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THE SUBJECTIVE COST OF YOUNG CHILDREN: A EUROPEAN COMPARISON

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Abstract

Understanding child-related costs is crucial given their impact on fertility and labour supply decisions. We quantify and compare the cost of children in Europe by analysing the effect of child births on parents' self-reported ability to make ends meet. This study is based on EU-SILC longitudinal data for 30 European countries from 2004 to 2015, enabling comparisons between country groups of different welfare regimes. Results show that newborns decrease subjective economic wellbeing in all regions, yet with economies of scale in the number of children. The drop is mainly caused by increased expenses due to the birth of a child (direct costs), which are largest in high-income regions. Immediate labour income losses of mothers (indirect costs) are less important in explaining the decrease. These income losses are closely related to the employment patterns of mothers and are highest in regions where women take extensive parental leave. In the first years after the birth, indirect costs are mostly compensated for via public transfers or increased labour income of fathers, while direct costs of children are not compensated for.

Keywords

Cost of children, subjective economic wellbeing, European welfare states, EU-SILC.

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The Subjective Cost of Young Children: A European Comparison

Sonja Spitzer, Angela Greulich, Bernhard Hammer

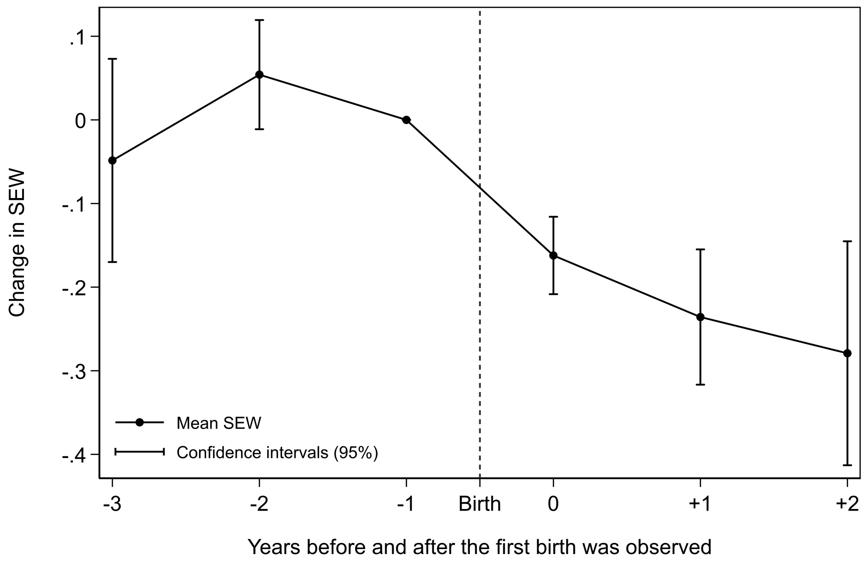
1 Introduction

The cost of raising children affects fertility and labour supply decisions, which is why understanding child-related costs is crucial for both policymakers and potential parents. Most European governments spend a substantial share of their resources on reducing the cost of children for families. Overall, the importance of child-related policies has increased significantly over the last decades. In the EU, public spending on families has expanded from 2.0 per cent of GDP in 2000 to 2.4 per cent in 2014 (Eurostat 2018*f*). But are these policies effectively compensating the cost of raising children? How strong is the impact of children on the economic wellbeing of households? These are important questions that governments are confronted with when configuring family policies.

This paper provides measures of child-related costs based on parents' self-reported ability to make ends meet, which is referred to as subjective economic wellbeing (SEW). Overall, SEW of couples drops drastically after their first child is born (see Figure 1). We interpret this drop as the total subjective net cost of children that a household must bear. This total net cost is partly explained by higher household expenses due to a newborn child. Parents have to spend more on goods such as diapers, food or housing once their baby is born. This increase in needs is termed direct costs. In addition, indirect costs contribute to the drop in SEW. Indirect costs occur, for example, when parents endure income losses associated with the birth. These costs vary by country and are larger in regions where mothers take longer parental leave. Hence, the structure of child costs is expected to vary across welfare regimes due to different foci on family policies, but also due to differences in norms, institutions and macroeconomic conditions.

Child-related costs have received continuous attention over the last decades, but little research has been based on self-reported information. One exception is by Buddelmeyer et al. (2017), who analyse the cost of children based on self-reported financial stress of parents in Australia and Germany. Yet to the best of our knowledge, no one has conducted a similar analysis

Figure 1: Subjective economic wellbeing (SEW) before and after the birth of the first child, all countries



Source: EU-SILC longitudinal data 2004–2015. Mean SEW is the average reply to the following survey question: "A household may have different sources of income and more than one household member may contribute to it. Thinking of your household's total income, is your household able to make ends meet, namely, to pay for its usual necessary expenses?" The question is answered by a household respondent based on a Likert scale with categories (1) "with great difficulty", (2) "with difficulty", (3) "with some difficulty", (4) "fairly easily", (5) "easily", and (6) "very easily". Household level weights were used when calculating the means. SEW of all households is set to 0 in the year before the birth was observed, which is why there are no confidence intervals at time -1. The graph is based on a subsample of 4,709 couples that had their first child, but no additional child, during the observed period. In total, these couples provide 14,638 observations.

for all of Europe, linking differences in child-related direct and indirect costs to differences in family-related policies. Measures of child-related cost based on self-reported data allow for (i) analysing the impact of children on economic wellbeing, (ii) disentangling direct and indirect costs of children, and (iii) evaluating how governments and households perform to compensate for these costs. These aspects have important implications not only for potential parents, but also for the society as a whole. Child-related costs can affect the present and future demographic structure and consequently the national budgets of countries. In addition to addressing these important issues our analysis contributes to the recently growing literature on general satisfaction, of which economic wellbeing is an important domain (Sirgy 2017, Stanca 2012, Van Praag et al. 2003). In particular, we answer the following research questions:

1. How does childbirth affect the SEW of parents in the first years after childbirth?
2. How do direct and indirect costs contribute to the change in SEW after childbirth?
3. How do direct and indirect costs of children differ across European welfare regimes?
4. Do family-related benefits compensate for the child costs occurring shortly after childbirth?

In order to answer these questions we compare the subjective costs of children aged zero to three for 30 European countries separated into six welfare regime groups. Longitudinal data provided by the European Union Statistics on Income and Living Conditions (EU-SILC) for over 125,000 households are utilised. This extensive dataset is ex-ante harmonised and consequently provides ideal conditions for a comparative study covering the large majority of European countries. We apply panel methods including linear and ordinal response models with individual fixed effects (FE) and a range of robustness tests to yield reliable results.

The remainder of this paper is structured as follows. In Section 2, the theoretical framework is provided and the relevant literature is summarised. Following that, the dataset is introduced in Section 3 and descriptive statistics are presented in Section 4. The empirical strategy is explained in Section 5, along with the model specifications and estimation methods. Results are presented in Section 6, followed by a range of robustness analyses in Section 7. Section 8 concludes by summarising the study's findings and discussing potential limitations.

2 Background and Theoretical Framework

We interpret the effect of children on SEW as the total subjective net cost of children borne by households.[1] The total net cost of children is composed of direct costs d and indirect costs i, minus any family-related benefits b that a household receives. The relationship can be formalised as $T = d + i - b$ and is visualised in Figure 2. Direct costs of children reflect increased needs occasioned by the arrival of a child. These can be actual expenses as well as changes in parents' consumption behaviour after their babies are born. Examples for expenses are non-durable consumer goods such as diapers as well as durables like a bigger car or a larger apartment. If couples start buying expensive take-away food instead of cooking on a budget due to time constraints, this can also be considered an increase in direct costs.[2] Quantifying direct costs is not straightforward, yet literature for European countries suggests that the direct costs of a child equal on average 20 to 30 per cent of a childless couple's budget. Furthermore, evidence suggests that each additional child costs relatively less due to economies of scale (Letablier et al. 2009).

Indirect costs of children are defined as opportunity costs, i.e. forgone labour income due to the birth of a child. They can be separated into short-term indirect costs and long term

[1]Public costs of children can also be separated into direct costs such as schooling, and indirect costs such as unused human capital. This article, however, only discusses costs borne by households and individuals.

[2]Furthermore, time costs, if valued in monetary terms, contribute to the direct costs of children. Yet they are not included in this analysis due to data restrictions.

indirect costs. Short-term indirect costs are the immediate labour income loss around the birth of a child due to a reduction in working hours, usually during a period of maternity/ paternity leave and/or parental leave.[3] Long-term indirect costs include, for example, lower pension entitlements as well as the child-induced loss of professional networks and human capital caused by career breaks and reduced working hours (Letablier et al. 2009). Indirect costs of children are not gender-neutral, resulting in asymmetries such as the gender wage gap (Weichselbaumer & Winter-Ebmer 2005) or the female pension gap (Bettio et al. 2013). Overall, mothers earn less than comparable childless women (Cukrowska-Torzewska & Matysiak 2018).

Benefits compensate for the direct and indirect costs of children. They consist of in-kind and in-cash transfers, including tax deductions that target families. In the short term, maternity /paternity /parental leave benefits or other wage loss compensations are particularly relevant. Most European countries follow a common set of goals when implementing family policies, namely the reduction of family poverty and inequality, the reconciliation of family and work, gender equality and the support of children's wellbeing. Along with these policy objectives it is hoped to provide favourable conditions which allow individuals to have their desired number of children, so fertility objectives can be seen as an additional or overarching goal (Gauthier 2007, Kalwij 2010, Thévenon 2008, Thévenon & Luci 2012). However, European governments vary in how they approach these objectives, depending on prevalent norms, institutions and the macroeconomic context of the respective countries. Consequently, the magnitude and structure of child-related costs vary depending on the region. For example, the length of parental leaves influences indirect child costs via forgone income. Any benefits granted during leave – which can be lump-sum payments or a percentage of wages – curb these income losses and thus lower the total net cost of children. Furthermore, labour market policies also influence the costs of children. For example, employment protection might make it harder to re-enter the labour market after a break, but can also secure jobs for parents. Moreover, policies might differ in their effectiveness depending on the region, time and configuration. For example, evidence on the effect of family-related policies

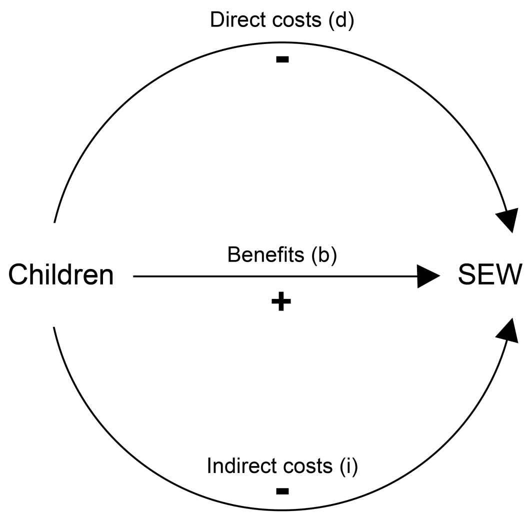


Figure 2: Components of the total net cost of children

[3]Maternity leave is taken by women shortly before and after the birth. Parental leave usually follows maternity leave and is granted to mothers and/or fathers to care for young children.

on fertility varies by the country observed and research methods applied (Björklund 2006, Kalwij 2010, Riphahn & Wiynck 2017). In addition to policies, the macroeconomic context impacts the costs of children. Higher income levels can increase the direct costs of children. By contrast, high unemployment affects the indirect costs of children by putting strain on the labour market and consequently makes it harder for parents to re-enter the labour market after taking parental leave.

