

## Intrafamilial Upstream Transfers and Household Production

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### Abstract

The article investigates intergenerational transfers from children to parents and provides evidence for an exchange motive. The transfers are, therefore, interpreted as expenditures for intrafamilial services. The application of the household production approach to the transfer-service relationship provides a new perspective into the following discussion: as cultural background determines the technology of the household production to a great extent, it is supposed that religion as one of the main cultural factors has an effect on the incidence of transfers.

*JEL Classification: D13, Z12*

### 1. Introduction

The social and demographic changes of the past decades have substantial consequences for the relationship between the young and the old generations. The persistent high unemployment rates and increases in life expectancy have put enormous pressure on the social security system. In Germany, for example, Ronald Pofalla, the general secretary of the Christian Democrats in the lower house of parliament, suggested recently that adult children should pay maintenance to their unemployed parents (cf. *Frankfurter Allgemeine Zeitung*, 2006). The aim of the policy proposed is to substitute a private, intrafamilial transfer for the state reduced-rate unemployment benefit, the *Arbeitslosengeld II*. Another example is the reform of the public pension scheme in Germany. The introduction of a sustainability factor aimed at reducing the growth of pensions and, simultaneously, the contributions paid by younger, working people. Making a prognosis about how the consequences of such policies affect

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the intergenerational redistribution of income among the members of the family requires information on the motives for private transfers, as well as on the mode of action of the transfer within the familial context. This article focuses on intrafamilial upstream transfers from adult children to their elderly parents.

In the next section, we provide a short review of the standard microeconomic model for private transfers that distinguishes between altruism and exchange as the motive for the transfer. Further, the household production approach is applied to the analysis of intrafamilial transfers. Section 3 gives an overview of the data and the multilevel econometric framework for the analysis of social relations within the family. The estimation results are discussed in section 4. Section 5 concludes the paper.

## **2. Preferences or Technology – What Determines Intrafamilial Transfers?**

Economists analyzing intrafamilial relationships customarily distinguish between two main motives for intergenerational financial transfers: altruism and exchange. The fundamental characteristic of altruism within the family is that a person's well-being depends positively on the well-being of the members of his or her family. Becker (1974) worked out that a redistribution of income (with total family income remaining constant) has no effect on the consumption of the members of the family as long as the altruistic benefactor continues the transfers. This result, the redistributive neutrality property, follows from the fact that a reduction in the altruist's income induces an equal sized decrease in the intrafamilial transfers and vice versa. It also has important implications for social policymaking. Barro (1974) showed, for example, that changes in the public pension scheme can lead to an adjustment in the pattern of private transfers that could fully offset the intergenerational redistribution. In contrast to an unconditional altruistic transfer, the giver may also expect a service in return. Various variants of this exchange motive were established in the literature. For example, Park (2003) interpreted child-to-parents transfers as a re-payment of an implicit loan for human capital investment, Stark (1995) postulated a demonstration effect,<sup>1</sup> and Kotlikoff and Spivak (1981) saw the intrafamilial transfers as an expression of a risk-sharing behavior among the members of the family.

The theoretical approaches regarding altruistic and exchange-related motives have in common the fact that they model the transfer decision as a utility

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<sup>1</sup> The idea behind the demonstration effect is that the sandwich-generation provides upstream transfers to set an example for the own offspring that is expected to adopt this behavior in the future.

maximization problem. In this context, Cox (1987) set up a general framework for the analysis of motives for private income transfers. The model allows the identification of the dominant motive for the transfer: it hypothesizes that, in the case of altruism, the transfer  $T$  increases when the altruist's income increases, and it decreases when the beneficiary's income increases, i.e.,  $\partial T/\partial y_A > 0$  and  $\partial T/\partial y_B < 0$ , where the index  $A$  denotes the altruist or, more generally, the giver and  $B$  is the beneficiary or recipient. In the case of upstream transfers,  $A$  is the child and  $B$  is the parent. In addition, the redistributive neutrality property must be satisfied (i.e.,  $\partial T/\partial y_B - \partial T/\partial y_A = -1$ ). This condition regarding the derivatives can be used for an empirical test of whether the child is an effective altruist.

