conditioning on individual and family characteristics. We find that mother’s employment is associated with lower SDQ scores; and adolescents from mothers in employment had lower (better) SDQ scores at both ages 14 and 17 than those with mothers who were not in paid work (Supplementary Table S1 Panel A). We also find that mother’s IS benefit receipt is associated with higher SDQ scores for the adolescents at both ages 14 and 17 (Supplementary Table S1 Panel B). These associations, however, do not have a causal interpretation, as employment



**Table 1**  
Descriptive statistics, by family types and time.

|  | Pre-reform         |                      | Post-reform        |                      |
|--|--------------------|----------------------|--------------------|----------------------|
|  | Partnered families | Lone mother families | Partnered families | Lone mother families |
| <b>Outcomes</b>  |                    |                      |                    |                      |
| Mother's employment rate (%)   | 76.99              | 57.33***             | 78.32              | 71.31***             |
| Mother's weekly work hours   | 26.29              | 17.74***             | 28.89              | 22.47***             |
| Child's SDQ scores (standardised)                                    | -0.08              | 0.28***              | -0.09              | 0.29***              |
| Child's SDQ scores (score 17 or above = 1) (%)                       | 5.20               | 11.33***             | 6.92               | 13.87***             |
| <b>Child's SDQ sub-scores: Internalising problems (standardised)</b> |                    |                      |                    |                      |
| Emotional symptoms   | -0.07              | 0.09***              | 0.09               | 0.40***              |
| Peer problems  | -0.08              | 0.12***              | 0.06               | 0.32***              |
| <b>Child's SDQ sub-scores: Externalising problems (standardised)</b> |                    |                      |                    |                      |
| Hyperactivity  | 0.04               | 0.33***              | -0.12              | 0.14***              |
| Conduct problems   | 0.03               | 0.36***              | -0.13              | 0.11***              |
| <b>Potential mechanisms</b>  |                    |                      |                    |                      |
| Income (OECD equivalised family annual income, logged)               | 9.77               | 9.28***              | 9.93               | 9.57***              |
| Social housing (%)   | 9.28               | 42.69***             | 10.64              | 37.02***             |
| Poverty (Income below 60% median, %)                                 | 17.51              | 48.12***             | 17.80              | 46.22***             |
| Mother's self-rated poor health (%)                                  | 7.51               | 12.37***             | 11.51              | 19.83***             |
| Mother's poor mental health (K6 distress score ≥ 13) (%)             | 2.07               | 5.16***              | 8.74               | 13.33***             |
| Childcare time insufficient (%)                                      | 64.34              | 57.24***             | 75.95              | 74.74                |
| <b>Covariates</b>  |                    |                      |                    |                      |
| Child's age  | 5.30               | 5.33                 | 15.70              | 15.59***             |
| Child's number of siblings (%)                                       |                    | ***                  |                    | ***                  |
| No sibling   | 12.29              | 28.37                | 12.91              | 23.84                |
| One sibling  | 50.16              | 41.11                | 45.76              | 41.81                |
| Two siblings   | 25.34              | 19.50                | 25.80              | 21.54                |
| Three or more siblings   | 13.31              | 11.02                | 15.53              | 12.81                |
| Mother's age   | 35.49              | 31.90***             | 45.77              | 43.30***             |
| Mother's education (%)   |                    | ***                  |                    | ***                  |
| No more than GCSE or equivalent                                      | 28.10              | 42.80                | 22.46              | 32.36                |
| A-level or equivalent  | 15.28              | 15.36                | 13.86              | 13.85                |
| University education or more   | 46.74              | 25.03                | 51.80              | 39.51                |
| Overseas education and other   | 9.89               | 16.81                | 11.89              | 14.28                |
| Number of persons  | 8199               | 4263                 | 7884               | 3959                 |
| Number of observations   | 20,318             | 9285                 | 12,974             | 5798                 |

and benefit receipt are endogenous to unmeasured family and child characteristics. We now turn to our main analysis on the impact of the LPO reform.

5.2. LPO reform and mother's employment

Fig. 1 shows maternal employment trends separately for lone and partnered mothers from 2004 to 2018. Partnered mothers had higher employment rates than lone mothers throughout the period, but both groups experienced an increase in employment rates from 2004 to 2015 before narrowing the gap by 2018.

