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Long-term Care Insurance and Carers' Labor Supply

A Structural Model

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Johannes Geyer and Thorben Korfhage[1]

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Abstract

In Germany, individuals in need of long-term care receive support through benefits of the long-term care insurance. A central goal of the insurance is to support informal care provided by family members. Care recipients can choose between benefits in kind (formal home care services) and benefits in cash. From a budgetary perspective family care is a cost-saving alternative to formal home care and to stationary nursing care. However, the opportunity costs resulting from reduced labor supply of the carer are often overlooked. We focus on the labor supply decision of family carers and the incentives set by the long-term care insurance. We estimate a structural model of labor supply and the choice of benefits of family carers. We find that benefits in kind have small positive effects on labor supply. Labor supply elasticities of cash benefits are larger and negative. If both types of benefits increase, negative labor supply effects are offset to a large extent.

JEL Classification: J22, H31, I13

Keywords: labor supply; long-term care; long-term care insurance; structural model

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1. Introduction

Family care at home is an important pillar of the German long-term care system. From a policy perspective, home care provided by informal carers is a cost saving alternative to both formal home care and stationary care in nursing homes. However, many family carers are of working age and have to reconcile care and paid work (Schneekloth and Wahl, 2005). On average, carers work fewer hours and are more often not working than people who do not provide care on a regular basis. In 2010, 50% of German main caregivers reported to have reduced or stopped working in order to cope with the extended care burden (Schneekloth and Schmidt, 2011). Thus, hidden (public) financial costs of informal care include not only decreased tax revenues but also reduced social security contributions. Since Germany – as many other countries – aims to maintain a high level of family care supply in order to deal with demographic change, it is important to account for these opportunity costs. While the existing literature on labor supply and long-term care (LTC) mostly examines the relation between caring responsibilities and working hours in general, our paper focuses on the incentives set by the long-term care insurance (LTCI).

The LTCI provides benefits to individuals with permanent (at least six months) impairments in at least two activities of daily living (ADL) and one instrumental activity of daily living (IADL). Depending on the level of impairments, three care levels are distinguished (see Schulz, 2010, for more details). Since the LTCI aims to support and strengthen family care (BMG, 2007, pp.8f), informal care is given precedence over formal care at home and home care takes precedence over stationary care. Regarding home care, care recipients can choose between cash benefits, benefits in kind or a combination of both. Benefits are not means tested. It is important to note that the LTCI does not provide full coverage of the risk of long-term care. Benefits are designed to support not to replace family care. Benefits in kind comprise direct provision of formal home care services. The formal care provider is directly reimbursed by the LTCI. Benefits in cash range from 205 euro (in care level I) up to 665 euro (in care level III) and can be used to reimburse family carers. Cash benefits are neither earmarked nor is their spending monitored. To increase working carers' temporal flexibility, additional regulations have been implemented since 2008. Family carers are entitled to take an emergency leave of up to ten days per year for medical reasons. Furthermore, carers working in firms with more than 15 employees can request an unpaid reduction in working hours for a period of up to six months.[1] Moreover, carers receive a small amount of additional pension entitlements. In general, it is not only less expensive for the LTCI to priorize home care but also in line with the preferences of care recipients who typically prefer to stay in familiar surroundings. According to the German Care Statistic (*Pflegestatistik*) in 2011, 70% of all individuals eligible for LTCI benefits received benefits for home based care (Pfaff, 2013, p.5).

Our paper focuses on working age carers who live together with the person in need of

[1] Take-up rates of both options are very low. The current government plans to introduce financial incentives to increase take-up rates.

care, most often their partner or parent, and are most likely the main caregivers. The care need can have different effects on labor supply. On the one hand, time and effort spent on informal care may lead to a reduction of working hours (substitution effect). On the other hand, increased care related expenses impact labor supply positively (income effect). At this point LTCI comes into play. The choice of benefits depends on caregivers' preferences for family care, labor market opportunities, and the relative attractiveness of the two different benefit schemes. By increasing non-labor income, benefits in cash comprise negative labor supply incentives.[2] Benefits in kind substitute informal care, which enables family carers to increase labor supply and leisure.

We set up a structural behavioral model that explains jointly the decision on the supply of working hours and care hours. The choice of care hours includes the decision about the benefit scheme. We estimate a utility function and assume households to maximize utility subject to budget and time constraints. This structural approach has the advantage of allowing to evaluate hypothetical policy reforms of the LTCI based on the estimated parameters. In particular, we analyze to what degree households would substitute benefits in kind and benefits in cash, if the relative attractiveness of both types of benefits had changed.

We use data from the Socio-Economic Panel Study (SOEP) covering the years 2001 to 2010. Our study focuses on working age individuals living together with a person eligible for LTCI benefits. The econometric specification takes into account unobserved individual heterogeneity.

We find that a 1% increase of benefits in kind leads to an increase in average working hours of 0.06%. A 1% increase in benefits in cash is found to decrease working hours by 0.46%. Simulations for a 10% increase of both types of benefits show that the different labor marked effects offset each other to some extent. However, the average effect is significantly negative.

To the best of our knowledge, the effects of the German LTCI on carers' labor supply have only once been analyzed in an econometric setting. Geyer and Korfhage (2014) examine the labor supply effects of the introduction of the LTCI in 1995 for co-residential carers. Using a difference-in-differences approach, the authors find a negative effect for men and no significant effect for women. Earlier studies analyze the relation between caring and labor supply for women in the US context (see Lilly et al., 2007, for a literature review). Depending on the data set and identification strategy, studies find either no significant effect (e.g. Wolf and Soldo, 1994; Stern, 1995) or a negative impact of caring hours on labor supply (e.g. Ettner, 1995, 1996; Johnson and Lo Sasso, 2000). European studies also identify either negative or insignificant labor market effects. For example, for Britain, Carmichael and Charles (1998, 2003) find negative labor supply responses. Heitmueller (2007) also uses British data and focuses on individual heterogeneity related to the provision of informal care and paid labor. He finds the link between care provision

[2] Even in the case of inelastic supply of informal care, an increase in non-labor income reduces labor supply incentives.

and employment decision to depend on the care setting. While he cannot identify an effect for *extra-residential carers* (who do not live in the same household as the care recipient), he finds a negative relationship for *co-residential carers* (who live in the same household). For Germany, Schneider et al. (2001) examine SOEP data from 1985 through 1996. They find that living in a household with someone in need of care increases a woman's propensity to withdraw from the labor market. However, they do not find a significant effect on working hours. Using more recent SOEP data (2001–2007) Meng (2013) finds no significant effect of caring on employment, she finds a small negative effect on working hours that is slightly larger for men than for women. In another study, also using SOEP data, Meng (2012) estimates the effect of caring duties on retirement decisions and finds a positive effect on the probability to retire. Spiess and Schneider (2003) use European data which include a variety of European countries. While they cannot identify country specific effects, they find an overall negative relationship between caring hours and labor supply. Viitanen (2005) extends this previous study by accounting for individual heterogeneity, state dependency and country specific effects. Her results show a negative impact of caregiving on labor supply only for Germany, but not for any of the other European countries analyzed in her study. Heger (2014) uses data from the Survey for Health, Aging and Retirement in Europe to measure the effect on labor market participation. She finds that employment effects depend on institutional settings: While she finds negative effects in countries with few formal care alternatives, this effect is not significant in countries with more generous care systems.

