Measuring Altruism

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Preliminary

Abstract

Altruism relates to the main goal of socialization, to a core attribute of personality, and to theories concerned with human nature (Krebs, 1970). However, little economic literature has directly measured altruism. Does altruism exist in people's economic behavior? Does it vary systematically with relationships and demographics? Utilizing the Health and Retirement Study's rich information on altruistic behavior, I structurally estimate a measure of altruism and find that altruism exists and that after controlling for demographics and behavior, the level of altruism increases with the intimacy of relationships. Senior white people who are healthier and have more children are more altruistic than others. People measured as being more selfless tend to retire later, to save more before retirement and for precautionary purposes, to be more likely to leave a bequest greater than $10,000, to transfer more than $500 to children while alive, and to spend more than 100 hours helping a grandchild.

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1 Introduction

Altruism is important for people's economic decisions: for example, familial transfers can be motivated by altruism (Altonji et al., 1997), and altruism justifies the representation of infinite planning horizon in the foundations of neoclassical growth models (Acemoglu, 2008). Little economic literature, however, has tried to measure altruism. Instead, most economic literature on altruism has been focused on relating altruistic behavior to events (e.g., divorce, job loss) or demographics (e.g., income, education) (see, e.g., McGarry, 2016), and on modeling the channels through which altruism affects human behavior.[1] Kimball et al. (2015) is the only paper that has directly measured altruism. Using a richer and larger data set on altruism towards multiple relationships, this paper extends the economic literature on the measurement of altruism. In particular, this paper answers the following questions: Does altruism exist in people's economic behavior? Does it relate systematically to relationships and demographics? Do more altruistic people tend to exhibit certain behavior (e.g., retire later, consume less) more often than those less altruistic?

To answer these questions, this paper estimates a structural measure of altruism using data from the Health and Retirement Study (HRS). The HRS module on altruism was designed with eliciting a direct measure of altruism in mind and contains rich information on various altruistic behavior towards six relationships. This rich information on altruism and on various other behavior of the respondents equip the altruism measure with sufficient information for a direct investigation of the aforementioned questions.[2]

The altruism measure derives from the interdependent utility maximization approach (Becker, 1974; Fontaine, 2008) that is common in this literature. The interdependence refers to that the well-being of the recipient enters the utility of the giver rather than directly the behavior of the recipient, in the style of Tullock (1978). This formulation does not take a stance on the philosophical motives of altruism. It should instead be interpreted as modeling the behavior of the giver (Becker, 1981). The measure of altruistic behavior is in the spirit of the altruism scale of Sawyer (1966). To relate the measure to relationships, a threshold-crossing model will be taken to the data through maximum likelihood estimation.

The estimates show that altruism exists in people's economic behavior and varies with relationships, even after controlling for sociodemographics and behavior, in a way that tends to increase with the levels of intimacy of the relationships. It is also found that older white people who are healthier and have more children tend to be more altruistic than others. On behavior, people with a higher altruism measure tend to retire later, save more before retirement, save more for precautionary purposes, and be more likely to leave a bequest greater than $10,000, transfer more than $500 to kid while alive, and spend more than 100 hours helping grandkid.

[1] See Laferrère and Wolff (2006) for a survey of such microeconomic models and Michel et al. (2006) for a survey of such macroeconomic models.

[2] Though having many advantages, the data is not perfect: The most important bias associated with survey methods in the context of this paper is social desirability bias. See the data section for impact of this bias on the result.

The contribution of this paper is twofold. First, this paper is the first to document the link of a direct measure of altruism to six relationships. Second, this paper establishes the validity of the altruism measure by showing that the way the measure is related to behavior is consistent with theories (e.g., endogenous retirement theories).

The next section discusses the method for structurally eliciting and estimating the altruism measure. Section 3 describes the data, and Section 4 reports the estimation results on the measure itself and the relationships of the measure with sociodemographics and behavior. Section 5 concludes.

2 Methodology

This section details the measure of altruism, its elicitation and estimation, and the way to relate it to sociodemographics and behavior.

2.1 The Measure of Altruism

An individual giver (G) is assumed to maximize the utility $U(c_G, c_R)$, which includes her own consumption c_G and the consumption of the recipient c_R, as in Becker (1974).[3] Imposing additive separability of the direct utility of the giver's own consumption and the indirect utility from recipient's utility function as in Sawyer (1966), the giver maximizes the following utility function

$$u_G(c_G) + Au_R(c_R).$$

To derive a measure for altruism, an explicit functional form for utility is needed. Because the relative risk aversion measure is stable over time (Sahm, 2007; Chuang and Schechter, 2015), I choose to use the iso-elastic functional form for the indirect utility of u_G and u_R.[4] On the one hand, this is common in the literature (see, e.g., Barsky et al., 1997; Kimball et al., 2008, 2009, 2015) and is the most widely used parametric utility function that tends to fit data better than alternative specifications (Wakker, 2008). On the other hand, this is not a strong assumption as the parameter A can adjust the intensity of the actual effect of the consumption of the recipient on the giver.

For illustrative purposes, u_G is assumed to have the same curvature parameter as u_R.[5] Though easily relaxed, this assumption can be justified by the plausible conjecture that the giver perceives the welfare of the recipient derived from consumption in the same way as she derives utility from her own consumption. Under these assumptions, the giver's utility

[3]Becker (1974) formulates utility as $U_1(c_G, U_2(c_R))$ which is mathematically equivalently to $U(c_G, c_R)$ after redefining the function. Notice that the giver still derives his/her utility from the welfare of the recipient, so this indeed is in fashion of Becker (1974) rather than of Tullock (1978).

[4]This means the benefactor perceives the consumption of the recipient in the same way as the consumption of her own.

[5]This assumption is readily relaxed by allowing the curvature to differ between the giver and recipient. The same measure will result after a renormalization of the parameter A.

function is

$$\frac{c_G^{1-\gamma}-1}{1-\gamma}+e^{\alpha\gamma}\frac{c_R^{1-\gamma}-1}{1-\gamma}$$

where the nonnegative parameter γ controls the curvature of the sub-utility functions and A is normalized to $e^{\alpha\gamma}$.

