SFB 649 Discussion Paper 2013-035

A new perspective on the economic valuation of informal care: The well-being approach revisited

Konstantin Kehl*
Stephan Stahlschmidt**

* Ruprecht-Karls-Universität Heidelberg, Germany
** Humboldt-Universität zu Berlin, Germany

This research was supported by the Deutsche Forschungsgemeinschaft through the SFB 649 "Economic Risk".

http://sfb649.wiwi.hu-berlin.de
ISSN 1860-5664

SFB 649, Humboldt-Universität zu Berlin
Spandauer Straße 1, D-10178 Berlin

A new perspective on the economic valuation of informal care: The well-being approach revisited*

Konstantin Kehl

Centre for Social Investment

Heidelberg University

Stephan Stahlschmidt

Ladislaus von Bortkiewicz Chair of Statistics

Humboldt–Universität zu Berlin

and

Centre for Social Investment

Heidelberg University

*The financial support from the Generali Zukunftsfonds (GZF) and the Deutsche Forschungsgemeinschaft (DFG) via SFB 649 "Ökonomisches Risiko", Humboldt–Universität zu Berlin, is gratefully acknowledged. The authors like to thank Volker Then as well as Prof. Manfred G. Schmidt for valuable discussions and helpful comments.

Abstract

Informal care has drawn much attention among scholars and policymakers as it concerns an essential but hard to evaluate resource of welfare. Albeit several studies addressed the monetary value of informal care, differences in the relationship between caregivers and recipients have often been ignored. We report on a profound and formerly unobserved distinction between care in the household and non-household care for a family member or in a voluntary framework. According to our results caregivers within the household perceive care as a burden and a positive shadow price arises. By contrast in the family but non-household context – and especially in the voluntary case – care is (at least partly) understood as an enriching experience which extends well-being and leads to negative shadow prices. This distinction calls a marketized view of informal care into question and may contribute to explaining the limitations of monetary incentive policies to encourage informal care.

Keywords: informal care, well-being, economic valuation, shadow price
JEL codes: D61, I11, I31

1 Introduction

The monetary value of informal care has been addressed in several studies (Van den Berg et al., 2004; Schneider, 2006; Koopmanschap et al., 2008; De Meijer et al., 2010; Mentzakis et al., 2012). Van den Berg & Ferrer–i–Carbonell (2007) apply the well-being valuation method which avoids several drawbacks of alternative approaches. On the basis of a sample of Dutch caregivers with characteristics distinct from the average population they calculate the income necessary to maintain the same level of well-being after providing an extra hour of care. They model well-being via Ordered Probit (OP) and Ordinary Least Squares (OLS) regressions, and include income, care intensity, and other socio-demographic attributes as explanatory variables. The authors show that this behavioral-economic approach which considers all costs and benefits of providing informal care entails lower shadow prices compared to the proxy good and opportunity cost method, as well as compared to contingent valuation. However, their differentiation between family and non-family recipients reveals comparable prices for all respondents. With pricing based on the well-being effects of caregiving the results seem to be at conflict with the literature on care, life satisfaction and voluntary action suggesting differences between care for a family (or household) member and caregiving in a situation of spatial distance and with a higher degree of personal autonomy. Fading out these insights can lead to fuzziness and even ineffective incentives if policymakers base their decision-making in welfare evaluation and planning on the well-being proposition.

In this analysis we extend the approach and refine the empirical implementation to strengthen the method's impact. For that purpose we apply the concept to data for Germany from the German Socio-Economic Panel (GSOEP) and the Survey of Health, Ageing and Retirement in Europe (SHARE). This allows us to paint a reliable picture for the country and to differentiate between four modes of caregiver–recipient relationships: household and non-household care, as well as family and non-family care. We show that it makes a difference for shadow prices whether people share the same household or not, and whether they provide care for a family member – due to a moral commitment at least to a certain degree – or act in a rather voluntary way. We seek to underline that accounting for experienced utility allows us to conceive the economic value of informal care not as solely determined by additional costs but as a ratio of perceived caregiver burden and intrinsic utility

depending on the housing situation and family membership. With this distinction we employ an economic model to show the limits of a pure economistic/marketized evaluation and may contribute to explaining the limited effectiveness of monetary incentive policies to encourage informal care.

Next we describe the method and develop our hypotheses from the literature. Afterwards we describe the econometric model as well as the data. The following section reports on the empirical findings, which are subsequently discussed.

2 The well-being valuation method

Different methods can be used to assess the monetary value of informal care (Koopmanschap et al., 2008; Van den Berg et al., 2004). The opportunity cost method takes the caregiver's foregone earnings with reference to the reported income. Consequently the value of care exclusively depends on the caregiver's position on the labor market and care of high–income earners ranks higher than care of low-income earners. The proxy good method instead rests upon the price of a market substitute, e.g. a certified nurse. From this point of departure informal and professional care are interpreted as perfect substitutes, and both the special quality of social relations and trust in the informal sector, as well as the formal education and work ethics in the professional sector are neglected. Hence there is little reason to refer to the price of market equivalents at all, and it would be more convincing to ask what an adequate price could be in individual cases. This perspective is taken by the contingent valuation method. By directly questioning, it reveals the willingness to accept (WTA) a monetary compensation or the willingness to pay (WTP) for doing or not having to do anything (e.g. giving informal care). Here the problem of strategic answering arises, and some people may find it difficult or even reprehensible to estimate an "adequate" price for intangibles. However the most important problem of these well-known approaches consists of the understanding that care is solely thought of as a cost factor and any positive effects for the caregiver are disregarded. This holds true due to joint production (Van den Berg & Spauwen, 2006; Van den Berg et al., 2004; Schneider, 2006) or intrinsic utility which at least can be seen as a stress-reducing – intermediary – factor (Whitlatch et al., 1991; Walker et al., 1995; Kramer, 1997; Marks, 1998; Marks et al., 2002; Brouwer et al., 2005; Roth et al., 2009; Al–Janabi et al., 2010). As such benefits are seldom consciously per-

ceived and expected and, thus, difficult to capture upon questioning microeconomics supplements the concept of decision utility by experienced utility concentrating on the hedonic appraisal of an outcome despite expectation or the orientation towards particular results (Kahneman et al., 1997; Kahneman & Krueger, 2006; Kahneman & Thaler, 2006; Dolan & Kahneman, 2008; Frey et al., 2004).

The well-being valuation method starts exactly from this assumption. It assumes that answers on well-being questions can be interpreted as positive monotonic transformations of a more comprehensive understanding of welfare. It takes it for granted that well-being is the total of all positive and negative (cognitive) evaluations of an individual life, is comparable in an interpersonal way among people and relatively stable over time (Ferrer–i–Carbonell & Frijters, 2004; Diener, 2006; Kahneman & Krueger, 2006). For this reason it has been applied to monetary valuations of various kinds, such as chronic diseases (Ferrer–i–Carbonell & van Praag, 2002), airport noise (Van Praag & Baarsma, 2005) or terrorism (Frey et al., 2009). It is an appealing concept since there is usually one question to capture the phenomenon ("All things considered how satisfied are you with your life as a whole these days?") and an answering scale with five or eleven discrete values. An important assumption for applying the concept in our context is that decisions are made freely in the light of realistic action alternatives and to maintain or even expand the level of well-being (Ferrer–i–Carbonell & Frijters, 2004; Frijters, 2000; Kahneman et al., 1993; Ng, 2003). Thus, to engage in care is always the result of evaluating alternatives. It may seem to merely reduce an individual's well-being at first sight, but if social norms and sanctions exert strong pressure on the individual caring may actually expand the perceived well-being due to complying with social or individual expectations. However when we accept the status quo being a condition which came about in consistence with maximized well-being in the light of realistic action alternatives, every shift of the basic parameters should have an effect on well-being. When these parameters consist not only of intangibles (e.g. the decision on time use) but of material wealth we are able to observe the necessary shift in income – as a proxy for material wealth – after changing the time for care in a virtual situation. Hence we are looking at the necessary gain or loss in income to maintain the same level of caregiver's well-being after providing an extra hour of informal care. Microeconomically speaking this can be accomplished by calculating the compensating variation (Hicks, 1946) as an interplay of care hours, income and subjective well-being.

