Altruism and the Child-Cycle of Alumni Donations

by

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CEPS Working Paper No. 150
May 2007

Acknowledgements: We are grateful to B. Douglas Bernheim, William Bowen, Ronald Ehrenberg, Jean Grossman, Bo Honore, Donna Lawrence, Brian McDonald, Ashley Miller, John Morgan, Sriniketh Nagavarapu, Andres Santos, Julie Shadle and Burton Weisbrod for useful suggestions. Brent Newhouse and Zhihao Zhang provided excellent research assistance. This research was supported in part by Princeton's Center for Economic Policy Studies and in part by the Stanford Institute for Economic Policy Research.

ABSTRACT

Altruism and the Child-Cycle of Alumni Giving

This paper uses a unique data set to assess whether donors' contributions to a nonprofit institution are affected by the perception that the institution might confer a reciprocal benefit. We study alumni contributions to an anonymous research university. *Inter alia*, the data include information on the ages of the alumni's children, whether they applied for admission to the university, and if so, whether they were accepted. The premise of our analysis is simple: If alumni believe that donations will increase the likelihood of admission for their children 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 university, and the outcome of the admissions process. We refer to this pattern as the *child-cycle of alumni giving*.

If the child-cycle is operative, one would observe that, *ceteris paribus*, the presence of children increases the propensity to give, that giving drops off after the admissions decision is made, and that the decline is greater when the child is rejected by the university. Further, under the joint hypothesis that alumni can reasonably predict the likelihood that their children will someday apply to the university and that reciprocity in the form of a higher probability of admission is expected, we expect that alumni with children in their early teens who eventually apply will give more than alumni whose teenagers do not.

The evidence is strongly consistent with the child-cycle pattern. Thus, while altruism drives some giving, the hope for a reciprocal benefit plays a role as well. Using our results, we compute rough estimates of the proportion of giving due to selfish motives.

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1. Introduction

In an essay on the economics of altruism, Samuelson [1993, p. 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." Bergstrom and Stark [1993, p. 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."

However, the notion that mainstream economics categorically rejects the existence of altruism is essentially false. 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. Clotfelter's [1985] important volume on charitable giving 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 in return, or favorable publicity for their businesses. 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, merely observing 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 of measuring the benefits that donors expect to receive. 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 that 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*.

[1] In the same way, Dugan *et al.* [1999, p.2] 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."

An interesting feature of this phenomenon is that the institution makes no promise of reciprocity whatsoever. True, children of Anon U alumni have a higher rate of acceptance than other students,[2] 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, who are rewarded with 'legacy' preferences for their children." [Golden, 2006, p. A10]. Perceptions of reciprocity may be reinforced by university administrators who link the acceptance of alumni children to 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." (Hechinger [2006, p. B1]). 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 issue of altruism. 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 2004-05, alumni contributed $7.1 billion to higher education, about 28 percent of all voluntary support.[3]

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[2] According to public information, children of alumni at Anon U are accepted at roughly three times the rate as other applicants. However, Bowen et al. [2005] document the importance of correcting for differences in the characteristics of applicant pools when assessing the importance of legacy preferences.

[3] Other sources of voluntary support include other individuals, corporations, foundations, and religious and other organizations. See *Chronicle of Higher Education* [2006].

In Section 2 we briefly review some pertinent previous research in this area, with particular emphasis on theoretical work that helps motivate a child-cycle framework. Section 3 describes the data and econometric framework. The results are presented in Section 4. The evidence is strongly consistent with the child-cycle pattern. Alumni parents of teenage children who eventually apply to Anon U make larger donations than alumni whose children do not eventually apply. Once an alumnus's child is accepted, his donations fall off substantially. If the child is rejected, giving falls off dramatically. Section 5 discusses the sensitivity of the results to alternative specifications of the model. Section 6 concludes with a summary and suggestions for additional research.

2. Previous Literature

The role of altruism in human behavior has long been of interest to economists. As Kolm [2000b, p. 7] notes, "all great economists have considered the effects of positive social sentiments," including Smith, Mill, Walras, Pareto, and Bentham. In more recent times, notions of altruism have been brought to bear in theoretical analyses of charitable giving (Becker [1974]), rescues (Landes and Posner [1978]), commercial policy (Rotemberg [2000]) and remittances of migrants to their home countries (Docquier and Rapoport [2000]), among other important social phenomena. Additional examples can be found in Kolm [2000a].

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 incentives to be strategic with respect to their children. In contrast, Bernheim, Shleifer and Summers [1985] de-

velop 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 intra-family 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], Altonji *et al.* [1992] and Cigno and Rosati [2000] find evidence that gifts from parents to children have a strategic component, while McGarry and Schoeni [1995], Raut and Tran [2000] and Ioannides and Kan [2000] find that altruistic motives predominate.

Turning to the important case of charitable donations — which amounted to about $250 billion in 2004[4] — researchers have more or less taken for granted that selfish motives play a role. According to Clotfelter [1985, p. 38], "Individuals may volunteer for organizations in order for their families or themselves to consume services." Weisbrod [1978, p. 34] is more pointed: "The extent to which narrow self-interest lies behind the donations of money and time to non-profit 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 underlie donations to universities: "Donors demand attention and prestige supplied by college fund raisers"[5] [Yoo and Harrison,1989, p. 367].

Are such assertions valid? Schokkaert and Van Ootegem [2000] provide extensive survey evidence of reasons for giving. Also, a number of laboratory experiments have

[4] Giving USA Foundation [2005].
[5] 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, et al. [1995]), it is difficult to ascribe a causal relationship because the variables are likely jointly determined.

investigated the extent to which contributions to public goods are marked by altruism. (See, for example, Andreoni [1993] and List [2006].[6]) However, in marked contrast to the literature on giving within the family, we have been able to find no statistical work on motivations for charitable giving based on observational data. The same holds for the voluminous literature on the determinants of alumni giving to their universities.[7] Econometric studies of alumni giving have examined a wide array of variables: 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.[8] However, we have found no systematic attempts at all 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 that donors expect to receive in return for their donations. Our study is premised on the notion that alumni believe that 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 whose prize is admissions for their children.

Framing the issue this way suggests a connection between alumni giving and Morgan's [2000] theory of lotteries as a mechanism for financing public goods. Morgan observes that lotteries are often held by private charities. He shows that, under a broad set of conditions, lotteries raise the level of provision of a public good relative to stan-

[6] For an ethnographic approach to studying motivations for charitable giving, see Odendahl [1990].
[7] Taylor and Martin [1995] provide an extensive survey of variables that have been analyzed in previous studies.
[8] See, for example, Clotfelter [2003], Monks [2003], Shulman and Bowen [2001, Chapter 10], Taylor and Martin [1995], and Wunnava and Lauze [2001].

dard voluntary contribution schemes—a lottery increases giving, *ceteris paribus.* Another of Morgan's important findings is that as the lottery becomes more "discriminating" (that is, the prize is more likely to go to whomever donates the most money), the overall giving level increases.[9]

Our child-cycle framework fits well within Morgan's model. Here, the public good is the donation to the university, which benefits its students, faculty, and society at large. The power of our test comes from the fact that only alumni with children can play the lottery, and among those who have children, the value depends on their ages. In particular, the value is relatively high for the parents of teenagers who plan to apply to their parents' alma mater. On the other hand, once a child is past the college admissions age, playing the lottery has no value at all.

As we stressed above, whether the probability of one's child being admitted depends on prior or expected future donations is unknown.[10] 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, Morgan's mechanism is operative.[11]

3. Data and Econometric Model

3.1 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. 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.

[9] This particular result is demonstrated in an unpublished 1995 working paper with the same title as the published version.

[10] 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.)

[11] However, the mapping from Morgan's model into the alumni donation problem is not perfect. The model assumes that the impact on the amount that is donated upon the probability of winning is common knowledge, which is clearly not true in our context.

For example, if an individual has been an alumna for 5 years, she accounts for 5 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. 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 for the classes of 1972 and onwards, 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. 1,100 observations were deleted 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 a total of 32,488 alumni.

We focus on three dimensions of alumni giving. First is the probability that an alumnus made any gift at all in a given year.[12] Universities care about the proportion of their alumni who make donations. Anon U, for example, makes considerable efforts 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. Third, 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 one percent of gifts accounted for 69.2 percent of total giving. We estimate the probability that the alumnus is a "class

[12] Pledges without an associated gift are not counted.

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 mean and standard deviation of each of these variables are shown at the top of Table 1.[13] The unconditional mean gift (in 2006 dollars) is $466. The relatively large 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. [14] In addition, we also estimate our models (except for class leader) 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.

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 upon women until the 1970s. Whites comprise 81.9 percent of our observations. 57.9 percent of the observations are associated with secondary education at a public school; almost 39 percent with participation in undergraduate varsity athletics[15]; 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, p. 404]). We address this issue in two ways. First, for a large subset of our alumni, we have information that is closely related

[13] 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.

[14] 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 $1.00 equal to $1.01. Therefore, observations for which there is no giving are associated with $1, whose logarithm is zero.

[15] 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.

to permanent income, occupation and field.[16] Table 2 shows the occupations and fields for the 344,342 observations, representing 20,039 alumni, for which we have this information.[17] 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.

3.2 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 believe that a gift to Anon U may some day 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

[16] 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, Cunningham and Cochi-Ficano (2002) point out that SAT scores are closely related to family socioeconomic status as well.

[17] 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.

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 and older.

Even if giving increases as admissions time approaches (at approximately 18 years old) 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 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 into their teens, so that $CHILD_i$Appl is defined only for values of i from 14 through 17. 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 equal one if the child ultimately did not apply and zero otherwise, with i running from 14 to 17. 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 chil-

dren 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, $CHILD_{i\text{-}}$ Young, equal of 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.

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.[18] 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, $CHILD_iAcc$, which equal one if the child applied to Anon U and was accepted and zero otherwise; and $CHILD_iRej$, which equal one if the child applied to Anon U and was rejected and zero otherwise.[19] For these variables, i runs from 18 through 26 and over.

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

[18] Reduced giving after admissions might be driven by income effects associated with tuition payments. If tuition is 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 shown below, these alumni do not exhibit anything like the substantial decreases in giving that we see for the alumni of accepted children.

[19] 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 accurately measure any differences in the two populations.

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 in one model the cycles for multiple children and their interactions. 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. 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.

3.4 Econometric Model

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

$$\text{Prob}(G_{jt}) = \Phi[\alpha + \text{CYCLE}_{jt}\beta_1 + X_{jt}\gamma + \text{YEAR}_t\beta_2 + \text{LOC}_{jt}\beta_3 + \text{CLASS}_j\beta_4] \ ,$$

where $\text{Prob}(G_{jt})$ is the probability that alumnus j makes a gift in year t, $\Phi[\bullet]$ 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.[20] 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 on a given alumnus are likely to be correlated, the standard errors are adjusted for clustering within individuals. Our analysis of class leaders also uses a probit model; here the outcome variable is the probability that in a given year, the alumnus made a gift that was greater than or equal to the gift made by the top 10 percent of his or her classmates.

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, $6.0, 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 one dollar equal to one dollar and one cent. In effect, then, 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.

[20] Bristol [1991] emphasizes the role of the stock market and Ehrenberg and Smith [2003] document the importance of macroeconomic conditions. Time effects also take into account changes in the value of the university's endowment (Oster [2001]).

We assume that the determinants of the amount of giving are the same as those that affect the probability of giving. As with the probit estimates, we correct for correlation among the error terms for any given individual by using a clustering procedure.

