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# Family Size and Subjective Well-being in Europe: Do More Children Make Us (Un)Happy?<sup>1</sup>

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## ABSTRACT

We estimate the causal relationship between the number of children and parental subjective well-being using the 2013 wave of SILC data and relying on multiple births as the source of exogenous variation. The major value added of our study is estimating this effect by children's age. We show that parents of larger families experience the same or higher levels of well-being than parents of smaller families. The positive effect is mainly driven by parents of teenage children. Among parents of pre-school children we mainly estimate a negative effect of an additional (twin) child. We further show that the negative relationship between the number of children and parental well-being at young child ages is mainly driven by dissatisfaction with accommodation and by increased frequency of feeling nervous. The positive effect at higher child ages is driven by satisfaction with financial situation only for fathers, while for mothers it is mainly driven by lower frequency of experiencing negative feelings. We conclude that higher fertility levels might be reached if parents receive more help during the early years of their children and if the positive future effects of having large families are publicized.

*JEL classification: I31, J12, J13*

*Keywords: fertility, subjective well-being*

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## 1. Introduction

Low fertility is one of the challenges of the developed world. Combined with extending life expectancy, low fertility is responsible for population ageing that threatens the stability of tax, public healthcare, and pension systems. Rational choice models of fertility predict that individuals optimally choose the number of offsprings considering the perceived costs and benefits. A large literature quantifying the costs of parenthood grew motivated by the need to better understand fertility decisions. We add to this literature by analyzing the effect of children on parental subjective well-being. If rational individuals' objective is to maximize their subjective well-being (Benjamin et al 2012; Fleurbaey and Schwandt 2015), we should observe that arrival of each planned child is associated with increased levels of well-being, however an increase in family size beyond what was planned is associated with lower levels of well-being. We probe this latter presumption by comparing the well-being of parents with and without an exogenous increase in family size caused by multiple birth. To test the stability of the relationship between family size and well-being, we focus on parents with children in different age groups.

The up to date literature analyzing the relationship between fertility and individual well-being focuses mainly on the effect of becoming a parent (extensive margin – see, for example, Clark 2008, Hansen 2012, Stanca 2012, Clark and Georgellis 2013, Deaton and Stone 2014, Beatchman et al. 2016), while the relationship between the number of children and parental well-being (intensive margin) is less studied. The recent study by Priebe (2020) who estimates the effect of having three rather than two children on parental well-being is an exception here. Other related studies include Kohler et al. (2005) and Myrskylä and Margolis (2014) who use an event study approach to show that the birth of the first child (first two children in the latter study) increases well-being of parents, while further children (third child) do not. Many studies point to adaptation and document that well-being returns to its pre-childbirth levels after few years (e.g., Clark et al. 2008, Angeles 2010, Frijters et al. 2011, Aassve et al. 2012, Stanca 2012, Clark and Georgellis 2013, Myrskylä and Margolis 2014).

Our study adds to the existing literature in several dimensions. First, we study the dynamics in the effect of an additional child. Most of the previous literature works with longitudinal data and documents dynamic reaction to childbirth in an event study setup. The typical result is that birth of a (first) child is associated with decreased levels of parental well-being which return to their pre-

childbirth levels after a few years, though Myrskylä and Margolis (2014) and Baetchmann et al. (2016) show that first birth is associated with an increase in subjective-well being for a few years. To the best of our knowledge, no previous study has investigated the dynamics in the effect of the *number* of children on parental well-being. Limited by the cross-sectional nature of the used dataset, we model dynamics by dividing the sample along children's age. We show that having an additional unplanned child is associated with lower levels of subjective well-being when children are small, but this relationship turns positive once children are in their teens.<sup>2</sup>

Second, we identify heterogeneous effects between parents showing that mothers' and fathers' well-being evolves differently with children's age. The majority of papers in the literature concentrate on the effect of children on maternal outcomes. Clark et al. (2008), Aassave et al. (2012), Stanca (2012), and Buddelmeyer et al. (2018) are among the few studies that analyze mothers and fathers separately. These studies agree that the arrival of the first child affects mothers stronger than fathers, but none of them studies the relationship between the *number* of children and parental well-being separately for mothers and fathers.

Third, we analyse different measures of subjective well-being. Similarly as the majority of recent papers, we focus on the self-reported life satisfaction. Second, we work with a happiness index (introduced in Spolcova and Pertold-Gebicka, 2020) which is a summary measure based on the frequency of experiencing five different feelings. Due to its reliance on several questions referring to frequency rather than intensity of specific feelings, the happiness index is less prone to arbitrariness in reporting and mistakes in recall than life satisfaction. In accordance, the effect of children on subjective well-being is estimated with higher precision when the happiness index is used as a well-being measure, especially for mothers. Moreover, we zoom onto different aspects of well-being. This allows us to identify which factors are mostly responsible for the estimated effects. We show that both parents are hit negatively with an unexpected increase in family size in terms of satisfaction with time allocation and with accommodation and in terms of higher frequency of feeling nervous. All the negative effects disappear when children get older. Similarly, Stanca (2012) attributes the adverse childbirth effect on subjective well-being to a decrease in financial

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<sup>2</sup> In a similar spirit, Stanca (2012) divides the cross-sectional sample by the age of parents to show that the negative effect of parenthood diminishes with the age of parents, which might be actually related to the age of children.

satisfaction, and Buddelmeyer et al. (2018) identify increased financial and time stress experienced by parents after childbirth.

Finally, unlike most of the previous papers analyzing the relationship between the number of children and parental well-being, we deal with selection into the number of children. Recently, Priebe (2020) approached this problem by using the gender composition of first two siblings to instrument for parental decision concerning birth of the third child. We follow Cáceres-Delpianoa and Simonsen (2012) and rely on multiple birth occurrences to instrument for family size.<sup>3</sup> We effectively observe parents who have decided for a specific number of children, but some of them experienced multiple pregnancy and were thus assigned to higher than planned family size. Comparing the well-being of parents “treated” with multiple birth with the well-being of the “untreated” parents allows us to identify the marginal well-being coming from an additional unplanned child.<sup>4</sup> Being aware of possible disadvantages of the multiple births instrument, we apply several strategies and robustness checks to make the presented estimates reliable. Our preferred estimates are based on the comparison of families experiencing at least two births and occurrence of multiple birth at second parity is used as an instrument for the number of children. Relying on multiple births at second parity greatly reduces the unwanted effect of infertility treatments on our estimates. Robustness checks including only single-gender twins in the definition of the instrument further support irrelevance of infertility treatments to results presented in this paper. Additionally, the risk that occurrence of twins is compensated by resigning from future fertility is much lower at second parity than at first parity. Finally, we disentangle the effect of an unexpected birth of twins per se (the “shock effect”) on parental wellbeing by stratifying the sample by children age. While the “shock effect” is observed among parents of newborns, it should be absent among the parents of older children.

To sum up, we estimate the causal relationship between family size and parental subjective well-being. Estimating this relationship for subgroups of mothers and fathers whose children fall into different age categories, we document the dynamics of this relationship along children’s age. After

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<sup>3</sup> This strategy was first proposed by Bronars and Grogger (1994) and applied, among others, by Angrist and Evans (1998).

<sup>4</sup> For comparison and where sample size allows we also use the siblings’ sex composition instrument. In this case we rely on the observation that families whose first two children are of the same gender are more likely to decide for a third child than families whose first two children are a mixed couple. Siblings’ sex composition instrument allows us to identify the effect of an additional *planned* child on parents’ well-being. Due to low predictive power of siblings’ gender composition instrument and its reliance on very large datasets we prefer the multiple births instrument.

controlling for self-selection, parents of larger families experience the same or higher levels of well-being than parents of smaller families. The positive effect is mainly driven by fathers of teenage children, while among the parents of pre-school children we mainly estimate a negative effect of an additional child. This suggests that higher fertility levels might be reached if parents receive more help during the early years of their children and if the positive effects of having large families are publicized.

## 2. Data and stylized facts

For the analysis presented in this paper we use the 2013 wave of the European Union Statistics on Income and Living Conditions (EU-SILC).<sup>5</sup> The choice of this dataset is driven by the inclusion of the well-being questionnaire in the 2013 wave of SILC, by the international coverage of the data which are collected in all European Union member states plus Iceland and Norway, and by the household structure of the data, what allows for identification of own children and partner. Apart from the variables capturing individual subjective well-being, the dataset also contains information on individuals' health status, demographics, socioeconomic status, and labor market statistics including wages.

Children can be matched with their parents as long as they live in the same household.<sup>6</sup> For each person, the dataset records the information about their mother, father, and partner. This allows us to retrieve the number of children living in the same household as their parent. To limit the possibility of observing parents whose older children have already moved out and thus underestimating the actual number of their children, we restrict the parents' sample to adult individuals included in the well-being module who have at least one dependent child not exceeding 15 years of age *and no older children* living in the same household. While it is possible that parents of a 15-years-old have an older child that has already moved out, the majority of siblings are spaced 2-3 years from each other and the majority of children in Europe live with their parents until their

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<sup>5</sup> Access to SILC can be obtained by any research institution upon first registering with Eurostat and then filing a request for data access, which is free of charge. This procedure is explained in detail in the following document: [https://ec.europa.eu/eurostat/documents/203647/771732/How\\_to\\_apply\\_for\\_microdata\\_access.pdf/82d98876-75e5-49f3-950a-d56cec15b896](https://ec.europa.eu/eurostat/documents/203647/771732/How_to_apply_for_microdata_access.pdf/82d98876-75e5-49f3-950a-d56cec15b896)

<sup>6</sup> Individuals included in the SILC survey are not asked about the number of children they ever had; only children living in the household at the time of the interview are recorded.

early 20s. Further, we exclude single parents by limiting the sample to mothers and fathers living in a partnership.<sup>7</sup>

In the baseline analysis we focus on all parents with children younger than 16 and no older child sharing the household. Further, when zooming on parents who experienced two births, we stratify the sample of parents according to their children's age. This allows us to compare parents in the same stage of childbearing. All own children must fall into the specified age interval for a parent to be included in the given age sample. To include the majority of families and at the same time to ensure children's age homogeneity within subsamples we consider eleven 6-year age intervals: 0-5, 1-6, 2-7, ..., 10-15. These intervals are wide enough to include the majority of parents experiencing two childbirths and narrow enough to include parents facing similar children-related issues.<sup>8</sup>

In the empirical analysis, we compare the well-being of parents with different number of children. For identification, we rely on twin births and on third births triggered by the first two siblings being of the same gender. Table 1 reports counts of parents by the number of children and by the gender structure of their first two children. For comparison, we also report the number of all adult individuals and the number of all individuals living in a partnership. Table 1 reveals that there are more women than men in the parents' sample. This is given by the fact that it is more frequent among mothers than among fathers to live with a new partner and with their own children from a previous relationship.<sup>9</sup> About 5% of parents with at least two children have twins. The gender mix of the first two children is balanced among parents of at least two children and slightly skewed towards a higher representation of same-sex children among parents of three and more children. While we observe 14 thousand fathers and 16.4 thousand mothers with at least two children, there are only 3 thousand fathers and 3.7 thousand mothers with three or more children in our sample. This does not give us enough power to present any subsample analysis using this latter group of parents.

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<sup>7</sup> Angeles (2010) shows that there is a significant difference in how single individuals and individuals living in a partnership react to children in terms of their subjective well-being.

<sup>8</sup> We use alternative definition of children age intervals for robustness checks with parent classified to specific subgroups according to their **youngest** child age. The analysis based on subgroups defined by all children ages is preferred because this compares parents facing similar children-related issues and because this makes each subgroup similar in terms of age spread of all children.

<sup>9</sup> Further limiting the sample to partners with only common children living in the household does not affect the conclusions presented in this paper.



**Table 1.** Number of observations

	Men	Women
Total observations	165,678	203,516
Living in partnership	111,170	121,190
Have at least 1 child	24,276	28,072
Have at least 2 children	13,964	16,434
Number of twin births	702	797
Number of same sex siblings (for first two children)	7,053	8,252
Have at least 3 children	3,045	3,698
Number of twin births	312	359
Number of same sex siblings (for first two children)	1,611	1,990
Have at least 4 children	564	659

Note: Table displays observation counts for the baseline sample consisting of all individuals included in the well-being module (first line) and living in a partnership (second line) and subsamples of these individuals who have the specified number of dependent children younger than 15 and no older child sharing the household.

In the baseline analysis, we employ two measures of individual subjective well-being. First, following the most common practice in the literature, we analyze the self-reported life satisfaction. In the SILC dataset life satisfaction is captured by the question: 'Overall, how satisfied are you with your life nowadays?' As a response individuals have to choose a number from an integer 0 – 10 scale, where 0 means 'Not at all satisfied,' and 10 means 'Completely satisfied.'<sup>10</sup> The left part of Table 2 presents the summary statistics of this measure, while histograms can be found in Figure A1 in the Appendix. 90% of the sample report life satisfaction of 5 and higher, with 8 being the median and modal value. In our sample parents report higher levels of life satisfaction than childless adults living in a partnership. We do not observe significant differences in life satisfaction levels reported by parents of one, two, or three children. Parents of four report slightly lower levels of life satisfaction, though.

