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# The effects of unemployment among single mothers on adolescent children's mental health

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## Abstract

The effects of parental unemployment on the health and well-being of children have been receiving increased attention in recent years. However, the previous research on this topic focused on children living in two-parent families. This paper studies the effects of maternal unemployment in single-mother families – a particularly vulnerable family setting for coping with the effects of unemployment – on the mental health of adolescent children. We use data from a large, register-based panel of Finnish adolescents aged 15-21 years in 1995-2018 (n=150,073) that includes information on maternal unemployment and adolescent psychotropic medication purchases in six-month periods. We employ panel data models with individual fixed effects to explore how maternal unemployment was associated with adolescents' psychotropic medication use, net of measured time-varying confounders and all stable unobserved confounders. We estimate separate models for adolescent boys and girls, and also examine whether the effects were mediated through maternal income, or were compensated for by the absent father's income or the mother's re-partnering. Our findings show that exposure to maternal unemployment was associated with a moderate increase in psychotropic medication use among boys and girls, although the effect was statistically significant only for boys. This effect was not mediated by the mother's income, and it did not differ depending on the biological father's income or the mother's re-partnering. Our results suggest that boys are more vulnerable to the stressful event of maternal unemployment than girls, and do not support the assumption that the financial consequences and income losses associated with unemployment mediate these effects. Further research is needed to investigate the vulnerability of adolescent boys, and the factors that contribute to the potentially greater resilience of adolescent girls to the effects of maternal unemployment.

## Introduction

Going beyond the well-documented negative effects of unemployment on individual health among adults, a growing body of research is focusing on how unemployment affects the family members of the unemployed. Recent studies have provided insights into the cross-over effects among spouses (Inanc, 2018; Baranowska-Rataj and Strandh, 2021; Mendolia, 2014; Nikolova and Ayhan, 2019; Kim and Do, 2013; Marcus, 2013). Cross-over effects from parents to children may also occur, as the family provides important resources that shape children's development and health, and stressful family life events may have detrimental effects on children's health (Sleskova et al., 2006). This emerging strand of research is furthering our understanding of the processes of social contagion by showing that parental unemployment influences children's health (Sleskova et al., 2006; Moustgaard et al., 2018; Schaller and Zerpa, 2019).

Adolescence appears to be a particularly interesting life course stage to focus on when investigating the effects of parental unemployment on children. It is a very sensitive period of rapid individual change when children start developing their identity, values, and orientations, and make choices that could have major consequences for their later life. Adolescence is also a critical period that influences an individual's health and disease risk later in life (Viner et al., 2015). There is, for example, evidence that 75% of lifetime mental health disorders start before age 25, with many first occurring during adolescence (Kessler et al., 2005). This highlights the need to better understand the origins of mental health problems in early life, and how they may be related to the social circumstances of the family.

While family diversity has been growing in many countries, and the proportions of children who are being raised in single-mother families have been increasing (Bernardi et al., 2018a; Koops et al., 2021), most previous studies examining the effects on parental unemployment on their children's health have focused on families in which the children were living in two-parent households. This is primarily because of a lack of representative data. However, expanding our knowledge about adolescents who are raised by single mothers is increasingly important, as single mothers are more likely to experience job losses than other women (Covizzi, 2008; van Damme and Kalmijn, 2014). Furthermore, there are good reasons to assume that a job loss in a single-mother family would have graver consequences than a job loss in a two-parent family (McLanahan and Sandefur, 2009). A single mother is often the sole breadwinner in the household, and usually has less income and wealth to cushion her family from the financial consequences of unemployment than married parents have. Hence, the children in single-mother families may be particularly vulnerable to the consequences of maternal unemployment. Furthermore, unlike children in two-parent households, children in single-parent families often lack support from other adults in the household, which has been shown to help compensate for the decreased support of the unemployed parent (Bacikova-Sleskova et al., 2011).

To the best of our knowledge, only one study conducted in the US has examined how unemployment among single mothers affects the mental health of adolescent children. The results showed that adolescents whose mother experienced job displacement faced a higher risk of depressive symptoms (Brand and Simon-Thomas, 2014). However, studies on the effects of parental employment have yet to address potential selection into unemployment based on stable maternal characteristics, such as personality (Kokko et al., 2000) or a history of mental health problems (Olesen et al., 2013), which may also cross over to affect the mental health outcomes of adolescents. Furthermore, evidence of the role of potential mediators and effect moderators is also lacking, as is knowledge of the cross-over effects

of single mothers' unemployment in societal contexts other than the US. This study draws on theoretical insights from scholarship on family stress, gender, and the life course to make four key contributions to the literature that help to address these gaps.

First, our study adopts an intergenerational perspective to assess the effects of maternal unemployment on the health of single-mother families. This approach enables us to provide insights into a particularly vulnerable group of families. Second, we use administrative panel data from Finland –which, like similar data from other Nordic countries, have a rich register-based data structure – to study intergenerational effects in single-mother families. While survey data typically provide too few observations to allow researchers to examine children raised in family forms other than families with two biological parents, register data provide a large number of observations with no loss to follow-up of adolescent children raised by single mothers, which also allows us to carry our analyses separately for the sons and the daughters of single mothers. Third, Finland is a particularly interesting country to study when examining single-parent families and the consequences of adverse life events, as the Finnish social welfare state provides financial resources that might buffer the harmful effects of such events on mental health[1]. Moreover, as single-mother households emerged relatively early in Finland, and the country continues to have a high prevalence of such households (Statistics Finland, 2020), Finland can be seen as a forerunner in trends that arrived later in other countries. Fourth, as unmeasured characteristics, such as a family history of mental health problems, may increase the risk of both maternal unemployment and poor mental health among children, we use fixed-effects models not only to control for various observed differences, but also to account for all stable but unobserved characteristics of children. Thus, by using fixed-effects models, we can estimate the effects of maternal unemployment on adolescents' mental health net of unobserved, fixed-in-time confounders.

## Background

### *Parental unemployment and children's mental health*

There is increasing evidence that parental unemployment is associated with various mental health and well-being outcomes for children. It has, for example, been shown that parental unemployment is associated with behavioral problems (Harland et al., 2002; Isaranurug et al., 2001), binge drinking (Lundborg, 2002), worsening well-being (Nikolova and Nikolaev, 2018), and depression (Kaltiala-Heino et al., 2001) among children.