3 Theoretical expectations and research hypotheses

In accordance with Van den Berg & Ferrer–i–Carbonell (2007) we expect a positive relation between well-being and income in which an increase in income extends well-being (H1). Although the popular findings of Easterlin (1974) suggest no relationship in international and inter-temporal comparison these findings have been challenged during the last decade (Hagerty & Veenhoven, 2003; Stevenson & Wolters, 2008) and many scholars find a positive correlation from intra-national perspectives; i.e. when people of the same economy are considered (Deaton, 2008; Diener et al., 1993; Frey & Stutzer, 2002; Frank, 2005; Stevenson & Wolters, 2008; Veenhoven, 1991). In addition, we go beyond the assumption of an *overall* negative correlation between care hours and well-being – as stated by Van den Berg & Ferrer–i–Carbonell (2007) – by differentiating between care within and outside the household, and care within and outside the family.

From a comprehensive point of view a negative correlation between well-being and care can be assumed due to the generally high impact of household and family care which we expect to be more burdensome than non-household and non-family care (H2). Care can have a negative effect on general well-being as well as on physical and mental health, on social contact intensity and activity, and it turns out to be a stressor for coping with the challenges of everyday life (Pearlin et al., 1990; Hoyert & Seltzer, 1992; Walker et al., 1995; Kramer, 1997; Marks, 1998; Marks et al., 2002; Pinquart & Sörensen, 2003; Brouwer et al., 2004; Roth et al., 2009). Schneekloth (2006) reports that 42 percent of the main caregivers in Germany feel a strong and a further share of 41 percent feel a very strong burden of care. A negative effect can be attributed to conflicts between the role as caregiver and, say, wife, daughter or employee (Marks, 1998). It can be all the more demanding if a moral commitment to care can only be met by reducing working hours or dropping out of the labor market, which has been shown to be a prevalent tendency among females who carry the main burden of care in Germany and other Western countries (Ettner, 1996; Johnson & Sasso, 2000; Spiess & Schneider, 2003; Carmichael & Charles, 2003; Schneekloth, 2006; Van Houtven et al., 2013). This may result in secondary effects since reduced flexibility and mental and physical fitness can narrow down career and income opportunities (Schneider, 2006).

But care must not necessarily be seen as a burden and a barrier for the individual life course. Often the positive effects of care are neglected (Walker et al., 1995; Marks, 1998; Marks et al., 2002; Brouwer et al., 2005). Providing care can be quite enriching and meaningful, and it has been reported that quality of life and well-being indicators can be higher for those who are embedded in a care relationship without any strains compared to non-caregivers (Roth et al., 2009). This implies that a difference arises whether people assess care giving as a moral obligation or if they engage voluntarily. Consequently one has to differentiate between distinct settings. We make a distinction between care within and outside the household (H2a), and care within and outside the family (H2b). Both differentiations refer to a discrepancy in closeness and intimacy as well as personal autonomy – the one caused by spatial separation (household), the other by emotional depth (family). This doesn't imply that intrinsic benefits of care make up for the perceived costs in terms of time spent, or that well-being can be fully maintained. However the well-being approach at least allows for the complexity and individuality of respective decisions to engage in informal care and factors in several considerations people constantly balance during the decision and care process.

When differentiating between household and non-household care, the negative impact of care on well-being should be *higher* for caregivers who live in a household together with the care recipients (H2a). Caregivers who live in a household together with the care recipients cannot avoid taking care responsibilities as caregivers outside the household do due to their higher autonomy and better opportunities to retreat (Walker et al., 1995). Thus intra-household care should imply a higher time investment and mental stress because caregivers often guarantee a 24-7 availability. It could be argued that this is the case because of more physical and mental impairments of care recipients in the household. However, although the subjective caregiver burden seems to increase with the strength of care dependency (Schäufele et al., 2006) it is a controversial issue whether the health situation of the care recipient has objective effects on the caregiver (Walker et al., 1995). In recent research Son et al. (2007) found an association between care receivers' behavior problems and caregiver health whereas Robinson et al. (2009) did not find a significant impact of care recipients' dementia on caregiver health or psychosocial problems. Since there is no adequate information in the data we have to assume that the health situation

of the care recipients is reflected by the amount of care given – which in the household is about three times as high as in the case of non-household care – as proposed by a large German survey indicating a relationship between the level of care and the hours reported by caregivers (Schneekloth, 2006). Reduced labor market participation constitutes a further indirect negative effect on happiness (Hoyert & Seltzer, 1992; Carmichael & Charles, 2003). Some scholars argue that intra-household care is accompanied by higher flexibility and lower logistic expense, and that activities of joint production do not entail additional efforts (Van den Berg et al., 2004; Schneider, 2006). However we assume that the burdensome effect of the 24-7 availability problem which has been reported by no less than two-thirds of the principal care givers in Germany (Schneekloth, 2006) outweights the positive countereffects. Consequently any monetary compensation should be higher for people living in the same household compared to people who do not.

When differentiating between family and non-family care, a *positive* impact of care on well-being can be expected for those who are not family members of the care recipients (H2b). This is a central conceptual difference to Van den Berg & Ferrer–i–Carbonell (2007). With this assumption we make an analytical distinction between family as "community" in a narrow sense and a wider sphere in which the system of personal ties and moral obligation (the system of family and friends) shades off into the intermediary sphere of civil society where action is voluntary in a primordial way and determined by a generalized sense of solidarity (Kocka, 2004; Alexander, 2006; Offe, 2000). Having said this we refer to the literature on volunteering which suggests a positive relationship between well-being/mental health and volunteering because it prevents social isolation, allows for personal achievements and maintains physical functionality especially in old age (Wilson & Musick, 1999; Musick & Wilson, 2003; Meier & Stutzer, 2008; Frey, 2008; Thoits & Hewitt, 2001; Lum & Lightfoot, 2005; Baker et al., 2005). It follows that negative values should result from our model which would be consistent with the assumption that volunteering and pro-social behavior is predominantly motivated by intrinsic instead of extrinsic (financial) rewards (Wilson & Musick, 1999; Frey & Goette, 1999).