In the case of an exchange motive, the model interprets transfers as expenditures for intrafamilial services. Hence, the total transfer amount is the product of the quantity of service supplied and its implicit price. Two hypotheses regarding  $y_A$  and  $y_B$  can be derived. First, an increase in the giver's income leads to an increase in transfers ( $\partial T/\partial y_A > 0$ ). This result is identical to the one obtained from assuming altruism. Second, the effect of a change in the recipient's income on the transfer amount is not determined ( $\partial T/\partial y_B \leq 0$ ). This ambiguous deduction is the essential difference to altruistic behavior. Therefore, the distinguishing feature between altruism and exchange is that an increase in the transfer amount due to an increase in the recipient's income, i.e.,  $\partial T/\partial y_B > 0$ , is only compatible with an exchange motive.

Finally, it has to be pointed out that the implications of the analysis of the transfer amount are not valid for the transfer decision. Cox (1987) showed that the probability of a transfer occurrence increases with an increase in  $A$ 's income and decreases with an increase in  $B$ 's income independently, whether the transfer decision is based on altruism or exchange. Therefore, an analysis of the intergenerational transfers will not reach unambiguous conclusions if it focuses on the transfer decision only.

As the economic research in the area of intrafamilial transfers largely concentrates on the identification of one dominating motive, the combination of different motives regarding the transfer behavior has hardly been considered yet. Kohli and Kuenemund (2003) rightly emphasized that the transfer behavior within families is a multidimensional, complex conglomeration. Thus, one has to be aware that the results obtained from research *limited* to the altruism-exchange contrast can only provide *limited* conclusions.

This article applies the household production approach to the analysis of intrafamilial transfers. This novel viewpoint enables research to go beyond the dual-motive framework of altruism and exchange and, therefore, yields new insights into the mechanism by which transfers operate. Hence, the central point of the analysis is no longer the motive for transfers alone, but includes the household's technology and the joint consumption of household commod-

ities.<sup>2</sup> The heart of the matter of the household production approach is the notion that households “combine time and market goods to produce more basic commodities that directly enter their utility function” (Becker, 1965 p. 495). Commodities are “children, prestige and self esteem, health, altruism, envy and pleasures of the senses” (Becker, 1998, p. 8).<sup>3</sup> Becker (1965) derived that, in the simple case of constant returns in producing the commodity and given prices (including the wage rate), the household’s resource constraint can be written as

$$(1) \quad \sum (p_i b_i + \bar{w} t_i) Z_i = V + \bar{w} H,$$

where  $p_i$  and  $\bar{w}$  are price vectors giving the unit prices of the market goods and time used in the production of the household commodity  $Z_i$ , respectively.  $b_i$  and  $t_i$  denote vectors giving the input of market goods and time per unit of  $Z_i$ , respectively. Constant returns to scale imply that  $b_i$  and  $t_i$  are fixed values. Thus, the expression within brackets can be interpreted as the full price of one unit of  $Z_i$ . The unit price multiplied by the amount of the commodity yields the total cost of  $Z_i$ . The right-hand side of equation 1 denotes the maximum money income:  $V$  is nonworking income and  $\bar{w}H$  represents the earnings if all the time were composed of working time.

The household production approach allows the analysis of intrafamilial transfers from the viewpoint of either the recipient or the giver. For the recipient, the intrafamilial transfer provides additional monetary income and, consequently, relaxes his or her budget constraint. Two aspects are noteworthy: First, if the transfer is unconditional, it will be interpreted as another source of money income and, hence, enters the right-hand side of equation 1. Altruistic transfers are an example. Second, the transfer may also be given on the condition that it must be used for a specified purpose. This issue can be illustrated in the context of upstream transfers as follows: elderly parents may receive financial support from their children that must be used in the production of, say, functionality, e.g., the transfer could be interpreted as a price subvention for a specific health good or service. In this case, the transfer has to be consid-

<sup>2</sup> The issue of joint consumption is not addressed in this paper.

