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FAMILY SIZE AND SUBJECTIVE WELL-BEING IN EUROPE: DO MORE CHILDREN MAKE US (UN)HAPPY?

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Family Size and Subjective Well-being in Europe: Do More Children Make Us (Un)Happy?

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Abstract:
With the goal to shed more light on fertility drivers in Europe, we estimate the causal relationship between the number of children and parental subjective well-being using two alternative measures: life satisfaction and a happiness index. Multiple births are used as the source of exogenous variation to deal with number of children endogeneity. Estimating this relationship on subgroups of mothers and fathers whose children fall into different age categories, we document that fathers' well-being is negatively hit by the unexpected increase in family size due to twin birth all across Europe. This effect turns positive as children get older in all European regions when happiness index is investigated and in all regions except for the post-communist countries when life satisfaction is investigated. For mothers we identify larger variation across Europe and over child ages. We show that fathers' reaction to children is mainly driven by their (dis)satisfaction with time allocation and accommodation, while mothers' reaction to additional children at highest child ages is mainly driven by dissatisfaction with job. Region-specific fertility rates are correlated with fathers' marginal utility of additional child.

JEL: C21, J13, I31
Keywords: Fertility, subjective well-being

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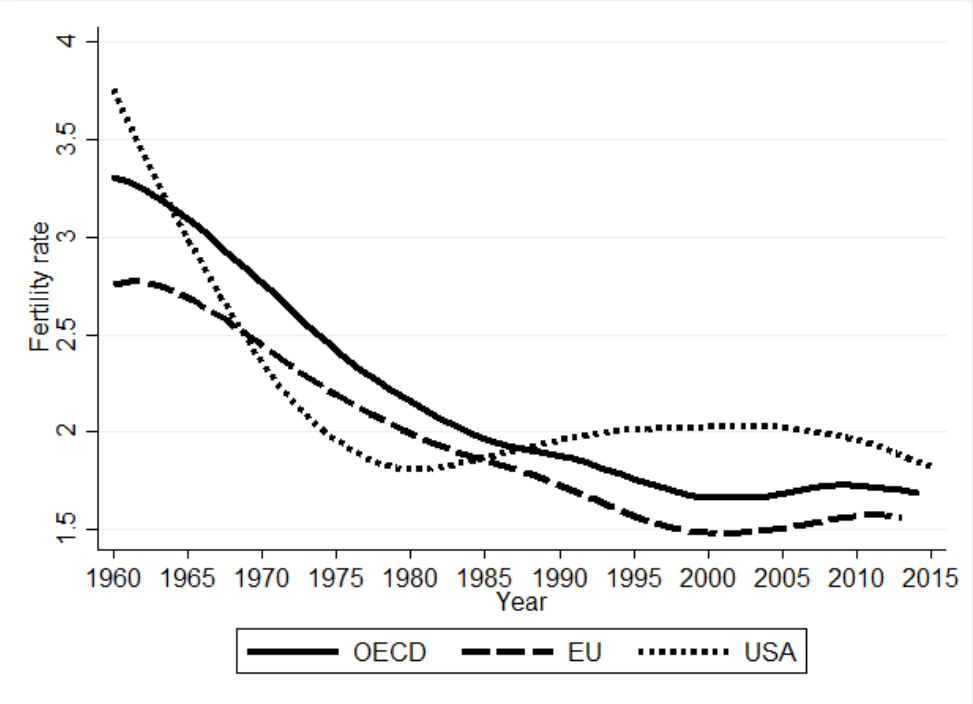
1. Introduction

One of the biggest challenges of the developed world is low fertility (See Figure 1). Combined with extending life expectancy it is responsible for population ageing that challenges the stability of tax, public healthcare, and pension systems. Among the hypothesized reasons for low fertility is the increasing cost of having children as nations become richer (Becker et al. 1994) and decreasing benefits from having a large family as females become more involved in the labor market (Stevenson and Wolfers, 2009). To shed more light on the former channel the economic literature has investigated the effect of having children on a set of parental outcomes such as wages of mothers (Waldfogel 1998) and fathers (Lundberg and Rose, 2002), maternal health (Cáceres-Delpianoa and Simonsen, 2012), or financial stress (Buddelmeyer et al., 2017), as these are believed to capture direct and indirect costs of having children. We extend this literature by investigating the influence that children have on both parents' subjective well-being. As argued by Fleurbaey and Schwandt (2015), subjective well-being can be treated as a proxy for utility. Thus, it is expected to capture the net effects of having children, taking into account both the costs and the benefits.

Figure 1. Evolution of fertility rates over time



Source: OECD database, time series smoothed.

Rational individuals are maximizing their expected utility. The rational-choice models of fertility predict that individuals optimally choose the number of off-springs taking into account their costs and benefits. This should be reflected in positive, or at least non-negative, marginal utility from each planned child. As the cost of rising children has risen significantly over the last decades (mainly due to high opportunity costs), the marginal utility of children has fallen and individuals choose lower fertility levels. While this framework is not new in the economic literature (see, for example Greenwood et al., 2005 or Becker et al., 1994), there is little empirical work in economics devoted to identifying the marginal utility of children.

In this paper we fill the gap and estimate the causal relationship between the number of children and parental subjective well-being. Treating the self-reported well-being as a measure of instantaneous utility we identify the marginal utility from an additional child. Estimating this relationship for subgroups of mothers and fathers whose children fall into different age categories, we document the dynamics of this relationship with distance from the last childbirth. The results of this exercise shed light on potential explanations of fertility behavior in Europe and might be helpful for designing pro-fertility policies. For example, we show that fertility rates correlate with fathers' (and not mothers') marginal utility from additional child and that significant cross-country heterogeneity emerges when comparing the marginal utility of the third child.

Drop in fertility levels observed over the last decades is driven by both the extensive and intensive margins – i.e. by increasing number of individuals deciding to remain childless, and by fewer children per parent. The analysis presented in this paper provides some insight on the intensive margin, leaving the extensive margin untouched. This is driven by the methodology that only allows studying the relationship between the number of children and parental well-being and not the relationship between becoming a parent and individual's subjective well-being. However, we believe that analyzing the intensive margin is at least as important for understanding the reasons behind falling fertility levels as the extensive margins. Previous research (Myrskyla and Margolis 2012) and fertility statistics support this statement. Decomposition of fertility evolution in Europe over the period 2005-2013 into the intensive and extensive margins suggests that about 60% of changes happen at the extensive margin and about 40% at the intensive – namely drop in the number of three and more child families in favor of one child families.

