

Maternal Employment and Happiness: The Effect of Non-Participation and Part-Time Employment on Mothers' Life Satisfaction

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Abstract

The happiness effect of labor market non-participation and part-time employment has not yet been a major issue in the Economics literature - unlike the happiness effect of unemployment, which has been found to be substantially negative. In Germany, many women with dependent children are involuntarily out of labor force or in part-time employment because they face family constraints. One of the most important reasons for that might be insufficient access to appropriate child care. Using data from the German Socio-Economic Panel (SOEP) study, this paper analyzes the impact of (involuntary) non-participation and of part-time employment on mothers' life satisfaction. Controlling for unobserved individual heterogeneity, in a first step of the paper, I find that non-participation and part-time employment are associated with substantially lower life satisfaction than full-time employment. In a second step, I show that non-participation is in a majority of cases due to family constraints and that this involuntary non-participation significantly lowers subjective well-being. Compensating income variations reveal that the residual household income would have to be raised by 182 percent (157 percent / 77 percent) in order to just offset the negative effect of not being able to work because of family constraints (being in small / large part-time employment). The estimated coefficients are decomposed into a pecuniary effect (forgone earnings) and a non-pecuniary (psychological) effect, which are both found to be substantial and significantly different from zero. The findings also reveal that - in terms of overall happiness of the population of mothers - non-participation is a more serious problem than unemployment.

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Keywords: Life satisfaction, subjective well-being, female employment, work-family conflict

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1 Introduction

The purpose of this study is to investigate the impact of non-participation and part-time employment on life satisfaction of mothers in Germany.

Neoclassical labor supply theory would suggest that individuals choose their employment status and working hours according to their preferences (trade off between income and leisure¹) in order to maximize utility. If individuals can freely choose between employment states, non-participating individuals should presumably be just as contented as working individuals, and full-time employed individuals should be as contented as part-time employed individuals. However, this reasoning does not apply any more in the presence of constraints either on the job market or on the family level. Unemployed individuals, e.g., face job constraints and are thus not able to adopt their preferred employment status, which would be full-time employment or part-time employment. A number of studies have investigated the impact of unemployment on subjective well-being² and have typically found a substantial negative effect.³ The argument of labor market constraints does usually not apply to individuals outside the labor force. However, the status of being out of labor force may still be involuntary for certain individuals. The argument of this paper is that in Germany many mothers are unable to combine family responsibilities with (full-time) work. One of the main reasons for that might be insufficient access to appropriate child care. Hence, these mothers are not able to take up employment (non-participating mothers) or to work more hours (part-time employed mothers) even though they may wish to do so. In this study, I will analyze whether this has an important impact on these mothers' subjective well-being.

Using data from the German Socio-Economic Panel (SOEP) study and controlling for an extensive set of socio-economic and demographic characteristics as well as for unobserved individual heterogeneity, I find in a first step that non-participation and part-time employment is associated with significantly lower life satisfaction compared to full-time employment. Since the reason for being out of labor force might vary between individuals, in a second step of this paper, I distinguish between mothers who are unable to take up employment because of family constraints, mothers who face labor market constraints (discouraged workers), and mothers who simply have preferences for homemaking. The data show that the group of women who face family constraints is a dominating one among mothers. The results suggest that these mothers experience significant losses in life satisfaction and that both, the pecuniary effect (forgone earnings) as well as the non-pecuniary effect (psychological costs), are substantial in magnitude. The findings provide an important argument in favor of policies supporting parents to combine work and family.

The set-up of the present paper is as follows. In Section 2, I discuss why many

¹Leisure here means 'time not spent in gainful employment'. In addition to real leisure time this may include time spent for housework and child care.

²Reknown economist have started to empirically analyze subjective happiness measures to address economic issues, arguing that "measures of subjective well-being can [...] serve as proxies for "utility" (Frey and Stutzer 2002b, p. 405). For a general survey on happiness research see Frey and Stutzer (2002a,b), Kahneman, Diener, and Schwarz (1999), Van Praag and Ferrer-i Carbonell (2004), Layard (2005), Di Tella and MacCulloch (2006), Dolan, Peasgood, and White (2008).

³Some of the most well-known studies on the effect of unemployment on happiness are Clark and Oswald (1994), Winkelmann and Winkelmann (1998), Clark (2003, 2006).

mothers in Germany face family constraints in their working decision. Section 3 gives an overview over previous studies in the field of non-participation, part-time employment, and life satisfaction. In Section 4, I display the data used in the empirical part of the paper. In Section 5, the results are presented and discussed. Section 6 concludes.

2 Background

In this section, I will discuss why many mothers in Germany might face family constraints that prevent them from taking up employment or from working more hours even though they may wish to do so. The reason why I focus on mothers rather than on fathers is that in most cases in Germany it is still the woman rather than the man who is the main caregiver for the child(ren) and who withdraws from the labor market or reduces working hours if necessary (see e.g. Spieß and Büchel 2003).

One of the most prominent factors in this context of family constraints to maternal employment is the relatively low availability of child care, especially for children under the age of three years and for school children. School children in Germany traditionally attend classed only during the morning hours and many schools do not provide lunch for their students.⁴ Most children between three and six years attend a day care center, however in most cases only half-day and in many cases the day care institution also does not provide lunch.⁵ The overall low supply of day care for children, especially in the Western part of the country, has often been criticized, e.g. by the OECD (2004). A recent study by Wrohlich (2008) has shown that this low child care availability is not due to low demand but to a restricted supply policy. Assessing the demand for and the supply of subsidized child care in Germany, the author has found that more than 50 percent of children aged zero to three years and about ten percent of children aged four to six years are queuing for a child care place. This assessment does even not include the excess demand for full-day care by children who are already in half-day care, nor the excess demand for afternoon day care for school children. A survey undertaken by the Forsa-Institute (2004) points to the same problem, revealing that for 32 percent of parents with children aged zero to 13 years it is/was very hard to find a day care place for their child.

This situation of excess demand is due to the German child care system:⁶ There is no free entry into the child care “market”, since municipalities decide on the funding, the regulation, and the market entrance (which is mainly accorded to non-profit providers) and moreover they are themselves providers of day care services. For-profit providers are almost nonexistent on the German child care market and provide only about one percent of the total number of day care slots. Furthermore, the mostly supply-side oriented funding system has not provided adequate incentives for providers to design their services according to parental needs (e.g. concerning flexible opening hours).⁷ This inflexibility

⁴For more information on the half-day schooling system in Germany see e.g. Gottschall and Hagemann (2002), Radisch and Klieme (2003), Beblo, Lauer, and Wrohlich (2005).

⁵A detailed description of the current child care usage in Germany by age, child care hours, and state can be found in Spieß, Berger, and Groh-Samberg (2008).

⁶A current and detailed overview of the German child care system can be found in Spieß (2008).

⁷Some German states have already changed to a demand-sided funding system, prominent

also contributes to the situation that parents are seriously constrained in their working decisions.

Given the institutional setting, the availability of appropriate day care can be seen as largely exogenous to parents and therefore the question of availability of child care matters in the context of employment decisions of parents in Germany rather than the cost of day care, which matters in other countries (e.g. Kreyenfeld and Hank 2000). Empirical studies for Germany have actually found a link between the local availability of day care and maternal labor supply: Based on data from the German Socio-Economic Panel study, Büchel and Spieß (2002) and Spieß and Büchel (2003) have found that the local availability of “Kindergarten” places and the proportion of full-day places among those places positively affect labor supply of mothers with children aged three to six years. Beblo, Lauer, and Wrohlich (2005), analyzing labor supply of mothers with school children, have found an impact of the local availability of full-day schools on mothers’ labor supply. These findings suggest that child care is an important constraint for mothers’ employment decisions. This is also consistent with a recent survey conducted by the Forsa-Institute (2008), where 44 percent of mother-respondents stated that they would like to work (more hours) but the current child care situation does not allow them to do so.