In Fig. 2, we present data comparing changes in employment rates before and after the LPO reform separately for lone and partnered mothers. We capture this change by estimating the difference between

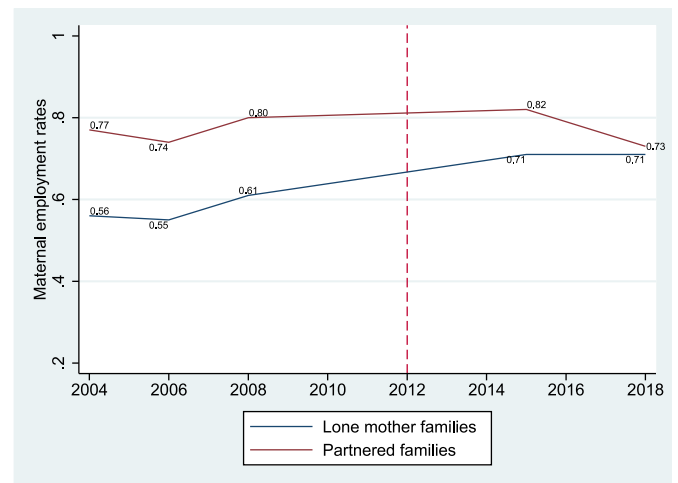


Fig. 1. Trends in maternal employment rates, by family type, Millennium Cohort Study, 2004–2018.

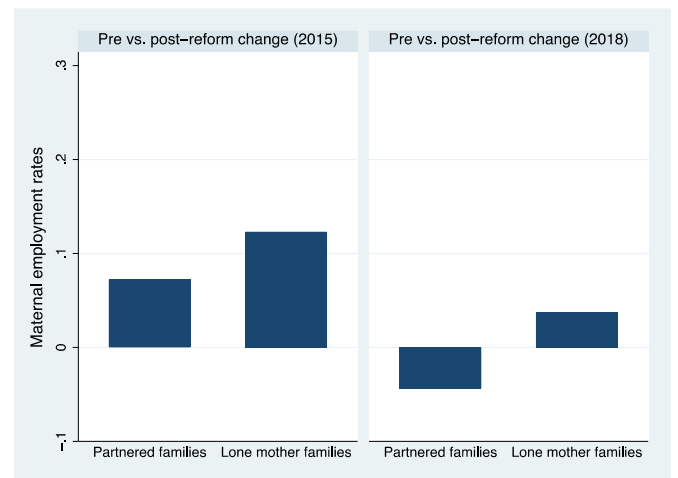
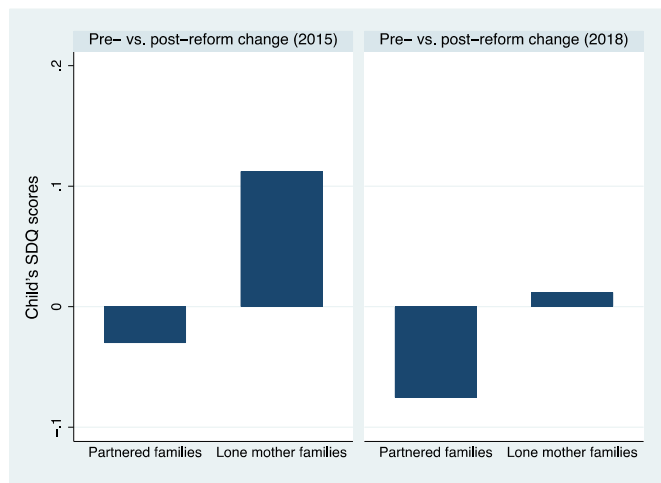


Fig. 2. Changes in maternal employment rates before and after the LPO reform, by family type, Millennium Cohort Study, 2004–2018.

the average employment rate in the pre-reform years (2004–2008) and each of the post-reform years (2015 and 2018, presented separately). Analysis of change between the pre-reform years and 2015 (left-hand panel) suggest that both lone and partnered mothers experienced an increase in employment after the reform, but this increase was larger for lone mothers. The difference became more marked for 2018 (right-hand side panel): whereas partnered mothers saw a decrease in employment, lone mothers experienced an increase in employment.

In Fig. 3, we present equivalent data, but now for changes in adolescents' SDQ scores (standardised) before and after the LPO reform. Analyses of change between the pre-reform period (2004–2008) and 2015 (left-hand side panel) show that while adolescents from partnered families saw a decline in SDQ scores, adolescents from lone mother families saw a worsening (increase) in SDQ scores. Analysis of change for 2018 (right-hand side panel) show that adolescents from partnered mothers saw a large decline in SDQ scores, while adolescents from lone mothers experience no change in SDQ scores.