4. Results

4.1. Probability of Making a Gift

Our basic results are reported in Table 3. To begin, column (1) shows each variable's marginal effect on the probability that an alumnus made any gift in a given year and the associated standard error.[21] We discuss the child-cycle variables and then turn to the other covariates.

Consider first the $CHILD_i$ variables, each of which takes a value of one if the alumnus had a child of age i during the year of the observation and zero otherwise. When a child is born, the probability of making a donation increases 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. These coefficients are precisely estimated.

When children reach the age of 14, we distinguish between those who eventually apply to Anon U and those who do not. The figures under the heading *Child Did Not Apply* show the coefficients on interactions of a dichotomous variable equal to one if the child did not apply with the child's age, that is, the $CHILD_i$NoAppl variables. The variables under *Child Did Apply* show the corresponding coefficients when the child eventually did apply, $CHILD_i$Appl in our earlier notation. Comparing the two sets of coefficients, we see that at every age from 14 to 17, the incremental probability of giving is greater for alumni whose children ultimately applied. The differences at each age are statistically significant from each other. This differential is consistent with the joint hy-

[21] The year, class, and location effects are not reported for brevity.

pothesis that alumni can reasonably predict the likelihood that their children will apply to Anon U and that reciprocity in the form of admission is expected.[22]

The $CHILD_i$Appl variables are defined only up to the age of 17. After that point, we distinguish between successful and unsuccessful applications to Anon U.[23] The coefficients under the *Child Accepted* heading indicate 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 27 percentage points), but remains elevated into the child's mid-20s. The parents of unsuccessful applicants behave very differently. As the figures under *Child Rejected* indicate, the incremental probability of making a gift falls off substantially at age 18, and at ages 19 and beyond, 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 were 26 or older. 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.

To provide a better sense of the implications of the child-cycle coefficients in column (1), we graph them 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 graph starts when the child is born and shows that having a child increases the probability of giving by about 13 percentage points. At age 14, the line divides, showing the difference between alumni whose children do and do not ultimately apply to Anon U. The gap between the two groups is substantial, and it widens as the children approach college age. At age 18, the graph splits again, this time

[22] 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.

[23] 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 is a sensible choice.

between applicants who were rejected and those who were accepted at Anon U. At admissions time, the probability of making a gift falls substantially for alumni whose children were rejected. It also declines for those whose children were accepted, albeit by a smaller amount.

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 estimated a model in which $CHILD_i$Appl and $CHILD_i$NoAppl are included for ages 0 through 17. 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 ($p = 0.1415$). The same is true for amount given ($p = 0.3083$) and annual class leader ($p = 0.6902$). These findings increase our confidence that the child-cycle results are not being driven the alumnus's unobservable affinity for Anon U. Further evidence along these lines is presented in Section 5 below.

The patterns in Figure 1 cannot readily be explained by public good provision or by a "warm glow" from giving. In contrast, the results fit well in the child-cycle framework.

Other variables. 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. With respect to gender, men are 4.6 percentage points less likely to donate in a given year, *ceteris paribus*. Whites are more likely to contribute than American Indians, African-Americans, Hispanics or Asians. The gap is largest with African-Americans, who are 16 percentage points less likely to make a gift than whites. These gender and ethnic/racial differentials are similar to those re-

ported in previous studies (Monks [1993]).[24] 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 non-academic and academic criteria. An A is the highest score and an E is the lowest score. Alumni who received the lowest non-academic ratings at the time of admissions are 6.9 percentage points less likely to make donations. On the other 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 it by 13 percentage points.[25] 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.

[24] Some of these differentials may be due to the fact that income and wealth differ across ethnic groups. As noted below, 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.

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

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; majors in the small social sciences departments (such as sociology) and small humanities departments (such as linguistics) tend to have relatively low probabilities. 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 (Grant and Lindauer [1986], Olsen et al. [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. It is not unreasonable to expect, therefore, that the child-cycle results would also generalize to other selective institutions.

4.2 Amount of Giving

Each entry in column (2) of Table 3 shows the unconditional marginal effect of the corresponding variable on the amount given. 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. Qualitatively, just as in column 1, the coefficients are consistent with the child-cycle framework. Having a child increases the expected logarithm of the amount of giving by 0.76, or roughly 114 percent. Once the child enters the teens, parents whose children eventually apply to Anon U give more than parents whose children do not. For

example, at age 15, the logarithm of giving is 1.38 higher (about 223 percent) for parents of future applicants than for individuals without children. The corresponding coefficient for alumni whose children do not eventually apply is 1.01 (about 175 percent). For parents of successful applicants, giving remains elevated after admission; the incremental effect on the logarithm of giving at age 18 is about 2.5 (about 1150 percent). For parents of rejectees, one cannot reject the hypothesis that the incremental effect on the amount of giving falls to about zero at age 19. As we saw for the probability of giving, the parents of rejected applicants behave no differently than alumni without children. The child-cycle coefficients are graphed in Figure 2.

Figure 2 allows us to address that possibility 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 2 demonstrates, these alumni do not exhibit anything like the substantial decreases in giving that we see for the alumni of accepted children.[26]

Another issue pertaining to the child-cycle interpretation of Figure 2 is that the overall 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 was lifetime giving as of 2006,[27] and the right hand side included the basic demographic variables in Table 3 (minus the child-cycle variables) 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 child. Further, lifetime giving increases by 5.1 percent for each year of the first

[26] 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.

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

child's age and 2.0 percent for each year of the second child's age. In short, life-time giving is affected by the presence and age of children; the child-cycle does not arise simply because alumni are shifting donations over time.

The coefficients on the other variables in column (2) generally have the same signs as those for the probability of giving in column (1). One possible concern is that even after taking logs, the estimates in column (2) might be driven by outliers. We estimate the model after deleting the largest one percent of the gifts, and no substantive differences emerge. To assess the sensitivity of our results to the logarithmic transformation, we also estimate the Tobit equation in levels (with censoring at zero), both with and without the top one percent of gifts deleted. As shown in the Appendix figures, the child cycle is robust with respect to this change in functional form.

4.3 Probability of Being a Class Leader

As is true at most universities, the majority of money donated to Anon U comes from a few very generous donors. Column (3) of Table 3 examines the probability of being a class leader, defined as an individual whose gift was greater than or equal to the 90^{th} percentile in his or her class. When interpreting these figures, recall that, by definition, the probability of a random person being a class leader is about 10 percent. Therefore, if a given characteristic raises the probability by (say) 5 percentage points, this represents a 50 percent increase relative to the mean.

The coefficients indicate that, for this dimension of giving as well, the child-cycle pattern is present and very similar to the patterns we have already seen. These coefficients are graphed in Figure 3. The other covariates are generally similar in sign to those in the other two columns. An important exception is gender. While women are more likely to make a gift in a given year (column (1)) and to make larger gifts on average (column (2)), *ceteris paribus*, column (3) tells us that the probability of making a very large gift is 1.2 percentage points higher for males.

4.4 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. After all, the lottery has been decided; why continue to buy tickets? Perhaps the alumnus is showing tangible evidence of warm feelings engendered by the acceptance of his or her child.[28] 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 3.[29] 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 accepted children 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. The impact of having a child accepted at Anon U on directed giving peaks at 16.5 percentage points when the child is 21. 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.[30]

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.

[28] 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.
[29] A directed gift is defined as one not made to the general annual appeal.
[30] The full set of results is available upon request.

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 non-altruistic motivations.

4.5 Basic Model: Summary

Whether we look at the probability of making any gift, the size of the gift, or the probability of making a large gift (relative to one's classmates), the child-cycle pattern comes through clearly. 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 any 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 Table 3 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 alumni without children 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.[31] 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 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 4.4. 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 coefficients on $CHILD_{17}Appl$ and $CHILD_{17}NoAppl$ from column (2) of Table 3, 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.[32] 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.

5. Alternative Specifications

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

[31] 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.

[32] 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. We next 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 amount associated with selfish reasons is (6.06-3.14)/6.06 (= 0.482).

5.1 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.[33] We began by re-estimating our basic model from Table 3 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.

Again, for brevity we present only the graphical representation of the child-cycle for amounts given. (See Figure 5.) 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 those with no children at all, and significantly so at ages 22 and 23. 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.[34]

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

[33] 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.

[34] 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.

would be to interact the child-cycle variables for the *second* child with indicators for the *first* child's outcome. However, estimating such a model is infeasible, as it would involve hundreds of right hand side variables, many of which are all or nearly all zeros. Instead, we augmented the specification for the *second* child with three indicator 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.[35]

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 upwards. The probability of making a gift increases by 11.6 percentage points, while the amount given increases by about 87 percent. If the first child is rejected, the probability of making a gift falls by 6.1 percentage points, while the amount given decreases by about 27 percent. (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 or the amount given. 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 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.[36] 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 sta-

[35] 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 or over, while the indicator for first child non-application can be one only for those years in which the first child is 14 and over.
[36] In this specification, there are 493,854 observations representing 32,817 alumni with 1,687 third children.

tistically significant 39 percent. The first child's 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.

5.2 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, likely 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.

When we augment the basic model with the field and position variables, the estimated child-cycle is essentially unchanged. For brevity, we do not include the coefficients here. Rather, we present a graphical summary of the child-cycle for the amount given in Figure 4. The same tendencies that we saw in Figure 1 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.[37]

[37] Although the child-cycle coefficients do not substantially change, we note in passing that 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 (computed from column (2) of Table 3). However, once we take occupation into account, this figure falls to 37 percent. In part, the coefficient in Table 3 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.

5.3 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 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 a probit model is not possible, and doing so with Tobit is cumbersome. Therefore, we use ordinary least squares. Figures 6, 7, and 8 show the child-cycles for the probability of giving, the amount given, and the probability of being a class leader, 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 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 age 25. The incremental probability of an alumnus with a rejected child making a gift drops to -.044 percentage points at age 19 and stays insignificantly different from the probability for a childless alumnus. The results for amount given and probability of being a class leader are similarly pronounced. We conclude that our results are not likely affected by time-invariant unobservable variables.

5.4 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: 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. The number of children who applied since 1983 is 5,096 (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. This section presents results based on the augmented sample.

Figures 9, 10, and 11 show the child-cycles for the probability of giving, the amount given, and the probability of being a class leader, respectively. The results are nearly identical to those from the basic sample. The only noticeable difference is in Figure 10, which shows that although the relative amount given by parents of rejected children falls, it does not actually become statistically indistinguishable from childless alumni. The key point, though, is that 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.

6. 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 their children. This child-cycle of alumni giving is consistent with the hypothe-

sis 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.[38] 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 hence we would expect to see a path of alumni giving with respect to children's age that is less steep, and that exhibits less of a falloff after the child's admissions decision.

[38] By definition, the child-cycle can be operative only at selective schools.

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Table 1*
Variable Definitions and Summary Statistics

Variable	Description	Mean	Standard Deviation
TotalYear	Total giving for year in 2006 dollars	466.14	49512
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
Annual Classleader	1 if giving was at or above the 90th percentile in the alumnus's class for a given year	0.1207	0.3258
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	.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 "Non-Academic" Ranking			
A	Omitted Category: 1 if the alumnus received the highest non-academic ranking from the admissions office	0.03220	0.1765
B	1 if the alumnus received the second highest non-academic ranking from the admissions office	0.4660	0.4988
C	1 if the alumnus received the third highest non-academic ranking from the admissions office	0.4188	0.4934
D	1 if the alumnus received the fourth highest non-academic	0.07897	0.2697

	ranking from the admissions office		
E	1 if the alumnus received the fifth highest non-academic ranking from the admissions office	0.00401	0.06319
Admissions Office □Academic□ Ranking	Omitted Category: 1 if the alumnus received the highest academic ranking from the admissions office	0.1536	0.3605
A			
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
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 departments	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, Astro-	0.1375	0.3444

	physics, Biochemistry, Biology, Chemistry, Ecology and Evolutionary Biology, Geology, Mathematics, Physics, or Statistics		
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	0.01293	0.1130
Public Policy	1 if the alumnus received a minor in Public Policy	0.05027	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.	0.01840	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.	0.02731	0.1630
Other Humanities	1 if the alumnus received a minor in a humanities field	0.05261	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 Ph.D. or equivalent degree	0.06742	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
MDDDS	1 if the alumnus has a medical degree	0.06173	0.2407
MBA	1 if the alumnus has an MBA	0.08986	0.2860

*Based on 487,913 observations on gift-giving from 1983 to 2006. 32,488 alumni who graduated from 1972 to 2005 are represented.