Apart from the child care situation, there are also other factors that influence whether a mother is actually able to work the number of hours she prefers to. These are, for instance, the partner’s engagement in child care, the women’s possibility to work on a flexible working schedule and working place, and the access to informal child care opportunities. The latter largely depend on social networks of the parents (relatives, friends, neighbors); e.g. support by the grandmother of the child frequently plays an important role in this context (see e.g. Attias-Donfut, Ogg, and Wolff 2005). Finally, whether a mother is actually able to work (the number of hours she wishes to) depends on a complex variety of factors and this situation may change over time as the number and age of children as well as surrounding conditions evolve. If a mother is actually not able to take up employment or to work more hours even though she wishes to, she is likely to experience losses in life satisfaction.

Whether this effect actually exists and its magnitude are empirically analyzed in the present study.

3 Previous studies

The large body of literature in the field of employment and subjective well-being deals with the effect of unemployment on life satisfaction. Empirical studies have found substantial negative effects which are typically attributed to reduced social networks and self-esteem brought by employment (e.g. Clark and Oswald 1994, Winkelmann and Winkelmann 1998, Clark 2003, 2006). Even though Winkelmann and Winkelmann (1998, p. 6) conclude that “it is ‘joblessness’ that matters, not just unemployment”, there is much less empirical evidence on the relationship between non-participation and subjective well-being and findings are ambiguous. Because individual heterogeneity has a major importance when analyzing subjective well-being (e.g. Ferrer-i Carbonell and Frijters 2004), in the following, I will only cite studies that have applied panel methods.

examples are Hamburg and Berlin (Spieß 2008).

Winkelmann and Winkelmann (1998) find a negative effect of non-participation (compared to being employed) on men's life satisfaction analyzing data from the SOEP. The same is found by Booth and van Ours (2009) using Australian panel data from the 'Household, Income and Labour Dynamics in Australia' (HILDA) Survey. For women, however, the authors have found that full-time employment lowers life satisfaction compared to non-employment (including non-participation as well as unemployment). The same authors find different results from an analysis of the British Household Panel Survey (BHPS) (Booth and van Ours 2008). These results suggest that mothers and fathers who work full-time are significantly more satisfied than non-working individuals with children. For childless women and men, however, they find no significant association between employment compared to non-employment and life satisfaction.

The relationship between part-time employment and subjective well-being has also received relatively little attention in the happiness literature. Findings are again rather ambiguous. Meier and Stutzer (2008), using data from the SOEP, find an inverse U-shaped relationship between working hours and life satisfaction with maximum happiness experienced at 44 weekly working hours. This would suggest that part-time employment compared to full-time employment is negatively associated with subjective well-being. Bardasi and Francesconi (2004), using a sample of employed individuals from the BHPS, find no significant relationship between part-time work and life satisfaction, neither for men nor for women. The findings of Booth and van Ours (2009), however, suggest that part-time employed women are more satisfied with their lives than full-time employed women, while men prefer full-time employment. In contrast, Booth and van Ours (2008) come to the conclusion that both women and men with children are happier in full-time than in part-time employment. For childless individuals, they find no significant effect.

This paper will contribute to the existent literature in the following: First, I will clearly differentiate between unemployment and non-participation and further, within the group of non-participants, I will distinguish between those who are voluntarily out of labor force, those who face labor market constraints (discouraged workers), and those who face family constraints. Therefore I will concentrate on the population of women with children under the age 14 years.

Second, I will analyze the *total* effect of non-participation and of part-time employment, meaning the pecuniary as well as the non-pecuniary effect. All previously cited studies control for the total household income in their estimation models. Since individuals' own labor income is part of the total household income it is endogenous with the employment status. Thus, these studies estimate the pure non-pecuniary working hours effect on happiness keeping income constant. Since women who face family constraints and therefore are not able to work (more hours) have to bear the non-pecuniary (psychological) as well as the pecuniary consequences (forgone earnings), I will first estimate the total effect using the *residual* household income (total household income net of own labor income) as control in my estimation models. In a further step, I will separate between the pecuniary and the non-pecuniary effects and illustrate the magnitude of the pure non-pecuniary effect in terms of compensating income variations.

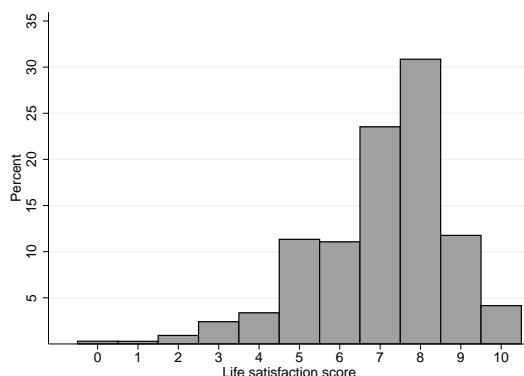
4 Data

I use data from the German Socio-Economic Panel study (SOEP), an annual household panel study, which is representative for the German population (Wagner, Frick, and Schupp 2007). I include data for the years 1994 to 2007,⁸ and restrict the sample to mothers in working age (20 to 65 years) who are neither in education nor retired and who have at least one child younger than 14 years.⁹ The sample turns out to be an unbalanced panel and comprises 28,429 person-year-observations from 5,706 individuals.

Dependent variable

The dependent variable in the estimations is general life satisfaction on an 11-point scale, based on the SOEP question “How satisfied are you with your life, all things considered?”. Respondents were instructed to choose a number ranging from 0 (completely dissatisfied) through to 10 (completely satisfied). Figure 1 gives a histogram of pooled frequencies of the life satisfaction responses. The frequency distribution is skewed to the right with a mean value of 7.05 and a modal response value of 8.

Figure 1: Reported life satisfaction of mothers



Source: Own calculations with pooled data from 14 waves (1994-2007) of the SOEP (see text).

Explanatory variables

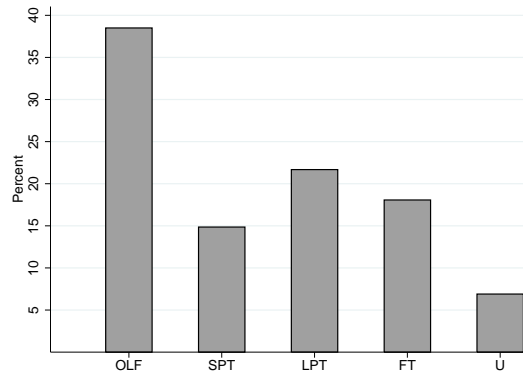
The explanatory variables of main interest in this paper are the employment states ‘out of labor force’ and ‘part-time employment’. Since the sample comprises employed as well as non-employed individuals, I define the five categories:

⁸Data for the years earlier than 1994 is not included because data for East Germany is not available before the German Reunification. Also, some socio-economic variables (namely whether an individual is actively looking for work, self-reported health, disability) are missing for the earlier waves.

⁹This age group is chosen because children in about this age are supposed to need to be cared for during the day. This is also the age range the German Youth Institute (DJI) collects data on child care usage for (see Section 2).

‘small part-time employment’ (1-19 weekly working hours), ‘large part-time employment’ (20-34 weekly working hours), ‘full-time employment’ (35 or more weekly working hours), ‘unemployment’, and ‘out of labor force’. Since part-time employment usually is a very broad definition, encompassing employment of 1 hour per week up to 34 hours per week, which is assumed to have very different consequences for life satisfaction, I distinguished between “small part-time employment” for employment of one and up to 19 hours per week and “large part-time employment” which encompasses 20 to 34 weekly working hours. Unemployment is defined according to ILO norms.¹⁰ The category of ‘out of labor force’ is in a way a residual category. It comprises all individuals who are not employed nor self-employed and who do not meet the conditions for being unemployed, i.e. it comprises individuals who do not look for work or who are not able to work.

Figure 2: Employment status of mothers



OLF = out of labor force, SPT = small part-time employment (1-19 hrs), LPT = large part-time employment (20-34 hrs), FT = full-time employment (35+ hrs), U = unemployment.

Source: Own calculations with pooled data from 14 waves (1994-2007) of the SOEP (see text).