To explain the adverse effects of parental unemployment on children's mental health, family stress models are often cited (Lavee, 2013). According to these models, adverse life course events, such as the loss of a job, are stressors that can have detrimental effects on the mental health of family members. Unemployment may be associated with adverse changes in parents' emotional reactions and behaviors that place a burden on their other family members, and especially on their children (Frasquilho et al., 2016). Changes in parental behaviors can also affect parenting practices and parent-

[1] The unemployment allowance is earnings-related, and is paid from the unemployment fund for those who are fund members. Non-members who have worked for at least 26 weeks generally receive a basic unemployment allowance from the Social Insurance Institution of Finland. Both allowances can be paid for up to 350-500 days. After this period, unemployed workers may receive a labor market subsidy (ibid). Unemployed parents with children under age 18 may be eligible for additional unemployment payments. For more detailed information, see https://www.kela.fi/web/en/amount-of-the-unemployment-benefit.

child interactions, which may have negative consequences for children's mental health (Maitoza, 2019). Children may also become affected by parental unemployment because they identify with a parent and share his or her emotional states.

In addition, parental job loss may lead to a cascade of additional stressors, such as an abrupt deterioration in the family's financial situation, which may, in turn, lead to a loss of social status in the local community and a change in the family's lifestyle and living standards, such as a reduction in their access to healthy food and healthy behaviors. More drastic changes in the family's financial situation may also require a relocation to less expensive housing or to less expensive neighborhood (Brand, 2015). These financial mechanisms have implications not only for the parent who becomes unemployed, but also for the parent's children. From the life course perspective, the unemployment of a parent who serves as a child's role model may also have substantial consequences for the child's mental health into adulthood (Maitoza, 2019; Kuh et al., 2003).

Interestingly, the results of empirical studies examining the health outcomes associated with parental unemployment among children raised by both of their parents suggest that the mother's unemployment has weaker effects than the father's unemployment (Moreno-Maldonado et al., 2020; Sleskova et al., 2006), has no substantial effects (Moustgaard et al., 2018; Schaller and Zerpa, 2019; Bacikova-Sleskova et al., 2015), or may even have positive effects (Pieters and Rawlings, 2020). The financial consequences for the overall family budget of a maternal job loss are, on average, less severe than the effects of a paternal job loss, because in most families, men still out-earn women. Taken together, these findings imply that in families with two heterosexual parents, a maternal job loss can be expected to have fewer detrimental effects on adolescent children's mental health than a paternal job loss. The question of whether the effects of maternal unemployment on children's mental health are different in single-mother families, in which the mother is often the only breadwinner and the only caregiver, remains open.

The findings of the few existing studies that have examined the effects of maternal unemployment in single-mother families have suggested that it might have harmful effects on the well-being of adolescents. For example, Kalil and Ziol-Guest (2005) found that when single mothers have unstable employment trajectories, the levels of self-esteem and mastery of their adolescent children tend to decline. The stressors resulting from a job loss might be more pronounced for single mothers than for partnered mothers, as a partner may be able to both compensate for the financial loss and provide emotional support (Brand and Simon-Thomas, 2014). Indeed, using US panel data and propensity score matching techniques, Brand and Simon-Thomas (2014) found significant negative effects of single mothers' job displacement on adolescents' social-psychological well-being. More studies are needed to assess whether the negative effects on children of maternal unemployment in single-parent households might go beyond declines in self-esteem, mastery, or psychological well-being, and lead to more severe outcomes, such as poor mental health. Previous studies have suggested that when parents lose a job, they may experience feelings of personal failure, the loss of structure in their daily routine, and the loss of social contacts, which may, in turn, reduce the levels of support they can provide to their children. Whereas in a two-parent family, these negative effects can be compensated for by the other (not unemployed) parent (Sleskova et al., 2006), in a single-mother family, adolescent children might lack support from another adult in the household while their mother is coping with the stressors associated with unemployment. Therefore, while the evidence on the effects of maternal

unemployment in two-parent families is inconsistent, we expect to find that maternal unemployment in single-mother families has negative effects on adolescents' mental health.

*Hypothesis 1: In single-mother families, maternal unemployment has negative effects on adolescents' mental health.*

### *The moderating role of adolescent gender*

There is evidence that women and men respond differently to negative life events. Compared to men, women are more likely to be other-focused (Simon, 2014), to react more strongly to the adverse life course events experienced by their relatives (Kessler and McLeod, 1984), and to have a stronger sense of responsibility for them (Conger, Lorenz, Elder, Simons, & Ge, 1993; Kessler & McLeod, 1984). Men, in turn, are more vulnerable than women to stressors that occur in their own lives. This suggests that daughters may be more affected by a parental job loss than sons. Additional arguments for this hypothesis stem from the literature on intergenerational relations, which emphasizes that for an adolescent child, the same-gender parent fulfils the function of a role model, and may be the parent with whom the child identifies more strongly. Of all the generational bonds, the mother-daughter relationship is assumed to be the closest (Rossi and Rossi, 1990). The literature on gendered intergenerational links has suggested that daughters can be expected to be more affected than sons by maternal unemployment. Conversely, income losses and financial difficulties in the family are expected to affect sons more than daughters. While subjective social status is central to the health of both adolescent boys and adolescent girls (Karvonen and Rahkonen, 2011), prior research has suggested that changes in the family's economic situation may be a greater threat to the male identity (Michniewicz et al., 2014).

Previous empirical findings on the differences in the effects of parental unemployment on daughters and sons have been based on intact families, and diverge not only across studies but also within studies, depending on the health outcomes studied and the modelling approaches used. For instance, Bubonya et al. (2017) found that a parental job loss had negative effects on the mental health of Australian adolescents living with at least one parent, and that adolescent girls were more affected by their mother's job loss than adolescent boys. However, Nikolova and Nikolaev (2021) found that in Germany, maternal unemployment led to improved life satisfaction for adolescent daughters, but had no significant effects on adolescent sons. In addition, results for the UK from Powdthavee and Vernoit (2013) suggested that adolescent girls' happiness benefited from the onset of paternal unemployment, whereas adolescent boys' happiness benefited from the onset of maternal unemployment. Finally, for Finland, Kaltiala-Heino et al. (2001) showed that the unemployment of one or both parents was associated with an elevated risk of depression among adolescent boys, but not among adolescent girls.

As this substantial variation in findings might have been caused by small effects, additional evidence on how the gender of children moderates the effects of parental unemployment is clearly needed. Since the studies discussed above either focused on two-parent households or did not differentiate between types of families, research that takes single-mother families into account is important to extend this strand of the literature.

We tentatively predict that the mental health of both adolescent girls and adolescent boys in single-mother families will deteriorate in response to maternal job loss.