Table 2*
Position and Field Definitions and Summary Statistics

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

*Based on 344,342 observations on gift-giving from 1983 to 2006 for individuals for whom data on field and position are reported. 20,039 alumni who graduated from 1972 to 2005 are represented.

Table 3*
Basic Model

Variable	(1) Didgive	(2) Amount	(3) Annual Classleader
Child			
Age 0	*0.1347* *(0.00674)*	*0.7619* *(0.03785)*	*0.04197* *(0.00478)*
Age 1	*0.1293* *(0.00603)*	*0.7371* *(0.03376)*	*0.03318* *(0.00423)*
Age 2	*0.1341* *(0.00605)*	*0.7561* *(0.03465)*	*0.03438* *(0.00426)*
Age 3	*0.1436* *(0.00607)*	*0.8068* *(0.03562)*	*0.03349* *(0.00429)*
Age 4	*0.1505* *(0.00611)*	*0.8588* *(0.0368)*	*0.03050* *(0.00432)*
Age 5	*0.1469* *(0.00624)*	*0.8596* *(0.03804)*	*0.02806* *(0.00434)*
Age 6	*0.1541* *(0.00638)*	*0.8904* *(0.03942)*	*0.02652* *(0.00446)*
Age 7	*0.1543* *(0.00658)*	*0.8986* *0.04119)*	*0.02134* *(0.00451)*
Age 8	*0.1620* *(0.00676)*	*0.9511* *(0.04314)*	*0.02683* *(0.00477)*
Age 9	*0.1629* *(0.00702)*	*0.9730* *(0.04525)*	*0.02102* *(0.00479)*
Age 10	*0.1652* *(0.00730)*	*1.026* *(0.04792)*	*0.02480* *(0.00509)*
Age 11	*0.1806* *(0.00742)*	*1.116* *(0.04994)*	*0.03055* *(0.00536)*
Age 12	*0.1812* *(0.00773)*	*1.151* *(0.05252)*	*0.0400* *(0.00575)*
Age 13	*0.1743* *(0.00816)*	*1.099* *(0.05476)*	*0.03142* *(0.00583)*
Child Did Not Apply			
Age 14	*0.1380* *(0.01452)*	*0.9535* *(0.0941)*	*0.03986* *(0.01069)*

Age 15	*0.1595* *(0.01421)*	*1.011* *(0.09295)*	*0.01863* *(0.01002)*
Age 16	*0.1552* *(0.01437)*	*1.0276* *(0.09411)*	*0.03923* *(0.01064)*
Age 17	*0.1705* *(0.01419)*	*1.143* *(0.09483)*	*0.02927* *(0.01038)*
Age 18	*0.1523* *(0.01455)*	*0.9994* *(0.09535)*	*0.02870* *(0.01028)*
Age 19	*0.1318* *(0.01637)*	*0.9088* *(0.1055)*	*0.03342* *(0.01139)*
Age 20	*0.1266* *(0.01795)*	*0.7961* *(0.1122)*	0.01992 (0.01189)
Age 21	*0.1032* *(0.01986)*	*0.6701* *(0.1217)*	0.01675 (0.01280)
Age 22	*0.08568* *(0.02233)*	*0.5497* *(0.1335)*	0.00684 (0.01342)
Age 23	*0.09589* *(0.02377)*	*0.5745* *(0.1417)*	0.00619 (0.01440)
Age 24	*0.08697* *(0.02701)*	*0.5954* *(0.1631)*	0.01787 (0.01670)
Age 25	*0.08394* *(0.03124)*	*0.4776* *(0.1806)*	-0.00849 (0.01755)
Age 26 and above	*0.1208* *(0.03436)*	*0.7603* *(0.2224)*	0.01774 (0.02436)
Child Did Apply			
Age 14	*0.1813* *(0.01224)*	*1.172* *(0.08215)*	*0.03261* *(0.00917)*
Age 15	*0.2048* *(0.01187)*	*1.376* *(0.08346)*	*0.06187* *(0.01017)*
Age 16	*0.2071* *(0.01198)*	*1.462* *(0.08601)*	*0.07480* *(0.01053)*
Age 17	*0.2497* *(0.011)*	*1.800* *(0.08671)*	*0.1099* *(0.01131)*
Child Accepted			
Age 18	*0.3360* *(0.01362)*	*2.525* *(0.1193)*	*0.1889* *(0.01999)*

Age 19	*0.3071* *(0.01631)*	*2.382* *(0.1346)*	*0.1852* *(0.0212)*
Age 20	*0.2670* *(0.0202)*	*2.083* *(0.1515)*	*0.1610* *(0.02230)*
Age 21	*0.2674* *(0.02271)*	*2.078* *(0.1665)*	*0.1748* *(0.02579)*
Age 22	*0.2512* *(0.02597)*	*1.837* *(0.1807)*	*0.1497* *(0.02820)*
Age 23	*0.2491* *(0.02913)*	*1.736* *(0.1982)*	*0.1284* *(0.03013)*
Age 24	*0.1747* *(0.03589)*	*1.284* *(0.2281)*	*0.06793* *(0.02969)*
Age 25	*0.1459* *(0.04276)*	*1.122* *(0.2517)*	*0.08681* *(0.03492)*
Age 26 and above	0.07759 (0.05461)	0.5236 (0.3015)	-0.00234 (0.03083)
Child Rejected			
Age 18	*0.1352* *(0.01639)*	*0.9030* *(0.1055)*	*0.03016* *(0.01164)*
Age 19	0.02262 (0.01896)	0.2026 (0.1070)	-0.01564 (0.01014)
Age 20	0.02675 (0.02073)	0.1698 (0.1143)	-0.01788 (0.01093)
Age 21	*0.04713* *(0.02238)*	*0.2869* *(0.1251)*	-0.02333 (0.01157)
Age 22	0.02477 (0.02595)	0.1222 (0.1377)	-0.01926 (0.01354)
Age 23	-0.01938 (0.03031)	-0.1187 (0.1519)	*-0.03922* *(0.01374)*
Age 24	-0.00816 (0.03412)	-0.02148 (0.1794)	-0.02581 (0.01711)
Age 25	-0.04415 (0.03943)	-0.2117 (0.1999)	*-0.05188* *(0.01662)*
Age 26 and above	-0.03201 (0.05015)	-0.1109 (0.2663)	-0.02369 (0.02394)

Child Too Young to Have Applied			
Age 14	*0.2295* *(0.01374)*	*1.535* *(0.09402)*	*0.06728* *(0.01190)*
Age 15	*0.2304* *(0.01588)*	*1.566* *(0.1094)*	*0.06800* *(0.01388)*
Age 16	*0.2101* *(0.02147)*	*1.525* *(0.1473)*	*0.08390* *(0.01861)*
Yearssince	*-0.01455* *(0.00085)*	*-0.00904* *(0.00403)*	-
Yearssince2	*0.00034* *(0.00002)*	*0.00044* *(0.0001)*	-
Spouseisalum	*0.1401* *(0.005968)*	*0.5879* *(0.03113)*	*0.02086* *(0.003734)*
Male	*-0.04591* *(0.00482)*	*-0.1690* *(0.02444)*	*0.01163* *(0.002584)*
Race/Ethnicity			
Amerind	*-0.09796* *(0.03579)*	*-0.5464* *(0.1638)*	-0.03699 (0.01640)
Black	*-0.1622* *(0.00979)*	*-0.8398* *(0.0433)*	*-0.06219* *(0.00348)*
Hispanic	*-0.1112* *(0.01146)*	*-0.5852* *(0.05246)*	*-0.04640* *(0.00459)*
Asian	*-0.07193* *(0.00823)*	*-0.3497* *(0.03857)*	*-0.02722* *(0.00379)*
Secondary Schooling			
Boarding	*0.01963* *(0.00656)*	*0.1723* *(0.03467)*	*0.03182* *(0.00398)*
Private	*0.01021* *(0.00501)*	*0.09102* *(0.02564)*	*0.01545* *(0.00282)*
Schloth	-0.02547 (0.01764)	-0.1313 (0.09234)	0.00065 (0.01057)
SATmath	-0.00010 (0.00009)	-0.00081 (0.00042)	-0.00005 (0.00005)
SATverbal	0.000002 (0.00010)	0.00026 (0.00044)	-0.00001 (0.00005)