The relationship between the number of children, or the family size, and subjective well-being received a lot of attention in the sociological and demographic literature (e.g. Aassve et al. 2012; Frijters et al. 2011; Hansen 2012; Kohler et al. 2005; Myrskyla and Margolis 2012, Myrskyla and Margolis 2014). Recently, this topic also received some attention from economists. Here it is worth to mention the study by Stanca (2012) who reports the relationship between being a parent, irrespective of number of children, and subjective well-being on a sample of individuals from 94 countries. Clark et al. (2008) estimate the effect of childbirth on parental well-being on British panel data using an event study approach. Baetschmann et al. (2016) analyze the effect of motherhood on life satisfaction using longitudinal data from Germany. Cáceres-Delpianoa and Simonsen (2012) estimate the effect of family size on indirect measures of maternal well-being such as the risk of divorce, the risk of poverty, participation in welfare programs, and health. Finally, Buddelmeyer et al. (2017) investigate how children affect financial and time stress of parents taking advantage of Australian and German longitudinal data.

Identification of the effect of family size on parental well-being is complicated by the endogenous character of the number of children individuals have (Kravdal 2014). Despite a large body of literature analyzing the relationship between the number of children and parental outcomes, not all studies attempt to address this issue. The most common approach is within-individual longitudinal analysis, which however does not deal with dynamic selection to parenthood (Clark et al. 2008, Clark and Georgellis 2010, Myrskyla and Margolis 2012, Buddelmeyer et al. 2017). Baetschmann et al. (2016) couple longitudinal analysis with matching to deal with dynamic selection on observables. Most relevant to us, Cáceres-Delpianoa and Simonsen (2012) rely on multiple birth occurrences to instrument for family size.[2] We build on this strategy and take advantage of the variation in the number of children caused by multiple births (and by the gender composition of the first two children) to estimate the influence of family size on mothers' and fathers' well-being across European countries. While this approach does not allow to identify the effect of becoming a parent, it neatly deals with the endogeneity in the number of children and thus allows us to obtain an unbiased estimate of the intensive margin effect.

[2] This strategy was first proposed by Bronars and Grogger (1994) and applied, among others, by Angrist and Evens (1998).

The contribution of our research is multiple. First, to the best of our knowledge this is the first paper estimating the causal effect of family size on parental subjective well-being using an estimation strategy relying on exogenous variation in family size.

Second, we identify heterogeneous effects between genders – showing that mothers' and fathers' utility functions differ in shape with respect to the number of children – while the majority of papers in the literature concentrate on the effect of children on maternal outcomes. Clark et al (2008), Stanca (2012), and Buddelmeyer et al. (2017) are among the few studies that account for different effects by gender. These studies agree that 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 study dynamics in marginal utility from an additional child by dividing the sample into parents whose children fall into different age brackets. Most studies study the relationship between the parenthood status or the number of children and parental well-being regardless children age. Clark et al (2008) show that arrival of a first child is associated with significant and positive anticipation effect, which turns into a negative effect soon after birth and returns to pre-birth values five years after birth. Stanca (2012) divides the sample by the age of parents to show that the negative effect of parenthood diminishes with the age of parents, which might be related to the age of children. Consistent with Clark et al (2008) our results indicate that the marginal utility from an additional child is negative for fathers of young children and increases with distance from birth towards positive values for fathers of teenagers in most of the European countries. The relationship is very heterogeneous for mothers, though.

Fourth, we further decompose the effect of family size on subjective well-being into different aspects of well-being and life satisfaction. This allows us to identify which factors are mostly responsible for the estimated effects. We show that fathers are hit negatively with unexpected increase in family size in terms of satisfaction with time allocation or with accommodation, but they seem to adapt to the new situation as children get older. On the other hand, mothers are especially negatively affected by unexpected increase in family size in terms of their satisfaction with job when children get older.

Finally, we compare the relationship between the number of children and parental well-being across Europe pointing out significant cross-regional differences that might explain differences in

fertility rates. Up to date there exist two cross-sectional research studies (Stanca 2012, Pedersen and Schmidt 2014) using international data to investigate the relationship between the number of children and subjective well-being, though these studies do not dig into cross-country differences. Adding international dimension to the analysis allows us to identify differences across cultural norms that might drive the effect of children on subjective well-being and, more importantly, might drive the differences between genders.

This paper is organized as follows. The next section details out the empirical strategy used to identify the causal relationship between the number of children and parental well-being that relies on multiple births. It discusses the underlying assumptions and presents some evidence supporting the exogeneity of multiple birth occurrence, at least at higher parities. The third section provides description of the European Union Survey of Income and Living Conditions (EU SILC) dataset used in the empirical analysis and presents some basic stylized facts. Finally, the fourth section presents and comments on the results. We report the estimates of the relationship between family size and subjective well-being using pooled data and several alternative estimation approaches as well as using the preferred identification strategy and stratifying the sample into subgroups in several dimensions (gender, age of the youngest child, country). The last section summarizes our findings.

2. Data and stylized facts

For the purpose of the analysis presented in this paper we use the 2013 wave of the European Union Statistics on Income and Living Conditions (EU-SILC). The main advantages of this dataset are its size, allowing for detailed sub-group analysis, and its cross-country dimension. The choice of the reference year is driven by the inclusion of an ad-hoc module with personal well-being questionnaire. Apart from variables capturing individual subjective well-being, the EU-SILC dataset also contains information on individuals' health status, demographics, socio-economic status, and labor market statistics including wages. Data is collected at household level, what allows for identification of own children as long as they live in the same household as their parents.

EU-SILC data cover all European Union member states plus Iceland and Norway. There are between 6,500 and 15,500 adult individuals and between 3,000 and 8,250 households observed in each country. The sample used for analysis consists of all 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,[3] though for comparison we also present basic characteristics of the sample of all adults included in the well-being module, independent on their parenthood status. In the empirical analysis we further limit the sample to only mothers and fathers who live with a partner to abstract from the effect of the number of children on single parents. Table 1 illustrates how specific restrictions affect the size of the final estimation sample.

Table 1. Number of observations

	Men	Women
Total observations	296,783	318,002
Well-being module	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 (second line) and living in partnership (third line) and subsamples of these individuals who have the specified number of dependent children younger than 15 and no older child sharing the household.

[3] This restriction limits (though does not completely eliminates) the possibility of observing parents whose older children have already moved out. While it is possible that parents of a 15 year old have an older child that has already moved out, the majority of siblings are spaced 2-3 years from each other and the vast majority of children in Europe live with their parents until their early 20s.

There are more women than men responding the well-being module in the sample. However, when the sample is limited to mothers and fathers living in a partnership, gender representation is much more balanced.