To accommodate the plausible regularity that the consumption of charitable beneficiaries should not noticeably decrease as an individual giver donating 5% of her income, the marginal utility from the recipient u_R is assumed to be constant for charity.[6] Re-normalizing A to $(e^{-\alpha}y_R)^{-\gamma}$, we get the utility function of the giver toward charity:

$$\frac{c_G^{1-\gamma}-1}{1-\gamma}+(e^{-\alpha}y_R)^{-\gamma}c_R.$$

The optimal choice of the giver subject to the constraints $c_G + c_R = y_G + y_R$ and $c_R \geq y_R$ dictates that the giver benefits the recipient only when

$$\alpha > \ln(\frac{y_R}{y_G}).$$

That is, the giver will exhibit altruistic behavior whenever the natural logarithmic income ratio of the recipient to the giver is less than the altruistic measure of the giver.[7]

2.2 The Income Ratio Cutoffs

The survey collects several categorical responses representing various degrees of altruism. From the discussion in the last section, the optimal behavior of the giver implies that the respondents whose altruism measure is within a certain range of log-income-ratios will choose the same answer. The cutoffs that delimit these ranges divide the set of all possible values of the altruism measure into several subsets. These cutoffs are crucial for estimating the altruism levels and derives directly from the survey questions.

To minimize potential response errors, the survey questions start by clarifying the intended way of thinking about the survey questions:

> *"Sometimes people give substantial financial help to relatives or friends. We would like to find out about situations where you (and your husband/and your wife/and your partner/...) might be willing to give substantial help to others. You should suppose that any help you give will not be repaid, and that the person you might help has been unlucky rather than lazy."*

The survey goes on with typical questions like the following.

[6] If one view charitable activity as a public good, then this formulation is in the spirit of the warm-glow type utility component of Andreoni (1989).

[7] It's trivial to define the behavior of the benefactor when $\alpha = \ln(\frac{y_R}{y_B})$ because the probability of this is 0 in the statistical model.

"Suppose that your (parents/father/mother) had only half as much income per person to live on as you do. Would you be willing to give your (parents/father/mother) 5% of your own family income per month, to help out until things changed—which might be several years?"

Respondents are given dichotomous answer options—"Yes" and "No"—for each question. The optimal choice of a respondent implies that she would answer "Yes" to the above question if her altruism measure is greater than $\ln(1/2)$ and "No" if her altruism measure is less than $\ln(1/2)$. In this example, $\ln(1/2)$ is the cutoff that divides the set of all possible values of the altruism measure into one corresponding with the affirmative answer and one corresponding with the negative answer to this question.

To increase the identification power and improve the accuracy of the estimates of the altruism measure, each respondent was asked a follow-up question to put the altruism measure into a narrow interval of possible values. As a result, every set of such two-question modules allows us to put the altruism measure into one of four mutually exclusive but exhaustive intervals:

$$\alpha \in \begin{cases} [\kappa_3, +\infty) & \text{if "Yes, Yes"} \\ [\kappa_2, \kappa_3) & \text{if "Yes, No"} \\ [\kappa_1, \kappa_2) & \text{if "No, Yes"} \\ (0, \kappa_1) & \text{if "No, No"} \end{cases}$$

where the cutoff $\kappa_1 = \ln(1/3)$, $\kappa_2 = \ln(1/2)$, $\kappa_3 = \ln(3/4)$ for questions related to parent, spouse parent, child, sibling; $\kappa_1 = \ln(1/5)$, $\kappa_2 = \ln(1/3)$, $\kappa_3 = \ln(1/2)$ for questions related to friend; $\kappa_1 = \ln(1/10)$, $\kappa_2 = \ln(1/5)$, $\kappa_3 = \ln(1/3)$ for questions related to charity. "Yes, Yes" means that the respondent answers both Yes in the two questions, "Yes, No" means the respondent answers Yes in the first question and No in the second, "No, Yes" and "No, No" are defined analogously.

The altruism modules appeared in several waves of HRS surveys, which enables the separation of temporary shocks and measurement errors from the true altruism measure through the help of a statistical model.

2.3 Estimating the Altruism Measure

The statistical model of respondent i's wave w measure of altruism toward relationship r is

$$\tilde{\alpha}_{iwr} = \alpha_i + v_r + \varepsilon_{iwr} \tag{1}$$

where $\alpha_i \sim \mathcal{N}(0, \sigma_\alpha^2)$[8] represents the baseline altruistic variation of respondent i, $v_r \sim \mathcal{N}(\tau_r, \sigma_v^2)$ denotes relationship-specific altruism, $\varepsilon_{iwr} \sim \mathcal{N}(0, \sigma_\varepsilon^2)$ represents the idiosyncratic shock[9] to individual i's measured altruism level in wave w for questions related to

[8]The mean of individual altruism level is normalized to 0 because it is not possible to separately identify the individual-specific mean from relationship-specific mean. This normalization is equivalent to normalizing one relationship-specific distribution to be zero-mean.

[9]This can include measurement error and response errors (caused by, e.g., hypothetical bias and interviewer bias).

relationship r. It is assumed that α_i, v_r, ε_{iwr} are mutually independent and ε_{iwr} correlates within wave and individual but not across waves or individuals: $Cov(\varepsilon_{i1r}, \varepsilon_{i1r'}) = \sigma^2_{\varepsilon w}$, $Cov(\varepsilon_{i1r}, \varepsilon_{i2r}) = 0$, and $Cov(\varepsilon_{i1r}, \varepsilon_{j1r}) = 0$ for $j \neq i$. It follows that the distribution of individual i's altruism measure for relationships 1 and 2 in the two waves of questions is

$$\begin{bmatrix} \widetilde{\alpha}_{i11} \\ \widetilde{\alpha}_{i21} \\ \widetilde{\alpha}_{i12} \\ \widetilde{\alpha}_{i22} \end{bmatrix} \sim \mathcal{N}\left(\begin{bmatrix} \tau_1 \\ \tau_1 \\ \tau_2 \\ \tau_2 \end{bmatrix}, \begin{bmatrix} \sigma^2_\alpha + \sigma^2_{v_1} + \sigma^2_\varepsilon & \sigma^2_\alpha + \sigma^2_{v_1} & \sigma^2_\alpha + \sigma^2_{\varepsilon w} & \sigma^2_\alpha \\ \sigma^2_\alpha + \sigma^2_{v_1} & \sigma^2_\alpha + \sigma^2_{v_{r_1}} + \sigma^2_\varepsilon & \sigma^2_\alpha & \sigma^2_\alpha + \sigma^2_{\varepsilon w} \\ \sigma^2_\alpha + \sigma^2_{\varepsilon w} & \sigma^2_\alpha & \sigma^2_\alpha + \sigma^2_{v_2} + \sigma^2_\varepsilon & \sigma^2_\alpha + \sigma^2_{v_2} \\ \sigma^2_\alpha & \sigma^2_\alpha + \sigma^2_{\varepsilon w} & \sigma^2_\alpha + \sigma^2_{v_2} & \sigma^2_\alpha + \sigma^2_{v_2} + \sigma^2_\varepsilon \end{bmatrix} \right)$$

It is assumed that respondents make choices independently.[10]

With the distribution and cutoffs, one can maximize the likelihood of observing the actual responses to estimate the parameters. The computation is intense because of the large number of parameters to be estimated. This method of uncovering preference parameters from survey data first appeared in the seminal paper of Barsky et al. (1997) and has been used extensively in the literature (see, e.g., Sahm, 2007; Kimball et al., 2008, 2009, 2015).

