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Borah, Melanie; Knabe, Andreas; Pahlke, Kevin

Working Paper

Parental Time Restrictions and the Cost of Children: Insights from a Survey among Mothers

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Melanie Borah, Andreas Knabe, Kevin Pahlke

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Poschingerstr. 5, 81679 Munich, Germany
Telephone +49 (0)89 2180-2740, Telefax +49 (0)89 2180-17845, email office@cesifo.de
Editors: Clemens Fuest, Oliver Falck, Jasmin Gröschl
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Parental Time Restrictions and the Cost of Children: Insights from a Survey among Mothers

Abstract

In this paper, we provide estimates of the subjectively perceived cost of children depending on the extent of parental time restrictions. Building on a study by Koulovatianos et al. (2009) that introduces a novel way of using subjective income evaluation data for such estimations, we conduct a refined version of the underlying survey, focusing on young women with children in Germany. Our study confirms that the monetary cost of children is substantial and increases with parental nonmarket time restrictions. The loss in the material living standard associated with supplying time to the labor market is sizeable for families with children.

JEL-Codes: I320, J130, J220.

Keywords: child cost, equivalence scales, full-time employment, subjective income evaluations.

Melanie Borah
Otto-von-Guericke University
Magdeburg / Germany
Melanie.Borah@ovgu.de

Andreas Knabe
Otto-von-Guericke University
Magdeburg / Germany
andreas.knabe@ovgu.de

Kevin Pahlke
Otto-von-Guericke University
Magdeburg / Germany
pahlke.kevin@ovgu.de

1. Introduction

At given levels of total commodities consumption, the standard of living of households varies with their size and structure. In general, larger households need more commodities than smaller households to provide their members the same standard of living. Due to economies of scale in consumption, a household's consumption needs are generally not proportional to the number of its members. Moreover, the consumption requirements of certain household members may be systematically lower or higher than those of an average single person. Children, for instance, provide such a case. For physiological reasons (e.g. lower calorie intake), their needs may be considerably lower than those of an additional adult. Equivalence scales are an important tool capturing such differences in needs and economies of scale in household consumption. They quantify the percentage increase in household income or expenditure necessary to leave a household's standard of living unchanged as additional members join it. Frequently, equivalence scales are restricted to considering money incomes or expenditures. While this is helpful in many applications, it neglects that material consumption requirements, in principle, can be satisfied (although not fully interchangeably) in two different ways – by purchasing marketed goods and services using money income and by producing them at home using time.

Household production as a substitute for market commodities appears to be especially relevant when one is trying to assess the cost of children. Household production can presumably satisfy a relatively large fraction of children's consumption needs at the expense of parental time (e.g., in supervisory childcare, food preparation, tutoring or leisure activities). Naturally, this will be more difficult for households whose adult members work a significant number of hours in the market and hence have less time available for household production. Time-restricted parents will have to cover more of their children's needs using marketed goods and services (e.g., by affording formal childcare services, ready-made meals, private tutors, or entertainment technologies), which increases pressure on their money income. Following this logic, the monetary cost of children, and thus their weight in the income equivalence scale, may prove sensitive to the extent of parental time restrictions.

There is a large body of literature on the monetary cost of children and their weight in income equivalence scales. Empirical approaches to their estimation either employ indirect accounts of economic well-being via observed household consumption demand and expenditure patterns or rely on direct measures of well-being using subjective survey data (for

a review, see van Praag and Warnaar, 1997). Demand-based approaches suffer from their strong dependence on the underlying model's assumptions and problems related to the identification of utility functions that are comparable across households (for a critique, see Pollak and Wales, 1979). Subjective approaches circumvent these problems and may thus provide an alternative approach to estimating the cost of children. Of course, these approaches also rely on a set of assumptions. Most importantly, they assume that individuals correctly assess their own households' "welfare" or "standard of living" when assigning verbal labels to actual or hypothetical levels of income or when assigning income requirements to actual or hypothetical levels of welfare (see e.g. Coulter et al., 1992, and van Praag and van der Sar, 1988). While one might be fundamentally skeptical about the interpersonal comparability and meaningfulness of subjective evaluations (see Bertrand and Mullainathan, 2001), various studies have shown that people answer subjective evaluation questions on income and well-being in a meaningful and consistent way (for a review, see Frey and Stutzer, 2002, pp. 406-408). Studies that have applied the subjective method to estimate equivalence scales have generally obtained results at the lower end of the ranges known from common expert scales (e.g. the OECD scale) or those obtained by demand-based studies.

Due to data limitations, most empirical studies on the cost of children that use the subjective approach do not include parents' time input into raising their children and may thus underestimate children's relative consumption needs. An exception is a study by Koulovatianos, Schröder and Schmidt (2009), henceforth abbreviated KSS, who apply the subjective approach to estimate the monetary cost of children depending on their parents' employment status as a proxy for their time availability. They introduce a novel survey instrument that lets respondents evaluate the income requirements of hypothetical households that differ in their demographic structure as well as their nonmarket time endowment as expressed by parents' employment states. Differences in respondents' income statements across household types provide direct evidence of the income increments needed to keep the household's standard of living constant when additional members join the household or when more time is devoted to labor market work. Their analysis, for which the authors collected data through online surveys in Belgium and Germany, suggests that that there is a sizable tradeoff between money and time, in general. Furthermore, their results indicate that households with children require even slightly larger income compensations in return for a restrictive reduction in adults' nonmarket time than childless households.

KSS's survey design allows obtaining income evaluations for arbitrary household types. It does so even if survey respondents do not belong to any such household. This doubtlessly has the advantage that one can obtain data on relative income requirements of a large number of household types even if the number of respondents is small. One might wonder, however, whether reliable answers can be obtained when respondents have only limited knowledge of the needs of households unlike their own, e.g. when asking young childless singles about the needs of married couples with children (Bradbury 1989). This is especially true for KSS' German sample, where 85.4 percent of the respondents do not have children and 57.9 percent of the respondents do not have a partner either. In fact, the majority of respondents in the German sample are male students that lack the experience of parenthood, market work and the costs associated with these two. The Belgian sample used by KSS is more balanced in terms of gender and employment, but the majority of respondents is childless as well. To address this issue, we conduct an online survey among mothers in Germany asking them to evaluate their own instead of hypothetical households' income requirements. Even though this does not give us a representative sample of the entire population, our convenience sample of mothers allows us to collect income evaluations from individuals who typically face the cost of children on a daily basis (see Pahl, 2008). By focusing on a purposefully selected convenience sample, our paper allows us to examine the robustness of KSS's findings with respect to modifications in sample selection.

Another purpose of our paper is to check the robustness of KSS's findings with respect to modifications in survey techniques. KSS ask respondents to assess income requirements of hypothetical households that differ in their number of children (and are presented in ascending order) and in the number of full-time employed adults (ordered such that households become ever more time-restricted). Again, the advantage of this is the large number of household types whose income requirements can be evaluated by a limited number of respondents. However, one could be afraid that this way of presenting the set of hypothetical households may induce a kind of focusing illusion or framing effect (Kahneman et al. 2006). Respondents might be implicitly induced to think that, as the number of children or time-restrictions increase, income requirements of these households should increase as well. In this case, they might end up assigning too high values to the dimensions emphasized in the survey, i.e. children and market work. In our paper, we reduce the scope of unintended focusing by asking each respondent a single income evaluation question about one type of household (his or her own).