Table 2. Number of observations by regions

	Northern Europe		Southern Europe		Central Europe		Post-communist Europe		South-Eastern Europe		Non-continental Europe	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Total observations	15,381	15,527	49,429	58,399	31,407	35,373	41,113	59,154	19,584	23,656	8,764	11,407
Living in partnership	10,327	9,924	33,614	35,366	21,519	21,855	27,042	33,728	12,740	13,616	5,928	6,701
At least 1 child	2,570	2,545	7,587	8,547	5,116	5,475	5,333	6,986	2,110	2,433	1,560	2,086
At least 2 children	1,742	1,702	4,172	4,892	3,206	3,407	2,804	3,813	1,054	1,263	986	1,357
# twin births	99	87	234	260	177	176	119	170	32	44	41	60
# same sex siblings (first two)	892	834	2,108	2,461	1,622	1,707	1,402	1,941	511	610	528	699
At least 3 children	530	491	712	937	768	806	578	834	158	203	299	427
# twin births	66	53	82	101	86	79	49	79	12	19	17	28
# same sex siblings (first two)	274	264	382	499	408	430	311	462	78	106	158	229
At least 4 children	101	83	122	156	134	132	119	157	27	43	61	88

Note: Table displays observation counts for the baseline sample consisting of all individuals included in the well-being module (first line) and living in 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.

About 4% of parents with at least two children have twins. Gender mix of the first two children is balanced among the parents of at least two, and slightly skewed towards higher representation of same sex children among the parents of three and more children.

The well-being module was collected in 32 European countries and we take advantage of this international dimension to study cross-country differences. Limited sample sizes do not allow us to study each country separately. Instead, we group countries into four larger groups: Northern Europe (Denmark, Finland, Iceland, Norway, Sweden), Southern Europe (Cyprus, Greece, Spain, France, Italy, Malta, Portugal), Central Europe (Austria, Belgium, Switzerland, Germany, Luxemburg, Netherlands), Non-continental Europe (Ireland, Great Britain), Post-communist Europe (Czechia, Estonia, Hungary, Lithuania, Latvia, Poland, Slovakia, Slovenia), and South-Eastern Europe (Bulgaria, Croatia, Romania, Serbia). This division is motivated by similarities shared by countries within each group. In Table 2 we report number of observations for each of the regions. Note that the sample sizes are very small for Non-continental Europe and South-Eastern Europe. We thus cannot conduct separate regional analysis for these groups of countries, while they are included in the pooled analysis.

To measure subjective well-being we rely on the question capturing life satisfaction (LS) "*Overall, how satisfied are you with your life nowadays?*", where individuals could answer on a 0-10 scale with 0 meaning *Not at all satisfied*, and 10 meaning *Completely satisfied*. The left part of Table 3 presents the summary statistics of this measure. In our sample parents report, on average, slightly lower levels of LS than childless adults, what is consistent with cross-sectional statistics reported in other studies (Stanca 2012, Hansen 2012). On the other hand, among parents those with more children report higher levels of LS. Moreover, parents of up to three children report, on average, higher levels of LS than an average adult living in a partnership.[4] However, the median values of self-reported LS are the same for childless adults and for adults with children independently on the number of offspring.

Following the suggestion of Kahneman and Krueger (2006) that life satisfaction might capture both the subjective well-being and certain type of self-worth, we construct an alternative measure

[4] Bond and Lang (2019) argue that comparing mean values of variables reported on ordered scales might be misleading in many cases. This is why we also report median values. In the empirical analysis we rely on Chen et al (2019) who show that in most cases regressions based on the mean, such as the OLS, can be interpreted as median regressions due to symmetricity. In a companion paper (Pertold-Gebicka and Spolcova, 2019) we show that this holds also for life satisfaction measure reported in the SILC dataset.

of subjective well-being that is supposed to be less influenced by comparison to others or to own expectations. The use of this measure also overcomes the Bond and Lang (2019) critique, because it is, roughly speaking, a frequency measure. The Happiness Index (HI) is a compound measure capturing the frequency of feeling happy, calm and peaceful, down in the dumps, downhearted or depressed, and very nervous over the last four weeks. Its construction is inspired by Kahneman and Krueger's (2006) "U-index", but unlike the "U-index" that summarizes feelings experienced during one day, it expresses the overall mood over a longer period. Therefore, the HI might be more suitable as a proxy of subjective well-being. For comparability with LS, we normalize the HI and fit it to the 0 to 10 scale, where 0 corresponds to experiencing only negative feelings all the time and 10 to experiencing only positive feelings all the time. The right part of Table 3 presents the summary statistics for the Happiness Index. It is worth noting that LS and HI are highly correlated (correlation coefficient 0.53), but HI is slightly more stable with lower overall variation and smaller differences by the number of children, though larger differences by gender.

Table 3. Summary of subjective well-being measures

	Life satisfaction				Happiness index			
	men		women		men		women	
	mean	median	mean	median	mean	median	mean	median
All adults	7.047	7	7.009	7	7.005	7.5	6.603	7
	(2.039)		(2.076)		(1.881)		(1.965)	
All adults in partnership	7.211	8	7.256	8	7.066	7.5	6.890	7
	(1.956)		(1.959)		(1.835)		(1.872)	
All parents	7.376	8	7.517	8	7.076	7.5	6.874	7
	(1.825)		(1.776)		(1.755)		(1.787)	
Parents of one child	7.332	8	7.475	8	7.076	7.5	6.883	7
	(1.844)		(1.804)		(1.780)		(1.803)	
Parents of two children	7.436	8	7.570	8	7.115	7.5	6.882	7
	(1.771)		(1.716)		(1.702)		(1.761)	
Parents of three children	7.343	8	7.526	8	7.091	7.5	6.844	7
	(1.914)		(1.845)		(1.798)		(1.797)	
Parents of four children	7.254	8	7.326	8	6.769	7.5	6.667	7
	(2.063)		(1.980)		(2.061)		(1.963)	

Note: Table displays the mean (together with its standard deviation in parentheses) and the median value for each of the subjective well-being measures for the baseline sample consisting all individuals included in the well-being module (first line) and living in a partnership (second line) and subsamples of the latter who have the specified number of dependent children younger than 15 and no older child sharing the household.

Despite the differences between the two well-being measures, the same pattern is observed for the average HI of parents as was observed for the average LS. Namely, parents have, on average, slightly lower levels of the happiness index than childless adults, but among parents those with more children have higher levels of the happiness index.

The raw statistics presented in Table 3 might suggest that the arrival of the first child is associated with a fall in parents' subjective well-being, but each additional child increases parents' well-being. 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 that deals with this issue.

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 goal of the empirical analysis is to estimate γ – the parameter capturing the relationship between the number of own children and parental subjective well-being. The effect of an additional child, though, 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 significant overestimation of the relationship between the number of children and parental well-being.