European countries can be grouped based on how they approach family-related policies and on their macroeconomic conditions. In this paper, countries are grouped based on dimensions that are relevant for child-related costs. In particular, the following aspects were considered: the magnitude and configuration of public spendings on families (especially policies related to child care provision and maternity /paternity /parental leave), employment patterns of parents, work–family reconciliation, fertility patterns, attitudes towards the division of labour and relevant macroeconomic dimensions such as unemployment rates. Based on these criteria, six country groups can be differentiated. These groups are (i) Nordic countries, (ii) Western European countries, (iii) German-speaking countries, (iv) Liberal countries, (v) Southern European countries, (vi) and Central and Eastern European (CEE) countries (see Table 1 for the specific grouping). In fertility-related literature, European countries are often separated into four welfare regimes only, combining Western, German-speaking, and Liberal countries into one group (see, for example, D'Albis et al. 2017). However, these three regions are treated separately in the present analysis, given their substantial differences in the magnitude and configuration of public spendings on families, their patterns in parental employment and also their fertility patterns (Matysiak & Węziak-Białowolska 2016, OECD 2018, Thévenon 2011). Grouping countries will always result in a simplification, in particular since some countries might be equal according to one dimension but different in others. Yet combining similar countries has two main advantages. First, an assessable set of regions allows for straightforward conclusions, while analysing 30 countries separately would soon become incomprehensible. Second, insufficient sample sizes of small countries can be overcome by combining them with other, similar countries. The following paragraphs outline the six welfare regimes.

The Nordic countries form a relatively homogeneous group. Spendings on maternity and parental leave per child in per cent of GDP per capita are the highest in Europe. Along with this they have long parental leaves, also specifically dedicated to fathers (Thévenon 2008). Nevertheless, after taking that parental leave, the large majority of women in our sample re-enters the labour market full time. This is possible due to the wide coverage of public childcare, resulting in the highest share of children younger than two in formal care (OECD

Table 1: Country groups based on family-related policies, norms, institutions, and macroeconomic indicators

Region	Countries
Nordic:	Denmark, Finland, Iceland, Norway, Sweden
Western:	Belgium, France, Netherlands
German-speaking:	Austria, Switzerland
Liberal:	Ireland, UK
Southern:	Cyprus, Greece, Spain, Italy, Malta, Portugal
CEE:	Bulgaria, Czech Republic, Estonia, Croatia, Hungary, Lithuania, Latvia, Poland, Romania, Serbia, Slovenia, Slovakia

2018, Thévenon 2008). Furthermore, women do not spend as much time on unpaid work as in other European regions (OECD 2018) and the overall opinion on the division of labour seems less traditional (Matysiak & Węziak-Białowolska 2016). For example, the Nordic countries have a high share of individuals agreeing with the statement that "paid leave should be shared equally between mothers and fathers". Fertility rates in 2015 were among the highest in the EU and OECD countries (OECD 2018).

The group of Western countries consists of France, Belgium and the Netherlands. In contrast to the Nordic countries, weeks of paid parental leave granted are below European average there. On average, Western mothers re-enter the labour market rather quickly after giving birth and are also the most active on the labour market in our sample. However, while France and Belgium have high rates of mothers in full-time employment, the Netherlands have one of the highest share of women in part-time employment in Europe. The quick return to the labour market is facilitated by the substantial provision of childcare and pre-school services for children younger than two (OECD 2018). Overall, public spendings on families in per cent of GDP are above OECD average (Thévenon & Luci 2012).

German-speaking countries included in EU-SILC are Austria and Switzerland.[4] Compared to the Nordic and Western countries, they promote a strong division of labour with little support for combining family and work (Matysiak & Węziak-Białowolska 2016). Parental leaves are long and generously paid in Austria, but not so much compensated in Switzerland (OECD 2018). Most of the women from German-speaking countries in our sample did not re-enter the labour market in the first two years after giving birth. Also, coverage of child care for children under the age of three is low, in particular in the countryside. Public spending on families in per cent of GDP is still above OECD average (Thévenon & Luci 2012), but the focus is very

[4]Germany did not provide EU-SILC longitudinal data.

much on high non-means tested cash benefits. Fertility rates are well below OECD as well as below EU average (OECD 2018).

Liberal countries, consisting of Ireland and the UK, are at the very bottom of the list when it comes to policies supporting the reconciliation of work and family (Matysiak & Węziak-Białowolska 2016). Mothers are encouraged to work, but childcare for children younger than three is mostly private and expensive (Thévenon 2008). Nevertheless, the share of children below the age of two in formal care is above European average (OECD 2018) and once children grow older, more public childcare is provided for them (Thévenon 2008). The little benefits available target low-income families and consist of benefits and tax deductions rather than in-kind support (Thévenon 2008, Thévenon & Luci 2012).

Southern Europe is characterised by the lowest total fertility rates in 2015 in our sample (OECD 2018). Parental leaves can be long, but income replacement rates during leave are extremely low (Thévenon 2008). In general, public spendings on families in per cent of GDP are below OECD average (Thévenon & Luci 2012). Along with rigid working hours and a strong employment protection legislation, this makes it hard to combine work and family (Matysiak & Węziak-Białowolska 2016). Child care facilities are scarce, which in the case of Italy might be linked to the low maternal labour market participation (Del Boca & Vuri 2007). In addition, the South is by far the region with the highest unemployment in Europe (Eurostat 2018*b*). Yet not all population groups are equally affected by the high unemployment. Women between ages 16 to 40 that are in a relationship – which is the sample analysed in this paper – have relatively high employment rates in Southern Europe.

CEE countries are the most heterogeneous group in our sample (Javornik 2014, Szelewa & Polakowski 2008), yet creating subcategories is not all that straightforward since some countries are similar by one dimension, but differ by others. One commonality is the large share of mothers not actively participating in the labour market. Also, the rate of young children in formal care is below European average in most CEE countries. Women spend relatively more time on unpaid work than in other regions (OECD 2018) and gender norms are rather conservative (Matysiak & Węziak-Białowolska 2016).

In all European welfare regimes, children have an average negative impact on couples' finances (Aassve et al. 2005). Furthermore, children affect their parents' general wellbeing. However, evidence on the direction of this effect is inconclusive (Riederer 2018). Most findings indicate that parenthood decreases life satisfaction (see, for example, Moglie et al. 2018, Stanca 2012), yet not all (see, for example, Baranowska & Matysiak 2011). While satisfied people are more likely to have children in the first place (Cetre et al. 2016), the birth-related drop in parents' life satisfaction is associated with a decrease in fertility expectations (Luppi & Mencarini 2018). Since SEW is an important domain of general wellbeing, these patterns are presumably intertwined. Lower financial satisfaction of parents seems to be an important explanation for their lower life satisfaction as compared to non-parents (Stanca 2012). However, analysing these interdependencies is beyond the scope of this paper.

3 Data

The empirical analysis relies on EU-SILC longitudinal data which was collected yearly from 2004 to 2015 by Eurostat in cooperation with European National Statistical Institutes[5] (Eurostat 2018*c*). In total, 31 European countries participated in the survey, 30 of which are considered in this study.[6] Advantageously, EU-SILC data are harmonised across all countries and cover a wide range of economic and demographic information of individuals (European Commission 2017). The survey is designed as a rotating panel, with most countries following the participants for a maximum of four years. As an exception, France provides a nine-year rotating panel and Norway provides an eight-year one. For comparability reasons and due to panel attrition, only the first four years are considered in these two countries.

We restrict our sample to married and unmarried heterosexual couples living together, with women aged 16 to 40 and men aged 16 an older. The age boundaries for women are based on the reproduction behaviour observed in the sample. Additionally, dropping older mothers reduces the risk of wrongly attributed birth orders. The older a woman, the higher the likelihood of a child no longer living in the same household. EU-SILC only captures children who live in their parents' household, which can result in a bias in the number of children, especially for older mothers (Greulich & Dasré 2017). In order to clearly identify direct and indirect costs induced by the birth of a child, only couples living without additional adults are considered. This way, income from adult children or grandparents does not distort the income variables. Thus, we do not analyse households with more than two generations or

[5]The countries fully participating since 2004 are Austria, Belgium, Denmark, Estonia, Greece, Spain, Finland, France, Ireland, Iceland, Italy, Norway, Portugal and Sweden. One year later, Cyprus, Czech Republic, Hungary, Lithuania, Latvia, the Netherlands, Slovenia, Slovakia and the UK joined. Bulgaria and Malta have been participating since 2006, yet Malta has no observations for 2015. Romania joined in 2007 but has very few observations for the years 2009 to 2012. Croatia joined in 2010 and Switzerland in 2011. Serbia joined most recently and has provided data since 2013. Denmark, Greece and Norway provided some data for 2003 already, however, we start our analysis in 2004.

[6]Luxembourg is the only participating country not considered in this analysis. Most data files provided by Eurostat had household identification numbers that were attributed to more than one household. These duplicates could be identified by the authors for all countries but Luxembourg.

those with children older than 16. Once the oldest child turns 16, the household is dropped. After the age of 16, individuals are considered as adults and only included in the sample if they have their own household with a partner, but without additional adults.

Each household respondent in EU-SILC is asked to evaluate the ability to make ends meet of his or her household. Due to the longitudinal design of the survey, it is possible to analyse SEW of couples before and after the birth of a baby. This way, the impact of children on SEW can be clearly identified. SEW is operationalised based on the following survey question: "*A household may have different sources of income and more than one household member may contribute to it. Thinking of your household's total income, is your household able to make ends meet, namely, to pay for its usual necessary expenses?*" The question is answered by the household respondent[7] based on a Likert scale with categories (1) "*with great difficulty*, (2) "*with difficulty*", (3) "*with some difficulty*", (4) "*fairly easily*", (5) "*easily*", and (6) "*very easily.*"[8] The survey question is targeting current economic wellbeing rather than explicitly asking to refer to a particular income period. In general, subjective assessments of financial circumstances seem to primarily reflect day-to-day conditions rather than more distant concerns such as having enough savings for retirement (Sass et al. 2015). Table 2 provides average SEW before and after the birth of a couple's first child. Although mean values of ordered categorical variables need to be treated with caution, they can still be quite informative. The overall level of SEW varies very much by country. For example, average SEW is less than two in Greece, but 4.5 in Norway. If plotted against GDP, a clear positive correlation between SEW and aggregated income is ascertained. A similar pattern can be observed among first-time parents. The total means of SEW provided in Table 2 show that the overall level of SEW is lowest in Southern European (3.37) and CEE countries (3.38), and highest in the Nordic countries (4.51).

Given that the main effect of interest is that of a newborn child on SEW, the sample is arranged accordingly. Only children who live at least with their mother or their father are considered. Also, households that have an increase in the number of children due to an older child joining the family are dropped, so that changes in the number of children only occur due

[7]We argue that the evaluation by the household respondent is representative for the SEW of the entire household. The EU-SILC ad-hoc module 2013 provides information on subjective economic wellbeing by individuals, however, based on a slightly different question. Every household member was asked to evaluate their satisfaction with their financial situation on a Likert scale ranging from (0) "*not at all satisfied*" to (10) "*completely satisfied*" (Eurostat 2018*a*). When comparing the distribution of answers by household respondents with that of other household members, no systematic deviation can be found.

[8]Other studies based on this particular question from the EU-SILC include Cracolici et al. (2012, 2014), Guagnano et al. (2016), Palomäki (2017, 2018) and Buttler (2013). However, none of them focuses on the relationship between SEW and children.