The distribution of person-year observations over the five labor force categories is presented in Figure 2. A major share of mothers, 39 percent, does not participate in the labor force. Another important part, 37 percent, are in some part-time employment, and only 18 percent are full-time employed. Seven percent of the mothers in the sample are unemployed.¹¹

In order to analyze the effect of non-participation and part-time employment on life satisfaction in a multivariate regression model, I introduce a number of socio-economic and demographic characteristics that are likely to be correlated

¹⁰According to ILO definition, an individual is considered unemployed if he/she (1) reported not to be in gainful employment or self-employment at the time of the interview, (2) had actively sought work during the four weeks prior to the date of the interview, and (3) is available for work within the next two weeks.

¹¹These figures are in line with the official statistics of the German Microcensus from the Federal Statistical Office, according to which, in 2007, 37 percent of women with children under the age of 15 are out of labor force, 15 percent are full-time employed, 41 percent are part-time employed, and seven percent are unemployed.

with the employment status on the one hand and with life satisfaction on the other hand. In line with previous studies (see references in Section 3), I use the following covariates: log of net residual household income (in Euros, inflation-adjusted to the base year 2001) which is calculated as the total household income minus the own labor income, age (linear and squared), migration background (a binary variable taking on the value one if the individual has a migration background), highest educational degree (a set of dummies for university degree, vocational degree, no professional degree), a binary variable taking on the value one if a person in need of care lives in the household, disability (a binary variable taking on the value one if the individual is disabled or is, due to medical reasons, to a reduced extent capable to work), self-rated health on a 5-point scale,¹² a binary variable for living in East Germany,¹³ the size of the town where the household lives (in three categories: urban area, between rural and urban area, rural area), a binary variable for self-employment, a binary variable indicating whether the individual will have a child in the upcoming year,¹⁴ partner status (partner in household, no partner, partner lives in a different household), the number of children younger than fourteen, and the age of the youngest child (<1 year, 1-2 years, 3-6 years, and 7-13 years), and year dummies. Table A1 in the Appendix gives some descriptive statistics for the control variables.

5 Results

5.1 Employment status and life satisfaction

Column 1 of Table 1 gives the results of an OLS regression of life satisfaction on employment status, age, age squared, and year dummies. The coefficients suggest that mothers outside the labor force and part-time employed mothers are more satisfied with their lives than full-time employed mothers (reference category). However, as soon as a number of individual characteristics are controlled for (column 2 of Table 1), the coefficients related to non-participation and part-time employment turn into negative and significant. This suggests that the positive non-participation and part-time employment coefficients in column 1 were driven by heterogeneity. In column 2, it turns out that full-time employed mothers are, *ceteris paribus*, most satisfied with their lives while being out of labor force is associated with life satisfaction lowered by .24 points on the 11-point satisfaction scale. Small and large part-time employment are asso-

¹²Since this is a subjective measure as is also the life satisfaction variable, it is very likely that common factors influence the outcome of both variables. If the effects of the main explanatory variables (employment states) are still significantly different from zero (even though self-rated health may have absorbed part of the effects), this points to the robustness of the effects. Despite, to further check robustness, I have estimated the main model excluding self-rated health. The effects of all variables stay qualitatively and quantitatively very similar, only the adjusted R squared drops substantially.

¹³In an earlier specification I included dummy variables for each federal state. The effects of the eastern states were not significantly different from each other neither were the western states, however, the coefficients related to the east states were significantly different to the coefficients related to the west states. This is why I decided to use a single east-west dummy variable.

¹⁴It might be important to control for this since some women may stop work some time before they have a child and, at the same time, the variable is likely to influence subjective well-being. This could establish a spurious correlation between non-participation and life satisfaction.

Table 1: Estimation results: The effect of employment status on life satisfaction

	OLS		FE
	(1)	(2)	(3)
Employment status (ref.: full-time employment):			
Out of labor force	0.20** (0.03)	-0.24** (0.03)	-0.28** (0.05)
Small part-time employment	0.22** (0.03)	-0.20** (0.03)	-0.24** (0.05)
Large part-time employment	0.16** (0.03)	-0.09** (0.03)	-0.12** (0.04)
Unemployment	-0.90** (0.05)	-0.89** (0.05)	-0.57** (0.05)
Ln(Residual HH income)		0.31** (0.02)	0.15** (0.02)
Age	-0.01 (0.01)	-0.02 (0.01)	
Age ² /1000	0.06 (0.19)	0.31+ (0.18)	-0.05 (0.31)
Migration background		0.03 (0.03)	
Education (ref.: vocational degree):			
University degree		0.11** (0.02)	-0.03 (0.13)
No professional degree		-0.21** (0.03)	-0.05 (0.06)
Pers in need of care in HH		-0.25** (0.07)	-0.02 (0.12)
Disabled		-0.06 (0.08)	-0.10 (0.12)
Self-rated health		-0.73** (0.01)	-0.40** (0.01)
East Germany		-0.58** (0.03)	-0.03 (0.17)
Town size (ref.: urban area):			
Between rural and urban area		0.00 (0.02)	0.12 (0.08)
Rural area		0.04 (0.03)	0.21* (0.10)
Self-employed		-0.00 (0.04)	0.03 (0.07)
Have a child in the upcoming year		0.16** (0.04)	0.10* (0.05)
Partner status (ref.: partner in HH):			
No partner		-0.43** (0.05)	-0.32** (0.07)
Partner outside the HH		-0.04 (0.06)	-0.04 (0.07)

Table continues

Continued Table 1

	(1)	(2)	(3)
Number of children (ref.: two children):			
One child		0.06** (0.02)	0.04 (0.05)
Three or more children		-0.09** (0.02)	0.07 (0.06)
Age of the youngest child (ref.: 7-13 years):			
<1 year		0.35** (0.04)	0.28** (0.06)
1-2 years		0.13** (0.03)	0.06 (0.05)
3-6 years		0.06* (0.02)	0.03 (0.03)
Constant	7.28** (0.26)	6.98** (0.30)	6.87** (0.60)
No. of observations	28,429	28,429	27,542
No. of individuals			4,778
Adjusted R2 (within)	0.030	0.220	0.072

Results from OLS estimations (model 1 and 2) and fixed-effects estimations (model 3), dependent variable is life satisfaction (11-point scale). All models contain year dummies. Robust standard errors in parentheses.

+ p<0.10, * p<0.05, ** p<0.01

Source: Own calculations with data from SOEP, waves 1994-2007 (see text).

ciated with a life satisfaction level lowered by .20 and .09 points, respectively. The reason why the coefficients related to employment status change their signs as soon as a number of controls are introduced is that some characteristics negatively influence labor supply while at the same time they positively affect life satisfaction (e.g. having a very young child, being pregnant, residual household income).

The psychological literature has found that fixed personality traits exert a strong influence on self-reported happiness (Diener and Lucas 1999). If these unobserved personality traits also have an impact on the employment decision, a pooled OLS regression will produce biased estimates. Concretely, if inherently unhappy individuals are more likely to be out of labor force or to be part-time employed, the negative effects of being out of labor force and being part-time employed on life satisfaction will be overestimated. To remove this possible self-selection problem, individual fixed effects are controlled for in the model which is very important in the context of self-reported well-being as has been shown by Ferrer-i Carbonell and Frijters (2004). The results from a fixed-effects estimation are shown in column 3 of Table 1.¹⁵ Most coefficients estimated by the fixed-effects model are smaller in absolute value compared to the results

¹⁵Using this approach, only individuals observed at least in two time periods contribute to the estimation. This slightly reduces the sample to 27,542 person-year-observations (4,778 individuals). Furthermore, the covariates age and migration background fall out of the regression since migration background is time-invariant and age is perfectly collinear with the year dummies in the model.

from the pooled OLS model. This gives evidence that unobserved heterogeneity has led to overestimation of the effect of most variables in the latter model. An F-test leads to reject the hypothesis that unobserved individual effects are inexistent at any conventional significance level. Moreover, performing a Hausman test with the fixed-effects estimates against the estimates from a random-effects model (not shown here) reveals that the individual effects are not random but correlated with the observed explanatory variables. Hence, a fixed-effects specification is actually the appropriate method to use.