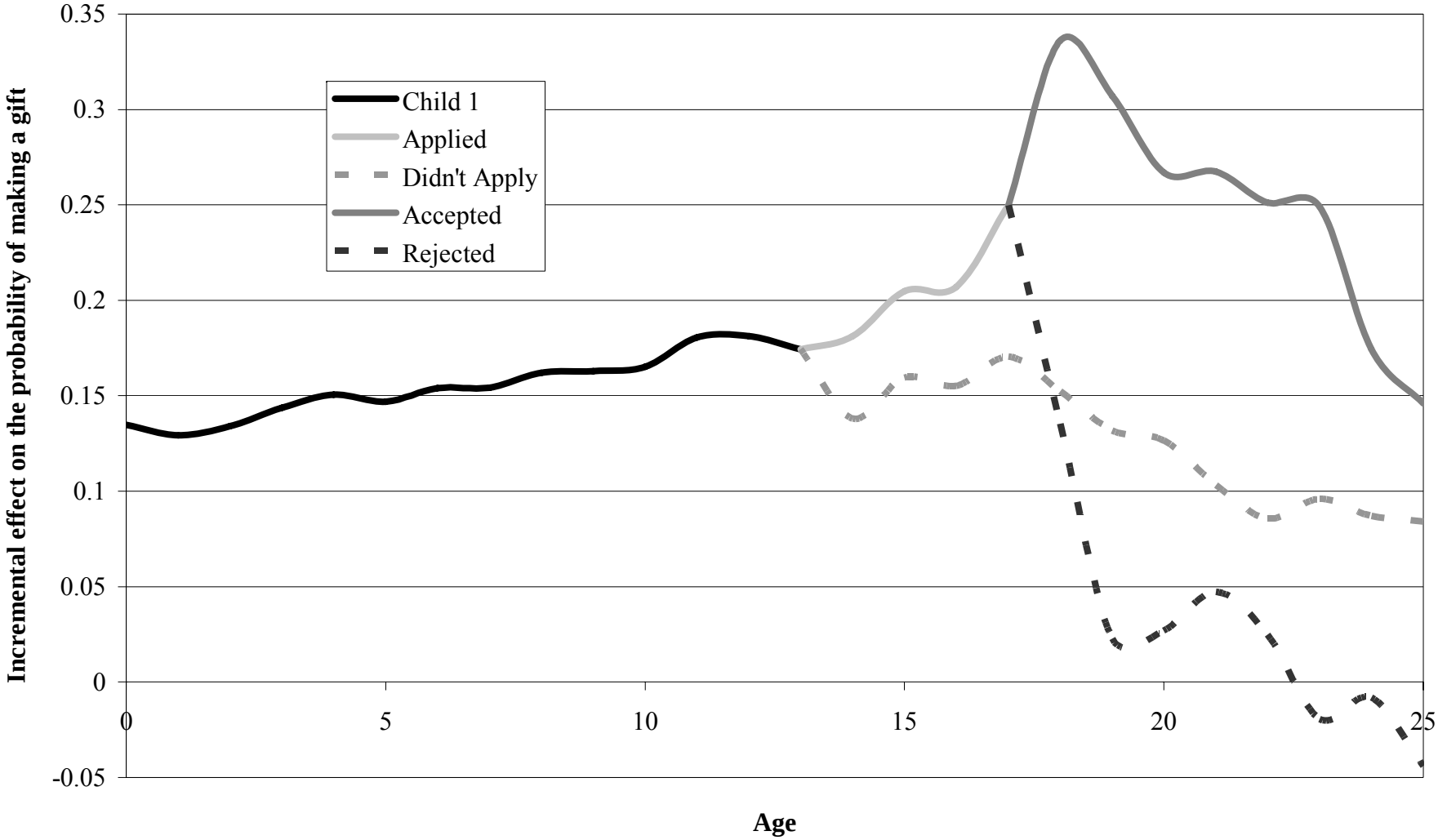
Admissions Office "Non-Academic" Ranking			
B	0.00123 (0.01326)	-0.01145 (0.07015)	-0.00569 (0.00690)
C	0.00505 (0.01365)	0.00651 (0.0722)	-0.00383 (0.00713)
D	-0.01293 (0.01563)	-0.05963 (0.08027)	-0.00846 (0.00785)
E	*-0.06919* *(0.03214)*	-0.2641 (0.1520)	-0.00849 (0.01642)
Admissions Office "Academic" Ranking			
B	*0.01503* *(0.00724)*	*0.09554* *(0.0368)*	0.00569 (0.00397)
C	*0.02461* *(0.00939)*	*0.1944* *(0.04927)*	*0.02227* *(0.00552)*
D	0.00710 (0.01231)	*0.1399* *(0.06569)*	*0.02383* *(0.00749)*
E	-0.02640 (0.02365)	0.06120 (0.1321)	*0.05336* *(0.01678)*
Varsity	*0.04912* *(0.00494)*	*0.2848* *(0.02528)*	*0.02996* *(0.00276)*
Club sport	-0.00860 (0.00598)	-0.05443 (0.03053)	0.00053 (0.00330)
Honors	-0.00105 (0.00628)	0.01172 (0.0318)	0.00559 (0.00344)
Greek	*0.1285* *(0.00501)*	*0.6643* *(0.02486)*	*0.04356* *(0.00251)*
GPA – Second Quartile	0.00313 (0.00662)	0.00221 (0.03277)	-0.00036 (0.00357)
GPA – Third Quartile	*-0.02053* *(0.00812)*	*-0.1066* *(0.04056)*	-0.00255 (0.00438)
GPA – Bottom Quartile	*-0.05714* *(0.00946)*	*-0.3072* *(0.04644)*	*-0.01688* *(0.00486)*

Major			
Small Social Sciences	*-0.03655* *(0.01782)*	-0.1644 (0.08596)	0.00824 (0.01141)
English	-0.02557 (0.01426)	-0.08494 (0.06708)	*0.02144* *(0.00937)*
Economics	*0.08084* *(0.01408)*	*0.6131* *(0.07868)*	*0.11356* *(0.01302)*
Public Policy	*0.04885* *(0.02069)*	*0.3950* *(0.1093)*	*0.08576* *(0.01713)*
Political Science	0.02286 (0.01428)	*0.2191* *(0.07239)*	*0.06621* *(0.01125)*
Psychology	-0.02501 (0.01583)	-0.1181 (0.07523)	0.00769 (0.01003)
History	*0.03214* *(0.01388)*	*0.2711* *(0.07058)*	*0.06825* *(0.01093)*
MAE	*0.06214* *(0.01650)*	*0.3558* *(0.08775)*	*0.04322* *(0.01195)*
EE/CS	*0.06090* *(0.01520)*	*0.4403* *(0.08358)*	*0.08403* *(0.01297)*
Arch & Civ	*0.06510* *(0.01504)*	*0.3974* *(0.08039)*	*0.05299* *(0.01151)*
Small Humanities	*-0.03285* *(0.01411)*	*-0.1325* *(0.06571)*	*0.02406* *(0.00932)*
Small Engineering	*0.09559* *(0.01666)*	*0.5887* *(0.09486)*	*0.08625* *(0.01478)*
Small Sciences	-0.00471 (0.01377)	0.01634 (0.06591)	*0.02486* *(0.00916)*
Minor			
African/African-American Studies	*-0.03727* *(0.01555)*	*-0.2348* *(0.08006)*	*-0.02458* *(0.00798)*
American Studies	*0.09132* *(0.01337)*	*0.4297* *(0.06904)*	*0.02150* *(0.00816)*
Latin	-0.00103 (0.04341)	-0.02392 (0.2076)	-0.00124 (0.01921)
Finance	*0.09217* *(0.02246)*	*0.3102* *(0.08333)*	*0.06009* *(0.01415)*
Theater	*-0.07022* *(0.01876)*	*-0.4213* *(0.08803)*	*-0.04300* *(0.00722)*

Public Policy	-0.00890 (0.01896)	-0.03483 (0.08983)	0.00518 (0.01042)
Other Engineering	0.02029 (0.01739)	0.1389 (0.08696)	0.01410 (0.00985)
Other Sciences	0.00304 (0.01282)	-0.02102 (0.0614)	*-0.01354* *(0.00639)*
Other Humanities	-0.00678 (0.00936)	-0.05838 (0.04539)	*-0.00997* *(0.00481)*
Teaching	-0.00768 (0.01930)	-0.1215 (0.09668)	*-0.02239* *(0.00980)*
Reunion	*0.06318* *(0.00141)*	*0.5627* *(0.0077)*	-
Post Baccalaureate Education			
Ph.D.	*0.04909* *(0.00955)*	*0.1581* *(0.04894)*	*-0.02790* *(0.00468)*
Masters	*0.08972* *(0.00670)*	*0.3830* *(0.03587)*	-0.00292 (0.00380)
J.D.	*0.1483* *(0.00721)*	*0.8610* *(0.04357)*	*0.05149* *(0.00516)*
M.D./D.D.S.	*0.1258* *(0.00901)*	*0.6625* *(0.0515)*	0.00768 (0.00537)
M.B.A.	*0.1873* *(0.00703)*	*1.152* *(0.04391)*	*0.09493* *(0.00553)*

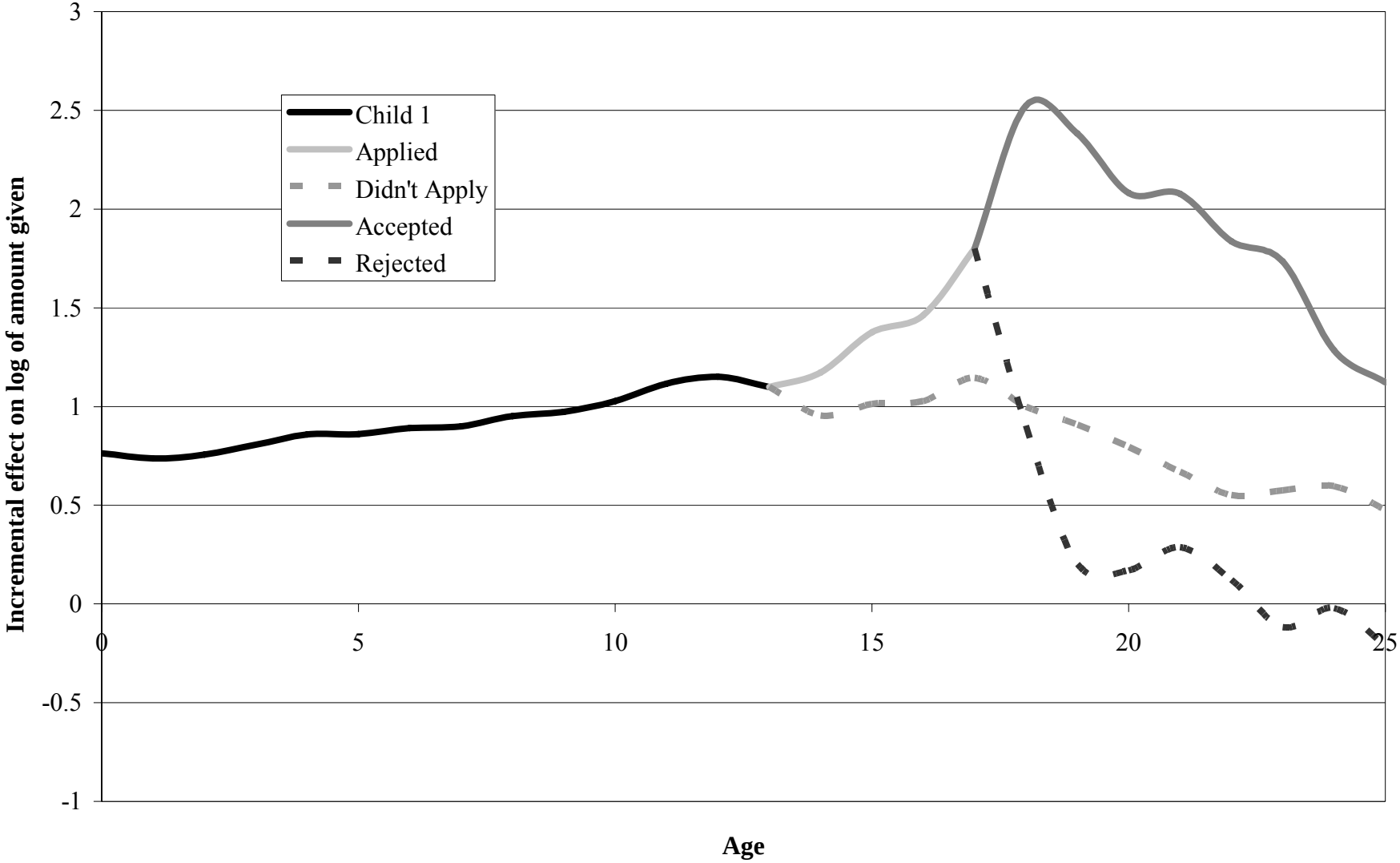
* Column (1) shows incremental effects on the probability of making a gift in a given year; column (2) shows incremental effects on the logarithm of amount of gift in a given year, and column (3) shows incremental effects on the probability that the individual gave a gift greater than or equal to the top 10 percent in a given year. Results in columns (1) and (3) are marginal effects generated by a probit model. Column (2) reports marginal effects generated by a Tobit model. Columns (1) and (2) use the basic sample of 487,913 observations. Column (3) uses a slightly smaller sample, 487,873, because some observations are dropped due to collinearity. The figures in parentheses are standard errors. Figures in italics are statistically significant at the 5% level. Standard errors are adjusted for clustering based on individuals. In addition to the variables listed, the regressions in columns (1) and (2) include location effects, year effects and class effects, which are suppressed for brevity. The regression in column (3) includes location and class effects.