2.1 Baseline 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 birth 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 birth 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 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 offspring 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 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 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 single-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 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 we divide the sample into subgroups of parents according to their children's age.

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. A non-positive estimate would suggest that not planning additional children is a utility (subjective well-being) maximizing strategy. Further digging into the pathways driving the relationship between the number of children and parental well-being allows us to identify which factors are mostly responsible for the estimated effects. For this purpose we use satisfaction with specific aspects of life as alternative dependent variables.

2.2 Alternative identification strategy

As an alternative instrument that exogenously varies the number of children we use the sex composition of the first two offspring. This strategy has also reached some popularity in the previous literature (Angrist and Evans, 1998; Angrist, Lavy, and Schlosser, 2010; Black, Devereux, and Salvanes 2010; deHaan, 2010), although it is more data-hungry. The identifying assumption is that parents whose first two children are of the same gender are more likely to decide for a third child. The analysis relying on this approach can only be performed on the sample of parents who have at least two children, what allows us to identify the effect of having the third child on parental well-being.[5] 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 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 offspring, 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. These parents and their fertility behavior might be of higher interest from the policymakers' point of view, because it might be relatively easy to increase their fertility (i.e. design policies that would motivate them to have a third child even if the first two are a boy and a girl). Unfortunately, the limited predictive power of the siblings' sex composition

[5] We do not use sex composition of siblings to identify the effect of the fourth child. While the twin instrument requires we observe enough families with twins born at third parity to identify the effect for the fourth child, the siblings' sex composition instrument requires we observe enough number of fourth parity births to estimate this effect. 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.

instrument combined with low sample size does not allow us to use this identification strategy in every specification. Siblings' sex composition instrument is only used as a robustness check in full-sample analysis.

4. Results

We begin with 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 region to show significant heterogeneity in the relationship between family size and subjective well-being that might hide the relevant associations. All results are reported for two measures of subjective well-being: the life satisfaction (LS) and the happiness index (HI).

Table 4 reports the baseline estimates of the marginal effect of an additional child on parental subjective well-being. 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' LS, no matter whether twin births or siblings' sex composition (only in case of the third child) 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 and significant for all parents, and positive but statistically significant when estimated separately for fathers and mothers (probably due to limited sample sizes). When the HI is used as the measure of subjective well-being, a negative effect of an unexpected birth of a second child is estimated for all parents and this effect is clearly driven by mothers. The effects of the third and fourth child are qualitatively the same for both measures of subjective well-being, though in most cases insignificant.

Table 4. 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

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

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), Happiness index (Panel B); Other control variables: household income, employment dummy, age, marital status, health status, education level, region fixed effects; In columns (2), (4), and (6) the number of children is instrumented by a dummy equal to one if multiple birth 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 estimate of the coefficient corresponding to the marginal effect of additional child from a separate regression. All regressions are weighted by sample weights.
Standard errors clustered by country in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

The picture changes when the sample of parents is divided into subgroups by the age of dependent children. Thinking of the dependent variable – individual subjective well-being – as of the instantaneous utility, this approach allows us to test whether the marginal utility of an additional child changes as children become older. Due to small sample sizes, for this exercise we only report the results based on the samples of parents with at least one child and parents with at least two children, with twin births as the instrument. These are reported in Table 5. The IV estimates using LS as the measure of subjective well-being show a significant and consistent pattern for fathers of increasing marginal utility from additional child as their children become

older. This pattern is statistically significant when estimated on the sample of fathers with at least two children. While fathers' LS is at first hit negatively by an unexpected increase in family size caused by twin birth at second parity, having three rather than two children between 10 and 15 years of age is linked to higher levels of LS. Mothers' LS is negatively affected by an unexpected increase in family size. While mostly insignificant, this effect seems to persist as children become older.

Table 5. The estimated relationship between the number of children and subjective well-being, pooled sample, 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
Panel A: Parents with at least one child, twin birth instrument (MB1) – life satisfaction						
All parents	**0.091****	-0.073	0.065	0.166	**0.166*****	-0.072
	(0.037)	(0.213)	(0.045)	(0.170)	**(0.038)**	(0.250)
N	16534	16534	11681	11681	10527	10527
Fathers	**0.095***	0.015	**0.090***	0.222	**0.142*****	0.312
	(0.054)	(0.198)	**(0.046)**	(0.235)	**(0.041)**	(0.300)
N	7696	7696	5536	5536	4914	4914
Mothers	**0.091****	-0.159	0.034	0.103	**0.199*****	**-0.482***
	(0.043)	(0.243)	(0.055)	(0.327)	**(0.058)**	**(0.252)**
N	8838	8838	6145	6145	5613	5613
Panel B: Parents with at least two children, twin birth instrument (MB2) – life satisfaction						
All parents	0.036	-0.617	0.067	0.028	-0.028	0.136
	(0.198)	(0.405)	(0.103)	(0.253)	(0.066)	(0.322)
N	4712	4712	4700	4700	4163	4163
Fathers	-0.159	**-0.917****	0.153	0.219	-0.016	**0.429****
	(0.262)	(0.455)	(0.137)	(0.295)	(0.126)	(0.197)
N	2157	2157	2220	2220	1939	1939
Mothers	0.230	-0.343	0.005	-0.167	-0.031	-0.171
	(0.179)	(0.438)	(0.124)	(0.261)	(0.113)	(0.500)
	2555	2555	2480	2480	2224	2224
	(1) OLS 0-5	(2) IV 0-5	(3) OLS 5-10	(4) IV 5-10	(5) OLS 10-15	(6) IV 10-15

Panel C: Parents with at least one child, twin birth instrument (MB1) – happiness index						
All	-0.016	**-0.498*****	0.034	-0.008	0.080	**-0.455***
parents	(0.040)	**(0.131)**	(0.052)	(0.261)	(0.051)	**(0.268)**
N	16213	16213	11382	11382	10245	10245
Fathers	0.003	-0.159	0.061	-0.027	**0.102***	-0.113
	(0.041)	(0.143)	(0.056)	(0.205)	**(0.054)**	(0.290)
N	7545	7545	5379	5379	4770	4770
Mothers	-0.038	**-0.825*****	0.007	0.007	0.066	**-0.795****
	(0.055)	**(0.249)**	(0.058)	(0.420)	(0.082)	**(0.342)**
N	8668	8668	6003	6003	5475	5475
Panel D: Parents with at least two children, twin birth instrument (MB2) – happiness index						
All	0.036	-0.617	0.067	0.028	-0.028	0.136
parents	(0.198)	(0.405)	(0.103)	(0.253)	(0.066)	(0.322)
N	4712	4712	4700	4700	4163	4163
Fathers	-0.115	**-0.812****	0.026	0.377	-0.029	0.212
	(0.243)	**(0.345)**	(0.166)	(0.347)	(0.099)	(0.172)
N	2131	2131	2172	2172	1888	1888
Mothers	0.186	**-0.590****	**-0.306***	-0.788	0.006	**0.828***
	(0.165)	**(0.297)**	**(0.177)**	(0.522)	(0.198)	**(0.498)**
	2522	2522	2443	2443	2176	2176