4 Econometric modeling

The model of Van den Berg & Ferrer–i–Carbonell (2007) is extensively described in their original paper and may be outlined as follows: "First, we estimate the effect of providing informal care and of income on individual's subjective well-being. In a second step, we estimate the necessary income (compensating variation) to maintain the same level of informal caregiver's well-being after providing an additional hour of informal care. This compensating variation is taken as the monetary value of informal care. The well-being valuation method is thus based on the economic standard practice of valuing non-market commodities with shadow prices, which, in the present context, are described as the change in well-being followed by a change in the provision of the commodity informal care" (Van den Berg & Ferrer–i–Carbonell, 2007, page 1229). Thus we are interested in the tradeoff between income (Y) and care (C) at constant well-being (W); i.e. the monetary value of an extra hour of care is defined as the necessary compensation ΔY to maintain W constant after increasing C; or formally written:

$$\frac{\delta Y}{\delta C} = \frac{\delta W/\delta C}{\delta W/\delta Y}$$

We apply a parametric OP model which may be denoted by[1]:

$$W^\star = \alpha + \beta \ln(Y) + \gamma \ln(C) + \varphi \ln(C)D + \theta X + \varepsilon$$
$$W = k \Leftrightarrow \mu_k \leq W^\star \leq \mu_{k+1}$$

where $W^\star$ represents the latent (unobservable) variable well-being, W the manifest (observable, i.e. self-reported) variable well-being, k are the discrete well-being categories, μ_k the intercept terms ($\mu_1 = -\infty$, $\mu_K = \infty$; the remaining are estimated), D states a dummy variable which equals 1 when we are dealing with care and support outside the caregiver's household (GSOEP) or family (SHARE) and X are the further socio-demographic variables, which are incorporated in the model via the parameter vector θ. Finally ϵ embodies an error term. The interaction term $\ln(C)D$ involves the assumption that not only the reported hours of care C have an effect on well-being but that the influence of care intensity is additionally determined by household/family affiliation described by the dummy variable D. Income and care

[1] For non-parametric regression, see Härdle & Luckhaus (1984).

hours are rescaled into logarithmized terms to account for diminishing marginal utility of income and diminishing marginal costs (utility) of providing care and support. Thus we hypothesize a different value of care for an extra hour given after e.g. five than 50 hours effectively provided before. Shadow prices in the household and family context result from the general model above and may be denoted by:

$$\%\Delta Y = \exp\left\{\frac{\gamma}{\beta}\delta \ln(C)\right\} - 1$$

for intra-household/family care, and:

$$\%\Delta Y = \exp\left\{\frac{\gamma + \varphi}{\beta}\delta \ln(C)\right\} - 1$$

for care outside the household, respectively family. At this ΔY denotes the necessary income increase to compensate for one additional caring hour. The selection of explanatory variables is based on the original model. Unfortunately the data provides no information on any physical and mental problems of the caregiver/recipient, and general health and education were evaluated on a different scale than in the original paper. Due to our findings on several well-being determinants (for an overview see Frey, 2008) we included two additional variables (satisfaction with democracy, and comparative evaluation of personal achievements) in the GSOEP model. This extension of the model and the broad data base enhances the model's explanatory power to a large degree as reported by the Pseudo R^2 value of 0.26 (GSOEP), respectively 0.41 (SHARE), if compared to the value of 0.06 in the original paper.

5 Data (implementation) and descriptive statistics

Well-being is modeled as a function of income, hours of care and other socio-demographic variables. In an OP model with well-being as the dependent variable we expect the coefficients of personal income (caring hours) to display a positive (negative) sign. Thus when we increase care intensity, and hold the level of well-being steady, income should rise (fall) accordingly. From the necessary increase (decrease) as a percentage of income needed to maintain the care giver's well-being we can estimate the shadow price of care.

We employ the data of the German Socio-Economic Panel (GSOEP), a panel study

of more than 12,000 households conducted since 1984. The applied wave of 2005 (V) provides information on 21,105 cases. We ignored later waves, and consequently any longitudinal approach, since they do not provide complete information about care giving (2006, 2008, and 2010) or miss the two additional variables on satisfaction with democracy and personal achievements (2007, 2009 and 2011) that enhance the model's Pseudo R^2 value from 0.17 to 0.26. The personal income refers to the reported net household income per month after tax and social insurance contributions divided by the number of persons in the household. 1,302 of the 21,105 persons in 1,057 households report giving at least one hour of care per week on average[2]. This corresponds to 6.19% of the respondents. Since we use a non-random sample we apply the provided weights to account for any changes since the 1^{st} wave. This procedure reduces the share to 5.12%. We use the GSOEP data for the included differentiation between household and non-household care givers. Unfortunately the GSOEP questionnaire doesn't ask directly who benefits from the care provided. However information whether a person in need of care lives in the household is available. According to this, 362 or 27.8% of the care givers live with a person in need of care in the same household, whereas 940 or 72.2% provide care without living in a household with a person in need of care. Thus we have to assume that in the former case care inures to the benefit of the needy in the household, while in the latter case care is provided for somebody outside the household. In the model this is realized by the dummy variable D presuming that the effect of care on well-being is determined by household membership.

We utilize the Survey of Health, Ageing and Retirement in Europe (SHARE) data for the differentiation between family and non-family members. SHARE surveys people aged 50 and older with more than 30.000 respondents from 14 European countries in the 2^{nd} wave (interviewed in 2006 and 2007) to measure the social, economic and health conditions of the ageing population in Europe. The 2008 and 2009 follow-up SHARELIFE doesn't imply the information needed for the analysis at hand. In the data set personal income refers to the reported net household income per month after tax and social insurance contributions, divided by the number of persons in the household. The German 2006 sub sample consists of 2,568

[2] Due to partly implausible hours reported we set a maximum of 18 hours per day for the following calculations.

respondents (1,184 male, 1,384 female) minus 40 spouses younger than 50 who were also interviewed. Thus 2,528 persons aged 50 and older remain. 858 respondents report giving care and additional support for at least one hour per month. This corresponds to a portion of 33.94%, or 32.10% weighted[3].

It is important to notice that SHARE applies a wider concept of care compared to the GSOEP questionnaire; thus the datasets are not directly comparable. Beyond personal care, which corresponds to the GSOEP information, SHARE includes practical household help and help with paperwork. Since the three types of care are asked for a maximum of three different recipients with multiple answers, it's not feasible to assign the reported hours to one type of help. However the frequencies show that practical household help is the dominant form of help (83.3%) for the first person, followed by paperwork (28.5%) and personal care (17.5%), so that we conclude that – referring to the basic population – about 5% or 6% of the Germans aged 50 and older give care in this narrow sense (which corresponds to the GSOEP data for all age cohorts). Since the SHARE data only includes care outside the household, the rate would be higher from a comprehensive point of view. Of the 858 care givers 241 (28.1%) care exclusively someone outside their own family and 617 (71.9%) care a family member (and in some cases also someone outside their family). This differentiation was operationalized by classifying the items of a comprehensive list of care recipients. As a consequence of multiple answers a certain fuzziness results with regards to the family context: Since it was our aim to clearly delineate care outside the family we had to attribute mixtures of family and non-family help to the family sector to include all three possible recipients and not only the principal recipient (as we did it with the reported hours of care). This leads to the assumption that the effect of care outside the family is captured perfectly, whereas care inside the family is slightly overestimated.

[3] Because of the questionnaire style and the relatively small amount of care hours in the SHARE study we use hours per month as reference value.

6 Empirical findings

In the GSOEP model, hours of care per month (log), personal income in Euros (log), age, education in years, unemployment, subjective health, number of household members, satisfaction with democracy, and comparative evaluation of personal achievements can be identified as explanatory variables. In the SHARE model the independent variables are hours of care – due to the relatively small amount – per year (log), personal income in Euros (log), age, education in years, unemployment, subjective health, and number of household members. Gender has no effect in both models; the same holds for marital status or children in the household. These 3 insignificant variables on a 5% level have been excluded from the following tables. With both datasets we report average values across 5 imputations to account for missing values. Since in the GSOEP questionnaire care for a household or non-household member is not directly asked for, the interaction variable refers to the care hours and the care *demand* of a household member. In this context we assume that a household member in need of care has only an effect on the happiness of the person actually providing care and does not affect the happiness of any other household members. Thus the variable "household member needs care" is not included on its own. In the SHARE model we work with an interaction term between hours of care and care for a (non-)family member, whereas again the variable care for a non-family member is not included on its own. This approach follows from the assumption that a non-family care-recipient has only an effect on the informal care givers happiness in combination with any care hours provided.