<sup>3</sup> Setting up an explicit production function for altruism, Becker (1998) drew an imprecise picture of altruism. On the one hand, altruism is – as indicated by the quotation above – interpreted as a commodity. On the other hand, Becker argued that altruism is a type of motivation that changes behavior. In the latter context, altruism is a property of the utility function because from this point of view altruistic “means that [a person’s] utility function depends positively on the well-being of [another person]” (p. 173). Combining both arguments – altruism as a commodity that can be produced according to the household production function and as a property of the utility function – leads to the conclusion that preferences are not constant, but can be altered by the household production. However, Becker treated altruistic behavior as a constant internal type of motivation when analyzing altruism in the family.

ered on the left-hand side of equation 1. The price for the market good used in the household production is reduced by the transfer per unit of the subsidized factor input.

The household production approach is also applicable to the analysis of the giver's situation. The following example explains this issue. When bringing up children, the sandwich-generation parents have to decide whether to invest their own time or to substitute an intrafamilial service ("babysitting"), e.g., provided by grandparents. In this case, the intrafamilial transfers might be regarded as expenditures for the service. Therefore, the crucial question in this example is: under what circumstances do the parents outsource the offspring's upbringing? The answer can be deduced from standard cost minimization: the transfer-service regime occurs (or is extended) when the ratio of the marginal productivity of the service and the marginal productivity of the sandwich-generation's time is greater than the ratio of the price for the service and the wage rate. Therefore, a low marginal productivity of time is accompanied by a tendency to make use of the service, whereas households with a high marginal productivity tend towards the use of their own time.

It becomes clear that the fundamental point for the decision whether and to what extent to use intrafamilial services or own time, i.e., the decision on the use of factor inputs, is the technology of the household production. Differences in the productivity between two households reflect the different technologies. We hypothesize that norms are one of the main determinants of technology in the familial context. In this context, the cultural background of the members of the family represents a very influential source for the household's technology. For example, religious norms play a decisive role: the Catholic Church regards matrimony as a requirement for the upbringing of children. The education of the offspring should be oriented towards religious values as well. Additionally, religious sects often proclaim a traditional role behavior. Therefore, a family influenced by religious norms may estimate the productivity of one unit of own time spent on bringing up children at a relatively larger value than the productivity of one unit of intrafamilial service.<sup>4</sup> As a consequence, we conclude that religious families may have a higher propensity to bring up children on their own, rather than making use of intrafamilial services, and, hence, transfer payments are less likely.

The paper proceeds with empirical tests of the hypotheses derived from the utility maximization framework regarding the motives for the transfer. The estimation results are interpreted taking the reflections on the household production into account.

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<sup>4</sup> A further aspect is that social costs may evolve and alter the factor prices. For example, taking up a professional career, a Catholic mother has to bear social costs because of the disapproval of the members of the parish or family. This issue can be considered on the left-hand side of equation 1.

### 3. Data and Estimation Strategies

This paper uses data from the German Socio-Economic Panel Study (SOEP) for the years 1996 to 2004. The SOEP is a longitudinal dataset that contains information on all household members (cf. Haisken-DeNew and Frick, 2005). The data cover a wide range of topics that are of interest for the analysis of upstream intergenerational transfers, e.g., information about children's and parents' socioeconomic characteristics and household composition. A major advantage of the SOEP is that people are included in the panel even when they have moved out of the original household. Therefore, it is possible to create a dataset with matched child-parents pairs when the child has grown up and formed a household of his or her own.

Despite the advantages of the SOEP, there is also a serious shortcoming that makes an investigation of intrafamilial transfers a challenging task. The difficulty arises from the impossibility of directly linking the transfers given to the transfers received. The reason it is not possible to build a direct linkage between the donor and the recipient is that the two questions in the questionnaire regarding incoming and outgoing intrafamilial payments have different formulations. The transfers received from people living outside the household are recorded as part of the income question "[...] please state what sources of income you received in the past calendar year" where one answer category is "[o]ther types of financial assistance from persons who do not live in the household". In contrast, the question regarding monetary transfers given to parents in the questionnaire is: "Have you personally given payments or support during the last year [...] to relatives or other persons outside of your household" (Infratest Sozialforschung, 2004). The answer categories include the total amount per year that is transferred "[t]o parents/step parents".<sup>5</sup> The analysis of intrafamilial transfers and utilization of the SOEP would be improved considerably if the questionnaire had a consistent design regarding the incoming and outgoing transfers.

Even after pooling nine panel waves, the total number of transfers reported is relatively small. The proportion of children providing financial support for their parents is about 2 % per year. The average transfer amount given is for those who give between 1600 and 2100 euros per year (in constant 2000 prices).