<sup>10</sup> The few 'I don't know' responses to this and other questions are excluded from the sample.

Self-reported life satisfaction might reflect not only the experienced well-being but also an evaluative comparison of current life situation with one's aspirations and with others (Diener, 1984). Inspired by the psychological literature that distinguishes between life-evaluative subjective well-being measures (e.g. life satisfaction) and experienced well-being measures (Ryan and Deci, 2001; Kahneman and Deaton, 2010), we additionally employ an alternative measure of subjective well-being. Here we take advantage of five questions asking SILC respondents to recall the frequency of experiencing certain positive (calm and peaceful, happy) and negative (very nervous, down in the dumps, downhearted or depressed) feelings and emotions over the last four weeks measured on the following scale: 1 -- 'None of the time,' 2 -- 'A little of the time,' 3 -- 'Some of the time,' 4 -- 'Most of the time,' 5 -- 'All of the time.' By summing up the numerical responses for positive feelings and subtracting the numerical responses for negative feelings, we construct a Happiness Index (HI). The happiness index measures the experienced well-being and is supposed to be less influenced by comparison to others or to own expectations than life satisfaction. For comparability with LS, we normalize the HI and fit it to the 0 to 10 scale.<sup>11</sup> The right part of Table 2 presents the summary statistics for the Happiness Index, while histograms can be found in Figure A2 in the Appendix. It is worth noting that LS and HI are highly correlated (raw correlation coefficient 0.53), but HI is slightly more stable with lower overall variation and smaller differences by the number of children, but larger differences by gender. Moreover, the distribution of the HI is closer to normal.

In a supportive analysis we additionally focus on specific aspects of subjective well-being, such as satisfaction with financial situation, satisfaction with time allocation, satisfaction with accommodation, and on individual components of the happiness index. These are summarized in Tables A11 and A12 in the Appendix. The patterns observed here differ slightly from those presented in Table 2. Specifically, we observe decreasing satisfaction with accommodation as a family grows larger and childless couples seem to be satisfaction maximizers regarding both financial situation and accommodation, while people appear to be the most satisfied with their time allocation when they are single. Moreover, parents of two are the most happy of all parents in our sample. Although fathers are more nervous than childless men living in a partnership, there is almost no variation in the frequency of feeling nervous with the number of children. Among

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<sup>11</sup> The actual full range of values is used, which implies that the HI takes on 21 distinct values from 0 to 10 with 0.5 increment.

mothers we observe a slight increase in the frequency of feeling nervous with each additional child. These numbers suggest that raising a family is time demanding, money consuming, and accommodation restricting but children might offset the negative well-being effects in terms of bringing happiness and overall life satisfaction.

**Table 2.** Summary of subjective well-being measures

	Life satisfaction		Happiness index	
	men	women	men	women
All adults	7.047 (2.039)	7.009 (2.076)	7.005 (1.881)	6.603 (1.965)
Adults in partnership	7.211 (1.956)	7.259 (1.959)	7.066 (1.835)	6.727 (1.892)
Of them parents	7.376 (1.824)	7.517 (1.776)	7.088 (1.755)	6.874 (1.787)
Parents of one child	7.332 (1.844)	7.475 (1.804)	7.076 (1.780)	6.883 (1.803)
Parents of two children	7.436 (1.771)	7.570 (1.716)	7.114 (1.702)	6.882 (1.761)
Parents of three children	7.343 (1.914)	7.526 (1.845)	7.091 (1.798)	6.844 (1.796)
Parents of four children	7.254 (2.063)	7.326 (1.980)	6.769 (2.061)	6.667 (1.963)

Note: Table displays the mean value and standard deviation (in parentheses) for each of the subjective well-being measures for the baseline sample consisting of all adult individuals included in the well-being module (first line) and subsamples of these individuals who live in a partnership (second line) and have the specified number of dependent children younger than 16 and no older child sharing the household.

The raw statistics presented in Table 2 might suggest that the arrival of the first child is associated with a slight increase in parents' subjective well-being, and parents maximize their well-being (and happiness, as visible in Table A12) when having two children. These statistics are, however, corrupted by selection to parenthood and choices regarding the number of children. In the following section, we describe a strategy of identifying the relationship between the number of children and parental subjective well-being net of these selection issues.

### 3. Empirical approach

We analyze the relationship between the number of children and parents' subjective well-being generally described by the following formula:

$$wellbeing_i = f(X_i\beta + \gamma \cdot g(N_i) + unobservables_i), \quad (1)$$

where the explanatory variable of interest is  $N_i$ , capturing the number of children an individual  $i$  has, and  $X_i$  is a vector of individual-level variables potentially affecting the level of subjective well-being, such as health status, education level, age, or income. The effect of an additional child on parental subjective well-being might differ by the number of previously born children. We account for these nonlinearities by repeating the analysis on three samples of parents: with at least one child, with at least two children, and with at least three children. This allows us to capture the effect of an additional child beyond the first one, of an additional child beyond the second one, and of an additional child beyond the third one.

There are several reasons why the number of children might be endogenous in the above specification. Some of these are pointed out by Kravdal (2014). In a nutshell, individuals with higher (unobserved) preferences towards family tend to have more children and at the same time they derive higher utility from having a large family. This could lead to a significant overestimation of the relationship between the number of children and parental well-being.

#### 3.1 Identification strategy

To deal with endogeneity of the family size variable several earlier studies, analyzing the effect of the number of children on different family outcomes, explored the variation in the number of children caused by multiple births (Bronars and Grogger, 1994; Angrist and Evans, 1998; Black, Devereux, and Salvanes 2010, 2005; Angrist, Lavy, and Schlosser, 2010; Cáceres-Delpianoa and Simonsen, 2012). Under the assumption that multiple births are not planned and thus are truly exogenous in specification (1), while at the same time they affect family size beyond what was planned by the parents, we can treat occurrence of multiple births as a natural experiment and compare treated (larger) and nontreated (smaller) families. In this approach, a multiple birth indicator is used as an instrument exogenously assigning parents to either a treatment or a control group.

There are several issues threatening this identification strategy. First, future fertility, and thus the final family size, might be affected by earlier occurrences of multiple births. Families aiming at two children would not plan additional pregnancy after receiving twins as their first-born, while they would plan additional pregnancy after giving birth to a singleton. In such a case multiple births would not increase family size beyond what was planned by the parents. Second, multiple births are more frequent among mothers receiving fertility treatment who most probably have high preferences towards family. This would question the exogeneity of the proposed instrumental variable.

We approach these problems using the strategy proposed by Cáceres-Delpianoa and Simonsen (2012). Several alternative instrumental variables (denoted as  $MB_k$ ) are constructed as dummies equal to one if multiple births occurred at  $k$ -th parity. To identify the effect of the  $n$ -th child on parents' subjective well-being we consider a sample of parents with at least  $n-1$  children and explore the variation in the number of children caused by twin birth occurring at the  $n-1$  parity. If the arrival of twins at the  $n-1$  parity is exogenous, this approach should identify the change in subjective well-being caused by increasing the number of own children from  $n-1$  to  $n$ .

If parents aim at having two children, the arrival of twins at first birth might be offset by resigning from further fertility and would not affect the final number of children. However, the arrival of twins at second birth (after a singleton first birth) would exogenously increase such parents' number of offsprings from the planned two to unplanned three. Similarly, if parents aim at having three children, the arrival of twins at third parity would exogenously increase such a family's size. Thus, while we analyze the effect of the second child (using  $MB_1$  as an instrument), of the third child (using  $MB_2$  as an instrument), and of the fourth child (using  $MB_3$  as an instrument), we trust most the estimates relying on multiple birth shocks at higher parities. This is supported by the evidence that most parents' preferred number of children is two (Goldstein et al. 2003). Higher parity births are also less often affected by fertility treatments. This is why relying on twin births in the second or third parity should also minimize the threat of instrument endogeneity.

In the related literature (Cáceres-Delpianoa and Simonsen, 2012) the problem caused by the high occurrence of multiple births among mothers undergoing fertility treatment is treated by restricting the multiple-births instrument to capture only same-sex births. Fertility treatment increases the probability of dizygotic (non-identical) twins occurrence, but it does not affect the probability of

monozygotic (identical) twins occurrence. As monozygotic twins are always of same-sex, this restriction highly oversamples unexpected twin pregnancies over fertility treatment-induced twin pregnancies. Unfortunately, our sample size does not allow us to apply this restriction in every specification. Twin-birth instrument limited to same-sex siblings is only used as a robustness check in the full-sample analysis.

Instrumental variable estimation identifies the local average treatment effect – the effect on the sample affected by the instrument. When using multiple (mostly twin) births as an instrument for the number of children, we identify the effect of an *unexpected* increase in family size on parental subjective well-being. Moreover, this unexpected increase in family size comes at once with the planned one and might be, at least in the first months, difficult to handle. Parental subjective well-being might be negatively affected by the unexpected arrival of twins even if otherwise the affected parents enjoy a large family. Let us call this the “shock effect”. The “shock effect” is expected to phase out during the twins’ toddler years, after which we expect to observe only the raw family size effect. To account for this, when working with the sample of parents who experienced at least one or at least two births, we divide the sample into subgroups of parents according to their children’s age. 6-year age intervals are considered and all own children must fall into the given age interval for a parent to be included in the sample.<sup>12</sup>

The obtained estimates indicate whether parents could reach higher levels of subjective well-being by increasing their family size beyond what was planned. A positive estimate of the relationship between the number of children and parental well-being would indicate that current fertility levels are sub-optimal in the sense that parents derive positive well-being from an increase in family size beyond what was planned. A non-positive estimate would suggest that the planned number of children (i.e. the number of children corresponding to the number of births) is a subjective well-being maximizing strategy.

As an alternative instrument that exogenously varies the number of children, one can use the sex composition of the first two offsprings. This strategy has also reached some popularity in the previous literature (Angrist and Evans, 1998; Angrist, Lavy, and Schlosser, 2010; Black, Devereux,

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<sup>12</sup> When stratifying the sample by children’s age intervals we lose about 25% of observations that mainly come from parents with three and more births, but also from parents with two births spaced far away from one another. Consequently, the estimates based on child age subsamples correspond to much more homogenous groups of parents.

and Salvanes 2010; De Haan, 2010), although it is more data-hungry than the twin-birth instrument. The identifying assumption is that parents whose first two children are of the same gender are more likely to decide for a third child. In the context of our analysis, this approach can be used to identify the effect of having the third child on parental well-being.<sup>13</sup> We define a dummy instrumental variable (SS) that is equal to one for all parents whose first two children are of the same gender and zero otherwise. This instrument predicts an increase in family size from two to three children for those parents who would have had two children if a mixed couple was born as their first two offsprings, but decide for a third pregnancy if their first two children are of the same gender. Thus, by using this identification strategy we estimate an effect of a *planned* increase in family size on parental subjective well-being for the sample of parents who are on the margin when the preferred number of children is concerned.

There are some limitations to the use of this identification strategy. First, one ought to be careful when interpreting the estimates based on siblings' sex composition instrument, as parental reaction to the arrival of the third child might depend on the gender of that child. Second, the limited predictive power of the siblings' sex composition instrument combined with low sample size does not allow us to use this identification strategy in every specification. Consequently, the siblings' sex composition instrument is only used for comparison in the full-sample analysis.

### 3.2 Estimation method

All results presented in this paper come from linear regression models – OLS and 2SLS – even though the dependent variables used in the analysis are of the ordered nature. We have decided to apply these simple techniques for their transparency and straightforward application of instrumental variables for dealing with endogeneity. The use of linear models is frequent in the related literature. Specifically, the papers most related to ours, Clark and Georgellis (2013), Baetchmann et al. (2016), and Buddlemeyer et al. (2017) base their conclusions on linear model estimates.

In their recent paper Bond and Lang (2019) criticize the use of linear models when working with dependent variables measured on ordered scales. They argue that for reliable comparison of

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<sup>13</sup> We do not use sex composition of siblings to identify the effect of the fourth child. The siblings' sex composition instrument in this context requires that we observe enough number of fourth parity births. Due to a limited number of families deciding for a fourth pregnancy, we cannot use this strategy to estimate the effect of the fourth child.

average well-being values between two groups of people we need that the distribution of the latent variable behind the reported well-being values of one group stochastically dominates that of the other group. They show that in most cases analyzed in the literature this assumption is not likely to hold. We nonetheless rely on linear models. First, because the dependent variables analyzed in this paper use rich scales (11 points in case of life satisfaction and 21 points in case of the happiness index), what brings them closer to the underlying linear latent variables. Second, because a sensitivity analysis using the least absolute deviation estimation produces qualitatively similar results.<sup>14</sup>

#### **4. Results**

We begin with reporting the results for the pooled sample of all parents living with their dependent children aged 15 or less. Next, we divide the sample by the age of dependent children and by the European region to account for heterogeneity in the relationship between family size and subjective well-being that might hide the relevant associations. Finally, we dig into potential pathways behind the observed relationship by zooming onto specific aspects of well-being.

