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What can happiness research tell us about altruism? Evidence from the German Socio-Economic Panel*

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Abstract

Much progress has been made in recent years on developing and applying a direct measure of utility using survey questions on subjective well-being. In this paper we explore whether this new type of measurement can be fruitfully applied to the study of interdependent utility in general, and altruism between parents and adult children who moved away from home in particular. We introduce an appropriate econometric methodology and, using data from the German Socio-Economic Panel for the years 2000-2004, find that the parents' self-reported happiness depends positively on the happiness of their adult children. A one standard deviation move in the child's happiness has the same effect as a 45 percent move in household income.

JEL Classification: D6, D64, C25, J10

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"...we might suppose that the object which X (whose own utility is P) tends – in a calm, effective moment – to maximise, is not P but $P + \lambda\Pi$; where λ is a *coefficient of effective sympathy.*"

Francis Ysidro Edgeworth (1881, p. 53)

1 Introduction

It has been found in earlier research that the long-run correlation in subjective well-being, or happiness, between parents and children lies between 0.4 and 0.5 (Winkelmann, 2005). Thus, happier parents tend to have happier children and vice versa, and "happiness runs in families". The reasons for this correlation are unclear, though. A first possibility is that a proclivity towards happiness is genetically transmitted. A second potential factor is the influence of shared environmental variables. And last but not least, the correlation may reflect the direct presence of sympathy, as suggested by our initial quote. It is the goal of this study to isolate this third effect, the contribution of sympathy, or altruism, towards individual happiness.

Our approach is based on a recent literature in empirical welfare economics, where a survey question on happiness is interpreted as an operational proxy measure for individual preferences or utility (see e.g., Frey and Stutzer, 2001, 2002, Blanchflower and Oswald, 2004, Layard, 2005). Much of the previous literature took a purely individualistic approach to happiness. By contrast, we focus here on the existence of pro-social preferences. Other recent papers on utility interdependence between individuals include Powdthavee (2005) who studies interdependence among spouses, and Shields and Price (2005) and Winkelmann (2005) who model intra-family correlation of subjective well-being using error components.[1] In this paper, we extend that line of research by using happiness data to study whether and to what extent parents have altruistic preferences towards their children.

[1] A number of studies have looked into the effect of family events, such as marriage or birth of a child, on well-being, without taking interdependencies into account. See e.g., Kohler, Behrmann and Skytthe, 2005, and Frey and Stutzer, 2005.

The possibility of estimating utility functions directly is new to economics. Previously, altruism has been defined from a behavioral perspective. A person is said to be altruistic if she is willing to reduce her own wealth or consumption in order to increase the wealth or consumption of a beneficiary. Often, altruism is studied in the context of a family, where the benefactor is the parent and the beneficiary is the child.[2]. The altruism hypothesis says that parents make transfers to their children because they care for their well-being *per se*, without expecting to be "paid back" and have a direct material benefit in return. Becker (1981, 1991) formalized parental altruism within a framework of utility maximization under interdependent preferences. Past empirical studies of altruism have focussed on predictions of the model, such as the implied correlation between transfer payments and income, rather than on the preference structure *per se*.

In the spirit of Becker's seminal analysis and many papers that followed, we concentrate on altruism within the extended family, i.e., between parents and adult children who left home. One reason for this is pragmatic. Only adult children (or at least those aged 17 or above) respond to the happiness question. Moreover, independent proxy information on children's consumption is only available for those living in a separate household. But this information is crucial for implementing an instrumental variable estimator, as detailed below.

A second reason is substantive, since knowing whether transfers of income, wealth and in-kind services between family members are driven by altruism, exchange or joy of giving is crucial for many policy questions, including efficient reform of old age security, long-term care and social assistance. It can be shown, e.g., that attempts by governments to redistribute income between generations can be neutralized if families are altruistic, since if the income of a beneficiary of an altrustic transfer is increased, that transfer will be reduced by an equal amount (see Laferrére and Wolff, 2004, for a current survey of the literature). The majority of empirical papers estimate inter

[2]Altruistic behavior can of course also be found among non-related individuals. Recent experimental research considers cases where the "benefactor" incurs costs to punish the "beneficiary", an instance of so-called altruistic punishment, which may be applied to a norm-violator or non-cooperating person in a situation that requires cooperation (see for example Fehr und Fischbacher, 2003)

household transfer equations where the amount of transfers from parents to children is regressed on the parents' income and income of the child together with other variables. Subsequently, tests can be set up to verify predictions from the model of altruistic families. However, this approach requires specific data on transfer payments between family members, and our suggestion to test for altruism with widely available happiness responses therefore constitutes a potentially useful alternative.