Table 2 shows results from DiD models on the impact of the LPO policy reform on mother's employment status. We report estimates using mother's employment rate in column (1) and weekly work hours (logged) in column (2). The results show that the LPO reform significantly increased mother's employment rate by 10 percentage points. The reform also raised mother's weekly work hours by 32.3% ( $e^{0.280} - 1 \times 100$ ).



**Fig. 3.** Changes in adolescents' SDQ scores before and after the LPO reform, by family type, Millennium Cohort Study, 2004–2018.

**Table 2**  
Impact of LPO on mother's employment status in the Millennium Cohort Study, 2004–2018.

|   | (1)<br>In employment    | (2)<br>Weekly work hours (logged) |
|---|-------------------------|-----------------------------------|
| Diff-in-diff estimate: pre-post LPO reform X treatment status | 0.102*** [0.084, 0.120] | 0.280*** [0.202, 0.358]           |
| Number of persons   | 11,142                  | 11,142                            |
| Number of observations  | 46,875                  | 39,519                            |

Notes: Stars represent statistical significance: \*p < 0.05. \*\*p < 0.01. \*\*\*p < 0.001. Coefficients are reported, and 95% confidence intervals are included in the brackets. Covariates are controlled, including child's age, child's number of siblings, mother's age, mother's education, survey wave, and region.

In supplementary analyses, we considered an alternative definition of mother's employment status based on ≥16 hours of work per week. We find that the LPO reform significantly increased mother's employment by seven percentage points (Supplementary Table S2).

5.3. LPO reform and adolescents' SDQ scores

Table 3 shows difference-in-differences estimates of the impact of the LPO reform on adolescents' overall SDQ scores and a dichotomous measure capturing children having an SDQ score ≥17. The first two columns show that the LPO reform led to a small but significant increase of 0.083 (95% CI: 0.047 to 0.119) of a standard deviation in SDQ scores, or a 2.5 (95% CI: 1.3 to 3.7) percentage-point increase in the probability of having a score of ≥17. When breaking down the sample by child's age in the next columns, we find that the LPO led to a similar increase in the probability having an SDQ score of ≥17 scores at age 14 (2.7 percentage

**Table 3**  
Impact of LPO on adolescents' SDQ scores (standardised and dichotomous) in the Millennium Cohort Study, 2004–2018.

|   | All ages                |                         | Age 14                  |                         | Age 17                |                        |
|---|-------------------------|-------------------------|-------------------------|-------------------------|-----------------------|------------------------|
|   | (1)<br>SDQ scores       | (2)<br>SDQ score ≥17    | (3)<br>SDQ scores       | (4)<br>SDQ score >17    | (5)<br>SDQ scores     | (6)<br>SDQ score ≥17   |
| Diff-in-diff estimate: pre-post LPO reform X treatment status | 0.083*** [0.047, 0.119] | 0.025*** [0.013, 0.037] | 0.111*** [0.070, 0.152] | 0.027*** [0.013, 0.041] | 0.062* [0.014, 0.110] | 0.026** [0.010, 0.042] |
| Number of persons   | 11,142                  | 11,142                  | 11,142                  | 11,142                  | 11,142                | 11,142                 |
| Number of observations  | 48,375                  | 48,375                  | 39,939                  | 39,939                  | 38,039                | 38,039                 |

Notes: Stars represent statistical significance: \*p < 0.05. \*\*p < 0.01. \*\*\*p < 0.001. Coefficients are reported, and 95% confidence intervals are included in the brackets. Covariates are controlled, including child's age, child's number of siblings, mother's age, mother's education, survey wave, and region.

points) and age 17 (2.6 percentage points).

In supplementary analyses (Supplementary Table S3), we investigate effect heterogeneity by incorporating interactions between the difference-in-difference parameters and child's gender, mother's educational attainment, and mother's employment intensity. We found that the LPO reform led to an increase in SDQ scores for both boys and girls. The effect of the reform was larger for girls than for boys when using the standardised SDQ scores, but this difference was not statistically significant when using SDQ score ≥17. There were no differences by mother's educational attainment or employment intensity.

Table 4 shows estimates for each of the SDQ sub-component scores. According to results in columns (1) to (2), the LPO reform led to a significant increase in internalising problems, including a small increase in emotional symptoms (i.e., worries, unhappiness, nervousness, fears, complaints of ailments) and in peer problems (i.e., playing alone, having good friends, being liked by peers, being picked on by peers, getting on better with adults). The reform also led to a small increase in externalising problems, measured by hyperactivity (column (3)), although it did not significantly influence conduct problems (column (4)). In supplementary analyses, we estimate separate models and find similar effects of the LPO reform on adolescents' SDQ sub-scale scores for both ages 14 and 17 (Supplementary Table S4).