##### *4.1. Family size and subjective well-being*

Table 3 reports the baseline estimates of the marginal effect of an additional child on parental subjective well-being. OLS estimates are presented for completeness, but we interpret only the instrumental variable estimates. Four sets of results can be found in this table: the first two columns show estimates for a sample of all parents (i.e. those who have experienced at least one birth), the next two columns show estimates for a sample of parents who experienced at least two births, while columns (5) and (6) show estimates for a sample of parents who experienced at least three births. For each sample we use a different instrument for the number of children – it is an indicator of twin birth at first birth ( $MB_1$ ), an indicator of twin birth at second birth ( $MB_2$ ), or an indicator of twin birth at third birth ( $MB_3$ ). The instrumental variable estimates can thus be estimated as an effect of an unplanned second child (column 2), third child (column 4) or fourth child (column 6) on parental well-being. The last two columns show estimates for a sample of parents who have at least two children. An indicator for the first two children being of the same gender is used as an instrument for the total number of children in column (8). This instrumental variable estimate can thus be

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<sup>14</sup> Results available from the Authors on request. In a related paper using the same data we explicitly show that OLS and median regressions produce comparable results (Spolcova and Pertold-Gebicka, 2020).



estimated as an effect of a planned third child on parental well-being for parents who are on the margin when it comes to the decision whether to have two or three children. First-stages for each instrumental variable regression are summarized in Appendix Table A1. Note that twin birth at second or third parity is a very strong predictor of family size with an almost one-to-one relationship, i.e. families who experience twin birth at second (third) parity have one child more than families where single child arrived at second (third) parity. This finding is in line with the observation that most (future) parents' desired number of children is two and very few parents plan to have four or more children (Eurobarometer 2001, 2011). As expected, twin birth at first parity is a weaker predictor of the final family size. Same gender of the first two children is a weaker instrument and one should be careful when interpreting the results based on this instrumental variable given that the samples we work with are not very large.

When all child ages and all countries are pooled together, we do not observe any significant effect of the second or third child on parents' life satisfaction, no matter whether twin births or siblings' sex composition are used as instruments. The only significant effect is observed for the fourth child. The marginal influence of an unexpected increase in family size from three to four children is estimated to be positive for all parents, and strongly statistically and economically significant for fathers. The estimated effects on the Happiness Index are similar for the third and fourth child. In the case of the HI, we also estimate a strong negative effect of the second child on parental well-being, which seems to be driven exclusively by mothers.<sup>15</sup>

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<sup>15</sup> As a robustness check we repeat the estimations reported in columns (1) – (6) of Table 3 using occurrence of twins of the same gender as the instrument. As visible in Table A8 in the Appendix, this approach gives qualitatively and quantitatively very similar results for samples of parents with at least one and at least two children (columns (1) – (4)). For the sample of parents with at least three children the alternative approach results in higher, but still statistically insignificant estimates. In this sample, however, we observe very few twin births what makes the reported results quite imprecise.

**Table 3.** The estimated relationship between the number of children and subjective well-being, pooled sample

	(1) OLS MB1	(2) IV MB1	(3) OLS MB2	(4) IV MB2	(5) OLS MB3	(6) IV MB3	(7) OLS SS	(8) IV SS
<i>Panel A: Life satisfaction</i>								
All parents	0.011 (0.022)	0.038 (0.168)	-0.053 (0.034)	0.021 (0.222)	-0.029 (0.098)	<b>0.579*</b> (0.313)	-0.053 (0.034)	-0.327 (1.025)
N	51902	51902	29305	29305	6139	6139	29305	29305
Fathers	-0.000 (0.024)	0.248 (0.216)	<b>-0.082**</b> (0.034)	0.068 (0.271)	0.011 (0.108)	0.653 (0.413)	<b>-0.082**</b> (0.034)	-1.516 (2.502)
N	24065	24065	13458	13458	2767	2767	13458	13458
Mothers	0.021 (0.025)	-0.162 (0.183)	-0.037 (0.038)	-0.028 (0.240)	-0.072 (0.131)	0.531 (0.325)	-0.037 (0.038)	0.380 (0.755)
N	27837	27837	15847	15847	3372	3372	15847	15847
<i>Panel B: Happiness index</i>								
All parents	<b>-0.046**</b> (0.017)	<b>-0.478**</b> (0.193)	<b>-0.077**</b> (0.033)	-0.056 (0.154)	-0.069 (0.082)	0.407 (0.373)	<b>-0.077**</b> (0.033)	-1.393 (0.967)
N	50747	50747	28743	28743	6032	6032	28743	28743
Fathers	<b>-0.043*</b> (0.025)	-0.098 (0.199)	<b>-0.098*</b> (0.051)	0.036 (0.123)	-0.092 (0.063)	0.211 (0.512)	<b>-0.098*</b> (0.051)	-1.555 (1.891)
N	23484	23484	13175	13175	2716	2716	13175	13175
Mothers	<b>-0.053**</b> (0.022)	<b>-0.822***</b> (0.296)	-0.066 (0.050)	-0.154 (0.282)	-0.047 (0.138)	0.524 (0.412)	-0.066 (0.050)	-1.575 (1.268)
N	27263	27263	15568	15568	3316	3316	15568	15568

Note: Sample of parents with at least one child (MB1), at least two children (MB2 and SS), at least three children (MB3) younger than 16; Dependent variable: Life satisfaction (Panel A) or Happiness index (Panel B); Other control variables: household income, employment dummy, age, marital status, health limitation dummy, education, region fixed effects; In columns (2), (4), and (6) the number of children is instrumented by a dummy equal to one if multiple births occurred at first, second, or third parity, respectively. In column (8) the number of children is instrumented by a dummy equal to one if the first two children are of the same gender. Each cell reports an estimate of the coefficient corresponding to the marginal effect of an additional child from a separate regression.

Standard errors clustered by country in parentheses, \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

The results presented in Table 3 might be misleading, though. The samples used for estimation pool together families with children of all ages. This might hide several phenomena. First, according to the adaptation hypothesis, the effect of an additional child might get attenuated over time. Even if strong for the first years after birth it might get insignificant when families with young

and older children are pooled together. Second, as argued earlier, using the twin birth instrument adds the “shock effect” which might be observed for the first years after the arrival of twins. Thus, the total effect on the pooled sample might be biased downwards. Third, we know nothing about the final number of children. While for parents of teenage children we might expect that their fertility is completed, parents of young children might plan on having a larger family than what is observed. This is why in the further analysis we analyze subsamples of parents according to their children’s age.

Table 4 presents OLS and IV estimation results for three subsamples: parents of children in the 0-5 age interval, parents of children in the 5-10 age interval, and parents of children in the 10-15 age interval. In the main text we only report the results for parents who experienced at least two births, as for this group of parents the IV estimation is the most reliable. The results for parents with at least one birth are reported in Table A4 in the Appendix.<sup>16</sup> The IV estimates reported in Table 4 show a clear pattern for fathers and differ for mothers depending on the subjective well-being measure used in the analysis. We observe that fathers’ life satisfaction and happiness index are at first hit negatively by an unexpected increase in family size caused by twin birth at second parity, but having three rather than two children between 10 and 15 is linked to higher levels of subjective well-being (the result for the oldest age group is statistically significant for LS and marginally insignificant for the HI). The relationship between the number of children and mothers’ life satisfaction is estimated with very low precision, suggesting that there is probably high heterogeneity among mothers. On the other hand, the estimated effect of the third child on mothers’ happiness index shows a similar pattern as for fathers – mothers of young children experience a decrease in their happiness index when an unplanned third child arrives, but mothers of three are happier than mothers of two when their children are teenagers.

As a robustness check, we repeat the analysis by children age subsamples when these subsamples are defined according to the youngest child age, allowing for older children to be of any age up to 15. The relevant estimation results are reported in Appendix tables A5 (life satisfaction) and A6 (Happiness Index). The estimated patterns are similar as those reported in Table 4, however with lower “shock effect”.

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<sup>16</sup> The analysis by children’s age is not performed for parents who experienced at least three births or using the siblings’ sex composition as the instrument because of small sample sizes.

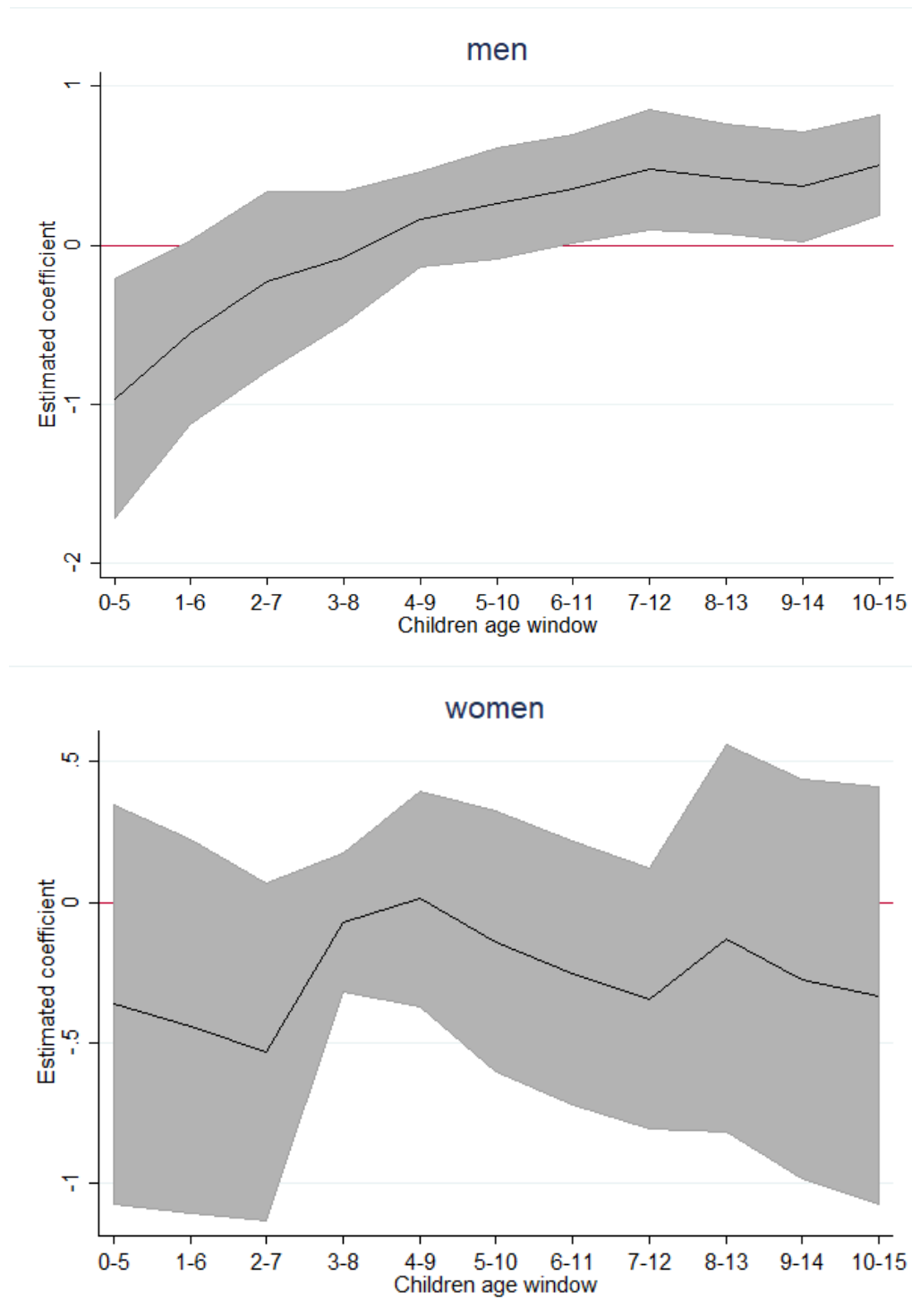
**Table 4.** The estimated relationship between the number of children and subjective well-being, the sample of parents with at least two children, by children age.