(Table 1 and 2 about here)

In accordance with H1 income has a positive effect on well-being in both models. From the overall perspective on care without interaction term (left columns in Table 1) hours of care have a negative influence on well-being in the GSOEP model. However if we make a distinction between household and non-household care (right columns in Table 1) the negative impact of care intensity on well-being is not only higher for caregivers living in a household with their care recipients but H2a must be reconsidered: In fact there is no negative effect of care on well-being for non-household care but a positive one. Thus keeping spatial distance and personal autonomy obviously leads to a situation in which care is not perceived as a burden

but aligns well with alternative aspects of life (albeit these people dedicate a substantial lower share of their time to care as compared to household members). The same reasoning is suggested by the SHARE model which focuses exclusively on care of people aged 50 and older outside the household. The model without interaction term (left columns in Table 2) generally shows a positive effect of care on well-being, and – specifying H2b – the impact is higher for non-family members. From this a two-step-logic can be concluded: when people live in the same household care is perceived as burdensome, whereas intrinsic benefits equalize the costs of care when care givers and recipients keep a spatial distance. If the latter condition is fulfilled, the second determinant is family membership: If care is provided for a person who is not part of the caregiver's family providing care has a higher positive impact on well-being than in the case of family membership, where moral obligation can be assumed to be of higher relevance. Beyond these findings the socio-demographic determinants are largely plausible: bad (good) health has a negative (positive) effect, whereas unemployment turns out to be negative and social contact density in the immediate (household) environment positive for well-being[4].

(Table 3 and 4 about here)

For all care givers in Germany the GSOEP model without interaction term reveals a shadow price of 5.52 Euros/h at an average of eight hours provided per week (median). Due to partly exceptionally high intensity reported (15.65 hours) the mean of care hours reaches a value of 2.89 Euros/h for an additional hour of care. When differentiating, a shadow price between 1.50 Euros/h (mean, 28.6 hours) and 2.04 Euros/h (median, 21 hours) arises for care within the caregivers' households, whereas care for a non-household member accounts for between -0.16 Euros/h (mean, 10.66 hours) and -0.23 Euros/h (median, 7 hours) respectively. When applying the approach to the SHARE data our estimation shows a shadow

[4] Solely the picture drawn by the education effect should be worth discussing. Whereas the years of education affect the well-being of the SHARE respondents in a positive way, the influence is negative for the GSOEP sample. Considering that the median for age in the SHARE case is much higher than for the GSOEP data (62 vs. 54 years) one could speculate that care giving in the prime of life and career leads to a feeling of being overqualified or even out of place with increasing educational achievements. In turn the comparison with labor market opportunities plays a less important role when pensioners carry more weight in the dataset.

price for non-household care and support between -9.69 Euros/h (mean, 6.90 hours) and -28.63 Euros/h (median, 1.95 hours per week) for individuals aged 50 and older. However the necessary compensation for care within the family turns out to be less negative than for individuals who are not akin to the caregiver: whereas in the former case an extra hour amounts to between -7.94 Euros/h (mean, 8.65 hours) and -23.47 Euros/h (median, 2.54 hours), care for friends and acquaintance takes incredibly negative values between -42.07 Euros/h (mean, 2.42 hours) and -118.35 Euros/h (median, 0.46 hours). We give account of both median and mean since the two allow for different perspectives of interpretation: When focusing on the individual the median is more adequate because it is less affected by the skewness of the distribution of care hours. The mean value allows for the fact that the overall picture of informal care in Germany is heavily influenced by a small group of high impact caregivers. Thus our presentation can be understood as a minimum–maximum scenario.

7 Discussion

Our findings differ from the original study in many respects: Van den Berg & Ferrer–i–Carbonell (2007) calculated a shadow price of 9.31 Euros/h (or 2.4% of the caregivers' income) for an extra hour of care (mean), whereas our findings indicate lower levels in terms of the median (5.52 Euros/h or 2.1% of the income) and the mean (2.89 Euros/h or 1.1% of the income), as well as much less reported hours (15.65 vs. 49 hours in the Dutch sample). The difference becomes even more apparent when we focus on the assumed relationship between care intensity's effect on well-being and household/family membership: Whereas in the model of Van den Berg & Ferrer–i–Carbonell the interaction term leads to only slightly lower shadow prices – 8.33 Euros/h (52 hours) for family care and 7.21 Euros/h (30 hours) in the non-family context – our work suggests a much more heterogeneous picture. Especially the question whether people care a family member or not, which we examined on the basis of the SHARE data, seems to turn the issue upside down. Here we find extremely negative shadow prices for voluntary and family care outside the household, whereupon the latter is relatively close to the overall SHARE model without the distinction. This is an interesting finding since in the original paper there are only small differences – in the range of 7.21 and 9.31 Euros/h – between the various specifications (no interaction vs. interaction family/non-family). Thus the Dutch study explored monetary values which turned out to be lower but any-

way "relatively" close to proxy good/opportunity cost and contingent valuations (between 8.53 and 32.67 Euros/h according to Van den Berg & Ferrer–i–Carbonell, 2007), whereas we found not only much lower but – even if marginally – negative prices for *all* forms of care which do *not* take place in the household of the caregiver.

At this point it is important to underline that the SHARE data allows for an interpretation of the population aged 50 and older only, and that all reported care has been provided outside the respondents' household. Thus, with caution we can interpret the SHARE differentiation as a further age-related sub-group of the GSOEP non-household group (but including more helping activities than only personal care). This makes sense insofar as the GSOEP model encourages us to assume that in the case of non-household care the costs and intrinsic benefits are more or less perfectly balanced out, leading to a shadow price approaching zero, whereas in the SHARE case the intrinsic benefits not only countervail the costs but provide as much utility as to creating negative shadow prices (especially in the case of non-household care for non-family members). One could explain this by different factors affecting the cost benefit ratio in favor of experienced utility: by reason of the advanced age it is more likely that for a great deal of the SHARE respondents the conflict between labor and care does not play an important role in life (what can, instead, be expected for some of the GSOEP respondents) and care may be rather a result of a "free" decision than of a feeling of obligation. What is more, the inclusion of household help and paperwork – and the relatively low weight of personal care – may lead to the assumption that care is perceived less as a burden than as an assisting activity which can be taken over without too much stress; this would be supported by the fact that care intensity is much less pronounced in the SHARE than in the GSOEP data and that care for non-family members seems to be more occasionally. Unfortunately we are not able to test these hypotheses with the data at hand since numerical problems arise in the regression estimation and more data would be necessary. However the questions remain why our models result in such different findings compared to the Dutch study (1) and how we can explain the "paradox" of negative shadow pricing in an appropriate way (2).

(1) Van den Berg & Ferrer–i–Carbonell (2007, page 1229) notice that "contingent valuation suffers from biases due to strategic behaviour of the respondents [. . .] This is not a danger when using an indirect valuation method, such as conjoint analysis

or the well-being valuation method, in which respondents are not explicitly asked to state a monetary value for the commodity under valuation". Although we agree with this statement in general, we should consider that a bias cannot only occur when people are asked directly for an expected monetary compensation but due to the selection of respondents *per se*. When recruitment of respondents is based on the cooperation with hospitals, the media, self-help groups or supporting infrastructures for informal caregivers we are not able to preclude strategic behavior already in the moment of *reporting hours* because in such settings we especially reach people who have an incentive to resort to such institutions (e.g. because they feel a heavy burden of care and seek to gain support) or are more willing to report high levels of care since they mistake the survey for an appropriate way to express their displeasure (Pinquart & Sörensen, 2003). This could explain the Dutch data which have been collected with the help of regional support centers for informal caregivers. The problem already appears when the authors report that "[c]ompared to two of the most used western data sets on the well-being literature, namely the British Household Panel Survey (BHPS) and the German Socio-Economic Panel (GSOEP), the present sample scores rather low in terms of subjective well-being" (Van den Berg & Ferrer–i–Carbonell, 2007, 1234). It becomes even more obvious when we look at the enormous amount of care hours reported by the Dutch caregivers, the lower average income, the higher female participation rate, or at the fact that care for family members is of much greater importance than in our (SHARE) sample. As a consequence one could say that the Dutch study gives a good image of a special group of people who are intensively involved in the care process whereas our study – based on two general data sets – provides additional value by mirroring the entire (German) population with all its facets. According to this it clearly makes a difference in which setting care takes place.