The coefficients related to non-participation and part-time employment are still negative and significantly different from zero and have even increased in magnitude compared to OLS results. This suggests that, in contrast to e.g. unemployment, there is no self-selection into non-participation and part-time employment which would produce a spurious negative correlation. In fact, mothers outside the labor force experience a life satisfaction level reduced by .28 points compared to full-time employed mothers. If being out of labor force is freely chosen according to individual preferences (solving the trade off between income and non-working time), one should not find a negative coefficient related to non-participation. If, however, not participating in the labor force is primarily the result of constraints, the estimated negative effects on life satisfaction are plausible. As I argued in Section 1, many mothers in Germany face family constraints and are unable to combine paid work with family responsibilities. These constraints might be responsible for reduced life satisfaction.

The reasoning for part-time employment is analogous: The estimated negative relationship between part-time employment and life satisfaction suggest that the employment decision has been subject to constraints. Being in small (large) part-time employment is associated with losses in life satisfaction of .24 (.12) points (relative to the reference category full-time employment). This finding suggests that not only the question of employment versus non-employment is essential for individual well-being but also the number of working hours. The negative effect may be due to prevalent preferences for a higher number of weekly working hours among mothers. It may also reflect the less satisfying job characteristics of part-time jobs which are frequently associated with lower levels of responsibility, required qualification, and wage. Women who, due to family constraints, are not able to work more than part-time have to bear all these disadvantages associated with part-time employment.

In order to illustrate the magnitude of the estimated coefficients, it is useful to consider ‘compensating income variations’, following Winkelmann and Winkelmann (1998). A compensating income variation gives the relative increase in income that is needed to compensate an individual for the drop in satisfaction resulting from being outside the labor force or being in part-time employment. Since a 100% increase in income raises life satisfaction by β_{inc} and non-participation decreases satisfaction by β_{OLF} , income needs to be increased by $\beta_{OLF}/\beta_{inc} * 100\%$ in order to make up for the lost satisfaction resulting from non-participation. Based on the estimated income coefficient of .15, the compensating variation to offset the non-participation effect is 188 percent, i.e. income would need to be increased by 188 percent in order to trigger an increase in satisfaction large enough to just offset the adverse effect of being out of labor force. The analogous compensating income variation for small (large) part-time employment is 160 percent (78 percent).

So far, the life satisfaction scale has been interpreted as a cardinal scale,

however, strictly speaking, it is an ordinal scale. This is why in a robustness check I have estimated all models with an ordered-fixed-effects-logit approach proposed by Ferrer-i Carbonell and Frijters (2004). The signs and significances and even the relative magnitude of the coefficients do not change compared to the results from the linear fixed-effects model. This is also what Ferrer-i Carbonell and Frijters (2004) find. A problem of their estimator is that marginal effects cannot be calculated and this complicates the interpretation. The results and a discussion why I prefer the linear model to the ordered-fixed-effects-logit approach can be found in the Appendix.

5.2 Being not able to work and life satisfaction

In this section, I will further investigate if mothers outside the labor force really foremost face family (child care) constraints rather than having other reasons for not participating in the labor market, e.g. labor market constraints or high preferences for homemaking.

Unfortunately, there are no explicit information available in the data set on *why* an individual does not participate in the labor force. Also, while it is documented whether a child is enrolled in a day care institution or not, one does not know whether a child actually applied for a place at a child care institution but was not accepted or whether it was offered only a part-time place while a full-time place was needed. This would inform the researcher more precisely on whether the mother faces family constraints which prevent her to enter gainful employment.

However, available information which is very useful is the variable indicating whether an individual intends to work and whether she would be able to take up employment if an appropriate job was offered to her. These variables usually serve for the definition of unemployment. If a mother is currently not able to take up employment though she in principle intends to work, child care constraints are a very likely explanation for her to be out of labor force. If, however, a woman reports to *be* able to take up employment, the reason for being out of labor force is likely to be related to labor market constraints. Thus, in this section, I will differentiate within the group of non-participating mothers using these information and build up three subcategories. Women who wish to work but face family constraints should be part of the subgroup ‘not able to work’ (first subgroup). The main focus of this section is on investigating if this is the case for a relevant number of mothers and if this inability to work produces reduced life satisfaction.

Women who face labor market constraints, in contrast, should be able to take up employment if an appropriate job was offered to them. According to the ILO definition, this second subcategory of mothers is defined as discouraged workers. Since they intend to work, are able to work, but are not actively looking for work (otherwise they would be considered unemployed), the reason for being out of labor force is likely to be related to bad labor market prospects and that they gave up looking for a job (second subgroup: ‘discouraged’). Those women are likely to experience lower life satisfaction than employed individuals, too. However, this effect has nothing to do with child care constraints. In contrast, the interpretation of such an effect would be similar to the effect of unemployment on life satisfaction – even though the magnitude may be different. Since the existence of such an effect would be related to labor market constraints, it has

to be clearly separated from a potential happiness effect caused by family constraints (first subgroup). If discouraged workers make up an important share of the non-participating mothers, it is possible that the negative non-participation effect that I have previously estimated in Table 1 is only due to these cases rather than to child care constraints.

There is a remaining group of individuals among non-participating mothers, those who do not intend to work any more in the future and therefore have not been asked even more about their ability to take up employment. Those women are combined in a third subgroup (subgroup ‘no intention to work’). For this subgroup, there is no a-priori expectation for the effect on life satisfaction. The reason for not participating in the labor force cannot be labor market constraints nor child care constraints. If this category comprises foremost individuals who have chosen not to participate in the labor force without facing (labor market or child care) constraints but just because they have high preferences for homemaking, they should not experience systematically lower life satisfaction than employed individuals. However, if some women reported not to intend to work any more because they know that they will not be able to work any more because of e.g. health problems, a disabled person they have to care for, or any other reason, it may well be possible that also these individuals are found to be less happy than working individuals. Anyway, if an effect of non-participation on life satisfaction will be found for this subgroup, this cannot be explained by restricted child care availability and therefore it is not the main focus of this paper.

The frequency distribution of mothers over the three subgroups is presented in Table 2.

Table 2: Mothers outside the labor force: Three subgroups

	N	Percent
Not able to work	6,293	57.5
Discouraged	1,865	17.0
No intention to work	2,787	25.5
Total	10,945	100.0

Source: Own calculations with pooled data from 14 waves (1994-2007) of the SOEP (see text).

Note that a majority (57.5 percent) of non-participating mothers see themselves currently unable to take up employment. This corresponds to 22.1 percent out of all mothers in the sample. Their inability to work is most likely to be related to lacking opportunities to combine work and family life. Within a comparable sample of “childless” women (women without children under 14 years), only two percent are not able to work. For these women, the reason for not being able to work is mostly related to health problems, care for an elderly, or pregnancy.¹⁶

¹⁶Looking on a SOEP sample of childless women (same age group etc.), twelve percent of the not-able women are disabled, 33 percent report to have bad or very bad health, six percent are living with a person in need of care in the same household, and 19 percent are going to have a child in the upcoming year. Among the not-able mothers, these figures are only one percent (disability), eight percent (bad health), two percent (living with a person in

It would be interesting to split up the group of part-time employed mothers in an analogous way as the group of non-participating women (i.e. according to the ability to take up a full-time job if an appropriate one would be offered), since the reason for being part-time employed may also be various. There may be mothers who would prefer to work full-time but are not able to do so because they are unable to combine more work with their family responsibilities. Other mothers may be willing and able to work more hours but do not find an appropriate full-time job. Again others may be just fine with a part-time job because this suits best their individual preferences. Unfortunately, I am not able to differentiate within the group of part-time employed women in this way because part-time employed respondents in the SOEP are not asked about their ability to take up full-time employment (if a full-time job was offered).