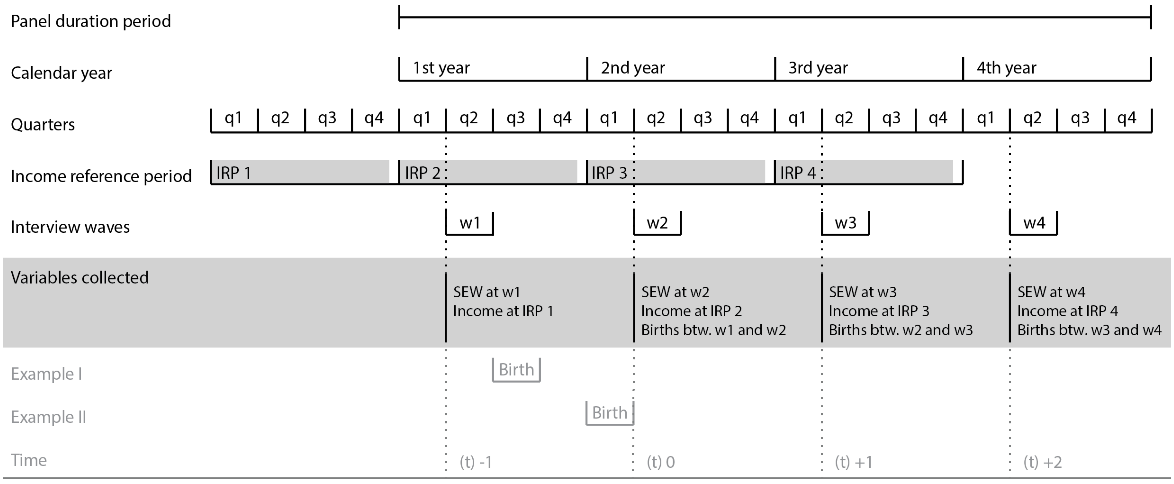
to births. Hence, if one partner has a child outside the relationship and that child moves into the couple's household, or if a couple adopts an older child, the household is not considered. Furthermore, couples that lost a child before the age of 16 are dropped. This loss could either be because the child passed away, or because it moved somewhere else. Also, couples that had more than one child from one wave to the other are dropped. These multiple births can either be due to the birth of actual multiples, or because a couple had two children shortly after one another. Households in which the household respondent changed over time are also dropped to facilitate the application of individual FE, which is explained in more detail in Section 5. Finally, only households with consecutive observations are included in the sample. If a household has missing observations within the panel duration period, it is dropped. This leaves a restricted sample of 127,916 households[9] of which 17 per cent participated in all four waves, 15 per cent participated in three consecutive waves, 26 per cent in two consecutive waves, and 42 per cent in one wave only. In total, the sample includes 262,565 observations.

Figure 3 illustrates the default panel structure. As mentioned above, the panel duration period consists of a maximum of four waves. Changes in the number of children and concomitantly the arrival of a newborn can be observed for a maximum of three times. For more clarity, Figure 3 provides examples. In example I, a child is born between wave 1 and wave 2. Therefore, the newborn is first registered in wave 2. A variable "number of children" would be x in wave 1 and x+1 in wave 2. The corresponding SEW is collected in wave 2 as well. When respondents evaluate their SEW, they are expected to refer to their household's current situation rather than to a specific period (European Commission 2017). Consequently, the day that a child is born and the corresponding SEW can be months apart.[10] Still, the birth always takes place before the evaluation of SEW. This fixed sequence allows to clearly identify the impact of children on SEW without issues of inverse causality.

[9]Implausible observations that reported negative labour income from employment or negative family-related benefits are also dropped. One Spanish household is excluded because it reported 99,999 Euros of family-related benefits per year.

[10]The spacing between the birth and the collection of SEW depends on the time of the birth and the time of the interviews. The births in the sample are roughly uniformly distributed over the year, with slightly more births in the second half of the year. Consequently, the difference between the birth and the collection of SEW varies within a certain period that is defined by the interval between interviews. 73 per cent of all interviews take place in the same quarter as the previous interview. In these cases, the possible maximum period between the birth of a child and the corresponding interview wave is twelve months. Hence, the birth and the collection of SEW could be twelve months apart if the baby was born immediately after the previous interview. In 14 per cent of the observations, the interview takes place one quarter earlier than in the previous wave. In theses cases, the maximum difference between the birth of a child and the corresponding interview wave is nine months. In nine per cent of all observations, the interview takes place one quarter later, which increases the maximum difference to 15 months. Only in four per cent of all observations did the interview quarter deviate by more than one from the previous interview quarter. So the possible minimum delay between the childbirth and the report of SEW is one day, the maximum delay is 24 month.

Figure 3: Default panel structure and examples



The income reference period (IRP) and the period between two interview waves are shifted, which is also shown in Figure 3. Hence, the income variable refers to a different time period than the SEW variable.[11] For the majority of the countries observed, the IRP is the previous calendar year.[12] Consequently, the income variable captures the income from the previous calender year. However, the survey interviews in which the SEW variable is collected take place after the IRP, namely in the following year. The majority of survey participants are interviewed in the second quarter, which is the scenario shown in Figure 3. For example, interview wave 2 takes place in the 2nd calendar year, during IRP 3. Hence, the collected SEW also refers to IRP 3 but income is collected from the previous year, in IRP 2. In our analysis, we want to link changes in SEW to changes in the number of children and changes in income. For this, we need to identify which observation of income is relevant for the observed SEW. The shift of IRP and the interviews has major consequences for our identification strategy. By the time the variable SEW is collected, the corresponding IRP is already over.

The shift in IRP and the survey interviews is not only relevant for the link between SEW and income, but also for the link between the birth and income. Again, take the examples in Figure 3 by way of illustration. Both children in example I and II are born between wave 1 and wave 2. Consequently, the survey registers both births at wave 2. However, the babys

[11] The European Commission allows a maximum of 8 months between the end of the income reference period and the interview, unless income data is based on register, in which case the interval can be up to 12 months (European Commission 2017). Income is based on register data in Denmark, Finland, Iceland, the Netherlands, Norway, Slovenia and Sweden (Joint Programming Initiative 2018).

[12] Exceptions are Ireland and the UK. In Ireland, the income of the last 12 months preceding the actual interview is considered. In the UK, the IRP is the current year (Mack & Lange 2015). To make the data provided by the UK comparable with the other countries, the IRP from the previous wave is used in the analysis for the UK. Consequently, the first observations of each households from the UK are not considered in the analysis, as they do not have a corresponding IRP yet.

are born in different IRPs. The birth in Example I takes place in the third quarter of the first year, hence in IRP 2. The birth in Example II, however, takes place in the first quarter of the second year, hence in IRP 3. One could think that the precise way would be to link the birth in Example I to IRP 2 and the birth in Example II to IRP 3. Yet there is one problem remaining. The IRPs observed in both examples are likely to cover periods during which the mothers were working and periods in which they were not working. In Example I, IRP 2 might still cover labour income before the mother went into maternity leave. Furthermore, that same mother might not yet work at the beginning of IRP 3, but she might start again at the end of it. A similar mixture is possible in Example II. That mother might already be in maternity leave in IRP 2 or go back to work in IRP 3. We expect SEW to drop when mothers' labour income drops due to the birth of their child. Unfortunately, EU-SILC only provides income data on a yearly basis. Consequently, it is not possible to clearly assign income to times in which mothers are working, and times in which they are not. Changes in SEW will always be related to changes in income that refer to yearly income and consequently might be a mixture of income during employment and income during maternity /paternity /parental leave. Hence, estimates based on this relationship are always somewhat imprecise. This inaccuracy is however acknowledged by implementing a robustness analysis. First, variables from interview wave 1 are linked to income from IRP 1. Second, as a robustness check, variables from interview wave 1 are linked to income from IRP 2, hence, a lead variable is added (the exact implementation is explained in Section 7). That way, it can be evaluated whether the shift in IRP and the interviews biases the results.

With the dataset presented, only the short-term costs of children can be captured. Couples are followed for a maximum of four years. Even if a child is born at the earliest possible time during the panel duration period, namely between the first and second wave, only a maximum of three values of SEW after that birth can be observed. When using income from the following IRP for the robustness analysis, only a maximum of two observations after that birth can be analysed. Consequently, long-term indirect costs such as lower pension entitlements are beyond the scope of this paper. Furthermore, potential adaptations to the costs of children cannot be observed. So called set-point theories state that changes in wellbeing only occur temporarily. In the long run, individuals adapt to new circumstances and return to their baseline level of wellbeing (Clark et al. 2004, 2008). For example, Myrskylä & Margolis (2014) show that in Germany and the UK, happiness of parents increases around the birth of their first child, but returns to before-birth levels afterwards. These findings are likely to be relevant for SEW too, but cannot be captured with EU-SILC data.

4 Descriptive Evidence

Changes in income after the birth of a child vary considerably across regions. Table 2 provides an overview of different income components before and after the arrival of the first child. The table is based on a subsample that had their first child, but no additional child, during the observed period. That way the differences in income with and without a child become clearly evident. Yet the subsampling results in small numbers of observations for some of the cells, especially in German-speaking and Liberal countries. Moreover, the subsample is a very particular group as it only includes couples that will soon have their first child or just had their first child. For the regression analysis described in Section 5, a much larger sample is utilised. This larger sample also includes couples with no children or more than one child. All income components in Table 2 are provided per annum and adjusted for inflation and differences in purchasing power to make them comparable across countries and time.[13] Since income levels vary even after controlling for differences in purchasing power, relative changes are presented as well. For this purpose, mean regional income is set to 100 per cent at time -1, which is the year before the birth was registered for the first time.

Labour income of men and women is computed as the respective employee cash or near-cash income with neither taxes nor social contributions being subtracted.[14] It includes income in cash and in kind as well as any social insurance contributions paid by the employer. Income from self-employment is added if not missing.[15] Table 2 shows that on average women experience substantial labour income losses in the first two years after the birth of their first child. These losses contribute to the indirect cost of children. In relative terms, labour income losses are largest in German-speaking countries, where the average labour income of women one year after the birth (time +1) is only 20.4 per cent of the average labour income in the year before the birth (time -1). Labour income of mothers in the Nordic countries drops to 54.6 per cent, and in CEE countries to 65.7 per cent. The drop is lowest in the West, where labour income of mothers remains at 85.1 per cent, followed by 77.3 per cent in the South. Table 2 also shows that labour income of women does not immediately drop to its minimum at time 0, where the birth is observed first. Instead, it keeps decreasing between time 0 and +1. This is likely due to the shift between IRP and the interview waves described above.

[13] Data on inflation and purchasing power parities are extracted from the Eurostat database. Inflation indices are based on "*prc hicp aind*" (Eurostat 2018*d*), and purchasing power parities on "*prc ppp ind*" (Eurostat 2018*e*). As suggested by Mack & Lange (2015), actual individual consumption is used as a base for purchasing power. For all countries, inflation indices and purchasing power parities from the previous year are used, given that income in the dataset refers to the IRP, which is the previous year. Since the IRP of Ireland does not refer to an actual calendar year, taking yearly data on inflation and purchasing power parity is somewhat imprecise for Ireland.

[14] Gross income instead of net income was used because net income is missing for one-third of the observations in EU-SILC.