While it is clear that equivalence scales are supposed to represent the income differentials between households that put them on the same level of welfare or well-being, it is less clear what exactly is meant by "welfare" or "well-being". Nelson (1993) points out that theoretical contributions, as well as many recent empirical applications, focus on a choice-theoretic concept of subjective utility as a measure of welfare, while policy applications typically define welfare in terms of a household's material standard of living. She argues that, for policy-related uses of household equivalence scales, "the critical question is what level of consumption of goods and services people are able to afford, not what level of overall happiness they may happen to attain." (Nelson, 1993, p. 473) This concerns policy areas such as the measurement of poverty or the determination of welfare benefits for families with children. In our paper, we follow this policy-oriented perspective and analyze income differentials that keep the *material* standard of living constant. Our research question thus differs from that of KSS who inquired about the standard of living in general, which is presumably closer to total utility than to the pure material standard of living. While KSS's results are thus informative about the value of time and time-restrictedness for family well-being in general, our results are supposed to identify the monetary value of material needs associated with additional household members and labor market work, where the latter may reflect expenditures directly related to employment or the need to substitute household production by market commodities.

These methodical considerations allow us to extend the study by KSS and substantiate their findings. Our results imply magnitudes and patterns of the cost of children similar to those found by KSS. For example, the first child of a couple in which one partner works fulltime while the other partner is not employed has 55 percent of the financial needs of a single, non-working adult. The compensation needed for devoting time to the labor market found in our study appears to be fairly large if there are children in the household. This suggests that the material cost of labor is mainly caused by a reduction in the time available for child-related household production activities and childcare, in particular. Moreover, we show that subjective income evaluations are sensitive to the level of the respondent's actual household income. We illustrate how to correct for this "preference drift".

Our paper is structured as follows. We first review the related literature and discuss the paper by Koulovatianos et al. (2009) in detail. Section 3 provides a detailed account of the data we use, including a description of the survey design, data collection procedure, and sample characteristics. Section 4 is devoted to the empirical analysis of the survey data. It presents descriptive statistics, the econometric model, and results. Section 5 concludes.

2. Related Literature

The determination of equivalence scales or the cost of additional household members traditionally involves an indirect account of different households' relative welfare levels. One approach lets experts assess relative needs. A well-known example is the (modified) OECD scale (OECD, 2005). A second approach uses objective expenditure data to estimate equivalence scales empirically. Recently, both types of scales have been extended to consider (parts of) the time cost of additional household members. Based on a review of empirical evidence regarding differences in expenditure and time use patterns of households, Folbre et al. (2017) propose an expert-type equivalence scale in extended incomes (the sum of monetary income and household production). The authors argue that economies of scale in adult-equivalent consumption and the needs of a child relative to an additional adult are greater in the consumption of household production than in the consumption of marketed goods and services. The equivalence parameters they suggest formalize these hypotheses but lack a precise empirical foundation. Apps and Rees (2002), Bradbury (2008) and Gardes and Starzec (2017) investigate the full consumption needs of additional household members (including domestic production and leisure) by combining information on time-use with objective income and expenditure data, respectively. Apps and Rees (2002) establish that the monetary cost of children is significantly higher in households facing greater time restrictions from full-time employment. Children's full cost, however, is virtually identical across these households and is considerably larger in relation to an additional adult than the monetary cost. Bradbury (2008) and Gardes and Starzec (2017) confirm the latter result. This corresponds to various other studies that investigate the time cost of children alone and find these to be substantial (see e.g. Gustafsson and Kjulin, 1994, Bittman and Goodin, 2000, and Ekert-Jaffé and Grossbard, 2015).

As must be noted for all studies based on an indirect account of households' welfare, the cited results rely on a number of strong assumptions. To avoid these, an increasing body of the literature on equivalence scales centers around a third approach that uses subjective evaluations of well-being and income. In a review of the related methods, Bradbury (1989) distinguishes four types of subjective data that can be used to approximate households' cost or welfare functions directly in order to construct the associated equivalence scales. The first type is the evaluation of one's o*wn living standard*, where respondents are asked to evaluate the level of welfare or satisfaction they experience at their current household income or, more generally, their current financial situation. The second type is the evaluation of a *hypothetical living*

standard, where individuals have to assess the level of well-being experienced at given incomes by different hypothetically structured households. The third type represents evaluations of respondents' *own income*. Here, people are confronted with a description of a certain level of welfare and are asked to indicate the income they would need to enjoy that same standard of living in their current household situation. In contrast to this, the fourth type of subjective evaluations concerns *hypothetical incomes*, which capture a respondent's evaluation of income levels that a range of hypothetical households would require to reach a pre-specified level of welfare.

Many studies estimate equivalence scales by analyzing income differences across households of different size and structure conditional on their self-reported level of wellbeing, and differentiate between adults and children based on own living standards responses. Using German panel data, Schwarze (2003), van Praag and Ferrer-i-Carbonell (2004) and Biewen and Juhasz (2017) show that the equivalence weight of children is lower than the weight of additional adults (which also appear relatively low compared to expert scales, e.g. the OECD scale). Most studies based on data from other countries confirm this result. Notable exceptions are Rojas (2007) and Bollinger et al. (2012). Van Praag and Ferrer-i-Carbonell (2004) also employ a specification that accounts for the number of working adults. This allows them to draw conclusions about the equivalence scale depending on the household's endowment with parental nonmarket time. They find that monetary needs are greater in families with two working adults as compared to families with one working and one nonworking adult.

A number of earlier studies analyze own income responses and also find rather low equivalence weights for adults and children. By letting the same respondent evaluate a number of different welfare levels, several studies construct welfare functions of income and estimate equivalence scales on their basis (see e.g. van Praag, 1971, Kapteyn and van Praag, 1976, van Praag and van der Sar, 1988). Other studies focus on a single own income response, where respondent have to report how much income they would need to "make ends meet" (Goedhart et al., 1977). Among others, van den Bosch et al. (1993) and Garner and de Vos (1995) have used this so-called minimum income question in the determination of equivalence scales. Similar to the latter approach, our survey relies on one single own income response for a given welfare level specified in terms of the reference household's income.

Our study builds on analyses by Koulovatianos et al. (2005, 2009), who use hypothetical income evaluations. First, Koulovatianos et al. (2005) design a questionnaire to collect hypothetical income responses, with the aim of testing the income dependence of equivalence

scales. In a subsequent study, the authors adjust the survey instrument to evaluate the cost of children depending on the employment status of their parents (Koulovatianos et al., 2009). Because our paper is very closely related to it, we present the survey design and results of this original study in detail, pointing out its strengths and potential weaknesses.