An important individual characteristic for the investigation is the children's religious affiliations. Unfortunately, this information is only available for

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<sup>5</sup> It must be pointed out that there is a translation error in the questionnaire. The English version individual questionnaire asks for payments or support given to "step parents" but the German version asks for transfers given to "Schwiegereltern", which means parents-in-law. As the respondents are usually confronted with the German version of the questionnaire, this translation error has no consequences for this study.

1997 and 2003. Therefore, the missing values of the remaining years have been replaced, i.e., the religious affiliation from 1997 was assigned to the year 1996 and the information on 2003 was substituted for the missing values from 1998 to 2004. Such a procedure is straightforward, because a person's religious affiliation is one of the more constant characteristics and it does not change for most people during their whole life.

The data regarding the intrafamilial child-to-parents transfers have a hierarchical structure. The longitudinal data provide repeated transfer observations on individuals, i.e., these observations over time are nested within children. In addition, children are nested in higher level clusters when several siblings belong to the same original household. The statistical analysis of hierarchically structured data requires an econometric model specification that allows for clustering at different levels. The necessity for a special estimation approach arises from the fact that the distinguishing features of the clusters are only observable to a certain extent and, as a consequence, there is cluster-specific unobserved heterogeneity, which results in dependence between units in the same cluster. Consequently, there is correlation between the repeated transfer observations per child and between different children within the same family. The within-family correlation arises because siblings who have grown up in the same original household share the same family background and they may show similar behavior and have analogous attitudes considering intrafamilial monetary transfers. Winkelmann (2005) gave a further example when he applied an ordered probit model with intrafamily correlation to an analysis of the subjective well-being of the members of the family. If the clustering is ignored, the variance of the estimated parameters may be biased and one may draw mistaken conclusions regarding the statistical significance level. In addition, Rodriguez and Goldman (2001) demonstrated that ignoring the unobserved effects can lead to a substantial bias in the estimated coefficients when the relationship between the observed response and the underlying latent variable is nonlinear, which is the case in the analysis of the transfer decision where only a binary outcome is observed.

An econometric model with random effects at the household and individual level is applied to an analysis of the transfer decision by extending the standard logistic regression framework to a multilevel model. Gibbons and Hedecker (1997) and Skrondal and Rabe-Hesketh (2004) provided overviews of the application of models with a nested error component structure. Combining the longitudinal data and the family clusters, the resulting three-level model can be written for the  $i$ -th child in family  $h$  at time  $t$  as

$$(2) \quad t_{hit}^* = \beta_0 + \mathbf{x}'_{hit} \boldsymbol{\beta} + \mathbf{z}'_{ht} \boldsymbol{\gamma} + \mu_h + \nu_{hi} + \varepsilon_{hit} ,$$

where  $\mathbf{x}'_{hit}$  and  $\mathbf{z}'_{ht}$  are the child's and the parents' observed characteristics, respectively,  $\boldsymbol{\beta}$  and  $\boldsymbol{\gamma}$  represent the corresponding coefficient vectors of inter-

est, and  $\beta_0$  is an overall constant term. The random effects at the household and child level are denoted  $\mu_h$  and  $v_{hi}$ , respectively. The former captures the time-invariant household specific effect, and the latter controls for a time-invariant individual-specific effect. Both are assumed to be random and normally distributed with mean zero and constant variances,  $\sigma_\mu^2$  and  $\sigma_v^2$ .  $\varepsilon_{hit}$  is the idiosyncratic error term on the third level. The left-hand side variable  $t_{hit}^*$  represents an unobservable latent variable, which is related to the observed binary response  $t_{hit}$  through a threshold concept. The observed response  $t_{hit}$  indicates whether the  $i$ -th child in family  $h$  makes a transfer at time  $t$ . Under the assumptions stated above, the marginal likelihood depends only on the fixed effects,  $\beta$  and  $\gamma$ , and the variances of the random intercepts,  $\sigma_v^2$  and  $\sigma_\mu^2$ .

