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Altruism and the Child Cycle of Alumni Donations[†]

By JONATHAN MEER AND HARVEY S. ROSEN*

We study alumni contributions to an anonymous research university. If alumni believe donations will increase the likelihood of their child's admission, and if this belief helps motivate their giving, then the pattern of giving should vary systematically with the ages of their children, whether the children ultimately apply to the university, and the admissions outcome. We call this pattern the child cycle of alumni giving. The evidence is consistent with the child-cycle pattern. Thus, while altruism drives some giving, the hope for a reciprocal benefit also plays a role. We compute rough estimates of the proportion of giving due to selfish motives. (JEL D91, D64, I21)

In an essay on the economics of altruism, Paul A. Samuelson (1993, 143) writes:

Mesmerized by Homo economicus, who acts solely on egoism, economists shy away from altruism almost comically. Caught in a shameful act of heroism, they aver: "Shucks, it was only enlightened self interest." Sometimes it is. At other times it may be only rationalization... "If I rescue somebody's son, someone will rescue mine."

Samuelson concludes that such arguments render economists guilty of "face saving tautologies." Theodore C. Bergstrom and Oded Stark (1993, 149) similarly criticize economists' stance toward altruistic behavior: "Why are economists convinced that Homo economicus is selfish? No doubt we find considerable support for this hypothesis in the behavior of our colleagues."

The notion that mainstream economics categorically rejects the existence of altruism is essentially false, however. As noted below, a substantial theoretical literature explicitly allows for the possibility that human behavior is unselfish and draws out the implications of altruism in a variety of contexts. Contrary to Samuelson, it would be more accurate to characterize economists' view of the importance of altruism as agnostic rather than skeptical. They are willing to contemplate the possibility that altruism is an important motivator of behavior but, at the same time, do not rule out selfishness. Charles T. Clotfelter's (1985) important volume on charitable giving

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is typical in this regard. In an introductory section, he provides a list of possible motivations for charity. Some involve narrow self-interest, such as the expectation that donors and their families will receive services or favorable publicity for their businesses in return for their contribution. But the list gives equal footing to altruism associated with social norms or a sense of duty or commitment. Clotfelter takes no position on the relative importance of the various motivations. He merely observes that they could all be operative.¹

Of course, saying that both selfishness and altruism can be present does not tell us that both motivations actually guide behavior. This is an empirical question, but empirical work using observational data is rare in this area. Perhaps the primary reason is the difficulty in measuring the benefits that donors expect to receive. For example, news accounts of donations to hospitals indicate that one reason for giving is the hope that, if individuals find themselves in the hospital in the future, they will receive particularly attentive treatment.² But how does one measure the magnitude of this benefit? Without quantifiable indicators of the potential selfish benefits, one cannot estimate how responsive giving is to their existence.

This paper uses a unique data set that allows us to assess whether donors' contributions to a nonprofit institution are affected by the expectation of a reciprocal benefit. We study alumni contributions to an anonymous selective research university, henceforth referred to as Anon U. The proprietary data provided by Anon U contain detailed information about donations made by alumni as well as a variety of their economic and demographic characteristics. The data also include information on the ages of the children of the alumni, whether they applied for admission to Anon U, and, if so, whether they were accepted. The premise of our analysis is simple. If alumni believe donations increase the likelihood of their children being accepted to Anon U, and if this belief helps motivate their giving, then the pattern of giving should vary systematically with the age of their children, whether the children ultimately apply to Anon U, and the outcome of the admissions process. Specifically, if reciprocity influences the behavior of donors, one would expect that, *ceteris paribus*, the presence of children increases the propensity to give, that giving drops off after the admissions decision is rendered, and that the decline is greater when the child is rejected. We refer to this pattern as the child cycle of alumni giving.

An interesting feature of this phenomenon is that the institution makes no promise of reciprocity. True, children of Anon U alumni have a higher rate of acceptance than other students,³ but this does not prove that having a parent who made donations in the past increases a child's likelihood of admission. Nevertheless, the view that reciprocity exists is widespread. As one account of the college admissions process stated, "Traditionally, universities have relied on gifts from alumni,

¹ In the same way, Dugan et al. (2000) ascribe a number of motivations to university donors. The list includes "avoidance of social stigma, tax incentives, recognition for generosity, a response to past or deterrence to future solicitation, and quid pro quo for services rendered indirectly such as access to elite social circles or business contacts." However, at the top of their list is "pure altruism."

² Julie Bick, "The Hospital Worked Wonders. Can you Return the Favor?," *New York Times*, August 5, 2007.

³ According to public information, children of alumni at Anon U are accepted at roughly three times the rate of other applicants. William G. Bowen et al. (2005) document the importance of correcting for differences in the characteristics of applicant pools when assessing the importance of legacy preferences, however.

who are rewarded with ‘legacy’ preferences for their children.”⁴ In 1976, a federal judge held in *Rosenstock v. Board of Governors of the University of North Carolina* that admission preferences for the children of out-of-state alumni were not unconstitutional, since “alumni provide monetary support for the University.” The judge viewed this as “a reasonable basis and...not constitutionally defective.” Perceptions of reciprocity may be reinforced by university administrators who link the acceptance of alumni children to the financial support of their institutions. In a recent interview with the *Wall Street Journal*, the president of Princeton University was asked, “Why does Princeton give admissions preference to alumni children...?” Her response was, “We are deeply dependent on the generosity of our alumni each and every year...They are extremely important to the financial well-being of this university.”⁵ We know of no statistical evidence on whether alumni donations at any university affect admissions probabilities for their children, and if so, how much. For our purposes, the key insight is that generating the child cycle of alumni giving requires only the perception of reciprocity.

Determining whether a child life cycle exists is important because of the opportunity it provides to shed light on the general question of motivations for altruism. As Lise Vesterlund (2006) notes, several important policy issues surround the question. Suppose, for example, that donors perceive the gain from a donation to be primarily private. In that case, if the government provides a grant to the institution, there is no strong reason for the donor to cut back on his or her donations, and vice versa. Thus, determining whether or not a child cycle of giving is present gives us some evidence about the importance of “crowding out,” at least in this context.⁶ In addition, the extent to which a donation for a public good is motivated by a private gain affects whether private provision of the public good is optimal and whether government intervention is required to enhance efficiency. Gaining a better understanding of the motivations for alumni giving is also of independent interest because of its importance to the financing of higher education. In 2004–2005, alumni contributed \$7.1 billion to higher education, about 28 percent of all voluntary support.⁷

In Section I, we briefly review some pertinent previous research in this area. Section II describes the data and econometric framework. The results are presented in Section III. The evidence is strongly consistent with the child-cycle pattern. Alumni parents of teenage children who apply to Anon U make larger donations than alumni whose children do not apply. Once an alumnus’s child is accepted, his donations fall off substantially. If the child is rejected, giving falls off dramatically. Section IV discusses the sensitivity of the results to alternative specifications of the model. Section V concludes with a summary and suggestions for additional research.

⁴ Daniel Golden, “How Lowering the Bar Helps Colleges Prosper,” *Wall Street Journal*, Saturday/Sunday, September 9–10, 2006.

⁵ John Hechinger, “The Tiger Roars,” *Wall Street Journal*, July 17, 2006.

⁶ Vesterlund (2006) notes that, relative to studies of crowd-out using survey or tax data, experimental studies tend to find stronger evidence of a public motive for giving.

⁷ Other sources of voluntary support include other individuals, corporations, foundations, and religious and other organizations. See *Chronicle of Higher Education* (2006).

I. Previous Literature

The role of altruism in human behavior has long been of interest to economists. As Serge-Christophe Kolm (2000, 7) notes, “all great economists have considered the effects of positive social sentiments,” including Adam Smith, John Stuart Mill, Léon Walras, Vilfredo Pareto, and Jeremy Bentham. In more recent times, notions of altruism have been brought to bear in theoretical analyses of charitable giving (Gary S. Becker 1974), rescues (William M. Landes and Richard A. Posner 1978), commercial policy (Julio J. Rotemberg 2000), and remittances of migrants to their home countries (Frederic Docquier and Hillel Rapoport 2000), among other important social phenomena. Additional discussion can be found in Amartya Sen (1977) and Kolm (2000).

Altruistic behavior within families has received particularly extensive attention because of its implications for several important policy questions. In particular, the efficacy of fiscal policy hinges on the extent to which intergenerational bequests are motivated by altruism. Becker (1974) considers a theoretical model in which parents are altruistic and shows that, under certain assumptions (an important one being that parents’ utility depends only on family income) they have no incentive to be strategic with respect to their children. In contrast, B. Douglas Bernheim, Andrei Shleifer and Lawrence H. Summers (1985) develop a theory in which bequests are motivated not only by altruistic concern for children, but also with the hope for reciprocity in the form of care or attention.

Theories relating to intrafamily altruism have been tested in a rich econometric literature. This literature has developed because there are observable variables related to the selfish gains that might be obtained from seemingly altruistic behavior. For example, one can look at the amount of contact between elderly parents and children and how it is related to the parents’ bequeathable wealth. The results are mixed. Bernheim, Shleifer, and Summers (1985); Joseph G. Altonji, Fumio Hayashi, and Laurence J. Kotlikoff (1992); and Alessandro Cigno and Furio C. Rosati (2000) find evidence that gifts from parents to children have a strategic component, while Kathleen McGarry and Robert F. Schoeni (1995), Lakshmi K. Raut and Lein H. Tran (2000), and Yannis M. Ioannides and Kamhon Kan (2000) find that altruistic motives predominate.

Turning to the much different but important case of charitable donations, which amounted to about \$250 billion in 2004⁸, researchers have more or less taken for granted that selfish motives play a role. According to Clotfelter (1985, 38), “Individuals may volunteer for organizations in order for their families or themselves to consume services.” Burton A. Weisbrod (1978, 34) is more pointed: “The extent to which narrow self-interest lies behind the donations of money and time to nonprofit organizations is little understood, but there can be no doubt that donors often do benefit through the making of business contacts and the receipt of favorable publicity for good deeds.” Similarly, it has been suggested that selfish motives may

⁸ Giving USA Foundation (2005).

underlie donations to universities. "Donors demand attention and prestige supplied by college fundraisers"⁹ (Jang H. Yoo and William B. Harrison 1989, 367).