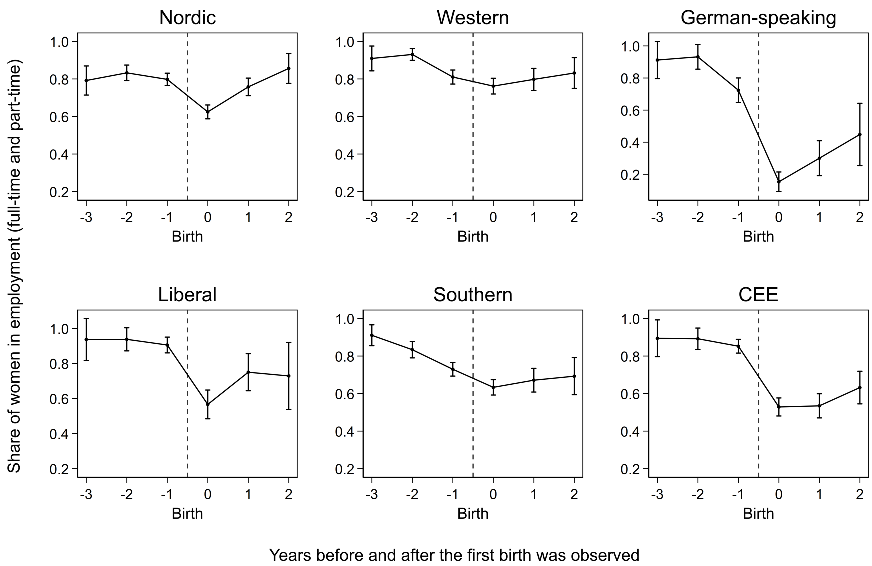
[15] Observations were dropped if they reported labour income from employment below zero. Labour income from self-employment, however, is allowed to be negative, resulting in below-zero values of labour income.

Table 2: Average income components and SEW before and after the birth of the first child by region

Time	Household income		Labour income				Benefits	SEW		N
			Women		Men					
	Absolute	%	Absolute	%	Absolute	%	Absolute	Absolute	%	
Nordic										
-2	38,481	96.6%	21,757	97.2%	29,985	98.3%	110	4.59	100.2%	552
-1	39,839	100.0%	22,379	100.0%	30,504	100.0%	203	4.58	100.0%	1,138
0	40,949	102.8%	16,326	73.0%	31,321	102.7%	5,144	4.42	96.6%	1,202
1	41,816	105.0%	12,227	54.6%	32,127	105.3%	9,663	4.44	97.0%	571
Total	40,271		18,172		30,984		3,780	4.51		
Western										
-2	38,291	97.3%	20,805	97.6%	26,597	92.8%	254	4.19	104.5%	337
-1	39,347	100.0%	21,308	100.0%	28,675	100.0%	239	4.01	100.0%	763
0	40,991	104.2%	19,652	92.2%	29,841	104.1%	1,578	3.65	91.0%	765
1	40,528	103.0%	18,141	85.1%	29,251	102.0%	3,030	3.48	86.7%	362
Total	39,789		19,977		28,591		1,275	3.83		
German-speaking										
-2	50,059	107.3%	26,842	104.4%	42,370	116.9%	18	4.20	104.2%	65
-1	46,647	100.0%	25,714	100.0%	36,235	100.0%	129	4.03	100.0%	195
0	46,965	100.7%	16,929	65.8%	36,829	101.6%	5,402	3.95	98.0%	195
1	41,262	88.5%	5,253	20.4%	39,153	108.1%	8,640	3.92	97.4%	93
Total	46,233		18,685		38,647		3,547	4.03		
Liberal										
-2	53,959	95.7%	27,784	90.6%	45,228	98.2%	54	4.38	109.5%	74
-1	56,392	100.0%	30,670	100.0%	46,035	100.0%	36	4.00	100.0%	232
0	53,573	95.0%	28,339	92.4%	46,240	100.4%	641	3.79	94.8%	232
1	52,539	93.2%	21,998	71.7%	43,151	93.7%	4,000	3.70	92.4%	93
Total	54,116		27,198		45,164		1,183	3.97		
Southern										
-2	39,836	107.7%	20,549	115.7%	29,510	107.0%	77	3.57	106.2%	414
-1	37,003	100.0%	17,754	100.0%	27,585	100.0%	128	3.36	100.0%	1,150
0	37,979	102.6%	15,648	88.1%	27,354	99.2%	1,413	3.29	98.1%	1,203
1	36,687	99.1%	13,730	77.3%	26,840	97.3%	1,459	3.26	97.1%	512
Total	37,876		16,920		27,822		769	3.37		
CEE										
-2	27,254	115.5%	15,425	115.2%	20,178	116.9%	40	3.59	104.8%	300
-1	23,587	100.0%	13,394	100.0%	17,257	100.0%	15	3.43	100.0%	903
0	26,047	110.4%	10,662	79.6%	19,285	111.8%	2,325	3.32	96.8%	912
1	25,521	108.2%	8,801	65.7%	18,867	109.3%	4,131	3.17	92.4%	472
Total	25,602		12,071		18,897		1,628	3.38		

Note: The weighted means presented in this table are based on a subsample of 4,709 couples that had their first child but no additional child during the panel duration period. Time denotes the years before and after the child is born. Zero refers to the first wave in which a new child was observed. The relative changes are normalised and set to 100 per cent at the year before the birth was observed. All income values are provided per annum and are adjusted for inflation and differences in purchasing power. Household income is a net value, labour income a gross value. The income variables in the table are not lead variables. Benefits include family-related benefits only. N refers to the number of observations per group.

Figure 4: Share of employed women before and after the birth of their first child



Note: The weighted means presented in this graph are based on the 4,709 couples in the sample that had their first child but no additional child during the panel duration period. In total, they provide 14,638 observations. Time denotes the years before and after the child is born, zero refers to the first wave in which a new child was observed. The share of employment is based on women's self-defined current economic status, where work is defined as any work for pay or profit. Women in maternity leave are considered as employed, while women in parental leave are not.

The main reason for the decline of mothers' labour income is their reduction of paid work. Figure 4 shows the share of employed mothers before and after they gave birth to their first child. All regions have similar shares of employed soon-to-be mothers to start with, however, the share drops drastically after the child arrives in Nordic and Liberal countries, and even more so in German-speaking and CEE countries. While the share of employed women in the Nordic countries returns to its initial level after two years, it remains at low levels in German-speaking and CEE countries. Furthermore, most of the Nordic countries go back to full-time work, while mothers in Austria and Switzerland start working part-time. The drop after childbirth is smallest in Western countries. As mentioned in Section 2, women in France, Belgium and the Netherlands have larger incentives to quickly re-enter the labour market after having children. This pattern is confirmed by Western womens' employment status in our sample. The drop is also not as pronounced in Southern European countries. Moreover, employment of Southern European women that will soon have their first child is much higher than that of Southern European women as a whole. A possible explanation for the high employment is the fact that the observed group is very selective, as it only includes women aged 16 to 40 that are in relationships and will soon have their first child.

Contrary to women, men's labour income slightly increases after the birth of their first child in all regions except German-speaking and Liberal countries. There are no indications of an increase in average weekly working hours by fathers in our sample. Hence, the increase in labour income of men is likely due to an increase in age and experience, or due to the so-called fatherhood wage premium (Killewald 2012).

Disposable household income of couples in our sample consists mainly of net labour income and net benefits, but could also include other income components such as net asset income. Any social insurance contributions or taxes on income and wealth are subtracted. Consequently, tax deductions linked to the birth of a child are considered, for example, family tax splitting. If disposable income were to be considered separately for each partner, tax deductions could not be observed. Remarkably, the average disposable household income does not drop after the birth of a child in any of the regions save the German-speaking and Liberal countries.[16] Constant disposable income after the birth does not signal an unchanged standard of living, because the newborn increases needs. Still, the stabilisation of disposable household income is surprising given the extensive drop in women's labour market income.

As shown in Table 2, the income losses of first-time mothers are compensated by two other income components, namely men's increased labour income and benefits. Only average values are evaluated, hence, we do not analyse if this finding holds along the income distribution. Theoretically, benefits consist of in-kind and in-cash transfers. With the data provided by EU-SILC, only in-cash transfers can be observed, however. In particular, benefits include financial support for bringing up children such as birth grants, parental-leave benefits[17] or child allowances received during the respective IRP. Furthermore, they include housing allowances and financial assistance to individuals who take care of relatives other than children.[18] On average, these benefits increase drastically in the year after childbirth and keep increasing in the second year after childbirth. At time $+1$, family-related benefits in relation to the total household income are largest in the Nordic countries (23.1 per cent). In German-speaking countries, benefits are also high and make up 20.9 per cent of the total household income. Even though benefits in German-speaking countries are generous, household income drops after the birth of the first child due to the extensive reduction in the labour market income

[16] If the birth of a child causes a drop in saving or even triggers dissaving, it could not be observed with EU-SILC data since the data do not provide any information on savings.

[17] Maternity and parental-leave benefits are included in benefits, unless payments cannot be separately identified from labour income. This can be the case if (i) payments made by the employer are in lieu of salaries and wages through a social insurance scheme, or if (ii) payments are made by the employer as a supplement to payments from a social insurance scheme (European Commission 2017).

[18] Financial assistance to individuals who support relatives other than children cannot be identified separately in the dataset.

of first-time mothers. In CEE countries, benefits at time $+1$ make 16.2 per cent of the total household income. Given that the CEE region is a very heterogeneous group, this number has to be interpreted carefully. For example, family-related benefits are high in Slovenia, Estonia and Hungary. Yet they are low in Serbia and Romania. In the remaining regions (Western, Liberal and Southern), family-related benefits make up less than ten per cent of the total disposable household income. In summary, the income and employment pattern observed around the birth of the first child seem very interlinked. Naturally, female labour income losses are largest in regions where women remain at home for a long time after giving birth. Furthermore, the size of family-related benefits seems negatively correlated with maternal labour market participation in the first years after childbirth.

5 Method

5.1 Modelling the Effect of Children on SEW

We analyse the effect of young children on SEW in each of the six regions, considering changes in household and labour income. SEW is assumed to be a function of childbirth, income, and other intervening variables. Thus, the underlying model can be written as follows

$$\text{SEW}_{jt} = \beta_0 + \beta_1 \text{CHILDREN}_{jt} + \beta_2 X_{jt} + \beta_3 \text{INCOME}_{jt} + \gamma Z_i + \mu_t + \alpha_i + \varepsilon_{jt} \quad (0)$$

where CHILDREN_{jt} indicates the number of children in household j at time t. Variable INCOME_{jt} is either specified as the total net household income or as the labour income of both partners, depending on the estimated model (see Section 5.2 for details). Term X_{jt} stands for other time-varying variables that affect SEW, in particular age and health. Z_i denotes observable time-constant characteristics, i.e. variables such as sex and nationality that do not usually change during the panel duration period and consequently drop out of a panel analysis. α_i and ε_{jt} are both error terms. ε_{jt} is allowed to vary over households and time, whereas α_i is time-constant for each household observed. Thus, α_i is a household FE that captures unobservable time-invariant characteristics such as personality traits, which are discussed in more detail below. A time FE μ_t is also included in the model, i.e. an intercept that varies with time. It accounts for time trends and shocks such as the economic crisis. Terms β_1, β_2, β_3, and γ are coefficients, and β_0 denotes the constant. Summary statistics for all variables used in the analysis are reported in Appendix A.1.

The main independent variable of interests is CHILDREN_{jt}, which is the number of children below the age of 16 in household j at time t. It is a categorical variable ranging from zero to four, where the maximum category of four includes any observation with four or more children. Up until now, we mainly discussed the effect of the first child on SEW, however, in the regression analysis we consider children of all birth orders. Since we are applying a panel approach, it is not necessary to operationalise the birth of a child directly in order to estimate the effect of an additional child on SEW. It is sufficient to have a variable quantifying the number of children in each household in each panel wave. Any increase in that variable then indicates the birth of a child. Coefficient β_1 quantifies the costs of children. More specifically, β_1 represents the average reduction in SEW due to the arrival of an additional child. The variable INCOME_{jt} is either operationalised as total disposable household income in household j at time t, or as the labour income of each partner in household j at time t. It is given in thousands of euros to avoid uninterpretably small coefficients. Its components were already explained in Section 3, robustness analyses regarding the variable's skewedness are described in Section 7.