Table 3: Estimation results: The effect of not being able to take up work on life satisfaction

	(1)	(2)
Employment status (ref.: full-time employment):		
Not able to work	-0.27** (0.05)	-0.13** (0.05)
Discouraged	-0.33** (0.05)	-0.19** (0.05)
No intention to work	-0.19** (0.06)	-0.06 (0.06)
Small part-time employment	-0.23** (0.05)	-0.15** (0.05)
Large part-time employment	-0.11** (0.04)	-0.07+ (0.04)
Unemployment	-0.57** (0.05)	-0.43** (0.05)
Ln(Residual HH income)	0.15** (0.02)	
Ln(Total HH income)		0.38** (0.04)
No. of observations	27,542	27,542
No. of individuals	4,778	4,778
Adjusted R2 (within)	0.0727	0.0753

Results from fixed-effects estimations, dependent variable is life satisfaction (11-point scale). Further covariates included in the models are the same as in column 3 of Table 1.

Robust standard errors in parentheses.

+ p<0.10, * p<0.05, ** p<0.01

Source: Own calculations with data from SOEP, waves 1994-2007 (see text).

Moving now to the multivariate analysis, column 1 of Table 3 gives the results from regressing life satisfaction on employment status with the category need of care in the same household), and eight percent (having a child in the upcoming year), respectively. For mothers, these characteristics are very similar for ‘not-able’ and employed women, while for childless women the mentioned characteristics differ remarkably between ‘not-able’ and employed women.

of ‘out of labor force’ being split up into the three presented subgroups. The results show that the coefficient related to ‘not able to work’ is significantly smaller than zero. The life satisfaction level of mothers who are not able to take up work is lowered by .27 points compared to the reference category of full-time employed mothers. The coefficient is very similar to that related to the undifferentiated ‘out of labor force’ category in column 4 of Table 1. This is due to the fact that the not-able group is actually a dominating one among the non-participating mothers. Also, the larger (more negative) happiness effect for discouraged workers (-.33) and the less harmful effect of ‘no intention to work’ (-.19) have obviously cancelled out each other.

The relative increase in income needed to offset the negative happiness effect of not being able to work is 182 percent. For a mother with average residual household income this would be 4,319 Euros per month. This is the maximum amount she should be willing to pay for child care each month in order to be able to take up (full-time) employment. If this women has two children and would need ten child care hours per day in order to be able to work, this corresponds to a shadow price of an hour of child care of 9.95 Euros. This is far higher than the average price for child care in day care centers in Germany. In 2005, parents paid on average only 133 Euros per month and child for full-day care including lunch.¹⁷ The maximum monthly rate observed in 2005 (in the SOEP) was 420 Euros (DJI 2007). This is still far lower than the amount an average mother who is not able to work should be willing to pay according to my calculations.

The adverse happiness effect of small (large) part-time employment (compared to full-time employment) is equal to the effect that would result from an income loss of 157 (77) percent. This suggests that a mother in a small (large) part-time job with an average residual household income should be willing to pay 3,731 (1,835) Euros monthly for additional child care that would allow her to work full-time. For comparison, in 2005, the actual average amount parents paid for half-day care including lunch were 94 Euros per month, the maximum rate was 300 Euros. For half-day care without lunch, the monthly fee amounted on average to 74 Euros at at maximum to 230 Euros (DJI 2007). This large gap in what mothers are willing to pay and what they actually have to pay suggests once more that there is substantial excess demand for child care services and this confirms the findings of Wrohlich (2008).

Another way to illustrate the magnitude of the negative happiness effect produced by being not able to work and by part-time employment is to compute comparable unemployment rates. These hypothetical unemployment rates would generate the same overall happiness effect as the observed share of women who are not able to take up work and who are part-time employed respectively. Since the estimated effect of unemployment is -.57 and 6.90 percent of all mothers are unemployed and the effect of not being able to work is -.27 concerning 22.14 percent in this population, the comparable unemployment rate amounts to 10.5 percent. This means that the overall subjective well-being is the same that would be predicted for a sample of mothers where another 10.5 percent are unemployed (in addition to the actual 6.9 percent). In other words, enabling the ‘not-able-to-work’ mothers to take up employed would increase the population’s overall happiness to the same extent as would be if one reduced happiness

¹⁷This is only the average over parents who actually pay a fee. Indeed, 6% of the children in child care are exempted from paying a fee (DJI 2007).

by ten percentage points (which is not possible because only 6.9 percent are unemployed). This illustrates that among mothers not being able to work because of family constraints is a more serious problem than unemployment. The consequences of part-time employment (small and large) are comparable to an additional unemployment rate of 10.5 percent. However, as I already mentioned, this part-time effect includes the effect of being underemployed which is related to labor market reasons rather than to family constraints.

The estimated effects cannot be attributed to between-individual endogeneity because the model has been estimated with a fixed-effects approach and thus all time-invariant individual characteristics have been controlled for. Hence, if non-participating mothers and part-time employed mothers are systematically different from full-time working mothers, this does not bias the presented results. If, however, there were external shocks during the observation period that affect life satisfaction as well as employment decisions, this could bias my results. In other words, if an exogenous event makes an individual less happy while it also makes her withdraw from the labor market or reduce working hours, the estimated non-participation effect is biased. However, since I have shown that between-individual endogeneity does not distort my main findings, it seems also plausible to assume that within-individual endogeneity might not distort the results.

Pecuniary and non-pecuniary effects

So far, I have estimated the *total* effect of non-participation and part-time employment on happiness and this total effect includes a pecuniary effect (due to forgone earnings) and a non-pecuniary effect which is related to psychological costs. This total effect has been estimated while controlling for the *residual* household income which is the household income net of own labor earnings. A mother who is not able to work because of family constraints or who can work only part-time has to bear both the psychological as well as the monetary consequences. The possibility to be out of labor force while earning a full-time labor income just does not exist and this is why I have not calculated only the pure psychological effect which would result from this theoretical case. Analogously, not being able to work more than part-time also implies not to be able to earn more than a part-time income, which is frequently even made up of a smaller hourly wage, especially for very small part-time jobs.

Nevertheless, the question arises whether there is actually a pure non-pecuniary effect of non-participation and of part-time employment on happiness or whether the estimated effect is exclusively due to pecuniary reasons. In order to detect the pure non-pecuniary effect, the model is re-estimated replacing *residual* household income by *total* household income. This corresponds to the specifications used in previous studies, cited in Section 3. The results from this new specification are shown in column 2 of Table 3. The coefficient related to 'not being able to work' decreases in absolute value from .27 to .13, the coefficients related to small (large) part-time employment from .23 (.11) to .15 (.07). However, all three coefficients are still significantly smaller than zero. This suggests that, while forgone earnings are responsible for part of the happiness losses, there are also psychological costs in being not able to work and in part-time employment.

The explanation for the existence of psychological costs of non-participation

(not being able to participate) may be similar to the reasoning on psychological costs of unemployment discussed by Feather (1990). Employment usually enlarges people's social networks and enhances self-esteem. Furthermore, for mothers, employment may be a welcome 'distraction' from domestic tasks. Also, knowing that career chances decline as soon as the human capital devaluates during the time a woman takes time off may also play a role for her current life satisfaction.

One explanation for the psychological costs of part-time employment may be the number of working hours themselves. If an individual prefers to work more hours because she likes her occupational tasks (more than home tasks) but she is not able to work more hours because of lacking child care availability, this is an explanation for the negative non-pecuniary effects found for women working part-time. A second explanation may be job quality. Part-time jobs are frequently jobs requiring low levels of skills and responsibility. This lower job quality of part-time jobs compared to full-time jobs may be an important reason for the losses in life satisfaction. A third explanation may be that some individuals are underemployed, meaning that they wish and are able to work more hours, but they do not find a full-time job (comparable to unemployed individuals). These individuals are likely to bear even higher psychological costs than part-time employed women with family constraints, because, analogously, unemployed women bear also higher psychological costs than 'not-able-to-work' women. As I already mentioned, it is unfortunately not possible to distinguish underemployed part-time individuals from those who are part-time employed because of family constraints (i.e. who are not able to work more hours). Hence, the true effect of part-time employment because of family constraints might be smaller than the estimated part-time effect. This is also likely to be the explanation why the non-pecuniary effect of small part-time employment is even larger than that of not being able to work.