Figure 1: Incremental Effect of the Child-Cycle on the Probability of Making a Gift



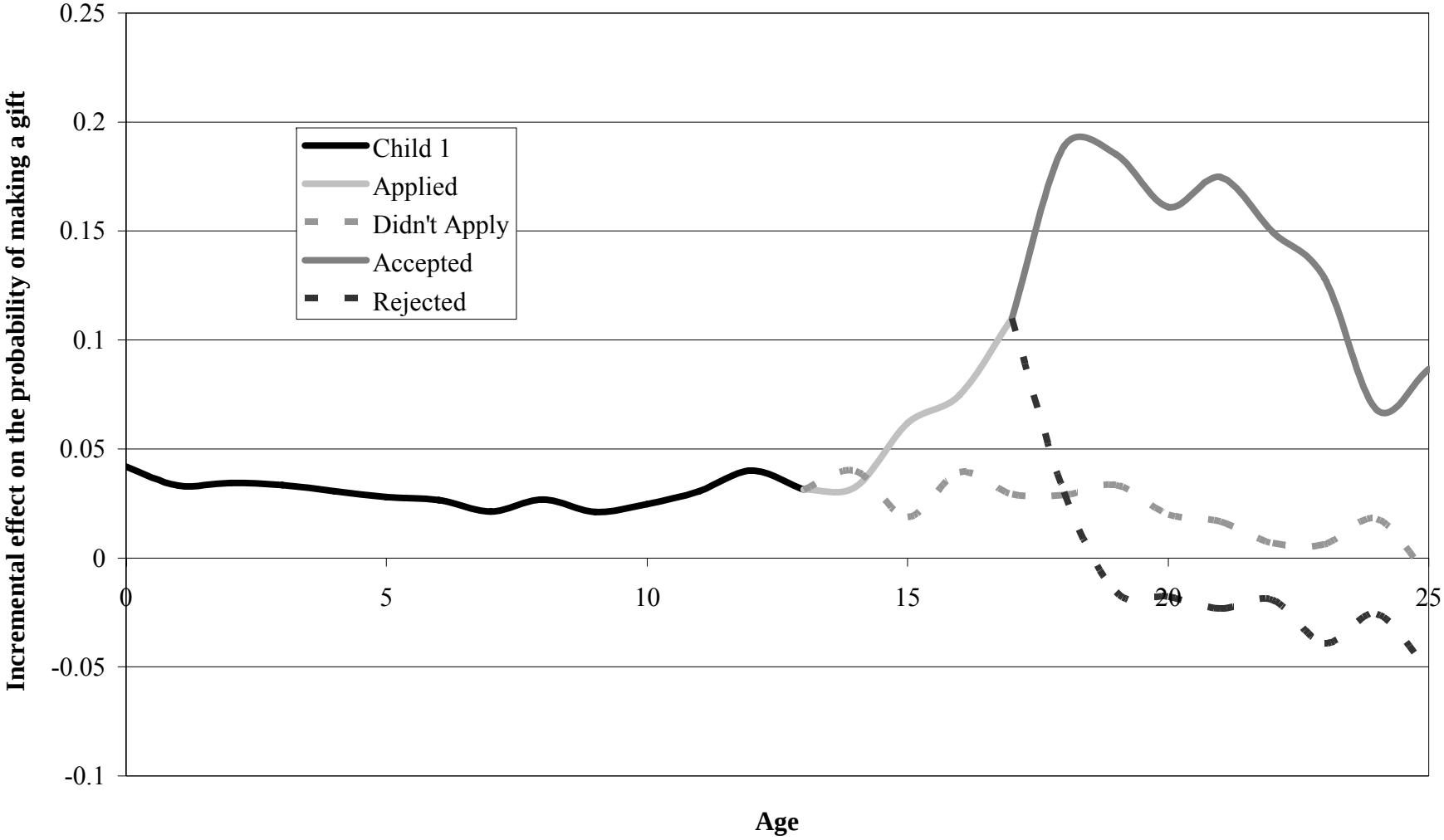
This figure graphs the child-cycle coefficients from column (1) of Table 3, using 487,913 observations. The vertical axis shows the incremental effect on the probability of making a gift in a given year as a function of the first child's age and admissions status.

Figure 2: Incremental Effect of the Child-Cycle on the Amount Given



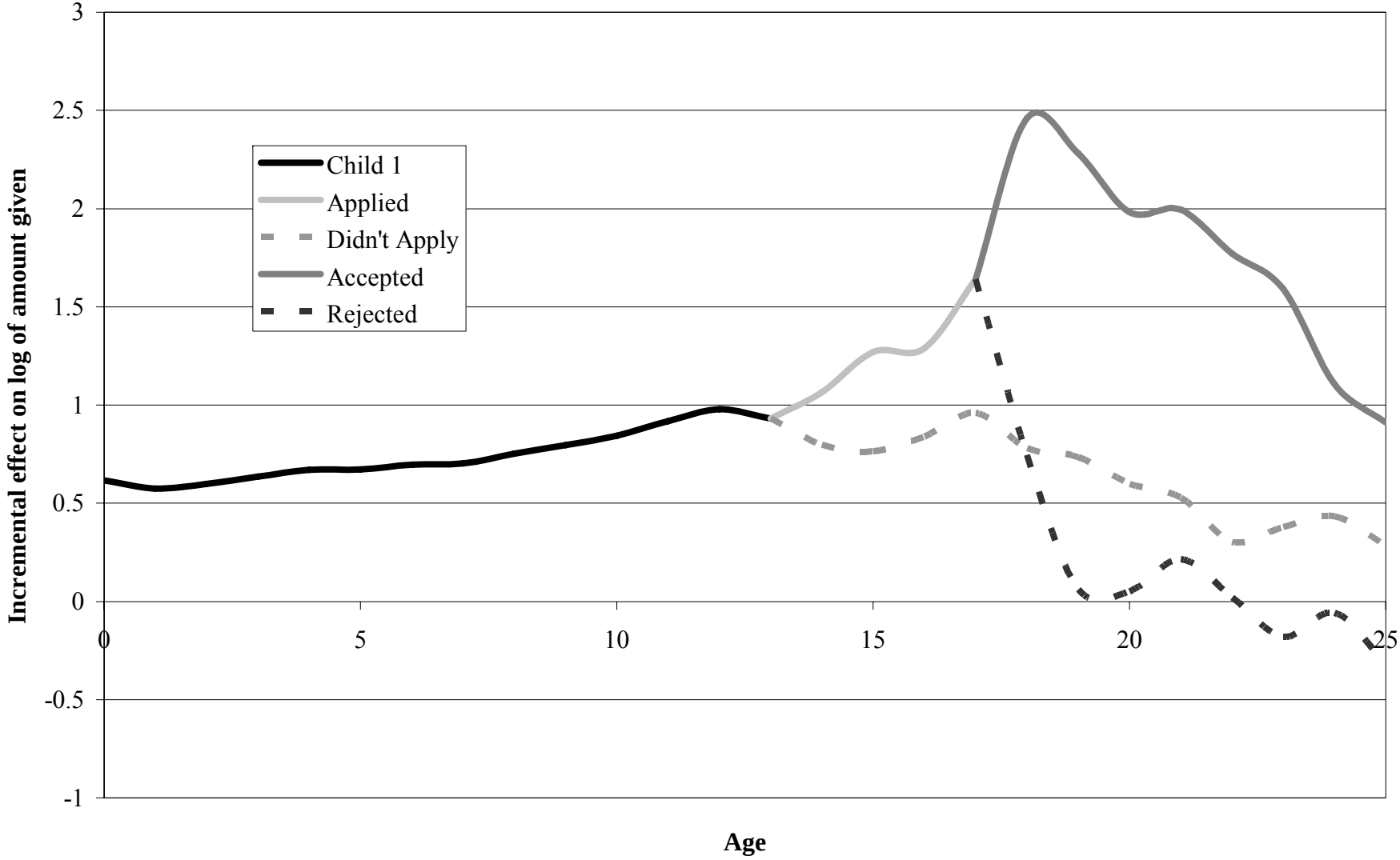
This figure graphs the child-cycle coefficients from column (2) of Table 3, using 487,913 observations. The vertical axis shows the incremental effect on the log of amount donated in a given year as a function of the first child's age and admissions status.

Figure 3: Incremental Effect of the Child-Cycle on the Probability of Being a Class Leader



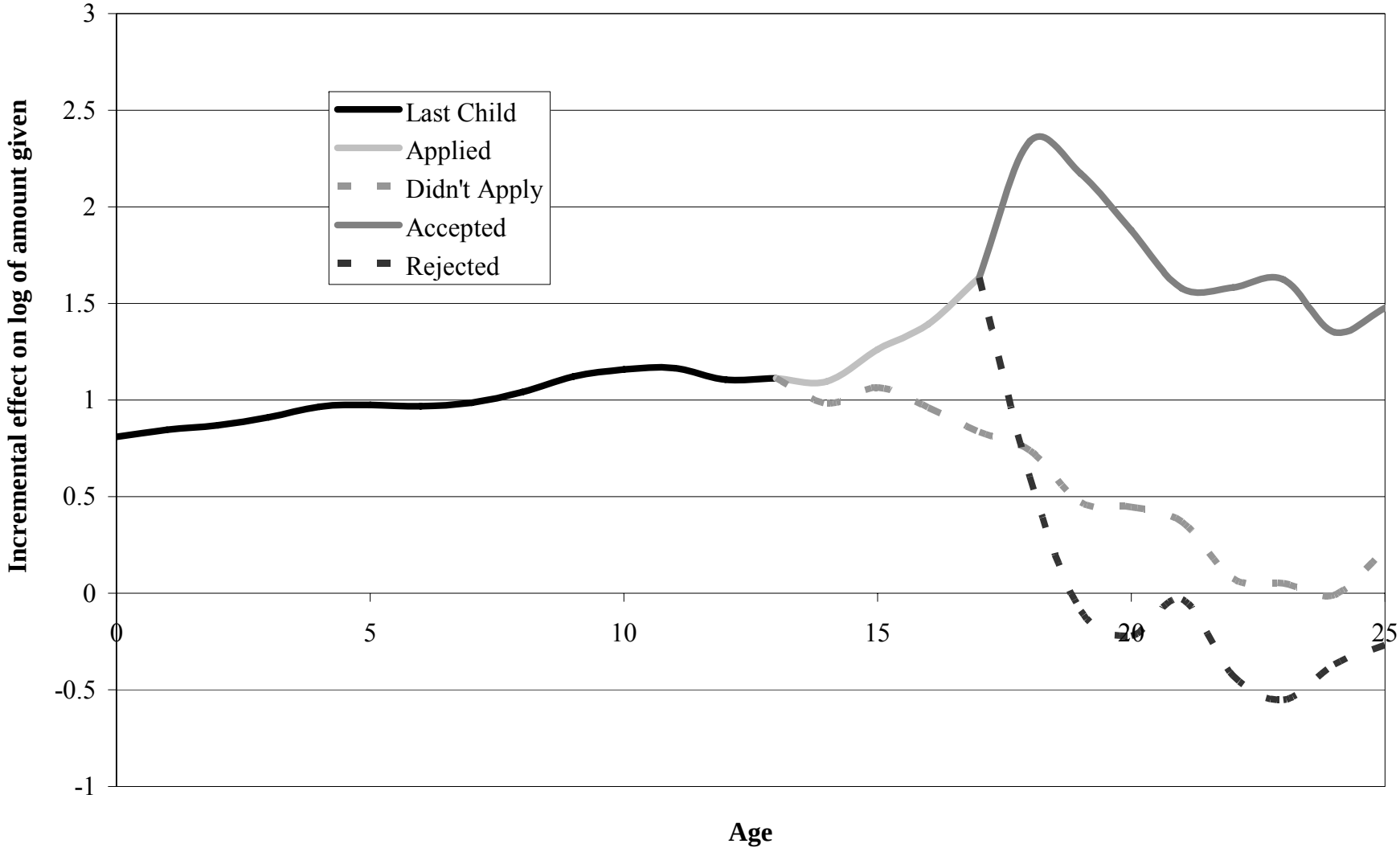
This figure graphs the child-cycle coefficients from column (3) of Table 3, using 487,873 observations. The vertical axis shows the incremental effect on the probability of being a class leader (making a donation at least as large as the upper 10 percent of gifts of all gifts) in a given year as a function of the first child's age and admissions status.