Are such assertions valid? Erik Schokkaert and Luc Van Ootegem (2000) summarize survey evidence on reasons for giving. Also, a number of laboratory experiments have investigated the extent to which contributions to public goods are marked by altruism. (See, for example, James Andreoni (1993), John A. List (2007), and the extensive survey by Andreoni, William T. Harbaugh and Vesterlund (2008).¹⁰ James C. Cox (2004) designed an experiment to determine how much of individuals' behavior is driven by altruism or reciprocity. He found that while reciprocity is an important component of motivation, a large proportion of the subjects still show some elements of pure altruism. Similarly, Gary Charness and Ernan Haruvy (2002) found that altruism plays a role in a gift-exchange experiment.

In marked contrast to the literature on giving within the family, however, we have been able to find no statistical work on motivations for charitable giving based on observational data. The same holds for the literature on the determinants of alumni giving to their universities. Econometric studies of alumni giving have examined a wide array of variables such as attitudinal measures of satisfaction with the undergraduate experience, income, marital status, number of children, occupation, the state of the stock market, marginal tax rates, gender, ethnicity, academic performance as an undergraduate, extracurricular activities including varsity athletics, membership in fraternities or other social clubs, whether the individual received financial aid, performance of athletic teams, and so on.¹¹ However, we have found no systematic attempts to assess whether self-interest might have a role in explaining giving behavior.

The likely reason for the dearth of such research is the absence of measurable indicators of the benefits donors expect to receive in return for their donations. Our study is premised on the notion that alumni believe donations enhance the probability that their children will be admitted to their alma mater. Therefore, the presence of children, their ages, and their admissions status are measurable indicators of the potential for reciprocal benefits generated by donations. In this view, alumni believe that donations buy them entrance into a lottery in which the prize is admission for their children. As we stressed above, whether the probability of one's child being admitted depends on prior or expected future donations is unknown.¹² However, as long as alumni perceive that their contributions improve their children's chances of being admitted and that greater contributions by others lessen the odds, then this mechanism is operative.

⁹ This suggests that efforts by college development offices could be an important determinant of alumni giving. Certainly, this is why colleges have such offices in the first place. While there is some evidence of a correlation between development costs and donations across institutions (Harrison, Shannon K. Mitchell, and Steven P. Peterson 1995), it is difficult to ascribe a causal relationship because the variables are likely jointly determined.

¹⁰ For an ethnographic approach to studying motivations for charitable giving, see Teresa Odendahl (1990).

¹¹ See, for example, Clotfelter (2003), James Monks (2003), James L. Shulman and William G. Bowen (2001, Chapter 10), Alton L. Taylor and Joseph C. Martin (1995), and Phanindra V. Wunnava and Michael A. Lauze (2001).

¹² In particular, our data do not allow us to explore this hypothesis for Anon U, as we have no information on the attributes of rejected students. (See below.)

II. Data and Econometric Model

A. Data

Our primary data source is the administrative archives of Anon U's development office, which contain information on all alumni donations from 1983 to 2006. There are no issues of selectivity with respect to the sample because every alumnus is included. The data are proprietary and sensitive, and individuals' names were stripped from the records before being made available to us. Our unit of observation is a yearly giving opportunity. For example, if an individual has been an alumna for five years, she accounts for five giving opportunities in our analysis, starting in the first fiscal year after graduation. Multiple gifts in the same year are summed together. The development office data also include information on academic major, extracurricular activities when the alumnus was an undergraduate, post graduate education, occupation, residence, whether he or she is married to another graduate of Anon U, as well as information on the age and admissions status of the alumnus's children.¹³ Anon U's registrar supplemented these data with information on SAT scores, academic honors, ethnicity, type of high school, summary evaluations made by the admissions office during the application process, and grade point average. The registrar's data are available only as far back as the class of 1972, so we restrict most of our analysis to this group of individuals.

We begin with 547,836 observations representing 35,556 alumni. We delete 27,992 observations because of missing data on the child's age, essential information for our analysis. We deleted an additional 1,100 observations because the child withdrew his or her application before a decision was rendered, and another 32,041 because of missing data for other variables. Altogether, our analysis sample has 487,913 observations on 32,488 alumni.

We focus on two dimensions of alumni giving. First is the probability that an alumnus made any gift at all in a given year.¹⁴ Universities care about the proportion of their alumni who make donations. Anon U, for example, makes considerable effort to contact as many alumni as possible and urge them to give something, even if it is just a few dollars. Second, we analyze the amount donated in any given year.¹⁵

The mean and standard deviation of each of these variables are shown at the top of Table 1.¹⁶ The unconditional mean gift (in 2006 dollars) is \$466. The relatively large

¹³ The data regarding post-graduation attributes are collected through various means, including surveys, class Web sites, and the alumni magazine. Class officers and the alumni records office also contribute to these data. Although the approach is not entirely systematic, Anon U's development office is confident that the data are fairly complete and accurate.

¹⁴ Pledges without an associated gift are not counted.

¹⁵ As is typically the case, a few relatively large gifts account for a disproportionate amount of Anon U's donations. For example, in 2006, the top 1 percent of gifts accounted for 69.2 percent of total giving. In results available upon request, we also estimate the probability that the alumnus is a "class leader" in a given year, where a class leader is defined as an individual who donated an amount greater than or equal to the 90th percentile of gifts in his or her class. The results with respect to the child cycle are qualitatively the same for the probability of being a class leader as they are for the probability of making any gift at all, and for the amount of the gift.

¹⁶ As noted above, these are summary statistics of our observations, which are not the same as summary statistics for the alumni themselves. In effect, the data in the table weight alumni characteristics by the number of years each alumnus was in the sample. Therefore, changes in the demographic structure of Anon U may not be fully evident. However, the summary statistics in the last panel of Table 1 report some variables for which the means are taken over the number of alumni rather than the number of observations.

TABLE 1—VARIABLE DEFINITIONS AND SUMMARY STATISTICS^a

Variable	Description	Mean	Standard deviation
TotalYear	Total giving for year in 2006 dollars	466.14	49,512
LogTotalYear	Log of total giving for year in 2006 dollars	2.425	2.425
Didgive	1 if any donation given in year	0.5563	0.4968
Yearssince	Number of years since graduation	12.05	7.826
Yearssince2	Number of years since graduation, squared	206.5	231.3
Spouseisalum	1 if the spouse is an alumnus	0.1302	0.3365
Male	1 if the alumnus is male	0.6507	0.4768
Race/ethnicity			
White	Omitted category: 1 if the alumnus is white	0.8195	0.3846
Amerind	1 if the alumnus is a Native American	0.00363	0.06012
Black	1 if the alumnus is black	0.06929	0.2539
Hispanic	1 if the alumnus is Hispanic	0.03798	0.1911
Asian	1 if the alumnus is Asian	0.06958	0.2544
Secondary schooling			
Public	Omitted category: 1 if the alumnus attended public school	0.5792	0.4937
Boarding	1 if the alumnus attended boarding school	0.1395	0.3464
Private	1 if the alumnus attended private school	0.2622	0.4398
Schloth	1 if the alumnus attended another type of school	0.01916	0.1371
SATmath	SAT math score. Scores prior to 1996 are adjusted to reflect recentering of the scoring scale	703.1	75.95
SATverbal	SAT verbal score. Scores prior to 1996 are adjusted to reflect recentering of the scoring scale	701.9	75.77
Admissions office "nonacademic" ranking ^b			
A	Omitted category: 1 if the alumnus received the highest nonacademic ranking from the admissions office	0.03220	0.1765
B	1 if the alumnus received the second highest nonacademic ranking from the admissions office	0.4660	0.4988
C	1 if the alumnus received the third highest nonacademic ranking from the admissions office	0.4188	0.4934
D	1 if the alumnus received the fourth highest nonacademic ranking from the admissions office	0.07897	0.2697
E	1 if the alumnus received the fifth highest nonacademic ranking from the admissions office	0.00401	0.06319
Admissions office "academic" ranking			
A	Omitted category: 1 if the alumnus received the highest academic ranking from the admissions office	0.1536	0.3605
B	1 if the alumnus received the second highest academic ranking from the admissions office	0.4242	0.4942
C	1 if the alumnus received the third highest academic ranking from the admissions office	0.2708	0.4444
D	1 if the alumnus received the fourth highest academic ranking from the admissions office	0.1435	0.3506
E	1 if the alumnus received the fifth highest academic ranking from the admissions office	0.0079	0.08858
Varsity	1 if the alumnus played on a varsity team	0.3892	0.4876
Clubsport	1 if the alumnus played on a club team	0.1728	0.3780
Honors	1 if the alumnus graduated magna, summa, or cum laude	0.4532	0.4978
Greek	1 if the alumnus was a member of a fraternity or sorority	0.6949	0.4604
Major			
Molbio	Omitted Category: 1 if the alumnus majored in molecular biology		
Small social sciences	1 if the alumnus majored in anthropology, urban studies, or Sociology	0.02940	0.1689
English	1 if the alumnus majored in English	0.1073	0.3095
Economics	1 if the alumnus majored in economics	0.07949	0.2705
Public policy	1 if the alumnus majored in public policy	0.05841	0.2345
Political science	1 if the alumnus majored in political science	0.08796	0.2832
Psychology	1 if the alumnus majored in psychology	0.04890	0.2157
History	1 if the alumnus majored in history	0.1182	0.3229
MAE	1 if the alumnus majored in mechanical/aerospace engineering	0.03534	0.1846
EE/CS	1 if the alumnus majored in electrical engineering or computer science	0.05533	0.2286

TABLE 1—VARIABLE DEFINITIONS AND SUMMARY STATISTICS (Continued)