*Hypothesis 2: In single-mother families, a maternal job loss has negative effects on the mental health of both adolescent girls and adolescent boys.*

### The mediating role of maternal income

To advance our knowledge of children's mental health in different types of families, we must see family, employment, and income dynamics as interrelated. Thus, it is important to study how access to economic resources mediates the effects of a parental job loss, especially for children in single-mother families, who tend to be particularly vulnerable. Previous research has not provided clear answers regarding the mediating role of parental income. Studies on the effects of parental job loss on the health of children in two-parent families have found that financial strain did not account for all or the majority of the effects of parental unemployment (Bacikova-Sleskova et al., 2015; Sleskova et al., 2006; Pedersen et al., 2005; Powdthavee and Vernoit, 2013). However, these previous studies did not investigate the mediating role of maternal income in single-mother families.

While financial mechanisms may play a prominent role in the cross-over effects of a maternal job loss, the effects of maternal unemployment may go beyond these mechanisms due to the direct transmission of distress from the mother to her adolescent children (Bakker and Demerouti, 2013), as well as to changes in mother-child interactions and in the quality of the mother-child relationship following such a stressful event (Sleskova et al., 2006). Since parents act as role models for their children, parental unemployment may undermine an adolescent's self-perception, aspirations, and, ultimately, well-being, even when the job loss is not followed by a loss of income. As maternal role modeling is particularly evident in single-mother families (Kalil and Ziol-Guest, 2005), these non-monetary mechanisms could play an important role in these families as well. Therefore, we expect that in single-mother families, changes in disposable income will not completely "explain away" the effects of a maternal job loss on the mental health outcomes of adolescent children.

*Hypothesis 3: A loss of income following unemployment partly mediates the overall effects of a maternal job loss on adolescents' mental health.*

### Paternal income and re-partnering as compensatory resources

Another important question is how potential access to other resources may compensate for some of the financial and other consequences of a maternal job loss. In the US context, it has been argued that in single-mother families, the biological father may step in to provide the additional economic resources needed to pay for essential goods and services such as medical care, which may, in turn, have beneficial effects on the children (Choi and Pyun, 2014). In the Nordic context, this argument may be less valid, as these goods and services are mostly public. However, even in the Nordic countries, compensation for a loss of income caused by maternal unemployment may play an important role in dual-earner families as well, as it may soften the impact of the reduction in household income on other household expenses, such as activities and hobbies. Adolescence is known to be a sensitive period of social development, characterized by an increased need for peer interaction (Blakemore and Mills, 2014). Therefore, being able to continue to participate in hobbies and other social interactions with paternal support might help to sustain the mental health of adolescents.

Similarly, when a single mother re-partners, the household composition and the resources available to the household members may be affected. The mother's new partner might represent an important

source of financial support, which could alleviate potential declines in the mother's income following a job loss (Berger et al., 2018). The resources provided by the new partner could also play a decisive role in supporting the mental health of the mother's adolescent children. In addition, the new partner could represent an additional parental figure who provides not just material, but emotional support for the mother and her children (Raley and Sweeney, 2020). However, the new roles within the stepfamily may also create challenges and conflicts (Gath, 2021). If, for example, adolescents are unable to adapt to new household routines, or are reluctant to share their mother's time and attention with the new partner, these new roles might be perceived as stressful (Kirby, 2006).

We predict that the biological father's income and maternal re-partnering will provide potential compensatory resources that have positive effects on adolescents' mental health.

*Hypothesis 4a: The biological father's income provides additional and compensatory resources, and has positive effects on adolescents' mental health.*

*Hypothesis 4b: Maternal re-partnering provides additional and compensatory resources, and has positive effects on adolescents' mental health.*

## Data and Methods

### *Sample and key measures*

We used Finnish register data available from 1995 to 2018. The data cover all adolescents aged 15 to 21, their biological mothers and fathers, and any other co-resident adults. Statistics Finland provided information on the annual socio-demographic and family characteristics for all these individuals. These data were linked to information on the mothers' employment and unemployment spell dates from the Labor Market Data File, and to information on prescription medication purchases derived from the Social Insurance Institution. The data sources were linked using personal identification codes assigned to all permanent residents (the Ethics Committee of Statistics Finland's permission TK-53-1121-18).

To focus on the effects of a maternal job loss on children in single-mother families, we included all adolescents who were living with their biological mother, but not with their biological father, at age 15, and who were present in the data for a minimum of two observations (n=238,922). Because our study examines the effects of maternal transitions to unemployment, our analytical sample was further restricted to children whose mother was employed at the beginning of the year when the child turned 15 years old (final n = 150,073, excluding 88,849 adolescents whose mother was not employed). Censoring occurred when the child moved out of the mother's household, migrated, or died. The adolescents were followed until age 21 in six-month time intervals, and were thus observed between a minimum of two times and a maximum of 14 times.

Adolescent mental health was measured using a binary measure of having at least one psychotropic drug purchase over each six-month period (yes/no). In Finland, over-the-counter psychotropic medications are unavailable, and purchases require an assessment and a prescription from a clinician. The prescription register includes detailed information on the date of purchase and the Anatomical Therapeutic Chemical (ATC) code of the medication. We identified drugs that are prescribed for mood, anxiety, and other mental disorders (psycholeptics (N05) and psychoanaleptics (N06), excluding anti-dementia drugs (N06D). As all permanent residents are entitled to reimbursement for medication expenses, sample selection was minimized. It is noteworthy that that for our sample of adolescents,

psychotropic medication purchases most likely captured relatively severe mental health problems. It has, however, been shown that medication purchases are a more sensitive and inclusive measure of mental health-related problems than the other available measure of psychiatric hospitalizations (Hämäläinen et al., 2009).

Exposure to maternal unemployment within a six-month interval (yes or no; measured over the six-month period (January-June/July-December) preceding the outcome ($t_{-1}$)) was identified using the Labor Market Data File data on spells in which the mother was registered as an unemployed jobseeker with the unemployment services. For example, if the mother registered as unemployed in January and was unemployed for a total of five months, we coded the adolescent as having experienced the mother's unemployment for the January-June period ($t_{-1}$), and the outcome was measured during the July-December period ($t_0$). If, however, the mother registered as unemployed in January and was unemployed for a total of eight months – an unemployment spell spanning both the January-June and the July-December periods – we coded the child as having been exposed to the mother's unemployment throughout the year. We excluded very short unemployment spells lasting less than a total of one month in each calendar year, as these were more likely to reflect workplace changes or freelance-type working arrangements. Income or other data were missing from a total of 487 observations (0.05% of observations). These observations were excluded. In the following, we refer to the six-month periods as spells.