The relationship-specific means are identified by the average tendency of altruism levels associated with each relationship. The standard deviation of individual baseline altruism level is identified by the variation in answers for different questions across waves. Relationship-specific standard deviations are identified through the differential variation between answers for same questions across waves and answers for different questions across waves. The standard deviation of idiosyncratic shock is identified by the variation in answers for same questions across waves and within waves. The correlation coefficient of idiosyncratic shock is identified through the differential variation between answers in same and different waves across questions.

2.4 Relating to Sociodemographics and Behavior

Relating the preference parameters, like the altruism measure, to sociodemographics and behavior helps validate the method and data (Barsky et al., 1997), and it is interesting to know how altruism is associated with people's characteristics and behavior.[11]

To estimate such associations, I add sociodemographic and behavioral variables as additional variables to the statistical model (equation 1). In general, one can model the additional

[10] It is possible to accommodate within-family variation. But it is likely the gain from more variation to be small and the precision of the within-family estimates be poor: On one hand, there are only 72 (out of the total 1553) respondants in the sample come from same families. On the other hand, the within sample variation will only affect the estimation by at most 2 respondants in each family. That is, no family has 3 or more respondants in the sample. Thus, it's probable that the within-family variation would be pulled towards 0 by the majority of the observations that do not have another family member in the sample and that the standard error would be large because the sample size of the sub-sample generating within-family variation is small.

[11] The association here means correlation rather than causation because the latter is beyond the scope of this paper in light of the number of associations investigated here.

variables as random variables equipped with all the parameters pinning down their distributions. This, however, will increase the already onerous computation burden.[12] Weighing this cost with the fact that it is almost always the central tendency (mean) of the association of various variables with the dependent variable that is of most interest, this paper treats the additional sociodemographic and behavioral variables as mean shifters, as in Sahm (2007).

For estimation, the likelihood function of the expanded model is calculated and maximized. The confidence intervals will be derived by inverting likelihood ratio tests.

3 Data

The data comes from two altruism modules in the 1996 wave and the 2000 wave of the Health and Retirement Study (HRS).[13] It is a nationally representative longitudinal biennial study of U.S. adults 58 years or older.[14] In each wave, the respondents were asked 12 questions relating to altruism toward six relationships: parent, spouse's parent, child, sibling, friend, and charity, in this order.

For each relationship, an individual respondent will first answer a question that has an initial income cutoff and then answer another question with an adjusted cutoff chosen based on their answers in the first question. For example, if the respondent answered "Yes" in the first question with an income ratio of one half, the second question then asked whether the respondent would still be willing to benefit the recipient if the income ratio is raised to three quarters. If the respondent answered "No" in the first question, the second question would lower the income ratio to one third. The three resulting cutoffs in these questions will divide the whole space of the altruism measure into four mutually exclusive but exhaustive subsets.[15] Each of the four possible choices to the two questions maps into one of the four subsets. The mapping will be used to uncover the altruism measure in the statistical model.

Deleting those who answered none of the survey questions in both waves, the sample is left with 1553 observations. The respondents who answered only one wave of the questions are included in the estimation because their responses, even though of only one wave, help the identification of parameters, directly for those related to the wave they answered and indirectly for those of the wave they did not answer.

Table 1 allows one to preview the answer to the motivating question on the relationship between the altruism measure and relationship. The fraction of people choosing "Yes, Yes" ranges from 54.98% to 76.97% in wave 1996 and 42.86% to 76.09% in wave 2000 for

[12] Currently, one instance of execution of the Matlab program for the estimation runs parallelly on a 12-core (two hex-core 2.8Ghz Intel Westmere processors) 24GB-RAM computer for 24 hours to 60 hours, depending on the number of variables in the models and effective size of sample.

[13] HRS's 2010 wave also has an altruism module but the questions are different from those in wave 1996 and wave 2000 and would not fit into the current model. The data on wealth and income comes from the Rand HRS fat file version P (the latest version as of Apr 13, 2017), which calculated the total wealth and income from various questions of wealth and income components in the HRS.

[14] As of 2017, the youngest cohort in the HRS sample, Mid Baby Boomer (MBB), born as late as 1959.

[15] See the Income Ratio Cutoffs section above for details of this categorization for each relationship.

Table 1: Response Summary

	Wave 1996					Wave 2000				
Responses	1	2	3	4	All	1	2	3	4	All
Altruism Measure	$[0,\kappa_1)$	$[\kappa_1,\kappa_2)$	$[\kappa_2,\kappa_3)$	$[\kappa_3,\infty)$		$[0,\kappa_1)$	$[\kappa_1,\kappa_2)$	$[\kappa_2,\kappa_3)$	$[\kappa_3,\infty)$	
Parent	3.03	0.61	19.39	76.97	990	6.73	0.67	16.5	76.09	297
Spouse's Parent	5.62	1.02	21.33	72.03	783	40.43	2.13	10.64	46.81	47
Child	7.97	3.33	20.99	67.71	991	8.22	2.83	25.02	63.93	1095
Sibling	18.18	6.93	19.91	54.98	231	14.29	0	42.86	42.86	7
Friend	42.21	9.6	10.53	37.67	969	48.16	9.21	10.53	32.11	1140
Charity	39.75	3.62	15.01	41.61	966	43.99	4.86	15.64	35.51	1132

Notes: Numbers under a response category are percentages of responses that fall into that category. Numbers under the All category are the total numbers of observations. Response 4 means answering "Yes Yes", 3 "Yes No", 2 "No Yes", and 1 "No No". The bounds are $\kappa_1 = \ln(1/3)$, $\kappa_2 = \ln(1/2)$, $\kappa_3 = \ln(3/4)$ for questions related to parent, spouse parent, child, sibling; $\kappa_1 = \ln(1/5)$, $\kappa_2 = \ln(1/3)$, $\kappa_3 = \ln(1/2)$ for questions related to friend; $\kappa_1 = \ln(1/10)$, $\kappa_2 = \ln(1/5)$, $\kappa_3 = \ln(1/3)$ for questions related to charity.

questions related to the four most intimate relationships (parent, spouse's parent, child, sibling),[16] which is evidently larger than the fraction of people making the same choice in the friend questions (37.67% in wave 1996 and 32.11 in wave 2000) and the charity questions (41.61% and 35.51% in waves 1996 and 2000, respectively).