Variable	Description	Mean	Standard deviation
Major			
Arch & Civ	1 if the alumnus majored in architecture or civil engineering	0.07040	0.2558
Small humanities	1 if the alumnus majored in art, art history, classics, East Asian studies, linguistics, music, Near Eastern studies, philosophy, religion, or languages and literature	0.1180	0.3226
Small engineering	1 if the alumnus majored in "engineering," operations research and financial engineering, or chemical engineering	0.03132	0.1742
Small sciences	1 if the alumnus majored in applied mathematics, astrophysics, biochemistry, biology, chemistry, ecology and evolutionary biology, geology, mathematics, physics, or statistics	0.1375	0.3444
Minor			
No minor	Omitted category: 1 if the alumnus received no minor	0.7673	0.4226
African/African American studies	1 if the alumnus received a minor in African or African American studies	0.02303	0.1500
American studies	1 if the alumnus received a minor in American studies	0.02324	0.1507
Latin	1 if the alumnus received a minor in Latin	0.00186	0.04305
Finance	1 if the alumnus received a minor in finance	0.00324	0.05683
Theater	1 if the alumnus received a minor in theater	0.0129	0.1130
Public policy	1 if the alumnus received a minor in public policy	0.05023	0.2185
Other engineering	1 if the alumnus received a minor in architecture, basic engineering, bioengineering, electrical engineering, geological engineering, management, materials sciences, or robotics	0.0184	0.1344
Other sciences	1 if the alumnus received a minor in applied and computational mathematics, biophysics, cognitive studies, environmental studies, science in human affairs, or neuroscience	0.0273	0.1630
Other humanities	1 if the alumnus received a minor in a humanities field	0.0526	0.2233
Teaching	1 if the alumnus received a teaching certificate	0.01377	0.1165
Reunion	1 if the year after graduation is some multiple of 5	0.1795	0.3838
Post baccalaureate education			
NoPostAB	Omitted category: 1 if the alumnus has no advanced degree	0.6053	0.4888
PhD	1 if the alumnus has a PhD or equivalent degree	0.0674	0.2508
Masters	1 if the alumnus has a masters	0.1381	0.3450
JD	1 if the alumnus has a JD	0.1004	0.3006
MD/DDS	1 if the alumnus has a medical degree	0.06173	0.2407
MBA	1 if the alumnus has an MBA	0.0899	0.2860
Alumni-based sample			
EverGave ^c	Proportion of alumni who gave at least once since graduation	0.8828	0.3216
Children ^c	Proportion of alumni with at least one child	0.2347	0.4238
AnyAccepted ^c	Proportion of all alumni who had at least one child admitted to Anon U	0.0212	0.144
PropApplied ^c	Conditional on the eldest child reaching age 17, proportion of alumni who had at least one child apply to Anon U ($n = 2,840$)	0.5870	0.4924
PropAccepted ^c	Conditional on at least one child applying, proportion of alumni who had at least one child admitted to Anon U ($n = 1,667$)	0.4107	0.4921

^a Based on 487,913 observations on gift giving from 1983 to 2006. Represented here are 32,488 alumni who graduated from 1972 to 2005. Unless otherwise indicated, these are summary statistics of our observations, which are not the same as summary statistics for the alumni themselves. In effect, the data in the table weight alumni characteristics by the number of years each alumnus was in the sample.

^b The nonacademic ranking is based on attributes such as musical talent, athletic ability, volunteer work, etc.

^c Based on 32,488 observations on alumni who graduated from 1972 to 2005, observed in 2006. Unless otherwise noted, these are summary statistics for the alumni themselves. These variables do not enter the regression models.

standard deviation, \$49,512, reflects the presence of enormous outliers. To reduce the likelihood that outliers drive our results, we take the log of the amount given.¹⁷ In addition, we also estimate our models without the top 1 percent of the observations, and find that the results are essentially unchanged. With respect to the probability of giving, Table 1 shows that about 55.6 percent of the giving opportunities result in a donation to the university. Relative to other schools, this is a high participation rate. Indeed, Anon U is at the edge of the right tail with respect to the proportion of alumni who make contributions.

Most of the explanatory variables in the table are dichotomous. For each set of dichotomous variables, the “omitted category” is the variable that is excluded from the regressions. About 65.1 percent of our observations are associated with male alumni. Historically, Anon U was an all-male institution and did not confer degrees on women until the 1970s. Whites comprise 81.9 percent of our observations. A total of 57.9 percent of the observations are associated with secondary education at a public school; almost 39 percent with participation in undergraduate varsity athletics;¹⁸ and 45.3 percent with individuals who receive honors when they graduate. About 40 percent receive a post baccalaureate degree.

Unfortunately, the data include no direct information on income, an important determinant of giving (Shulman and Bowen 2001, 404). We address this issue in two ways. First, for a large subset of our alumni, we have information that is closely related to permanent income, occupation and field.¹⁹ Table 2 shows the occupations and fields for the 344,342 observations, representing 20,039 alumni, for which we have this information.²⁰ The fields of education, finance, health care, and law are highly represented. We re-estimate our basic models with this subsample including the occupation and field data in order to see whether our substantive results are sensitive to their inclusion. As shown below, they are not. Second, if we are willing to think of an alumnus’s permanent income as an unchanging attribute (at least during our sample period), then we can model it as a fixed effect. We show below that our substantive results are unchanged with fixed-effects estimation.

B. *Characterizing the Child Cycle*

We characterize the child cycle by a vector of dichotomous variables indicating whether the alumnus has a child, and if so, his or her age and admissions status. We discuss the treatment of families with several children below. Recall that in our framework, alumni with children may believe that a gift to Anon U will some day

¹⁷ A logarithmic transformation presents problems for observations that take a value of zero. As noted below, we set 320 gifts that are greater than zero but less than or equal to \$1 equal to \$1.01. Therefore, observations for which there is no giving are associated with \$1, for which the logarithm is zero.

¹⁸ Varsity athletes are defined as those who participated in a varsity-level sport, not necessarily receiving a varsity letter. Club sports are defined as those that do not confer a varsity letter.

¹⁹ In this context, it is important to note that a number of the variables in our basic specification are also correlated with income including gender, ethnicity, college major and grade point average, advanced degrees, years since graduation, and location. Moreover, Brendan M. Cunningham and Carlena K. Cochi-Ficano (2002) point out that SAT scores are related closely to family socioeconomic status as well.

²⁰ Due to lack of reliable data regarding the start and stop dates of occupation and field, these variables indicate whether the alumnus was ever involved in that field or occupation, rather than whether they are involved during the particular year of observation.

TABLE 2—POSITION AND FIELD DEFINITIONS AND SUMMARY STATISTICS^a

Variable	Description	Mean	Standard deviation
Field			
Arts	1 if the alumnus ever worked in the arts field	0.06254	0.2421
Agriculture	1 if the alumnus ever worked in the agriculture field	0.00187	0.04324
Architecture	1 if the alumnus ever worked in the architecture field	0.02516	0.1566
Pharmaceuticals	1 if the alumnus ever worked in the pharmaceuticals field	0.02336	0.1511
Communications	1 if the alumnus ever worked in the communications field	0.09619	0.2949
Consulting	1 if the alumnus ever worked in the consulting field	0.1009	0.3011
Education	1 if the alumnus ever worked in the education field	0.1222	0.3275
Finance	1 if the alumnus ever worked in the finance field	0.1947	0.3960
Health care (Business/Industry)	1 if the alumnus ever worked in the health care field	0.1700	0.3756
Hospitality	1 if the alumnus ever worked in the hospitality field	0.00457	0.06743
Information technology	1 if the alumnus ever worked in the IT field	0.1150	0.3190
Law	1 if the alumnus ever worked in the law field	0.1883	0.3909
Manufacturing	1 if the alumnus ever worked in the manufacturing field	0.07509	0.2635
Retail	1 if the alumnus ever worked in the retail field	0.02251	0.1483
Transportation	1 if the alumnus ever worked in the transportation field	0.01014	0.1002
Federal government	1 if the alumnus ever worked for the federal government	0.04406	0.2052
State Government	1 if the alumnus ever worked for a state government	0.02515	0.1566
Foreign government	1 if the alumnus ever worked for a foreign government	0.00275	0.05234
Nongovernmental Organization	1 if the alumnus ever worked in the NGO field	0.02832	0.1659
Religion	1 if the alumnus ever worked in the religion field	0.01052	0.1020
Other	1 if the alumnus ever worked in another field	0.27108	0.4445
Multilateral organization	1 if the alumnus ever worked in the multilateral organization field	0.00191	0.04371
Military	1 if the alumnus ever worked for the military	0.00747	0.08612
Occupation			
Government worker	1 if the alumnus ever worked as a government worker	0.01007	0.09982
Miscellaneous worker	1 if the alumnus ever worked in some miscellaneous occupation	0.08177	0.2740
Physician/dentist	1 if the alumnus ever worked as a physician or dentist	0.1339	0.3405
White collar	1 if the alumnus ever worked in a white collar occupation	0.3079	0.4616
Attorney	1 if the alumnus ever worked as an attorney	0.2673	0.4426
Executive	1 if the alumnus ever worked as an executive	0.4863	0.4998

^aBased on 344,342 observations on gift giving from 1983 to 2006 for individuals for whom data on field and position are reported. A total of 20,039 alumni who graduated from 1972 to 2005 are represented.

generate a reciprocal benefit, and therefore the presence of a child should increase the probability of making a gift. Perhaps, though, having a child is correlated with unobserved variables that also drive giving decisions. For example, individuals who become parents might care about young people in general, and hence be particularly willing to support higher education. But if so, there would be no reason to expect giving to decline just when the child exceeds the age at which college admissions decisions are made. In contrast, the child-cycle framework implies that once the child is beyond that age, giving will drop off, because the admissions lottery is over. To examine how giving varies with the age of the child, we include a series of dichotomous variables, $CHILD_i$, which take a value of one if the alumnus has a child of age i and zero otherwise. The range of i is from zero (less than one year old) to 26 years old and older.