	(1) OLS 0-5	(2) IV 0-5	(3) OLS 5-10	(4) IV 5-10	(5) OLS 10-15	(6) IV 10-15
<i>Panel A: Life satisfaction</i>						
All parents	0.036 (0.198)	-0.617 (0.405)	0.067 (0.103)	0.028 (0.253)	-0.028 (0.066)	0.136 (0.322)
N	4712	4712	4700	4700	4163	4163
Fathers	-0.159 (0.262)	<b>-0.917**</b> (0.455)	0.153 (0.137)	0.219 (0.295)	-0.016 (0.126)	<b>0.429**</b> (0.197)
N	2157	2157	2220	2220	1939	1939
Mothers	0.230 (0.179)	-0.343 (0.438)	0.005 (0.124)	-0.167 (0.261)	-0.031 (0.113)	-0.171 (0.500)
N	2555	2555	2480	2480	2224	2224
<i>Panel B: Happiness index</i>						
All parents	0.034 (0.178)	<b>-0.697***</b> (0.260)	-0.161 (0.143)	-0.210 (0.252)	-0.014 (0.123)	<b>0.551**</b> (0.259)
N	4653	4653	4615	4615	4064	4064
Fathers	-0.115 (0.243)	<b>-0.812**</b> (0.345)	0.026 (0.166)	0.377 (0.347)	-0.029 (0.099)	0.212 (0.172)
N	2131	2131	2172	2172	1888	1888
Mothers	0.186 (0.165)	<b>-0.590**</b> (0.297)	<b>-0.306*</b> (0.177)	-0.788 (0.522)	0.006 (0.198)	<b>0.828*</b> (0.498)
N	2522	2522	2443	2443	2176	2176

Note: Sample of parents with at least two children younger than 16; Dependent variable: Life satisfaction (Panel A) or Happiness index (Panel B); Instrumented variable: number of children; Instrument: indicator of twin birth at second parity; other control variables: household income, employment dummy, age, marital status, health limitation dummy, education. Each cell reports an estimate of the coefficient corresponding to the marginal effect of an additional child from a separate regression.  
Standard errors clustered by country in parentheses, \* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01

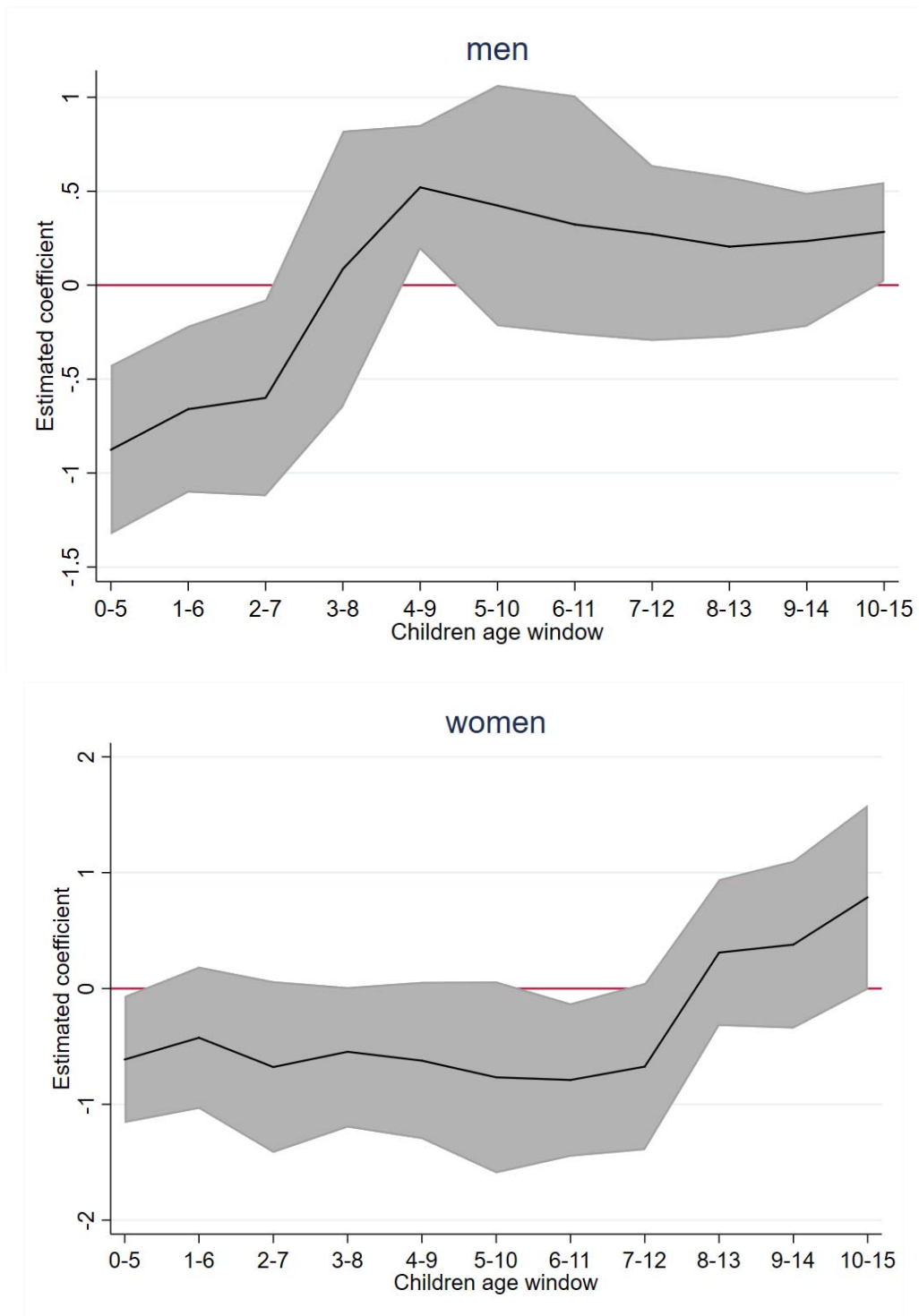
Table 4 only reports three sample age intervals. The complete evolution of the effect of a third child on parental well-being with increasing children's age is illustrated in Figure 1 (life satisfaction) and Figure 2 (Happiness index). These figures plot the estimated IV coefficients corresponding to the marginal effect of the third child against children's age brackets – eleven coefficients for eleven 6-year age brackets. For life satisfaction, we can observe a clearly increasing relationship for fathers and a very imprecisely estimated flat relationship for mothers. For the happiness index, we again observe an increasing relationship for fathers, but its shape differs from the shape observed in the life satisfaction graph. While the effect of the unexpected third child on

**Figure 1.** The estimated marginal effect of the third child on parental life satisfaction, pooled sample, moving window of children’s age



Note: Sample of fathers (Panel A) and mothers (Panel B) with at least two children; The line connects point estimates of the marginal utility from an additional child estimated on the sample of parents whose all dependent children are within the specific age bracket. The grey area represents the 95% confidence interval.

**Figure 2.** The estimated marginal effect of the third child on parental happiness index, pooled sample, moving window of children's age



Note: Sample of fathers (Panel A) and mothers (Panel B) with at least two children; The line connects point estimates of the marginal utility from an additional child estimated on the sample of parents whose all dependent children are within the specific age bracket. The grey area represents the 95% confidence interval.

fathers' life satisfaction is smoothly increasing with children's age, the effect on fathers' happiness index increases sharply from the lowest age bracket (0-5 years) till children approximately reach the school age (age bracket 4-9) and then levels out at positive, though not statistically different from zero values. For mothers, the effect of an additional child on the happiness index is estimated with higher precision than the effect on life satisfaction. It is oscillating around -0.7 from the lowest age bracket (0-5 years) till children's early teen years (age bracket 7-12) and increases sharply afterwards to reach positive values for the oldest analyzed age group.

#### *4.2. Discussion of the baseline results*

There are several interesting patterns in the results presented above. First, we observe that the effect of an additional child on parental well-being changes with children's age. While all the effects estimated on the sample of parents whose children fall into the 0-5 age category are negative, for the sample of parents whose children fall into the 10-15 age category we obtain mostly positive estimates. According to the adaptation hypothesis the well-being impact of entering a particular state is attenuated over time. Among others, Myrskala and Magnolis (2014) show that parents in Britain and Germany adapt to birth of a child after a few years and their well-being returns to the before childbirth levels. Our results indicate that the initially negative effect of an additional child turns into a positive affect several years after childbirth, what cannot be explained by pure adaptation. The positive estimates of having an additional child on parental well-being when children are in their teens suggest that parents actually benefit from having a larger than planned family.

Second, there are some differences between mothers and fathers. The relationship between the number of children and parental life satisfaction appears to be highly heterogeneous for mothers, although it is quite precisely estimated for fathers. Moreover, the relationship between the number of children and parental happiness index turns positive at older child ages for mothers than for fathers suggesting that for mothers it takes longer to adapt to the new, unplanned situation. In further sections, we dig into cross-country heterogeneity of the relationship between the number of children and subjective well-being to uncover potential sources of heterogeneity. We also zoom on specific aspects of subjective well-being, such as satisfaction with financial situation or satisfaction with time allocation, to better understand what is driving the observed patterns.

Third, there are differences between the two measures of subjective well-being used in our analysis. The effect of an additional child on mother's life satisfaction is estimated very imprecisely, what is most probably driven by high heterogeneity among mothers in how their life satisfaction responds to changes in family size. However, for the happiness index this effect is estimated with higher precision and estimates performed on samples of mothers whose children fall into different age categories form a regular pattern. This is most probably driven by the differences between the two well-being measures which are discussed in more detail in Spolcova and Pertold-Gebicka (2020). As suggested by Diener (1984) life satisfaction captures not only pure well-being but also to some extent comparison with others and with own expectations. Its level might be influenced by social norms and thus we might observe high heterogeneity between countries in how parents, especially mothers, respond to changes in family sizes. The happiness index, on the other hand, corresponds to the frequency of feelings and as such is less affected by expectations and comparison to others. Our results suggest that having a large family affects life satisfaction of both parents and emotional well-being of mothers. More specifically, we show that fathers report higher satisfaction levels when having three rather than two teenage children, while mothers report higher frequency of experiencing non-negative feelings when having three rather than two teenage children.

#### *4.3. Family size and different aspects of subjective well-being*

In this section we dig deeper into the relationship between the number of own children and parental subjective well-being by analyzing specific components of the subjective well-being to identify potential pathways through which children might affect their parents' well-being. Inspired by the recent literature (Aassave et al. 2012, Stanca 2012, Clark and Georgelis 2013, Buddlemeyer et al. 2017) we consider three aspects of life satisfaction: satisfaction with financial situation, satisfaction with time allocation and satisfaction with accommodation, and two components of the happiness index: the frequency of feeling nervous, and the frequency of feeling happy. The analysis is limited to the marginal effect of the third child on parental well-being.<sup>17</sup>

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<sup>17</sup> As argued earlier, relying on twin births in the second or third parity as instrumental variables for the number of children minimize the threat of instrument endogeneity and assure instrument relevance. At the same time, the sample of parents with three or more births is small.



Table 5 reports the IV estimates of the relationship between the number of children and satisfaction with financial situation, satisfaction with time allocation, satisfaction with accommodation, as well as the frequency of feeling nervous and the frequency of feeling happy. Estimates for the remaining three components of the happiness index are reported in the Appendix Table A10. The effect of an increase in family size on satisfaction with financial situation is among the weakest. We observe that for both mothers and fathers an unexpected third child causes a huge drop in satisfaction with time allocation and a significant increase in the frequency of feeling nervous when children are young. As children become older, these effects turn positive, although in some cases statistically insignificant. For mothers we also estimate a negative effect of an unexpected third child on satisfaction with accommodation and on the frequency of feeling happy when children are young. Nevertheless, also these effects disappear or turn positive as children become older.

The above results suggest that having three rather than two young children strongly increases time pressure and nervousness of parents. These estimates might be to a large extent driven by the “shock effect” – difficulty to deal with two babies/toddlers at the same time. They might capture the effect of an *arrival* of twins rather than the effect of *having* three as compared to two children. Note that our estimates here are qualitatively similar to Buddelmeyer et al. (2017) estimates of the effect of *arrival* of a child on parental time stress and satisfaction with financial situation. On the other hand, we observe that fathers of three teenage kids are better satisfied with their financial situation, better satisfied with time allocation (marginally insignificant estimate), and better satisfied with accommodation than fathers of two teenagers. This is consistent with the results for the overall well-being presented earlier and is a strong indicator that fathers of larger families are more satisfied with their lives than fathers of smaller families.