Our analyses considered a range of potential confounders that may have affected maternal unemployment and adolescents' psychotropic medication purchases. Under the Finnish reimbursement system, people pay more for their prescriptions at the beginning of each calendar year than they do at the end of the year. After individuals spend enough on prescriptions to reach an annual expenditure ceiling, their subsequent medication costs are low. As this system incentivizes people to buy their medications for the next calendar year in the previous year, purchases are higher in November and December than in other months. Therefore, we controlled for seasonal variations by including dummies for six-month periods (January-June/July-December). To account for macro-level variations, we also controlled for the child's age and age squared and the regional unemployment rate.

In addition, we investigated whether the maternal household income mediated the association between maternal unemployment and the daughter's or the son's mental health. Each household's annual disposable income during the previous year (in €) was measured as the total of the household's earned and entrepreneurial income, property income, income transfers, taxes, and tax-deductible expenses.

We also explored the compensatory effects of the biological father's income and the re-partnering of the mother. In Finland, parents are jointly responsible for the maintenance of their children even after separation. As the payments of the non-resident parent payments are non-taxable income for the recipient, they were not included in the mother's disposable income. The biological father's annual disposable income was measured during the previous year. The mother's re-partnering status (re-partnered/single) was measured at the end of the previous year.

### *Methods*

To analyze the relationship between maternal unemployment and adolescents' mental health, we estimated linear probability models (LPM). We used two estimation methods: a pooled ordinary least

squares (OLS) estimator and a fixed-effects (FE) estimator. The OLS estimation was used for descriptive purposes, and showed the population-averaged association between single mothers' unemployment and the mental health of adolescents. The OLS method considers variation both between individuals and "within" individuals across time.

The FE estimator was based solely on the "within" individual variation. In other words, the adolescent's psychotropic drug purchases during periods when she or he was exposed to the mother's unemployment were compared to the adolescent's purchases during periods when the mother was not unemployed; thus, each adolescent was used as his or her own control. FE models can be seen as a particularly valid modeling approach for addressing this research question, given that various stable, unmeasured characteristics, such as genetics, the child's early life experiences and upbringing, and the mother's and the child's personality are likely to be relevant for either the outcome, the exposure, or both (Allison, 2009). We additionally controlled for various relevant time-varying covariates listed in the section above. For the fixed-effects models, we calculated heteroscedasticity-consistent standard errors (Stock and Watson, 2008). We used Stata 16.1 (College Station, Texas) for all the analyses.

We opted to use an LPM instead of a logistic regression model, as the LPM results are easier to interpret and compare across specifications: unlike in LPM FE models, there is no established way to estimate predicted probabilities or average marginal effects from logistic FE models. As (Mood, 2010) explained, under specific conditions, an LPM may produce nonsensical predicted probabilities below zero or above one, and a large proportion of predicted probabilities outside the 0-1 range indicates a higher likelihood of bias. In the context of this study, none of the predicted probabilities derived from the models fell outside the 0-1 range (Allison et al., 2017).

We began our modeling strategy by analyzing the mother's unemployment, age, and age squared, as well as information on the season and the employment rate (Model 1). In Model 2, we additionally included the mother's income. Next, we added the biological father's income and its interaction with maternal unemployment (Model 3). In Model 4, we removed the father's income and added the re-partnering of the mother and its interaction with maternal unemployment (Model 4). All analyses were conducted for girls and boys separately to identify gender-specific mechanisms.

## Results

Our study population included 76,795 boys and 73,278 girls. Table 1 shows the descriptive statistics for our analytic sample by the maternal employment status and gender of the child. Of the adolescents in our sample, 12.35% (n=9,484) of the boys almost 10.75% (n=7,870) of the girls were exposed to maternal unemployment at least once between ages 15 and 21. Our finding that a higher proportion of boys than of girls were exposed to a maternal job loss may be attributable to the higher number of observations for boys than for girls. On average, boys were observed in 4.2 spells while girls were observed in 3.6 spells, which suggests that girls moved out of their mother's home at younger ages than boys did. Thus, boys were at risk of exposure to maternal unemployment for longer periods of time than girls were.

The prevalence of psychotropic medication use varied by sex and exposure group. Boys with a mother who was never unemployed had a lower prevalence (6.8%) of psychotropic medication purchases than boys who experienced maternal unemployment (7.7%). The corresponding percentages were higher

for girls, at 9.8% for girls with a mother who was never unemployed, and at 10.5% for girls who experienced maternal unemployment.

During the observation window, the majority of mothers stayed single, while slightly more than one-third re-partnered. There were also large differences in the average annual income of mothers and of fathers depending on the mother's employment status. The average income of mothers was lower for those who were ever exposed to unemployment (€37,041 for mothers of boys and €35,315 for mothers of girls) than for those who were never exposed to unemployment (€43,616 for mothers of boys and €44,076 for mothers of girls). The large differences in the average income of fathers depending on the mother's employment status suggest that adolescents with unknown, deceased, or poor fathers were more likely than others to experience maternal unemployment. Meanwhile, there were no notable differences across exposure groups in the likelihood of maternal re-partnering.

Table 1. *Sample characteristics, Finnish adolescents aged 15-21 in 1995-2018 by exposure to maternal unemployment*

| | Boys | | Girls | |
|---|---|---|---|---|
| | Mother never unemployed | Mother experienced unemployment | Mother never unemployed | Mother experienced unemployment |
| N of individuals (%) | 67,311 (87,65) | 9,484 (12,35) | 65,408 (89,26) | 7,870 (10,74) |
| N of 6-month period observations | 278,590 | 4,0647 | 236,391 | 29,926 |
| Purchase of psychotropic medications over the study period, % | 6.8 | 7.7 | 9.8 | 10.5 |
| Age of the child, mean [SD] | 17.71 [1.78] | 17.74 [1.78] | 17.34 [1.66] | 17.40 [1.67] |
| Age of the mother, mean [SD] | 46.00 [5.70] | 44.96 [5.98] | 45.60 [5.65] | 44.70 [5.99] |
| Mother completed tertiary education, % of person years | 41.5 | 27.3 | 43.2 | 28.6 |
| Mother's annual income, mean [SD] | 43,504.5 [32, 328.4] | 38,441.1 [287,020.9] | 44,010.0 [34,802.6] | 36,676.5 [27,147.4] |
| Mother re-partnered, % of person years | 34.7 | 35.5 | 35.2 | 34.9 |
| Biological father's annual income, mean [SD] | 41,672.7 [30,030.8] | 35,980.7 [131,247.0] | 42,010.4 [38,395.1] | 35,335.4 [26,664.2] |