Even if giving increases as admissions time approaches (at approximately 18 years of age) and falls thereafter, hopes for reciprocity need not be at work. Perhaps, for example, a child of college age reawakens fond memories of an alumnus's

undergraduate days, or inspires thoughts of experiences that the alumnus and his child might share during future parents' weekends. This could lead to an increase in an alumnus's propensity to give. To investigate this possibility, we take advantage of information on whether the child ultimately applies for admission. Suppose that by the time the child is a teenager, an alumnus can reasonably estimate the probability that his or her child will ultimately apply. Such an estimate could be based on the child's expressed preferences for type of college, academic performance, and so on. If so, the perceived payoff to the admissions lottery should be higher for alumni whose children ultimately apply than for those who do not, and so should their donations. We therefore include a set of interaction terms, $CHILD_i Appl$, which multiply $CHILD_i$ by a dichotomous variable that equals one if a child of age i eventually applied to Anon U and zero otherwise. We assume that parents can form reasonably accurate expectations about whether their children will apply only when the children are in their teens, so that $CHILD_i Appl$ is defined only for values of i from 14 through 17 years of age. Under the joint hypothesis that alumni can predict with some accuracy whether their children will apply and that expected reciprocity is a motivation for giving, these interaction terms should have positive coefficients.

Similarly, we define a series of dichotomous variables, $CHILD_i NoAppl$, which equals one if the child ultimately did not apply and zero otherwise, with i running from 14 to 17 years of age. If expected reciprocity is present, the coefficients on these variables will be smaller than those associated with the $CHILD_i Appl$ variables, but still positive. They remain positive because presumably some parents in this group believe that their children will apply, so their giving should be higher than that of members of the omitted category, who have no children at all. A third series of dichotomous variables, $CHILD_i Young$, equal one if the child was not old enough to have applied by the end of our sample in 2006, with i running from 14 to 16 years of age.

Turning now to the outcome of the admissions decision, we expect it to have no impact on giving if altruism is the only motivation. On the other hand, to the extent that giving is motivated by expected reciprocity, we expect parents of admitted children to reduce giving, as there is no longer an expected gain. This effect will be attenuated if these alumni perceive that Anon U has "held up its side of the bargain," and reciprocate by continuing to give. Below, we examine some other reasons why admittance of one's child might not lead to a dramatic decrease in giving. Turning now to the parents of rejected children, not only is the prospect of an expected gain gone, but the alumnus may perceive that the university has not reciprocated properly, and therefore retaliates by reducing donations even further.

To examine these conjectures about the impact of the admissions decision, we create a set of dichotomous variables: $CHILD_i Acc$, which equal one if the child applied to Anon U and was accepted and zero otherwise; and $CHILD_i Rej$, which equal one if the child applied to Anon U and was rejected and zero otherwise.²¹ For these variables, i runs from 18 through 26 years old and older.

²¹ The data allow us to distinguish between those who are accepted but do not attend and those who do attend. However, nearly all of Anon U's alumni children who are accepted to Anon U choose to attend. Therefore, sample sizes are too small to measure accurately any differences in the two populations.

A complication arises when families have multiple children. Which one should be used for characterizing the child cycle? In our basic results reported below, all the child-cycle variables are defined in terms of the first child. This makes sense because the giving decision surrounding the first child is unaffected by any prior personal experience of reciprocity. However, some of the giving that occurs during the first child's cycle might be affected by the presence of younger children. For example, alumni might continue to make large donations after their first child is accepted out of concern about the admissions prospects of younger children. Given the large number of child-cycle variables, it is infeasible to include the cycles for multiple children and their interactions in one model. Therefore, we simply estimate the child cycle based on the last child in the family. As shown below, the substantive results are essentially the same as those based on the first child.

It would be cumbersome and uninformative to report summary statistics for each of the large number of variables that characterize the child cycle. To provide some basic information, we note that in 2006, the last year of our sample, 23.5 percent of the alumni had at least one child. Of those who had a child, the mean age was 13.6 years old. Conditional on reaching age 17, 1,501 alumni children, representing 52.9 percent of that subsample, had applied to Anon U, and 37.2 percent were accepted. Other summary statistics that relate to the child cycle are reported in the last panel of Table 1 under the heading "Alumni-based sample."

C. *Econometric Model*

We model the decision to make a gift to Anon U with a probit model:

$$\Pr(G_{jt}) = \Phi[\alpha + CYCLE_{jt}\beta_1 + X_{jt}\gamma + YEAR_t\beta_2 + LOC_{jt}\beta_3 + CLASS_j\beta_4],$$

where $\Pr(G_{jt})$ is the probability that alumnus j makes a gift in year t ; $\Phi[\cdot]$ is the cumulative normal distribution function; $CYCLE_{jt}$ is the vector of variables characterizing the child cycle as discussed above; X_{jt} is a vector of the alumnus's personal characteristics; $YEAR_t$ is a set of time effects; LOC_{jt} is a set of location effects (state or foreign country of residence); and $CLASS_j$ is a set of class effects (equal to one if the alumnus graduated in a given year and zero otherwise). The time effects account for the impacts of the state of the business cycle, the stock market, and so on.²² The state effects allow for the possibility that alumni who live closer to Anon U might be more likely to donate, and their children might be more likely to attend. The class effects control for common influences on alumni in the same class, such as the political milieu when they were undergraduates, the presence of certain professors or administrators, and so on.

As noted above, we have more than one observation per alumnus. Because the errors for the observations for a given alumnus are likely to be correlated, the standard errors are adjusted for clustering within individuals.

²² Ralph Bristol (1991) emphasizes the role of the stock market and Ronald G. Ehrenberg and Christopher L. Smith (2003) document the importance of macroeconomic conditions. Time effects also take into account changes in the value of the university's endowment (Sharon M. Oster 2001).

When we turn to the actual amount of the gift, we face two issues that arise in all studies of donative behavior. First, a substantial number of the observations are zero. Second, there are a few very large outliers. For example, the three largest gifts in our sample are \$3.1 million, \$6 million, and \$31.1 million. To address the first issue, we use the Tobit estimator, which explicitly takes censoring into account. The second problem suggests that we transform the data to reduce the influence of outliers. We take logarithms. Because the logarithm of zero is not defined, we set the 320 positive gifts that were less than or equal to \$1 equal to \$1.01.²³ In effect, we have censoring at the point where the logarithm of the gift is equal to zero, and can then apply Tobit straightforwardly. There is, of course, some arbitrariness to this procedure. To assess its robustness, we also estimate the model in levels, first with the entire sample and then eliminating the top one percent of the observations in order to reduce the impact of outliers. The substantive results with respect to the child-cycle variables are not affected. As with the probit estimates, we correct for correlation among the error terms for any given individual by using a clustering procedure.

We assume that the determinants of the amount of giving are the same as those that affect the probability of giving. Under this condition, the marginal effects generated by the probit model and the Tobit model are the same up to a constant of proportionality. Because the quantitative magnitudes of the child-cycle variables on the probability of giving and the amount of giving are both of interest, we report both sets of marginal effects below.

III. Results

A. Probability of Making a Gift

Given the large number of child-cycle variables, the most convenient way to present the child-cycle coefficients is in a graph.²⁴ In Figure 1, the horizontal axis measures the child's age, and the vertical axis shows the incremental effect on the probability of making a gift (relative to having no children). The dashed lines indicate 95 percent confidence intervals. Note that overlapping confidence intervals do not imply necessarily that one cannot reject the hypothesis that the difference between the two associated coefficients is zero. We return to this issue below.

The graph starts when the child is born and shows that having a child increases the probability of giving by about 13 percentage points. The incremental effect of the child's presence generally increases with the child's age, reaching about 17 percentage points by the time he or she is 13 years old. These coefficients are estimated precisely. When children reach the age of 14, our model distinguishes between those who eventually apply to Anon U and those who do not. This is reflected by the fact that the line divides at age 14. Comparing the two sets of coefficients, we see that at every age from 14 to 17 years old, the incremental probability of giving is greater for alumni whose children ultimately applied. The differences at each age

²³ Dropping these observations, which represent only 0.12 percent of all gifts, leaves our results essentially unchanged.

²⁴ The coefficients and standard errors themselves are available upon request.

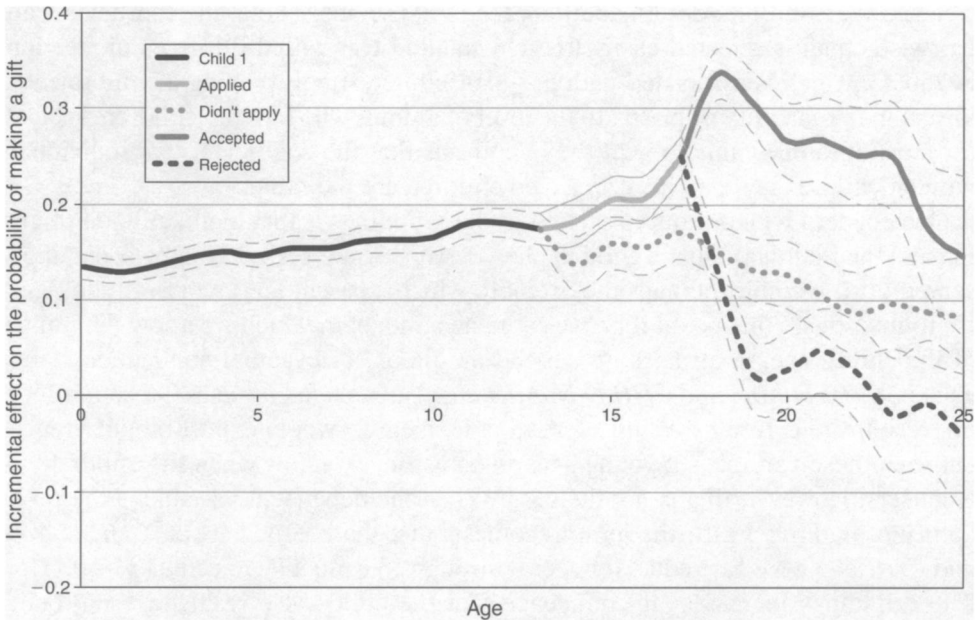


FIGURE 1. INCREMENTAL EFFECT OF THE CHILD CYCLE ON THE PROBABILITY OF MAKING A GIFT

Notes: This figure graphs the child-cycle coefficients from a probit model of the probability of making any donation in a given year, estimated using 487,913 observations. The vertical axis shows the incremental effect (relative to having no children) on the probability of making a gift in a given year as a function of the first child's age and admissions status. The dashed lines are 95 percent confidence intervals.

are statistically significant from each other. Moreover, the joint test that each pair of coefficients is different is highly significant (the chi-squared test with four degrees of freedom is 31.78, which is associated with $p = 0.0000$). This differential is consistent with the hypothesis that alumni reasonably can predict the likelihood that their children will apply to Anon U and that reciprocity in the form of admission is expected.²⁵

At age 18, the graph splits again, this time between applicants who were rejected by and those who were accepted at Anon U.²⁶ The graph indicates that, conditional on applying, the probability of giving increases by about 34 percentage points for an alumnus whose 18 year old child is accepted. The incremental probability falls after acceptance (by age 20 it is down to about 27 percentage points), but remains elevated into the child's mid-20s. The parents of unsuccessful applicants behave very differently. As the figure indicates, the incremental probability of making a gift falls off substantially at age 18, and at age 19 and older, it is essentially zero. At each age, the differences between probabilities for alumni whose children were accepted and those who were not are statistically significant except for those whose children

²⁵ Note also that this finding is inconsistent with the notion that the child-cycle pattern is due to the fundraising office focusing on alumni with children approaching college age. To explain this finding, one would have to argue that the fundraisers have perfect foresight with respect to the future behavior of alumni children.