Koulovatianos et al. (2009) investigate whether and by how much the monetary cost of children differs depending on a household's nonmarket time endowment. To characterize time endowments, the authors classify households by the number of full-time employed adults within one- and two-adult households. They assume that households experience a restrictive reduction of nonmarket time when all adult members are full-time employed. A couple consisting of one full-time employed and one nonworking partner is said to face a nonrestrictive reduction of its time endowment, whereas a nonworking single or two nonworking partners are subject to no time reduction at all. These time-endowment constellations, together with differing numbers of children, define hypothetical household types whose income requirements are evaluated in the survey. Respondents indicate the net household income they think different household types need to enjoy the same standard of living as a single, childless, nonworking adult with a pre-specified net monthly reference income. More specifically, the authors ask respondents to fill in 4×5 matrices whose rows represent the number of children (from zero to three) and columns distinguish the number of adults (one or two) and their possible work status combinations (nonworking and/or working full time). The questionnaire specifies a reference income for one of these constellations (nonworking single without children), such that respondents have to fill in the remaining 19 cells. This is repeated for three different reference incomes, such that one obtains 57 observations per respondent. This survey design has the advantage that it collects information for a broad range of household types. This allows KSS to estimate equivalence scale parameters even though the number of participants to their online survey in Belgium and Germany is relatively small (149 and 164, respectively) and participants mainly come from a small number of household types.

Analyzing responses from both countries separately, KSS find equivalence scale parameters that are within the range set by other equivalence scales, but are relatively large compared to those found by earlier studies using the subjective approach. Equivalence weights tend to fall with reference income, which suggests that there are more economies of scale when living standards are higher. Most importantly, the results indicate that the monetary cost of children is significantly higher in fully time-restricted than in other households, whereas a non-restrictive reduction in nonmarket household time does not affect the income requirements

associated with a child. The results imply that the tradeoff between money and time is significantly higher in households with children when all adults are working full-time. At the same time, the results suggest that there is a strong tradeoff between money and time even if there are no children in the household. The disutility of labor appears to be substantial. Since KSS ask about the income necessary to hold the general standard of living constant, the greater monetary needs of working adults may stem from three different sources. First, there may be expenditures directly related to being employed (costs of commuting, work equipment etc.). Second, labor market work decreases the time available for household production activities, which can be substituted for by the purchase of market goods and services (e.g. eating out instead of cooking at home or affording external childcare). Third, individuals may seek monetary compensation for their loss in leisure, which would allow them to substitute leisure by material consumption. While the first two kinds of compensations are supposed to hold the household's material standard of living constant, the third one is meant to increase the material standard of living to compensate for the loss of leisure time such that total utility remains unchanged. As we argued in the introduction, welfare economists might be interested in the effect on total utility, whereas social policymakers are typically interested in the material standard of living (Nelson, 1993). In our survey, we focus on the latter and specifically ask about the income necessary to secure equal material living standards across household types.

3. Data

3.1 The Questionnaire

We analyze responses to an online questionnaire that we created using the software package SoSci. We provide an English version of the entire (originally German) questionnaire in the appendix. The maximum number of questions a respondent had to answer was 17. The majority of questions concerned the socio-economic characteristics of the respondent, his/her children and, if applicable, his/her partner. Supplemented by a single income evaluation question, the generated dataset provides a suitable basis for the analysis of additional household members' financial needs.

Among the inquired personal characteristics are the respondent's nationality, region of residence (German federal state), gender, age, highest educational degree and employment status. Gender information is used to restrict the sample to women, while the other variables

serve as covariates in our empirical analysis. Of special importance is the employment status, which subsumes if the respondent is currently working, the kind of employment or non-employment, as well as weekly hours of work, if applicable. Furthermore, we asked individuals to state if they were singles or in a relationship with a partner living either in the same or in a separate household. We also requested them to indicate if there were any other adult household members except for them, their partners or, possibly, their children. To construct a measure of the time restrictedness of the respondent's household, we had to assess the partner's employment status, if present. This involved the exact same questions as those concerning the respondent's own employment. In order to investigate the differential monetary needs of children given the differences in their parents' non-market time endowment, we also asked respondents to state the number and age of children living in their households.

In the second-last question of the survey, we enquired respondents to specify their households' actual net monthly income. In an attempt to receive measures as accurate as possible, we provided a detailed list of income components that they should include in the respective answer. Finally, we assess our dependent variable via the following question regarding own income requirements:

> *"How much income do you think you would need in your current family situation to enjoy the same material standard of living as a single adult, who is unemployed, has no children and receives social security benefits amounting to 822 euros?"*

822 euros was the average amount of monthly welfare benefits to households provided by the German welfare system (*Arbeitslosengeld II*) in 2012 (Bundesagentur für Arbeit, 2013). Although it is more than 60 percent higher than the lowest reference income used by KSS[1], it reflects a relatively low standard of living in Germany. To remind respondents of the dimensions along which they differ from the reference household, we presented a table to them, contrasting their own to the hypothetical household's characteristics. It summarized the respondents' earlier statements regarding their household's number of adults, their employment, and the number of children in comparison to the details mentioned in the above question. Table 1 represents an illustrative example.

[1] We set all our results in relation to estimates by KSS that rely on the assumption of a reference income of 500 euros.

Table 1: Summary Tool - Example

	Your own household	Reference household
Relationship status:	in a partnership	single
Employment status:	both working	not working
Number of children:	3 children	no children
Income:	???	€ 822

Below the table, respondents had to fill in the net income that they considered equivalent to the reference income, in the sense of being necessary to enjoy the same material standard of living, given the differences in their households' characteristics (as indicated by the "???" cell). A response to this question completed the survey.

3.2 Data Collection

Bradbury (1989) argues that people are better able to evaluate their own household's income requirements than those of a hypothetical, differently composed household. When the research focus is on the cost of children, it thus seems desirable to ask parents about their income evaluations. Furthermore, it may be beneficial to enquire individuals that are concerned with the household's child-related expenditures primarily. These are typically mothers.[2] Therefore, we have made an effort to let as many mothers as possible answer our questionnaire.

We recruited a convenience sample of respondents via the social networking site Facebook. A multitude of Facebook groups address parents specifically and thus allow an easy identification of people in our target group. Therefore, we posted an appeal to participate in our survey to 116 groups and two large communities[3] directly related to parenthood or the exchange of child-specific goods and advice. Sometimes this required the approval by a group administrator whom we had to contact first. Because we designed our survey to study the financial needs of German households, we placed our call in German groups only. At the time of survey, the number of members within the groups ranged from 59 to 10,786, whereas the communities had as many as 277,339 and 182,248 subscribers. Altogether, this resulted in a

[2] For empirical evidence in support of this view, see Pahl (2008).
[3] Groups are designed for relatively small numbers of people to communicate on subjects of common interest and are either public or private, as chosen by the initiator. Community pages, on the other hand, are official profiles of public figures, businesses and organizations that are publicly available to all internet users.

total number of 736,922 potential participants, in theory. Of course, this number is extremely optimistic because many members or subscribers probably did not access Facebook at all, or did not receive notifications from the groups or communities during the survey period.