Respondents in the sample seem very altruistic, to the extent that might be too altruistic to be true. One explanation is the social desirability bias[17] (Phillips and Clancy, 1972): people tend to respond in ways that make them sound more favorable than they really are. This is hardly avoidable in human interviews, and there is no information available in the data to purge this effect. At the very least, the measure can still be called the (respondent) claimed altruism measure, which by definition would include this upward adjustment. However, this should not mask the true altruism variation because the tendency of social desirability should be relatively stable during the short time interval of answering survey questions, which means the upward bias is proportional to the true altruism level. One piece of evi-

[16] It's easy to get different answers for the rank of 4 relationships in terms of degree of intimacy if one asks people. Thus, to avoid confusion, the degree of intimacy of these 4 relationships is assumed to be same or approximately the same while the their degree of intimacy is larger than that of friend, which is again larger than the degree of intimacy of charity, for obvious reasons.

[17] Other possible problems of the survey instrument are that people might not understand the problems as intended, response errors, and measurement error. For the first bias, first I note that this is just a possibility and there's no information that can test the existence of it in the data. Second, the straightforward wording of the question and the framing introduction at the start of modules should minimize this possibility, if any. As discussed later in the paper, evidences showing people indeed respond in ways that consistent with common sense and literature about altruistic behavior show this bias, if exists, doesn't mask the useful variation in data for uncovering the altruism parameter. Response errors caused by hypothetical bias and interviewer bias should be zero-mean as they could go either way and there's no a priori that one direction is more probable than the other. Measurement error are taken care of by the error term in the statistical model.

dence is, as we have already seen, respondents indeed gave less altruistic answers toward friend and charity compared to their answers toward familial relationships.

Another, perhaps more convincing, piece of evidence is that people respond to changes in the income of the recipients in a way consistent with both intuition and the literature (see, e.g., Cox, 1987 and McGarry, 2008, 2016): in general, altruistic behavior is compensatory. To see this in the data, first note that for any relationship, the first question and the second question differ only in the income of the recipients.[18] Second, by the compensatory nature of altruistic behavior, a respondent would behave less altruistic when recipients' income increases and more altruistic when recipients' income decreases. The implication of this is that we should see non-zero portions of the respondents giving "Yes, No" and "No Yes" answers, which we do see in Table 1. The large fractions of "Yes, No" to "Yes, Yes" and of "No, Yes" to "No, No" make it clear that these positive portions of responses are not generated, at least purely, by measurement error. This reassuring evidence affirms that the data indeed contain a good amount of information that can be used to uncover the altruism measure.[19]

It is worth noting that the fact that the respondents' altruistic behavior moves inversely with the income of the recipient also provides support for the specification of the functional form of the giver's utility function. That is, the giver's marginal utility from the consumption of the recipient decreases in recipients' income.

This piece of evidence also demonstrates the power of hypothetical questions, in the sense that there is no change in respondent demographics or other environmental factors, no change in the magnitude of the size of monetary transfer, and the only thing that is different is the income of the recipient across the questions because the questions were asked in such a short time interval that changes that would confound the analysis are basically nonexistent. The wording of the question also rules out the possibility of exchange based explanation of altruistic behavior (see, e.g., Bernheim et al., 1985), which provides yet another support for the specification of the giver's utility function.[20] Thus, the change in response ("Yes" to "No" and "No" to "Yes") should be interpreted as caused by the change in income of the recipient.

In addition to the altruism modules, HRS also contains a rich set of information on sociodemographics and behavior (Table 2). In the sample, female accounts for a slightly larger share (57%). While white represents 84% of the sample, nearly all (except 4.5%) of the respondents have some religion preference. The average person in the sample ages 61 years old, has 3 living children, about 12.6 years of education, 65% to 73% chance of being married or partnered, and self-reported health condition ranges from good to very good. The typical person has an annual income of around $55,000 and wealth of around $290,000

[18]The superficial difference of the questions is the income cutoffs. But it's highly unlikely that the income of the giver changed and the giver realized her income was changed in the very short time (possibly in most cases less than 1 minute) interval between the questions. Thus, a change in cutoff is equivalent to a change in the income of the recipients.

[19]This discussion is in the similar spirit of "construct validity" assessments in the contingent valuation literature (see, e.g., Cameron, 2008).

[20]That is, the Becker specification is reasonable in this context.

Table 2: Sample Characteristics

	Wave 1996					Wave 2000				
	Mean	S.D.	Min.	Max.	Obs.	Mean	S.D.	Min.	Max.	Obs.
Age[a]	61.099	8.022	29	93	1,553	65.099	8.022	33	97	1,553
Gender[b]	0.573	0.495	0	1	1,553	0.573	0.495	0	1	1,553
Race[c]	0.839	0.368	0	1	1,553	0.839	0.368	0	1	1,553
Religion[d]	0.955	0.206	0	1	1,548	0.955	0.206	0	1	1,548
Education[e]	12.618	2.864	0	17	1,553	12.618	2.864	0	17	1,553
Marital Status[f]	0.727	0.446	0	1	1,375	0.645	0.479	0	1	1,430
Self-Reported Health[g]	2.475	1.093	1	5	1,379	2.651	1.098	1	5	1,430
Number of living children	3.182	1.995	0	14	1,374	3.207	2.051	0	14	1,421
Household Wealth (ln(positive))	11.689	1.610	1.386	16.592	1,304	11.860	1.725	3.401	17.507	1,340
Household Wealth (ln(-negative))	8.529	2.009	4.605	13.045	47	8.497	1.845	4.605	12.780	53
Household Income	10.502	0.976	5.298	13.849	1,369	10.455	1.040	4.382	14.087	1,424
Household Wealth Change (ln(positive))	10.606	1.681	4.407	16.468	798	10.784	1.803	1.609	17.449	806
Household Wealth Change (ln(-negative))	10.264	1.763	0	14.674	534	10.378	1.824	3.045	18.214	571
Retirement Status	0.670	0.470	0	1	1,378	0.565	0.496	0	1	1,429
Age Plan to Retire	62.636	4.735	37	94	184	63.549	4.706	51	80	122
Age Plan to Stop Working	64.124	4.832	37	94	404	65.928	5.454	51	90	279
Risk Attitudes[h]	4.456	1.617	1	6	226	4.447	1.781	1	6	38
Bequest[i]	0.710	0.387	0	1	1,353	0.733	0.368	0	1	1,359
Care of grandkid[j]	0.456	0.498	0	1	963	0.405	0.491	0	1	1,147
Transfer to Kid[k]	0.448	0.498	0	1	1,140	0.397	0.490	0	1	1,321

Notes:

[a]At middle of interview month.