Section 2 describes the data from the German Socio-Economic Panel Study (SOEP). A descriptive analysis of happiness interdependencies between parents and their adult children is given in Section 3. In Section 4 we consider a simple model of altruistic families as the starting point for testing altruistic preferences empirically. We find that the identification and estimation of the altruism parameter faces a number of obstacles that are subsequently addressed in the econometric analysis. In a nutshell, the simple raw correlation in happiness between parents and adult children who left the family home is not a good measure of altruism, since it ignores omitted variables as well as the simultaneity (or reflection) problem. Panel models with individual specific effects and instrumental variable estimators can address these issues. The regression results are presented in Section 5. Section 6 concludes.

2 Data

The German Socio-Economic Panel (SOEP) was started in 1984 with a random sample of 5,624 households in West Germany (Wagner, Burkhauser and Behringer, 1993). In 1990, it was augmented by a sample of East German households. From the beginning, an attempt was made to trace and interview adult children who moved from their parents' household to live in an own household alone or together with a partner and own children. If the tracing was successful, the SOEP allows to link the original and spin-off households, and therefore merge data on parents with those on their children. Initially, these cases were rare but in recent years the number of linkable parent-child observations became quite large, enabling the kind of analysis we want to conduct.

We therefore use the recent waves of the SOEP from 2000 to 2004 as a basis for our investigation. For some of the models we want to estimate, a single cross-section would be sufficient. For others, however, the panel information is essential.

The basic unit of observation is a parent-child pair. We start by extracting all parents from the SOEP waves 2000-2004. If we can find for any of these fathers or mothers in any year information for at least one child living in a spin-off household and providing valid information in the data, this parent-child pair constitutes one observation. Each additional child for a given parent generates one additional observation. The cross-sectional structure of the dataset from the parents point of view, for the year 2002, is depicted in Table 1. The basis are 1,750 parents for whom information on up to five children not living in the same household was found in the SOEP. For 1,317 parents information for exactly one adult child not living in the same household was found. 363 parents have two children, and so on. All together the 2002 data comprise 2,264 observations (=parent/child pairs). From the total of 1,750 parents 1,454 or 83 percent are couples whereas in the remaining 296 cases, only a single parent is included in the data.

— Table 1 —

In the 2000-2004 time dimension, the data form an unbalanced panel. The number of parents with at least one entry over all five years is 2,562. 26.4 percent of parents are observed at most three times, 19.6 percent are included four times and the remaining 54.0 percent is observed in all five years, adding up to 8,630 separate parent-year observations. The total number of adult children out of the family home in any year is 2,009. Again, many children are observed repeatedly over time, so that there are 6,520 child-year observations.

The SOEP provides a wide range of socio-economic variables on households and persons. Satisfaction is central for the present paper. Each respondent is asked for her life satisfaction: "How satisfied are you with your life, all things considered? Please answer according to the following scale: 0 means completely dissatisfied, 10 means completely satisfied". In Table 2 we see that the arithmetic mean of the happiness response is 6.6 for parents and 7.1 for children.

— Table 2 —

In addition, we extract information on the following characteristics, which have been discussed in the previous literature as potential determinants of life satisfaction: age, age squared, health, gender, nationality, years of education, marital status, whether widowed, whether divorced, household size, number of children, place of abode, employment status, and income. Health is measured by a self rating of the respondents on a five point scale, and converted to a "good-health" indicator for the values four and five. Income is measured as disposable monthly income of the household (post-government income). The following variables are extracted for adult children not living in the parent's household: age, gender, marital status, health, education, employment status, and household income. They are computed in the same way as they were for parents.

From Table 2, we see that parents are on average about 27 years older than their adult children. Children report a substantially better health than parents (70 percent as opposed to 31 percent with "good health"). On the other hand, the marital rate is much lower among adult children than among parents (46 percent as opposed to 82 percent). Fewer adult children own a house, and their average log income is about 12 log points below that of their parents.

In addition to those standard socio-economic variables, two measures of distance are used. The distance between a parent and her child might be important in two ways. First, the distance itself might influence a parent's well-being. Second, the distance can serve as a measure of information. The greater the distance between the households the less accurate might be the information which parents have about the living conditions of their children. We employ two measures for the geographical distance between parents and children. A first is a simple indicator whether or not the child lives in the same district as the parents – this is the case for 65 percent of all children. The second is the distance in kilometers, using the geographical coordinate of the county's midpoint (European Terrestrial Reference System, ETRS89).[3]

[3]According to data protection rules, this part of research using regional information was carried out at the DIW Berlin. We thank the staff for making the information available.