Zooming at the estimates reported in the last six columns of Table 5 we note that the frequency of feeling nervous is much more affected by family size than the frequency of feeling happy. This is consistent with other studies analyzing positive and negative affect which show that the frequency of experiencing negative rather than positive feelings is mostly affected by life events and circumstances (e.g. Kahneman & Deaton 2010, Jebb et al. 2018). Note that the pattern estimated for the frequency of feeling nervous closely follows the pattern estimated for the overall happiness index. Mothers of larger families experience higher frequency of feeling nervous than mothers of smaller families roughly for the first ten years after the arrival of the third child and only when

**Table 5.** The estimated relationship between the number of children and different aspects of subjective well-being, cross-country sample, by children age

	Satisfaction with financial situation			Satisfaction with time allocation			Satisfaction with accommodation			Frequency of feeling nervous			Frequency of feeling happy		
	(1) IV 0-5	(2) IV 5-10	(3) IV 10-15	(4) IV 0-5	(5) IV 5-10	(6) IV 10-15	(7) IV 0-5	(8) IV 5-10	(9) IV 10-15	(10) IV 0-5	(11) IV 5-10	(12) IV 10-15	(13) IV 0-5	(14) IV 5-10	(15) IV 10-15
All parents	-0.257 (0.343)	-0.109 (0.382)	0.116 (0.280)	<b>-1.514***</b> ( <b>0.383</b> )	-0.547 (0.360)	0.448 (0.284)	<b>-0.615**</b> ( <b>0.259</b> )	0.462 (0.452)	0.248 (0.355)	<b>0.454***</b> ( <b>0.152</b> )	<b>0.250**</b> ( <b>0.100</b> )	<b>-0.318*</b> ( <b>0.184</b> )	<b>-0.223**</b> ( <b>0.097</b> )	-0.026 (0.116)	0.023 (0.191)
Fathers	-0.373 (0.315)	0.058 (0.405)	<b>0.358*</b> ( <b>0.199</b> )	<b>-1.933***</b> ( <b>0.504</b> )	-0.355 (0.383)	0.229 (0.186)	<b>-0.893***</b> ( <b>0.265</b> )	0.574 (0.633)	0.317 (0.230)	<b>0.577***</b> ( <b>0.192</b> )	-0.032 (0.225)	<b>-0.207**</b> ( <b>0.098</b> )	-0.174 (0.123)	0.125 (0.113)	0.025 (0.172)
Mothers	-0.154 (0.483)	-0.277 (0.407)	-0.093 (0.448)	<b>-1.143**</b> ( <b>0.495</b> )	-0.752 (0.461)	0.622 (0.519)	-0.323 (0.361)	0.343 (0.409)	0.179 (0.532)	<b>0.341**</b> ( <b>0.169</b> )	<b>0.544**</b> ( <b>0.231</b> )	-0.414 (0.336)	<b>-0.271**</b> ( <b>0.107</b> )	-0.179 (0.223)	0.009 (0.238)

Note: Sample of parents with at least two children; Dependent variables: Satisfaction with financial situation (columns (1)-(3)), Satisfaction with time allocation (columns (4)-(6)), Satisfaction with accommodation (columns (7)-(9)), Frequency of feeling nervous (columns(10)-(12)), Frequency of feeling happy (columns(13)-(15)); Instrumented variable: number of children; Instrument: indicator of twin birth at second parity; Other control variables: household income, employment dummy. Each cell reports estimate of the coefficient corresponding to the marginal effect of additional child from a separate regression. Standard errors clustered by country in parentheses, \* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01

children are in their teen years we observe lower frequency of feeling nervous among mothers of three (marginally insignificant estimate). For fathers we observe a quicker recovery. Results for the remaining three happiness index components reported in Table A10 in the Appendix show similar patterns.

#### *4.4. Cross-country comparison*

Different social norms as well as family and work-related policies across countries may lead to diversity in the well-being derived from children. We investigate this cross-country heterogeneity by dividing the sample into several European regions according to the geographical position, welfare settings and political history. In a similar spirit as Aassave et al. (2012) and Cukrowska-Torzewska and Lovasz (2020) we divide Europe into five regions: Northern Europe, Central Europe, Southern Europe, post-communist European countries, and Anglo-Saxon countries (see the Appendix for detailed description). Unfortunately, limited sample sizes make the regional analysis stretched out in some cases (see Table A3 in the Appendix for first-stage regressions) and force us to completely eliminate the Anglo-saxon countries from the regional analysis.

Table 6a (6b) summarizes the estimated relationship between family size and parental life satisfaction (happiness index) at different child ages for parents living in the specified regions of Europe. These results point to significant cross-country heterogeneity in the development of the relationship between family size and parental subjective well-being along children's age. This heterogeneity is the most visible for the group of parents with the youngest children, which is the most sensitive to family and work-related policies. Nevertheless, with the exception of post-communist countries for which the twin birth instrument seems to be particularly weak among mothers, we observe that both mothers and fathers respond positively or neutrally to having a larger than planned family when children are in their teens.

The pattern estimated for fathers in Northern, Central, and Southern Europe is consistent with the overall pattern reported in the top row of Table 6. Fathers experience negative marginal well-being of additional unexpected child when their children are young, but the estimated marginal well-being derived from children grows to positive and significant values as children get older. This pattern is not shared by post-communist countries, where fathers' subjective well-being is negatively related to family size at all child ages.

**Table 6a.** The estimated relationship between the number of children and subjective well-being, by region and children age, Life satisfaction

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS 0-5	IV 0-5	OLS 5-10	IV 5-10	OLS 10-15	IV 10-15
<i>Panel A: Fathers</i>						
Overall	-0.159 (0.262)	<b>-0.917**</b> <b>(0.455)</b>	0.153 (0.137)	0.219 (0.295)	-0.016 (0.126)	<b>0.429**</b> <b>(0.197)</b>
N	2157	2157	2220	2220	1939	1939
North Europe	0.097 (0.441)	<b>-1.011**</b> <b>(0.406)</b>	0.129 (0.223)	-0.286 (0.516)	<b>0.546***</b> <b>(0.205)</b>	<b>0.860***</b> <b>(0.324)</b>
N	272	272	304	304	235	235
Central Europe	-0.084 (0.404)	-1.305 (0.957)	<b>0.353*</b> <b>(0.190)</b>	<b>0.586*</b> <b>(0.354)</b>	-0.142 (0.192)	<b>0.724**</b> <b>(0.297)</b>
N	573	573	605	605	548	548
South Europe	<b>-1.119*</b> <b>(0.595)</b>	-1.189 (0.766)	0.434 (0.326)	0.457 (0.632)	0.122 (0.371)	0.181 (0.412)
N	621	621	640	640	538	538
Post-Communist	0.290 (0.383)	-1.463 (1.141)	-0.285 (0.320)	-0.208 (0.685)	-0.425 (0.346)	<b>-1.235***</b> <b>(0.479)</b>
N	395	395	394	394	309	309
<i>Panel B: Mothers</i>						
Overall	0.230 (0.179)	-0.343 (0.438)	0.005 (0.124)	-0.167 (0.261)	-0.031 (0.113)	-0.171 (0.500)
N	2555	2555	2480	2480	2224	2224
North Europe	0.164 (0.335)	<b>-0.921***</b> <b>(0.289)</b>	0.120 (0.294)	-0.620 (0.757)	0.304 (0.329)	0.387 (0.392)
N	308	308	267	267	222	222
Central Europe	0.525* (0.278)	0.738 (0.699)	-0.279 (0.368)	0.113 (0.193)	0.210 (0.136)	<b>0.509*</b> <b>(0.339)</b>
N	609	609	613	613	567	567
South Europe	-0.290 (0.298)	-0.851 (0.805)	-0.087 (0.245)	-0.123 (0.474)	-0.297 (0.257)	0.026 (0.650)
N	709	709	708	708	647	647
Post-Communist	0.019 (0.249)	-0.451 (0.485)	0.559 (0.354)	0.054 (0.399)	0.377 (0.380)	-0.388 (0.533)
N	526	526	540	540	421	421

Note: Sample of parents with at least two children; Dependent variable: Life satisfaction; Instrumented variable: number of children; Instrument: indicator of twin birth at second parity (MB2); Other control variables: household income, employment dummy, age, marital status, health limitation dummy, education. North Europe includes: Denmark, Finland, Norway, Sweden, and Iceland. Central Europe includes: Austria, Belgium, Switzerland, Germany, France, Luxembourg, and Netherlands. South Europe includes: Cyprus, Greece, Spain, Italy, Malta, and Portugal. Post-Communist countries are: Czech Republic, Estonia, Hungary, Lithuania, Latvia, Poland, Slovenia, and Slovak Republic. Each cell reports estimate of the coefficient corresponding to the marginal effect of additional child from a separate regression.

Standard errors clustered by country in parentheses, \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table 6b.** The estimated relationship between the number of children and subjective well-being, by region and children age, Happiness index

	(1) OLS 0-5	(2) IV 0-5	(3) OLS 5-10	(4) IV 5-10	(5) OLS 10-15	(6) IV 10-15
<i>Panel A: Fathers</i>						
Overall	-0.115 (0.243)	<b>-0.812**</b> <b>(0.345)</b>	0.026 (0.166)	0.377 (0.347)	-0.029 (0.099)	0.212 (0.172)
N	2131	2131	2172	2172	1888	1888
North Europe	-0.663 (0.492)	<b>-0.933***</b> <b>(0.277)</b>	0.415 (0.310)	0.092 (0.747)	<b>0.477**</b> <b>(0.191)</b>	<b>0.554**</b> <b>(0.221)</b>
N	272	272	303	303	234	234
Central Europe	-0.152 (0.365)	-0.908 (0.716)	<b>0.421**</b> <b>(0.198)</b>	<b>0.874***</b> <b>(0.335)</b>	0.003 (0.156)	0.141 (0.347)
N	571	571	598	598	543	543
South Europe	-0.596 (0.784)	<b>-1.023**</b> <b>(0.490)</b>	0.080 (0.484)	0.506 (0.636)	0.130 (0.303)	0.539 (0.832)
N	611	611	626	626	522	522
Post-Communist	0.370 (0.455)	-0.023 (0.535)	<b>-0.878*</b> <b>(0.520)</b>	0.434 (0.857)	0.069 (0.329)	0.400 (0.589)
N	386	386	374	374	292	292
<i>Panel B: Mothers</i>						
Overall	0.186 (0.165)	<b>-0.590**</b> <b>(0.297)</b>	<b>-0.306*</b> <b>(0.177)</b>	-0.788 (0.522)	0.006 (0.198)	<b>0.828*</b> <b>(0.498)</b>
N	2522	2522	2443	2443	2176	2176
North Europe	-0.054 (0.221)	-0.525 (0.333)	-0.163 (0.238)	-1.967 (1.357)	-0.203 (0.475)	0.237 (0.442)
N	308	308	266	266	219	219
Central Europe	0.547 (0.336)	<b>0.919**</b> <b>(0.378)</b>	-0.135 (0.203)	0.648 (0.549)	-0.039 (0.544)	1.023 (0.642)
N	608	608	608	608	563	563
South Europe	-0.042 (0.457)	-1.245* (0.660)	-0.700** (0.328)	-1.851*** (0.304)	0.080 (0.388)	1.814** (0.728)
N	698	698	696	696	638	638
Post-Communist	-0.215 (0.435)	-0.120 (0.219)	0.173 (0.373)	<b>0.423*</b> <b>(0.226)</b>	0.390 (0.244)	0.677 (0.456)
N	512	512	524	524	401	401

Note: Sample of parents with at least two children; Dependent variable: Happiness index; Instrumented variable: number of children; Instrument: indicator of twin birth at second parity (MB2); Other control variables: household income, employment dummy, age, marital status, health limitation dummy, education. North Europe includes: Denmark, Finland, Norway, Sweden, and Iceland. Central Europe includes: Austria, Belgium, Switzerland, Germany, France, Luxembourg, and Netherlands. South Europe includes: Cyprus, Greece, Spain, Italy, Malta, and Portugal. Post-Communist countries are: Czech Republic, Estonia, Hungary, Lithuania, Latvia, Poland, Slovenia, and Slovak Republic. Each cell reports estimate of the coefficient corresponding to the marginal effect of additional child from a separate regression.

Standard errors clustered by country in parentheses, \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

The results for mothers partially explain insignificant estimates on the pooled sample. In line with previous findings (Aassave et al. 2012) there seems to be strong heterogeneity across Europe in the relationship between family size and mothers' subjective well-being, even at the lowest child ages. This heterogeneity might be caused by differences in family policies and cultural norms concerning childbearing (Harknett et al. 2014). However, limited sample sizes do not allow us to dig deeper into cross-country differences.

## 5. Conclusion

In this paper we investigate whether parents can reach higher levels of subjective well-being when having a larger than planned family. While there is a sizeable literature analyzing the relationship between childbirth and individual subjective well-being, little is known about the relationship between the number of children and parental well-being. Since the decision concerning the number of children is equally important as the decision whether or not to become a parent in determining the current fertility levels in Europe, understanding how family size corresponds to the well-being of parents is crucial from the public policy perspective.

We show that parents of larger families experience the same or higher levels of well-being than parents of smaller families. The positive effect is mainly driven by parents of teenage children, while among parents of pre-school children we mainly estimate a negative effect of an additional child. These estimates are causal and can be interpreted as the effect of an additional *unplanned* child on parental well-being, because we rely on twin births as an instrument for the number of children. Our cross-country analysis in line with Harknett et al. (2014) and Aassave (2012) suggests a positive link between generous family policies (including mothers' fast return to work and involvement of fathers in childbearing) and the strength of the positive child's effect for mothers.

Inspecting different aspects of subjective well-being we find that financial situation is not the main driver of the observed effect of children. The negative relationship between the number of children and parental well-being at young child ages is mainly driven by dissatisfaction with accommodation and by increased frequency of feeling nervous. The positive effect of the number of children on parental well-being when children are in their teens is driven by satisfaction with financial situation only for fathers, while for mothers it is mainly driven by lower frequency of experiencing negative feelings such as nervousity, being down in the dumps or feeling depressed.

The result for fathers is consistent with earlier findings by Lundberg and Rose (2002) analyzing father's wage response to each additional child.