[b]0 male and 1 female.

[c]0 non-white and 1 white.

[d]0 no religious preference, 1 has religious preference.

[e]In years, and 17 represents 17 or 17+ years of education.

[f]1 married or partnered, 0 otherwise.

[g]1 excellent health, 5 poor health.

[h]Not available in wave 1996; the numbers in wave 1996 are from wave 1998. 1 least risk averse and 6 most risk averse.

[i]Probability of leaving >$10,000 bequest.

[j]Number of hours spent taking care of grandkids >100 in last 2 years. 1 Yes, 0 No.

[k]Greater than $500 in last 2 years; 1 Yes, 0 No.

to $380,000, which increased from previous survey periods by $53,984 in wave 1996 and $9422.04 in wave 2000. 57% to 67% percent of the respondents have retired before the survey periods. For those still working during the survey, they plan to retire around 63 and stop working at 64 to 66 on average. The overall attitude toward risk in the sample is pretty intolerant. 71-73% respondents said they were likely to leave a bequest of $10,000 or more, 40% to 45% spent greater than 100 hours taking care of grandchildren and with approximately the same probabilities to make transfers greater than $500 to kids in the two years before the survey periods.

4 Result

This section reports estimation results. First, we will look at how the mean and variance of the altruism measure vary across relationships. After adding sociodemographics into the estimation, we will see how demographics are associated with the altruism measure. Finally, we will investigate how behavior is correlated with altruism.

4.1 Altruism Levels

Applying the baseline statistical model to the survey data with six relationships, we get estimates on relationship-specific altruism levels.

Table 3: Mean and Variance of Altruism Levels

		95% Confidence Interval	10% Significance Level
τ_{Parent}	0.626	[0.532, 0.722]	Y
$\tau_{SpouseParent}$	0.456	[0.336, 0.552]	Y
τ_{Child}	0.319	[0.247, 0.390]	Y
$\tau_{Sibling}$	-0.139	[-0.319, 0.038]	N
τ_{Friend}	-1.343	[-1.440, -1.236]	Y
$\tau_{Charity}$	-1.712	[-1.856, -1.583]	Y
$\sigma_{Respondant}$	0.639	[0.543, 0.752]	Y
σ_{Parent}	0.011	[-0.195, 0.194]	N
$\sigma_{SpouseParent}$	0.011	[-0.209, 0.213]	N
σ_{Child}	0.015	[-0.236, 0.237]	N
$\sigma_{Sibling}$	0.090	[-0.408, 0.413]	N
σ_{Friend}	0.908	[0.768, 1.069]	Y
$\sigma_{Charity}$	1.444	[1.259, 1.637]	Y
σ_{ϵ}	0.942	[0.915, 0.974]	Y
$\sigma_{\epsilon w}$	0.712	[0.668, 0.742]	Y

Notes: The null of the significance test is that the estimate equal to 0.

The estimates in Table 3 show that altruism levels indeed vary with relationships. The altruism level decreases not only from relatives to friend to charity, but also within the famil-

ial relationships: people in the survey are most altruistic toward parent, then spouse's parent, followed by child, and are least altruistic toward sibling. Looking at the dispersion parameters, relationship-specific variances increase from parent to charity, indicating that the altruism measure varies more toward less intimate relationships. There's significant within-wave error correlation, the correlation coefficient of within-wave errors is about 0.57,[21] which indicates that more than half of the measurement and response errors are persistent across questions within individual waves. The fraction of variations that can be explained by the baseline altruism variation[22] increases as intimacy of relationship increases, pointing to the explanation that people are more inclined to express true feelings toward more intimate relationships.

4.2 Adding Sociodemographics

Adding demographics to the statistical model, we arrive at the estimates reported in Table 4. The estimates suggest that people who are older, female, and white people tend to be more altruistic, though the gender variable is not significant at the 10% level. Having religious preference, being more educated or married shows no significant effect on altruism levels. The subjective health condition and number of children turn out to have significant impacts. This points to the explanations that people in larger families are more likely to be more altruistic[23] and that better health correlates with higher altruism level. Another result, perhaps surprising, is that household wealth and income seem associated with altruism in a significant way, at least after controlling for all the rest demographic characteristics. This is in line with the finding that subjective well-being mediates the effect of objective well-being on altruism (see, e.g., Brethel-Haurwitz and Marsh, 2014). The estimates of mean and variance are in similar magnitudes and patterns, as discussed in section 4.1.

4.3 Relating to Behavior

This subsection discusses several theoretical predictions of altruism's effects on behavior and the corresponding empirical strategies to test these predictions.

4.3.1 Late Retirement

If a person cares about others, her incentive to increase her wealth will be higher because in addition to her desire to increase her own consumption, she also wants to increase the

[21] $\sigma^2_{\varepsilon w}/\sigma^2_{\varepsilon} \approx 0.57$.

[22] The fraction of variation can be explained by the baseline altruism variation is calculated using $Corr(\tilde{\alpha}_{iwr}, \alpha_i) = \frac{Cov(\tilde{\alpha}_{iwr}, \alpha_i)}{\sqrt{Var(\tilde{\alpha}_{iwr})Var(\alpha_i)}} = \frac{Cov(\alpha_i, \alpha_i)}{\sqrt{Var(\tilde{\alpha}_{iwr})Var(\alpha_i)}} = \frac{\sigma^2_{\alpha}}{\sigma^2_{\alpha}+\sigma^2_{v_r}+\sigma^2_{\varepsilon}}$, which ranges from 0.46 (parent, spouse's parent, child, sibling) to 0.14 (charity). For friend relationship, the portion is 0.24.

[23] As an indirect evidence confirming this explanation, it is widely recognized by most Chinese people that the selfish behavior of the young generation is partially caused by the one-child policy.