Our paper proceeds as follows: Section 2 describes the behavioral model. Section 3 explains the econometric methods we use to estimate the structural parameters. Section 4 describes the underlying dataset. Section 5 presents our results. Section 6 concludes.

2. The Behavioral Model

We assume a set of discrete alternatives of labor supply (working hours) and benefits from the LTCI (in kind & in cash). With respect to working hours, this approach takes into account that working hours are heavily concentrated at particular points of the distribution, such as zero hours, part-time and full-time. It also allows to model nonlinearities in the budget constraint because of regulations of the tax-benefit system and frictions on the labor market (see, e.g., Duncan et al., 1999).

The choice set of the carer consists of three working hour categories and two categories of benefits form the LTCI. The working categories include non-working (0 hours), part-time working (19 hours), and full-time working (41 hours). Only very few households choose mixed benefits, therefore we simplify our model by assuming that households can only choose between benefits in cash and benefits in kind. Consequently, households can choose between six alternative combinations.

In order to set up the behavioral model, we follow the theoretical model described by Johnson and Lo Sasso (2000) and assume a rational utility-maximizing carer who has to

allocate her scarce time resources between time spent for caring and time spent on the labor market. As defined in Becker (1991, ch. 8), the carer is altruistic. That is, she not only gains utility from leisure and consumption, but also from the well-being of the household member in need of care. The utility function can be stated as follows:

$$V = v[c, l, f(\lambda, h_c, h_o); X, \xi, \zeta], \tag{1}$$

where c is real consumption and l is the carer's pure leisure time. $f(\cdot)$ describes the utility of the care recipient and depends on the care-level λ, informal family care hours h_c, and formal care-hours provided by the LTCI h_o. Furthermore, utility depends on observable characteristics which are captured by the vector X. ξ describes unmeasured characteristics that influence preferences and ζ accounts for unobserved attributes of the discrete alternatives. Becker (1974) showed that maximizing the carer's personal utility is equivalent to the maximization of an aggregated household welfare function as long as the carer is altruistic. When unobserved heterogeneity in the population is accounted for, we can derive a model based on random utility maximization (RUM) (McFadden and Train, 2000).

2.1. The Budget Constraints

Individuals maximize the utility function subject to constraints describing the available time and income resources. They depend on chosen working categories as well as on the benefits from the LTCI.

Real consumption depends on the hourly wage w, working hours h_w, non-labor income A, and on the tax-benefit system $t(\cdot)$ that determines available household income. As we assume a static model consumption is assumed to equal net income.

$$c = \begin{cases} t(wh_w + A; X), & \text{if benefits in kind are chosen} \\ t(wh_w + A; X) + b_c(\lambda), & \text{if benefits in cash are chosen} \end{cases}, \tag{2}$$

where net income generated by $t(\cdot)$ depends in addition to household income on individual and household characteristics captured by the vector X (e.g., children, marital status). We use a micro-simulation model in order to simulate net household income for each of the three alternative working hours categories. This is further described in Subsection 4.5. Benefits from the LTCI are free from income taxes as long as the benefits are either taken by the care recipient herself or if they are passed on to family members to provide informal care (§3 nr.36 EstG). Furthermore, benefits are not withdrawn and not credited against other transfers, such as social assistance or housing benefits. Therefore, benefits in cash b_c can be added to the households net income without further adjustments. According to the LTCI scheme, benefits increase with a higher care-level (λ).

In our model, two crucial assumptions are made with respect to supplied care: Firstly, we assume that the observed household member of the care recipient is always the main caregiver. Secondly, we assume that secondary care can only be provided by the formal

care service supplied by the insurance scheme. Hence, we exclude the possibility of extra-residential caring children, friends or other paid caring services. The first assumption is motivated by Schneekloth and Wahl (2005, p. 76), who find that for all people who receive home based care, 92% name their closest family member as their main caregiver. In our dataset about 98% report to receive care from a household member. It is reasonable to assume that the household member who is usually a spouse or a grown up child is also the main caregiver taking on the bulk of the informal care load. The second assumption seems more ambitious because the availability of additional carers most likely affects the household members caring and labor supply decisions. However, as will be discussed in Section 4, even the simple specification without secondary carers captures the household's caring burden well enough to yield information about the relevant tradeoffs they are facing. We also control for household characteristics in the estimation, which captures other potential care sources within the household.

We assume that a certain care level is related to a fixed amount of care hours that must always be provided. We rely on a representative survey study by Schneekloth and Wahl (2005) to obtain average weekly care hours. They find an average provision of care in the first care-level of 29.4 hours per week, in the second level 42.2 hours per week, in the third level 54.2 hours per week.

We use these averages as the total care-time (h_T) that must be provided formally by the care service and/or informally by the caring household member.

$$h_T(\lambda) = h_c + h_o \tag{3}$$

Note, this assumption implies h_c and h_o are substitutes. There is a comprehensive literature trying to estimate whether informal care and formal care can be considered substitutes or compliments. Results are mixed but seem to depend on the type of care (for an overview, see, e.g., Bonsang, 2009; Van Houtven and Norton, 2004). For instance Bonsang (2009) finds that informal care is a substitute for formal care as long as the needs require unskilled types of care. Bolin et al. (2008) find informal care to be a substitute for formal home care, but a complement to doctor and hospital visits. Following those findings, we assume that at least fundamental care needs can be supplied by any carer. Thus, it is reasonable to believe that carers will reduce their caring effort, if the exogenous supply of care is increased *ceteris paribus*.

If households decide to receive benefits in kind, a part of the care load is provided formally. Depending on the care-level, households are eligible for different amounts of benefits that are directly paid to a care service. Since benefits in kind $b_k(\lambda)$ are defined in monetary terms, in order to obtain formal care hours h_o, they have to be divided by the hourly price of formal care p_{h_o}.

$$h_o = \begin{cases} b_k(\lambda)/p_{h_o}, & \text{if benefits in kind are chosen} \\ 0, & \text{if benefits in cash are chosen} \end{cases} \tag{4}$$

We follow Büscher et al. (2007) and assume an hourly price of formal care of $p_{h_o} = 28.30$euro in 2006.[3] We adjust prices by the consumer price index for all other years.