(2) The negative shadow prices can be best interpreted as willingness to dispense with income when one more hour of care is provided and well-being left constant. For this interpretation we should point out that our model is a ceteris paribus construction where well-being as equilibrium is determined exclusively by the interplay of income and care intensity. Thus income and the effects of care are principally seen as substitutable with respect to their influence on well-being. The more negative the shadow prices are, the more pronounced is the positive effect of the caring experience on individual well-being since the shadow price mirrors the ratio of care's

and income's contribution to happiness – or, say, the "exchange rate" of intangible benefits and income as a proxy for material wealth. Since well-being is set constant, the negative prices illustrate that income (or material wealth) must – to the corresponding extent – not be earned if one extra hour of care is provided. For example, in the case of SHARE family care the contribution of care to well-being more or less equals the contribution of income (mean), whereas in the case of SHARE non-family care one hour of care refers to the well-being equivalent of between more than five hours (14.0% of weekly amount, or 42.07 Euros; mean) and 15 hours labor time (39.4%, or 118.35 Euros; median).

However the exact price level is not the most important insight. It should be more gainful to note that individuals who provide care for a non-household member receive as much intrinsic utility so as they do not necessarily need a monetary compensation for providing extra care. From this point of departure monetary incentives can be seen as of limited use for activating informal care especially for the non-household and civil society sphere (as far as the general conditions of care turn out to be as good as care is perceived as enriching rather than burdensome). This can have considerable consequences for public policy: Although in Germany – with a care insurance system offering the opportunity to choose between professional services and cash benefits for informal care – the trend towards institutional care is accompanied by an indication of increased demand for slight assistance (and therefore evidence for the general adequacy of informal care at home) the relevance of cash benefits declined from 56.3 to 43.9% (of total care insurance recipients) between 1997 and 2012. This development will likely go on since traditional help potentials within the family are thought to decline due to childlessness, loose cohabitation and increased female labor participation. Whereas a promising solution is seen in the recruitment of non-family (i.e. neighborhood and civil society) resources there is good cause for scrutinizing the effects of cash benefits in this context since volunteering and pro-social behavior is rather motivated by feelings of solidarity and intrinsic utility. Since our empirical experience points in a similar direction we conclude that social policy should be well advised not to *reduce* itself to monetary instruments but to draw attention to the enabling conditions of care in different settings – be it in the fashion of new work time models or supporting infrastructures for informal caregivers and low-threshold help (Kehl & Then, 2013). This holds true especially for the older population since the extraordinary high shadow prices may be explained

by the lower importance of income and wealth in old age – in general as well as in comparison with intrinsic benefits. As many of the SHARE respondents do not work at all or draw a pension, the diminishing effect of the labor–care conflict on well-being should be less pronounced[5]. Such an interpretation would be in line with research suggesting that the influence of income on well-being is determined by the relative position in (and interaction with) the social environment – especially colleagues – because in old age the social status will not change dramatically anyway due to few career chances remaining or a completed employment biography (Frey, 2008; Mayraz et al., 2009).

8 Conclusion

We estimated shadow prices for informal care in Germany according to the well-being valuation method suggested by Van den Berg & Ferrer–i–Carbonell (2007). Well-being is defined as a function of income, caring hours, and further socio-demographic variables, and calculated by the compensating variation necessary to maintain the same level of well-being after a caregiver provides an extra hour of care. In contrast to the Dutch study, we apply two general datasets, enhance the explanatory power of the model and elaborate alternative hypotheses regarding statistical relations. We express the assumption that care and support yield higher shadow prices in the household context compared to non-household care, and that non-family care comes along with negative shadow prices since voluntary action corresponds to a statistical surplus of well-being.

The descriptive statistics show that informal care is a socially widespread phenomenon among the German population. According to the German Socio-Economic Panel (GSOEP) around 5% give at least one hour of care per week on average, but only a rough quarter of this subgroup lives in a household together with the care recipient. The Survey of Health, Ageing and Retirement in Europe (SHARE) data shows that many seniors are involved in care: Nearly a third of the respondents

[5] We presupposed a 40-hour week of labor time for all models despite the fact that many of the SHARE respondents do not have a formal employment. It makes no difference for interpretation because we can simply take the percentage; that's why we speak not only of income but of a proxy for material wealth.

aged 50 and older reported giving care and support for at least one hour per month though care for a family member is the predominant part (more than 70%). We observe that housing situation and family membership have considerable effect on the monetary value of informal care: Whereas an extra hour of care accounts for approximately 2 Euros/h within the household context, the necessary monetary compensation for caring a non-household member turns out to be zero. Our model yields negative shadow prices for senior caregivers, and the values increase enormously within the negative continuum for the non-family sphere. In contrast to Van den Berg & Ferrer–i–Carbonell (2007), who report only positive shadow prices and minor differences between the model specifications, we weren't only able to validate our hypothesis of negative pricing for non-family care but found – even if marginally – negative values for *all* forms of care which doesn't take place in the household environment.

Thus it definitely makes a difference whether people provide care for a household member or somebody outside the household, for a family relative or in a voluntary framework. Since care for a household member usually comes along with high care intensity, it is often perceived as an overwhelming burden and/or leads to serious conflicts between care and other aspects of everyday life (e.g. the desire to hold a job). Often there is no realistic option to exit out since care is required on a 24-7 basis. In our model this directly transforms into necessary monetary compensations for additional care. In contrast the costs and benefits of care for a non-household member almost level out perfectly. In such cases the greater degree of autonomy and spatial distance lets "flower out" the intrinsic value of caring a near and dear person; with the effect that a mentionable monetary value of informal care is absent. Of course this doesn't imply that care provided by non-household members would be worthless; it is but not in monetary terms valuable. What is more, care and support for non-family members outside the household tends to be characterized by a different rationale. The extremely high negative prices show that care on a voluntary basis is a non-market good.

Our work relates to the well-being literature by giving another example of how to apply the happiness proposition to evaluations of non-market commodities. It underlines that considering all costs and benefits of providing care challenges monetary thinking in the informal welfare economy. We contribute to the care literature

by showing that informal care is a multi-dimensional phenomenon and that different cost benefit ratios of care directly transform into different levels of monetary value. We bridge the gap to social policy research insofar that we point to the limitations of monetary incentives. With a money-based argument we support the assumption of civil society literature that voluntary action is predominantly driven by solidarity and intrinsic rather than monetary utility. Furthermore, these aspects have a special German dimension: To our knowledge this study is the first to value informal care in Germany apart from the proxy good and opportunity cost method. It is even more important since a system of monetary compensation for informal caregivers in Germany de facto exists (as element of the care insurance system) without caregiver differentiation, and a lively discussion on how to win volunteers for the field of care and support is under way in the policy arena. If policy accepts the well-being proposition this article may show at the least that money is not the silver bullet in every single case.