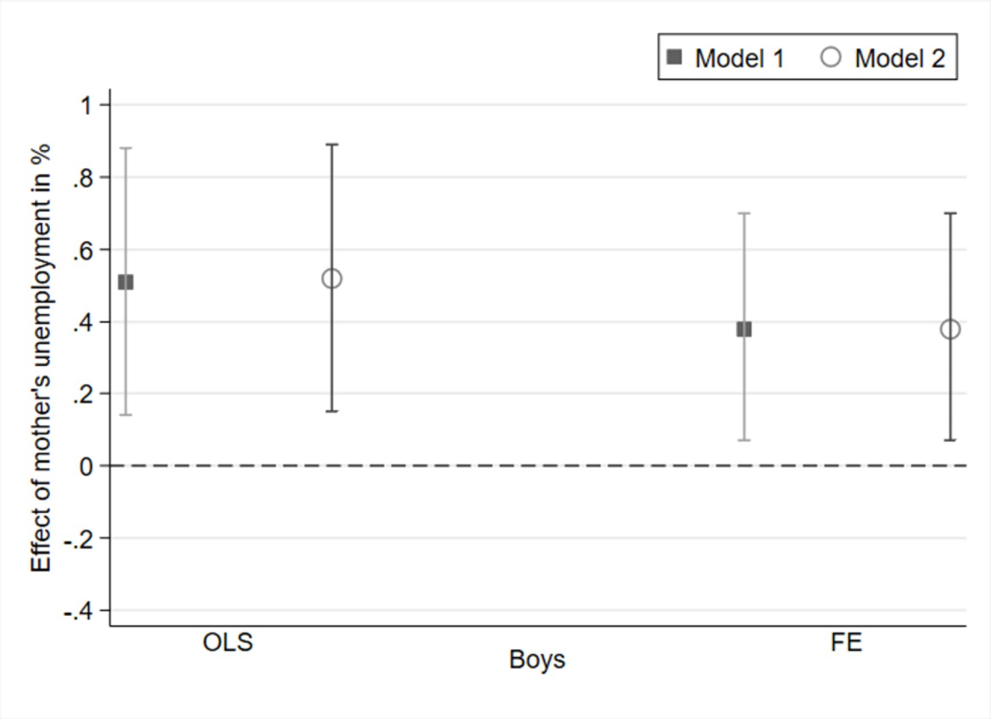
Abbreviations: SD, standard deviation.

*As unknown fathers have an income of €0, the average income is relatively low.

The effects of maternal unemployment on psychotropic medication use among boys

Figure 1 displays our OLS (left panel) and FE (right panel) estimates of the effects of the mother's unemployment on psychotropic medication use among boys. Before adjusting for all stable characteristics, the probability of psychotropic purchases was 0.5 percentage points (95% CI: 0.1,0.1) higher following maternal unemployment (see Model 1; Table A.1 in the Appendix). Changes in the mother's income following unemployment did not mediate the effects of maternal unemployment on psychotropic medication use among boys (Model 2). Controlling for all stable characteristics in the FE models attenuated the effect size. In Model 1, we observed a 0.4 percentage point increase (95% CI: 0.1,0.7) in psychotropic medication use among boys following maternal unemployment. In Model 2, the size of the association remained similar when controlling for the mother's income.

Figure 1. *Effects of maternal unemployment on psychotropic medication use among boys*




Source: Finnish register data, own calculations.
Notes: Model 1: Mother's unemployment, age, age squared, season, employment rate. Model 2: Model 1 + mother's income.

Table 2 shows the results of the OLS and FE estimation, including the interaction of the biological father's income and maternal unemployment (Model 3). Maternal unemployment did not change the probability of psychotropic medication use among adolescents whose father did not have any income, as the main effect in the interaction was not statistically significant (OLS, Model 3). The interaction term between maternal unemployment and the father's income had a positive sign, but the interaction effect was also small and not statistically significant, which indicates that the effects of the mother's income did not change when the father's income increased. In the FE model, the interaction term was equal to zero, but the main effect of maternal unemployment on boys' psychotropic medication use remained statistically significant.

In Model 4, the main effect in the interaction was statistically significant and was somewhat stronger than in Model 3, but the interaction term between maternal re-partnering and maternal unemployment had a negative sign in both the OLS and the FE models, which suggests that maternal unemployment was less harmful for the mental health of boys if the mother had a new partner. However, the interaction term was not statistically significant, and its size was negligible in the FE model. Thus, we did not observe a clear pattern of the mother's new partner playing a compensatory role when the mother experienced a job loss.

Table 2. *Results from ordinary least square (OLS) and individual fixed-effects (FE) models estimating the effects of maternal unemployment on psychotropic medication use among boys and girls.*