According to Equation (3) the informal care hours can simply be calculated as the difference between the exogenous total care time h_t and formal care time h_o. Yet, because it can be assumed that even at full-time employment individuals do not work more than five days a week, we assume that all modeled tradeoffs only concern weekdays and that at weekends, care is always provided informally. Hence, only 5/7 of the total care-time must be allocated to formal and informal care.

$$h_c = (5/7)h_T(\lambda) - h_o \tag{5}$$

Remember that the insurance only partly covers the risk of long-term care, meaning that home care is primarily provided by the household member, no matter what type of benefits is chosen. h_c is thus always positive and larger than h_o.

Leisure (on working days) is calculated as the difference between total time allowance ($T = 80$), time devoted for paid employment h_w, and for informal care services h_c.

$$l = 80 - h_w - h_c \tag{6}$$

Substituting Equations (2), (4), (5) and (6) into the utility function (1) yields the carer's maximization problem

$$V = v\left\{t(wh_w + A) + b_c(\lambda), 80 - h_w - h_c, f[\lambda, h_c, h_t(\lambda) - h_c]; X, \xi, \zeta\right\} \rightarrow \max_{h_c, h_w} \tag{7}$$

subject to non-negativity of the choice variables.

TABLE 1 about here

Trade-offs

Table 1 shows the values of the choice variables (working and informal care hours) and the values of the variables that are given by the constraints (formal care hours, leisure hours, and benefits in cash). All values are expressed as weekly amounts in hours or euro. They demonstrate the trade-offs arising between the different alternatives. As working hours increase consumption possibilities increase as well, but pure leisure decreases. Benefits in kind relax the time constraint and carer are able to enjoy more leisure. However, by abandoning cash benefits households face opportunity costs in terms of reduced consumption possibilities.

[3] The hourly price of formal care is not observed for our sample. It results from a bargaining process between the LTCI and unions of care suppliers (Büscher et al., 2007, p. 344). Instead of having fixed hourly prices, money is paid for special services, such as washing, feeding somebody or making a bed. In order to derive an hourly price we follow Büscher et al. (2007) who investigate the impact of a revised reimbursement scheme for home care services. They assume an hourly rate of 28.30 euro which they argue is accurate according to the German law (§SGB XI) in 2006.

We use the constraints described above to draw budget lines for a representative carer in Figure 1 to illustrate the trade-off between leisure and consumption. Thereby, we substitute equations (4), (5) and (6) into (2) in order to yield constraints that depend on the exogenous variables X, A, λ, and w only. Assuming $A = 0$, $\lambda = 2$ and a household composition in which income is taxed without any exemptions, we can draw budget lines for different wage rates as well as for different choices of benefits from the LTCI. Looking at the graphical representation one can observe that:

1. If benefits in kind are chosen, the maximum amount of possible leisure time is higher. This is, the budget lines conditional on cash benefits end at 49 hours, while benefits in kind allow for a maximum of 58 hours of leisure.

2. Benefits in kind become more attractive as wages increase. Wages can be considered opportunity costs of caring for the individual. If wages are low, cash benefits are valued higher compared to the foregone income of reduced working hours. However, with increasing wage, opportunity cost of caring rise and it becomes more attractive to substitute formal for informal care in order to increase working hours. Thus, an increasing wage rate leads to an outward shift of the budget lines which is larger for benefits in kind compared to benefits in cash.

3. People choosing benefits in cash are favored by the tax benefits system. Firstly, because cash benefits are not withdrawn and not credited towards other social benefits they are especially favorable as soon as net income is low enough to be eligible for social assistance. Hence, the two budget-lines for $w = 10$ are close to each other for low leisure, but spread as soon as social assistance ships in (at arround $l = 40$). Secondly, because cash benefits are free from income tax, individuals chosing benefits in kind have to pay higher taxes in order to yield the same net income as individuals choosing benefits in cash. In Figure 1 this is made visible by the shift in kinks created by the progressive tax system.

Note that the carer not only considers the trade-off between consumption and leisure but also the well-being of the care recipient. This is, if the person in need for care has a large preference of being cared for by a family member, benefits in cash might be chosen even though wages are high enough to assume strict dominance of benefits in kind in the pure leisure consumption trade off.

Figure 1 about here

3. Econometric Specification

McFadden and Train (2000) show that if the number of alternatives in a choice set is bounded, preferences over allocations are complete and transitive and individuals with similar characteristics have similar preferences, then RUM models can be estimated using

mixed logit with random coefficients. The utility U_{ijt} that carer i gains from choice j at time t comprises the deterministic portion V_{ijt} described above and an error term ε_{ijt}. With a log-linear functional form of the utility function, the carer's utility can be restated as

$$\begin{aligned} U_{ijt} &= V_{ijt} + \varepsilon_{ijt} \\ &= \log(l_{ijt})\beta_{li} + \log(c_{ijt})\beta_{ci} + \log(h_{c_{ijt}})\beta_{h_c} \\ &+ \log(l_{ijt}) \times \log(c_{ijt})\beta_{lc} + X'_{ijt}S_{ijt}\beta_X + \varepsilon_{ijt}. \end{aligned} \tag{8}$$

Thereby, β_{li} and β_{ci} are random coefficients which are allowed to vary between individuals and are introduced in order to capture the unobserved heterogeneity ξ and ζ in Equation (1). We follow Haan (2006) and assume that both random coefficients are normally distributed $\beta_{li} \sim \mathrm{N}(\beta_l, W_l)$ and $\beta_{ci} \sim \mathrm{N}(\beta_c, W_c)$, where the means $\beta_{l,c}$ and the variance-covariance matrices $W_{l,c}$ are to be estimated. For the matter of simplicity, in the following description of the model we relate to the random coefficient as a single coefficient β_i.[4] Furthermore, observable characteristics X_{ijt} are interacted with observable attributes of the alternatives which are collected in vector S_{ijt}. They are included as taste shifters[5] in order to control for observable heterogeneity. All other β-coefficients are mean coefficients and will be estimated.