Term X_{jt} denotes the control variables age, health status of both partners and year FEs. Changes in health are likely to alter needs, which is why the health status of both partners is included in all models. Health status is operationalised based on the following survey question: "*How is your health in general? Is it...*" which is answered by each household member separately. The potential answers are (1) "*very good*", (2) "*good*", (3) "*fair*", (4) "*bad*", and (5) "*very bad*". The question is supposed to target different dimensions of health such as physical health or emotional health (European Commission 2017). The five answers are dichotomised into a category "bad health" if the answers were (4) or (5) and "no bad health" for all other answers. Because 14 per cent of all women and 17 per cent of all men have missing values for this variable, a third category is created indicating if values are missing. The age of both partners is also included as a control variable. It is operationalised as a categorical variable, consisting of five-year age groups with an open-ended category 60 plus for men. Including age allows us, among others, to control for a potential increase in wages with age.

The model described above is estimated with panel methods. This way, time-invariant unobserved heterogeneity of households is accounted for. One such unobservable time-constant characteristic is personality traits. Literature indicates that individuals have different personality traits that influence the way they perceive the world and the way they answer survey questions (for a discussion, see Ng 2015, Ravallion & Lokshin 2001, Sirgy 2017, Clark & Oswald 2002). Personality traits can be very straightforward, like a pessimistic view of the world versus an optimistic view of the world. In the context of survey questions, it can also mean that there are differences in the way individuals interpret the thresholds between survey answer categories, differences in the variation of answers and differences in the tendency to choose extreme answers. Personality traits and other time-constant unobservables are problematic, because they are likely to influence the dependent variable as well as the explanatory variables. In a cross-sectional analysis, unobserved time-constant heterogeneity is ignored. Still, the majority of studies analysing SEW rely on cross-sectional data only, often because longitudinal data is not available (see, for example, Arber et al. 2014, Cracolici et al. 2012, 2014, Guagnano et al. 2016, Hayo & Seifert 2003, Hsieh 2004, Malone et al. 2010, Sass et al. 2015, Vera-Toscano et al. 2006, Palomäki 2017). There are, however, exceptions, for instance Buddelmeyer et al. (2017), Dudel et al. (2016), Palomäki (2018), or Ravallion & Lokshin (2001). We follow their example and exploit panel data to reliably estimate the effect of children on SEW in the light of unobservable time-constant variables. By including household FE, we are further able to control for observable time-constant variables that influence SEW, but where data are not available for in EU-SILC.

FE estimators are also called within estimators, since their estimated coefficients are based on within-variation only. In other words, only households with changes in their variables contribute to the βs (Longhi & Nandi 2015). This approach results in a lot of information being unused and potentially large standard errors as opposed to between-household estimations. This is because little variation within a household is likely, whereas between-household variation in SEW and the explanatory variables is large. Consequently, estimated coefficients from panel methods have smaller R-squared and larger standard errors than estimates from cross-sectional analysis, but provide more reliable results.

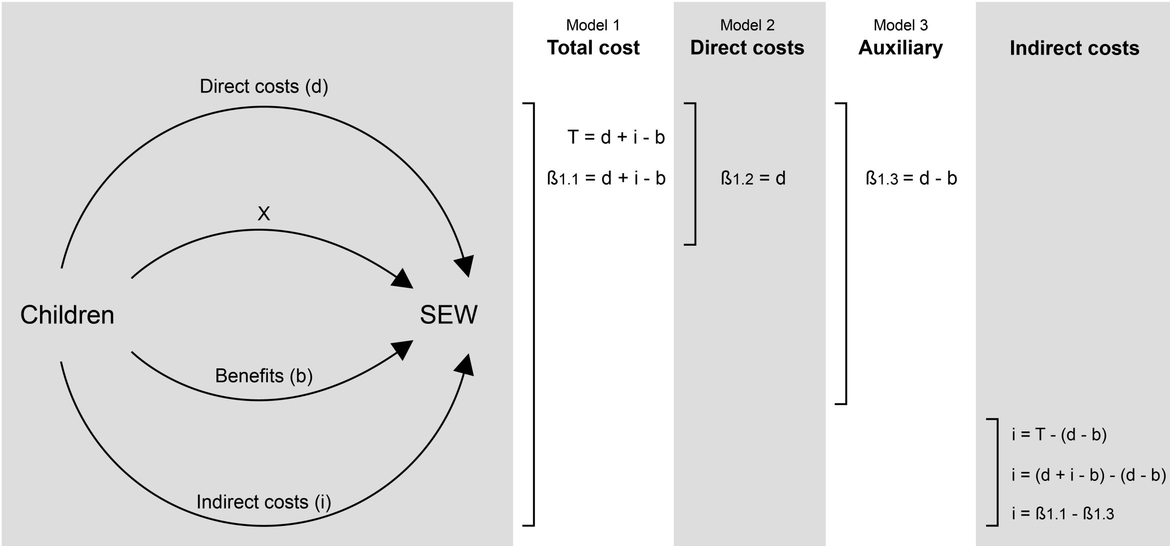
5.2 Disentangling Direct and Indirect Costs of Children

The primary aim of this paper is to quantify the effect of young children on SEW, hereby capturing the total net cost of children. In addition, we aim to decompose the total net cost of children into direct and indirect costs. For this purpose, three different empirical specifications of the model described in Section 5.1 are estimated, separately for each region. These three specifications are then used to disentangle the direct and indirect costs of children. The approach is explained in the following paragraphs and visualised in Figure 5.

We start by estimating the total net cost of children, hence, the average total effect of children on SEW. For this purpose, the following model, denoted as Model 1, is estimated

$$\mathrm{SEW}_{jt} = \beta_0 + \beta_{1.1}\mathrm{CHILDREN}_{jt} + \beta_2 X_{jt} + \mu_t + \varepsilon_{jt} \qquad (1)$$

Figure 5: Disentangling direct and indirect costs of children



Since income is not controlled for in Model 1, the estimated value of $\beta_{1.1}$ captures the total average reduction in SEW caused by the arrival of an additional child in the respective country group. This effect can be interpreted as the total net cost of children, combining the impact of increased needs (direct costs) and income losses (indirect costs) after benefits. As mentioned above, this relation can be formalised as $T = d + i - b$. We can replace the total subjective net cost T with $\beta_{1.1}$ to get

$$\beta_{1.1} = d + i - b$$

In order to estimate the direct costs caused by young children, a second model is estimated. In that second model, we control for changes in labour income and family-related benefits, so that only the direct costs of children are captured. For this purpose, total disposable household income is added to the model, which includes labour income and benefits. Importantly, disposable household income also includes tax deductions, such as family splitting, which constitute a relevant family policy instrument in some regions and are calculated based on the total household income of families. A robustness analysis concerning the operationalisation of disposable household income is discussed in Section 7. Model 2 is specified as follows

$$\text{SEW}_{jt} = \beta_0 + \beta_{1.2}\text{CHILDREN}_{jt} + \beta_2 X_{jt} + \beta_3\text{HOUSEHOLD INCOME}_{jt} + \mu_t + \varepsilon_{jt} \quad (2)$$

Coefficient $\beta_{1.2}$ in Model 2 can directly be interpreted as the direct costs of children in the respective region. More specifically, $\beta_{1.2}$ indicates the costs of children if household income were to remain constant after the birth of a child. Any changes in labour income as well as family-related benefits are controlled for. Consequently, $\beta_{1.2}$ solely reflects the increase in needs induced by children, more specifically

$$\beta_{1.2} = d$$

Given that the direct costs d are only a part of the total net cost T, the total net cost of children is larger than direct costs only. Consequently, $\beta_{1.1}$ is expected to be larger than $\beta_{1.2}$ unless direct costs are compensated for by other income components.

While the total net cost of children and the direct costs of children can directly be quantified via $\beta_{1.1}$ and $\beta_{1.2}$, respectively, the indirect costs of children can only be identified as a difference based on the components in equation $T = d + i - b$. Therefore, a third model is estimated, in which we only control for the indirect costs of children by adding labour income to our model. Model 3 looks as follows

$$\text{SEW}_{jt} = \beta_0 + \beta_{1.3}\text{CHILDREN}_{jt} + \beta_2 X_{jt} + \beta_3\text{LABOUR INCOME}_{jt} + \mu_t + \varepsilon_{jt} \quad (3)$$

By controlling for changes in labour income, we control for indirect costs of children. Hence, the i in $T = d + i - b$ is controlled for, which leaves us with $d - b$ only. It follows that

$$\beta_{1.3} = d - b$$

Since changes in family-related benefits are not controlled for in Model 3, $\beta_{1.3}$ is expected to be smaller than $\beta_{1.2}$. Coefficient $\beta_{1.3}$ will be used as an auxiliary to calculate the indirect costs of children. We now have all components to disentangle the direct costs of children from the indirect costs, namely

$$\begin{aligned} \text{Total cost from Model 1:} \quad & \beta_{1.1} = d + i - b \\ \text{Direct costs from Model 2:} \quad & \beta_{1.2} = d \\ \text{Auxiliary from Model 3:} \quad & \beta_{1.3} = d - b \end{aligned}$$

By rearranging $T = d + i - b$ and inserting the estimation coefficients $\beta_{1.1}$ and $\beta_{1.3}$, we can now calculate the indirect costs of children

$$\begin{aligned} T &= d + i - b \\ i &= T - (d - b) \\ i &= \beta_{1.1} - \beta_{1.3} \end{aligned}$$

Furthermore, we can calculate the part of indirect costs that is not compensated for via family-related benefits—more specifically, the difference between indirect costs i and benefits b

$$
\begin{aligned}
T &= d + i - b \\
i - b &= T - d \\
i - b &= \beta_{1.1} - \beta_{1.2}
\end{aligned}
$$

Models 1, 2 and 3 describe a linear relation, their coefficients are estimated using Ordinary Least Squares (OLS). In Section 7, we further apply an ordered logit approach to analyse whether the results vary by estimation method. In order to make the coefficients from each of the three models comparable, only observations that have no missing values in the labour income of both partners as well as household income are considered in the estimations. Consequently, the coefficients from Models 1, 2 and 3 are estimated based on the exact same subsample. Each of the three models is estimated separately for each region. That way, region-specific peculiarities due to different family-related policies, norms, institutions and macroeconomic conditions can be analysed. Results are presented in the next section, robustness analyses in Section 7.

6 Results

Table 3 summarises the results from the linear fixed effects (LFE) estimations for first-order children. It provides the average total subjective net cost of the first child for each country group, as well as its decomposition into direct and indirect costs. Column 1 shows the total net cost of the first child, which is based on the average total effect of children on SEW from Model 1. The direct costs of children are presented in Column 2, estimations being based on Model 2. The indirect costs of first-order children are presented in Column 4. They are calculated as the difference in the coefficient $\beta_{1.1}$ from Model 1 and the auxiliary $\beta_{1.3}$ from Model 3. The final column provides the amount of indirect costs that is not compensated for via family-related benefits. It is calculated as the difference between $\beta_{1.1}$ and $\beta_{1.2}$. Results for higher-order births as well as standard errors for each coefficient can be found in Appendix A.2.