²⁶ Because our unit of observation is based on an entire year, there is some ambiguity in precisely when the admissions decision becomes known. The year in which the child turns 18 years old is a sensible choice.

were 26 years old or older. In addition, the joint hypothesis that the coefficients are pairwise equal is rejected easily (the chi-squared test with 18 degrees of freedom is 260.32, which is associated with $p = 0.00$). Interestingly, having a child rejected lowers the probability of giving to the level of alumni who have no children. Indeed, for most ages one cannot reject the hypothesis that the coefficients for individuals without children and parents of rejected children are the same.

One concern with our interpretation of these findings is that the likelihood of giving and the likelihood that a child applies to Anon U are both driven by some unobserved third variable, perhaps the extent to which a parent feels an affinity to Anon U. To investigate this possibility, we estimate a model in which we allow the impact of the child's age, at all ages, to depend on his or her eventual application status. That is, $CHILD_i Appl$ and $CHILD_i NoAppl$ are also included for ages 0 through 14. If our results are driven by affinity for Anon U, then we would expect the differences between these variables at young ages to be as important as when the children are teenagers. However, this is not the case. When the dependent variable is the probability of making a gift, the joint hypothesis that the coefficients on $CHILD_i Appl$ and $CHILD_i NoAppl$ are equal for ages 0 through 13 cannot be rejected ($p = 0.1415$). These findings increase our confidence that the child-cycle results are not being driven by the alumnus's unobservable affinity for Anon U. Further evidence along these lines is presented in Section IV.

Another possible problem with our interpretation of Figure 1 is that reduced giving after admissions might be driven by income effects associated with tuition payments. If tuition were the important factor, then we would also expect to see decreases in giving among alumni whose children did not apply to Anon U but instead attended other institutions. As Figure 1 demonstrates, however, these alumni do not exhibit anything like the substantial decreases in giving that we see for the alumni of accepted children.²⁷

In short, the patterns in Figure 1 cannot be explained readily by the public good provision, by a "warm glow" from giving, or by income effects associated with tuition payments. In contrast, the results fit well in the child-cycle framework.

Other variables.—The coefficients on the other variables in the basic model are of some interest, because they allow us to see whether the determinants of giving at Anon U are similar to those that have been found in previous studies of alumni giving. Since they are not of central importance to documenting the existence of a child cycle to alumni donations, however, we discuss them in the Appendix to this paper. The Appendix shows that, taken together, our results are very much in line with those from previous studies. While no school is "typical," Anon U appears not to be idiosyncratic with respect to the determinants of the donation decision. It is not unreasonable to expect, therefore, that the child-cycle results would also generalize to other selective institutions.

²⁷ Another argument along the same lines is that when one's child is accepted at another institution, new opportunities for charitable giving open at that institution. Again, though, if this were the case, we would expect the behavior of the parents of rejected children and the parents of children who never applied to be about the same, in contrast to Figure 2.

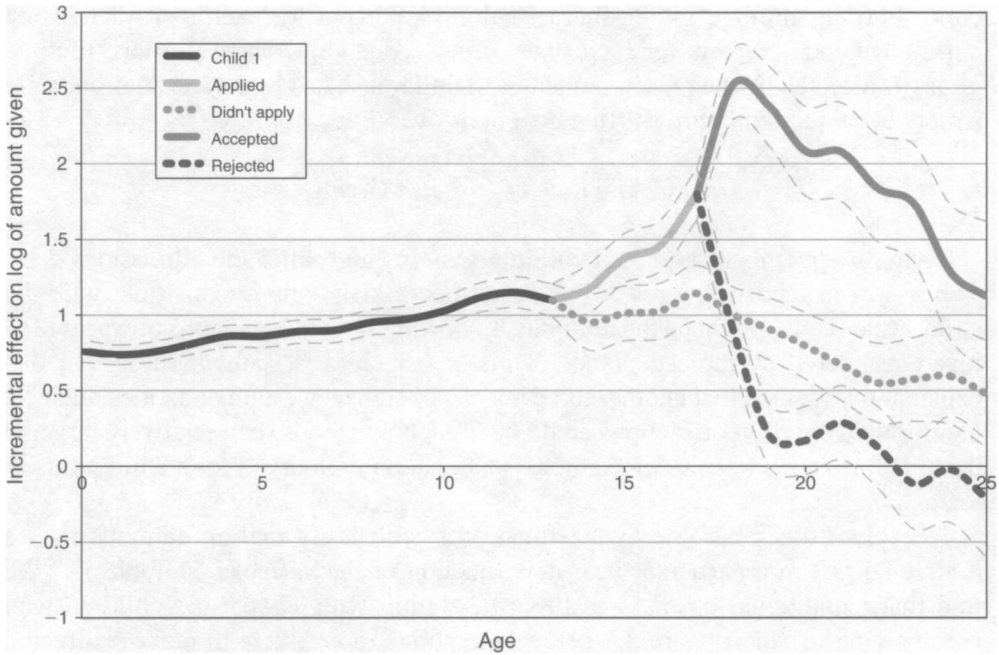


FIGURE 2. INCREMENTAL EFFECT OF THE CHILD CYCLE ON THE AMOUNT GIVEN
(*Last Child*)

Notes: This figure graphs the child-cycle coefficients from the Tobit model of the amount of donations in any given year, estimated using 487,913 observations. The vertical axis shows the incremental effect (relative to having no children) on the log of amount donated in a given year as a function of the first child's age and admissions status. The dashed lines are 95 percent confidence intervals.

B. Amount of Giving

Figure 2 graphs the child-cycle coefficients from the Tobit model of the amount of donations. As noted above, the probit and Tobit coefficients are the same up to a constant of proportionality, so the figure does not provide any truly new information. The magnitudes are of some interest, however. In this context, it is important to note that, because the dependent variable is the logarithm of giving, small coefficients are approximately percentage changes. However, this approximation is not very good for large coefficients, so caution is required in their interpretation.

A challenge to the child-cycle interpretation of Figure 2 is that total giving over an alumnus's life may not be affected much by having an eligible child, just the timing of donations. To investigate this possibility, we estimate a cross sectional regression in which the left-hand-side variable is lifetime giving as of 2006,²⁸ and the right-hand-side variable includes the basic demographic variables in Table 1 augmented with a series of dichotomous variables for number of children and continuous variables for the age of each child. We find that lifetime giving is 109 percent higher for alumni with one child and an additional 58 percent higher with a second

²⁸ Specifically, this is computed as the sum of giving in constant dollars over all years that the alumnus has been in the sample.

child. Further, lifetime giving increases by 5.1 percent for each year of the first child's age and 2 percent for each year of the second child's age. In short, lifetime giving is affected by the presence and age of children. The child cycle does not arise simply because alumni are shifting donations over time.

C. The Role of Directed Giving

Giving by parents of accepted children remains high after the admissions decision has been rendered, a result that is not necessarily wholly consistent with the child-cycle model. Perhaps the alumnus is showing tangible evidence of warm feelings engendered by the acceptance of his or her child.²⁹ Without ruling out this explanation, we note that another force may be operative. Certain donations made by alumni with children on campus could be less public goods than relatively targeted benefits for their progeny. An example is a donation earmarked for a child's varsity team.

To explore this possibility, we estimate the probability that an alumnus makes a directed gift in a particular year as a function of the variables in Table 1.³⁰ We find that, conditional on making any gift, alumni with 17-year-old children who are applying to Anon U are 3.4 percentage points more likely to make a directed gift than alumni who have no children, and the difference is statistically significant. After admission, this figure increases substantially. Alumni with 18 year old children who have been accepted are 6.1 percentage points more likely to make a directed gift, while those whose accepted children are 19-years-old are 12.8 percentage points more likely to make a directed gift. The impact of having a child accepted at Anon U on directed giving peaks at 16.5 percentage points when the accepted child is 21 years old. It remains statistically significant through age 25, but drops to an insignificant -0.22 percentage points for children aged 26 and older. In contrast, conditional on giving, the parents of rejected children are not significantly more likely to make a directed gift when their children are of college age.³¹

In short, during the time an alumnus's child is on campus, the probability of making a gift aimed at specific purposes, conditional on making a gift at all, is elevated. This phenomenon might be due to the fact that prior to the matriculation of their children, parents know little about the activities of certain campus organizations, or even of their existence. But if that is the case, it is hard to explain why the relative likelihood of directed giving drops after the child graduates. We conjecture that at least part of the explanation is that the specific purposes directly benefit the child. Therefore, elevated giving after the admission of one's child may be due in part to nonaltruistic motivations.

²⁹ Another possibility is that the alumnus is concerned about admissions prospects for younger children. However, as shown below, the same tendency exists when we look at the child cycle for the last child in the family.

³⁰ A directed gift is defined as one not made through the general annual appeal. It is possible that individuals could support a particular student organization without going through the official channel of alumni giving. However, in this case, the donation is unlikely to be tax deductible, hence, there are strong incentives to give through the university.

³¹ The full set of results is available upon request.