Table 4: Sociodemographics

		95% Confidence Interval	10% Significance Level
Age	0.417	[0.278, 0.520]	Y
Gender	0.061	[-0.036, 0.164]	N
Race	0.194	[0.139, 0.271]	Y
Religion	-0.028	[-0.093, 0.060]	N
Education	0.009	[-0.054, 0.061]	N
Marital Status	-0.002	[-0.085, 0.092]	N
Self-Reported Health	-0.036	[-0.060, -0.004]	Y
Number of living children	0.020	[0.000, 0.041]	Y
Household Wealth (ln(positive))	0.040	[-0.034, 0.094]	N
Household Wealth (ln(-negative))	0.074	[-0.381, 0.504]	N
Household Income	-0.030	[-0.098, 0.043]	N
τ_{Parent}	0.141	[0.034, 0.218]	Y
$\tau_{SpouseParent}$	-0.062	[-0.159, 0.050]	N
τ_{Child}	-0.198	[-0.251, -0.110]	Y
$\tau_{Sibling}$	-0.607	[-0.797, -0.448]	Y
τ_{Friend}	-1.828	[-1.928, -1.725]	Y
$\tau_{Charity}$	-2.207	[-2.352, -2.085]	Y
$\sigma_{Respondant}$	0.640	[0.525, 0.729]	Y
σ_{Parent}	0.015	[-0.188, 0.189]	N
$\sigma_{SpouseParent}$	0.015	[-0.202, 0.200]	N
σ_{Child}	0.019	[-0.226, 0.226]	N
$\sigma_{Sibling}$	0.013	[-0.372, 0.379]	N
σ_{Friend}	0.920	[0.779, 1.072]	Y
$\sigma_{Charity}$	1.421	[1.264, 1.633]	Y
σ_{ϵ}	0.907	[0.882, 0.939]	Y
$\sigma_{\epsilon w}$	0.683	[0.644, 0.713]	Y

Notes: The null of the significance test is that the estimate equal to 0.

consumption of the recipients.[24] One way to increase wealth is to work longer, trading leisure for income. Endogenous retirement models (see, e.g., Kimball and Shapiro, 2003 and McFall, 2011) indeed predict that the higher the marginal utility of income, the later a person will retire. Since the more altruistic a person is, ceteris paribus, the higher her marginal utility of income, she will thus choose to retire later.

One should expect to see in the data that people's expected retirement age is larger for more altruistic people as their motive of increasing the consumption of the recipient is greater. The empirical strategy is, therefore, testing whether the altruism measure is positively correlated with retirement age.

The coefficient estimates in Table 5 confirm the prediction that altruism is positively correlated with late retirement, though not significant at the 10% level. It's also interesting to see that the magnitude of some variables has changed compared to estimates in the sociodemographics section, in a way that is consistent with intuition. The magnitudes of parameter estimates for gender, religion, and number of children increase, suggesting that female respondents believing in religion and having more children tend to retire early. The parameters for race, education, marital status, and self-reported health decrease, which suggests that married white respondents who spent more years in school and who are less healthy are more likely to retire later than those not. The large decrease in the estimate for the negative wealth parameter suggests that having negative wealth is positively correlated with late retirement.

4.3.2 More Saving Before Retirement

When giving up leisure in exchange for more income, a person would also decrease her consumption as well for optimality,[25] which is also predicted by the endogenous retirement models mentioned above. Since there is no consumption data in HRS before 2001, I use saving as a proxy for consumption. If one is less altruistic, she would thus decrease her consumption less and correspondingly save less. This means that we should be able to see a positive correlation between the giver's altruism measure and her saving before retirement.

To verify this prediction, first I restrict the sample to those had not retired at the time of the survey as this prediction relates only to before-retirement saving decision. Second, I focus on the correlation[26] between the givers' saving and her altruism measure conditional on her income and wealth to account for the possibility that more saving is usually a natural result of more income and wealth (Keynes, 1936).

The result in Table 6 confirms this prediction. More altruistic people indeed have more

[24] Under the weak condition that the marginal utility of the recipient's consumption does not every where smaller than the marginal utility of the giver's consumption.

[25] Under the most likely assumption that leisure is normal.

[26] This correlation will mix the effect of more saving as a result of less consumption before retirement and more saving as a result of more precautionary saving. To see that the estimate in this section is not solely from the precautionary saving motive, the estimate of parameter on saving here should be larger than that in the precautionary saving section which stripped the late retirement motive (see the precautionary saving section for detail).

Table 5: Late Retirement

		95% Confidence Interval	10% Significance Level
Age Plan to Retire	0.194	[-0.097, 0.475]	N
Age	0.573	[0.279, 0.899]	Y
Gender	0.233	[-0.009, 0.46]	Y
Race	0.132	[-0.037, 0.285]	N
Religion	0.269	[0.086, 0.462]	Y
Education	-0.163	[-0.309, -0.042]	Y
Marital Status	-0.260	[-0.457, -0.065]	Y
Self-Reported Health	-0.083	[-0.158, -0.014]	Y
Number of living children	0.043	[-0.002, 0.102]	Y
Household Wealth (ln(positive))	0.040	[-0.105, 0.189]	N
Household Wealth (ln(-negative))	-0.215	[-3.604, 2.877]	N
Household Income	-0.093	[-0.268, 0.062]	N
τ_{Parent}	-0.031	[-0.187, 0.12]	N
$\tau_{SpouseParent}$	-0.078	[-0.262, 0.075]	N
τ_{Child}	-0.198	[-0.338, -0.036]	Y
$\tau_{Sibling}$	-0.611	[-0.873, -0.316]	Y
τ_{Friend}	-1.796	[-2.072, -1.523]	Y
$\tau_{Charity}$	-2.457	[-2.88, -2.014]	Y
$\sigma_{Respondant}$	0.280	[-0.611, 0.613]	N
σ_{Parent}	0.015	[-0.268, 0.262]	N
$\sigma_{SpouseParent}$	0.030	[-0.304, 0.308]	N
σ_{Child}	0.279	[-0.517, 0.51]	N
$\sigma_{Sibling}$	0.127	[-0.777, 0.791]	N
σ_{Friend}	1.080	[0.772, 1.568]	Y
$\sigma_{Charity}$	1.909	[1.414, 2.818]	Y
σ_{ϵ}	0.883	[0.852, 0.928]	Y
$\sigma_{\epsilon w}$	0.806	[0.749, 0.837]	Y

Notes: The null of the significance test is that the estimate equal to 0.