Estimation is based on the comparison of utilities in the different alternatives.[6] It is expected that the carer is making rational decisions, meaning that she will always choose the available alternative that yields the highest utility. For instance, the carer will choose alternative k only if $U_{ikt} > U_{ijt}$ for all $j \neq k$. Consequently, the probability that carer i chooses alternative k at time t can be expressed as

$$\begin{aligned} P_{ikt} &= \mathrm{Prob}(U_{ikt} > U_{ijt}) \quad \forall\, j \neq k \\ &= \mathrm{Prob}(\varepsilon_{ijt} < \varepsilon_{ikt} + V_{ikt} - V_{ijt}) \quad \forall\, j \neq k. \end{aligned} \tag{9}$$

In the mixed logit model we expect β_i to be constant over time. Thus, we can estimate probabilities of choice sequences which contain all the choices a carer makes at different points of time: $y_i = \langle y_{i1}, \ldots, y_{iT} \rangle$. If the error term ε_{ijt} is assumed to be iid extreme value, the conditional probability of choosing a certain sequence can be calculated as the product of logit probabilities over t:

$$P(y_i|X_i, \beta_i) = \prod_{t=1}^{T} \frac{\exp(V_{ikt})}{\sum_j \exp(V_{ijt})}. \tag{10}$$

The unconditional probability can be expressed as a weighted average over all possible

[4] Note that the representation for only one random coefficient slightly differs from a representation with multiple random coefficients. For instance, simulations have to be performed for each random coefficient.

[5] Taste shifters will be further discussed in Section 4.

[6] For the description of the econometric theory in this section we draw from Train (2009, ch. 2,3,6 and 11) and Greene (2011, ch. 18). If other sources are used, they are indicated separately.

outcomes of β_i. In the case of a continuous distribution of the random coefficient, it can be integrated out:

$$P(y_i|X_i) = \int_{-\infty}^{\infty} P(y_i|X_i, \beta_i) f(\beta_i) d\beta_i \tag{11}$$

The integral in Equation (11) does not have a closed form. Simulation methods have to be used to estimate choice probabilities. Thereby, probabilities are approximated by drawing R values for each random coefficient from its assumed density. For all R draws the conditional probability (10) is calculated and its mean is derived. The simulated log likelihood function of the parametric model takes the following form:

$$SLL = \sum_{i=1}^{n} \ln \left\{ \frac{1}{R} \sum_{r=1}^{R} \prod_{t=1}^{T} \prod_{k=1}^{J} [P(y_i|X_i, \beta_i^r)]^{d_{ikt}} \right\} \tag{12}$$

where R is the number of draws and β_i^r is the r^{th} draw from the distribution $f(\beta_i)$. d_{ikt} equals *one*, if the individual i chooses the observed alternative and equals *zero* otherwise. The SLL is maximized to obtain the moments of the distribution $f(\beta_i)$.[7]

Individual-level Parameters

In order to estimate individual specific parameters, we use the procedure suggested by Revelt and Train (2000). The general idea is to assume that the distribution of preferences among individuals who make a specific choice differs from the distribution over the entire population. This relates to the assumption made above that individuals with similar characteristics also have similar preferences. We use Bayes' rule in order to derive a distribution of β_i which is conditional on attributes and choice decision. Revelt and Train (2000) show that the conditional distribution can be used to calculate expected individual parameters as

$$E(\beta_i) = \int_{-\infty}^{\infty} \beta_i \frac{P(y_i|X_i, \beta_i)\ f(\beta_i)}{P(y_i|X_i)} d\beta_i. \tag{13}$$

Substituting Equations (10) and (11) into (13) yields the complete expression for $E(\beta_i)$. However, because the integrals can again only be solved by using methods of simulation, the formula for the estimations of β_i turns out to have the following shape:

$$\hat{\beta}_i = \frac{\frac{1}{R} \sum_{r=1}^{R} \beta_i^r \prod_{t=1}^{T} \prod_{j=1}^{J} \left[\frac{\exp(X'_{ikt}\beta_i^r)}{\sum_j \exp(X'_{ijt}\beta_i^r)} \right]^{d_{ikt}}}{\frac{1}{R} \sum_{r=1}^{R} \prod_{t=1}^{T} \prod_{j=1}^{J} \left[\frac{\exp(X'_{ijt}\beta_i^r)}{\sum_j \exp(X'_{ijt}\beta_i^r)} \right]^{d_{ikt}}} \tag{14}$$

Note that the estimated individual coefficients can also be used to estimate individual level specific choice probabilities. We use this concept to calculate individual derivatives and

[7] For estimation, we use the Stata ado `mixlogit`, described by Hole (2007), based on Halton draws. Halton draws are pseudo-random draws and considerably reduce simulation variance in the estimation of mixed logit parameters compared to random draws (Train, 1999). For the matter of simplicity, we do not allow the random parameters to be correlated.

elasticities in Section 5.

4. Data

4.1. Dataset and Definition of Sample

To estimate the parameters of the utility function we use SOEP data from 2001 until 2010. SOEP is a representative panel study of households and individuals. As of 2011, SOEP contains about 20,000 individuals who live in almost 10,000 households.[8]

We choose individuals who are able to work and are flexible in their labor supply decision. They are between 35 and 65 years old, not retired, and live in the same household with a person in need of LTC. The need of care is defined as being eligible for benefits from the LTCI.

Overall, we use 1,601 observations. Thereby, we observe more than 40% of all individuals more than five periods.[9]

4.2. Sample Characteristics

In Table 2, the main sample characteristics are presented. The table is divided into characteristics of potential carers, characteristics of care recipients as well as common household characteristics.

TABLE 2 about here

Of all carers, 72% are employed and they have an average age of 49 years. The majority of carers are women. A relatively large fraction of 17% of all carers report having poor or bad health.[10]

Of all care recipients, 73% report receiving benefits in cash, which is very similar to official LTCI statistics. On average, care recipients are younger than carers. Since we analyze the effects on the labor supply of co-residential carers who are younger than 65, the age structure is not surprising.[11]

SOEP includes a question to obtain information about the source of informal care provision.[12] Because multiple answers are possible, frequencies do not add up to 100%. Of all

[8] To obtain detailed information about SOEP, see Wagner et al. (2007).

[9] Panel attrition can bias our estimates, if it is correlated with care related variables. We rely on Meng (2013, p.969) who shows that panel attrition due to caregiving does not bias estimated coefficients systematically.

[10] However, health status was found to have no significant effect on utility and was therefore not used in the estimated model.

[11] In addition to the reported sample, we conducted all analysis using a restricted sample of couples in which one partner is in need of care. The results are qualitatively very similar but due to the low sample size, we extended the sample to all households with working age individuals.

[12] The exact question is asked as follows: *Does someone in your household need care or assistance on a constant basis due to age, sickness or medical treatment? [...] From whom does this person receive the necessary assistance? Relatives in the household, public or church nurse, social worker, private care service, friends, neighbors and/or relatives not in the household?*

care recipients, 98% report receiving help from relatives within the household, 12% receive help from relatives outside the household, and 6% receive care from friends. Note that this variable should be considered endogenous with respect to the labor supply decision. For instance, if the potential carer is working full time, it is much more likely that external help will be received. Hence, the dummies generated from this question cannot simply be included into the model as interactions.