We conducted the survey in February 2017. A personal message explaining the purpose of our study and a link to the survey were posted to each group between February 5 and February 11, 2017. Facebook gave all group members the option to comment on our entry. This option was valuable to us for three reasons. Firstly, it allowed for the timely interaction with potential respondents and the clearance of their questions. Secondly, each comment led to a refreshment of the newsworthiness of the entry, leading it to appear at the top of the page repeatedly. This may have enhanced the visibility of our request and thus may have increased the response rate. Thirdly, having people recommend the survey to friends with the help of a reference in the comment section may have helped to achieve the same result. Seven to ten days after our entry's first appearance, we posted a reminder also indicating the date at which our survey would expire. The online survey tool was deactivated on February 28, 2017, thus ending the process of data collection.

We received 1,062 responses, of which 935 respondents completely answered the survey.

3.3 Sample Characteristics

Of the 935 completed questionnaires, only 59 stemmed from male respondents. We dropped these responses because they did not match our target group of mothers. Because of ambiguities in the income evaluation of individuals that live separately from their partners, we also excluded 58 women who reported to have a partner not living within the same household. With the data collection organized according to the narrow definition of our target group, the number of childless individuals that had participated in our survey was very low. Not considering them led to a loss of only nine observations. There are no households with other adult members (except for the partner) in our sample, because indication of the same led to the immediate termination of the survey. Hence, we have ensured that apartments shared by extended families or unrelated adults do not affect our estimated equivalence scales. To approximate the needs of dependent children, we exclude households from the analysis that consist of at least one child above the age of 17. This concerns 16 observations and leaves us with information about 793 mothers and their households.

Unfortunately, from some of these mothers we have received implausible responses to the income evaluation question. Although previous answers clearly suggested that their households consisted of more people than the reference household, they declared to require less income than a childless single to enjoy the same material standard of living. This concerns 46 responses. We cannot be sure if these statements are the result of a misunderstanding, a normative judgement about the adequacy of social security benefits in general, or the inclusion of non-pecuniary welfare effects of additional household members. Whatever the reason, stated income requirements of less than €822 certainly do not correspond to our understanding of what this variable should capture. Hence, we have decided to exclude the 46 critical observations from our empirical analysis.[4] Our final sample thus comprises 747 observations.

We provide sample statistics for some of the enquired control variables in Table 2.

A comparison of the sample characteristics with the individual characteristics of respondents in the German sample of KSS shows that our survey responses come more strongly from working families with children. While the large majority (more than 85 percent) of respondents in the sample of KSS reported to have no children, our sample allows us to analyze the income responses of people who actually face the cost of children in everyday life. This allows us to test whether the KSS results can be generalized and apply also to families with children. Furthermore, our number of independent observations is considerably larger than in the KSS study, which considers 19 clearly interrelated hypothetical incomes stated by each of the 164 respondents.

Overall, we see that the vast majority of our sample of mothers is German, lives with a partner, and is between 20 and 40 years old. More than 89 percent of the respondents have either one child or two children. Many women in our sample have completed a vocational training. Despite motherhood, a large fraction of our sample is in employment. Yet, this percentage is small in comparison to the employment share of the respondents' partners. Differences also exist in the working time of mothers and their partners. On average, mothers spend 29 hours per week in paid employment while their partner works about 42 hours per week. The mean net household income in our sample is about €2,661. Only a small fraction of households (<5%) reports to have an actual income below the reference level of €822.

[4] A robustness test confirmed that retaining those 46 observations in our sample results in only small changes in the estimated coefficients. Our results remain qualitatively unchanged.

Table 2: Sample Characteristics

	N	%		N	%
Total	747				
Nationality			Own Employment		
German	728	97.5	Yes	463	62.0
Others	19	2.5	No	284	38.0
Partner			Employment of the Partner	(N=654)	
Yes	654	87.6	Yes	617	94.3
No	93	12.4	No	37	5.7
Children			Own Working Time	(N=463)	
One	402	53.8	<=20	140	30.2
Two	264	35.3	20-35	160	34.6
Three	66	8.8	>=35	163	35.2
More than Three	15	2.0			
Age	Mean: 31.00		Partner's Working Time	(N=617)	
< 20	6	0.8	<=20	9	1.5
20-40	710	95.0	20-35	12	1.9
> 40	31	4.1	>=35	596	96.6
Highest Degree			Net household income	Mean: 2661.19	
No degree	3	0.4	< 822	36	4.8
Secondary School	139	18.6	822-1625	150	20.1
Abitur	48	6.4	1625-2375	150	20.1
University Degree	153	20.5	2375-3125	173	23.2
Vocational Training	348	46.6	>= 3125	238	31.9
Others	56	7.5			

4. Empirical Analysis

4.1 Descriptive Statistics

In the empirical analysis of this paper, the variable of primary interest is the ratio of the income that respondents need to reach the pre-specified material standard of living and the reference income. This quotient represents the equivalence weight that the respondent assigns to her household in order to achieve the same level of well-being as an unemployed single adult with an income of €822. Following KSS, we call this variable the equivalent-income ratio. Table 3 presents its means and standard deviations for households differentiated by the number

of adults and children as well as by the incidence of full-time employment (W), which is defined as being employed and working for 35 hours per week or more.[5] The table also reports the number of observations for each of these types, thus informing about the distribution of household characteristics within our sample.

Table 3: Mean Equivalent-Income Ratio by Household Type

Number of Children	Single		Couple			
	N	W	NN		WN	WW
1	**1.69**	**1.92**	**2.13**	***	**2.68**	**2.60**
	(0.44)	(0.46)	(0.72)		(1.11)	(1.53)
	41	12	21		234	94
	**	*	**		***	**
2	**1.96**	**2.35**	**2.71**		**3.01**	**3.17**
	(0.56)	(0.28)	(0.84)		(1.18)	(1.21)
	24	3	20		188	29
					**	
3	**2.07**	**3.53**	**2.59**	*	**3.63**	**3.81**
	(0.52)	(0.69)	(0.90)		(1.53)	(1.68)
	9	2	4		40	11

*Note: Each cell consists of the mean equivalent-income ratio (in bold), the standard deviation (in parentheses) and the number of observations. Stars between two cells indicate that the difference between their means is statistically significant with * p < 0.1, ** p < 0.05, *** p < 0.01.*

We observe the equivalent-income ratio for single mothers and couples with up to four children. Because there is only a small number of households having four children, we do not include them in the presentation of Table 3. Thus, we distinguish households according to the number of children in three rows. The sample statistics in the first two columns refer to single mothers without (N) and with full-time employment (W). From the number of observations reported in the third line of each cell, we know that full-time employment among single mothers in our sample is quite rare, especially when there is more than one child. The first line of each cell reports the mean equivalent-income ratio generated from responses of women in the respective households. With the reference household's income normalized to one, we can immediately derive the percentage increase in income needed for different households to enjoy

[5] We also conducted our analyses applying different definitions of being time-restricted, i.e. we considered an adult as restricted by "working" when he/she reported to work more than 20 hours per week or simply a positive number of hours. A less stringent definition of time restrictions does not affect the estimated coefficients for adults and children considerably but leads to lower or even insignificant compensations for children in time-restricted households. The results are available upon request.

the same material standard of living. From the top left cell, for instance, we can conclude that non-working single mothers with one child report that they need, on average, 69 percent more income than a non-working single without children to enjoy the same material standard of living. Single full-time employed mothers require an even greater monetary compensation for the first child and their time restriction or material cost of labor. Women of this kind indicate a necessary income increase of 92 percent. The difference between the income requirements of non-working and working single mothers with one child is not statistically significant, though. The same is true for single mothers with two or three children. Although working mothers always indicate greater mean equivalent-income ratios, the difference is never statistically significant, which may be due to the relatively small number of observations in each cell. By comparing means vertically, we can investigate the income increase needed for additional children. For mothers without full-time employment, the cost of an additional second or third child seems to be much lower than that of the first child. While the second child is associated with an income increment of 27 percentage points, we only find a small and statistically insignificant income increment for a third child (11 percentage points). For full-time employed single mothers, there are not enough observations to draw any reliable conclusion, unfortunately.