The magnitude of the pure non-pecuniary effects can again be illustrated by compensating income variations, which are this time based on total household income instead of residual household income. Based on the income coefficient of .38, the compensating variation to offset the non-pecuniary 'not-able-to-work' effect is 35 percent, i.e. income would need to be increased by more than one third in order to offset the non-pecuniary effect of being not able to work. For an average household income of 2,881 Euros, this corresponds to 1,020 Euros. Even this amount is still far higher than the actual fees for one month of child care in Germany. The analogous compensating income variation for small (large) part-time employment is 39 percent (18 percent).

Table 4: Estimation results: The effect of not being able to take up work on life satisfaction – interaction effects

		(1)	(2)
Low income ^a	X NAW	-0.20** (0.07)	-0.11 (0.07)
	X SPT	-0.20* (0.08)	-0.16+ (0.08)
	X LPT	-0.10+ (0.06)	-0.09 (0.06)
High income ^b	X NAW	0.06 (0.05)	0.02 (0.05)
	X SPT	0.07 (0.05)	0.03 (0.05)
	X LPT	-0.00 (0.05)	-0.03 (0.05)
No partner in HH	X NAW	-0.07 (0.11)	-0.03 (0.11)
	X SPT	-0.08 (0.14)	-0.05 (0.14)
	X LPT	-0.01 (0.10)	-0.04 (0.10)
Youngest child <3 years	X NAW	0.07 (0.08)	0.07 (0.08)
	X SPT	0.15+ (0.08)	0.15+ (0.08)
	X LPT	0.05 (0.06)	-0.02 (0.08)
Youngest child 3-6 years	X NAW	0.10 (0.08)	0.11 (0.08)
	X SPT	0.07 (0.06)	0.07 (0.06)
	X LPT	0.04 (0.06)	0.05 (0.06)
One child	X NAW	0.09 (0.06)	0.10+ (0.06)
	X SPT	0.22** (0.08)	0.21** (0.08)
	X LPT	0.08 (0.07)	0.08 (0.07)
Three or more children	X NAW	-0.00 (0.07)	-0.01 (0.07)
	X SPT	0.03 (0.09)	0.04 (0.09)
	X LPT	0.01 (0.09)	0.01 (0.09)

Table continues

Continued Table 4

		(1)	(2)
University degree	X NAW	0.02 (0.08)	0.03 (0.08)
	X SPT	0.07 (0.10)	0.06 (0.10)
	X LPT	-0.04 (0.08)	-0.06 (0.08)
No vocational degree	X NAW	-0.08 (0.07)	-0.09 (0.07)
	X SPT	0.00 (0.10)	-0.00 (0.09)
	X LPT	-0.04 (0.09)	-0.05 (0.09)
East Germany	X NAW	-0.01 (0.08)	-0.01 (0.08)
	X SPT	-0.01 (0.13)	-0.00 (0.12)
	X LPT	0.09 (0.08)	0.08 (0.08)
Age >40	X NAW	0.09 (0.07)	0.09 (0.07)
	X SPT	0.01 (0.06)	0.01 (0.06)
	X LPT	-0.03 (0.05)	-0.04 (0.05)

^a Low income refers to a residual household income below the 25 percentile.

^b High income refers to a residual household income below the 75 percentile.

Results from fixed-effects estimations, dependent variable is life satisfaction (11-point scale). The explanatory variables are the same as in column 3 of Table 1 plus one set of the here shown interaction terms per estimation. NAW = not able to work, SPT = small part-time employment (1-19 hrs), LPT = large part-time employment (20-34 hrs); a X b means interaction between variable a and variable b.

Robust standard errors in parentheses.

+ p<0.10, * p<0.05, ** p<0.01

Source: Own calculations with data from SOEP, waves 1994-2007 (see text).

5.3 Interaction effects

In order to investigate if the adverse effect of part-time employment and non-participation (being not able to work) on life satisfaction differs between certain population groups, I have interacted the variables ‘not able to work’, ‘small part-time employment’, and ‘large part-time employment’ with several characteristics which are income, partner status, age of the youngest child, number of children, education, region (East versus West Germany), and age. The results are shown in Table 4. In column 1 the residual household income is controlled for, in column 2 the total household income is controlled for.

For mothers in the lower part of the income distribution, being not able to work and part-time employment are worse than for mothers in the middle

or upper part of the income distribution (see column 1 of Table 4).¹⁸ One reason for that is that gaining an additional labor income is more important for them than for higher income groups. As soon as the total household income is controlled for and the pure non-pecuniary effects are estimated (column 2 of Table 4), the interaction effects with income disappear (low income X NAW) or decrease (low income X SPT).

For mothers with a child younger than 3 years, small part-time employment is less harmful than for mothers with older children. This interaction effect is due to a difference in the non-pecuniary effect, since the effect is still existent in column 2 of Table 4. The reason for that might be that when children are very young, mothers are more likely to voluntarily choose little working hours. As soon as the children grow older, the mothers might want to work more hours and if this is not possible (for family reasons or because of low labor market chances), they increasingly feel dissatisfied.

For women with more than one child, the non-pecuniary effect of not being able to work and of small part-time employment is more harmful than for women with just one child. One explanation for this could be that it is even more difficult to organize child care for several children in different age groups than for just one child. Also, women with several children are likely to have been outside the labor force for a longer time than women with just one child (since only the age of the youngest child is controlled for). Also, the more children a woman has, the more busy she may be in homemaking and child care, the more she may need some 'distraction' from these tasks in the form of paid employment. On the other hand, one could argue that the more intensive a woman is involved in home tasks (having several children), the more important these tasks may feel to her and the more stressful in contrast gainful employment may be to her. This would suggest a more negative 'small-part-time' effect and 'not-able-to-work' effect for women with just one child. However, the empirical results suggest that this effect does not dominate.

Interactions with partner status, educational degree, East Germany, mothers' age, and yearly dummies (the latter not shown) have not produced significant results. Though there is no difference in the not-able-to-work and part-time employment effect on life satisfaction between East and West Germany, there is a difference in the occurrence of it. While in West Germany 25 percent among all mothers see themselves not able to take up employment, in East Germany this is true for only 13 percent. Also, in West Germany 18 percent of mothers are in small part-time jobs, while in East Germany, these are only four percent. The full-time rate among mothers is in East Germany is much higher (39%) than in West Germany (12%). Also, while interactions of employment status with year dummies do not yield significant results, one can observe that the share of mothers who are not able to take up employment has decreased since 2000 from 23 percent to 15 percent in 2007. Hence, the problem seems to shrink. But those who are still concerned not to be able to work experience always the same negative effect. On the other hand, the share of mothers in part-time employment has sharply increased in the same period from 26 percent in 1994 to 47 percent in 2007. This suggests that it is worth to further investigate the relationship between part-time employment and maternal well-being.

¹⁸The segmentation into low-income and high-income groups has been done using the 25 and the 75 percentile of the distribution of residual household income.

6 Conclusions

There is a fairly large and growing literature on the impact of unemployment on subjective well-being, whereas much less economists have analyzed the happiness effect of non-participation and of part-time employment. This is due to the fact that unemployment is clearly seen as involuntary while non-participation and part-time employment are usually seen as voluntarily chosen. However, in Germany, it is very difficult for both parents to reconcile full-time work with family responsibilities, and therefore many mothers reduce working hours or completely withdraw from the labor market though they may wish to work full-time. As to my knowledge, there is no previous study that addresses the question how these family constraints, which prevent women from working full-time, affect subjective well-being. The data analyzed in this paper reveal that a major part of mothers outside the labor force intend to work but are not able to do so even if an appropriate job was offered to them. This suggests that family constraints are the reason for their labor market non-participation, not labor market constraints, nor preference for non-participation. Investigating the impact on subjective well-being, I have shown that not being able to take up employment negatively affect mothers' life satisfaction. Also, part-time employed mothers are less satisfied with their lives than full-time employed mothers. Compensating income variations reveal that the magnitude of the effects are substantial: residual household income would have to be raised by a tremendous amount in order to offset the adverse happiness effects, which are due to forgone earnings as well as to psychological costs.