Households have an average size of 3.7, and a minimum of two. Extra adults are typically either grown up children or other relatives who can provide care work.

To obtain first insights of the chosen alternatives, Table 3 presents shares of actual choices from the set of alternatives that we analyze. Except for age, all values indicate shares in percent. Overall, the non-working category is chosen as often as the part-time category (both about 28%), the share of full-time employment is considerably larger with 44% of all choices. Furthermore, in all alternatives benefits in cash are preferred over benefits in kind. This remains true for all care-levels. Yet, in care-level III people seem to choose benefits in cash more often when deciding to supply less paid labor and turn to benefits in kind in the full-time working alternative more often than people with other care-levels. While men work more often full-time than women, the part-time alternatives include almost solely women.

Table 3 about here

4.3. Control variables

We include interactions with variables that might lead to systematic taste variation to control for observable individual heterogeneity. Because living costs are still considerably lower in East Germany and unemployment rates are higher, we include a region dummy into the model interacted with net income. Furthermore, as the available income depends on household size, it is also interacted with net income.

Among others, important sources for systematic variation of utility gained from leisure might be age, gender or migration background. Moreover, household size can have different effects depending on the the additional household member. If extra children (not grown up) are part of the household, leisure is expected to be decreased, while further adults might take over care tasks, thus increasing the time available to the primary carer.

An important interaction for the utility gained from informal caring seem to be the care levels of the care recipient. Not only does the hourly care burden increase with higher care-levels, the tasks that the carer has to perform regularly are different. Interactions with dummies are included to indicate care-levels 2 and 3. Care-level 1 is the base category.

4.4. Benefits

SOEP does not include a question that directly asks the household about the type of benefits it is receiving from the LTCI. However, individuals are asked to report the amount

of money they are receiving each month from the LTCI. Combined with the knowledge about the care level of the recipient, one can compare the amount of cash the household is eligible for with the amount the household is actually receiving.

We assume that the household chooses benefits in cash whenever the monetary transfers from the insurance are at least 50% of what it is eligible for. Note that we omit the possible choice of combining benefits in kind with benefits in cash to obtain two discrete choice categories. Mixed benefits are rarely observed. Compared with the German Care Statistic (*Pflegestatistik*) (Pfaff and Rottländer, 2005; Schneekloth and Wahl, 2005), our approximation works relatively well.

4.5. Net household income

Net household income is simulated for the choice alternatives on the basis of the microsimulation model STSM.[13] The STSM is a model of the German tax-benefit system and contains the main properties of the German tax and transfer system. In a first step, observable sources of labor and non-labor income are used to calculate each household's taxable income. In a second step, taxes and benefits are calculated to obtain net household income. Thereby, taxes and transfers not only depend on the amount of taxable income but also on household characteristics.

If individuals choose one of the working categories, their labor income is calculated by multiplying the assumed weekly working hours in each choice set by the observed individual wage rate. As wages cannot be observed for non-working individuals, they have to be estimated. In order to account for sample selection, we use the two step-procedure suggested by Heckman (1979).

5. Results

In this section, we present estimation results for the mixed logit. Then we derive elasticities for a 1% change of gross wages, benefits in cash and benefits in kind. We also simulate a potential reform of the LTCI scheme that increases all benefits by 10%.

5.1. Estimation Results and Model Selection

The coefficients of the estimated model are shown in Table 4. The estimated standard deviations in the mixed logit model are highly statistical significant at the 1% level for the random coefficients of leisure and net income. That is, the assumption of unobserved individual heterogeneity in these variables cannot be rejected.

Table 4 about here

In Table 5, the in-sample predictions of the mixed logit model are compared with the observed frequencies in the data. Although we do not include alternative specific dummy

[13] For detailed information about the STSM, see Steiner et al. (2012).

variables, the random coefficients model fits the data quite well with no systematic over- or underestimation of any working category or the chosen benefits from the LTCI.

Table 5 about here

Generally, the estimated coefficients in Table 4 can be interpreted as effects on the carer's utility but, because of the interaction terms that are included in the utility function, it is more convenient to calculate differentials to identify direct effects of the key variables on the carer's utility. Thereby, derivatives are calculated on the individual level using Equation (14) with 500 draws from the estimated distribution for each of the random coefficients.

The first derivative of the utility function, with respect to income, is positive for 92% of all individuals. Consequently, due to the log specification, the second derivative is also negative for 92% of all individuals. Thus, the generally made assumption of increasing and diminishing marginal returns is fulfilled for nearly all individuals. The reason for the partly negative first derivatives is the specification of the random coefficient for net income and the calculation of individual level parameters.

The first derivative of the utility function with respect to leisure is positive for 66% of all individuals. It can be assumed that a part of the positive effect of leisure on utility is captured by informal care hours. First derivatives with respect to informal care hours are positive for 100% of all individuals, meaning that they yield positive utility for an extra hour of provided informal care. This corresponds to the preference for LTC that is provided informally by family members.

While the mean coefficients of informal care hours is significant at the 1% level, it is not statistically significant for leisure and net income. Instead, most of the effect of leisure and net income on utility is driven by the highly significant estimates for its standard deviation and interaction effects. Significant coefficients on taste switchers indicate differing utility functions by region and gender. Additionally, people whose household member needs a higher care level seem to gain less utility from caring.

5.2. Elasticities

In order to compare results with other studies using structural labor supply models, we simulate labor supply elasticities with respect to a 1% increase of gross wages, benefits in kind, and benefits in cash.

We obtain confidence intervals for the elasticities using a parametric bootstrap. Because the central limit theorem suggests that the arithmetic mean of a sufficiently large number of iterations of independent random variables is approximately normally distributed (Greene, 2011, pp. 1078ff), we assume that the mean values of the estimated model coefficients follow a multivariate normal distribution. We use the estimated mean and covariance of the estimated coefficients to draw 500 new coefficients. For each of the 500 draws, choice probabilities are predicted. Individual level estimates for the random coefficients are calculated using Equation (14) with 500 draws from its estimated distribution for each

of the random parameters. By comparing the predicted probabilities of the original model with the probabilities predicted after a one percent increase, we can calculate elasticities. We calculate 90% confidence intervals using the calculated elasticities that result from the different random draws of coefficients.

Table 6 about here

Results for the wage elasticities are presented in Table 6. The boundaries of the 90% confidence intervals are indicated by p5 and p95. On average, a 1% increase in gross wages leads to an increase of working hours by 0.18% and an increase of labor participation of 0.06 percentage points (PP). Female labor supply reacts stronger.