For couples, we distinguish the degree of time restrictedness by considering three possible combinations of adults' employment states. Column NN refers to two adults who both are not full-time employed. The combination WN represents what KSS call the 'traditional household', in which one adult works full-time whereas the other one does not. The last column studies fully time-restricted households, whose adult members both are in full-time employment. The distribution of the number of observations clearly shows that the 'traditional household' indeed is the most common household arrangement in our sample. Again, mean equivalent-income ratios provide first evidence regarding the cost of additional household members under different time constraints. As suggested by these numbers, households with an additional non-working adult and a child need 113 percent more income than the reference household. Subtracting from this the requirement of the average non-working single with a child yields a 44 percentage point income increment for the second non-working adult. In the presence of at least one working adult, these costs increase significantly. However, they do not depend on whether time restrictions are partial or complete. Even though with less statistical significance, similar findings appear also in households with two or three children. Contrary to that, we find mixed evidence when comparing households that differ in the number of children.

In moving from one child to two children, we find significantly positive income increments needed for all types of households. Non-working as well as fully employed households require an additional 57 to 58 percent of reference income for the second child, whereas 'traditional households' need only half as much. On the other hand, income requirements appear not to rise with a third child to a non-working couple, but to increase by more than 60 percentage points in the other two household types. From the descriptive statistics and simple mean comparisons, it is thus very difficult to draw unambiguous conclusions regarding the cost of children in differently time-constrained households. A multivariate regression analysis will prove more helpful in this regard.

4.2 Econometric Model

Because one aim of this paper is to find out whether the results by Koulovatianos et al. (2009) are reproducible using a different sample and survey design, our empirical analysis closely follows the regression model of that study. KSS estimate an equivalence scale proposed by Cutler and Katz (1992). We do the same and regress the stated equivalent-income ratio (EIR) on the accordingly defined household's equivalence weight along with other personal and household characteristics that might affect responses to the hypothetical income question. This leads us to our *Baseline Specification:*

$$EIR_i = (n_{Ai} + \alpha n_{Ci})^{\theta} + X_i^{'}\mathrm{b} + e_i \qquad \text{(Baseline)}$$

The first term on the right-hand side represents the equivalence scale, where n_A is the number of adults in the household and n_C is the number of children. α is the weight that a child receives in relation to an additional adult and the parameter θ captures economies of scale in adult equivalents. X_i is a vector of personal and household characteristics that may also have an impact on the own income response. We include the respondent's age, her education as measured by the highest degree attained, a dummy for being a German national as well as the state of residence in all our regressions. To test whether actual household incomes are related to own income responses, we furthermore consider the respondent's monthly net household income in parts of the analysis below. e_i is the error term.

We obtain a model that is very similar to KSS by extending the definition of the equivalence scale by the number of working adults. This produces the following *Specification 1:*

$$EIR_i = (n_{Ai} + \alpha n_{Ci} + \beta n_{Wi})^{\theta} + X_i^{'}\mathrm{b} + e_i \tag{1}$$

n_{Wi} reflects the number of working adults in the household of respondent i and the associated coefficient β quantifies the compensation for an adult's full-time employment in terms of the cost of an additional non-working adult.

Specification 2 provides a more detailed account of the differential cost of children in relation to the employment status of their parents. It does so by interacting the number of children with dummies indicating the degree of the household's time restrictiveness:

$$EIR_i = (n_{Ai} + \alpha n_{Ci} + \beta n_{Wi} + \gamma n_{Ci} D_{WNi} + \delta n_{Ci} D_{Fi})^{\theta} + X_i^{'}\mathrm{b} + e_i \tag{2}$$

D_{WNi} is equal to one if household i is a 'traditional household' and zero otherwise. D_{Fi} refers to households that are fully time-restricted and is equal to one if either a single or both adults in a couple are in full-time employment. The assessment of a child's relative weight in those households must consider all the related coefficients. While it equals α in a household with no full-time employed adults, it is the sum of α and γ in a traditional and the sum of α and δ in a fully time-constrained household.

One question we seek to answer is whether our results are robust to the functional form that we impose on the equivalence scale. By assuming a Cutler and Katz parametrization, our regression model is clearly nonlinear. Therefore, we estimate equations (Baseline) to (2) by nonlinear least squares. It is easy to transform these into analogous linear equations if one is willing to assign fixed equivalence weights to specific household members, as in the commonly applied OECD-scale (see OECD, 2005). We do this and estimate the linear alternatives to the three previous specifications:

$$EIR_i = 1 + \tau(n_{Ai} - 1) + \alpha n_{Ci} + X_i^{'}\mathrm{b} + e_i \tag{Baseline a}$$

$$EIR_i = 1 + \tau(n_{Ai} - 1) + \alpha n_{Ci} + \beta n_{Wi} + X_i^{'}\mathrm{b} + e_i \tag{1a}$$

$$EIR_i = 1 + \tau(n_{Ai} - 1) + \alpha n_{Ci} + \beta n_{Wi} + \gamma n_{Ci} D_{WNi} + \delta n_{Ci} D_{Fi} + X_i^{'}\mathrm{b} + e_i \tag{2a}$$

The advantage of estimating the linear alternatives to our baseline specifications is that they yield the equivalence weight of additional household members immediately. Thus, we can evaluate the relative cost of a child independent of the total number of family members.

A second issue we want to address is the role that a respondent's actual income plays in determining her income response and hence the equivalent-income ratio assigned to her household. We would expect respondents to indicate greater income requirements the higher their actual household incomes and thus current consumption habits are. To control for this 'preference drift' (van Praag, 1971, Kapteyn and van Praag, 1976), we include the ratio of actual to reference income in supplementary regressions of all linear and nonlinear specifications. As actual household income is positively correlated with the number of adults, of full-time employed adults and of children (with a correlation coefficient of 0.329, 0.308 and 0.159, respectively), omission of this variable will lead to an overestimation of the unadjusted equivalence parameters for (working) adults and children. However, it will be necessary to correct the estimated equivalence weights when actual incomes significantly affect income responses (Bradbury, 1989). This is because a respondent, whose actual income is higher than that needed to attain the reference household's material standard of living, would indicate lower income requirements once she received the income that she had previously deemed necessary. To be able to make consistent comparisons of income responses across differently composed households, one therefore has to calculate the income requirement for a household whose actual income corresponds to this income requirement. . Here, we use the same method as often applied in studies of the minimum income question or income functions (see e.g., van Praag and van der Sar, 1988). It implicitly imputes current household incomes that would lead respondents to state these as their required incomes. In the linear version of our Baseline Specification, for instance, the inclusion of the actual-income ratio $(Y_i / 822)$ as a regressor yields the following equation:

$$EIR_i = 1 + \tau(n_{Ai} - 1) + \alpha n_{Ci} + \lambda\left(Y_i / 822\right) + X_i^{'}\mathrm{b} + e_i .$$