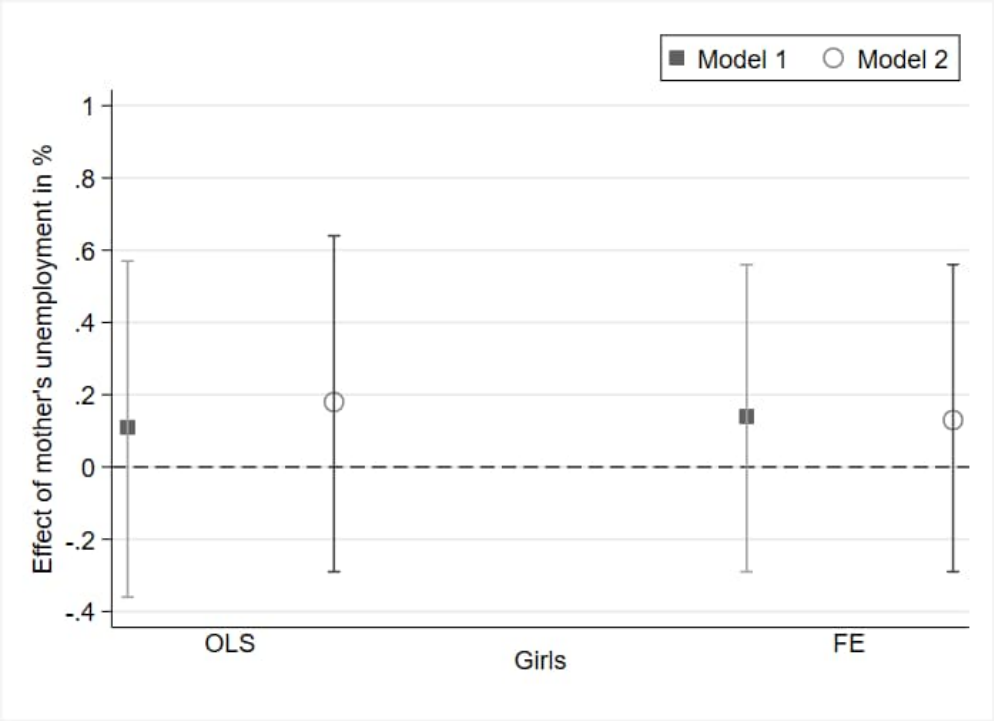
| | Boys | | | | Girls | | | |
|---|---|---|---|---|---|---|---|---|
| | Model 3 | | Model 4 | | Model 3 | | Model 4 | |
| | b | 95% CI | b | 95% CI | b | 95% CI | b | 95% CI |
| **OLS** | | | | | | | | |
| Mother unemployed (Ref. Employed) | 0.002 | [-0.000,0.01] | 0.007 | [0.002,0.0116] | -0.007 | [-0.013,-0.001] | -0.008 | [-0.007,0.004] |
| Age | -0.015 | [-0.02,-0.007] | -0.013 | [-0.02,-0.006] | 0.017 | [0.001,0.022] | 0.015 | [0.004,0.025] |
| Age squared | 0.001 | [0.000,0.001] | 0.000 | [0.000,0.001] | -0.000 | [-0.000,0.000] | -0.000 | [-0.001,0.000] |
| Spring (Ref. Autumn) | 0.001 | [-0.000,0.002] | 0.001 | [-0.000,0.002] | 0.002 | [0.000,0.004] | 0.002 | [0.001,0.004] |
| Unemployment rate | 0.028 | [-0.03,0.086] | 0.024 | [-0.033,0.082] | 0.026 | [-0.042,0.094] | 0.023 | [-0.045,0.092] |
| Mother's income | 0 | | 0 | | -0.000 | [-0.000,0.000] | 0.000 | [0.000,0.000] |
| Biological father's income in €1,000 | 0.000 | [-0.000,0.000] | | | 0.000 | [0.000,0.000] | | |
| Unemployed#biological father's income in €1,000 | 0.000 | [-0.000,0.000] | | | 0.000 | [0.000,0.001] | | |
| Mother re-partnered (Ref. Single) | | | 0 | [-0.003,0.001] | | | -0.005 | [-0.007,-0.002] |
| Unemployed#re-partnered | | | -0.005 | [-0.012,0.003] | | | 0.011 | [0.001,0.020] |
| Constant | 0.132 | [0.069,0.194] | 0.118 | [0.056,0.179] | -0.125 | [-0.218,-0.032] | -0.148 | [-0.240,-0.055] |
| **FE** | | | | | | | | |
| Mother unemployed (Ref. Employed) | 0.004 | [0.001,0.007] | 0.004 | [0.000,0.008] | -0.004 | [-0.009,0.000] | -0.001 | [-0.006,0.004] |
| Age | -0.02 | [-0.024,-0.010] | -0.02 | [-0.024,-0.010] | 0.022 | [0.012,0.032] | 0.022 | [0.012,0.032] |
| Age squared | 0.001 | [0.000,0.001] | 0.001 | [0.000,0.001] | -0.000 | [-0.000,-0.000] | -0.000 | [-0.000,-0.000] |
| Spring (Ref. Autumn) | -0.001 | [-0.002,-0.000] | -0.001 | [-0.002,-0.000] | -0.000 | [-0.007,0.001] | -0.000 | [-0.002,0.001] |
| Unemployment rate | -0.202 | [-0.292,-0.113] | -0.202 | [-0.292,-0.113] | 0.004 | [-0.119,0.127] | 0.0113 | [-0.117,0.134] |
| Mother's income | 0 | | 0 | | 0 | | 0 | |
| Biological father's income in €1,000 | 0 | | | | 0 | | | |
| Unemployed#biological father's income in €1.000 | 0 | [-0.000,0.000] | | | 0.000 | [0.000,0.000] | | |
| Mother re-partnered (Ref. Single) | | | 0 | | | | 0 | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Unemployed#re-partnered | | | -0.000 | [-0.007,0.006] | | | 0.006 | [-0.002,0.015] |
| Constant | 0.159 | [0.101,0.218] | 0.159 | [0.101,0.218] | -0.230 | [-0.32,-0.143] | -0.23 | [-0.3173,-0.142] |
| N | 319237 | | 319237 | | 266317 | | 266317 | |

Effects of maternal unemployment on psychotropic medication use among girls

Figure 2 displays the corresponding OLS (left panel) and FE (right panel) estimates for girls. The mother's unemployment had a small but statistically non-significant effect on psychotropic medication use among girls both before and after adjusting for unmeasured, stable confounding (OLS: 0.1 (95% CI: -0.4,0.6); FE: 0.1 (95% CI: -0.3,0.6)). As was found for boys, changes in maternal income did not appear to mediate the association between maternal unemployment and psychotropic medication use among girls (OLS: 0.2 (95% CI: -0.3,0.6); FE: 0.1 (95% CI: -0.3,0.6)). It is, however, possible that the smaller effect size observed for girls than for boys reflected gender differences in the effects of maternal unemployment on adolescents' mental health.

Figure 2. *Effects of maternal unemployment on psychotropic medication use among girls*




Model 1: Mother's unemployment, age, age squared, season, employment rate.
Model 2: Model 1 + mother's income.

In Model 3, we found that among girls whose father did not have any income, the effect of maternal unemployment on psychotropic medication use was smaller, although this effect was statistically significant only in the OLS model. The interaction term between the father's income and maternal unemployment was positive, which suggests that maternal unemployment increased girls' psychotropic medication use more when the father's income was higher (Table 2).

In both the OLS and the FE estimates in Model 4, maternal unemployment had no effect on girls' psychotropic medication use when the mother did not have a new partner. The interaction term was positive – but again, was statistically significant only in the OLS model – which suggests that maternal unemployment increased girls' psychotropic medication use more if the mother had a new partner.

## Discussion

This study has extended existing research about the intergenerational cross-over effects of unemployment on health by focusing on families in which adolescents were living with their mother, but not with their biological father. Compared to a mother in a two-parent family, a single mother is more likely to be the primary breadwinner (Artazcoz et al., 2004; Moustgaard et al., 2018). Hence, a mother's job loss can be expected to take a greater toll on the mental health of her children if she is single. The only previous study that addressed this issue showed that in the US context, single mothers' unemployment indeed had strong effects on the depressive symptoms of their adolescent children (Brand and Simon-Thomas, 2014). We analyzed this association in a non-US context by assessing the effects of single mothers' unemployment on the mental health of their adolescent children, while controlling for confounding due to unobserved characteristics, in an individual fixed-effects regression framework using panel data from Finland. The results of our panel regression models indicated that in single-mother families, maternal unemployment had detrimental effects on the mental health of adolescent boys, while the effects on the mental health of girls were negligible and not statistically significant. These findings were not primarily driven by stable maternal or adolescent characteristics, such as personality or family history, or by the family's economic situation following the mother's job loss. Overall, our findings showed that in single-mother families, maternal unemployment was detrimental to the mental health of boys. However, we did not find consistent evidence that maternal unemployment was harmful for girls.