Children cause a strong significant drop in their parents' SEW in the first years after they are born in all six welfare regimes. This decrease is interpreted as the total net cost of young children. It is largest in regions with high income levels, namely Western European, Nordic, Liberal and German-speaking countries. Furthermore, we find some evidence for the first child being the most costly one, each additional child reduces SEW to a lesser extent. This pattern indicates economies of scale in children. The only exception is the Nordic countries,

Table 3: Cost components of first-order children in the first years after their birth

	(1)	(2)	(3)	(4)	(5)
Region	**Total net cost (T)**	**Direct costs (d)**	**Auxiliary**	**Indirect costs (i)**	
				total	not compensated
Coefficient(s)	$\beta_{1.1}$	$\beta_{1.2}$	$\beta_{1.3}$	$\beta_{1.1} - \beta_{1.3}$	$\beta_{1.1} - \beta_{1.2}$
Nordic	0.232	0.225	0.151	0.081	0.007
Western	0.231	0.233	0.229	0.002	-0.002
German-speaking	0.190	0.182	0.156	0.034	0.008
Liberal	0.198	0.198†	0.198†	0.000†	0.000†
Southern	0.152	0.155	0.141	0.011	-0.003
CEE	0.179	0.178	0.140	0.039	0.001

Note: The coefficients presented in the table are based on the LFE estimator and refer to first-order children. Results for higher-order births as well as standard errors for each coefficient can be found in Appendix A.2. † Cost components of Liberal countries have to be interpreted cautiously given the lack of significant income coefficients.

where SEW decreases almost linearly with each additional child. Due to large standard errors, the finding of economies of scale in the number of children has to be treated cautiously for German-speaking, Liberal and Southern European countries.

The direct costs of children explain most of the decrease in SEW. The values of direct costs (Column 2) are almost as large or larger as the values of total net cost (Column 1). Hence, increased needs due to the arrival of a child are the main driver of the drop in SEW. On the contrary, indirect costs in the form of labour income losses play a minor role, at least in the first years after the child is born. When considering the standard errors of the coefficients, indirect costs are hardly existent. For the Liberal countries, results have to be interpreted with particular care, since the coefficients for labour income are not significant. Consequently, indirect costs cannot be interpreted for that region. For Western European countries, however, income effects are significant—and still there are hardly any signs of short-run indirect costs of children in that country group. This result fits the employment pattern observed in that region, where it became apparent that Western European women return to the workplace shortly after they gave birth. Consequently, their labour income hardly drops and their indirect costs are even lower than in the other regions.

In relative terms, indirect costs are largest in countries where women take extensive parental leave. Relating indirect costs of the first child (Column 4) to total net costs (Column 1) shows that indirect costs make 34.9 per cent in the Nordic countries, 21.8 per cent in CEE countries and 17.9 per cent in German-speaking countries. These are the regions in which the share of employed women drops drastically after the birth. In the South, indirect costs make up 7.2 per cent and in the West, where women re-enter the labour market quickly after giving birth, indirect costs make up only 0.9 per cent. Again, estimates from Liberal countries cannot be interpreted meaningfully given the lack of significant coefficients.

Increases in other income components offset mother's short-term labour income losses. Column 5 in Table 3 shows how much of income losses is not compensated for. The values are close to zero for all regions, indicating that indirect costs are compensated for almost entirely by increases in other income components. This finding fits the numbers presented in Table 2, where it was shown that transfers together with the increase in labour income of fathers balance out the labour income losses of mothers in most regions in the first years after the first child was born. German-speaking countries have the highest non-compensated indirect costs, which is in line with the descriptive evidence too. In Southern and Western countries, indirect costs are slightly overcompensated by an increase in other income components, notwithstanding benefits playing a relatively minor role in these regions. Two explanations are possible for this finding. As shown in Table 2, labour income of mothers in Southern and Western countries drop as much as in other regions after the birth of the first child. Furthermore, the standard errors in Appendix A.2 show that, for all regions, there is uncertainty on whether the indirect costs are actually slightly over- or undercompensated.

Four more explanations for the low indirect costs of newborns are plausible, in addition to the compensation of female labour income losses via other income components. First, indirect costs may be low in the short run. Second, household respondents might only focus on the short-term effect of children when evaluating their SEW. Third, household respondents might consider their direct costs stronger than their indirect costs, or even anticipate indirect costs before the birth of their child. Finally, the relatively low indirect costs of children could be due to self-selection into parenthood. Potentially, only couples that do not expect a strong increase in indirect costs, or even total net cost, have children. For example, Southern Europe has the highest unemployment rate of all regions (see Section 2), nevertheless, the mothers observed in this analysis have employment rates as high as the mothers in the other regions (see Figure 4). This might be an indicator for the self-selection of well-off parents into parenthood. Since we can only observe the effect of treatment (children) on the treated (couples with children), we might only observe couples who knew that they would not experience a large drop in their SEW. In summary, all of these expositions could explain why direct costs dominate indirect costs in the short run.

While the indirect costs of children in the form of labour losses seem compensated for almost entirely in the short run, the direct costs of children are not. Instead, household income remains rather constant after the birth of a child, but needs increase given the arrival of a baby. This results in a strong drop of SEW after childbirth.

7 Robustness Analyses

Robustness analyses mostly support the findings described above, yet they indicate that the exact size of the cost components has some uncertainties. First, we analyse if our findings are sensitive with respect to the estimation method. When estimating linear models, it is assumed that the response variable SEW is cardinal. Yet it could be argued that SEW is actually an ordinal variable, in which case OLS would not be the appropriate choice of estimator (for a detailed explanations, see Longhi & Nandi 2015, Williams 2016). To account for this, a robustness analysis is conducted applying an ordinal logit method that treats SEW as an ordinal variable.

In an ordered logit context, SEW is seen as the collapsed version of an underlying latent variable SEW*. Household respondents have a specific level of SEW* somewhere along that underlying continuous variable. When they are asked to evaluate their SEW, they pick the answer on the Likert scale that is closest to their actual value of SEW*. One can imagine thresholds along variable SEW. When households cross these thresholds, the observed value of the ordered variable SEW changes for that household. These thresholds are called cut-off points denoted by μ. In the case presented in this paper, the ordinal variable SEW has six outcomes and consequently five cut-off points. The concept can be formalised as follows:

$$SEW_{jt} = \begin{cases} 1 & \text{if} \quad SEW*_{jt} \leq \mu_1 \\ 2 & \text{if} \quad \mu_1 < SEW*_{jt} \leq \mu_2 \\ \vdots & \\ 6 & \text{if} \quad SEW*_{jt} > \mu_5 \end{cases}$$

Estimating ordered logit models is straightforward, but adding FE is not. Simply combining ordered logit models with FE leads to inconsistent estimators (Geishecker & Riedl 2010) in particular when some observed groups consist of rather small observations, which is the case in the dataset observed (Geishecker & Riedl 2010, Chamberlain 1980). To account for the ordered nature of the dependent variable as well as for unobserved heterogeneity, the so-called "blow-up and cluster" (BUC) estimator proposed by Baetschmann et al. (2015) is applied. It is based on the conditional logit estimator first introduced by Chamberlain (1980) and estimates the probability of one of the six outcomes of SEW. The underlying idea is that the ordered variable could simply be dichotomised by splitting it along any of the cut-off points μ, and then estimated via logistic regression. However, this approach reduces a lot of variation in the dependent variable SEW. Households would much less often cross thresholds μ if SEW was reduced to a binary variable. Since FE estimators for panel data rely on within-variation only, reducing this variation is not desirable. Thus, for the BUC estimator, SEW is first recoded into all possible dichotomisations along the five thresholds μ. After this process, each observation appears five times in the dataset, hence the name "blow-up". Following the "blowing up" of the data, conditional logit estimators with standard errors clustered at the household level can be applied.

Even though the ordered logit model is theoretically the correct choice for ordered response variables, Ferrer-i Carbonell & Frijters (2004) as well as Riedl & Geishecker (2014) find little difference between assuming ordinality or cardinality of ordered variables, especially when the scale of potential answers is long. Also in our analysis, there is little difference between the results based on the LFE approach and the results based on the ordinal BUC estimator. Coefficients based on the BUC estimator are given in log odds and direct and indirect costs cannot be disentangled due to non-linearity. Consequently, the results are not directly comparable. Yet the relative size of each coefficient compared to all other coefficients in the same model as well as across models is the same for both methods. Consequently, LFE and BUC estimations lead to the same findings. The corresponding output tables can be found in Appendix A.3.

As a second robustness analysis, we analyse whether the control variable 'health' biases our results. In the original model, we assume that health affects SEW, because needs increase when a household member gets sick. However, the causal direction could also be the other way around since financial stress could also have a negative impact on health. For our robustness analysis, we estimated all models excluding the health variables of both partners. Still, the estimated values of all coefficients remain almost identical, no matter whether the health variables are included or not. Output tables presenting the results of this as well as the following robustness analyses are provided upon request.

Third, we analyse whether the skewed income variables have an impact on the results. Both household and labour income are highly non-normally distributed, with a strong right skew.

Due to the many zeros in women's labour income, a log transformation of the variable is not feasible. Instead, the cube root of income was taken for the sensitivity test to account for the skewed distribution of income (Cox 2011). Results based on the cube root specification yield almost identical results as the original estimations. Since income in thousands of euros is easier to interpret, these results were presented in the main results section.

A fourth sensitivity analysis concerns the shift between IRP and the period between two interview waves, which was described in Section 2. To analyse whether the results are biased by this shift, all income variables are replaced by their lead variables. For example, in wave 2, income from IRP 3 instead of IRP 2 is used in the estimations. Since the last observations of each couple obviously do not have a lead variable of income, this robustness analysis reduces the sample size drastically, namely by almost 50 per cent. Consequently, this robustness analysis is based on a different sample in which each couple is followed one year less. We use this reduced sample to estimate the original models including income from the year prior to the interview (IRP t) as well as the new models including income from the year in which the interview took place (IRP t+1). For Liberal and German-speaking countries, this robustness analysis provides no significant results, probably due to the even smaller sample size. For the other regions, the lead variable of income leaves the coefficients in Model 2 almost unchanged. In Model 3, the coefficients for the number of children vary, leading to even smaller estimates of indirect costs in all regions save Western Europe, where the estimates of indirect costs increase once lead income is utilised.

Finally, we address the definition of household income. We interpret total disposable household income as the sum of net labour income and family-related benefits, also considering family-related tax deductions. These two components are by far the largest components of household income, yet other income components such as asset income could also be included. We conduct a robustness analysis in which we replace the total disposable household income in Model 2 with the sum of both partners' labour income and family-related benefits. The newly generated household income is slightly higher than the original one, since it includes gross labour income instead of net labour income. The latter is missing for one-third of the observations in EU-SILC. The estimated direct costs are slightly lower for all regions when the new household income variable is used, yet the decrease is so small that it does not alter our conclusions.

8 Conclusion

The birth of a child reduces parents' self-reported ability to make ends meet. Our results indicate that the primary reason for this drop are increased needs caused by the newborn, while child-related income losses play a minor role in the short term. We investigated how the birth of a child relates to its parents' subjective economic wellbeing (SEW) and compared country groups of different welfare regimes in Europe. The analysis is based on longitudinal data from the European Union Statistics of Income and Living Conditions (EU-SILC), which covers 30 European countries from 2004 to 2015. The survey's panel design facilitates observing SEW before and after the birth, permitting a distinct identification of the impact that young children have on SEW. Overall, our results provide clear answers to the research questions posed in this study.

We find evidence that SEW of couples drops considerably in the first years after their baby is born. In most regions, the first child is the costliest, each additional child reduces SEW less, which signals economies of scale in the number of children. When exploring the contribution of direct and indirect costs to the changes in SEW, we find that SEW drops mainly due to higher expenses induced by children. These expenses could be, for example, increased spending on food, diapers or housing and are referred to as direct costs of children. Comparing subjective direct costs between different welfare regimes, we find that they are higher in high-income regions, namely in the Nordic countries, Western Europe (France, Belgium and the Netherlands), Liberal countries (Ireland and the UK) and German-speaking countries (Austria and Switzerland).