3 Is happiness interdependent?

What prima facie evidence is there for interdependent happiness in our data? For example, is it the case that happier parents also have happier children? Table 3 shows such a simple cross-tabulation of happiness for parents and children. Observations are pooled over the three years. The original eleven point scale is collapsed into a trichotomy: 0-5, 6-7, 8-10 corresponding to the notions of below, average, and above average happiness. The table indicates a striking positive association between the happiness of adult children and the happiness of their parents. For example, only 23 percent of parents of adult children with below average happiness report an above average happiness themselves, compared to 44 percent of those parents with above average happy adult children. A formal Pearson chi-squared test rejects the independence hypothesis with p-value of 0.000. A similar result is obtained when the original eleven-point scale is used instead of the grouped categories.

— Table 3 —

As mentioned before, the association in happiness of parents and children can reflect genetic and environmental factors as well as a true causal interdependence due to altruistic preferences. If happiness between parents and children were causally related, then one would expect to find that *changes* in happiness of parents are related to *changes* in happiness of children. Such an association is much stronger evidence for a causal relation, as it eliminates any potential confounding interference of time-invariant genetic and environmental factors. In Table 4 we show the distribution of year-to-year changes in a parent's happiness (decline / no change/ increase) conditional on year-to-year changes in the reported child happiness. The first two columns are for any decrease or increase, respectively, whereas the second two colums refer to large changes in a child's happiness, a decline or increase by a minimum of 3 points on the eleven point response scale.[4]

Indeed, we find an association in first differences as well. For example, the relative frequency of an increase in happiness for parents is lowered by 5 percentage points if the child's happiness

[4]Such large changes are of course relatively infrequent. The table is based on 262 and 232 observations for large positive and large negative changes, respectively.

decreased by a minimum of 3, compared to the case where the child's happiness increased by a minimum of 3. In the "all changes" comparison, the corresponding effect is reduced to a 2.5 percentage points difference.

— Table 4 —

To summarize, the evidence is compatible with the hypothesis that part of the association in happiness responses of parents and adult children is due to direct utility interdependence, or altruism. However, such a descriptive analysis cannot rule out that there are other time-variant explanations for this interdependence. For a closer understanding of what these results tell us about altruism, we turn now to a more formal modeling approach.

4 Empirical models of altruism

Starting point is the Becker (1991) formulation of an additive separable altruistic utility function:

$$Z = U(C_p) + \eta V(C_k) \tag{1}$$

where C_p denotes consumption of the parent and C_k denotes consumption of the child. Thus, the total utility of the parent Z equals utility from own consumption plus the child's utility from consumption times η, where $0 \leq \eta < 1$.[5]

In the following we explore possibilities to estimate η directly, and to test the hypothesis $\eta = 0$ (=selfishness) against the alternative $\eta > 0$ (=altruism).[6] In previous empirical research inspired by Becker's utility formulation, it was taken for granted that utility cannot be measured. Therefore, tests for altruistic preferences were based on behavioral implications, for example how transfer payments between parents and children adjust when income changes, that arise if the utility function

[5] The Becker altruistic utility function is a special case of general interdependent preferences where $Z = U(C_p, C_k)$.

[6] We won't enter into the philosophical debate whether maximizing one's own utility is a selfish endeavor per definition, and therefore cannot possibly be labeled "altruistic". The key point is that for $\eta > 0$ such a utility function would induce an observable behavior that conforms well to the common notion of "altruistic behavior", i.e., giving up own material goods for the benefit of others.

(1) is maximized subject to some constraints. By contrast, it is our working assumption that a valid proxy measure for utility Z and V is available. Under this assumption, the selfishness hypothesis can be tested directly based on (1), without observing consumption data or transfer payments at all.

We have described the employed data before. The basic unit of observation is a parent, either father or mother. The condition for inclusion in the data is that for a given parent-year observation, at least one adult child in a spin-off household has been surveyed in the data. In many cases, the same parent is matched to several children – up to five in our sample – abroad. This is a problem in a regression context, since the realisation of the dependent variable, the happiness of the parent, is fully determined from any single parent-child observation. In these cases, we merge the parent observation with a synthetic child observation, the average over all observed children. The data also have a household dimension (if observations are available for father and mother), but this dimension is inconsequential for identifying the altruism parameter, although it has implications for computating standard errors and therefore valid inference. In the result section below, we always report standard errors that are corrected for data clustering.[7]

Finally, we are well aware that the happiness measure from the eleven point response scale is discrete and ordinal. However, we for simplicity disregard this aspect and treat the survey responses as cardinal variables. Past research has shown that it makes virtually no difference whether one uses linear models or non-linear ordered response models in applications with subjective well-being data (Ferrer-i-Carbonell and Frijters, 2004).