We conclude that parents derive different levels of well-being from having a large family at different stages of their children's lives. While it is emotionally and materially hard for them to handle a higher number of small children, having many offsprings pays off once they grow older. This latter finding is in line with Oliveira (2016) who shows that Chinese parents are better-off at old age when they gave birth to twins. On the other hand, Kruk and Reinhold (2014) show that higher number of children is linked to increased occurrence of depression at old age among mothers. To build a full picture of the effect of children on parental well-being one should follow the subjective well-being of parents over the whole lifecourse. Unfortunately, we are not aware of a dataset that would allow for such analysis.

Taken at face value, our results suggest that higher fertility levels might be reached if parents receive more help during the early years of their children<sup>18</sup> and if the positive (future) effects of having large families are publicized.

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<sup>18</sup> More help during the early years of (multiple) childbearing could also mitigate potential future negative effects of children that are caused by prolonged exposition to stress (Bucher-Koenen et al. 2019).

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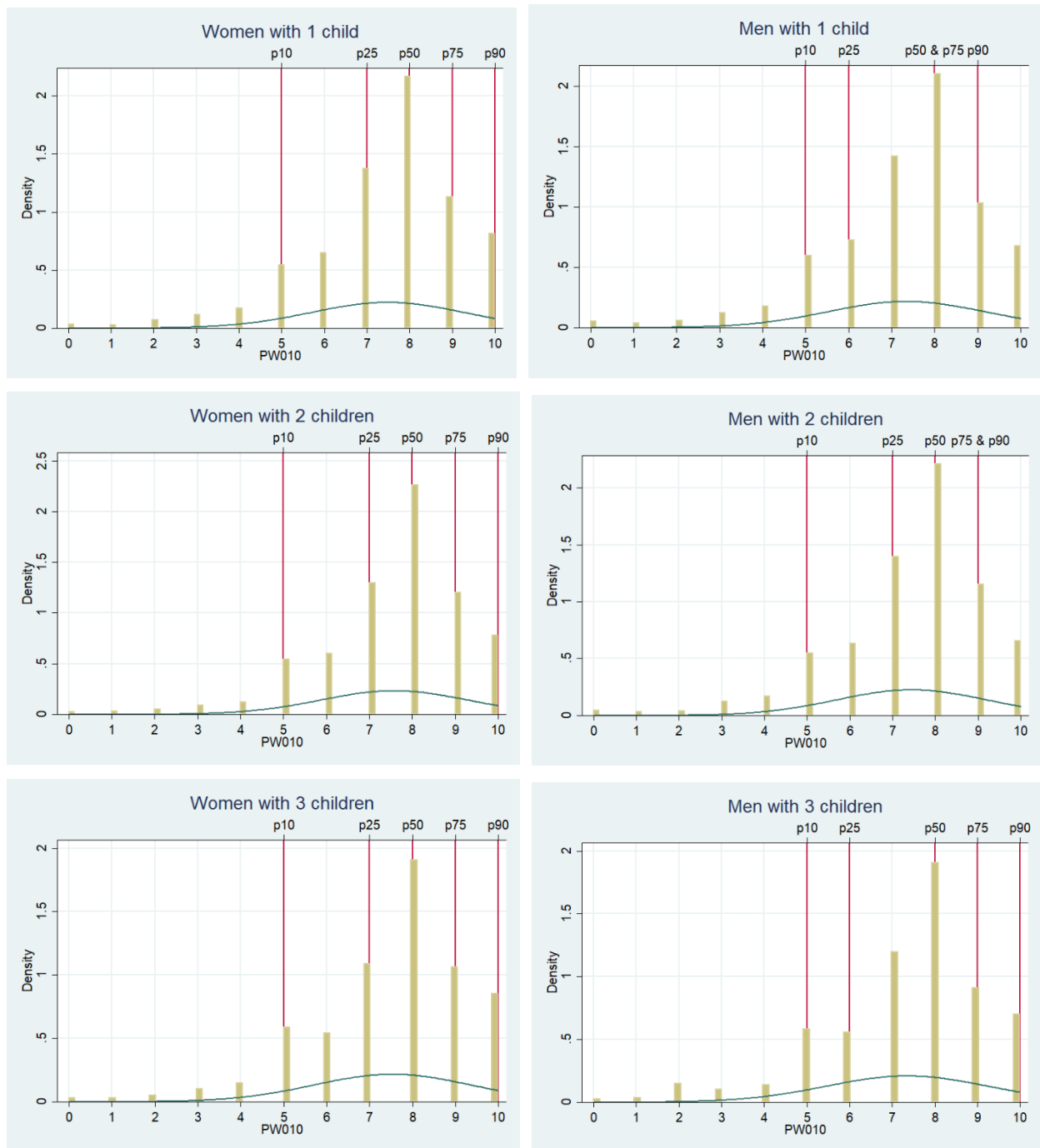
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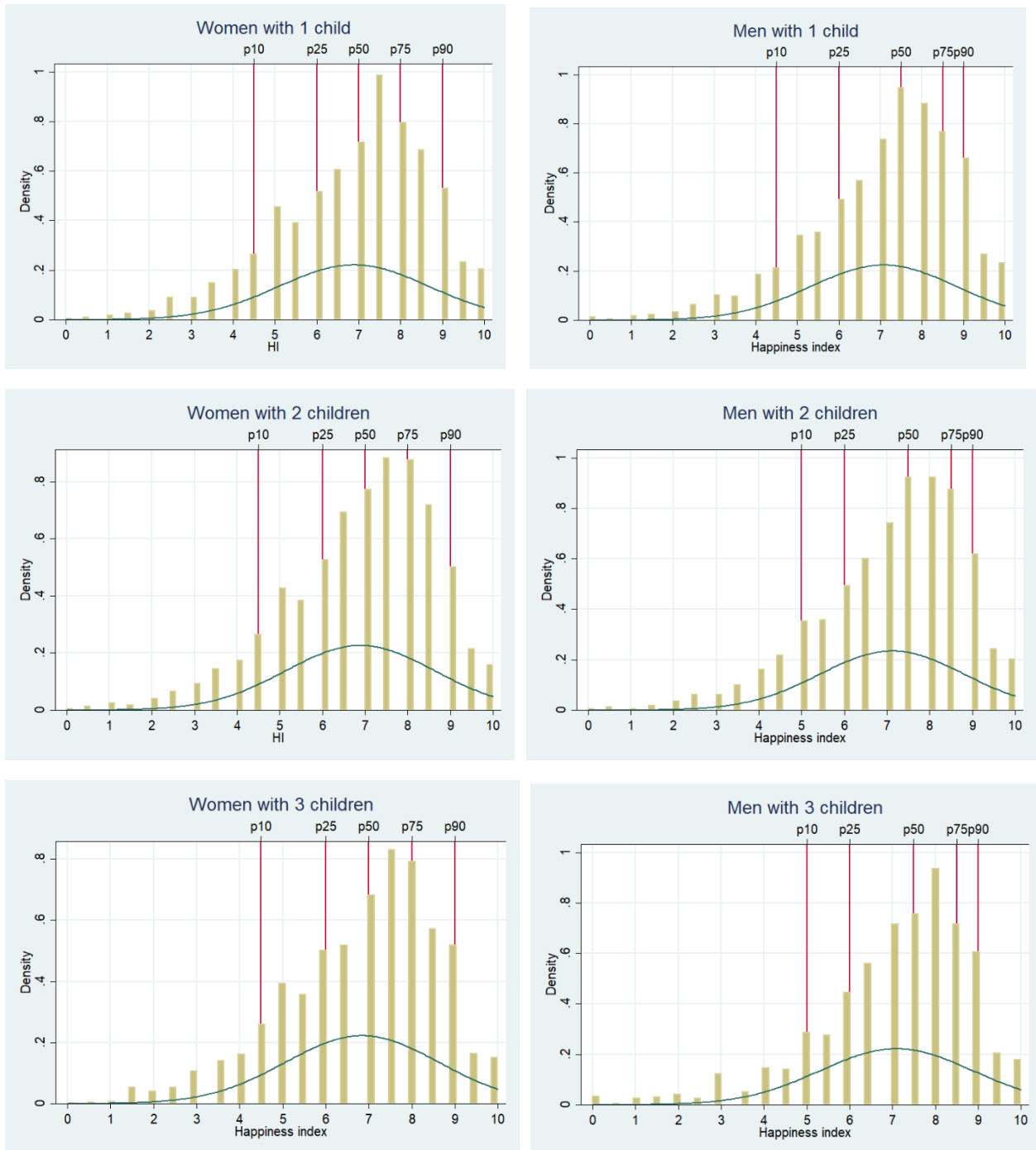
## Appendix

Figure A1: Histograms of life satisfaction for mothers and fathers by the number of own children



Note: Histograms present the distribution of self-reported life satisfaction for the sample of mothers (left column) and fathers (right column) living in a partnership and having the specified number of own children not older than 15 living in the same household.

Figure A2: Histograms of the happiness index for mothers and fathers by the number of own children



Note: Histograms present the distribution of the happiness index for the sample of mothers (left column) and fathers (right column) living in a partnership and having the specified number of own children not older than 15 living in the same household.

Table A1 – First stage regressions for Table 3

	(1) MB1	(2) MB2	(3) MB3	(4) SS
All parents	0.513*** (0.028)	0.898*** (0.023)	0.868*** (0.046)	0.029*** (0.007)
R <sup>2</sup>	0.069	0.062	0.067	0.030
F	330.358	547.350	84.105	71.971
Fathers	0.532*** (0.028)	0.899*** (0.031)	0.814*** (0.040)	0.026*** (0.007)
R <sup>2</sup>	0.071	0.057	0.055	0.025
F	200.837	199.078	130.185	47.646
Mothers	0.504*** (0.031)	0.892*** (0.027)	0.911*** (0.059)	0.031*** (0.009)
R <sup>2</sup>	0.079	0.074	0.087	0.043
F	218.893	341.731	237.008	92.562

Note: Table reports point estimates of the relationship between the instrument and the endogenous explanatory variable (number of children) coming from the first-stage regressions in 2SLS estimations presented in Table 3. The instruments are: a dummy equal to one if multiple birth occurred at first (column 1), second (column 2), or third parity (column 3), a dummy equal to one if the first two children are of the same gender (column 4).

Standard errors clustered by country in parentheses, \* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01

Table A2 – First stage regressions for Table 4

	(1) IV 0-15	(2) IV 0-5	(3) IV 5-10	(4) IV 10-15
All parents	<b>0.898***</b> (0.023)	<b>1.006***</b> (0.032)	<b>0.970***</b> (0.020)	<b>0.980***</b> (0.034)
R <sup>2</sup>	0.062	0.189	0.185	0.178
F	547.350	230.229	529.648	148.633
Fathers	<b>0.899***</b> (0.031)	<b>0.968***</b> (0.024)	<b>0.981***</b> (0.029)	<b>0.994***</b> (0.044)
R <sup>2</sup>	0.057	0.195	0.225	0.174
F	199.078	805.169	154.744	68.335
Mothers	<b>0.892***</b> (0.027)	<b>1.044***</b> (0.056)	<b>0.964***</b> (0.026)	<b>0.975***</b> (0.031)
R <sup>2</sup>	0.074	0.191	0.163	0.187
F	341.731	84.436	347.067	102.891

Note: Table reports point estimates of the relationship between the instrument and the endogenous explanatory variable (number of children) coming from the first-stage regressions in 2SLS estimations presented in Table 4. First column reports the full sample estimates and columns 2- 4 report estimates on subsamples according to children's age. The instrument is a dummy equal to one if multiple birth occurred at second parity.