These results are in line with other studies estimating labor supply elasticities on the basis of SOEP (e.g., Steiner and Wrohlich, 2004; Haan, 2006; Wrohlich, 2011). For instance, in a parametric random coefficients model, Haan (2006) estimates that men increase working hours by 0.2% and labor participation by 0.13 PP in response to a 1% wage increase. In his model women react also more elastic with a 0.39% increase in working hours and a 0.14 PP increase in labor participation. Wrohlich (2011) estimates labor supply elasticities for mothers who care for children. She finds that if wages increase by 1%, mothers increase working hours by 0.49% and labor participation by 0.13 PP.

As individuals increase labor supply, their available time for leisure and informal care decreases. Thus, it is not surprising that individuals decrease the amount of provided informal care. To close the gap in care hours, more people chose benefits in kind to use formally provided care more often. However, elasticities are considerably smaller than wage elasticities. Overall, a 1% increase in wages only results in a very small reduction of informal care hours of 0.02%, meaning that most of the extra labor supply is provided by reducing personal leisure time. The reduction in leisure is almost the same for women and men.

Table 7 about here

In Table 7, elasticities are presented for a 1% increase of benefits in cash. Overall, the increase leads to higher demand for benefits in cash as it becomes more attractive in relation to benefits in kind. Compared to benefits in kind, its share increases by 0.063 PP. Because formal care is thus reduced, carers have to increase informal care hours by an average of 0.018%. This effect is larger for women than for men and larger in higher care-levels, where a 1% increase results in a larger absolute raise as initial levels are higher. Based on theoretical considerations, one would expect that the increased non-labor income relaxes the budget constraint and consumption possibilities increase. Consequently, the marginal utility of an extra hour of working decreases. Therefore, the carer decreases working hours and uses some of the extra time that becomes available on leisure and some on informal caring. We find negative effects for working hours and labor participation that lead to a 0.46% decrease in working hours and a 0.17 PP reduction in labor participation to back the theory.

In Table 8, elasticities are presented for a 1% increase of benefits in kind. It can be seen that individuals decrease their supplied informal care hours by an average of 0.08%. The way the model is set up, with an exogenous total care time and no other helpers except the formal help provided as benefits in kind, the change in informal care hours can only occur if the share of benefits in cash decreases. Thus, we assume a decrease in benefits in cash, even though this effect cannot be backed up on the 10% level of significance. A fraction of the extra available time resource is used for working (which also compensates for the forgone income from benefits in cash) and working hours increase by 0.06%.

Again, effects are larger for women than for men and larger in higher care-levels. With regard to the care-levels the stronger response probably results from the fact that a 1% increase leads to a higher absolute change of possible formal care services and therefore to a larger impact on the carer's time constraint.

Table 8 about here

5.3. Simulation

In order to examine a realistic reform scenario in which both types of benefits are increased simultaneously, Table 9 shows results for a simulation of a 10% increase of all benefits.

At first sight, the results seem puzzling. The attractiveness of the increase in benefits in cash seems to outweigh the increase in benefits in kind in the regard that more households decide to choose the direct financial support over formal help provided by the insurance. On average, the share of benefits in cash increases by 1.19 PP. Consequently, one would expect that informal care hours would increase on average because fewer people choose to use the formally supplied care, which has to be substituted by informal care hours of the household member. Yet, on average, informal care hours decrease by 0.48%. The reason is that formal care hours, which can be claimed from the insurance, increase. Thus, all people who do not change from benefits in kind to benefits in cash, reduce their informal care hours just by staying in that choice category. This effect outweighs the average reduction through changing individuals, and informal care hours decrease on average.

Changes in benefits are larger in the lower care levels. This is an interesting result as we found a lower elasticity if only one of the benefits was increased. However, if both benefits are increased simultaneously, carers face a trade-off between the two benefits. Hence, the result indicates that it is easier to turn away from formal care if care recipients are in better state of health. A potential reason is that the overall care burden is considerably smaller in lower care-levels.

A look at the response of the labor supply variables *working hours* and *labor participation* supports the view that the incentives given by the different benefits offset each other to some extent. The negative labor supply effects dominate for men and women. The effect is driven by larger reactions in response to changes of benefits in cash. However, given that we increase benefits in cash by 10%, the labor supply response is relatively small. On average they decrease their working hours by 0.76% and the participation rate by 0.32 PP.

Table 9 about here

6. Conclusion

Most of the literature on LTC and labor supply of family carers only considers direct effects of care responsibilities on labor market participation. We add to the literature by taking into account the institutional regulations of the LTCI in Germany. The LTCI offers two different benefit schemes implying different labor supply incentives to support home care. The structural model that we set up to identify the relationship between benefit scheme and labor supply assumes individuals to make their choice on the basis of an individual utility function. Our approach extends the usual static structural labor supply model by including the type of benefits into the choice set. Moreover, the structural approach allows to simulate hypothetical reform scenarios.

Our findings suggest that both benefits in kind and cash benefits have an influence on informal care hours and affect labor supply. Carers increase labor supply if benefits in kind are increased and decrease labor supply if benefits in cash are increased. The elasticities of cash benefits are relatively large and amount to 0.46%. However, if both types of benefits are increased the labor supply effects offset one another to a large extent. Simulations for a 10% increase of both types of benefits show that the average labor supply effect is negative but very small.

Our results indicate that opportunity costs in terms of reduced labor supply of carers due to the LTCI are of minor importance if benefits in kind are taken into account. The considerably more expansive support via benefits in kind has a significantly positive effect on labor supply, which can be associated with negative opportunity costs. Thus, their increase has positive effects on tax revenues and social security contributions.

Because, to the best of our knowledge, this is the first structural analysis of the effect of the LTCI on carers' labor supply we can only compare results with theoretical considerations. The incentive schemes of the insurance seem to be very important for the trade-off between family care and market work and future research should take that into account.

The policy implications depend on the policy goals. If it is the goal to find the most efficient insurance scheme in terms of costs and benefits for LTCI, the implications of our study are not straightforward. Even though benefits in cash seem to be cost saving at first glance, benefits in kind provide incentives to already caring household members to increase labor supply and therefore result in increased public revenues. If it is the goal to strengthen the informal care supply *per se* – e.g. in response to the strong preference within the German population to be cared for by family members in their familiar surroundings – an increase of benefits in cash seems to be the best way to accomplish this goal as they prove to provide incentives for increased informal care hours. In order to give households freedom of choice and to attenuate negative labor supply effects, it seems best to change both types of benefits simultaneously.