Table 6: More Saving before Retirement

		95% Confidence Interval	10% Significance Level
Household Wealth Change (ln(positive))	0.100	[0.084, 0.11]	Y
Household Wealth Change (ln(-negative))	0.111	[0.091, 0.124]	Y
Age	-0.240	[-0.447, -0.069]	Y
Gender	0.045	[-0.097, 0.179]	N
Race	0.225	[0.126, 0.321]	Y
Religion	0.019	[-0.091, 0.139]	N
Education	-0.475	[-0.56, -0.387]	Y
Marital Status	-0.002	[-0.134, 0.126]	N
Self-Reported Health	0.027	[-0.024, 0.061]	N
Number of living children	0.020	[-0.011, 0.049]	N
Household Wealth (ln(positive))	-0.148	[-0.267, -0.066]	Y
Household Wealth (ln(-negative))	-0.176	[-0.787, 0.387]	N
Household Income	-0.030	[-0.139, 0.074]	N
τ_{Parent}	0.141	[0.004, 0.242]	Y
$\tau_{SpouseParent}$	-0.031	[-0.164, 0.109]	N
τ_{Child}	-0.198	[-0.284, -0.091]	Y
$\tau_{Sibling}$	-0.607	[-0.806, -0.38]	Y
τ_{Friend}	-1.734	[-1.896, -1.61]	Y
$\tau_{Charity}$	-2.238	[-2.414, -2.014]	Y
$\sigma_{Respondant}$	0.632	[0.474, 0.809]	Y
σ_{Parent}	0.015	[-0.241, 0.238]	N
$\sigma_{SpouseParent}$	0.026	[-0.242, 0.244]	N
σ_{Child}	0.027	[-0.334, 0.336]	N
$\sigma_{Sibling}$	0.014	[-0.463, 0.464]	N
σ_{Friend}	0.935	[0.736, 1.144]	Y
$\sigma_{Charity}$	1.577	[1.349, 1.917]	Y
σ_{ϵ}	1.057	[1.025, 1.092]	Y
$\sigma_{\epsilon w}$	0.871	[0.817, 0.901]	Y

Notes: The null of the significance test is that the estimate equal to 0.

saving, and the magnitude of this correlation is larger than that from the more precautionary saving motive (see section 4.3.4).

4.3.3 Less Risk Aversion

Compared to no altruism, the altruistic component will reduce the curvature of givers' utility function and as a result, the giver is less risk averse.

Empirically testing this prediction would be to see whether the altruism measure is negatively correlated with a risk aversion measure after controlling for wealth. HRS elicited risk attitude of respondents using hypothetical questions (see, e.g., Barsky et al., 1997) in similar spirits as those for altruism. It is unfortunate, however, that HRS did not collect such information in the 1996 survey wave, so that I have to use the risk attitude data in wave 1998 as a proxy for risk attitudes in wave 1996.

Table 7: Less Risk Aversion

Risk Aversion	0.095
Age	2.073
Gender	0.170
Race	-0.244
Religion	-0.169
Education	-0.350
Marital Status	0.217
Self-Reported Health	-0.114
Number of living children	-0.043
Household Wealth (ln(positive))	0.024
Household Wealth (ln(-negative))	-2.340
Household Income	-0.030
τ_{Parent}	0.016
$\tau_{SpouseParent}$	-0.078
τ_{Child}	-0.229
$\tau_{Sibling}$	-0.529
τ_{Friend}	-1.546
$\tau_{Charity}$	-1.582
$\sigma_{Respondant}$	0.013
σ_{Parent}	0.014
$\sigma_{SpouseParent}$	0.014
σ_{Child}	0.363
$\sigma_{Sibling}$	0.472
σ_{Friend}	1.294
$\sigma_{Charity}$	2.684
σ_{ϵ}	0.822
$\sigma_{\epsilon w}$	0.805

The estimate on risk attitude in Table 7 does not confirm the negative association between altruism and risk aversion. Two possible explanations for this result can be drawn: risk attitude measure in year 1998 is not a good proxy for risk attitude in year 1996, and other omitted variable(s) confounds the estimate in a way similar to previous estimates on (log-)negative household wealth change. The second explanation seems more plausible as Kimball et al. (2015) also finds a positive correlation between altruism and risk aversion,[27] though their estimate is statistically insignificant, as is here.

4.3.4 More Precautionary Saving

One implication of less risk aversion as a result of being altruistic is that more altruistic people will be more prudent (Kimball, 1990) than those less altruistic. In other words, more altruistic people will save more, keeping everything else the same. The intuition of this prediction can be seen from the complementarity of more consumption and less risk (Dreze and Modigliani, 1972; Kimball, 1990), a result of the obligatory assumption of decreasing absolute risk aversion (Kimball, 1990; Carroll and Kimball, 2008). When people's degree of risk aversion decreases, people will take more risk than before, which would imply their consumption will decrease and as a result precautionary saving must increase.

Under this prediction, one would expect saving to be positively correlated with the altruism measure, after controlling for wealth (to purge the effect that people with more wealth tend to save more) and late retirement (to account for the increased saving induced by reduced consumption before retirement). To distinguish the precautionary saving effect from late retirement effect, I would expect to see that the parameter associated with saving in the precautionary saving to be smaller than the estimate from the section on more saving before retirement. Here the sample is not restricted to the before retirement as in the more-wealth-before-retirement section because the motive should hold true for everyone, including the retired.

Table 8 affirms that the saving measure indeed positively correlates with altruism, and it is significant at 1% level.

4.3.5 Bequest, Inter-Vivos Transfer, In-Kind Assistance

The most natural implications of altruistic behavior are bequests, inter-vivos transfers, and in-kind assistance. It is intuitive that everything else equal more altruistic people tend to exhibit more of these behavior than those less altruistic. Perhaps due to a lack of an altruism measure, most empirical literature on altruistic behavior studies how observed events (e.g., job loss) correlates with the altruistic behavior (see, e.g., McGarry, 2016)

Tables 9, 10, and 11 report the estimates on the probabilities of leaving greater than $10,000 bequest, of larger than $500 transfer to kid, and of spending more than 100 hours to take care of grandkid in last two years. The estimates on parameters for variables of

[27] The correlation coefficient is 0.3 in Table 11 of Kimball et al. (2015).

Table 8: Precautionary Saving

		95% Confidence Interval	10% Significance Level
Household Wealth Change (ln(positive))	0.092	[0.075, 0.104]	Y
Household Wealth Change (ln(-negative))	0.088	[0.07, 0.11]	Y
Age Plan to Retire	0.038	[-0.144, 0.257]	N
Age	-0.052	[-0.251, 0.194]	N
Gender	0.108	[-0.053, 0.284]	N
Race	0.319	[0.214, 0.437]	Y
Religion	-0.044	[-0.151, 0.12]	N
Education	-0.491	[-0.59, -0.397]	Y
Marital Status	-0.143	[-0.279, 0.009]	Y
Self-Reported Health	-0.036	[-0.091, 0.013]	N
Number of living children	0.036	[-0.001, 0.071]	Y
Household Wealth (ln(positive))	-0.023	[-0.135, 0.082]	N
Household Wealth (ln(-negative))	0.449	[-0.607, 1.49]	N
Household Income	-0.093	[-0.21, 0.027]	N
τ_{Parent}	0.016	[-0.111, 0.135]	N
$\tau_{SpouseParent}$	-0.078	[-0.215, 0.066]	N
τ_{Child}	-0.198	[-0.301, -0.065]	Y
$\tau_{Sibling}$	-0.607	[-0.857, -0.396]	Y
τ_{Friend}	-1.796	[-1.954, -1.597]	Y
$\tau_{Charity}$	-2.175	[-2.475, -1.947]	Y
$\sigma_{Respondant}$	0.292	[-0.532, 0.538]	N
σ_{Parent}	0.015	[-0.199, 0.2]	N
$\sigma_{SpouseParent}$	0.023	[-0.237, 0.241]	N
σ_{Child}	0.312	[-0.49, 0.487]	N
$\sigma_{Sibling}$	0.018	[-0.535, 0.534]	N
σ_{Friend}	0.978	[0.77, 1.295]	Y
$\sigma_{Charity}$	1.639	[1.308, 2.122]	Y
σ_{ϵ}	0.950	[0.917, 0.984]	Y
$\sigma_{\epsilon w}$	0.839	[0.793, 0.871]	Y

Notes: The null of the significance test is that the estimate equal to 0.