4.1 Linear Models

To understand the possibilities for estimating the altruism parameter with data as described, we start from (1). If C_p and C_k were unrelated, we could rewrite the equation as

$$\text{Model 1} \qquad Z = \alpha + \eta V + u$$

[7] It is not possible to condition on household specific fixed effects since in households with two separate observations (for mother and father), the main variable of interest, V, does not vary along the household dimension.

with $u = U(C_p)$ and $\eta = \text{Cov}(Z, V)/\text{Var}(V)$. Hence, a valid estimator of the altruism coefficient could be obtained from a simple linear regression of Z on V. However, the required assumption that C_p and C_k are unrelated is not very plausible. For example, we know that intergenerational mobility in education and income is limited (for Germany, see e.g. Dustmann (2004) and Lillard (2001)). Therefore, children of parents with above average income tend to have above average income and consumption possibilities themselves. Another argument builds directly on the underlying household consumption model: If families are altruistically linked they pool their resources (incomes) to finance consumption. But if C_p and C_k are positively correlated, the least squares regression coefficient from estimating (1) directly is upward biased.

An obvious remedy to this problem is to include the parents' consumption as controls, and to estimate η based on the ceteris paribus variation of V given C_p. If a measure of individual consumption is not available, as is often the case in general purpose household survey data, we can instead proxy it by a number of socio-economic characteristics, such as income, household size and composition, education level and employment status. This leads us to

$$\text{Model 2} \qquad Z = \alpha + x_p'\beta + \eta V + u$$

which can be estimated by multiple linear regression. The model can be further generalized by including individual specific time invariant intercepts

$$\text{Model 3} \qquad Z = \alpha_i + x_p'\beta + \eta V + u$$

If α_i and V were uncorrelated, we could treat these individual specific effects as random and estimate the model by GLS, provided that repeated observations on parents and children are available. More realistically, α_i and V are correlated. First, endogeneity of V arrises as long as unobserved variation in the permanent component of parental consumption (the part that is not captured by $x_p'\beta$) is correlated with the child's consumption. Second, one has to face the possibility that there is some inter-individual variation in the utility functions $U(C_p)$ and $V(C_k)$. Let $U_i(C_p) = U(C_p) + \gamma_i$ and $V_i(C_k) = V(C_k) + \xi_i$ where the terms γ_i and ξ_i symbolize different attitudes towards well-being.

For example, "optimists" will report higher well-being levels (for a given consumption level) than "pessimists". Similar differences can arise if individuals anchor their responses differently on the eleven point response scale. Estimation of η based on Model 2 is affected if there is a correlation between γ_i and ξ_i, for instance because personality traits such as "optimism" or "anchoring of responses" are genetically transmitted.[8] In these cases, we can treat α_i as fixed effects and thereby identify the altruism parameter even in the presence of such endogeneity.

Models 1 to 3 are direct empirical translations of Becker's utility function (1). In this formulation it is supposed that the child is egoistic. This assumption had its logic since altruistic preferences were first introduced by Becker in the context of parents and children, especially young children.[9] For adult children, or husbands and wives, however, such an asymmetry is questionable. If we allow that children are altruistic towards their parents as well, then we obtain, in obvious notation, a simultaneous equations system with two equations

Model 4
$$\begin{aligned} Z_p &= \alpha_{i,p} + x_p'\beta_p + \eta_p Z_k + u_p \\ Z_k &= \alpha_{i,k} + x_k'\beta_k + \eta_k Z_p + u_k \end{aligned}$$

In this model, Z_k is contemporaneously correlated with u_p as long as $\eta_k \neq 0$. For example, assume that the two altruism parameters (of parents towards adult children and of children towards parents) are the same. For the simplest case ($\alpha_j = 0$, $\beta_j = 0$), we obtain after substitution a reduced form equation for Z_k:

$$Z_k = \eta(\eta Z_k + u_p) + u_k = \frac{\eta}{1-\eta^2}u_p + \frac{1}{1-\eta^2}u_k \tag{2}$$

[8] The heritability of subjective well-being has been studied by Tellegen et al. (1988). They report that monozygotic twins are extremely similar in terms of subjective well-being, regardless of whether they were reared together or apart. On the other hand, dizygotic twins were on average far less similar. They conclude that genetics account for 48 percent of the variability in well-being.