Figure 4: Incremental Effect of the Child-Cycle on the Amount Given (Controlling for Position and Field)



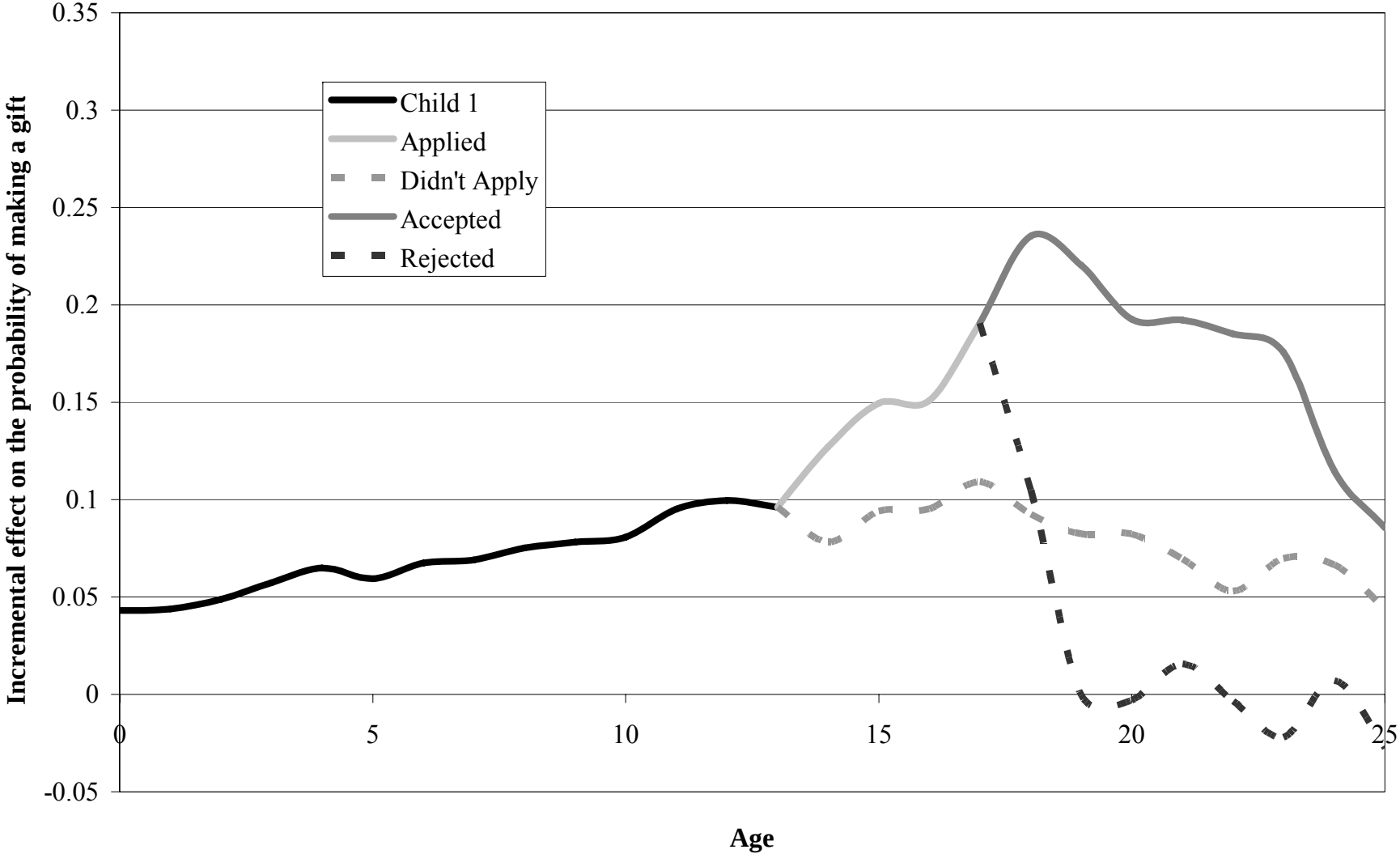
This figure graphs the analogs to the child-cycle coefficients from column (2) of Table 3, using 344,342 observations, when the basic model is re-estimated including information on alumni's fields and positions. The vertical axis shows the incremental effect on the log of amount donated in a given year as a function of the first child's age and admissions status.

Figure 5: Incremental Effect of the Child-Cycle on the Amount Given (Last Child)



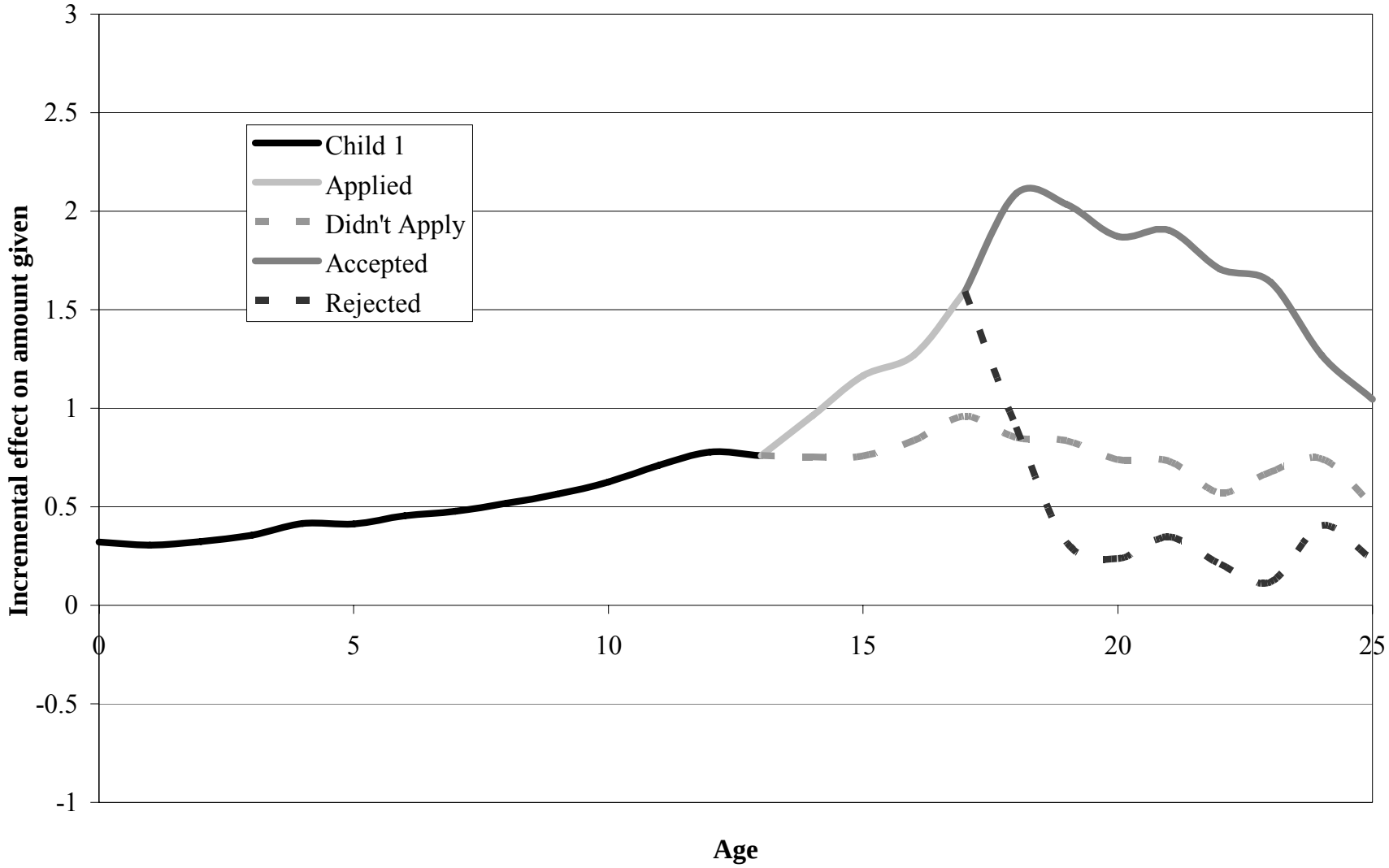
This figure graphs the analogs to the child-cycle coefficients from column (2) of Table 3, using 482,760 observations, when the basic model is re-estimated using the last child's age and admissions status rather than the first child's. The vertical axis shows the incremental effect on the log of amount donated in a given year as a function of the first child's age and admissions status.

Figure 6: Incremental Effect of the Child-Cycle on the Probability of Making a Gift (Fixed Effects Estimates)



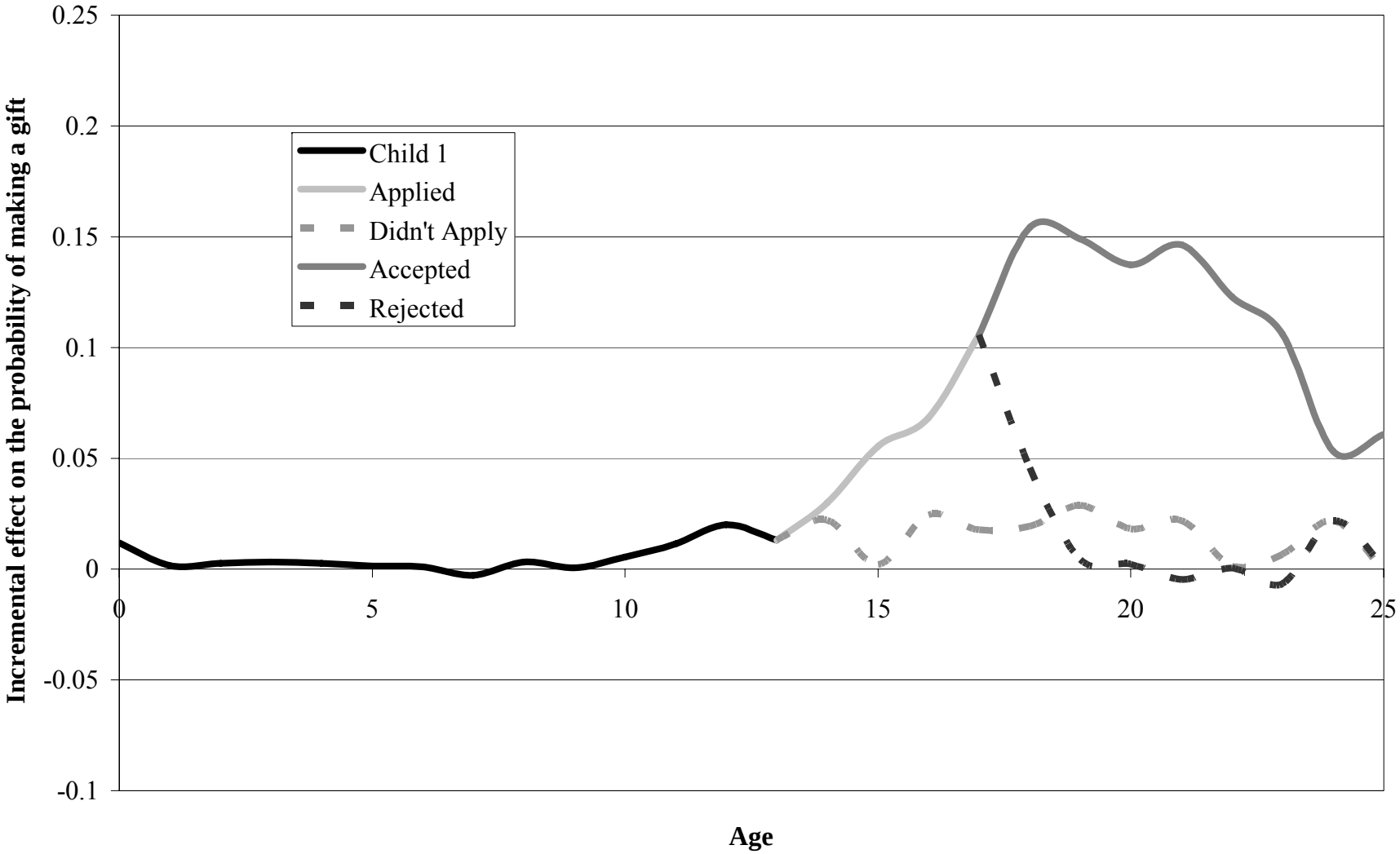
This figure graphs the analogs to the child-cycle coefficients from column (1) of Table 3 when the basic model is re-estimated with OLS and fixed effects. The vertical axis shows the incremental effect on the probability of making a gift in a given year as a function of the first child's age and admissions status.