Table 9: Bequest

Bequest	0.181
Age	-0.271
Gender	0.076
Race	0.350
Religion	0.159
Education	-0.022
Marital Status	-0.003
Self-Reported Health	-0.013
Number of living children	0.020
Household Wealth (ln(positive))	-0.062
Household Wealth (ln(-negative))	-0.020
Household Income	-0.034
τ_{Parent}	0.141
$\tau_{SpouseParent}$	-0.031
τ_{Child}	-0.167
$\tau_{Sibling}$	-0.638
τ_{Friend}	-1.781
$\tau_{Charity}$	-2.175
$\sigma_{Respondant}$	0.561
σ_{Parent}	0.015
$\sigma_{SpouseParent}$	0.011
σ_{Child}	0.031
$\sigma_{Sibling}$	0.031
σ_{Friend}	0.939
$\sigma_{Charity}$	1.428
σ_{ϵ}	0.918
$\sigma_{\epsilon w}$	0.699

Table 10: Inter-vivos Transfer

		95% Confidence Interval	10% Significance Level
Transfer to Kid	0.056	[-0.073, 0.177]	N
Age	-0.005	[-0.144, 0.125]	N
Gender	-0.010	[-0.116, 0.110]	N
Race	0.335	[0.267, 0.412]	Y
Religion	-0.036	[-0.115, 0.059]	N
Education	0.009	[-0.056, 0.076]	N
Marital Status	-0.002	[-0.097, 0.103]	N
Self-Reported Health	-0.009	[-0.036, 0.025]	N
Number of living children	0.012	[-0.010, 0.033]	N
Household Wealth (ln(positive))	-0.023	[-0.099, 0.046]	N
Household Wealth (ln(-negative))	-0.106	[-0.582, 0.393]	N
Household Income	0.150	[0.078, 0.242]	Y
τ_{Parent}	0.140	[0.029, 0.247]	Y
$\tau_{SpouseParent}$	-0.062	[-0.179, 0.066]	N
τ_{Child}	-0.190	[-0.259, -0.101]	Y
$\tau_{Sibling}$	-0.639	[-0.858, -0.430]	Y
τ_{Friend}	-1.875	[-1.983, -1.759]	Y
$\tau_{Charity}$	-2.207	[-2.364, -2.060]	Y
$\sigma_{Respondant}$	0.655	[0.549, 0.771]	Y
σ_{Parent}	0.023	[-0.221, 0.220]	N
$\sigma_{SpouseParent}$	0.026	[-0.238, 0.235]	N
σ_{Child}	0.010	[-0.225, 0.224]	N
$\sigma_{Sibling}$	0.023	[-0.403, 0.405]	N
σ_{Friend}	0.888	[0.735, 1.083]	Y
$\sigma_{Charity}$	1.428	[1.230, 1.648]	Y
σ_{ϵ}	0.901	[0.869, 0.937]	Y
$\sigma_{\epsilon w}$	0.660	[0.618, 0.701]	Y

Notes: The null of the significance test is that the estimate equal to 0.

Table 11: In-kind Assistance

		95% Confidence Interval	10% Significance Level
Care of Grandkid	0.150	[0.034, 0.247]	Y
Age	0.198	[0.078, 0.316]	Y
Gender	0.045	[-0.030, 0.173]	N
Race	0.210	[0.159, 0.289]	Y
Religion	-0.013	[-0.072, 0.084]	N
Education	0.009	[-0.051, 0.064]	N
Marital Status	-0.002	[-0.081, 0.094]	N
Self-Reported Health	-0.027	[-0.047, 0.009]	N
Number of living children	0.020	[0.002, 0.042]	Y
Household Wealth (ln(positive))	0.040	[-0.029, 0.100]	N
Household Wealth (ln(-negative))	0.105	[-0.358, 0.508]	N
Household Income	-0.030	[-0.093, 0.049]	N
τ_{Parent}	0.110	[0.013, 0.193]	Y
$\tau_{SpouseParent}$	-0.078	[-0.177, 0.029]	N
τ_{Child}	-0.198	[-0.256, -0.119]	Y
$\tau_{Sibling}$	-0.639	[-0.805, -0.454]	Y
τ_{Friend}	-1.828	[-1.926, -1.725]	Y
$\tau_{Charity}$	-2.191	[-2.327, -2.061]	Y
$\sigma_{Respondant}$	0.621	[0.522, 0.716]	Y
σ_{Parent}	0.027	[-0.186, 0.185]	N
$\sigma_{SpouseParent}$	0.022	[-0.204, 0.204]	N
σ_{Child}	0.014	[-0.219, 0.217]	N
$\sigma_{Sibling}$	0.051	[-0.374, 0.381]	N
σ_{Friend}	0.900	[0.777, 1.080]	Y
$\sigma_{Charity}$	1.415	[1.244, 1.615]	Y
σ_{ϵ}	0.869	[0.846, 0.905]	Y
$\sigma_{\epsilon w}$	0.648	[0.608, 0.677]	Y

Notes: The null of the significance test is that the estimate equal to 0.

interest all have the desired signs, confirming the prediction that more altruistic people tend to exhibit altruistic behavior like bequests, inter-vivos transfers, and in-kind assistance.

5 Conclusion

This paper uses the Health and Retirement Study to structurally estimate and relate a measure of altruism to behavior and sociodemographic characteristics. With the rich information of relationship-specific altruistic behavior of the data set, the estimation shows that the altruism measure varies with relationships and correlates with sociodemographics and behavior. Specifically, after controlling for sociodemographics and behavior, the altruism measure tends to increase with the intimacy of relationships. It is also found that older white people who are healthier and have more children tend to be more altruistic than others. People with a higher altruism measure tend to retire later, save more before retirement, save more for precautionary purposes, and be more likely to leave a bequest greater than $10,000, transfer larger than $500 to kid while alive, and spend more than 100 hours helping grandkid.

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