5.4. Sensitivity analysis

We conduct several sets of sensitivity analyses. First, we consider alternative definitions of mother's employment status based on employment types (i.e., not working, part-time, full-time). We find that the LPO reform increased part-time and full-time employment rates by nine percentage points and five percentage points, respectively (Supplementary Table S5). Second, we analyse a subsample of mothers who had no change of partnership status across the survey waves, as mothers who change their employment may do so for reasons associated with

**Table 4**  
Impact of LPO on adolescents' SDQ sub-scores in the Millennium Cohort Study, 2004–2018.

|   | SDQ sub-scores: internalising problems |                         | SDQ sub-scores: externalising problems |                        |
|---|--|-------------------------|--|------------------------|
|   | (1)                                    | (2)                     | (3)                                    | (4)                    |
|   | Emotional symptoms                     | Peer problems           | Hyperactivity                          | Conduct Problems       |
| Diff-in-diff estimate: pre-post LPO reform X treatment status | 0.163*** [0.120, 0.206]                | 0.101*** [0.061, 0.141] | 0.043* [0.008, 0.077]                  | -0.031 [-0.066, 0.005] |
| Number of persons   | 11,142                                 | 11,142                  | 11,142                                 | 11,142                 |
| Number of observations  | 48,375                                 | 48,375                  | 48,375                                 | 48,375                 |

Notes: Stars represent statistical significance: \*p < 0.05. \*\*p < 0.01. \*\*\*p < 0.001. Coefficients are reported, and 95% confidence intervals are included in the brackets. Covariates are controlled, including child's age, child's number of siblings, mother's age, mother's education, survey wave, and region.

their child's emotional wellbeing. Our results are robust to this restriction and show nearly identical results as for our main specification (Supplementary Table S6). Third, we exclude a small proportion of lone mother households who had a young child below the IS age threshold in the post-reform period (and who would, therefore, be eligible for IS), and find very similar results as for the original sample (Supplementary Table S7). Fourth, we impute data for health covariates to address issues of missing data and attrition during sample selection, by using multiple imputation with chained equations (20 rounds). Adolescents' health and mother's health are also included as additional controls and in the imputation process. The results (Supplementary Table S8) are in line with our main analyses.

### 5.5. The common trends assumption

We provide some evidence of the parallel trend assumption by examining differences in trends in outcomes for treatment and control groups prior to the policy. In Table 5 columns (1) to (4), we report results for mother's employment (rates and hours), and child's SDQ scores (standardised and dichotomous), respectively. There were no significant differences in pre-reform trends for these outcomes between treatment and control groups in the period 2004–2008. The only exception was for SDQ scores  $\geq 17$ , which were worse for the treatment than the control group in 2006 (but not in 2008, or for SDQ raw scores either year). Overall, results yield some support for the common trend assumption.

### 5.6. Mechanisms

To explore potential mechanisms, we examine the impact of the LPO reform on several family and mother's outcomes and report results in Table 6. Estimates in column (1) suggest that the reform led to an eight percentage-point increase in family income and a reduction of two percentage points in the probability of living in social housing. However, the reform did not significantly reduce the risks of falling below the poverty line. The reform also led to an increase of five percentage points in the probability that mothers reported poor overall health, the results of which are robust to alternative dichotomisations of the self-rated health item. The reform also generated a three percentage-point increase in the probability that the mothers scored  $\geq 13$  in the K Psychological Distress scale. Using the continuous K6 scores, we find that the reform led to 0.07 of a standard deviation (95%: 0.027 to 0.119;  $p < 0.01$ ) increase in mother's K6 scores (results not shown in Table). The reform also increased by five percentage points the probability that mothers felt that the time spent with childcare was insufficient. In robustness checks, we find that the common trend assumption holds for housing, poverty, mother's psychological distress and perceived childcare time insufficiency, but not for income and mother's self-reported overall health (Supplementary Table S9). Results for the latter outcomes, therefore, should be interpreted with caution. Further, we examine the interaction between the LPO reform and these family outcomes in models with child SDQ scores as the outcomes. We find that the reform had a larger negative impact on child total SDQ scores for those

from families with lower income, living in poverty, and mothers with poor self-reported health or poor mental health. However, these differences in the reform impact on child SDQ scores were not statistically significant when measuring child outcome using SDQ scores at or above 17. (Supplementary Table S10).