Note: Sample of parents with at least one child (Panel A), at least two children (Panel B); Dependent variable: Life satisfaction (Panels A and B), Happiness index (Panels C and D); Instrumented variable: number of children; Instrument: indicator of twin birth at second parity; Other control variables: household income, employment dummy, age, marital status, health status, education level, region fixed effects. Each cell reports estimate of the coefficient corresponding to the marginal effect of additional child from a separate regression. All regressions are weighted by sample weights.
Standard errors clustered by country in parentheses, * p < 0.1, ** p < 0.05, *** p < 0.01

Panels C and D of Table 5 show that using the HI as the measure of subjective well-being brings different results. All parents are negatively hit by twin birth, be it at first or second parity. The effect remains negative till children's teens when twin birth at first parity is used as the instrument, while it turns positive (statistically significant only for mothers) for parents of teenagers when twin birth at second parity is used as the instrument.

The evolution of the relationship between the number of children and parental well-being as measured by LS is illustrated in Figure 2, and measured by HI is illustrated in Figure 3. Both figures plot the estimated IV coefficients corresponding to the marginal effect of an additional

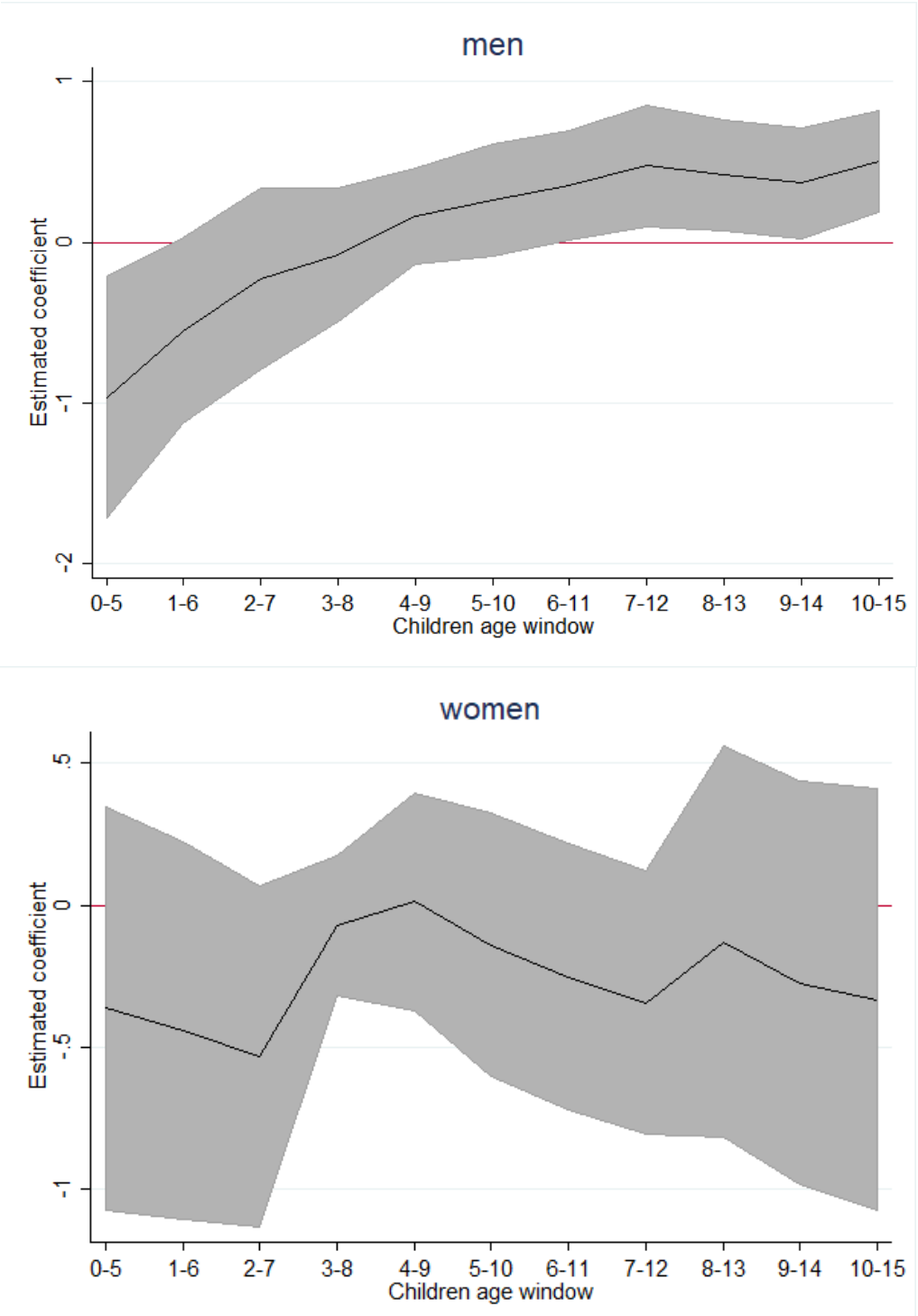
child against the children's age bracket – eleven coefficients for eleven 6-year age brackets – with twin birth at second parity used as the instrument. These Figures show that the patterns identified in Table 5 are representative of the evolution of the marginal effect of additional child on parental well-being with the children age. They also point towards the differences between the two measures of subjective well-being.

When life satisfaction is used as the measure of subjective well-being, we observe a consistently increasing relationship for fathers and a flat relationship for mothers. In other words, fathers' reaction to having an additional child improves as the child gets older, while mothers' reaction remains constant. When the happiness index is used, fathers' reaction to having an additional child grows from negative to positive over the first few years of the child's age and stays at moderately positive values till the child's teens. Mothers' reaction, as measured by their happiness index, is negative for the first ten years and it grows towards positive numbers when the child enters the teens age.