These findings challenge the notion that adolescent girls are more vulnerable than boys to the negative life course events affecting their family members. At least for the specific life course stage of late adolescence, we found no support for the idea that daughters are more vulnerable than sons to parental unemployment. Specifically, our results (FE models) indicated that after experiencing maternal unemployment, the psychotropic medication use of boys increased significantly, while that of girls also rose, but the increase was not significant. These findings suggest that the mechanisms that are often proposed for explaining gender differences may not hold for cross-over effects that operate across generations. Instead, these findings could be explained by differences in the coping resources and strategies boys and girls use to deal with stress (Turner et al., 1995; Simon, 2002; Thoits, 1995; Turner and Lloyd, 1999). For example, some studies have suggested that when faced with stressful circumstances, women are more likely than men to seek social support (Ptacek et al., 1994). The availability of social support and the capacity to make use of it appear to be important moderators of life stress (Cohen and Wills, 1985). Indeed, countless studies have shown that having social support improves a variety of health outcomes (see Uchino (2006) for a review).

We also explored whether changes in the mother's income mediated the effects of the mother's unemployment on the mental health of adolescents in single-mother families. While the income levels of unemployed mothers were generally lower than those of employed mothers, we found no evidence that income losses mediated the effects of unemployment. These findings add to previous research suggesting that mechanisms related to financial strain cannot fully account for the higher incidence of mental health problems or reduced well-being among children with unemployed parents (Bacikova-Sleskova et al., 2015; Sleskova et al., 2006; Pedersen et al., 2005; Powdthavee and Vernoit, 2013). It is also plausible that the strength of the mediating effects of income are context-specific. Unlike in the US context, where parental unemployment may be associated with more severe income losses (Kalil and Ziol-Guest, 2008), this potential mechanism may be less important in the Finnish context, where

the welfare state provides social benefits that might help to compensate for the detrimental effects of unemployment in general.

Furthermore, we investigated the role of the non-resident biological father's income in the association between maternal unemployment and the mental health of adolescents. For boys, we observed that the father's income played no compensatory role following maternal unemployment. For girls, we found some preliminary evidence that their probability of using psychotropic medication increased after they experienced a maternal job loss if their father's income was higher. This effect was partially confounded by having a father who had a very low income. In the FE model, the effects of the interactions suggested that among adolescent girls whose biological father had a higher income, maternal unemployment was more strongly related to psychotropic medication use. This finding contradicts the expectation that the biological father's income tends to mitigate the resource losses associated with maternal unemployment. On a speculative note, it is possible that in some single-mother families, the father does not provide sufficient economic support for his biological children, even though he generally has a legal obligation to do so. As the financial obligations of the father depend on his own financial resources (Claessens and Mortelmans, 2018), the welfare state covers the father's obligations if he cannot contribute (e.g., because he is deceased or his income is too low). If, however, the biological father has a high income but does not contribute, social insurance benefits are not available for the single-mother family. In such cases, experiencing maternal unemployment might be more stressful for adolescents. This underscores the importance of single-mother families having other forms of support through policies and social transfers (Bernardi et al., 2018b), as well as support from other family members (Metsä-Simola et al., 2021).

To gain a more complete picture of the living circumstances of adolescents living in single-mother families, we also analyzed the role of maternal re-partnering. For boys, maternal re-partnering did not change the pattern of how maternal unemployment affected their mental health, while for girls, maternal unemployment was associated with increased psychotropic medication use if the mother had a new partner. It is possible that in some cases, the mother's re-partnering generated additional stressors for the children involved. For example, Kirby (2006) found that adolescents who moved from a single-parent family to a stepfamily had an elevated risk of initiating alcohol use. However, our findings were only significant in the OLS models, but not in FE models, which suggests that these results were confounded by stable unobserved characteristics. Therefore, while re-partnering is an important process that may be linked to well-being in single-mother families (Recksiedler and Bernardi, 2019), we found no consistent evidence that it had compensatory effects for boys or for girls who experienced a maternal job loss.

### *Methodological considerations*

The major strengths of our study include our use of large register-based data, which provided us with an objective mental health measure, and a dataset on mothers and their offspring with full national coverage. The data had practically no nonresponses or attrition, which are important advantages when assessing unemployment and mental health in a panel setting. Another advantage of our use of an objective mental health measure when studying young adolescents is that we were able to avoid self-reporting biases. In particular, it has been shown that proxy respondents (mostly parents) tend to underestimate mental health issues, which suggests that there is a parental positivity bias (Lagattuta et al., 2012). Furthermore, our study design and our use of a narrow observation window – a panel of

six-month periods for up to six years – enabled us to estimate the probability of psychotropic purchases during periods of maternal unemployment. In addition, we were able to directly observe potential key mechanisms related to changes in the economic resources of families headed by single mothers, such as maternal and paternal income. Unlike previous studies that looked at the effects of the employment experiences of single mothers on the mental health of their children, we considered these resources longitudinally.

However, this study has some limitations. The mental health measure we used was based on clinical evaluations. While our measure was objective, it only captured treated individuals. It is likely that not all individuals with mental health issues sought treatment. Therefore, our mental health measure only observed those individuals who had mental health problems, and were willing and able to seek treatment. Therefore, it is likely that we only captured adolescents with more severe mental health problems. In addition, our data did not cover all dimensions of mental health. Previous research has shown that while women appear to use more emotion-focused coping strategies, such as developing depression and anxiety (Turner et al., 1995; Simon, 2002; Thoits, 1995; Turner and Lloyd, 1999), men often react to stressful circumstances by developing behavioural disorders, such as excessive use of drugs or alcohol (Carver et al., 1989). Future work should aim to replicate some of our analyses using alternative measures of mental health and well-being.

In addition, we were unable to observe all important dimensions of heterogeneity among single-mother families. Importantly, while we analyzed children registered as living with their biological mother, but could not identify whether a single mother and her former spouse had joint custody of their children. Joint custody is a relatively new phenomenon, and it remains challenging to identify (Bernardi et al., 2018a). Whether child custody or parental authority is shared may affect the economic and social resources available to the children of a single mother, and to what extent the children identify with their mother. While our ability to account for re-partnering and the biological father's income likely mitigated any bias that this lack of information on custody arrangements might have caused, further efforts to clarify the role of non-resident fathers are needed.