[9] Another justification follows from Becker's "rotten kid theorem", that sufficient caring by an effective altruist (a person who provides at least half the family income) "... induces even a selfish beneficiary *to act* as if she cares about the benefactor as much as she cares about herself." (Becker 1981, p. 5)

from where we see that the correlation in the structural equation between Z_k and u_p is $\eta\sigma_p^2/(1-\eta^2)$. In this case, OLS estimation of the altruism parameter in Equation 1 has probability limit

$$\operatorname{plim}\hat{\eta} = \eta + \frac{\eta\sigma_p^2/(1-\eta^2)}{\eta^2\sigma_p^2/(1-\eta^2)^2 + \sigma_k^2/(1-\eta^2)^2} \tag{3}$$

An interesting consequence is that under $H_0 : \eta = 0$, there is no bias whatsoever, so that the null hypothesis of selfishness can be tested directly from Model 3 without accounting for simultaneity. If the null hypothesis is rejected (or if one wants to consider more general forms of simultaneity where $\eta_p \neq \eta_k$), we will need to consider methods for consistently estimating the first structural equation of Model 4. The fixed effects estimator only accounts for the fact that Z_k might be correlated with *time invariant* individual characteristics that also affect Z_p. Hence, fixed effects estimation alone is inconsistent, and we need to use instrumental variables. Both structural equations are (over)identified since within this model, the consumption proxies of one person (x_p or x_k) affect the other person only through their effect on Z. Hence, they can be used as instruments. An additional instrument is the predicted future happiness of the child. Since we have several instruments for one endogenous variable, we can test for overidentifying restrictions.

To get an estimable model, we must first deal with the presence of $\alpha_{i,p}$. Wooldridge (2002, p. 310) recommends to estimate pooled two-stage least squares using within-transformed data and instruments. Thus Z_k is replaced by its predicted value from a regression of the time-demeaned Z_k on all time-demeaned exogenous variables, i.e. x_p and x_k. Alternatively, we estimate Model 4 using an instrumented between estimator. This estimator is more appropriate if parents care more about the permanent utility of their offspring rather than about the short-term ups and downs in the child's life. Because the estimated η in the within-model would capture exactly such short-term responses, it may then underestimate the true effect (Egger and Pfaffermayer, 2004).

4.2 Extensions

So far, our modelling followed strictly the simple Becker utility function (1). Under the maintained assumption of the model, a positive partial effect of the child's utility unambiguously identifies

altruistic preferences. However, if one broadens the model somewhat and considers other aspects of the parent-child relationship, alternative interpretations for a positive interdependence in happiness become possible. In other words, a positive η does not need to signify altruism at all.

A first such alternative explanation is *joy of giving*. If parents derive direct happiness from making a transfer to their child, regardless of the consequences of the transfer for the child's utility, then such joy of giving will erroneously be interpreted as altruism. In the above Models 1-4, this situation can be interpreted as omitted variable bias. The transfer enters the error term u_p with positive sign and at the same time increases, on average, the utility of the child, thereby leading to an upward bias in η_p. The simple solution, then, is to include transfers directly among the regressors. In doing so, the joy of giving motive and the altruism motive can be estimated and tested separately.

A second potential problem with the simple Becker model are paternalistic preferences. These arise if parents derive happiness from x_k directly, regardless of their effect on the children's utility. Obviously, Models 1-4 are then misspecified, as the variables x_k are excluded from the parents happiness equation. We doubt, however, that this is a serious problem in practice. True, parents may have paternalistic preferences and value for example the child's education *per se*. But the child's education is largely time invariant. It is likely, therefore, that such paternalistic preferences are implicitly controlled for in the person specific intercept of Models 3 and 4 and do not lead to a bias in η in these models.

There are a number of further possible sources of bias. The first relates to activities that children may undertake in order to help and support their parents. If these services enter the child utility negatively and the parents utility positively, not controlling for this unobserved variable would tend to reduce the estimated altruism parameter. Similarly, if parents observe the child's utility only with error, the altruism parameter would be, under the assumptions of the classical measurement error model, biased towards zero. A related problem may arise if there is more than one child abroad, and parents do not weigh all their children equally. Our method of using arithmetic means would then introduce a measurement error. We address these issues in a number of robustness

checks. First, we repeat the analysis using the subsample of "only children". Second, we use a different subsample where only the oldest child abroad is included. To reduce measurement error that results from a discrepancy in the month of the interview between parents and children, we conduct also an analysis, where we include only parent-child pairs where the interview took place within a month.