One can calculate the marginal probability by integrating out the random intercepts, which is feasible by making use of the assumption of the conditional independence among the transfer occurrences given the family- and the child-specific unobserved effects. The parameters are estimated by first-order marginal quasi-likelihood and restricted iterative generalized least squares using the software package MLwiN. The econometric model for the transfer amount is estimated using *xtmixed*, which is part of the statistical software Stata (version nine). The starting point of the econometric model is equivalent to the approach in equation 2 apart from the fact that the transfer amount is substituted for the latent transfer propensity.

#### 4. Estimation Results

The estimates for the coefficients of the child's and the parents' income in the transfer decision regression exhibit a positive and negative sign, respectively. Although the motive underlying the transfer cannot be identified, the theoretical hypotheses are clearly confirmed by these highly statistically significant estimation results. For both altruism and exchange, the theoretical model predicts a positive correlation between the transfer probability and the child's income, on the one hand, and a negative correlation between the transfer probability and the parents' income, on the other hand.

The coefficient estimated for the child's income in the transfer amount regression is statistically significant and positive. Also, this finding is in line with the theoretical framework, but it does not provide information about the underlying transfer motive. The theory predicts an increase in the transfer amount for both altruism and exchange when the child's income rises. The most informative result is, however, that the parents' income has a positive effect on the transfer amount, i.e., an increase in the parents' income leads to an increase in the transfer amount. As mentioned above, the effect of a change in the parents' income on the transfer amount is the essential indicator to distinguish between an altruistic and an exchange motive. Altruism unambigu-



Table 1  
**Estimation Results**

	transfer decision		transfer amount	
	coefficient	se.	coefficient	se.
<b>income</b>				
child's income (in 1000)	0.009***	0.002	61.38***	6.71
parents' income (in 1000)	-0.007***	0.002	12.24*	7.05
<b>cultural background ("technology")</b>				
non-denominational	0.162*	0.095	267.46	309.93
foreigner	0.193	0.123	-258.56	356.46
East Germany	0.113	0.114	-149.07	363.38
<b>child's characteristics</b>				
female	-0.132	0.085	-368.02	281.68
age	0.006	0.011	-12.3	40.38
married	-0.108	0.097	29.57	353.6
own children	-0.318**	0.124	43.06	437.08
number of persons in household	0.047	0.051	4.35	200.99
number of siblings	0.02	0.03	-101.79	88.85
years of education	-0.219**	0.111	694.99*	380.37
years of education (squared)	0.008*	0.004	-27.99*	14.33
<b>parents' characteristics<sup>†</sup></b>				
age	-0.012	0.009	-11.03	32.35
number of persons in household	-0.007	0.041	98.97	135.64
pensioner	0.078	0.094	228.31	300.23
bad health status	-0.015	0.07	494.29**	207.23
parents live in other district	0.144*	0.079	-46.62	280.29
constant	-0.083	0.785	-3615.59	2906.64
$\sigma_{\mu}^2$	0.249	0.120	- <sup>‡</sup>	
$\sigma_{\nu}^2$	0.907	0.139	1.7 · 10 <sup>6</sup>	0.3 · 10 <sup>6</sup>

Source: SOEP 1996–2004. Significance levels: \* < 0.1, \*\* < 0.05, \*\*\* < 0.01. <sup>†</sup> Average values for two parents. <sup>‡</sup> The household-specific effect was not statistically significant and was, therefore, omitted. n = 2234 (decision). n = 135 (amount). Descriptive statistics can be found in the appendix.

ously requires a negative sign of the coefficient. On the other hand, the statistically significant and positive correlation observed in the regression is compatible only with an exchange motive. Consequently, the conclusion is that the intergenerational upstream transfers are expenditures for intrafamilial services provided by parents. The nature of the intrafamilial services is not further investigated here. However, one can assume that it is difficult to obtain substi-

tutes for them in the marketplace, or, in other words, the children's demand is relatively price inelastic.<sup>6</sup>

From the point of view of the household production approach, cultural and, in particular, religious norms determine the technology of household production. A dummy variable indicating whether the child has a religious affiliation is included in the regression analyses to control for the effect of the cultural background.<sup>7</sup> The coefficient on the dummy variable is statistically significant regarding the transfer decision, whereas it is estimated imprecisely in the transfer amount regression. The positive sign in the decision regression suggests that non-denominational children have a higher propensity to make transfers. However, we cannot conclude that they also spend larger sums than religious people do because of the statistically insignificant result in the transfer amount regression. On the basis of the theoretical consideration in section 2, it is supposed that this finding reflects the different technologies of religious and nonreligious people with respect to the production of household commodities.