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A. Tables

Table 1: Summary of choice sets in each care-level

	Working hours (h_w)	Informal care hours (h_c)	Formal care hours (h_o)	Pure leisure (l)	Benefits in cash (b_c)
Care-level 1					
No work & in cash	0.0	21.0	0.0	59.0	48.2
No work & in kind	0.0	17.8	3.2	62.2	0.0
Part time & in cash	19.0	21.0	0.0	40.0	48.2
Part time & in kind	19.0	17.8	3.2	43.2	0.0
Full time & in cash	41.0	21.0	0.0	18.0	48.2
Full time & in kind	41.0	17.8	3.2	21.2	0.0
Care-level 2					
No work & in cash	0.0	30.1	0.0	49.9	96.4
No work & in kind	0.0	22.5	7.6	57.5	0.0
Part time & in cash	19.0	30.1	0.0	30.9	96.4
Part time & in kind	19.0	22.5	7.6	38.5	0.0
Full time & in cash	41.0	30.1	0.0	8.9	96.4
Full time & in kind	41.0	22.5	7.6	16.5	0.0
Care-level 3					
No work & in cash	0.0	38.7	0.0	41.3	155.0
No work & in kind	0.0	27.0	11.8	53.0	0.0
Part time & in cash	19.0	38.7	0.0	22.3	155.0
Part time & in kind	19.0	27.0	11.8	34.0	0.0
Full time & in cash	41.0	38.7	0.0	0.3	155.0
Full time & in kind	41.0	27.0	11.8	12.0	0.0

Source: Own calculation.

Table 2: Descriptive statistics

	Obs	Mean	St. Dev.
Potential carer			
Employed	1601	0.72	0.45
Age	1601	49.01	7.56
Female	1601	0.53	0.50
Migration background	1601	0.14	0.35
Self-rated health status: good–very good	1601	0.43	0.50
Self-rated health status: satisfactory	1601	0.40	0.49
Self-rated health status: poor–bad	1601	0.17	0.38
Care recipient			
Benefits in cash	1601	0.73	0.45
Age	1601	40.47	30.73
Female	1601	0.47	0.50
Care-level 1	1601	0.44	0.50
Care-level 2	1601	0.35	0.48
Care-level 3	1601	0.21	0.41
Care from relatives outside household	1601	0.12	0.33
Public care service	1601	0.06	0.23
Private care service	1601	0.10	0.30
Care from relatives inside household	1601	0.98	0.14
Care from neighbours	1601	0.02	0.13
Care from friends	1601	0.06	0.23
No care / no answer	1601	0.00	0.00
Household			
East	1601	0.23	0.42
Number of people inside household	1601	3.72	1.04
Number of children inside household	1601	1.16	1.06
Adults inside household	1601	2.56	0.74
Observations	1601		

Source: SOEP.v29, own calculation

Table 3: Shares of actual chosen alternatives by characteristics

	All	Level 1	Level 2	Level 3	Female	Male	Kid in HH	Age
No work & in cash	19.9	18.9	19.5	22.6	28.2	10.7	18.6	51.3
No work & in kind	7.7	6.4	7.7	10.6	10.5	4.7	7.4	49.3
Part time & in cash	20.8	22.1	22.0	16.1	34.6	5.5	22.0	47.4
Part time & in kind	7.6	6.7	8.5	7.9	11.9	2.8	7.7	49.1
Full time & in cash	31.9	33.8	32.8	26.4	9.2	57.0	33.1	48.1
Full time & in kind	12.2	12.2	9.5	16.4	5.7	19.3	11.1	50.3

Note: Except for the last column which shows the mean age for each alternative, values indicate shares of chosen alternatives in percent. For instance, of all female caregiver 28% chose not to work and to get benefits in cash.

Source: SOEP.v29, own calculation

Table 4: Estimation results for random coefficients model

Variables	Coefficients
log (leisure) × log (net income)	1.489**
	(0.311)
log (net income) × east	−2.947*
	(1.267)
log (net income) × (household size > 2)	3.812**
	(1.368)
log (leisure) × age	−0.615**
	(0.195)
log (leisure) × (age^2/100)	0.711**
	(0.201)
log (leisure) × female	4.636**
	(0.420)
log (leisure) × children in household	0.108
	(0.259)
log (leisure) × adults in household	−0.182
	(0.187)
log (leisure) × migration background	0.171
	(0.494)
log (informal) × care-level 2	−0.099**
	(0.027)
log (informal) × care-level 3	−0.193**
	(0.024)
log (informal)	4.319**
	(0.607)
log (leisure)	2.344
	(4.794)
log (net income)	1.149
	(1.786)
Standard deviation	
log (leisure)	2.870**
	(0.276)
log (net income)	8.801**
	(0.834)
Log likelihood	-2052.85
Akaike's Information Criterion (AIC)	4137.70
Observations	9606

Note: Values denote estimated coefficients. Standard errors are reported in parentheses. The random coefficients model is estimated using simulation methods. Simulation was performed using 500 pseudo-random Halton draws for each household. Significance levels: † p <0.10, ∗ p <0.05, ∗∗ p <0.01

Source: SOEP.v29, own calculation

Table 5: Observed and predicted alternatives (within-sample fit)

	Observed	Random coefficients
No work & in cash	19.9	21.3
No work & in kind	7.7	13.8
Part time & in cash	20.8	15.3
Part time & in kind	7.6	6.6
Full time & in cash	31.9	33.8
Full time & in kind	12.2	9.2

Note: For the estimation of the individual specific random coefficients simulation methods are used. On the basis of 500 draws form the estimated distribution, for each household, β_i is chosen conditional on attributes and on choice patterns. Values are given in percent.

Source: SOEP.v29, own calculation.

Table 6: Estimated elasticities of a 1% increase in wages

	Working hours (%)	Labor participation (PP)	Informal care hours (%)	Share of benefits in cash (PP)
all				
mean	0.1824	0.0641	−0.0209	−0.0771
p5	0.1395	0.0483	−0.0235	−0.0869
p95	0.2233	0.0787	−0.0183	−0.0674
males				
mean	0.0062	−0.0027	−0.0236	−0.0884
p5	−0.0201	−0.0164	−0.0269	−0.1007
p95	0.0344	0.0120	−0.0203	−0.0768
females				
mean	0.3391	0.1236	−0.0185	−0.0670
p5	0.2756	0.1041	−0.0211	−0.0764
p95	0.3990	0.1414	−0.0159	−0.0575
care-level 1				
mean	0.1668	0.0574	−0.0069	−0.0436
p5	0.1296	0.0421	−0.0080	−0.0504
p95	0.2018	0.0715	−0.0058	−0.0368
care-level 2				
mean	0.1781	0.0624	−0.0228	−0.0835
p5	0.1331	0.0464	−0.0266	−0.0968
p95	0.2195	0.0776	−0.0190	−0.0701
care-level 3				
mean	0.2233	0.0816	−0.0480	−0.1384
p5	0.1695	0.0644	−0.0536	−0.1544
p95	0.2778	0.0984	−0.0419	−0.1216

Note: Elasticities are calculated using parametric bootstrap with 500 draws. The estimated means and the variance covariance matrix is used to draw new coefficients that are used for simulation. p5 and p95 indicate the boundaries of the 10% confidence interval.