To sum up, the results have shown that employment is an important factor for mothers' subjective well-being. Not only unemployment has a negative impact on individual life satisfaction (which has been shown in a number of previous studies), but also non-participation and part-time employment, being the result of family constraints, negatively influence happiness. It has been shown that, in terms of overall happiness loss, for women with children, family constraints to employment are even more harmful than unemployment.

This paper's findings deliver another argument in favor of improving policies that support parents to reconcile work and family life. Since mothers have to bear not only the pecuniary but also the psychological costs if they are not able to work (more hours), the government should place more emphasis on supporting parental employment than on replacing income. One of the most important instruments in this context is the child care infrastructure which is poorly developed in many German regions. Advocates of an improved child care infrastructure often refer to the argument of the increasing scarcity of skilled labor and to the argument of the beneficial educational effect of preschool care, especially for children from disadvantaged families. The argument of mothers' subjective well-being, which is substantially influenced by her employment status, has not yet been a major issue in this debate. This study shows that paid work is important for mothers both for monetary and for psychological reasons. If the final political aim is to improve general well-being, the argument of mothers' individual well-being should be a very obvious one in the context of family-work support.

A limitation of this study is that the motivation for part-time employment – in contrast to the motivation for labor market non-participation – could not be identified. I could not detect how many part-time employed women face family

constraints (i.e. are not able to work full-time even if a full-time job was offered to them), how many face labor market constraints, i.e. are underemployed (do not find a full-time job though they look for one and would be able to work full-time), and how many simply prefer to work part-time rather than working full-time. Though I have found that part-time employed mothers are less happy than full-time employed mothers, it is still unclear to what extent this is due to family constraints. This question remains for further research.

Appendix

Table A1: Descriptive statistics of the control variables

	Mean	St. dev. ^a
Residual HH income	2,371	1,416
Total HH income	2,881	1,502
Age	35.9	6.4
Migration background	0.20	
University degree	0.16	
Vocational degree	0.63	
No professional degree	0.21	
Person in need of care in HH	0.02	
Disabled	0.02	
Self-rated health	2.37	0.82
East Germany	0.22	
Urban area	0.51	
Between rural and urban area	0.35	
Rural area	0.14	
Self-employed	0.04	
Have a child in the upcoming year	0.04	
Partner in HH	0.90	
Partner outside the HH	0.03	
No partner	0.07	
One child	0.33	
Two children	0.43	
Three or more children	0.24	
Youngest child <1 year	0.10	
Youngest child 1-2 years	0.19	
Youngest child 3-6 years	0.28	
Youngest child 7-13	0.43	

^a Displayed only for non-binary variables.

Source: Own calculations with pooled data from 14 waves (1994-2007) of the SOEP (see text).

Results from an ordered-fixed-effects-logit model

In the linear models discussed so far, the life satisfaction variable has been interpreted as a cardinal scale, i.e. distances between the eleven life satisfaction scores have been assumed to be equal. Some economists argue that this is not correct because a change from e.g. 5 to 6 on the scale is unequal to a change from 9 to 10. This would imply that ordinal methods have to be applied when analyzing subjective well-being scores. Since usual methods for ordinal data cannot be applied because these models do not control for fixed effects (which is important as has been shown by Ferrer-i Carbonell and Frijters (2004)), some authors use an arbitrary fixed cut-off point to reduce the 11-point scale to a binary variable in order to be able to apply Chamberlain's method for

a conditional logit model (Winkelmann and Winkelmann 1998, Bardasi and Francesconi 2004). Since this method comes along with an enormous efficiency loss in the data (only individuals moving across the cut-off point contribute to the estimation), Ferrer-i Carbonell and Frijters (2004) have proposed a “ordered-fixed-effects-logit” estimator. They actually use individual cut-off points (e.g. individual means) instead of a global cut-off point to transform the original satisfaction scale into a binary variable. Finally, they also estimate a conditional (binary) logit model. This method is now widely used in the economic happiness literature.¹⁹

In order to check the robustness of my results, I reestimate the results from Table 1 and 3 using the ordered-fixed-effects-logit approach. The results are presented in Table A2. The signs and significances and even the relative magnitude of the coefficients are very similar to the results from the linear fixed-effects model. Apparently, the cardinality assumption does not lead to serious distortions. This is also confirmed by the inventors of the new estimator themselves, Ferrer-i Carbonell and Frijters (2004).

I want to mention two disadvantages of the estimator that made me prefer the conventional linear fixed-effects model: First, coefficients from conditional logit models cannot be interpreted quantitatively and cannot be compared across models, because marginal effects depend not only on its own coefficients but also on the coefficients related to all other variables including the unobserved and uncalculated individual fixed effects. Therefore, marginal effects cannot be calculated without making strict assumptions on the distribution of the individual effect.

Second, reducing the happiness scale to a binary scale still comes along with a large information loss (even when individual cut-off points are used). Transitions between two scores on the original satisfaction scale that are both above the cut-off point or both below that point are not visible any more in the binary variable. Such a change in satisfaction is not recognized as a change, while a move across the cut-off point is fully accounted for, no matter how small the change actually is on the original 11-point scale. Furthermore, the scope of a change in satisfaction is not taken into account at all. A change of one point on the original satisfaction scale is accounted for to be as large as a change of e.g. five points – as long as both transitions pass the cut-off point. For example, if 6.5 is the individual cut-off point (individual mean), a move on the original satisfaction score from 0 to 6 is not accounted for as any improvement in satisfaction while a change from 6 to 7 is accounted for as a change from unsatisfied to satisfied (0 to 1 in the binary variable). I argue that this is less (at least not more) plausible than assuming equal distances between the original life satisfaction scores which would allow to fit a linear model.

Since the results from the linear fixed-effects model seem not to be biased by the cardinality assumption and they can be interpreted straightforward this is my preferred model.

¹⁹See for example Frijters, Haiken-DeNew, and Shields (2004b,a), Booth and van Ours (2008, 2009) who use this approach.

Table A2: Estimation results: The effect of employment status on life satisfaction

	(1)	(2)	(3)
Employment status (ref.: full-time employment):			
Out of labor force	-0.43** (0.07)		
Not able to work		-0.42** (0.08)	-0.23** (0.08)
Discouraged		-0.52** (0.08)	-0.33** (0.08)
No intention to work		-0.29** (0.09)	-0.11 (0.09)
Small part-time employment	-0.34** (0.07)	-0.34** (0.07)	-0.22** (0.07)
Large part-time employment	-0.24** (0.07)	-0.24** (0.07)	-0.17* (0.07)
Unemployment	-0.80** (0.08)	-0.81** (0.08)	-0.61** (0.08)
Ln(Residual HH income)	0.20** (0.04)	0.20** (0.04)	
Ln(Total HH income)			0.52** (0.06)
Age ² /1000	-0.87+ (0.51)	-0.87+ (0.51)	-0.79 (0.52)
Education (ref.: vocational degree):			
University degree	-0.00 (0.22)	-0.01 (0.22)	-0.01 (0.22)
No professional degree	-0.10 (0.10)	-0.11 (0.10)	-0.09 (0.10)
Pers in need of care in HH	-0.04 (0.16)	-0.05 (0.16)	-0.07 (0.16)
Disabled	-0.18 (0.18)	-0.18 (0.18)	-0.17 (0.18)
Self-rated health	-0.57** (0.02)	-0.57** (0.02)	-0.57** (0.02)
East Germany	-0.10 (0.22)	-0.09 (0.22)	-0.04 (0.22)
Town size (ref.: urban area):			
Between rural and urban area	0.23+ (0.12)	0.22+ (0.12)	0.23+ (0.12)
Rural area	0.34* (0.15)	0.34* (0.15)	0.35* (0.15)
Self-employed	-0.04 (0.12)	-0.03 (0.12)	-0.02 (0.12)
Have a child in the upcoming year	0.16* (0.07)	0.14+ (0.07)	0.15* (0.08)
Partner status (ref.: partner in HH):			
No partner	-0.43** (0.09)	-0.42** (0.09)	-0.34** (0.09)
Partner outside the HH	-0.09 (0.10)	-0.09 (0.10)	-0.00 (0.10)

Table continues

Continued Table A2

	(1)	(2)	(3)
Number of children (ref.: two children):			
One child	0.12 (0.08)	0.12 (0.08)	0.13 (0.08)
Three or more children	0.16 (0.10)	0.16 (0.10)	0.14 (0.10)
Age of the youngest child (ref.: 7-13 years):			
<1 year	0.34** (0.09)	0.32** (0.09)	0.32** (0.09)
1-2 years	-0.00 (0.08)	-0.01 (0.08)	-0.01 (0.08)
3-6 years	-0.02 (0.05)	-0.03 (0.05)	-0.03 (0.05)
No. of observations	26,149	26,149	26,149
No. of individuals	4,275	4,275	4,275

Results from ordered-fixed-effects-logit estimations, dependent variable is life satisfaction (11-point scale). All models contain year dummies.