Applying the household production approach, in particular the resource constraint in equation 1, to the parents' situation, we can also provide a meaningful interpretation of the significantly positive coefficient of the dummy variable identifying parents being in a bad state of health. For that purpose, we interpret the information about the health status as a proxy information for the demand for health-related commodities. The empirical results give rise to the conclusion that an increase in this demand leads to higher child-to-parents transfers. Therefore, the transfer may be regarded as a price subvention for health-related commodities. An in depth analysis of this kind of conditional transfer is suggested for further research.

## 5. Conclusion

Our analysis provides no evidence of an altruistic motivation underlying the intrafamilial upstream transfers in Germany. In contrast, the results support the hypothesis that the upstream transfers are driven by an exchange motive. Consequently, child-to-parents transfers are interpreted as expenditures for intrafamilial services provided by parents.

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<sup>6</sup> Cox (1987) provided a detailed discussion of this issue.

<sup>7</sup> As one of the few studies considering the influence of the cultural background on intergenerational family transfers, Wolff et al. (2005) analyzed the effect of the religious affiliation – essentially differentiating between Muslim and non-Muslim – on *downstream* transfers using a cross-sectional dataset of immigrants to France. One of their main findings is that Muslims are more likely to give financial aid, but that the average transfer amount is smaller. Analysis with respect to different religions is, however, beyond the scope of our study.

Considering intrafamilial transfers from the perspective of the household production approach gives new insights into the functioning of the transfer-service regime. If intergenerational transfers are regarded as expenditures for intrafamilial services, then there are grounds for supposing that the services provided are used as factor inputs in the production of household commodities and, hence, the transfers can be analyzed with respect to the household's budget constraint. The findings give rise to the supposition that the household's decision to use intrafamilial services in producing household commodities – and, with it, to give upstream transfers – depends on the technology. Technology and, as a consequence, the productivity of factor inputs seem to be determined by the cultural norms of the members of the family.

The transfers that represent the total expenditures for the services are interpreted as a source of (market) income for the parents. This is the crucial point for the question of whether the transfer-service regime can function as a substitute for a public social security system. Finding evidence for an exchange motive for the monetary upstream transfers, we doubt as to whether submission to a transfer-service regime is the best strategy for families to fulfill their needs. Even Karl Marx diagnosed the disintegration of family structures in the *Manifesto of the Communist Party*: “The bourgeoisie has torn away from the family its sentimental veil, and has reduced the family relation to a mere money relation” (Marx and Engels, 1975). In reforming the social security systems, we have to keep in mind that the family relationships are probably insufficient to provide an *unconditional* minimum income for elderly people.

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## Appendix A

Table 2

## Descriptive Statistics

	transfer decision			transfer amount		
	mean	min	max	mean	min	max
transfer amount	–	–	–	1362.81	47.85	19342.36
transfer decision	0.02	0	1	–	–	–
<b>income</b>						
child's income (in 1000)	17.47	0	225.33	23.37	0	203.09
parents' income (in 1000)	27.00	0	438.07	20.98	0	95.29
<b>cultural background</b> (“technology”)						
non-denominational	0.28	0	1	0.43	0	1
foreigner	0.13	0	1	0.17	0	1
East Germany	0.18	0	1	0.23	0	1
<b>child's characteristics</b>						
female	0.50	0	1	0.37	0	1
age	30.18	17	63	30.46	18	56
married	0.47	0	1	0.35	0	1
own children	0.47	0	1	0.31	0	1
number of persons in household	2.53	1	9	2.21	1	5
number of siblings	1.86	0	11	1.86	0	11
years of education	12.00	7	18	12.13	7	18
<b>parents' characteristics</b> <sup>†</sup>						
age	57.47	34	89	57.70	39	84
number of persons in household	2.39	1	13	2.27	1	6
pensioner	0.42	0	1	0.45	0	1
bad health status	0.40	0	1	0.44	0	1
parents live in other district	0.47	0	1	0.58	0	1

Source: SOEP 1996–2004. <sup>†</sup> Average values for two parents.