D. Basic Model: Summary

The child-cycle pattern comes through clearly in our estimates. This is not to say that altruism is unimportant—people without any children give substantial amounts of money, after all. For the top 1 percent of all gifts, unconditional on class or year, 2,875 gifts came from alumni with children, while 2,003 came from alumni without children. Among the top 1 percent of lifetime (cumulative to 2006) givers, 212 had children and 110 did not. However, it is hard to explain the patterns found in Figures 1 and 2 on the basis of altruism alone.

If we are willing to make some strong assumptions, we can be more precise about the relative roles played by altruistic and selfish motivations. Specifically, suppose that: 1) Giving by childless alumni is done without the expectation of receiving any reciprocal benefit. Of course, other motivations, such as public recognition or donating to research projects that could be useful to one's business, may also be present. To the extent that they are, our estimate of the proportion of giving due to altruism may be considered an upper bound. 2) The additional giving by alumni with children who do not ultimately apply to Anon U is unselfish as well. As conjectured above, it is generated for one reason or another by warm feelings toward Anon U that are associated with having children.³² 3) The additional giving by alumni whose children do apply is motivated by self-interest. Under these assumptions, we can use our estimates of the difference in giving associated with a child who did not apply relative to a child who did apply to estimate the self-interested component of giving. A complication arises because this differential depends on the child's age. Seventeen years old seems a sensible choice because at this age the application choice has generally been made, so that alumni whose children do not apply are not making any precautionary donations. At the same time, these children have not yet been accepted, so parents do not have an incentive to make directed donations as discussed in Section IIIC. For the same reason, neither can donations be influenced by warm feelings due to the acceptance of one's child.

Under these assumptions, and using the estimated coefficients on $CHILD_{17}Appl$ and $CHILD_{17}NoAppl$, we calculate that about 52 percent of giving by alumni whose children apply to Anon U is due to altruism and the remaining 48 percent is due to self-interest.³³ To the best of our knowledge, this is the first attempt to use observational data to decompose donative behavior into altruistic and self-interested components, and it suggests that the two motivations are of about equal importance, at least in this context.

³² One concern is that giving by alumni whose children do not apply may be motivated by the desire to enhance the prospects of younger children. However, as shown below, this portion of the child cycle for the last child in a family is very similar to the child cycle for the first child.

³³ The calculation is done as follows. We assume, without loss of generality, that giving associated with no children (the baseline) is 1. We then exponentiate the coefficient on $CHILD_{17}Appl$, which gives us a figure of 6.06, the amount donated by alumni whose 17-year-old children applied to Anon U, relative to the baseline. Next, we exponentiate the coefficient on $CHILD_{17}NoAppl$ to obtain the relative amount given by those whose 17-year-old children did not apply, which is 3.14. Under our assumptions, the proportion due to altruism has two components: baseline altruism, and the increment associated with having children. The proportion of giving from baseline altruism is $1/6.06 (= 0.165)$, while the proportion due to warm feelings associated with having children is $(3.14 - 1)/6.06 (= 0.353)$, and the proportion associated with selfish reasons is $(6.06 - 3.14)/6.06 (= 0.482)$.

It is worth noting, however, that the self-interested component is likely to differ by the type of charitable giving (Vesterlund 2008). A gift to one's local religious congregation entitles one to counseling and fellowship, while the rewards for donating to international relief efforts are less tangible. Given that we cannot observe what rewards a donation to Anon U garners, one might expect that our estimate of the self-interested component of donations to universities is a lower bound.

IV. Alternative Specifications

In this section we present some alternative specifications of our model in order to assess the robustness of the basic results.

A. Subsequent Children

So far we have characterized the child cycle in terms of the first child in the family. A possible drawback is that giving along the first child's cycle could be affected by concerns about younger children's admissions prospects. Therefore, estimating the cycle for the last child might allow a cleaner test of the model.³⁴ We began by re-estimating our basic model using information on the last child rather than the first, which, in effect, ignores any possible impact of older siblings. All alumni with complete data, including those who only have one child, are included in this sample. After deleting observations with missing data on the child's age (27,882 observations), this sample contains 488,297 observations.

For brevity, we present only the graphical representation of the child cycle for amounts given (see Figure 3). If anything, the child-cycle pattern is even stronger than for the first child. Note that giving by those whose last child was rejected is lower than by those with no children at all, and significantly so at ages 22- and 23-years-old. This is a sharper relative decrease than we observed for first children. Within our framework, this suggests that parents of rejected first children still give some amount with an eye toward enhancing their younger children's prospects. But with the last child, this motivation disappears.³⁵

A natural question is whether the character of the child cycle is affected by a previous child's outcome. Does acceptance of a first child to Anon U reinforce the notion that donations generate a reciprocal benefit? One way to answer this question would be to interact the child-cycle variables for the second child with indicators for the first child's outcome. Estimating such a model is infeasible, however, as it would involve hundreds of right-hand-side variables, many of which are all or nearly all zeros. Instead, we augment the specification for the *second* child with three indicator

³⁴ For families with only one child, the first child is also considered to be the last. Future children may not yet be born, but it is reasonable to expect that at least for the children's age group that is our primary interest, 14 years and older, most families are unlikely to have another child. In addition, for some families, previous children may be sufficiently old that alumni are concerned about the admissions prospects for grandchildren.

³⁵ This raises the question of whether other family relationships might be associated with expectations of reciprocal benefits to giving. For example, grandparents might make donations hoping to enhance the likelihood of admissions for their grandchildren. Unfortunately, in our data set, we are only able to reliably link grandparents and grandchildren when the members of the intermediate generation also attended Anon U. This would leave us with a small and very unrepresentative sample of grandparent-grandchild pairs.

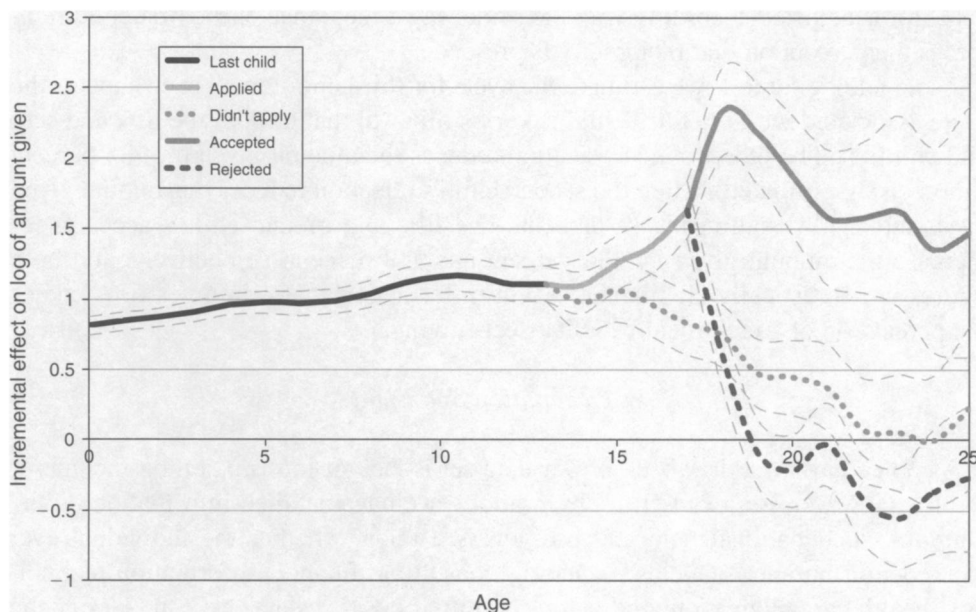


FIGURE 3. INCREMENTAL EFFECT OF THE CHILD CYCLE ON THE AMOUNT GIVEN
(*Last Child*)

Notes: This figure graphs the analogs to the child-cycle coefficients from the Tobit model, using 482,760 observations, when the basic model is re-estimated using the last child's age and admissions status rather than the first child's. The vertical axis shows the incremental effect (relative to having no children) on the log of amount donated in a given year as a function of the first child's age and admissions status. The dashed lines are 95 percent confidence intervals.

variables relating to the status of the first child: whether the first child was rejected by Anon U, whether the first child was accepted, and whether the first child did not apply to Anon U at all. Note that these variables are not constant over time. Their values change as the first child grows older and his or her admissions status becomes known.³⁶

We find that the shape of the giving cycle associated with the second child is unaffected by the inclusion of these variables. However, if the first child is known to have been accepted, the entire child cycle shifts upward. The probability of making a gift increases by 11.6 percentage points. If the first child is rejected, the probability of making a gift falls by 6.1 percentage points. (All of these figures are statistically significant.) If the first child did not apply, there is no significant change in the probability of making a gift. These results have a straightforward interpretation within the child-cycle framework. Rejection of the first child indicates to the alumnus that his or her expectations regarding reciprocity were to some extent incorrect, and giving

³⁶ In particular, the variables for first child acceptance and rejection can take on a value of one only for those years in which the first child is 18-years-old or older, while the indicator for first child nonapplication can be one only for those years in which the first child is 14-years-old and older.

behavior is adjusted accordingly. In the same way, acceptance of the first child reinforces the perception that reciprocity is present.

As an additional test, we estimate the cycle for third children.³⁷ The shape of the cycle associated with the third child is very similar to that of both the first and second children. The oldest child's rejection reduces the amount given by 14.5 percent (imprecisely estimated), while the second child's rejection reduces the amount given by a statistically significant 39 percent. The first and second child's acceptances increase the amount given by 134 percent and 118 percent, respectively, and both figures are statistically significant. Again, information that reinforces or weakens the perception of a reciprocal benefit affects giving.

B. *Occupation and Field*

As noted earlier, a drawback of our data set is lack of information on income or wealth. However, for a subset of observations, we have detailed information on the alumnus's occupational field and position. We know whether the individual ever worked in a number of fields, including consulting, finance, information technology, health care, education, and so on. From the position data, we can classify the alumnus as an executive, government worker, academic, attorney, physician, white collar worker, or some other occupation. We believe that this information, together with the variables in our basic model, do a reasonable job of proxying for permanent income. Using the field and position data reduces our sample size substantially, from 487,913 to 344,342 giving opportunities, which is why we did not include these variables in our basic model.