### *Conclusions*

Overall, our study showed that in single-mother families, maternal unemployment was associated with an increased probability of psychotropic medication use among boys and girls, although this effect was smaller in size and was not statistically significant among girls. Further research is needed to investigate the vulnerability of adolescent sons, as well as the factors that contribute to the potentially greater resilience of adolescent daughters to the effects of maternal unemployment. Our findings highlighted the importance of investigating single-mother households, and of exploring how stressful life events cross over to the adolescent children in such households. In particular, adolescent boys may need more psychological support when they experience stressful life events, such as a maternal job loss. This would improve their chances of having a positive mental health trajectory, which is essential for leading a healthy life as an adult.

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## Appendix

Table A1.

*Results from ordinary least square (OLS) and individual fixed-effects (FE) models estimating the effects of maternal unemployment on psychotropic medication use among boys and girls.*

| | Boys | | | | Girls | | | |
|---|---|---|---|---|---|---|---|---|
| | Model 1 | | Model 2 | | Model 1 | | Model 2 | |
| | b | 95% CI | b | 95% CI | b | 95% CI | b | 95% CI |
| **OLS** | | | | | | | | |
| Mother unemployed (Ref. Employed) | 0.005 | [0.001,0.009] | 0.005 | [0.002,0.009] | 0.001 | [-0.004,0.006] | 0.002 | [-0.003,0.006] |
| Age | -0.013 | [-0.02,-0.006] | -0.013 | [-0.02,-0.006] | 0.015 | [0.004,0.025] | 0.014 | [0.003,0.025] |
| Age squared | 0.004 | [0.000,0.001] | 0.000 | [0.000,0.001] | -0.000 | [-0.001,0.000] | -0.000 | [-0.001,0.000] |
| Spring (Ref. Autumn) | 0.000 | [-0.000,0.002] | 0.001 | [-0.000,0.002] | 0.002 | [0.001,0.004] | 0.002 | [0.001,0.004] |
| Unemployment rate | 0.021 | [-0.036,0.079] | 0.022 | [-0.035,0.080] | 0.009 | [-0.059,0.077] | 0.017 | [-0.051,0.085] |
| Mother's income | | | 0 | | | | 0.0001 | [0.0000,0.0001] |
| Constant | 0.119 | [0.057,0.18] | 0.119 | [0.058,0.180] | | | | |
| **FE** | | | | | | | | |
| Mother unemployed (Ref. Employed) | 0.004 | [0.001,0.007] | 0.004 | [0.001,0.007] | 0.001 | [-0.003,0.006] | 0.001 | [-0.003,0.006] |
| Age | -0.017 | [-0.024,-0.010] | -0.02 | [-0.024,-0.010] | 0.022 | [0.012,0.032] | 0.022 | [0.012,0.032] |
| Age squared | 0.001 | [0.000,0.001] | 0.001 | [0.000,0.001] | -0.000 | [-0.001,-0.000] | -0.000 | [-0.001,-0.000] |
| Spring (Ref. Autumn) | -0.0011 | [-0.002,-0.000] | -0.001 | [-0.002,-0.000] | -0.000 | [-0.002,0.001] | -0.000 | [-0.002,0.001] |
| Unemployment rate | -0.2023 | [-0.292,-0.113] | -0.202 | [-0.292,-0.113] | 0.012 | [-0.111,0.135] | 0.011 | [-0.112,0.135] |
| Mother's income | | | 0 | | | | 0 | |
| Constant | 0.159 | [0.101,0.218] | 0.159 | [0.101,0.218] | -0.231 | [-0.318,-0.143] | -0.23 | [-0.318,-0.142] |
| N | 319237 | | 319237 | | 266317 | | 266317 | |

| | Boys | | | | Girls | | | |
|---|---|---|---|---|---|---|---|---|
| | Model 1 | | Model 2 | | Model 1 | | Model 2 | |
| | b | 95% CI | b | 95% CI | b | 95% CI | b | 95% CI |
| **OLS** | | | | | | | | |
| Mother unemployed (Ref. Employed) | 0.005 | [0.001,0.009] | 0.005 | [0.002,0.01] | 0.001 | [-0.004,0.006] | 0.002 | [-0.003,0.006] |
| Age | -0.013 | [-0.02,-0.006] | -0.013 | [-0.02,-0.006] | 0.015 | [0.004,0.025] | 0.014 | [0.003,0.025] |
| Age squared | 0.000 | [0.000,0.001] | 0.000 | [0.000,0.001] | -0.000 | [-0.001,0.000] | -0.000 | [-0.001,0.000] |
| Spring (Ref. Autumn) | 0.001 | [-0.000,0.002] | 0.001 | [-0.000,0.002] | 0.002 | [0.001,0.004] | 0.002 | [0.001,0.004] |
| Unemployment rate | 0.021 | [-0.036,0.079] | 0.022 | [-0.035,0.080] | 0.009 | [-0.059,0.077] | 0.017 | [-0.051,0.085] |
| Mother's income | | | 0 | | | | 0.0001 | [0.0000,0.0001] |
| Constant | 0.119 | [0.057,0.18] | 0.119 | [0.058,0.180] | | | | |
| **FE** | | | | | | | | |
| Mother unemployed (Ref. Employed) | 0.004 | [0.001,0.007] | 0.004 | [0.001,0.007] | 0.001 | [-0.003,0.006] | 0.001 | [-0.003,0.006] |
| Age | -0.017 | [-0.024,-0.010] | -0.08 | [-0.024,-0.010] | 0.022 | [0.012,0.032] | 0.022 | [0.012,0.032] |
| Age squared | 0.001 | [0.000,0.001] | 0.001 | [0.000,0.001] | -0.000 | [-0.001,-0.000] | -0.000 | [-0.001,-0.000] |
| Spring (Ref. Autumn) | -0.001 | [-0.002,-0.000] | -0.001 | [-0.002,-0.000] | -0.000 | [-0.002,0.001] | -0.000 | [-0.002,0.001] |
| Unemployment rate | -0.202 | [-0.292,-0.113] | -0.202 | [-0.292,-0.113] | 0.012 | [-0.111,0.135] | 0.011 | [-0.112,0.134] |
| Mother's income | | | 0 | | | | 0 | |
| Constant | 0.159 | [0.101,0.218] | 0.159 | [0.101,0.218] | -0.231 | [-0.318,-0.143] | -0.23 | [-0.318,-0.142] |
| N | 319237 | | 319237 | | 266317 | | 266317 | |