Potential pathways

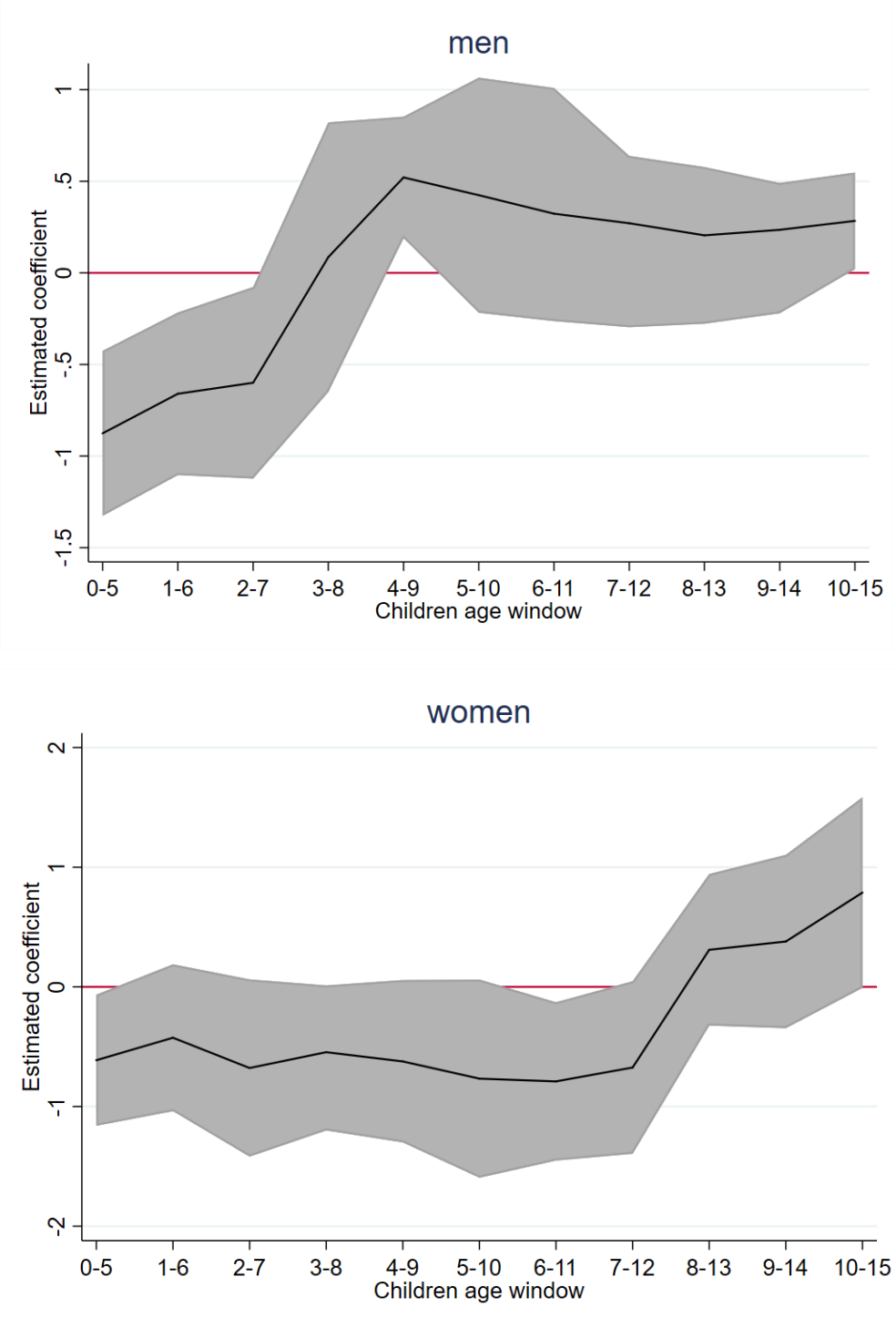
In this section we dig deeper into the relationship between the number of own children and parental subjective well-being. The estimates for mothers and fathers are compared. Moreover, we use specific components of subjective well-being, such as satisfaction with financial situation, satisfaction with time allocation, satisfaction with job, and satisfaction with relationships with others to identify potential pathways through which children might affect their parents' well-being. 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. This is why the following analysis is limited to the marginal effect of the third child on parental well-being.

Figure 2. The estimated marginal effect of the third child on parental subjective well-being as measured by *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 additional child estimated on the sample of parents whose all dependent children are within specific age bracket. Grey area represents the 95% confidence interval.

Figure 3. The estimated marginal effect of the third child on parental subjective well-being as measured by the *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 additional child estimated on the sample of parents whose all dependent children are within specific age bracket. Grey area represents the 95% confidence interval.

There might be several explanations for the observed pattern in the relationship between the number of children and parental subjective well-being. First, note that for women the relationship between the OLS estimates and the IV estimates of the marginal effect of the third child is consistent over children's age with IV estimates visibly lower than their OLS counterparts. This suggests that among women there is strong selection into multiple parenthood. First, mothers with otherwise higher levels of subjective well-being might be more likely to choose large families, what was also shown by Cetre et al (2016). Second, mothers with higher expected gains from an additional child might be more likely to choose large families. Using unexpected increase in family size caused by twin births breaks both these selection mechanisms leaving negative, but statistically insignificant estimates. Fathers of children in the youngest age bracket behave similarly to mothers. However, as children get older, fathers' IV estimates become positive and larger than the OLS estimates.[6]

These observations are in line with the hypothesis that these are women who make fertility choices. Their subjective well-being is positively, marginally statistically insignificant, correlated with their planned fertility, while the unplanned increase in family size either does not affect or lowers their subjective well-being. Fathers' subjective well-being is not positively correlated with planned family size when the number of children exceeds two. Moreover, the increasing marginal utility from additional unplanned child suggests that fathers adapt to the new, unplanned situation, as Clark et al. (2008) suggest. Following Doepke and Kindermann (2016) we might explain these results by the fact that in most European countries men's planned (ideal) fertility exceeds that of their partners' and thus unexpected increase in family size might from their point of view be actually utility-maximizing. The negative IV estimates at low child ages could just correspond to the difficulty of rising baby-twins – the "shock effect". Studying the relationship between the number of children and satisfaction with different aspects of life provide some guidance.

In Table 6 we report the IV estimates of the relationship between the number of children and satisfaction with financial situation, satisfaction with time allocation, satisfaction with job, and

[6] Clark et al. (2008) show that both mothers and fathers experience a drop in subjective well-being immediately after the birth of an additional child. They further show that for both parents this effect disappears five years after child's arrival. Our results are not contradicting these findings. We further show that for fathers, the effect of an additional child becomes positive more years after birth, while for mothers this is not the case.

satisfaction with relationships with others. Again, we observe a rather consistent pattern for men, whose marginal effect of an additional unplanned child on satisfaction with different aspects of life is negative at low children ages, while it becomes positive or close to zero at higher children ages. Men are especially hit by the unexpected increase in family size with respect to time allocation, satisfaction with job, and satisfaction with accommodation. Given that these negative effects disappear as children grow older, we can hypothesize that fathers adapt to the new, unplanned situation.