5 Regression Results

The results for the four models are shown in Table 5. The estimated altruism parameter in the simple bivariate model is $\hat{\eta} = 0.25$. This parameter corresponds to a correlation of 0.21 (the standard deviations of parents' and children's happiness are 1.8 and 1.6, respectively).[10] The effect is highly significant, as it remains throughout the other five estimated models. The OLS estimate of Model 2, where we control for other socio-economic factors and thereby account for the correlation in consumption between parents and children, leads to a slightly reduced estimate of $\hat{\eta} = 0.17$. The other aspects of Model 2 mostly corroborate previous results for well-being equations known from the literature: health, unemployment, income, household size and house ownership enter in a statistically significant way (see for example Shields and Price, 2005, for a recent summary). Specific to Germany, East Germans have a lower happiness, ceteris paribus, than West Germans (Frijters, Haisken-de New and Shields, 2004). The age effect with a significant positive term and an insignificant square term requires some explanation. In general samples of the population, one usually finds an U-shaped relation with a minimum at around 35-40 (Clark and Oswald, 1984). Since 99 percent of all parents are older than 40, we only have observations on the increasing part of the curve, hence the positive relationship.

Most of these effects – age and household size being notable exceptions – remain significant when we move to the panel estimations of Model 3. From a statistical point of view – based on a

[10] Because of regression to the mean, this value underestimates the long-term correlation reported in previous research.

Breusch Pagan test and a Hausman test respectively – the fixed effects estimator in column 4 is clearly prefered over pooled OLS or the random effect GLS estimator, indicating that it is important to account for correlation between the regressors and the time-invariant individual effects.

— Table 5 —

The fifth column of Table 5 shows the results from the instrumented fixed effects model, where the children's socio-economic characteristics and the predicted future happiness (the exclusion restrictions) serve as instruments. In the first stage regression, which is not shown here, future well-being, health, employment and income have strong explanatory power. The instruments are jointly highly significant with an F-statistic of 212 and a p-value of 0.000. Since there are more instruments (12) than endogenous variables (1), we can test for the overidentifying restrictions. The F-statistic for this test has a p-value of 0.382. Thus, we fail to reject the null hypothesis of no correlation between errors and instruments, and we can have some confidence in the set of instruments. This statistical test therefore supports the assumption that children's consumption affect parents' happiness only through its effect on happiness.

The estimate of η is now 0.084, an increase relative to the non-instrumented fixed effects model by a factor of about two. A Hausman test rejects the null hypothesis of no endogeneity. At first glance, this increase in the point estmate is somewhat unintuitive. A possible explanation is that the expected upwards bias due to simultaneity is overcompensated for by a downward bias due to other factors, such as measurement error. It is well known that the measurement error problem is amplified in the fixed effects model. Indeed, the final column of Table 5 shows, that the coefficient of the between estimator, where the measurement error problem is reduced due to averaging, is even higher than the FE-IV estimator.

While the point estimates for η vary depending on the specification, there is nevertheless a clear message in these results. The sympathy effect is an important determinant of well-being, and happiness is interdependent indeed. First, the happiness of the child is, together with region, health, unemployment and income, the only factor that comes out as statistically significant in all the models. Other variable such as schooling or marital status but also the spatial distance

between parents and children are not statistically significant. Also, transfers do not affect the parent's happiness significantly in any of the estimated models. Hence, we find no evidence in favor of the joy of giving hypothesis.

Second, the trade-off ratio between income and a child's happiness – the amount of money a parent requires as compensation for a unit decrease in a child's happiness such that the well-being remains unchanged – is substantial. Based on the fixed effects instrumental variable results, the log household income would need to increase by 0.084/0.291, or 29 log points. The estimated trade-off ratio is with 37 log point largest in the between estimation, somewhat smaller in the OLS estimation of Model 2 (27 log points) and smallest in the fixed effects estimation of Model 3 (14 log points). In order to obtain the trade-off ratios for a one standard deviation change in child happiness instead, one would need to multiply these values by a factor of one and a half. Thus, the effect is both economically and statistically significant.

Table 6 provides some further explorations into the robustness of the results. We repeated the same type of analysis for various sub-samples: women only, men only, parents with one child abroad only, parents and their oldest child only, parent-child pairs where the interviews took place within a month distance. Finally, we used the full sample to estimate a model with current and lagged child happiness as regressors. All the models include the same regressors as those introduced in Table 5, in addition to the child happiness variable, but we report only the estimated coefficient of the latter in the table.

— Table 6 —

Contrary to expectations, the altruism parameter is not gender specific. The male and female subsamples generate quite similar coefficients. The pooling over repeated child observations seems to be inconsequential as well. The results are very similar in the full sample, the only child sample, and the oldest child sample. If we look only at close interview dates, the estimates in most specifications increase somewhat, an indicator of reduce measurement error, but the change is quite small. Finally, in the distributed lag specification, we find that the lagged child's happiness is insignificant in Model 4 and the fixed effects estimation of Model 3, once we control for current

happiness.