## 6. Discussion

We examine the impact of a policy that required lone mothers to search for work as condition to receive welfare benefits on the socio-emotional development of adolescents. We find that the LPO reform increased lone mother's employment and income, but it did not reduce the risk of family poverty. The reform led to a small but statistically significant increase in adolescents' SDQ scores, signalling a small negative effect on their socioemotional development. In exploring mechanisms, we find that the reform led to an increase in mother's psychological distress and poor self-rated health, and in the probability of mother's reports that the time they spent with their children was insufficient.

Our findings may seem at odds with prior studies reporting a positive association between mother's employment and child's socioemotional development (Lombardi and Levine Coley, 2017; McMunn et al., 2012; Cooksey et al., 2009; Verropoulou and Joshi, 2009), also for lone mother families (Harkness and Skipp, 2013), which we were able to reproduce in our data. There are several potential explanations for this discrepancy. First, the positive association between employment and adolescents' socioemotional outcomes may be due to selection or omitted variable bias. Second, we assess the impact of a particular reform that increased mother's employment by making benefits conditional on work search. The reform combined an increase in employment (and earnings from work) with a reduction in income from benefits, two effects that cannot be distinguished in our analysis. Third, most prior literature has focused on the impact of mothers' employment on very young children. Our study is unique by examining the impact of a policy that increased employment among mothers with adolescents.

Our results suggest that the potential positive effects of the reform on mother's employment did not translate into improvements in adolescents' socioemotional development and may have led to small negative effects in SDQ scores. Herbst (2017) distinguishes three main mechanisms that may contribute to negative impacts of work requirements on child development. First, work requirements may not increase household consumption due to reduced benefits and increased work-related expenses, leading to no change or a reduction in disposable income. Although we had no data on consumption, we observed a net increase in household income, so our effects are unlikely to be due to a net reduction in income. Second, an increase in work may reduce the quantity and quality of maternal time investments in children, while at the same time increasing children's exposure to lower quality non-maternal care. Our data does suggest that mothers exposed to the reform were more likely to perceive that they spent insufficient time with their children. This may signal an increase in unfulfilled expectations of time spent with children inconsistent with mother's preferences. Third, work

**Table 5**  
Common trend tests, the Millennium Cohort Study, 2004–2008.

|                         | (1)                        | (2)                        | (3)                        | (4)                                |
|-------------------------|----------------------------|----------------------------|----------------------------|------------------------------------|
|                         | In employment              | Weekly work hours (logged) | SDQ scores (standardised)  | SDQ scores (score 17 or above = 1) |
| Treatment $\times$ 2006 | 0.010 [-0.017, 0.037]      | 0.026 [-0.087, 0.138]      | -0.002 [-0.058, 0.054]     | -0.023** [-0.039, -0.008]          |
| Treatment $\times$ 2008 | 0.009 [-0.018, 0.036]      | 0.036 [-0.078, 0.150]      | 0.031 [-0.025, 0.088]      | -0.009 [-0.024, 0.007]             |
| Treatment               | -0.203*** [-0.223, -0.183] | -0.889*** [-0.971, -0.806] | 0.353*** [0.312, 0.395]    | 0.073*** [0.062, 0.084]            |
| 2006                    | -0.023** [-0.038, -0.008]  | -0.009 [-0.072, 0.054]     | -0.395*** [-0.427, -0.364] | -0.036*** [-0.045, -0.028]         |
| 2008                    | 0.034*** [0.019, 0.049]    | 0.119*** [0.056, 0.182]    | -0.379*** [-0.410, -0.347] | -0.023*** [-0.032, -0.015]         |
| Number of individuals   | 11,142                     | 11,137                     | 11,142                     | 11,142                             |
| Number of observations  | 29,602                     | 29,368                     | 29,603                     | 29,603                             |

Notes: Stars represent statistical significance: \* $p < 0.05$ . \*\* $p < 0.01$ . \*\*\* $p < 0.001$ .