Under the provision that current incomes must be equal to required incomes, $EIR_i = (Y_i / 822)$, we can express the equivalent income ratio by

$$EIR_i = \frac{1}{1-\lambda} + \frac{\tau}{1-\lambda}(n_{Ai} - 1) + \frac{\alpha}{1-\lambda} n_{Ci} + X_i^{'}\frac{\mathrm{b}}{1-\lambda} + \frac{e_i}{1-\lambda},$$

where λ is the coefficient on the actual-income ratio, which usually ranges between zero and one. To correct for the preference drift, we thus only need to multiply the equivalence weight of the respective family member by the factor $1/(1-\lambda)$. This also applies to the nonlinear

model, where we first have to calculate the equivalence weights from the estimated parameters before we can apply the correction factor.

4.3 Regression Results

We now turn to the presentation of the results obtained from our novel dataset. As these are directly comparable to the results by KSS, we first focus on the parameter estimates obtained from the non-linear model. After that, we will consider the linear model assuming fixed equivalence weights. The estimated coefficients allow us to calculate equivalence weights of specific household members that are comparable across models and can be adjusted for a potential preference drift caused by own household income. This will help us evaluate the sensitivity of our findings with respect to the chosen specification as well as own income effects.

Nonlinear Model

The top panel of Table 4 summarizes the parameters obtained from estimating our three main specifications in the nonlinear framework (the (Baseline) and equations (1) and (2)). The first column of each specification presents the coefficients estimated when ignoring the respondent's actual income, while we account for it in the second column. Except for the baseline specification, which was not considered in the KSS study, the third column to each specification lists parameter estimates by KSS that are based on their German subsample taking a reference income of €500 as given. The estimated parameters are used to calculate the equivalence weight of additional household members. The bottom panel of Table 4 reports the weights for a selection of household members to illustrate the implications of the estimated parameters. To allow a fair comparison between adult and child weights, all of the numbers refer to a third person joining the household.

Consider first the regressions that do not include the respondent's actual household income. In the baseline specification, we estimate the most classical form of the Cutler-Katz scale not accounting for time restrictions of households. We find that the necessary income increase associated with a child is about 56 percent of that of an additional adult (parameter α). The economies of scale parameter θ is found to be very close to one, implying relatively low economies of scale in the number of adult equivalents. As a result, the equivalence weight of

an additional adult is 87 and that of a child 49 percent, irrespective of the employment status of the adults.

Table 4: Estimated Coefficients and Resulting Equivalence Weights from the Nonlinear Model

		Baseline		Spec. 1			Spec. 2		
		Own results		Own results		KSS	Own results		KSS
		without income	with income	without income	with income		without income	with income	
α	n_C	0.56***	0.77***	0.74***	0.83**	0.64***	0.47**	0.50*	0.57***
		(0.13)	(0.25)	(0.23)	(0.33)	(0.03)	(0.23)	(0.30)	(0.03)
β	n_W	.	.	0.28	0.08	0.95***	-0.13	-0.39	0.82***
		.	.	(0.18)	(0.20)	(0.04)	(0.25)	(0.31)	(0.05)
γ	$n_C \cdot D_{WN}$	.	.	.	.	.	0.35	0.36	-0.03
		.	.	.	.	.	(0.22)	(0.28)	(0.04)
δ	$n_C \cdot D_F$	.	.	.	.	.	0.57*	0.63	0.08***
		.	.	.	.	.	(0.32)	(0.42)	(0.03)
θ		0.92***	0.70***	0.83***	0.69***	0.93***	0.80***	0.67***	0.96***
		(0.08)	(0.09)	(0.09)	(0.11)	(0.02)	(0.12)	(0.14)	(0.02)
λ	$y / 822$	.	0.24***	.	0.23***	.	.	0.23***	.
		.	(0.03)	.	(0.03)	.	.	(0.03)	.
N		747	747	747	747	3,116 [a]	747	747	3,116 [a]
R^2		0.21	0.27	0.21	0.27	0.53	0.22	0.28	0.53
				Equivalence Weights					
non-working adult joins working adult with a child		0.87***	0.73***	0.70***	0.68***	0.86	0.53***	0.50**	0.89
		(0.12)	(0.16)	(0.16)	(0.20)	.	(0.19)	(0.24)	.
working adult joins working adult with a child		0.87***	0.73***	0.89***	0.73***	1.66	0.59***	0.43*	1.74
		(0.12)	(0.16)	(0.13)	(0.16)	.	(0.20)	(0.25)	.
first child joins one working and one non-working adult		0.49***	0.55***	0.52***	0.56***	0.55	0.55***	0.60***	0.50
		(0.07)	(0.10)	(0.07)	(0.11)	.	(0.09)	(0.13)	.
first child joins two working adults		0.49***	0.55***	0.51***	0.55***	0.54	0.71***	0.83***	0.59
		(0.07)	(0.10)	(0.07)	(0.10)	.	(0.15)	(0.24)	.

[a] *Observations stem from 164 respondents reporting 19 hypothetical incomes each.*
Note: The dependent variable is the income response divided by the reference value of €822. Own regressions include education, age, nationality and state dummies as additional control variables. Standard errors in parentheses.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Specification 1 introduces the number of full-time employed adults into the analysis. This specification corresponds to the benchmark model of KSS, so we can easily compare our parameter estimates to theirs. We find a relative weight of children that is about ten percentage

points higher and a scale parameter θ that is about ten percentage points lower. As we look at a reference income of €822 while KSS set theirs equal to €500, the smaller θ may reflect the finding that equivalence scales are decreasing in income. Yet, these two coefficients turn out to be remarkably similar despite the different datasets used. This does not apply to the parameter attached to the number of working adults, however. While full-time work involves nearly a doubling of the income requirements of the respective adult in the KSS study, our results indicate only a small and statistically insignificant income increment for employment. The material cost of labor market work (parameter β) thus appears to be considerably lower than the loss in general living standards found by KSS. This suggests that, when devoting more time to market work, households require much less additional income to be compensated for the loss in their material consumption of goods and services than for the loss in their general living standard. Time restrictions seem to affect people mainly though the pure loss in leisure and not so much via the reduction in time available for household production. Combining relative weights and the scale parameters, one finds the equivalence weights reported in the bottom part of Table 4. These are almost equal to the weights suggested by the 'old OECD scale', assigning a weight of 70 percent to an additional adult and 50 percent to a child. The equivalence weight of a child is virtually identical regardless of whether it joins a household with two working or one working and one non-working adult. An additional working adult requires a 19-percentage point higher income increment than an additional non-working adult, but this difference is statistically insignificant. This stands in stark contrast to the 80-percentage point difference found by KSS.