References

Alexander, JC. 2006. *The Civil Sphere*. Oxford & New York: Oxford University Press.

Al–Janabi H, Frew E, Brouwer W, Rappange D, Van Exel J. 2010. The inclusion of positive aspects of caring in the Caregiver Strain Index: Tests of feasibility and validity. *International Journal of Nursing Studies* 47: 984–993.

Baker LA, Cahalin LP, Gerst K, Burr JA. 2005. Productive Activities and Subjective Well-Being among Older Adults: The Influence of Number of Activities and Time Commitment. *Social Indicators Research* 73: 431–458.

Brouwer WB, van Exel NJ, van den Berg B, Dinant HJ, Koopmanschap MA, van den Bos GA. 2004. Burden of Caregiving: Evidence of Objective Burden, Subjective Burden, and Quality of Life Impacts on Informal Caregivers of Patients with Rheumatoid Arthritis. *Arthritis & Rheumatism* 51: 570–577.

Brouwer WB, Van Exel J, Van den Berg B, Van den Bos GA, Koopmanschap M. 2005. Process utility from providing informal care: the benefit of caring. *Health Policy* 74: 85–99.

Carmichael F, Charles S. 2003. The opportunity costs of informal care: does gender matter? *Journal of Health Economics* 22: 781–803.

Deaton A. 2008. Income, Health, and Well-Being around the World: Evidence from the Gallup World Poll. *Journal of Economic Perspectives* 22: 53–72.

De Meijer C, Brouwer W, Koopmanschap M, van den Berg B, van Exel J. 2010. The value of informal care – a further investigation of the feasibility of contingent valuation in informal caregivers. *Health Economics* 19: 755–771.

Diener, E. 2006. Guidelines for National Indicators of Subjective Well-Being and Ill-Being. *Journal of Happiness Studies* 7: 397–404.

Diener E, Sandvik E, Seidlitz L, Diener M. 1993. The relationship between income and subjective wellbeing: Relative or absolute? *Social Indicators Research* 28: 195–223.

Dolan P, Kahneman D. 2008. Interpretations of utility and their implications for the valuation of health. *The Economic Journal* 118: 215-23.

Easterlin RA. 1974. Does Economic Growth Improve the Human Lot? Some Empirical Evidence. In *Nations and Households in Economic Growth: Essays in Honor of Moses Abramowitz*. (eds. David PA, Reder, MW). New York: Academic Press, 89–125.

Ettner SL. 1996. The Opportunity Costs of Elder Care. *The Journal of Human Resources* 31: 189-205.

Ferrer–i–Carbonell A, Frijters P. 2004. How Important is Methodology for the estimates of the determinants of Happiness? *The Economic Journal* 114: 641-659.

Ferrer–i–Carbonell A, van Praag BMS. 2002. The subjective costs of health losses due to chronic diseases. An alternative model for monetary appraisal. *Health Economics* 11: 709–722.

Frank RH. 2005. Does Absolute Income Matter? In *Economics and Happiness. Framing the Analysis*. (eds.Porta PL, Bruni L). Oxford: Oxford University Press, 65–90.

Frey BS. 2008. *Happiness: A Revolution in Economics*. Cambridge MA, London UK: MIT Press.

Frey BS, Benz M, Stutzer A. 2004. Introducing Procedural Utility: Not Only What, but Also How Matters. *Journal of Institutional and Theoretical Economics* 160: 377–401.

Frey BS, Goette L. 1999. Does Pay Motivate Volunteers? *Institute for Empirical Research in Economics Working Paper* No. 7.

Frey BS, Luechinger S, Stutzer A. 2009. The life satisfaction approach to valuing public goods: The case of terrorism. *Public Choice* 138: 317–345.

Frey BS, Stutzer A. 2002. *Happiness & Economics. How the Economy and institutions affect human well-being*. Princeton, Oxford: Princeton University Press.

Frijters P. 2000. Do individuals try to maximize general satisfaction? *Journal of Economic Psychology* 21: 281-304.

Hagerty MR, Veenhoven R. 2003. Wealth and Happiness Revisited. Growing National Income Does Go with Greater Happiness. *Social Indicators Research* 64: 1–27.

Härdle WK, Luckhaus S. 1984. Uniform consistency of a class of regression function estimators. *The Annals of Statistics* 12: 612–623.

Hicks J. 1946. *Value and Capital: An inquiry into some fundamental principles of economic theory*, 2^{nd} ed. Oxford: Clarendon Press.

Hoyert DL, Seltzer MM. 1992. Factors Related to the Well-Being and Life Activities of Family Caregivers. *Family Relations* 41: 74–81.

Johnson RW, Lo Sasso AT. 2000. The Trade-Off between Hours of Paid Employment and Time Assistance to Elderly Parents at Midlife. *Research Report.* http://www.urban.org/UploadedPDF/elderly_parents.pdf

Kahneman D, Fredrickson BL, Schreiber CA, Redelmeier DA. 1993. When More Pain Is Preferred to Less: Adding a Better End. *Psychological Science* 4: 401–405.

Kahneman D, Wakker PP, Sarin R. 1997. Back to Bentham? Explorations of Experienced Utility. *The Quarterly Journal of Economics* 112: 375–406.

Kahneman D, Krueger AB. 2006. Developments in the Measurement of Subjective Well-Being. *Journal of Economic Perspectives* 20: 3–24.

Kahneman D, Thaler RH. 2006. Anomalies. Utility Maximization and Experienced Utility. *Journal of Economic Perspectives* 20: 221–234.

Kehl K, Then V. 2013. Community and Civil Society Returns of Multi-generation Cohousing in Germany. *Journal of Civil Society* 9: 41–57.

Kocka J. 2004. Civil society from a historical perspective *European Review* 12: 65–79.

Koopmanschap MA, van Exel JN, van den Berg B, Brouwer WB. 2008. An overview of methods and applications to value informal care in economic evaluations of healthcare. *PharmacoEconomics* 26: 269–280.

Kramer BJ. 1997. Gain in the Caregiving Experience: Where Are We? What Next? *The Gerontologist* 37: 218-232.

Lum TY, Lightfoot E. 2005. The Effects of Volunteering on the Physical and Mental Health of Older People. *Research on Aging* 27: 31-55.

Marks NF. 1998. Does It Hurt to Care? Caregiving, Work-Family Conflict, and Midlife Well-Being. *Journal of Marriage and Family* 60: 951-966.

Marks NF, Lambert JD, Choi H. 2002. Transitions to caregiving, gender, and psychological well-being: Prospective evidence from a U.S. national study. *Journal of Marriage and Family* 64: 657–667.

Mayraz G, Wagner GG, Schupp J. 2009. Life Satisfaction and Relative Income: Perceptions and Evidence. *IZA Discussion Paper*, No. 4390.

Meier S, Stutzer A. 2008. Is Volunteering Rewarding in Itself? *Economica* 75: 39–59.

Mentzakis E, McNamee P, Ryan M, Sutton M. 2012. Valuing Informal Care Experience: Does Choice of Measure Matter? *Social Indicators Research* 108: 169–184.

Musick MA, Wilson J. 2003. Volunteering and depression: the role of psychological and social resources in different age groups. *Social Science & Medicine* 56: 259–269.

Ng YK. 2003. From preference to happiness: Towards a more complete welfare economics. *Social Choice and Welfare* 20: 307–350.

Offe C. 2000. Civil society and social order: demarcating and combining market, state and community. *European Journal of Sociology* 41: 71–94.

Pearlin LI, Mullan JT, Semple SJ, Skaff MM. 1990. Caregiving and the Stress Process: An Overview of Concepts and Their Measures. *The Gerontologist* 30: 583–594.