**Table 6**

Impact of LPO on family outcomes, lone mother's health and psychological distress scores, and childcare time insufficiency in the Millennium Cohort Study, 2004–2018.

|   | (1)                     | (2)                       | (3)                   | (4)                             | (5)                     | (6)                         |
|---|-------------------------|---------------------------|-----------------------|---------------------------------|-------------------------|-----------------------------|
|   | Income                  | Housing                   | Poverty               | Mother's poor self-rated health | ≥13 K distress scale    | Childcare time insufficient |
| Diff-in-diff estimate: pre-post LPO reform X treatment status | 0.078*** [0.059, 0.097] | −0.021** [−0.035, −0.008] | 0.008 [−0.011, 0.026] | 0.046*** [0.032, 0.061]         | 0.030*** [0.018, 0.042] | 0.048*** [0.025, 0.071]     |
| Number of individuals   | 11,139                  | 11,139                    | 11,142                | 11,142                          | 11,073                  | 11,124                      |
| Number of observations  | 39,683                  | 39,684                    | 39,910                | 46,914                          | 46,283                  | 37,256                      |

Notes: Stars represent statistical significance: \* $p < 0.05$ . \*\* $p < 0.01$ . \*\*\* $p < 0.001$ . Coefficients are reported, and 95% confidence intervals are included in the brackets. Covariates are controlled, including child's age, child's number of siblings, mother's age, mother's education, survey wave, and region.

requirements may negatively influence household stability by increasing maternal stress, particularly if work is not flexible to support mothers' caring roles (Herbst, 2017).

Our results on the negative impact of the reform on mothers' mental health and self-rated health provide some evidence for this last mechanism, a finding consistent with earlier studies. For example, a recent study also reports negative effects of the LPO policy on lone mothers' mental health measured by the Mental Component Summary scores (Katikireddi et al., 2018). Our results complement this research with an alternative measure of mental health using the K distress scale. A systematic review of qualitative evidence (Campbell et al., 2016) found that mandatory work requirements increase stress, anxiety and depression for lone mothers, as a result of greater exposure to low quality work, work-childcare role conflicts, and reduced sense of control. A recent study in the US (Reichman et al., 2020) also found that work conditionality reduces parenting engagement and parent-child closeness, regardless of working conditions (e.g., full time, multiple jobs, industry type or non-standard schedules) (Reichman et al., 2020). Lone mothers with declining mental health may struggle to create a home environment that provides children with stimulating and positive interactions and supervision, which may lead to adverse socioemotional developmental outcomes (Cobb-Clark et al., 2019). This is particularly salient for children in pre-teen and early teenage years (ages 10–14), a sensitive developmental period during which crucial biological and psychological transitions take place, and a period highly sensitive to parental practices and style (Morris et al., 2005; Peng et al., 2021).

Our study has several limitations. First, the MCS data were subject to missing values and attrition. We try to address these issues by running sensitivity analyses using weighted data from multiple imputations. Second, the MCS did not collect detailed data on unemployment benefits in each survey wave, therefore we are unable to account for transitions from employment to unemployment benefits receipt. Third, we use eligibility to the LPO reform to define treatment status instead of the actual take-up of the IS benefit, as the latter may be endogenous to characteristics correlated with child and adolescent outcomes. Therefore, our results reflect the impact of the LPO reform rather than the impact of receiving benefits on child and adolescent outcomes. Finally, our study captures the effect of the LPO reform, a work requirement that may affect health via a number of mechanisms other than employment. While for some families employment would have increased as a result of the reform, there may be other mechanisms through which the reform affected child SDQ scores, such as increased surveillance, requirements to evidence work search or training uptake, or threat of or actual financial sanctions.

### 6.1. Conclusion and implications

Welfare-to-work programmes aim to increase lone mother's employment, but their impact on child and adolescent is often overlooked. Using a difference-in-differences approach, we show that the LPO reform, which required mothers in the UK to search for work as a condition to receive benefits, led to a small increase in adolescents'

socioemotional problems as measured by SDQ scores. Mixed impacts on mothers offer a possible explanation: Although the reform increased employment and income, it did not reduce families' risks of poverty, and increased mother's psychological distress and poor health reports. Although negative effects on adolescents are small, they offer a mixed picture of the benefits of work search requirements on families, and question the assumption that they improve the developmental outcomes of young children and adolescents. Theoretical models highlight the importance of non-cognitive socioemotional skills during childhood (Heckman et al., 2019) for future education and labour market outcomes (Noray, 2020; Papageorge et al., 2019). In assessing the overall welfare impacts of welfare-to-work programmes, governments should therefore incorporate the potential intergenerational consequences of welfare-to-work reforms on child and adolescent socioemotional development and future long-term outcomes.

### Credit author statement

Liming Li: Conceptualisation, Methodology, Formal analysis, Writing – original draft preparation, writing-reviewing and editing, Mauricio Avendano: Conceptualisation, Methodology, writing-reviewing and editing

### Data availability

The authors do not have permission to share data.

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### Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.socscimed.2023.115754>.

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