To establish a baseline, we begin by estimating our basic model (that is, the model without the field and position variables) with the smaller sample. The child-cycle graphs are virtually identical to their counterparts in Figures 1 and 2. When we augment this model with the field and position variables, the estimated child cycle is essentially unchanged. We present a graphical summary of the child cycle for the amount given in Figure 4. The same tendencies that we saw in Figure 2 are clearly present. Hence, the existence of a child cycle is not sensitive to the inclusion of a rich set of variables relating to the alumnus's permanent income.³⁸

C. *Permanent Income and Fixed-Effects Estimation*

Another approach to dealing with missing income data begins with the hypothesis that giving depends on the alumnus's permanent income. If so, then a sensible alternative is fixed-effects estimation, which controls for any attributes of an alumnus that

³⁷ For this specification, there are 493,854 observations representing 32,817 alumni with 1,687 third children.

³⁸ Although the child-cycle coefficients do not substantially change, some of the other coefficients do. For example, in our basic model, being an economics major increases the amount of giving by about 85 percent. Once we take occupation into account, however, this figure drops to 37 percent. In part, the coefficient in the basic model reflects the fact that Anon U's economics majors are particularly likely to go into the field of finance which, by itself, increases the amount of giving by about 75 percent, *ceteris paribus*. Interestingly, the coefficients on the race variables do not change substantially. For instance, the independent effect of being black is -56.8 percent in the basic model and -59.4 percent when we augment the model with occupation and field. Other race variables are similarly unaffected. Detailed estimates for these models are available upon request.

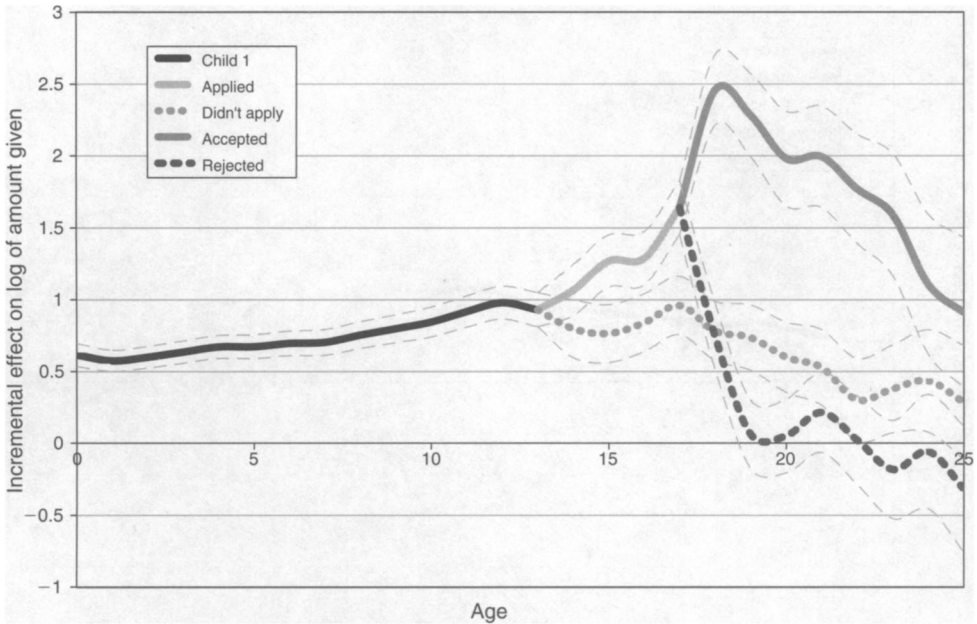


FIGURE 4. INCREMENTAL EFFECT OF THE CHILD CYCLE ON THE AMOUNT GIVEN
(Controlling for Position and Field)

Notes: This figure graphs the analogs to the child-cycle coefficients from the Tobit model, using 344,342 observations, when the basic model is re-estimated including information on alumni's fields and positions. The vertical axis shows the incremental effect (relative to having no children) on the log of amount donated in a given year as a function of the first child's age and admissions status. The dashed lines are 95 percent confidence intervals.

do not change over time (or at least over the length of our sample period). Indeed, a fixed-effects model takes into account any time-invariant unobservable variables that might drive both giving behavior and the admissions status of an alumnus's child, and hence confound the child-cycle interpretation of our findings. Such unobservables include affinity to Anon U, generosity, quality of undergraduate experience, and so on. Estimating fixed effects in nonlinear models is difficult at best, due to the incidental parameters problem (Jeffrey M. Wooldridge 2002, 484). Therefore, we use ordinary least squares.

To establish a baseline, we first estimate the equations with OLS but without fixed effects. The qualitative outcomes are very similar to those seen above. Next, we include fixed effects. Figures 5 and 6 show the resulting child cycles for the probability of making a gift and the amount given, respectively. If our results were in fact being driven by permanent income or other time-invariant unobservables, then the child cycle would be less pronounced than it was previously, or perhaps disappear altogether. However, if anything, the fixed-effects estimates are more consistent with the child-cycle framework. The probability that an alumnus with an accepted 22-year-old child makes a gift is 18.5 percentage points higher than for an alumnus without children. But this differential trends downward to 8.5 percentage points by the time the child reaches age 25. The incremental probability of an alumnus with a rejected child making a gift drops to -0.044 percentage points when the child is

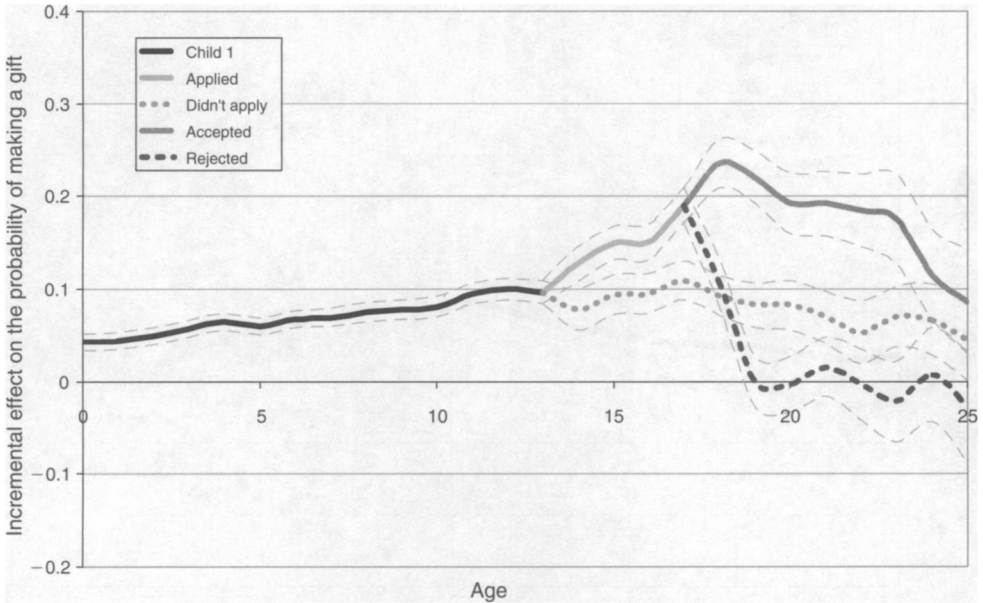


FIGURE 5. INCREMENTAL EFFECT OF THE CHILD CYCLE ON THE PROBABILITY OF MAKING A GIFT
(Fixed-Effects Estimates)

Notes: This figure graphs the analogs to the child-cycle coefficients when the basic probit model is re-estimated with OLS and fixed effects. The vertical axis shows the incremental effect (relative to having no children) on the probability of making a gift in a given year as a function of the first child's age and admissions status. The dashed lines are 95 percent confidence intervals.

19 years old and stays insignificantly different from the probability for a childless alumnus. The results for amount given are similarly pronounced. We conclude that our results are not likely affected by time-invariant unobservable variables.

D. Augmented Sample

Our analysis sample is based on alumni who graduated between 1972 and 2005. We have additional data on alumni who graduated before 1972. This sample, which includes alumni from classes as early as 1914, is far larger, containing 939,671 giving opportunities between 1983 and 2006. It has many more alumni children who are at college age and beyond, a group that is essential to estimating the child cycle. Some 5,096 children applied since 1983 (41.9 percent of whom were accepted), compared to 1,501 in our basic sample. The tradeoff is a less rich set of explanatory variables, because we lack data on SAT scores, admissions rating, race, grade point average, secondary school type, and honors for the pre-1972 classes.

When we estimate the model using the augmented sample, the results are nearly identical to those from the basic sample. Graphs of the coefficients are available upon request. Thus, our main results continue to hold using a data set with much more information on a critical group of alumni, those with children old enough to have gone through the admissions process.

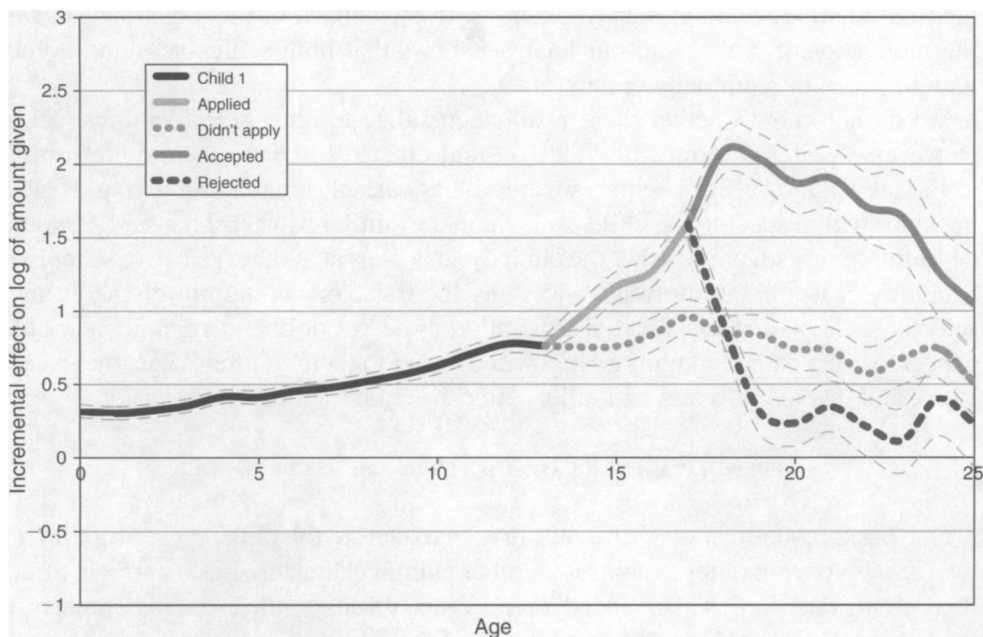


FIGURE 6. INCREMENTAL EFFECT OF THE CHILD CYCLE ON THE AMOUNT GIVEN
(Fixed-Effects Estimates)

Notes: This figure graphs the analogs to the child-cycle coefficients when the basic Tobit model is re-estimated with OLS and fixed effects. The vertical axis shows the incremental effect (relative to having no children) on the logarithm of the amount of giving in a given year as a function of the first child's age and admissions status. The dashed lines are 95 percent confidence intervals.