While our results from Specification 1 suggest considerably lower income compensations for adults' full-time employment than KSS's, Specification 2 indicates that the material cost of time restrictions becomes sizeable as the number of children increases. The inclusion of the two associated interaction effects in Specification 2 causes the relative weight of a child in a non-restricted household to fall to about 47 percent. Parameter γ indicates a large (although statistically insignificant) increase in this weight when there is one working adult among the two parents. In a fully time-restricted household, consisting of either one full-time-employed single or two full-time-employed partners, a child's relative weight increases by almost 60 percentage points (as shown by δ). The differential cost of children becomes visible more clearly in the equivalence weight of children joining an existing household that are reported in the bottom panel of Table 4 . While a child to a 'traditional' household requires nearly the same income increment as an additional adult forming the same kind of household (about 55 percent),

its weight is about 70 percent when joining a fully time-constrained household. Shifting from non-employment to employment thus increases the income requirements of households with children considerably. A household whose single adult member enters full-time employment requires a relative income increase of 44 percentage points ($\beta + \delta$) in the presence of one child and an increase of 101 percentage points ($\beta + 2\delta$) in the presence of two children. A household with one of two adults entering full-time employment (thus causing a non-restrictive reduction in the household's non-market time) faces an increase in its relative income requirements by 22 percentage points ($\beta + \gamma$) when one child is present and by 57 percentage points ($\beta + 2\gamma$) when there are two children. Thus, the material cost related to labor market work is substantial for households with children and rises considerably as the number of children increases. Contrary to that, we do not find evidence that an adult's full-time employment causes material cost when there are no children in the household (β). If anything, the effect appears to be negative, suggesting that people derive a positive material benefit from working. This stands in stark contrast to the findings by KSS, resulting in large discrepancies in an adult's equivalence weight. As can be seen by comparing the first two lines in the bottom part of Table 4 (non-working adult vs working adult joining a time-restricted household), we find that the material cost from employment is smaller than the cost in terms of general living standards found by KSS when the number of children is small (here: one). In our sample, an additional adult receives a considerably lower weight than in KSS's study which does not seem to vary much depending on his or her employment status. The income increment linked to an additional non-working adult is slightly lower than that of a working adult because that person removes the former time restrictions of the one-child household, implying a drop in the household's income requirements for the child by $\delta - \gamma$ percentage points.

Since we find that the material cost of labor market work is substantially increasing in the presence and number of children, while we do not obtain evidence for a material cost of labor for childless individuals, our results indicate that this cost arises entirely because of time restrictions in childcare. This needs to be interpreted with caution, though. When making inferences about childless adults, one must keep in mind that our sample exclusively consists of households with children. As long as all respondents base their own income response on the same welfare evaluation, we are able to identify an adult's equivalence weight by having our income evaluation question refer to an out-of-sample household with no children. We thus have to assume this condition to hold. We also do not observe pure changes in the number of working

adults as these always occur in the presence of children. This may explain why the material cost of labor in specification 2 becomes manifest in time restrictions with respect to childcare only.

To ensure greater correspondence with KSS, who accounted for only four broad categories of monthly net household incomes and found that they did not affect the level of reported estimates, we have not yet considered households' actual income in the regressions. A closer look at the second column of each specification reveals that our results are quite sensitive to the inclusion of actual household incomes, however. In the following, we will briefly discuss the associated changes. The results presented in the top panel of Table 4 are the unadjusted coefficients obtained immediately from the regressions. Only the equivalence weights in the bottom panel encompass a correction for the preference drift in the parameter estimates that we introduced in the previous subsection.

Focusing first on the top panel results, we find that in all three specifications the ratio of actual to reference income has a strong positive effect on the equivalent income ratio. This confirms the preference drift hypothesis. As the relation between actual household incomes and the number of adults is positive, the parameter θ, which captures economies of scale in adult equivalents, declines. At the same time, the relative weight of children goes up to partially counteract this influence. When we control for the number of working adults, as we do in specifications 1 and 2, the negative effect of considering actual incomes on the employed adult's relative weight becomes obvious in β as well.

These findings have an immediate bearing on the equivalence weights reported underneath. Even after adjusting the coefficients for the preference drift in income responses, the additional adult's weight remains slightly below the benchmark reported in the first column of each specification. The values thus fall short of the KSS results by an even greater extent than before. On the other hand, the weight of the first child increases in each specification, leading it to stay in line with the estimates by KSS or to exceed them even further.

Linear Model

To ensure that our results are robust to the choice of the equivalence scale specification, we now examine the outcomes of estimating a fixed-weight equivalence scale within a linear model. As in the previous subsection, we first ignore and then consider own income effects in the three analogous specifications (Baseline a, Specification 1a and 2a). Table 5 reports the related results.

Table 5: Estimated Coefficients and Resulting Equivalence Weights from the Linear Model

		Spec. Baseline a		Spec. 1a		Spec. 2a	
		without income	with income	without income	with income	without income	with income
τ	$n_A - 1$	0.84***	0.51***	0.65***	0.46***	0.63***	0.47**
		(0.13)	(0.13)	(0.16)	(0.15)	(0.19)	(0.19)
α	n_C	0.48***	0.39***	0.50***	0.39***	0.30***	0.24**
		(0.06)	(0.06)	(0.06)	(0.06)	(0.11)	(0.11)
β	n_W	.	.	0.20**	0.05	-0.05	-0.16
		.	.	(0.09)	(0.09)	(0.18)	(0.17)
γ	$n_C \cdot D_{WN}$	.	.	.	.	0.22**	0.16*
		.	.	.	.	(0.10)	(0.10)
δ	$n_C \cdot D_F$	.	.	.	.	0.34*	0.28
		.	.	.	.	(0.18)	(0.18)
λ	$y / 822$	.	0.24***	.	0.23***	.	0.23***
		.	(0.03)	.	(0.03)	.	(0.03)
N		747	747	747	747	747	747
R^2		0.21	0.27	0.21	0.27	0.22	0.28
		Equivalence Weights					
non-working adult joins working adult with a child		0.84***	0.67***	0.65***	0.60***	0.50***	0.46**
		(0.13)	(0.17)	(0.16)	(0.20)	(0.17)	(0.22)
working adult joins working adult with a child		0.84***	0.67***	0.85***	0.67***	0.57***	0.40*
		(0.13)	(0.17)	(0.13)	(0.17)	(0.19)	(0.23)
first child joins one working and one non-working adult		0.48***	0.51***	0.50***	0.51***	0.52***	0.53***
		(0.06)	(0.08)	(0.06)	(0.08)	(0.07)	(0.08)
first child joins two working adults		0.48***	0.51***	0.50***	0.51***	0.64***	0.68***
		(0.06)	(0.08)	(0.06)	(0.08)	(0.13)	(0.16)

Note: The dependent variable is the income response divided by the reference value of €822 minus one. All regressions include education, age, nationality and state dummies as additional control variables. Standard errors in parentheses.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

The great advantage of the linear regression is that one can straightforwardly use its estimates to determine individuals' equivalence weights. Each of those reported in the bottom panel of Table 5 is marginally below its counterpart from the nonlinear analysis. Yet, this model replicates our main results entirely. When having a child, a household with no time constraint requires an income increase of about 50 percent relative to the first adult. This is not very different from the income requirements associated with an additional nonworking adult. As an additional working adult contributes to the household's time restrictedness in fulfilling

childcare needs, that person's weight is a bit larger than that of the non-employed provided that one does not account for the differential cost of children (Specification 1a). However, this income increment is very small in comparison to KSS. The difference in adults' weights disappears or even reverses as one distinguishes the cost of children according to the time constraints of households (Specification 2a). The cost of children appears to be especially high in fully time-restricted households where a child requires a greater compensation than an adult does. As in the nonlinear model, accounting for own incomes leads to slight decreases in the equivalence weight of adults and minor increases in the weight of children.