Source: SOEP.v29, own calculation

Table 7: Estimated elasticities of a 1% increase in benefits in cash

	Working hours (%)	Labor participation (PP)	Informal care hours (%)	Share of benefits in cash (PP)
all				
mean	−0.4579	−0.1703	0.0181	0.0625
p5	−0.5732	−0.2153	0.0107	0.0350
p95	−0.3392	−0.1241	0.0255	0.0911
males				
mean	−0.2960	−0.1450	0.0022	0.0069
p5	−0.3909	−0.1898	−0.0048	−0.0211
p95	−0.2029	−0.1006	0.0099	0.0373
females				
mean	−0.6042	−0.1933	0.0325	0.1128
p5	−0.7539	−0.2421	0.0239	0.0815
p95	−0.4593	−0.1448	0.0402	0.1407
care-level 1				
mean	−0.2951	−0.1182	0.0074	0.0458
p5	−0.3823	−0.1509	0.0047	0.0287
p95	−0.2062	−0.0836	0.0100	0.0624
care-level 2				
mean	−0.5094	−0.1897	0.0150	0.0506
p5	−0.6423	−0.2408	0.0060	0.0171
p95	−0.3727	−0.1377	0.0240	0.0843
care-level 3				
mean	−0.7107	−0.2467	0.0454	0.1166
p5	−0.8673	−0.3082	0.0297	0.0681
p95	−0.5539	−0.1869	0.0608	0.1638

Note: Elasticities are calculated using parametric bootstrap with 500 draws. The estimated means and the variance covariance matrix is used to draw new coefficients, that are used for simulation. p5 and p95 indicate the boundaries of the 10% confidence interval.

Source: SOEP.v29, own calculation

Table 8: Estimated elasticities of a 1% increase in benefits in kind

	Working hours (%)	Labor participation (PP)	Informal care hours (%)	Share of benefits in cash (PP)
all				
mean	0.0606	0.0185	−0.0797	0.0150
p5	0.0481	0.0146	−0.0914	−0.0127
p95	0.0736	0.0223	−0.0685	0.0426
males				
mean	0.0169	0.0080	−0.0454	0.0637
p5	0.0123	0.0058	−0.0545	0.0415
p95	0.0218	0.0103	−0.0368	0.0854
females				
mean	0.1001	0.0281	−0.1106	−0.0289
p5	0.0788	0.0225	−0.1254	−0.0626
p95	0.1228	0.0334	−0.0958	0.0058
care-level 1				
mean	0.0033	0.0010	−0.0237	0.1069
p5	0.0004	−0.0001	−0.0322	0.0793
p95	0.0063	0.0022	−0.0159	0.1325
care-level 2				
mean	0.0419	0.0126	−0.0741	0.0178
p5	0.0283	0.0082	−0.0927	−0.0211
p95	0.0560	0.0171	−0.0559	0.0547
care-level 3				
mean	0.2094	0.0643	−0.2044	−0.1793
p5	0.1654	0.0516	−0.2331	−0.2223
p95	0.2533	0.0771	−0.1736	−0.1353

Note: Elasticities are calculated using parametric bootstrap with 500 draws. The estimated means and the variance covariance matrix is used to draw new coefficients, that are used for simulation. p5 and p95 indicate the boundaries of the 10% confidence interval.

Source: SOEP.v29, own calculation

Table 9: Simulation of a 10% increase in both types of benefits

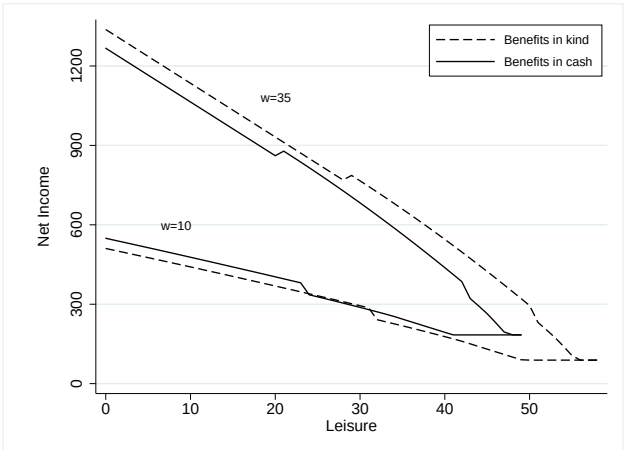
	Working hours (%)	Labor participation (PP)	Informal care hours (%)	Share of benefits in cash (PP)
all				
mean	−0.7628	−0.3159	−0.4837	1.1928
p5	−0.9565	−0.3957	−0.5803	1.0352
p95	−0.5796	−0.2405	−0.3941	1.3506
males				
mean	−0.5059	−0.2559	−0.2716	1.2487
p5	−0.6515	−0.3242	−0.3509	1.1163
p95	−0.3749	−0.1911	−0.1974	1.3836
females				
mean	−0.9949	−0.3702	−0.6755	1.1422
p5	−1.2375	−0.4560	−0.7901	0.9596
p95	−0.7569	−0.2810	−0.5569	1.3257
care-level 1				
mean	−0.5894	−0.2439	−0.1166	1.6711
p5	−0.7060	−0.2915	−0.1897	1.5095
p95	−0.4729	−0.1957	−0.0489	1.8174
care-level 2				
mean	−1.0200	−0.4069	−0.4141	1.2422
p5	−1.2532	−0.5014	−0.5637	1.0381
p95	−0.8063	−0.3214	−0.2678	1.4322
care-level 3				
mean	−0.7026	−0.3166	−1.3561	0.1234
p5	−1.0912	−0.4593	−1.5998	−0.1410
p95	−0.3119	−0.1751	−1.1044	0.3957

Note: Elasticities are calculated using parametric bootstrap with 500 draws. The estimated means and the variance covariance matrix is used to draw new coefficients, that are used for simulation. p5 and p95 indicate the boundaries of the 10% confidence interval.

Source: SOEP.v29, own calculation

B. Figures

Figure 1: Budget lines



Note: The dashed (solid) budget lines represent constraints, if benefits in kind (in cash) are chosen. The two lower (upper) lines are calculated at a gross wage rate of $w = 10$ ($w = 35$). All lines are drawn for an individual whose household member has carelevel 2 and the only sources of income are labor income or benefits from the insurance scheme. Net income and leisure are expressed in weekly amounts.
Source: own calculation.