V. Conclusions

Our starting point is an old question in economics. To what extent does philanthropy stem from altruism rather than the expectation of receiving some reciprocal benefit? Research on this topic using observational data is rare because quantifying a reciprocal benefit is difficult. To address the problem, we analyze a unique data set that allows us to estimate how alumni contributions to a university relate to a perceived benefit—an improvement in the likelihood that their children will be admitted.

We find that the presence of children increases an alumnus's giving, that giving drops off after the admissions decision, and that the decline is far greater when the child is rejected. In short, alumni giving varies systematically with the age and admissions status of the alumni's children. This child cycle of alumni giving is consistent with the hypothesis that some donations are made in the hope of a reciprocal benefit. The result is robust to choice of estimation method and alternative specifications of the model, and does not appear to be due to unobservable variables such as underlying affinity to the university.

Our results do not imply that self-interest is the only motivation behind donative behavior. As we document in the text, many alumni with no apparent reason to expect a reciprocal benefit, at least in terms of a higher admissions probability for

their children, are extraordinarily generous. In the context of the larger debate over the motivations for altruism, our analysis shows that both selflessness and giving with the hope of reciprocity are present.

We do not know whether these results generalize to other selective universities. However, we are encouraged by the fact that other institutions seem quite similar to the university we study with respect to other variables that affect giving. Hence, behavior with respect to the child cycle might be similar as well. That said, it would be useful to investigate whether the child cycle is present at other selective schools.³⁹ Similarly, it would be informative to study the trajectory of alumni giving at non-selective schools. At such schools, the child cycle is not operative, and we would expect to see a path of alumni giving, with respect to their children's age, that is less steep, and that exhibits less of a falloff after the child's admissions decision.

APPENDIX: OTHER COVARIATES IN THE BASIC MODEL

Our basic model includes variables that characterize the child cycle of giving as well as a set of covariates to control for other alumni characteristics that might affect their giving decisions. This Appendix reports and discusses the estimated impacts of the latter set of variables on the probability of making a gift.

The results are reported in Table A1. The coefficients on the linear and quadratic terms for years since graduation imply that the probability of making a gift falls for about the first 20 years after graduation, and then turns upward.⁴⁰ With respect to gender, men are 4.6 percentage points less likely to donate in a given year, *ceteris paribus*.⁴¹ Whites are more likely to contribute than American Indians, African Americans, Hispanics, and Asians. The gap is largest with African Americans, who are 16 percentage points less likely to make a gift than are whites. These gender and ethnic/racial differentials are similar to those reported in previous studies (Monks 1993).⁴² Alumni who attended boarding or private schools are somewhat more likely to contribute than those who attended public schools. There is no discernible impact of home or alternative schooling on the probability of giving relative to public school attendees.

As noted above, the admissions office produces summary evaluations of applicants on the basis of both academic and nonacademic criteria, such as musical talent, athletic ability, volunteer work, and so on. An A is the highest score and an E is the lowest score. Alumni who received the lowest nonacademic ratings at the time of admissions are 6.9 percentage points less likely to make donations. On the other

³⁹ By definition, the child cycle can be operative only at selective schools.

⁴⁰ The impact of years since graduation could embody several different effects, including changes in income, changes in attitudes toward the institution as one ages, and the extent to which solicitations of alumni vary over time.

⁴¹ We also interacted the gender variable with the child-cycle variables to see if the child-cycle pattern is different for men and women. The only branch of the child cycle for which there is a statistically significant difference is for the accepted children. For this group, there is a much steeper fall in giving after acceptance on the part of male alumni than there is for female alumni. Further, the fall in giving after graduation is much steeper for male than female alumni.

⁴² Some of these differentials may be due to the fact that income and wealth differ across ethnic groups. As noted in the text, when we re-estimate the model for a subsample of our data, which includes some reasonable measures of permanent income, the differentials do not disappear.

TABLE A1—OTHER VARIABLES IN THE BASIC PROBIT MODEL^a

	<i>Didgive</i>		<i>Didgive</i>
Yearssince	-0.01455 (0.00085)	Major	
Yearssince2	0.00034 (0.00002)	Small social sciences	-0.03655 (0.01782)
Spouseisalum	0.1401 (0.005968)	English	-0.02557 (0.01426)
Male	-0.04591 (0.00482)	Economics	0.08084 (0.01408)
Race/ethnicity		Public policy	0.04885 (0.02069)
Amerind	-0.09796 (0.03579)	Political science	0.02286 (0.01428)
Black	-0.1622 (0.00979)	Psychology	-0.02501 (0.01583)
Hispanic	-0.1112 (0.01146)	History	0.03214 (0.01388)
Asian	-0.07193 (0.00823)	MAE	0.06214 (0.01650)
Secondary schooling		EE/CS	0.06090 (0.01520)
Boarding	0.01963 (0.00656)	Arch & Civ	0.06510 (0.01504)
Private	0.01021 (0.00501)	Small humanities	-0.03285 (0.01411)
Schloth	-0.02547 (0.01764)	Small engineering	0.09559 (0.01666)
SATmath	-0.00010 (0.00009)	Small sciences	-0.00471 (0.01377)
SATverbal	0.000002 (0.00010)	Minor	
Admissions office “nonacademic” ranking ^b		African/African American studies	-0.03727 (0.01555)
B	0.00123 (0.01326)	American studies	0.09132 (0.01337)
C	0.00505 (0.01365)	Latin	-0.00103 (0.04341)
D	-0.01293 (0.01563)	Finance	0.09217 (0.02246)
E	-0.06919 (0.03214)	Theater	-0.07022 (0.01876)
Admissions office “academic” ranking		Public policy	-0.00890 (0.01896)
B	0.01503 (0.00724)	Other engineering	0.02029 (0.01739)
C	0.02461 (0.00939)	Other sciences	0.00304 (0.01282)
D	0.00710 (0.01231)	Other humanities	-0.00678 (0.00936)
E	-0.02640 (0.02365)	Teaching	-0.00768 (0.01930)
Varsity	0.04912 (0.00494)	Reunion	0.06318 (0.00141)
Club sport	-0.00860 (0.00598)	Post-baccalaureate education	
Honors	-0.00105 (0.00628)	PhD	0.04909 (0.00955)
Greek	0.1285 (0.00501)	Masters	0.08972 (0.00670)
GPA—Second quartile	0.00313 (0.00662)	J.D.	0.1483 (0.00721)
GPA—Third quartile	-0.02053 (0.00812)	M.D./D.D.S.	0.1258 (0.00901)
GPA—Bottom quartile	-0.05714 (0.00946)	M.B.A.	0.1873 (0.00703)

^a This table shows the coefficients on variables other than those that characterize the child cycle. (The child-cycle variables themselves are summarized graphically in Figure 1). Each figure shows the incremental effect on the probability of making a gift in a given year, as estimated by a probit model. The model is estimated using the basic sample of 487,913 observations. The figures in parentheses are standard errors. Figures in italics are statistically significant at the 5 percent level. Standard errors are adjusted for clustering based on individuals. In addition to the variables listed, the regression includes location effects, year effects and class effects, which are suppressed for brevity.

^b The nonacademic ranking is based on attributes such as musical talent, athletic ability, volunteer work, etc.

hand, students in the highest academic category are somewhat less likely to make donations than those with lower ratings. SAT scores do not appear to have any statistically significant impact on the probability of giving.

We now turn from variables that are known before matriculation at Anon U to those that reflect the alumnus's undergraduate experiences. Involvement in a varsity sport increases the probability of giving by about 5 percentage points, and membership in one of Anon U's fraternities or sororities increases giving by 13 percentage points.⁴³ These results are consistent with previous findings that students who were actively engaged in extracurricular activities as undergraduates are more likely to make donations as alumni (Dugan et al. 1999). With respect to academic performance, receiving honors has no effect on the probability of giving. However, the probability of giving increases with grade point average (GPA). Those in the bottom quartile of the GPA distribution were 5.7 percentage points less likely to make a gift, while those in the third quartile were 2.1 percentage points less likely. There is no significant difference in giving between the second and top quartiles.

Consistent with earlier studies, giving patterns differ substantially by course of study (Dugan, et al. 1999, Monks 2003). Alumni who majored in engineering, economics, and public policy have relatively high probabilities of making a gift later in life. Those who majored in the small social sciences (such as sociology) and small humanities departments (such as linguistics) tend to have relatively low probabilities of making a gift later in life. Students with minors in finance are more likely to make subsequent gifts (by about 9 percentage points), while those with minors in theater are less likely (by about 7 percentage points).

Turning to schooling after Anon U, alumni who continue their education are more likely to make donations than those who do not, a finding consistent with previous studies (Dugan et al., 1999, Monks 2003). Finally, we note that, consistent with previous research (James H. Grant and David L. Lindauer 1986, Olsen, Smith, and Wunnava 1989) the likelihood of giving increases substantially during reunion years, with the probability increasing by 6.3 percentage points.

Taken together, our results are very much in line with those from previous studies. While no school is "typical," Anon U appears not to be idiosyncratic with respect to the determinants of the donation decision.

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⁴³ Several organizations did not provide membership information for the class of 2001 and beyond. Interacting indicators for those classes with the Greek indicator did not change the estimate of the main coefficient substantially.

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