5. Conclusion

In this study, we have proposed a refinement of a survey instrument developed by Koulovatianos et al. (2009) to estimate the cost of children in differently time-constrained households. An analysis of responses collected from mothers in Germany has shown that children impose substantial monetary costs onto their households and that these tend to increase with parental nonmarket time restrictions. Furthermore, while we do not find evidence that switching from not working to working fulltime generates material cost for childless households, we have found that the respective cost are sizable for families with children. This might indicate that the material cost of labor arises primarily from restrictions in the time available for household production, e.g. childcare.

Our findings emphasize the need to collect reliable and suitable data for estimating the cost of children. In general, when one wants to use subjective evaluation data to estimate the value of some good or economic circumstance, it seems advisable to survey groups that have experience with it. Comparing our results to Koulovatianos et al. (2009), however, we see that deviations from this rule might not always be problematic. The estimated cost of children turns out to be quite similar across both studies. Hence, the fact that the majority of respondents in the KSS study did not have children does not seem to matter much. Instead, it looks like respondents with and without children have a similar understanding of what a child needs. We do find, however, that compensations asked in return for adults' labor supply strongly depend on the presence and number of children. This may be due to four different reasons. First, our survey focusses on income compensations to keep the material standard of living constant, whereas the study of KSS aims at holding the general standard of living constant. If the latter includes benefits from leisure, the difference in the compensations asked in return for labor

market work of childless adults may reflect the monetary equivalent of the value of forgone leisure. Secondly, there may be systematic differences in income responses resulting from slight adjustments in the underlying survey design. Our design reduces the threat of a focusing illusion that may cause an overestimation of the subjective cost of time spent working. It is also possible that gender differences or other aspects by which the two samples differ, e.g. the large share of students in the KSS study, are responsible for the difference. Lastly, the fact that we do not observe childless adults may affect the quality of our estimate of the cost of childless adults' full-time employment. Any one or a combination of these factors could cause the substantially lower compensations that we find for childless adults and households with just one child. It seems to be worthwhile for future research to assess the determinants of subjective evaluations of the disutility and material cost of labor in more detail.

We have addressed some limitations of our approach. One issue is the so-called preference drift. Correcting for this effect, we found somewhat greater income requirements for children. Another limitation of the approach cannot be circumvented that easily. Even though respondents consider their own household type when giving their own income response, they still need to evaluate the reference household's standard of living which they may have never experienced. This could affect their income responses in a way that we cannot control. A solution to this problem would be to have respondents compare their current household situation to arrangements that they actually experienced in the past. This would require data from respondents who recently experienced changes in the number of children or their household's time-restrictedness. These respondents could then be asked to compare their current household needs to those they had before the change in their household type. To the best of our knowledge, such data is not yet available. This also provides room for further research.

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Appendix: Questionnaire

1 What is your nationality?
- ☐ German
- ☐ Other: …

2 In which federal state do you live?
- ☐ Baden-Wuerttemberg
- ☐ Bavaria
- ☐ Berlin
- ☐ Brandenburg
- ☐ Bremen
- ☐ Hamburg
- ☐ Hesse
- ☐ Mecklenburg-Western Pomerania
- ☐ Lower Saxony
- ☐ North Rhine-Westphalia
- ☐ Rhineland-Palatinate
- ☐ Saarland
- ☐ Saxony
- ☐ Saxony-Anhalt
- ☐ Schleswig-Holstein
- ☐ Thuringia

3 What is your gender?
- ☐ Female
- ☐ Male

4 What is your age?

…

5 Please choose the highest educational degree you hold.
- ☐ No degree
- ☐ Certificate of secondary education
- ☐ General certificate of secondary education
- ☐ Abitur
- ☐ Bachelor
- ☐ Master
- ☐ Diploma
- ☐ PhD
- ☐ Foreman
- ☐ Vocational Training
- ☐ Other: …

6 What is your relationship status?
- ☐ I am single. *(→ 8)*
- ☐ I am in a relationship and do live with my partner (common dwelling).
- ☐ I am in a relationship and do not live with my partner (separate dwellings).

7 Besides you and your partner (and possibly your children), are there any other adults living in your household (e.g. parents, flat mates, etc.)?
- ☐ Yes *(drop out)*
- ☐ No *(→ 9)*

8 Besides you (and possibly your children), are there any other adults living in your household (e.g. parents, flat mates, etc.)?
- ☐ Yes *(drop out)*
- ☐ No

9 Are you currently working?
- ☐ Yes
- ☐ No *(→ 12)*

10 Please choose your work status.
- ☐ Worker
- ☐ Employee
- ☐ Self-employed
- ☐ Trainee
- ☐ Freelancer
- ☐ Civil servant
- ☐ Other: …

11 What is your weekly working time?

…

(If in a relationship → 13; If single → 17)

12 Since you negated that you are currently working, please choose from the following options. I am a/an
- ☐ Housewife/-husband
- ☐ Retiree
- ☐ Student
- ☐ Apprentice
- ☐ Pupil
- ☐ Intern
- ☐ Other: …

(If in a relationship → 13; If single → 17)

13 Is your partner working?
- ☐ Yes
- ☐ No *(→ 16)*

14 Please choose the work status of your partner.

- ☐ Worker
- ☐ Employee
- ☐ Self-employed
- ☐ Trainee
- ☐ Freelancer
- ☐ Civil servant
- ☐ Other: …

15 What is the weekly working time of your partner?

… *(→ 17)*

16 Since you negated that your partner is currently working, please choose from the following options. Your partner is a/an

- ☐ Housewife/-husband
- ☐ Retiree
- ☐ Student
- ☐ Apprentice
- ☐ Pupil
- ☐ Intern
- ☐ Other: …

17 How many children live in your household?

- ☐ 0 *(→ 19)*
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ More than 3

18 Please enter the age of your child / children.

Child 1: …
Child 2: …
Child 3: …
Child 4: …

19 To estimate the needs of additional members of a household, it is necessary to collect income data. The more precisely you state your own income, the more precisely we can determine needs.

What is your monthly net household income, i.e. your income after taxes and social security contributions? Please also include transfer payments such as child benefits, housing benefits, child allowances, maintenance payments, BAföG, pension payments and the like as part of your income provided that you receive them.

…

20 How much income do you think you would need in your current family situation to enjoy the same material standard of living as a single adult, who is unemployed, has no children and receives social security benefits amounting to 822 euros?

…