Figure 7: Incremental Effect of the Child-Cycle on the Amount Given
(Fixed Effects Estimates)



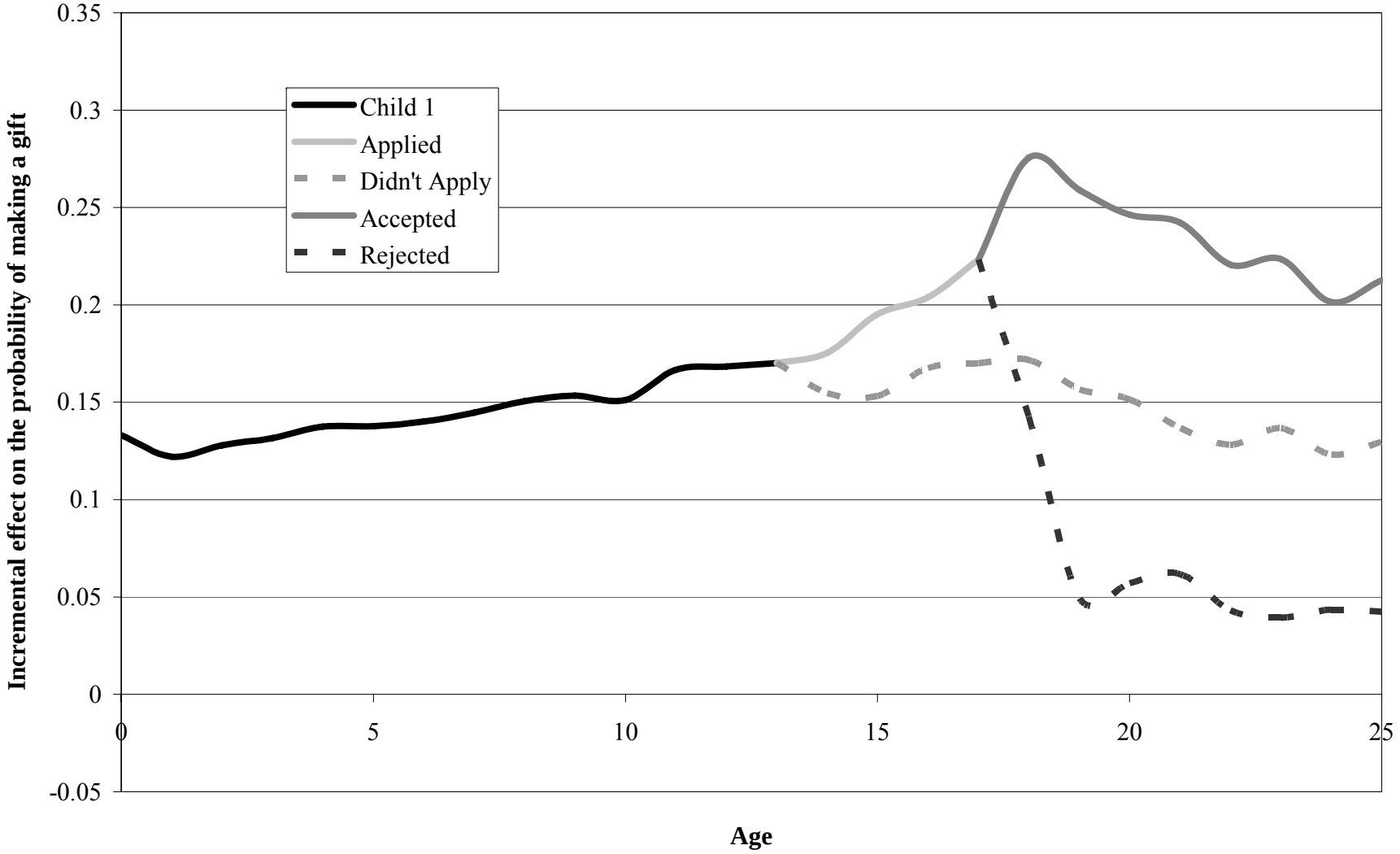
This figure graphs the analogs to the child-cycle coefficients from column (2) of Table 3 when the basic model is re-estimated with OLS and fixed effects. The vertical axis shows the incremental effect on the logarithm of the amount of giving in a given year as a function of the first child's age and admissions status.

Figure 8: Incremental Effect of the Child-Cycle on the Probability of Being a Class Leader (Fixed Effects Estimates)



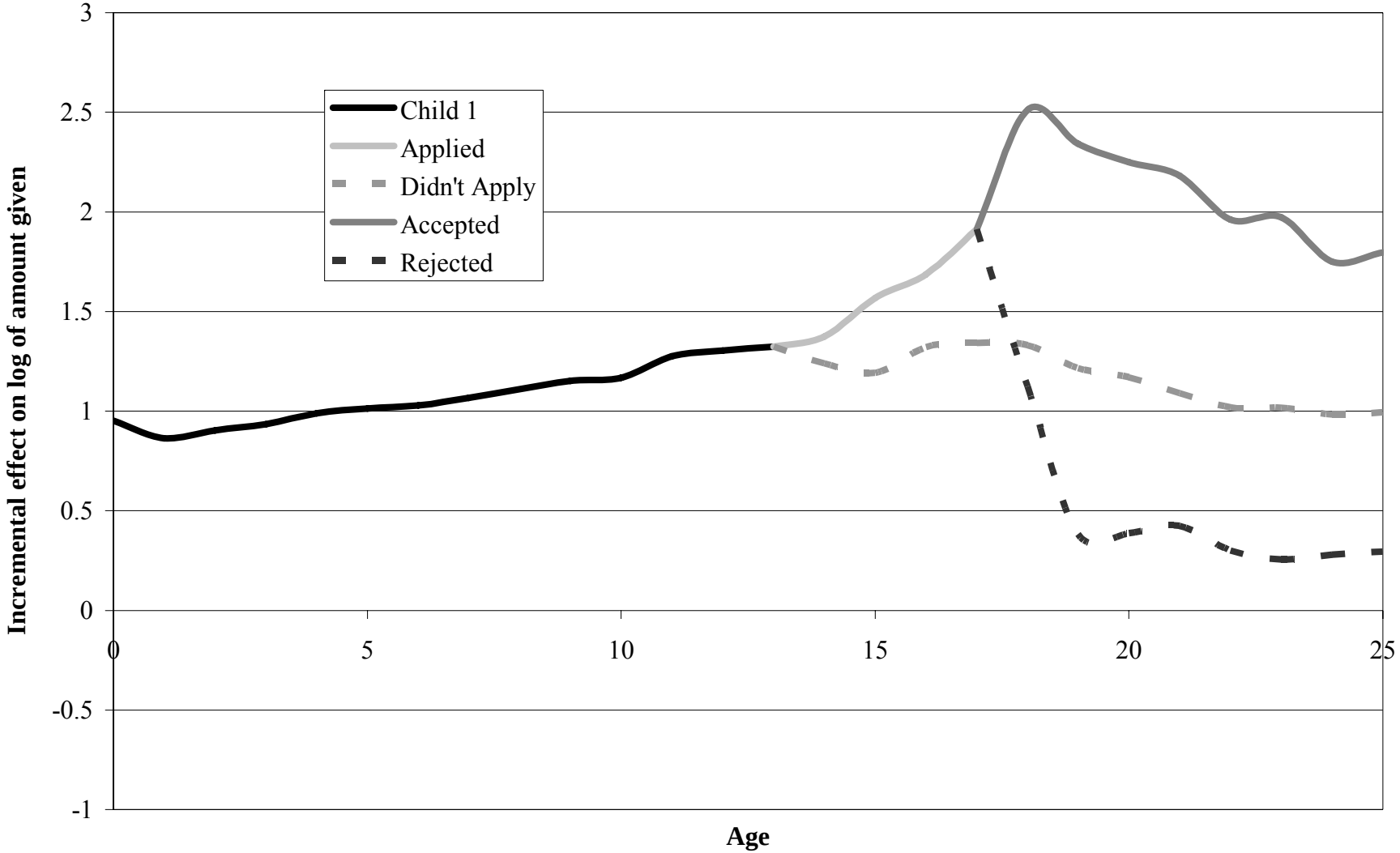
This figure graphs the analogs to the child-cycle coefficients from column (3) of Table 3 when the basic model is re-estimated with OLS and fixed effects. The vertical axis shows the incremental effect on the probability of being a class leader in a given year as a function of the first child's age and admissions status.

Figure 9: Incremental Effect of the Child-Cycle on the Probability of Giving (Augmented Sample)