Pinquart M, Sörensen S. 2003. Associations of stressors and uplifts of caregiving with caregiver burden and depressive mood: a meta-analysis. *Journals of Gerontology* 58B: 112–128.

Robison J, Fortinsky R, Kleppinger A, Shugrue N, Porter M. 2009. A Broader View of Family Caregiving: Effects of Caregiving and Caregiver Conditions on Depressive Symptoms, Health, Work, and Social Isolation. *The Journals of Gerontology* 64B: 788–798.

Roth DL, Perkins M, Wadley VG, Temple EM, Haley WE. 2009. Family caregiving and emotional strain: associations with quality of life in a large national sample of middle-aged and older adults. *Quality of Life Research* 18: 679–688.

Schäufele M, Köhler L, Teufel S, Weyerer S. 2006. Betreuung von demenziell erkrankten Menschen in Privathaushalten: Potenziale und Grenzen. In *Selbständigkeit und Hilfebedarf bei älteren Menschen in Privathaushalten. Pflegearrangements, Demenz, Versorgungsangebote.* (eds.Schneekloth U, Wahl HW). Stuttgart: Kohlhammer, 103–145.

Schneekloth U. 2006. Entwicklungstrends beim Hilfe- und Pflegebedarf in Privathaushalten. Ergebnisse der Infratest-Repräsentativerhebung. In *Selbständigkeit und Hilfebedarf bei älteren Menschen in Privathaushalten. Pflegearrangements, Demenz, Versorgungsangebote.* (eds.Schneekloth U, Wahl HW). Stuttgart: Kohlhammer, 57–102.

Schneider U. 2006. Informelle Pflege aus ökonomischer Sicht. *Zeitschrift für Sozialreform* 52: 493–520.

Son J, Erno A, Shea DG, Femia EE, Zarit SH, Stephens MAP. 2007. The caregiver stress process and health outcomes. *Journal of Aging and Health* 19: 871–887.

Spiess CK, Schneider AU. 2003. Interactions between care-giving and paid work hours among European midlife women, 1994 to 1996. *Ageing & Society* 23: 41–68.

Stevenson B, Wolfers J. 2008. Economic Growth and Subjective Well-Being: Reassessing the Easterlin Paradox. *NBER Working* Paper No. 14282.

Thoits PA, Hewitt LN. 2001. Volunteer work and well-being. *Journal of Health and Social Behavior* 42: 115–131.

Van den Berg B, Brouwer W, Koopmanschap M. 2004. Economic valuation of informal care: An overview of methods and applications. *The European Journal of Health Economics* 5: 36–45.

Van den Berg B, Spauwen P. 2006. Measurement of informal care: An empirical study into the valid measurement of time spent on informal caregiving. *Health Economics* 15: 447–460.

Van den Berg B, Ferrer-i-Carbonell A. 2007. Monetary valuation of informal care: The well-being valuation method. *Health Economics* 16: 1227–1244.

Van Houtven CH, Coe NB, Skira M. 2012. The Effect of Informal Care on Work and Wages. *Journal of Health Economics* 32: 240–252.

Van Praag BM, Baarsma BE. 2005. Using Happiness Surveys to Value Intangibles: The Case of Airport Noise. *The Economic Journal* 115: 224–246.

Veenhoven R. 1991. Is happiness relative? *Social Indicators Research* 24: 1–34.

Walker AJ, Pratt CC, Eddy L. 1995. Informal Caregiving to Aging Family Members: A Critical Review. *Family Relations* 44: 402-411.

Whitlatch CJ, Zarit SH, von Eye A. 1991. Efficacy of interventions with caregivers: a reanalysis. *The Gerontologist* 31: 9-14.

Wilson J, Musick MA. 1999. The Effects of Volunteering on the Volunteer. *Law and Contemporary Problems* 62: 141-168.

	No interaction			Interaction		
	Est.	St. Error	t-value	Est.	St. Error	t-value
log(carehoursMonthly)	-0.079	0.005	-14.284	-0.091	0.005	-16.332
carehours:HMemberNo				0.094	0.003	29.161
log(personalIncome)	0.445	0.012	36.805	0.462	0.012	38.068
age	0.012	0.000	32.086	0.014	0.000	38.047
educationYears	-0.053	0.002	-23.791	-0.060	0.002	-26.978
unemployedYes	-0.375	0.025	-14.836	-0.355	0.025	-13.992
healthSatisfying	-0.544	0.013	-41.086	-0.543	0.013	-40.957
healthBad	-1.283	0.016	-79.385	-1.308	0.016	-80.558
numberHousehold	0.288	0.007	39.761	0.333	0.007	44.880
democracyIn between	0.412	0.015	27.410	0.414	0.015	27.477
democracyHappy	0.529	0.012	40.719	0.550	0.013	42.229
deservedIn between	-0.457	0.015	-30.404	-0.444	0.015	-29.489
deservedNot gained	-0.392	0.012	-30.626	-0.382	0.012	-29.792
Intercept 1 | 2	0.513	0.095	5.372	0.957	0.096	9.865
Intercept 2 | 3	1.254	0.095	13.092	1.703	0.097	17.508
Intercept 3 | 4	2.761	0.096	28.559	3.227	0.098	32.879
Intercept 4 | 5	4.318	0.097	44.434	4.806	0.098	48.561
Mc Fadden Pseudo R^2	0.257			0.264		

Table 1: *Ordered probit model for happiness on GSOEP data*

	No Interaction			Interaction		
	Est.	St. Error	t-value	Est.	St. Error	t-value
log(carehoursYearly)	0.040	0.005	7.060	0.040	0.005	7.084
LOGcarehours:FamilyNo				0.033	0.006	5.555
log(personalIncome)	0.169	0.011	14.826	0.170	0.011	14.893
age	0.015	0.001	11.546	0.015	0.001	11.152
educationYears	0.026	0.003	7.791	0.027	0.003	7.840
unemployedNo	0.414	0.048	8.624	0.434	0.048	9.008
healthGood	0.568	0.025	22.532	0.584	0.025	22.998
healthVerygood	0.997	0.032	30.679	1.019	0.032	31.091
numberHousehold	0.114	0.012	8.843	0.114	0.012	8.846
Intercept 1 | 2	1.119	0.159	6.995	1.164	0.160	7.265
Intercept 2 | 3	1.641	0.156	10.497	1.682	0.156	10.736
Intercept 3 | 4	2.965	0.156	18.969	3.004	0.156	19.193
Intercept 4 | 5	4.440	0.158	27.984	4.483	0.158	28.208
Mc Fadden Pseudo R^2	0.407			0.407		

Table 2: *Ordered probit model for happiness on SHARE data*

	All Data			Recipient in Household			Recipient not in Household		
	Hours	percentage	valuation	Hours	percentage	valuation	Hours	percentage	valuation
5% Quantil	1.00	0.131	34.22	7.00	0.026	5.89	1.00	-0.004	-1.21
10% Quantil	2.00	0.075	19.50	7.00	0.026	5.89	2.00	-0.002	-0.71
25% Quartil	5.00	0.033	8.60	12.24	0.015	3.45	5.00	-0.001	-0.32
Median	8.00	0.021	5.52	21.00	0.009	2.04	7.00	-0.000	-0.23
Mean	15.65	0.011	2.89	28.60	0.006	1.50	10.66	-0.000	-0.16
75% Quartil	18.00	0.009	2.52	35.00	0.005	1.23	14.00	-0.000	-0.12
90% Quantil	35.00	0.005	1.31	65.80	0.002	0.66	21.00	-0.000	-0.08
95% Quantil	54.00	0.003	0.85	84.00	0.002	0.52	35.00	-0.000	-0.05