By contrast, subjective indirect costs of children play a minor role in explaining the drop in SEW. These costs occur when parents, usually mothers, endure income losses after having a child. Depending on maternal employment patterns, indirect child costs differ substantially between European regions. They are lowest in Western Europe where mothers tend to return to the labour market shortly after giving birth. Wage losses are higher in the Nordic countries, German-speaking countries, and Central and Eastern European (CEE) countries where women take extensive parental leaves. However, we also find that mothers in the Nordic countries return to their full-time jobs at the end of their parental-leave period, which is facilitated by relatively high child care coverage for young children in that region. On the contrary, mothers in CEE and German-speaking countries are more likely to remain at home for longer times. This observation suggests that indirect costs of children in CEE and German-speaking countries are higher in the medium and long run than in the Nordic countries. Yet the short follow-up of the EU-SILC panel does not allow for these medium- and long-term costs to be captured.

Finally, we analysed if family-related benefits compensate for the child costs occurring in the first three years after childbirth. Direct costs are not compensated for in any of the regions, which is why a strong birth-related drop in SEW is observed in every country group. Nonetheless, we find some evidence that in the short term, mothers' wage losses are compensated for by an increase in other income components. The losses are primarily offset by family-related benefits, followed by an increase in the labour income of fathers. One exception are German-speaking countries, where the birth-related drop in the labour income of first-time mothers is too large to be compensated for by other income components.

The three main limitations of our analysis are data related. First, self-selection into parenthood cannot be accounted for. If some couples decide not to become parents because they expect a drop in SEW due to children, the costs of children are underestimated. We find indications for such a self-selection, in particular, in Southern European countries. Second, long-term effects of children on SEW cannot be analysed. Consequently, long-term indirect costs of children cannot be observed, and neither can adaptations to the costs of children in the long run. Third, it cannot be observed whether expectations or general wellbeing change with the birth of a child.

Future studies could fruitfully explore the long-term costs of children by analysing longer panels that exist on national levels. The analysis at hand only allows conclusions to be drawn regarding the first three years after the birth of a child. Long-term direct and, more importantly, long-term indirect costs cannot be observed. The fact that flatter income curves or lower pension entitlements of mothers do not become apparent immediately after childbirth warrants future investigation.

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A Appendix

A.1 Summary Statistics

Table A.4: Summary statistics based on the full sample (includes couples with and without children)

Variable	N	Mean	Std. Dev.	Minimum	Maximum	50th percentile
SEW	262,272	3.461	1.295	1	6	3
Number of children	262,565	1.309	1.017	0	4	1
Household income	254,797	36.232	24.068	-604.618	1278.744	33.26
Labour income women	240,760	14.758	15.338	-138.453	600.152	11.64
Labour income men	240,761	28.223	25.759	-339.571	1924.375	24.268
Family-related benefits	239,928	2.372	3.937	0	80.977	.93
Health women	219,281	.02	.14	0	1	0
Health men	213,090	.021	.143	0	1	0
Age women	262,565	32.227	5.126	16	40	33
Age men	262,565	35.321	6.441	16	80	35
Employment women	259,347	.686	.464	0	1	1

Note: All income values are provided per annum and are adjusted for inflation and differences in purchasing power. Household income is a net value, labour income a gross value. Income from self-employment is added if not missing, which is why labour income can be below zero. The variable "number of children" is a categorical variable ranging from zero to four, where the maximum category of four includes any observation with four or more children. N refers to the number of observations.

Table A.5: Summary statistics based on the reduced sample (only includes first-time parents)

Variable	N	Mean	Std. Dev.	Minimum	Maximum	50th percentile
SEW	14,626	3.819	1.231	1	6	4
Number of children	14,638	.518	.5	0	1	1
Household income	14,434	38.833	22.398	-40.206	692.354	36.63
Labour income women	13,799	17.832	14.71	-4.247	189.04	16.388
Labour income men	13,799	29.49	24.803	-39.696	760.403	26.806
Family-related benefits	13,740	2.232	4.561	0	74.058	0
Health women	11,761	.009	.094	0	1	0
Health men	11,665	.012	.111	0	1	0
Age women	14,638	29.15	4.372	16	40	29
Age men	14,638	31.841	5.484	18	77	31
Employment women	14,455	.712	.453	0	1	1

Note: All income values are provided per annum and are adjusted for inflation and differences in purchasing power. Household income is a net value, labour income a gross value. Income from self-employment is added if not missing, which is why labour income can be below zero. The variable "number of children" is a categorical variable ranging from zero to four, where the maximum category of four includes any observation with four or more children. N refers to the number of observations.

A.2 Regression Output Tables Based on the LFE Model

Table A.6: LFE estimations for Nordic countries

	Model 1		Model 2		Model 3	
	b	SE	b	SE	b	SE
1 child	-0.232***	(0.026)	-0.225***	(0.025)	-0.151***	(0.026)
2 children	-0.362***	(0.036)	-0.355***	(0.036)	-0.238***	(0.037)
3 children	-0.512***	(0.053)	-0.500***	(0.053)	-0.327***	(0.055)
4+ children	-0.632***	(0.099)	-0.609***	(0.099)	-0.395***	(0.101)
Bad health woman	-0.123	(0.064)	-0.122	(0.063)	-0.126*	(0.063)
Health missing woman	-0.024	(0.068)	-0.028	(0.068)	-0.025	(0.068)
Bad health man	-0.057	(0.071)	-0.055	(0.071)	-0.054	(0.071)
Health missing man	-0.089	(0.064)	-0.096	(0.064)	-0.098	(0.065)
Household income			0.004***	(0.001)		
Labour income woman					0.007***	(0.001)
Labour income man					0.003***	(0.000)
Constant	4.321***	(0.060)	4.177***	(0.064)	4.093***	(0.063)
Control variable year	yes		yes		yes	
Control variable age	yes		yes		yes	
N	54,702		54,702		54,702	
Overall R2	0.019		0.054		0.097	
SE	cluster		cluster		cluster	

The reference group for the number of children is "no child" and for health "no bad health"; income is actual yearly income in thousands of euros; SE are clustered at the household level; control variables for the survey year and age of both men and women were included in the estimations; * p<0.05, ** p<0.01, *** p<0.001

Table A.7: LFE estimations for Western European countries

	Model 1		Model 2		Model 3	
	b	SE	b	SE	b	SE
1 child	-0.231***	(0.030)	-0.233***	(0.030)	-0.229***	(0.030)
2 children	-0.316***	(0.043)	-0.317***	(0.043)	-0.310***	(0.043)
3 children	-0.474***	(0.065)	-0.477***	(0.065)	-0.468***	(0.065)
4+ children	-0.327*	(0.131)	-0.331*	(0.131)	-0.320*	(0.131)
Bad health woman	-0.146**	(0.053)	-0.145**	(0.053)	-0.145**	(0.053)
Health missing woman	-0.017	(0.179)	-0.023	(0.178)	-0.018	(0.178)
Bad health man	-0.088	(0.058)	-0.087	(0.057)	-0.086	(0.057)
Health missing man	0.236	(0.147)	0.245	(0.147)	0.245	(0.147)
Household income			0.002***	(0.001)		
Labour income woman					0.001*	(0.001)
Labour income man					0.001*	(0.000)
Constant	4.045***	(0.080)	3.979***	(0.082)	3.996***	(0.081)
Control variable year	yes		yes		yes	
Control variable age	yes		yes		yes	
N	34,098		34,098		34,098	
Overall R2	0.036		0.067		0.073	
SE	cluster		cluster		cluster	

The reference group for the number of children is "no child" and for health "no bad health"; income is actual yearly income in thousands of euros; SE are clustered at the household level; control variables for the survey year and age of both men and women were included in the estimations; * p<0.05, ** p<0.01, *** p<0.001

Table A.8: LFE estimations for German-speaking countries

	Model 1		Model 2		Model 3	
	b	SE	b	SE	b	SE
1 child	-0.190**	(0.067)	-0.182**	(0.067)	-0.156*	(0.069)
2 children	-0.176	(0.094)	-0.165	(0.093)	-0.131	(0.096)
3 children	-0.161	(0.136)	-0.148	(0.134)	-0.102	(0.137)
4+ children	-0.053	(0.253)	-0.033	(0.245)	0.013	(0.251)
Bad health woman	-0.075	(0.110)	-0.066	(0.109)	-0.065	(0.109)
Health missing woman	0.001	(0.112)	0.001	(0.112)	0.008	(0.111)
Bad health man	-0.246*	(0.099)	-0.238*	(0.098)	-0.239*	(0.098)
Health missing man	0.112	(0.123)	0.115	(0.123)	0.117	(0.123)
Household income			0.004***	(0.001)		
Labour income woman					0.003*	(0.001)
Labour income man					0.003***	(0.001)
Constant	4.007***	(0.096)	3.847***	(0.098)	3.849***	(0.100)
Control variable year	yes		yes		yes	
Control variable age	yes		yes		yes	
N	12,015		12,015		12,015	
Overall R2	0.022		0.089		0.094	
SE	cluster		cluster		cluster	

The reference group for the number of children is "no child" and for health "no bad health"; income is actual yearly income in thousands of euros; SE are clustered at the household level; control variables for the survey year and age of both men and women were included in the estimations; * p<0.05, ** p<0.01, *** p<0.001

Table A.9: LFE estimations for Liberal countries

	Model 1		Model 2		Model 3	
	b	SE	b	SE	b	SE
1 child	-0.198**	(0.076)	-0.198**	(0.076)	-0.198**	(0.076)
2 children	-0.231*	(0.101)	-0.228*	(0.101)	-0.228*	(0.102)
3 children	-0.210	(0.136)	-0.208	(0.136)	-0.207	(0.137)
4+ children	-0.176	(0.225)	-0.172	(0.225)	-0.170	(0.226)
Bad health woman	-0.179	(0.155)	-0.180	(0.155)	-0.179	(0.155)
Health missing woman	0.099	(0.156)	0.104	(0.157)	0.101	(0.157)
Bad health man	-0.441***	(0.110)	-0.442***	(0.110)	-0.441***	(0.110)
Health missing man	0.051	(0.102)	0.060	(0.102)	0.061	(0.102)
Household income			0.001*	(0.000)		
Labour income woman					0.000	(0.001)
Labour income man					0.000	(0.000)
Constant	3.634***	(0.109)	3.595***	(0.111)	3.615***	(0.111)
Control variable year	yes		yes		yes	
Control variable age	yes		yes		yes	
N	11,512		11,512		11,512	
Overall R2	0.029		0.043		0.040	
SE	cluster		cluster		cluster	

The reference group for the number of children is "no child" and for health "no bad health"; income is actual yearly income in thousands of euros; SE are clustered at the household level; control variables for the survey year and age of both men and women were included in the estimations; * p<0.05, ** p<0.01, *** p<0.001