6 Conclusions

"What can happiness research tell us about altruism?", was the question that motivated the research in this paper. Quite a lot, we think. Modeling interdependencies in happiness responses among respondents is a promising new area of research that allows for quantification and direct tests of the altruism hypothesis. Of course, the potential reasons for interdependent happiness responses are manifold, altruism being only one of them, and establishing a causal relationships is a non-trivial task. But even in the absence of experimental data, good identification strategies are available for household panel surveys.

Using data from the German Socio-Economic Panel for the years 2000-2004, we find that the happiness of adult children who have left their parental home has a statistically significant effect on the parents' self-reported happiness. Hence, in following Becker's definition of altruism, there is evidence that parents have altruistic preferences. The altruism effect appears sizeable when converted to money equivalents. From an abstract theoretical point of view, it does not matter how large η is, as long as it is positive. Any positive η will induce a behavior of the utility maximizing agent that will conform to the common notion of altruism (i.e., giving up consumption in order to increase the utility of the beneficiary).

One limitation of our analysis has been that the altruism parameter is modelled as constant and identical in the population. The only interaction we have looked at so far was the one between gender and altruism, with no clear difference being detected. An alternative, and in our view very promising, approach would be to introduce parameter heterogeneity via a finite mixture analysis. For instance, Phelps (2001) reports on psychological experiments designed at determining whether people are altruists or not – the number she gives is that about 20 percent of the population are altruists. Similarly, the survey data could be used to estimate the share of altruists in the population. Moreover, such an analysis opens up the possibility of confronting the classification of

individuals into altruists and egoists with behavioral data, such as recorded transfer payments.

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Table 1: *Structure of the data set 2002*

Children not living in parents household	Number of parents		Mothers	Fathers	Number of observations	
	Frequency	Percent	Frequency	Frequency	Frequency	Percent
One	1,317	75.3	708	609	1,317	58.0
Two	363	20.7	199	164	726	32.2
Three	61	3.5	33	28	183	8.1
Four	7	0.4	4	3	28	1.2
Five	2	0.1	1	1	10	0.4
Total	1,750	100	945	805	2,264	100
Parents in two-parent households	1,454	83.1	-	-	-	-

Source: SOEP 2002.

Table 2: *Descriptive Statistics*

	Parents		*Children*	
Variable	mean	std.dev.	mean	std.dev.
Happiness	6.570	1.795	7.055	1.586
Female	0.541	0.498	0.513	0.499
Age	57.373	8.718	30.713	6.111
Good health	0.311	0.463	0.697	0.459
Married	0.822	0.381	0.460	0.498
Widowed	0.075	0.264		
Years of schooling	11.243	2.445	12.316	2.499
Unemployed	0.084	0.278	0.069	0.254
Retired	0.328	0.469		
House ownership	0.556	0.496	0.257	0.437
Log household income	8.290	0.519	8.163	0.560
Log household size	0.802	0.386	0.768	0.541
Distance	0.493	1.121		
Same district	0.644	0.478		
Number of children	1.965	1.186		
Children yes			0.457	0.498
Year=2000	0.184	0.388	0.184	0.388
Year=2001	0.190	0.392	0.187	0.390
Year=2002	0.197	0.398	0.197	0.398
Year=2003	0.209	0.406	0.211	0.408
Year=2004	0.217	0.412	0.217	0.412
Observations	8630[a]		6520[b]	

Source: SOEP 2000-2004.
[a] Excludes multiple person-year observations for parents with several children.
[b] Excludes multiple person-year observations for children with two parents.

Table 3: *Happiness responses of parents and children (in percent, n = 6507)*

	Happiness of child			
Happiness of parent	0-5	6-7	8-10	total
0-5	40.02	27.87	20.13	26.55
6-7	36.86	40.69	36.31	38.29
8-10	23.12	31.44	43.57	35.17
total	100.00	100.00	100.00	100.00

Source: SOEP 2000-2004.

Table 4: *Changes in happiness responses of parents conditional on changes for children (in percent)*

	Change in happiness of child			
Change in happiness	any change		large change	
of parent	≤ -1	$\geq +1$	≤ -3	$\geq +3$
decrease	34.46	31.95	37.79	32.33
no change	37.90	37.28	36.64	38.36
increase	27.63	30.77	25.57	29.31
total	100.00	100.00	100.00	100.00
P-val. chi-squared	0.104		0.413	

Source: SOEP 2000-2004.