Table 3: *Shadow prices based on GSOEP data in EUR (valuation), the corresponding level of given care (hours) and corresponding percentage of household income (percentage)*

	All Data			Recipient in Family			Recipient not in Family		
	Hours	percentage	valuation	Hours	percentage	valuation	Hours	percentage	valuation
5% Quantil	0.05	-0.500	-152.35	0.09	-0.440	-135.49	0.03	-0.762	-228.77
10% Quantil	0.09	-0.440	-134.06	0.19	-0.352	-108.51	0.05	-0.718	-215.63
25% Quartil	0.38	-0.263	-80.06	0.69	-0.191	-58.96	0.19	-0.548	-164.52
Median	1.95	-0.094	-28.63	2.54	-0.076	-23.47	0.46	-0.394	-118.35
Mean	6.90	-0.031	-9.69	8.65	-0.025	-7.94	2.42	-0.140	-42.07
75% Quartil	7.04	-0.031	-9.51	8.60	-0.025	-7.99	2.00	-0.162	-48.74
90% Quantil	20.34	-0.011	-3.48	21.13	-0.010	-3.38	7.04	-0.056	-16.91
95% Quantil	28.18	-0.008	-2.53	34.35	-0.006	-2.10	14.09	-0.029	-8.86

Table 4: *Shadow prices based on SHARE data in EUR (valuation), the corresponding level of given care (hours) and corresponding percentage of household income (percentage)*

SFB 649 Discussion Paper Series 2013

For a complete list of Discussion Papers published by the SFB 649, please visit http://sfb649.wiwi.hu-berlin.de.

001 "Functional Data Analysis of Generalized Quantile Regressions" by Mengmeng Guo, Lhan Zhou, Jianhua Z. Huang and Wolfgang Karl Härdle, January 2013.
002 "Statistical properties and stability of ratings in a subset of US firms" by Alexander B. Matthies, January 2013.
003 "Empirical Research on Corporate Credit-Ratings: A Literature Review" by Alexander B. Matthies, January 2013.
004 "Preference for Randomization: Empirical and Experimental Evidence" by Nadja Dwenger, Dorothea Kübler and Georg Weizsäcker, January 2013.
005 "Pricing Rainfall Derivatives at the CME" by Brenda López Cabrera, Martin Odening and Matthias Ritter, January 2013.
006 "Inference for Multi-Dimensional High-Frequency Data: Equivalence of Methods, Central Limit Theorems, and an Application to Conditional Independence Testing" by Markus Bibinger and Per A. Mykland, January 2013.
007 "Crossing Network versus Dealer Market: Unique Equilibrium in the Allocation of Order Flow" by Jutta Dönges, Frank Heinemann and Tijmen R. Daniëls, January 2013.
008 "Forecasting systemic impact in financial networks" by Nikolaus Hautsch, Julia Schaumburg and Melanie Schienle, January 2013.
009 "'I'll do it by myself as I knew it all along': On the failure of hindsight-biased principals to delegate optimally" by David Danz, Frank Hüber, Dorothea Kübler, Lydia Mechtenberg and Julia Schmid, January 2013.
010 "Composite Quantile Regression for the Single-Index Model" by Yan Fan, Wolfgang Karl Härdle, Weining Wang and Lixing Zhu, February 2013.
011 "The Real Consequences of Financial Stress" by Stefan Mittnik and Willi Semmler, February 2013.
012 "Are There Bubbles in the Sterling-dollar Exchange Rate? New Evidence from Sequential ADF Tests" by Timo Bettendorf and Wenjuan Chen, February 2013.
013 "A Transfer Mechanism for a Monetary Union" by Philipp Engler and Simon Voigts, March 2013.
014 "Do High-Frequency Data Improve High-Dimensional Portfolio Allocations?" by Nikolaus Hautsch, Lada M. Kyj and Peter Malec, March 2013.
015 "Cyclical Variation in Labor Hours and Productivity Using the ATUS" by Michael C. Burda, Daniel S. Hamermesh and Jay Stewart, March 2013.
016 "Quantitative forward guidance and the predictability of monetary policy – A wavelet based jump detection approach –" by Lars Winkelmann, April 2013.
017 "Estimating the Quadratic Covariation Matrix from Noisy Observations: Local Method of Moments and Efficiency" by Markus Bibinger, Nikolaus Hautsch, Peter Malec and Markus Reiss, April 2013.
018 "Fair re-valuation of wine as an investment" by Fabian Y.R.P. Bocart and Christian M. Hafner, April 2013.
019 "The European Debt Crisis: How did we get into this mess? How can we get out of it?" by Michael C. Burda, April 2013.

SFB 649, Spandauer Straße 1, D-10178 Berlin
http://sfb649.wiwi.hu-berlin.de

This research was supported by the Deutsche Forschungsgemeinschaft through the SFB 649 "Economic Risk".

SFB 649 Discussion Paper Series 2013

For a complete list of Discussion Papers published by the SFB 649, please visit http://sfb649.wiwi.hu-berlin.de.

020 "Disaster Risk in a New Keynesian Model" by Maren Brede, April 2013.
021 "Econometrics of co-jumps in high-frequency data with noise" by Markus Bibinger and Lars Winkelmann, May 2013.
022 "Decomposing Risk in Dynamic Stochastic General Equilibrium" by Hong Lan and Alexander Meyer-Gohde, May 2013.
023 "Reference Dependent Preferences and the EPK Puzzle" by Maria Grith, Wolfgang Karl Härdle and Volker Krätschmer, May 2013.
024 "Pruning in Perturbation DSGE Models - Guidance from Nonlinear Moving Average Approximations" by Hong Lan and Alexander Meyer-Gohde, May 2013.
025 "The 'Celtic Crisis': Guarantees, transparency, and systemic liquidity risk" by Philipp König, Kartik Anand and Frank Heinemann, May 2013.
026 "State Price Densities implied from weather derivatives" by Wolfgang Karl Härdle, Brenda López-Cabrera and Huei-Wen Teng, May 2013.
027 "Bank Lending Relationships and the Use of Performance-Sensitive Debt" by Tim R. Adam and Daniel Streitz, May 2013.
028 "Analysis of Deviance in Generalized Partial Linear Models" by Wolfgang Karl Härdle and Li-Shan Huang, May 2013.
029 "Estimating the quadratic covariation of an asynchronously observed semimartingale with jumps" by Markus Bibinger and Mathias Vetter, May 2013.
030 "Can expert knowledge compensate for data scarcity in crop insurance pricing?" by Zhiwei Shen, Martin Odening and Ostap Okhrin, May 2013.
031 "Comparison of Methods for Constructing Joint Confidence Bands for Impulse Response Functions" by Helmut Lütkepohl, Anna Staszewska-Bystrova and Peter Winker, May 2013.
032 "CDO Surfaces Dynamics" by Barbara Choroś-Tomczyk, Wolfgang Karl Härdle and Ostap Okhrin, July 2013.
033 "Estimation and Inference for Varying-coefficient Models with Nonstationary Regressors using Penalized Splines" by Haiqiang Chen, Ying Fang and Yingxing Li, July 2013.
034 "Robust Estimation and Inference for Threshold Models with Integrated Regressors" by Haiqiang Chen, July 2013.
035 "A new perspective on the economic valuation of informal care: The well-being approach revisited" by Konstantin Kehl and Stephan Stahlschmidt, July 2013.

SFB 649, Spandauer Straße 1, D-10178 Berlin
http://sfb649.wiwi.hu-berlin.de

This research was supported by the Deutsche Forschungsgemeinschaft through the SFB 649 "Economic Risk".