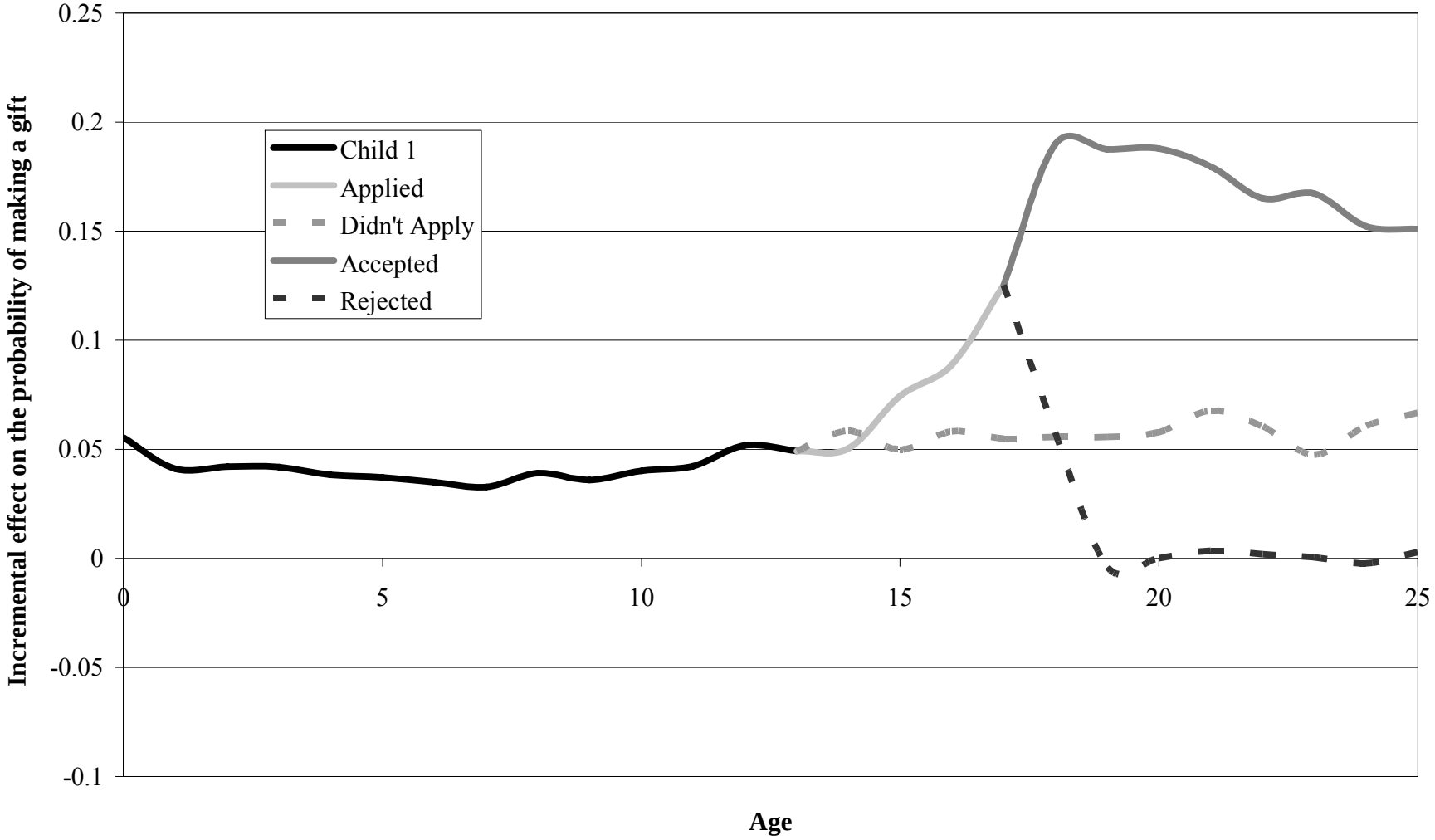
This figure graphs the analogs to the child-cycle coefficients from column (1) of Table 3, using 939,671 observations, when the basic model is estimated with a sample that includes alumni who graduated before 1972. This sample has more observations, but is lacking information on a number of covariates. The vertical axis shows the incremental effect on the probability of making a gift in a given year as a function of the first child's age and admissions status.

Figure 10: Incremental Effect of the Child-Cycle on the Amount Given (Augmented Sample)



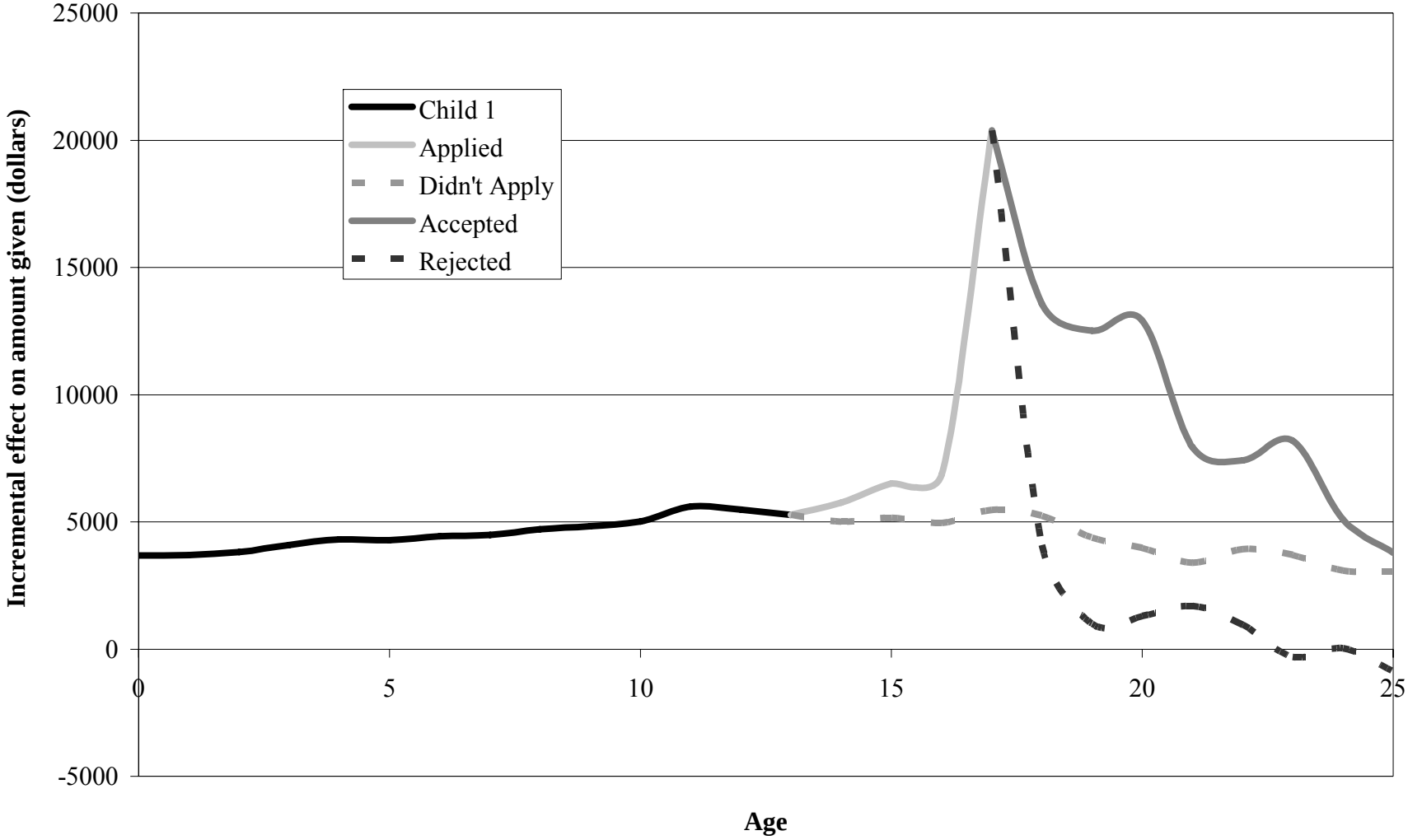
This figure graphs the analogs to the child-cycle coefficients from column (2) of Table 3, using 939,671 observations, when the basic model is estimated with a sample that includes alumni who graduated before 1972. This sample has more observations, but is lacking information on a number of covariates. The vertical axis shows the incremental effect on the log of amount donated in a given year as a function of the first child's age and admissions status.

Figure 11: Incremental Effect of the Child-Cycle on the Probability of Being a Class Leader (Augmented Sample)



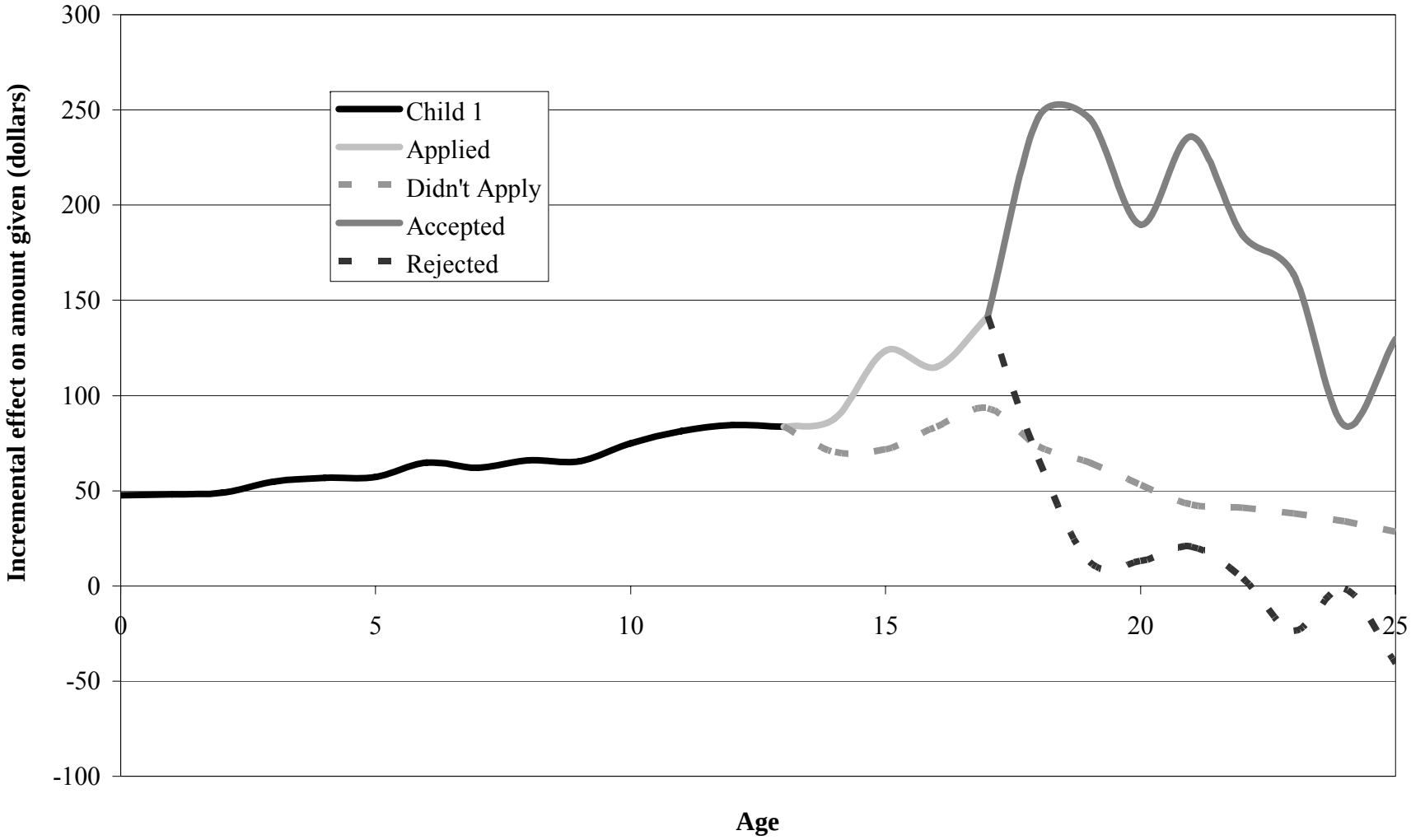
This figure graphs the analogs of the child-cycle coefficients from column (3) of Table 3, using 939,569 observations, when the basic model is estimated with a sample that includes alumni who graduated before 1972. This sample has more observations, but is lacking information on a number of covariates. The vertical axis shows the incremental effect on the probability of being a class leader (making a donation greater than or equal to the 90th percentile in one's class for that year).

Appendix Figure A1: Incremental Effect of the Child-Cycle on the Amount Given (Levels)



This figure graphs the analogs to the child-cycle coefficients from column (2) of Table 3, using 487,913 observations, when the basic model is estimated in levels rather than logarithms. The vertical axis shows the incremental effect on the number of dollars donated in a given year as a function of the first child's age and admissions status.

Appendix Figure A2: Incremental Effect of the Child-Cycle on the Amount Given
(Levels, Top One Percent of Donations Removed from Sample)



This figure graphs the analogs to the child-cycle coefficients from column (2) of Table 3, using 483,034 observations, when the basic model is estimated in levels rather than logarithms and the top 1 percent of gifts are deleted from the sample. The vertical axis shows the incremental effect on the number of dollars donated in a given year as a function of the first child's age and admissions status.