Table 5: *Dependent variable: Parent's happiness, N = 8630*

	Model 1	Model 2	Model 3		Model 4	
	OLS	OLS	GLS	FE	FE+IV	BE+IV
Happiness of child (η)	0.250**	0.168**	0.105**	0.041*	0.084**	0.230**
	(0.024)	(0.021)	(0.015)	(0.020)	(0.025)	(0.029)
Transfers (yes/no)		0.082	0.041	0.007	0.011	0.088
		(0.073)	(0.050)	(0.066)	(0.051)	(0.086)
East Germany		-0.310**	-0.478**	–	–	-0.354**
		(0.076)	(0.078)			(0.068)
Female		0.039	0.099*	–	–	0.101+
		(0.041)	(0.042)			(0.056)
Age		0.088*	0.060	-0.009	0.001	0.049
		(0.041)	(0.037)	(0.108)	(0.068)	(0.034)
Age squared		-0.001	-0.000	-0.000	-0.000	-0.000
		(0.000)	(0.000)	(0.001)	(0.001)	(0.000)
Good health		1.088**	0.702**	0.392**	0.393**	1.378**
		(0.051)	(0.039)	(0.052)	(0.043)	(0.071)
Married		0.097	0.101	0.104	0.100	0.093
		(0.114)	(0.105)	(0.284)	(0.189)	(0.112)
Widowed		-0.006	-0.147	-0.785+	-0.774**	-0.048
		(0.142)	(0.146)	(0.447)	(0.268)	(0.139)
Years of schooling		-0.020	0.010	0.495**	0.591	-0.024+
		(0.016)	(0.015)	(0.062)	(0.673)	(0.013)
Unemployed		-0.628**	-0.514**	-0.378**	-0.383**	-0.731**
		(0.099)	(0.083)	(0.118)	(0.076)	(0.122)
Retired		-0.114	-0.057	0.067	0.067	-0.107
		(0.080)	(0.059)	(0.083)	(0.069)	(0.096)
House ownership		0.275**	0.259**	-0.040	-0.041	0.295**
		(0.072)	(0.067)	(0.180)	(0.112)	(0.059)
Log household income		0.624**	0.540**	0.301**	0.291**	0.615**
		(0.078)	(0.070)	(0.110)	(0.072)	(0.076)
Log household size		-0.284*	-0.107	0.204	0.209	-0.324*
		(0.135)	(0.111)	(0.177)	(0.132)	(0.133)
Distance		-0.065+	-0.042	-0.069	-0.069	0.003
		(0.033)	(0.032)	(0.072)	(0.047)	(0.032)
Same county		-0.036	-0.014	-0.113	-0.114	0.149*
		(0.087)	(0.074)	(0.132)	(0.099)	(0.075)

Notes:
Analysis based on data from the German Socio-economic Panel 2000-2004.
GLS denotes the random effects estimator, FE the fixed effects estimator, BE the between estimator, and IV the use of instruments (the child's predicted future happiness and the child's health, income, employment status etc.).
Standard errors adjusted for clustering of households in parentheses.
+ significant at 10 percent; * significant at 5 percent; ** significant at 1 percent
All models include a constant and, except for Model 1, four dummies indicating the survey year.

Table 6: *Results for Different Samples*

	Model 1	Model 2	Model 3		Model 4	
	OLS	OLS	GLS	FE	FE+IV	BE+IV
Women (n=4675)						
Happiness of child	0.266**	0.183**	0.115**	0.038	0.077*	0.241**
	(0.026)	(0.024)	(0.019)	(0.026)	(0.035)	(0.040)
Men (n=3955)						
Happiness of child	0.230**	0.150**	0.093**	0.043+	0.098**	0.217**
	(0.029)	(0.026)	(0.019)	(0.025)	(0.036)	(0.044)
Only 1 child abroad (n=6524)						
Happiness of child	0.226**	0.153**	0.097**	0.028	0.081**	0.214**
	(0.025)	(0.022)	(0.017)	(0.024)	(0.030)	(0.030)
First child (n=7646)						
Happiness of child	0.216**	0.140**	0.089**	0.024	0.070**	0.205**
	(0.023)	(0.020)	(0.015)	(0.021)	(0.026)	(0.028)
Interview within 1 Month (n=7190)						
Happiness of child	0.249**	0.172**	0.112**	0.046*	0.109**	0.228**
	(0.024)	(0.021)	(0.016)	(0.023)	(0.028)	(0.030)
Current and lagged happiness (n=5811)						
Current happiness of child	0.151**	0.095**	0.078**	0.017	0.067*	0.193**
	(0.023)	(0.021)	(0.018)	(0.027)	(0.032)	(0.076)
Lagged happiness of child	0.124**	0.094**	0.070**	0.005	0.013	0.054
	(0.022)	(0.020)	(0.017)	(0.025)	(0.018)	(0.064)

Notes: see Table 5; only the estimated altruism parameter $\hat{\eta}$ is shown here.

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