Standard errors clustered by country in parentheses, \* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01

Table A3 – First stage regressions for Table 6

	(1) IV 0-15	(2) IV 0-5	(3) IV 5-10	(4) IV 10-15
<i>Panel A: Fathers</i>				
North Europe	<b>0.823<sup>***</sup></b> <b>(0.078)</b>	<b>0.955<sup>***</sup></b> <b>(0.020)</b>	<b>1.252<sup>***</sup></b> <b>(0.191)</b>	<b>1.169<sup>***</sup></b> <b>(0.196)</b>
N	1700	272	304	235
R2	0.058	0.269	0.422	0.419
F	17.224	.	.	7.738
Central Europe	<b>0.823<sup>***</sup></b> <b>(0.038)</b>	<b>0.946<sup>***</sup></b> <b>(0.025)</b>	<b>0.948<sup>***</sup></b> <b>(0.019)</b>	<b>1.012<sup>***</sup></b> <b>(0.075)</b>
N	3106	573	605	548
R2	0.057	0.277	0.184	0.223
F	59.047	446.535	1156.231	22.368
South Europe	<b>1.001<sup>***</sup></b> <b>(0.069)</b>	<b>1.021<sup>***</sup></b> <b>(0.079)</b>	<b>0.999<sup>***</sup></b> <b>(0.012)</b>	<b>0.917<sup>***</sup></b> <b>(0.019)</b>
N	3995	621	640	538
R2	0.069	0.301	0.388	0.142
F	30.476	32.060	1260.216	3932.186
Post-Communist Europe	<b>0.909<sup>***</sup></b> <b>(0.089)</b>	<b>0.926<sup>***</sup></b> <b>(0.046)</b>	<b>0.982<sup>***</sup></b> <b>(0.017)</b>	<b>0.993<sup>***</sup></b> <b>(0.066)</b>
N	2732	395	394	309
R2	0.057	0.069	0.249	0.251
F	16.506	1696.679	765.782	34.362
<i>Panel B: Mothers</i>				
North Europe	<b>0.738<sup>***</sup></b> <b>(0.054)</b>	<b>1.250<sup>***</sup></b> <b>(0.266)</b>	<b>0.820<sup>***</sup></b> <b>(0.049)</b>	<b>0.955<sup>***</sup></b> <b>(0.080)</b>
N	1651	308	267	222
R2	0.066	0.266	0.117	0.108
F	30.932	.	95.733	.
Central Europe	<b>0.818<sup>***</sup></b> <b>(0.034)</b>	<b>0.953<sup>***</sup></b> <b>(0.019)</b>	<b>0.934<sup>***</sup></b> <b>(0.033)</b>	<b>1.003<sup>***</sup></b> <b>(0.088)</b>
N	3301	609	613	567
R2	0.064	0.207	0.147	0.190
F	75.624	471.092	114.120	23.981
South Europe	<b>0.898<sup>***</sup></b> <b>(0.057)</b>	<b>1.049<sup>***</sup></b> <b>(0.058)</b>	<b>0.972<sup>***</sup></b> <b>(0.021)</b>	<b>0.949<sup>***</sup></b> <b>(0.021)</b>
N	4698	709	708	647
R2	0.075	0.272	0.222	0.172
F	41.224	40.441	334.114	447.463
Post-Communist Europe	<b>1.042<sup>***</sup></b> <b>(0.092)</b>	<b>1.510<sup>***</sup></b> <b>(0.318)</b>	<b>1.103<sup>***</sup></b> <b>(0.140)</b>	<b>0.984<sup>***</sup></b> <b>(0.075)</b>
N	3720	526	540	421
R2	0.089	0.230	0.313	0.213
F	24.475	3.667	8.644	28.851

Note: Table reports point estimates of the relationship between the instrument and the endogenous explanatory variable (number of children) coming from the first-stage regressions in 2SLS estimations presented in Table 6. First column reports the full sample estimates and columns 2- 4 report estimates on subsamples according to children's age. The instrument is a dummy equal to one if multiple birth occurred at second parity.

Standard errors clustered by country in parentheses, \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table A4: The estimated relationship between the number of children and subjective well-being, sample of parents with at least one child, by children age

	(1) OLS 0-5	(2) IV 0-5	(3) OLS 5-10	(4) IV 5-10	(5) OLS 10-15	(6) IV 10-15
<i>Panel A: Life satisfaction</i>						
All parents	<b>0.091**</b> ( <b>0.037</b> )	-0.073 (0.213)	0.065 (0.045)	0.166 (0.170)	<b>0.166***</b> ( <b>0.038</b> )	-0.072 (0.250)
N	16534	16534	11681	11681	10527	10527
Fathers	<b>0.095*</b> ( <b>0.054</b> )	0.015 (0.198)	<b>0.090*</b> ( <b>0.046</b> )	0.222 (0.235)	<b>0.142***</b> ( <b>0.041</b> )	0.312 (0.300)
N	7696	7696	5536	5536	4914	4914
Mothers	<b>0.091**</b> ( <b>0.043</b> )	-0.159 (0.243)	0.034 (0.055)	0.103 (0.327)	<b>0.199***</b> ( <b>0.058</b> )	<b>-0.482*</b> ( <b>0.252</b> )
N	8838	8838	6145	6145	5613	5613
<i>Panel B: Happiness index</i>						
All parents	-0.016 (0.040)	<b>-0.498***</b> ( <b>0.131</b> )	0.034 (0.052)	-0.008 (0.261)	0.080 (0.051)	<b>-0.455*</b> ( <b>0.268</b> )
N	16213	16213	11382	11382	10245	10245
Fathers	0.003 (0.041)	-0.159 (0.143)	0.061 (0.056)	-0.027 (0.205)	<b>0.102*</b> ( <b>0.054</b> )	-0.113 (0.290)
N	7545	7545	5379	5379	4770	4770
Mothers	-0.038 (0.055)	<b>-0.825***</b> ( <b>0.249</b> )	0.007 (0.058)	0.007 (0.420)	0.066 (0.082)	<b>-0.795**</b> ( <b>0.342</b> )
N	8668	8668	6003	6003	5475	5475

Note: Sample of parents with at least one child younger than 16 living in the same household; Dependent variable: Life satisfaction (Panel A) or Happiness index (Panel B); Instrumented variable: number of children; Instrument: indicator of twin birth at first parity; other control variables: household income, employment dummy, age, marital status, health limitation dummy, education. Each cell reports estimate of the coefficient corresponding to the marginal effect of additional child from a separate regression.

Standard errors clustered by country in parentheses, \* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01

**Table A5** Robustness check: The estimated relationship between the number of children and life satisfaction, subsamples defined by the age of the **youngest** child

	(1) OLS 0-5	(2) IV 0-5	(3) OLS 5-10	(4) IV 5-10	(5) OLS 10-15	(6) IV 10-15
<i>Panel A: Parents with at least one child, Instrument: MB1</i>						
All parents	-0.024 (0.022)	-0.046 (0.305)	-0.012 (0.044)	0.245 (0.225)	<b>0.166***</b> <b>(0.038)</b>	-0.072 (0.250)
N	28478	28478	19646	19646	10527	10527
Fathers	-0.021 (0.032)	0.081 (0.280)	-0.025 (0.043)	0.310 (0.285)	<b>0.142***</b> <b>(0.041)</b>	0.312 (0.300)
N	13109	13109	9197	9197	4914	4914
Mothers	-0.025 (0.025)	-0.179 (0.362)	-0.004 (0.048)	0.200 (0.380)	<b>0.199***</b> <b>(0.058)</b>	<b>-0.482*</b> <b>(0.252)</b>
N	15369	15369	10449	10449	5613	5613
<i>Panel B: Parents with at least two children, Instrument: MB2</i>						
All parents	<b>-0.068*</b> <b>(0.040)</b>	-0.082 (0.261)	-0.087 (0.058)	0.201 (0.204)	-0.028 (0.066)	0.136 (0.322)
N	16656	16656	12665	12665	4163	4163
Fathers	-0.079 (0.049)	-0.157 (0.333)	<b>-0.153*</b> <b>(0.076)</b>	0.399 (0.284)	-0.016 (0.126)	<b>0.429**</b> <b>(0.197)</b>
N	7570	7570	5881	5881	1939	1939
Mothers	-0.061 (0.041)	-0.050 (0.257)	-0.039 (0.068)	0.028 (0.185)	-0.031 (0.113)	-0.171 (0.500)
N	9086	9086	6784	6784	2224	2224

Note: Sample of parents living in a partnership with at least one child (Panel A), at least two children (Panel B) below 16 years living in the same household; Dependent variable: Life satisfaction; Instrumented variable: number of children; Instrument: indicator of twin birth at second parity; Other control variables: household income, employment dummy, age, marital status, health limitation dummy, education. Each cell reports estimate of the coefficient corresponding to the marginal effect of additional child from a separate regression. Standard errors clustered by country in parentheses, \* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01



**Table A6** Robustness check: The estimated relationship between the number of children and happiness index, subsamples defined by the age of the **youngest** child

	(1) OLS 0-5	(2) IV 0-5	(3) OLS 5-10	(4) IV 5-10	(5) OLS 10-15	(6) IV 10-15
<i>Panel A: Parents with at least one child, Instrument: MB1</i>						
All parents	-0.083*** (0.025)	-0.717*** (0.210)	-0.041 (0.029)	-0.091 (0.376)	0.080 (0.051)	-0.455* (0.268)
N	27917	27917	19182	19182	10245	10245
Fathers	-0.055* (0.032)	-0.139 (0.224)	-0.063 (0.049)	-0.212 (0.354)	0.102* (0.054)	-0.113 (0.290)
N	12838	12838	8958	8958	4770	4770
Mothers	-0.108*** (0.029)	-1.307*** (0.429)	-0.022 (0.024)	0.003 (0.506)	0.066 (0.082)	-0.795** (0.342)
N	15079	15079	10224	10224	5475	5475
<i>Panel B: Parents with at least two children, Instrument: MB2</i>						
All parents	<b>-0.076**</b> <b>(0.033)</b>	-0.199 (0.210)	<b>-0.147**</b> <b>(0.068)</b>	0.020 (0.211)	-0.014 (0.123)	<b>0.551**</b> <b>(0.259)</b>
N	16357	16357	12415	12415	4064	4064
Fathers	-0.046 (0.048)	-0.139 (0.155)	<b>-0.232**</b> <b>(0.094)</b>	<b>0.382*</b> <b>(0.209)</b>	-0.029 (0.099)	0.212 (0.172)
N	7424	7424	5751	5751	1888	1888
Mothers	-0.102 (0.061)	-0.288 (0.357)	-0.080 (0.078)	-0.308 (0.409)	0.006 (0.198)	<b>0.828*</b> <b>(0.498)</b>
N	8933	8933	6664	6664	2176	2176

Note: Sample of parents living in a partnership with at least one child (Panel A), at least two children (Panel B) below 16 years living in the same household; Dependent variable: Happiness index; Instrumented variable: number of children; Instrument: indicator of twin birth at second parity; Other control variables: household income, employment dummy, age, marital status, health limitation dummy, education. Each cell reports estimate of the coefficient corresponding to the marginal effect of additional child from a separate regression. Standard errors clustered by country in parentheses, \* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01

**Table A7** – First stage regressions for Tables A5 and A6

	(1)	(2)	(3)	(4)
	IV 0-15	IV 0-5	IV 5-10	IV 10-15
<i>Panel A: Parents with at least one child, Instrument: MBI</i>				
All parents	0.495*** (0.033)	0.442*** (0.049)	0.668*** (0.033)	0.495*** (0.033)
R2	0.103	0.085	0.102	0.103
F	266.789	212.850	297.845	266.789
Fathers	0.534*** (0.033)	0.440*** (0.046)	0.705*** (0.028)	0.534*** (0.033)
R2	0.098	0.091	0.111	0.098
F	595.991	142.682	264.712	595.991
Mothers	0.463*** (0.033)	0.436*** (0.070)	0.644*** (0.046)	0.463*** (0.033)
R2	0.114	0.090	0.105	0.114
F	194.261	336.712	238.870	194.261
<i>Panel B: Parents with at least two children, Instrument: MB2</i>				
All parents	0.844*** (0.037)	0.900*** (0.029)	0.980*** (0.034)	0.844*** (0.037)
R2	0.072	0.080	0.178	0.072
F	168.163	300.060	148.633	168.163
Fathers	0.854*** (0.053)	0.911*** (0.040)	0.994*** (0.044)	0.854*** (0.053)
R2	0.070	0.088	0.174	0.070
F	193.387	90.815	68.335	193.387
Mothers	0.824*** (0.046)	0.890*** (0.026)	0.975*** (0.031)	0.824*** (0.046)
R2	0.084	0.079	0.187	0.084
F	92.948	924.774	102.891	92.948

Note: Table reports point estimates of the relationship between the instrument and the endogenous explanatory variable (number of children) coming from the first-stage regressions in 2SLS estimations presented in Tables A5 and A6. First column reports the full sample estimates and columns 2- 4 report estimates on subsamples according to children's age. The instrument is a dummy equal to one if multiple birth occurred at first (Panel A), or second (Panel B) parity. Standard errors clustered by country in parentheses, \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table A8.** The estimated relationship between the number of children and subjective well-being, pooled sample, family size instrumented by same sex multiple births

	(1) OLS MB1S	(2) IV MB1S	(3) OLS MB2S	(4) IV MB2S	(5) OLS MB3S	(6) IV MB3S
<i>Panel A: Life satisfaction</i>						
All parents	0.011 (0.022)	0.088 (0.209)	-0.053 (0.034)	0.048 (0.224)	-0.029 (0.098)	0.261 (0.392)
N	51902	51902	29305	29305	6139	6139
Fathers	-0.000 (0.024)	0.299 (0.274)	<b>-0.082**</b> <b>(0.034)</b>	0.154 (0.248)	0.011 (0.108)	0.078 (0.713)
N	24065	24065	13458	13458	2767	2767
Mothers	0.021 (0.025)	-0.113 (0.181)	-0.037 (0.038)	-0.051 (0.268)	-0.072 (0.131)	0.353 (0.357)
N	27837	27837	15847	15847	3372	3372
<i>Panel B: Happiness index</i>						
All parents	<b>-0.046**</b> <b>(0.017)</b>	<b>-0.480**</b> <b>(0.229)</b>	<b>-0.077**</b> <b>(0.033)</b>	-0.021 (0.206)	-0.069 (0.082)	0.031 (0.538)
N	50747	50747	28743	28743	6032	6032
Fathers	<b>-0.043*</b> <b>(0.025)</b>	-0.183 (0.253)	<b>-0.098*</b> <b>(0.051)</b>	0.153 (0.184)	-0.092 (0.063)	0.033 (0.925)
N	23484	23484	13175	13175	2716	2716
Mothers	<b>-0.053**</b> <b>(0.022)</b>	<b>-0.745***</b> <b>(0.239)</b>	-0.066 (0.050)	-0.185 (0.368)	-0.047 (0.138)	0.010 (0.423)
N	27263	27263	15568	15568	3316	3316

Note: Sample of parents with at least one child (MB1S), at least two children (MB2S), at least three children (MB3S) younger than 16; Dependent variable: Life satisfaction (Panel A) or Happiness index (Panel B); Other control variables: household income, employment dummy, age, marital status, health limitation dummy, education, region fixed effects; In columns (2), (4), and (6) the number of children is instrumented by a dummy equal to one if same sex multiple births occurred at first, second, or third parity, respectively. Each cell reports an estimate of the coefficient corresponding to the marginal effect of an additional child from a separate regression.