The pattern for women is less consistent and estimated with lower precision. Worth noting is that additional young child visibly increases mothers' satisfaction with time allocation, but older children rather decrease it. There is no relationship between family size and satisfaction with job for mothers of young children, probably because few of these women are employed. Mothers of children 5-10 years old are more satisfied with job when having more children, but mothers of 10-15 years old experience an opposite effect. This might be driven by the decision of mothers with young children to work. This positive selection bias disappears at higher child ages, when female employment rates reach 80% in Europe. Relationship with others is negatively (and marginally statistically significant) affected for women with young children, and neutral for women with older children. Based on these results, it might be hypothesized that one of the reasons mothers' marginal utility from an additional child is still negative at higher children ages is difficulty to achieve work-family balance that is manifested by low satisfaction with job.

Table 6. 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 job			Satisfaction with relationship with others			Satisfaction with accommodation		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
	IV 0-5	IV 5-10	IV 10-15	IV 0-5	IV 5-10	IV 10-15	IV 0-5	IV 5-10	IV 10-15	IV 0-5	IV 5-10	IV 10-15	IV 0-5	IV 5-10	IV 10-15
All	-0.200	-0.061	0.105	-0.336	**-0.753****	0.152	**-0.884****	0.558	**-0.693***	-0.370	-0.101	-0.222	**-0.631****	0.422	0.137
parents	(0.375)	(0.340)	(0.283)	(1.370)	**(0.355)**	(0.454)	**(0.373)**	(0.514)	**(0.421)**	(0.314)	(0.186)	(0.621)	**(0.260)**	(0.410)	(0.335)
Fathers	-0.228	0.174	0.406	**-2.031*****	-0.541	-0.068	**-1.071*****	-0.025	-0.314	-0.107	0.177	-0.268	**-0.924*****	0.575	0.213
	(0.343)	(0.370)	(0.278)	**(0.481)**	(0.375)	(0.527)	**(0.372)**	(0.440)	(0.422)	(0.328)	(0.198)	(0.720)	**(0.257)**	(0.633)	(0.248)
Mothers	-0.115	-0.299	-0.143	1.236	-0.842	0.319	-0.477	**1.324***	-1.084	-0.618	-0.335	-0.065	-0.333	0.295	0.052
	(0.466)	(0.368)	(0.453)	(2.705)	(0.522)	(0.528)	(0.697)	**(0.725)**	(0.813)	(0.433)	(0.289)	(0.551)	(0.361)	(0.360)	(0.514)

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 job (columns (7)-(9)), Satisfaction with relationship with others (columns(10)-(12)), Satisfaction with accommodation (columns(13)-(15)); Instrumented variable: number of children; Instrument: indicator of twin birth at second parity; Other control variables: household income, employment dummy, age, marital status, health status, education level, region fixed effects.. Each cell reports estimate of the coefficient corresponding to the marginal effect of additional child from a separate regression. All regressions are weighted by sample weights.
Standard errors clustered by country in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Cross-country comparison

The relationship between the number of children and subjective well-being might differ across countries. This could be driven by different social norms, or different family and work related policies. We investigate this country heterogeneity by dividing the sample into several regions, namely Northern Europe, Central Europe, Southern Europe, and post-communist European countries. Limited sample sizes do not allow for more detailed, e.g. country-level, analysis. Countries belonging to these four groups share similar policy setup and values. As reported in Table A2 in the appendix, these groups differ in their median reported well-being with northern-European countries reporting the highest levels of both life satisfaction and the happiness index.

Panels A and B of Table 7 summarize the estimated relationship between family size and parental subjective well-being as measured by LS at different child ages for parents living in different regions of Europe. For comparison, the top row of each panel repeats estimates obtained on the pooled sample of countries. It can be observed that in Northern, Central, and Southern Europe the pattern estimated for fathers is consistent with the overall pattern. Namely, fathers experience negative marginal utility of additional unexpected child when their children are young, but the estimated marginal utility of children grows to positive and significant values as children get older. This pattern is not shared by post-communist countries, where fathers' LS is strongly negatively related to family size at all child ages.

The results for mothers partially explain insignificant estimates on the pooled sample. There seems to be strong heterogeneity across Europe in the relationship between family size and mothers' life satisfaction, even at the lowest child ages.

Panels C and D of Table 7 summarize the estimated relationship between family size and parental subjective well-being as measured by HI at different child ages for parents living in different regions of Europe. It is striking that the results using the HI as a measure of subjective well-being are much more consistent across Europe with post-communist countries reporting the same pattern as the rest of Europe. Roughly, we observe that parents' happiness index is negatively affected by an unexpected birth of twins at second parity (with exception of mothers in central Europe) and this effect turns into positive as children grow older. The trajectory of this change differs between mothers and fathers and across countries, though.

Table 7. The estimated relationship between the number of children and subjective well-being, by region and 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
Panel A: Fathers – life satisfaction						
Overall	-0.159	**-0.917****	0.153	0.219	-0.016	**0.429****
	(0.262)	**(0.455)**	(0.137)	(0.295)	(0.126)	**(0.197)**
N	2157	2157	2220	2220	1939	1939
North Europe	0.097	**-1.011****	0.129	-0.286	**0.546*****	**0.860*****
	(0.441)	**(0.406)**	(0.223)	(0.516)	**(0.205)**	**(0.324)**
N	272	272	304	304	235	235
Central Europe	-0.084	-1.305	**0.353***	**0.586***	-0.142	**0.724****
	(0.404)	(0.957)	**(0.190)**	**(0.354)**	(0.192)	**(0.297)**
N	573	573	605	605	548	548
South Europe	**-1.119***	-1.189	0.434	0.457	0.122	0.181
	(0.595)	(0.766)	(0.326)	(0.632)	(0.371)	(0.412)
	621	621	640	640	538	538
Post-Communist	0.290	-1.463	-0.285	-0.208	-0.425	**-1.235*****
	(0.383)	(1.141)	(0.320)	(0.685)	(0.346)	**(0.479)**
	395	395	394	394	309	309
Panel B: Mothers – life satisfaction						
Overall	0.230	-0.343	0.005	-0.167	-0.031	-0.171
	(0.179)	(0.438)	(0.124)	(0.261)	(0.113)	(0.500)
	2555	2555	2480	2480	2224	2224
North Europe	0.164	**-0.921*****	0.120	-0.620	0.304	0.387
	(0.335)	**(0.289)**	(0.294)	(0.757)	(0.329)	(0.392)
	308	308	267	267	222	222
Central Europe	0.525*	0.738	-0.279	0.113	0.210	**0.509***
	(0.278)	(0.699)	(0.368)	(0.193)	(0.136)	**(0.339)**
	609	609	613	613	567	567
South Europe	-0.290	-0.851	-0.087	-0.123	-0.297	0.026
	(0.298)	(0.805)	(0.245)	(0.474)	(0.257)	(0.650)
	709	709	708	708	647	647