Robust standard errors in parentheses.

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Source: Own calculations with data from SOEP, waves 1994-2007 (see text).

References

- ATTIAS-DONFUT, C., J. OGG, AND F.-C. WOLFF (2005): "Family Support," in *SHARE Survey of Health, Aging and Retirement in Europe*, ed. by A. Börsch-Supan, A. Brugiavini, H. Jürges, J. Mackenbach, J. Siegrist, and G. Weber, chap. 4.2, pp. 171–178. Mannheim Research Institute for the Economics of Aging (MEA).
- BARDASI, E., AND M. FRANCESCONI (2004): "The impact of atypical employment on individual wellbeing: evidence from a panel of British workers," *Social Science & Medicine*, 58(9), 1671–1688.
- BEBLO, M., C. LAUER, AND K. WROHLICH (2005): "Ganztagsschule und Erwerbsbeteiligung von Müttern – eine Mikrosimulationsstudie für Deutschland," Discussion Paper 543, German Institute for Economic Research, DIW Berlin.
- BOOTH, A. L., AND J. C. VAN OURS (2008): "Job Satisfaction and Family Happiness: The Part-Time Work Puzzle," *Economic Journal*, 118(526), F77–F99.
- (2009): "Hours of work and gender identity: Does part-time work make the family happier?," *Economica*, 76(301), 176–196.
- BÜCHEL, F., AND C. K. SPIESS (2002): *Kindertageseinrichtungen und Müttererwerbstätigkeit – Neue Ergebnisse zu einem bekannten Zusammenhang*. vol. 71 of *Vierteljahrshefte zur Wirtschaftsforschung*, pp. 95–113. German Institute for Economic Research, DIW Berlin.

- CLARK, A. E. (2003): “Unemployment as a social norm: Psychological evidence from panel data,” *Journal of Labor Economics*, 21(2), 323–351.
- (2006): “A Note on Unhappiness and Unemployment Duration,” *Applied Economics Quarterly*, 52(4), 291–308.
- CLARK, A. E., AND A. J. OSWALD (1994): “Unhappiness and unemployment,” *Economic Journal*, 104(424), 648–659.
- DI TELLA, R., AND R. MACCULLOCH (2006): “Some Uses of Happiness Data in Economics,” *Journal of Economic Perspectives*, 20(1), 25–46.
- DIENER, E., AND R. LUCAS (1999): “Personality and Subjective Well-Being,” in *Well Being: The Foundations of Hedonic Psychology*, ed. by D. Kahneman, E. Diener, and N. Schwarz, pp. 353–373. New York: Russel Sage Foundation.
- DJI (2007): “Zahlenspiegel 2007,” Discussion paper, German Youth Institute.
- DOLAN, P., T. PEASGOOD, AND M. WHITE (2008): “Do we really know what makes us happy? A review of the economic literature on the factors associated with subjective well-being,” *Journal of Economic Psychology*, 29, 94–122.
- FEATHER, N. T. (1990): *The Psychological Impact of Unemployment*. Springer Verlag New York.
- FERRER-I CARBONELL, A., AND P. FRIJTERS (2004): “How important is methodology for the estimates of the determinants of happiness?,” *Economic Journal*, 114(497), 641–659.
- FORSA-INSTITUTE (2004): “Mehr Kinder. Mehr Leben. Ergebnisse der repräsentativen forsa-Befragung,” Media Forschung und -Service.
- (2008): “Lebensgefühl von Eltern. Repräsentativbefragung für Gruner + Jahr AG & Co KG Redaktion ELTERN,” Gesellschaft für Sozialforschung und statistische Analysen.
- FREY, B. S., AND A. STUTZER (2002a): *Happiness and Economics: How the Economy and Institutions Affect Human Well-Being*. Princeton University Press.
- (2002b): “What Can Economists Learn from Happiness Research?,” *Journal of Economic Literature*, 40(2), 402–435.
- FRIJTERS, P., J. P. HAIKEN-DENEW, AND M. A. SHIELDS (2004a): “Investigating the Patterns and Determinants of Life Satisfaction in Germany Following Reunification,” *Journal of Human Resources*, 39(3), 649–674.
- (2004b): “Money Does Matter! Evidence from Increasing Real Income and Life Satisfaction in East Germany following Reunification,” *American Economic Review*, 94(3), 730–740.
- GOTTSCHALL, K., AND K. HAGEMANN (2002): “Die Halbtagschule in Deutschland: Ein Sonderfall in Europa?,” in *Aus Politik und Zeitgeschichte*, ed. by B. für politische Bildung Bonn, vol. 41, pp. 11–22.

- KAHNEMAN, D., E. DIENER, AND N. SCHWARZ (eds.) (1999): *Well-Being: The Foundations of Hedonic Psychology*. New York: Russell Sage Foundation.
- KREYENFELD, M., AND K. HANK (2000): “Does the availability of child care influence the employment of mothers? Findings from western Germany,” *Population Research and Policy Review*, 19, 317–337.
- LAYARD, R. (2005): *Happiness: Lessons from a New Science*. Penguin, London.
- MEIER, S., AND A. STUTZER (2008): “Is Volunteering Rewarding in Itself?,” *Economica*, 75, 39–59.
- OECD (2004): “Education at a Glance,” Report, Organization of Economic Cooperation and Development, Paris.
- RADISCH, F., AND E. KLIEME (2003): “Wirkung ganztägiger Schulorganisation - Bilanzierung der Forschungslage,” Literaturbericht im Rahmen von “Bildung Plus”, Deutsches Institut für internationale Pädagogische Forschung, Frankfurt/Main.
- SPIESS, C. K. (2008): “Early Childhood Education and Care in Germany: The Status Quo and Reform Proposals,” *Zeitschrift für Betriebswirtschaft – Special Issue*, 1, 1–20.
- SPIESS, C. K., E. M. BERGER, AND O. GROH-SAMBERG (2008): “Overcoming Disparities and Expanding Access to Early Childhood Services in Germany: Policy Considerations and Funding Options,” Working Paper 2008-03, Unicef Innocenti Research Center.
- SPIESS, C. K., AND F. BÜCHEL (2003): “Effekte der regionalen Kindergarteninfrastruktur auf das Arbeitsangebot von Müttern,” in *Soziale Sicherung am Arbeitsmarkt*, ed. by W. Schmähl, no. 294 in Schriften des Vereins für Socialpolitik, pp. 95–126. Duncker & Humblot Berlin.
- VAN PRAAG, B., AND A. FERRER-I CARBONELL (2004): *Happiness Quantified: A Satisfaction Calculus Approach*. Oxford University Press.
- WAGNER, G. G., R. FRICK, JOACHIM, AND J. SCHUPP (2007): “The German Socio-Economic Panel Study (SOEP) – Scope, Evolution and Enhancements,” SOEPpapers on Multidisciplinary Panel Data Research 1, German Institute for Economic Research, DIW Berlin.
- WINKELMANN, L., AND R. WINKELMANN (1998): “Why are the unemployed so unhappy? Evidence from panel data,” *Economica*, 65(257), 1–15.
- WROHLICH, K. (2008): “The Excess Demand for Subsidized Child Care in Germany,” *Applied Economics*, 40(10), 1217–1228.