Standard errors clustered by country in parentheses, \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table A9** – First stage regressions for Table A8

	(1) OLS MB1S	(2) IV MB2S	(3) OLS MB3S
All parents	0.523*** (0.037)	0.882*** (0.031)	0.893*** (0.054)
R2	0.065	0.050	0.051
F	314.541	143.936	138.127
Fathers	0.542*** (0.037)	0.892*** (0.035)	0.801*** (0.036)
R2	0.067	0.045	0.038
F	136.894	107.819	115.132
Mothers	0.508*** (0.035)	0.867*** (0.038)	0.962*** (0.062)
R2	0.076	0.062	0.072
F	230.378	281.832	180.937

Note: Table reports point estimates of the relationship between the instrument and the endogenous explanatory variable (number of children) coming from the first-stage regressions in 2SLS estimations presented in Table A8. The instruments are: a dummy equal to one if multiple birth of the same gender children occurred at first (column 1), second (column 2), or third parity (column 3).

Standard errors clustered by country in parentheses, \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table A10.** The estimated relationship between the number of children and the frequency of experiencing specific feelings

	Frequency of feeling down in the dumps			Frequency of feeling calm and peaceful			Frequency of feeling depressed		
	(1) IV 0-5	(2) IV 5-10	(3) IV 10-15	(4) IV 0-5	(5) IV 5-10	(6) IV 10-15	(7) IV 0-5	(8) IV 5-10	(9) IV 10-15
All parents	0.287 (0.179)	0.002 (0.130)	<b>-0.248***</b> <b>(0.072)</b>	<b>-0.268**</b> <b>(0.137)</b>	-0.031 (0.109)	0.239 (0.170)	0.153 (0.165)	0.092 (0.189)	0.287 (0.179)
Fathers	0.372 (0.257)	<b>-0.344*</b> <b>(0.200)</b>	0.034 (0.095)	-0.240 (0.217)	0.135 (0.162)	0.114 (0.120)	0.234 (0.162)	-0.131 (0.151)	-0.130 (0.120)
Mothers	0.200 (0.180)	0.346 (0.307)	<b>-0.487***</b> <b>(0.100)</b>	<b>-0.303**</b> <b>(0.135)</b>	<b>-0.200*</b> <b>(0.111)</b>	0.350 (0.284)	0.066 (0.221)	0.317 (0.297)	<b>-0.384**</b> <b>(0.175)</b>

Note: Sample of parents with at least two children; Dependent variables: Frequency of feeling down in the dumps (columns (1)-(3)), Frequency of feeling calm (columns (4)-(6)), Frequency of feeling depressed (columns (7)-(9)); These variables are measured on a 1 – 5 scale with 0 meaning ‘none of the time’ and 5 ‘all of the time’; Instrumented variable: number of children; Instrument: indicator of twin birth at second parity; Other control variables: household income, employment dummy. Each cell reports estimate of the coefficient corresponding to the marginal effect of additional child from a separate regression.

Standard errors clustered by country in parentheses, \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table A11.** Summary of the subjective well-being aspects

	Satisfaction with financial situation		Satisfaction with time allocation		Satisfaction with accommodation	
	men	women	men	women	men	women
All adults	6.083 (2.418)	5.975 (2.463)	6.762 (2.333)	6.696 (2.381)	7.463 (1.988)	7.501 (2.061)
Adults in partnership	6.222 (2.334)	6.233 (2.372)	6.662 (2.354)	6.573 (2.371)	7.600 (1.914)	7.623 (1.975)
Of them parents	5.913 (2.345)	5.964 (2.373)	6.206 (2.343)	6.172 (2.379)	7.407 (1.962)	7.447 (2.020)
Parents of one child	5.948 (2.314)	5.962 (2.360)	6.376 (2.328)	6.345 (2.356)	7.432 (1.945)	7.468 (1.993)
Parents of two children	5.963 (2.324)	6.039 (2.344)	6.104 (2.325)	6.085 (2.365)	7.432 (1.927)	7.505 (1.979)
Parents of three children	5.747 (2.447)	5.837 (2.422)	5.890 (2.406)	5.897 (2.449)	7.318 (2.023)	7.291 (2.115)
Parents of four children	5.255 (2.677)	5.488 (2.694)	6.026 (2.319)	5.757 (2.419)	7.045 (2.352)	6.952 (2.394)

Note: Table displays the mean value and standard deviation (in parentheses) for each of the three selected subjective well-being aspects for the baseline sample consisting of all adult individuals included in the well-being module (first line) and subsamples of these individuals who live in a partnership (second line) and have the specified number of dependent children younger than 15 and no older child sharing the household.

**Table A12.** Summary of the frequency of feelings

	Feel happy		Feel nervous		Feel down		Feel calm		Feel depressed	
	men	women	men	women	men	women	men	women	men	women
All adults	2.318 (1.039)	2.508 (1.060)	3.585 (0.918)	3.516 (0.929)	1.868 (0.989)	2.041 (1.044)	3.573 (0.948)	3.413 (0.969)	1.979 (0.977)	2.183 (1.017)
Adults in partnership	3.649 (0.882)	3.617 (0.880)	2.329 (1.033)	2.507 (1.046)	1.837 (0.967)	1.977 (1.013)	3.569 (0.941)	3.417 (0.957)	1.934 (0.955)	2.107 (0.986)
Of them parents	3.609 (0.888)	3.608 (0.871)	2.408 (1.035)	2.528 (1.040)	1.880 (0.976)	1.975 (1.005)	3.503 (0.952)	3.382 (0.961)	1.956 (0.963)	2.093 (0.977)
Parents of one child	3.606 (0.897)	3.594 (0.882)	2.400 (1.024)	2.524 (1.037)	1.806 (0.941)	1.895 (0.971)	3.529 (0.950)	3.432 (0.958)	1.892 (0.938)	2.017 (0.940)
Parents of two children	3.624 (0.876)	3.630 (0.851)	2.415 (1.024)	2.524 (1.037)	1.784 (0.923)	1.845 (0.952)	3.530 (0.918)	3.374 (0.937)	1.860 (0.904)	1.979 (0.923)
Parents of three children	3.582 (0.884)	3.606 (0.876)	2.405 (1.017)	2.537 (1.045)	1.776 (0.970)	1.885 (0.994)	3.493 (0.956)	3.355 (0.948)	1.900 (0.954)	1.988 (0.960)
Parents of four children	3.551 (0.907)	3.573 (0.919)	2.425 (1.080)	2.597 (1.081)	1.931 (1.064)	1.974 (1.053)	3.408 (1.052)	3.408 (0.891)	2.085 (1.100)	2.152 (1.070)

Note: Table displays the mean value and standard deviation (in parentheses) of the variables reporting the frequency of feeling nervous, the frequency of feeling happy, the frequency of feeling down in the dumps, the frequency of feeling calm and peaceful, and the frequency of feeling depressed over the last four weeks for the baseline sample consisting of all adult individuals included in the well-being module (first line) and subsamples of these individuals who live in a partnership (second line) and have the specified number of dependent children younger than 15 and no older child sharing the household. The reported variables are measured on a 1 – 5 scale with 0 meaning ‘none of the time’ and 5 ‘all of the time’.

## Description of the regions of Europe

In a similar spirit as Aassave et al. (2012) and Cukrowska-Torzewska and Lovasz (2020) we divide Europe into five regions: Northern Europe, Central Europe, Southern Europe, post-communist European countries, and Anglo-Saxon countries. Unfortunately, limited sample sizes make the regional analysis stretched out in some cases and force us to eliminate Anglo-saxon countries from the regional analysis.

**Table A13.** Fertility and suicide rates in European regions

Year: 2012	Fertility rate	Life satisfaction	Happiness index
North Europe	1,84	8.03	7.77
South Europe	1,37	6.55	6.36
Central Europe	1,67	7.71	7.12
Post-Communist	1,38	6.74	6.80

Note: Average fertility rates (column 1), life satisfaction (column 2) and happiness index (column 3) of particular countries weighted by country population. North Europe includes: Denmark, Finland, Norway, Sweden, and Iceland. Central Europe includes: Austria, Belgium, Switzerland, Germany, France, Luxembourg, and Netherlands. South Europe includes: Cyprus, Greece, Spain, Italy, Malta, and Portugal. Post-Communist countries are: Czech Republic, Estonia, Hungary, Lithuania, Latvia, Poland, Slovenia, and Slovak Republic. Data from Eurostat public database.

Northern Europe includes Denmark, Finland, Norway, Sweden, and Iceland. These countries are known for generous family policies and high participation of women, also mothers of small children, in the labor market, and very egalitarian gender norms. Also involvement of fathers in childbearing is high in Northern Europe. In 2013 these countries reported the highest fertility rates across Europe as well as the highest life satisfaction and happiness index.

Central Europe includes Austria, Belgium, France, Germany, Luxembourg, Netherlands, and Switzerland. These countries, especially Austria and Germany, used to have quite traditional view on family and the primary role of mothers as child bearers and housekeepers. At the same time these countries report quite high female labor force participation with wide availability of part-time employment, and many of them have recently reformed family policies to promote higher involvement of fathers in childbearing and to help mothers return to work after childbirth.

Southern Europe includes Cyprus, Greece, Spain, Italy, Malta, and Portugal. These countries together with post-communist countries report the lowest fertility rates in Europe. Countries of Southern Europe report also the lowest female labor force participation and are known for

traditional views on the role of women in the society. Fathers in Southern Europe are rarely involved in childbearing and childcare coverage is low in these countries, what leaves the burden of childbearing on mothers.

In the group of post-communist countries, we include the Czech Republic, Estonia, Hungary, Lithuania, Latvia, Poland, Slovenia, and the Slovak Republic. This group of countries used to be in the Soviet block before 1989, went through transition in the 1990s and entered the European Union in 2004. These countries experienced a huge drop in fertility in transition and in 2013 together with Southern European countries reported the lowest fertility rates in Europe. Post-communist countries (till 2013 with exception of Poland) apply generous family policies, namely long parental leaves with job protection which are in great majority taken by mothers. On the other hand, post-communist countries stand out by low provision of childcare for children below 3 and very traditional view on gender norms.

For more detailed characteristics of these groups of countries see and Cukrowska-Torzewska and Lovasz (2020).



## Abstrakt

V této studii odhadujeme vztah mezi počtem dětí a pocitem štěstí rodičů. Pracujeme s daty Evropského setření domácností SILC z roku 2013 a jako zdroj exogenní variace v počtu dětí používáme přítomnost vícerčat v rodině. Hlavním přínosem naší studie je odhad vztahu mezi počtem dětí a pocitem štěstí pro rodiče dětí v různém věku. Ukazujeme, že rodiče z větších rodin pociťují podobnou nebo vyšší úroveň štěstí než rodiče z menších rodin. Pozitivní vztah mezi počtem dětí a pocitem štěstí je pozorován hlavně u rodičů, jejichž děti již jsou ve věku 10-15. U rodičů, jejichž děti ještě nedosáhly školního věku, odhadujeme negativní vztah mezi počtem dětí a štěstím, což je pravděpodobně ovlivněno naší identifikační strategií, která pracuje s narozením vícerčat jakožto neplánovaným rozšířením rodiny. Dále ukazujeme, že negativní vztah mezi počtem dětí a pocitem štěstí u rodičů malých dětí jde ruku v ruku s nespokojeností s bydlením a častěji pociťovanými pocity nervozity. Pozitivní vztah mezi počtem dětí a pocitem štěstí u rodičů starších dětí je korelovaný s vyšší spokojeností s finanční situací rodiny (u otců) a nižší frekvencí negativních pocitů (u matek). Docházíme k závěru, že cílena pomoc rodičům malých dětí a zdůrazňování pozitivní strany rodičovství může pozitivně ovlivnit porodnost.

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