Post-Communist	0.019	-0.451	0.559	0.054	0.377	-0.388
	(0.249)	(0.485)	(0.354)	(0.399)	(0.380)	(0.533)
	526	526	540	540	421	421
	(1)	(2)	(3)	(4)	(5)	(6)
	OLS 0-5	IV 0-5	OLS 5-10	IV 5-10	OLS 10-15	IV 10-15
Panel C: Fathers – happiness index						
Overall	-0.115	**-0.812****	0.026	0.377	-0.029	0.212
	(0.243)	**(0.345)**	(0.166)	(0.347)	(0.099)	(0.172)
	2131	2131	2172	2172	1888	1888
North Europe	-0.663	**-0.933*****	0.415	0.092	**0.477****	**0.554****
	(0.492)	**(0.277)**	(0.310)	(0.747)	**(0.191)**	**(0.221)**
	272	272	303	303	234	234
Central Europe	-0.152	-0.908	**0.421****	**0.874*****	0.003	0.141
	(0.365)	(0.716)	**(0.198)**	**(0.335)**	(0.156)	(0.347)
	571	571	598	598	543	543
South Europe	-0.596	**-1.023****	0.080	0.506	0.130	0.539
	(0.784)	**(0.490)**	(0.484)	(0.636)	(0.303)	(0.832)
	611	611	626	626	522	522
Post-Communist	0.370	-0.023	**-0.878***	0.434	0.069	0.400
	(0.455)	(0.535)	**(0.520)**	(0.857)	(0.329)	(0.589)
	386	386	374	374	292	292
Panel D: Mothers – happiness index						
Overall	0.186	**-0.590****	**-0.306***	-0.788	0.006	**0.828***
	(0.165)	**(0.297)**	**(0.177)**	(0.522)	(0.198)	**(0.498)**
	2522	2522	2443	2443	2176	2176
North Europe	-0.054	-0.525	-0.163	-1.967	-0.203	0.237
	(0.221)	(0.333)	(0.238)	(1.357)	(0.475)	(0.442)
	308	308	266	266	219	219
Central Europe	0.547	**0.919****	-0.135	0.648	-0.039	1.023
	(0.336)	**(0.378)**	(0.203)	(0.549)	(0.544)	(0.642)
	608	608	608	608	563	563
South Europe	-0.042	-1.245*	-0.700**	-1.851***	0.080	1.814**
	(0.457)	(0.660)	(0.328)	(0.304)	(0.388)	(0.728)
	698	698	696	696	638	638

Post-Communist	-0.215	-0.120	0.173	**0.423***	0.390	0.677
	(0.435)	(0.219)	(0.373)	**(0.226)**	(0.244)	(0.456)
	512	512	524	524	401	401

Note: Sample of parents with at least two children; Dependent variable: Life satisfaction (Panels A and B), Happiness index (Panels C and D); Instrumented variable: number of children; Instrument: indicator of twin birth at second parity; Other control variables: household income, employment dummy, age, marital status, health status, education level. Each cell reports estimate of the coefficient corresponding to the marginal effect of additional child from a separate regression. All regressions are weighted by sample weights.
Standard errors clustered by country in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

5. Conclusion

It takes two to have a child. Doepke and Kindermann (2016) show that European couples often disagree on whether to have children and, especially, whether to have additional child on top of already existing children. Is this discrepancy driven by differences in the marginal utility of an additional child? And why is the marginal utility from additional child so different for mothers and fathers? In today's world with extremely low fertility levels countries develop policies aimed at increasing family size. What (financial side, time allocation side, information provision) and whom (males, females, both) should they target?

In this paper we tackle these questions by analyzing the relationship between the number of children and parents' subjective well-being. To deal with self-selection to different family sizes that is, at least partially, driven by preference towards children and potential well-being gains from a larger family, we rely on exogenous variation in the number of children caused by multiple births.

Our results show that (1) fathers react neutrally to planned increases in family size and negatively to unplanned increases in family size in the first years after their youngest child is born, while the marginal utility of an additional unplanned child becomes positive as children get older; (2) mothers' marginal utility from additional child is heterogeneous across countries with no clear pattern associated with child age; (3) Fathers are hit negatively with unexpected increase in family size in terms of satisfaction with time allocation or with accommodation, but they seem to adapt to the new situation as children get older; (4) Mothers are especially negatively affected by unexpected increase in family size in terms of their satisfaction with job when children get older; (5) Region-specific fertility rates are correlated with fathers' marginal utility of additional child.

Our results suggest that parents are generally satisfied with larger families even if having that many children was not their plan. This is of high policy importance. Fertility rates might be increased by helping parents cope with difficulties associated with rising many children when these children are little and by pointing towards positive sides of parenthood in the years to come. Our results also point towards differences between life satisfaction and happiness. While the former differs substantial across countries and genders, there is much more homogeneity in how children affect parents' emotions.

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Appendix

Table A1. Summary of subjective well-being measures by regions for parents with two children

	Life satisfaction		Happiness index	
	men	women	men	women
Northern Europe	8	8	8.5	8
Southern Europe	7	8	7	7
Central Europe	8	8	7.5	7
Post-communist countries	8	8	7.5	7.5
England	8	8	8	8
Eastern Europe	7	7	7	7

Note: Table displays the median value for each of the subjective well-being measures for the baseline sample consisting of individuals living with partner in the household and having two dependent children younger than 15 and no older child sharing the household for specific regions of Europe.

Table A2. First stages for Table 4

	(1) IV 0-15	(2) IV 0-5	(3) IV 5-10	(5) IV 10-15
All parents	**0.898*** **	**1.006*** **	**0.970*** **	**0.980*** **
	(0.023)	(0.032)	(0.020)	(0.034)
R2	0.062	0.189	0.185	0.178
F	547.350	230.229	529.648	148.633
Fathers	**0.899*** **	**0.968*** **	**0.981*** **	**0.994*** **
	(0.031)	(0.024)	(0.029)	(0.044)
R2	0.057	0.195	0.225	0.174
F	199.078	805.169	154.744	68.335
Mothers	**0.892*** **	**1.044*** **	**0.964*** **	**0.975*** **
	(0.027)	(0.056)	(0.026)	(0.031)
R2	0.074	0.191	0.163	0.187
F	341.731	84.436	347.067	102.891

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