Table A.10: LFE estimations for Southern European countries

	Model 1		Model 2		Model 3	
	b	SE	b	SE	b	SE
1 child	-0.152***	(0.029)	-0.155***	(0.028)	-0.141***	(0.028)
2 children	-0.213***	(0.041)	-0.216***	(0.041)	-0.194***	(0.041)
3 children	-0.222**	(0.072)	-0.230**	(0.071)	-0.201**	(0.071)
4+ children	-0.405**	(0.136)	-0.426**	(0.136)	-0.388**	(0.136)
Bad health woman	-0.123**	(0.047)	-0.124**	(0.047)	-0.121**	(0.047)
Health missing woman	0.094	(0.070)	0.099	(0.070)	0.102	(0.070)
Bad health man	-0.194***	(0.044)	-0.195***	(0.044)	-0.194***	(0.044)
Health missing man	-0.046	(0.073)	-0.059	(0.073)	-0.056	(0.073)
Household income			0.004***	(0.001)		
Labour income woman					0.005***	(0.001)
Labour income man					0.004***	(0.001)
Constant	3.189***	(0.055)	3.050***	(0.058)	3.037***	(0.058)
Control variable year	yes		yes		yes	
Control variable age	yes		yes		yes	
N	57,056		57,056		57,056	
Overall R2	0.030		0.115		0.131	
SE	cluster		cluster		cluster	

The reference group for the number of children is "no child" and for health "no bad health"; income is actual yearly income in thousands of euros; SE are clustered at the household level; control variables for the survey year and age of both men and women were included in the estimations; * p<0.05, ** p<0.01, *** p<0.001

Table A.11: LFE estimations for CEE countries

	Model 1		Model 2		Model 3	
	b	SE	b	SE	b	SE
1 child	-0.179***	(0.028)	-0.178***	(0.028)	-0.140***	(0.028)
2 children	-0.242***	(0.037)	-0.245***	(0.037)	-0.183***	(0.037)
3 children	-0.295***	(0.055)	-0.301***	(0.055)	-0.209***	(0.056)
4+ children	-0.398***	(0.111)	-0.407***	(0.111)	-0.288*	(0.112)
Bad health woman	-0.115***	(0.033)	-0.115***	(0.033)	-0.115***	(0.033)
Health missing woman	-0.043	(0.030)	-0.043	(0.030)	-0.046	(0.030)
Bad health man	-0.130***	(0.033)	-0.128***	(0.033)	-0.126***	(0.033)
Health missing man	-0.002	(0.019)	0.001	(0.019)	0.001	(0.019)
Household income			0.006***	(0.001)		
Labour income woman					0.006***	(0.001)
Labour income man					0.005***	(0.001)
Constant	3.213***	(0.059)	3.106***	(0.059)	3.066***	(0.060)
Control variable year	yes		yes		yes	
Control variable age	yes		yes		yes	
N	71,100		71,100		71,100	
Overall R2	0.025		0.151		0.173	
SE	cluster		cluster		cluster	

The reference group for the number of children is "no child" and for health "no bad health"; income is actual yearly income in thousands of euros; SE are clustered at the household level; control variables for the survey year and age of both men and women were included in the estimations; * p<0.05, ** p<0.01, *** p<0.001

A.3 Regression Output Tables Based on the BUC Model

Table A.12: BUC estimations for Nordic countries

	Model 1		Model 2		Model 3	
	b	SE	b	SE	b	SE
1 child	-0.645***	(0.072)	-0.628***	(0.071)	-0.437***	(0.074)
2 children	-1.023***	(0.100)	-1.011***	(0.100)	-0.706***	(0.104)
3 children	-1.400***	(0.147)	-1.363***	(0.148)	-0.915***	(0.154)
4+ children	-1.574***	(0.271)	-1.504***	(0.272)	-0.977***	(0.275)
Bad health woman	-0.234	(0.153)	-0.235	(0.153)	-0.247	(0.152)
Health missing woman	0.204	(0.189)	0.193	(0.191)	0.193	(0.192)
Bad health man	-0.145	(0.180)	-0.132	(0.180)	-0.137	(0.181)
Health missing man	-0.174	(0.166)	-0.202	(0.168)	-0.204	(0.170)
Household income			0.017***	(0.003)		
Labour income woman					0.019***	(0.002)
Labour income man					0.011***	(0.002)
Control variable year	yes		yes		yes	
Control variable age	yes		yes		yes	
N	50,002		50,002		50,002	
Pseudo R2	0.012		0.019		0.023	
SE	cluster		cluster		cluster	

Coefficients are given in log odds; the reference group for the number of children is "no child" and for health "no bad health"; income is actual yearly income in thousands of euros; SE are clustered at the household level; control variables for survey year and age of both men and women were included in the estimations; * p<0.05, ** p<0.01, *** p<0.001

Table A.13: BUC estimations for Western European countries

	Model 1		Model 2		Model 3	
	b	SE	b	SE	b	SE
1 child	-0.764***	(0.099)	-0.770***	(0.099)	-0.755***	(0.099)
2 children	-1.041***	(0.144)	-1.046***	(0.144)	-1.024***	(0.145)
3 children	-1.558***	(0.213)	-1.575***	(0.213)	-1.544***	(0.214)
4+ children	-1.056*	(0.415)	-1.085**	(0.413)	-1.044*	(0.413)
Bad health woman	-0.438**	(0.157)	-0.434**	(0.157)	-0.433**	(0.157)
Health missing woman	-0.027	(0.532)	-0.014	(0.532)	-0.006	(0.529)
Bad health man	-0.233	(0.171)	-0.234	(0.170)	-0.225	(0.170)
Health missing man	0.618	(0.418)	0.643	(0.418)	0.648	(0.419)
Household income			0.006**	(0.002)		
Labour income woman					0.005*	(0.002)
Labour income man					0.004**	(0.001)
Control variable year	yes		yes		yes	
Control variable age	yes		yes		yes	
N	25,312		25,312		25,312	
Pseudo R2	0.020		0.021		0.021	
SE	cluster		cluster		cluster	

Coefficients are given in log odds; the reference group for the number of children is "no child" and for health "no bad health"; income is actual yearly income in thousands of euros; SE are clustered at the household level; control variables for survey year and age of both men and women were included in the estimations; * p<0.05, ** p<0.01, *** p<0.001

Table A.14: BUC estimations for German-speaking countries

	Model 1		Model 2		Model 3	
	b	SE	b	SE	b	SE
1 child	-0.494**	(0.174)	-0.461**	(0.172)	-0.392*	(0.179)
2 children	-0.481	(0.247)	-0.448	(0.245)	-0.363	(0.255)
3 children	-0.435	(0.372)	-0.401	(0.370)	-0.295	(0.380)
4+ children	-0.146	(0.712)	-0.142	(0.671)	-0.028	(0.696)
Bad health woman	-0.184	(0.275)	-0.173	(0.272)	-0.167	(0.272)
Health missing woman	-0.011	(0.310)	-0.001	(0.316)	0.006	(0.310)
Bad health man	-0.617**	(0.239)	-0.601**	(0.231)	-0.616**	(0.236)
Health missing man	0.382	(0.411)	0.402	(0.412)	0.416	(0.414)
Household income			0.013***	(0.003)		
Labour income woman					0.008*	(0.003)
Labour income man					0.008***	(0.002)
Control variable year	yes		yes		yes	
Control variable age	yes		yes		yes	
N	9,985		9,985		9,985	
Pseudo R2	0.017		0.023		0.022	
SE	cluster		cluster		cluster	

Coefficients are given in log odds; the reference group for the number of children is "no child" and for health "no bad health"; income is actual yearly income in thousands of euros; SE are clustered at the household level; control variables for survey year and age of both men and women were included in the estimations; * p<0.05, ** p<0.01, *** p<0.001

Table A.15: BUC estimations for Liberal countries

	Model 1		Model 2		Model 3	
	b	SE	b	SE	b	SE
1 child	-0.566**	(0.214)	-0.564**	(0.214)	-0.567**	(0.215)
2 children	-0.640*	(0.284)	-0.626*	(0.283)	-0.629*	(0.285)
3 children	-0.556	(0.375)	-0.542	(0.374)	-0.538	(0.377)
4+ children	-0.439	(0.639)	-0.397	(0.631)	-0.373	(0.629)
Bad health woman	-0.410	(0.343)	-0.416	(0.345)	-0.409	(0.343)
Health missing woman	0.353	(0.426)	0.399	(0.433)	0.384	(0.436)
Bad health man	-1.464***	(0.367)	-1.473***	(0.364)	-1.469***	(0.365)
Health missing man	0.322	(0.294)	0.354	(0.296)	0.351	(0.296)
Household income			0.005*	(0.002)		
Labour income woman					0.000	(0.003)
Labour income man					0.004*	(0.002)
Control variable year	yes		yes		yes	
Control variable age	yes		yes		yes	
N	7,493		7,493		7,493	
Pseudo R2	0.029		0.031		0.030	
SE	cluster		cluster		cluster	

Coefficients are given in log odds; the reference group for the number of children is "no child" and for health "no bad health"; income is actual yearly income in thousands of euros; SE are clustered at the household level; control variables for survey year and age of both men and women were included in the estimations; * p<0.05, ** p<0.01, *** p<0.001

Table A.16: BUC estimations for Southern European countries

	Model 1 b	SE	Model 2 b	SE	Model 3 b	SE
1 child	-0.467***	(0.089)	-0.470***	(0.089)	-0.427***	(0.089)
2 children	-0.662***	(0.125)	-0.672***	(0.125)	-0.605***	(0.126)
3 children	-0.687**	(0.224)	-0.709**	(0.224)	-0.632**	(0.223)
4+ children	-1.002*	(0.430)	-1.082*	(0.429)	-0.979*	(0.432)
Bad health woman	-0.353**	(0.134)	-0.355**	(0.133)	-0.344**	(0.133)
Health missing woman	0.278	(0.206)	0.298	(0.206)	0.297	(0.209)
Bad health man	-0.584***	(0.138)	-0.594***	(0.139)	-0.600***	(0.139)
Health missing man	-0.124	(0.192)	-0.162	(0.191)	-0.156	(0.192)
Household income			0.012***	(0.002)		
Labour income woman					0.014***	(0.003)
Labour income man					0.010***	(0.002)
Control variable year	yes		yes		yes	
Control variable age	yes		yes		yes	
N	40,932		40,932		40,932	
Pseudo R2	0.022		0.026		0.027	
SE	cluster		cluster		cluster	

Coefficients are given in log odds; the reference group for the number of children is "no child" and for health "no bad health"; income is actual yearly income in thousands of euros; SE are clustered at the household level; control variables for survey year and age of both men and women were included in the estimations; * p<0.05, ** p<0.01, *** p<0.001

Table A.17: BUC estimations for CEE countries

	Model 1 b	SE	Model 2 b	SE	Model 3 b	SE
1 child	-0.574***	(0.091)	-0.575***	(0.092)	-0.437***	(0.094)
2 children	-0.765***	(0.122)	-0.786***	(0.122)	-0.562***	(0.126)
3 children	-0.934***	(0.178)	-0.974***	(0.179)	-0.643***	(0.184)
4+ children	-1.313***	(0.396)	-1.342***	(0.400)	-0.919*	(0.406)
Bad health woman	-0.377***	(0.112)	-0.377***	(0.112)	-0.368***	(0.112)
Health missing woman	-0.125	(0.105)	-0.134	(0.104)	-0.141	(0.104)
Bad health man	-0.418***	(0.106)	-0.406***	(0.107)	-0.408***	(0.107)
Health missing man	0.004	(0.068)	0.013	(0.067)	0.009	(0.067)
Household income			0.022***	(0.003)		
Labour income woman					0.021***	(0.003)
Labour income man					0.019***	(0.003)
Control variable year	yes		yes		yes	
Control variable age	yes		yes		yes	
N	48,913		48,913		48,913	
Pseudo R2	0.015		0.022		0.024	
SE	cluster		cluster		cluster	

Coefficients are given in log odds; the reference group for the number of children is "no child" and for health "no bad health"; income is actual yearly income in thousands of euros; SE are clustered at the household level; control variables for survey year and age of both men and women were included in the estimations; * p<0.05, ** p<0.01, *** p<0.001

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