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Giving Till it Helps? Alumnae Giving and Children's College Options

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Abstract This paper examines whether donations to colleges and universities are partly motivated by the desire of alumni to increase their children's admissions probabilities. The paper uses data from a single-sex college, so that only alums with a daughter would evince this motive. We find that alums with a teenage daughter, as opposed to a teenage son, are more likely to make donations of at least $5,000. The same relationship is not evident for smaller donations, or when children are older than 18. Further, we find evidence that this difference in the probability of a donation by alums with teenage daughters and teenage sons does not exist when acceptance rates are higher in an earlier period.

Keywords Alumni giving · Selective admissions · Altruism · Women's college

Introduction

Children of alumni are more likely to be accepted at selective private institutions of higher education than similar applicants.[1] Why might selective institutions find it desirable for

[1] Espenshade et al. (2004) find that legacy students are about three times more likely to be admitted to selective colleges and universities than non-legacies, conditional on SAT scores and other demographic characteristics (also see Shulman and Bown 2001). Consistent with the finding that legacy students are admitted at higher rates than similar non-legacy students, some research suggests that they perform less well in their classes (Elzinga and Melaugh 2009).

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admissions criteria to deviate from those of a strict academic meritocracy? In the case of "legacy" students, the considerations may hinge on the importance of maximizing donations, since alumni account for one-third of total donations to private universities (Ehrenberg and Smith 2003). Endowment returns help cover the substantial difference between "sticker price" tuition and actual costs (Ehrenberg 2010; Winston 1999).[2]

On the one hand, admitting children of alumni may increase the affinity between families and and universities, thus increasing future incentives to donate.[3] On the other hand, some alumni may donate with the self-interested motive of increasing their children's chances of admission, an implicit quid pro quo. At a private university, Meer and Rosen (2009a) show that donations are higher from alums when their children who eventually apply are 14–18 years old. This is precisely the age when children's college options are determined, which is consistent with self-interested motives. Even so, it is possible that a parent's desire to enroll a child at his alma mater and his concomitant donation both stem from deep satisfaction with the educational experience he received at the institution. In short, it is challenging to empirically distinguish between selfish and altruistic motives in most college and university data.

This paper builds on Meer and Rosen (2009a) by drawing upon a unique feature of Anon Women's College (henceforth AWC): only alumnae with at least one female child will be motivated to donate in order to increase a child's probability of admittance. Alumnae with sons are not subject to the same self-interested motives, and serve as the control group in the paper's empirical strategy. Using administrative data on donations between 1999 and 2009, we initially find that alumnae with a female child are, on average, more likely to donate than alumnae with only male children. It is possible that having female children changes perceptions of the importance of a women's college as an option for her own child (or other children), leading to a purely altruistic reason for increased donation.

To identify self-interested motives, we further investigate whether the probability of giving follows a pattern that is consistent with the timing of college applications of the female child. We find large and statistically significant increases in the probability of donating for alumnae whose oldest child is female and between 11 and 18 years old, compared to alumnae whose oldest child is male and similarly-aged. The same differences by gender are not present when children are younger than 11 or older than 18, consistent with strategic behavior on the part of alumnae. Moreover, these difference only exist for relatively larger gifts of greater than $5,000 and $10,000 (both of which receive special recognition at AWC). Finally, if donating is motivated by a desire to increase children's probability of acceptance, then the magnitude of strategic giving should be attenuated when AWC is less selective. We find the child-age-by-gender giving patterns just described are not evident in a dataset covering an earlier period from 1987 to 1998. During the earlier period, AWC's acceptance rate was approximately 11 percentage points higher.

[2] Endowment revenues facilitate targeted financial aid discounts to the full tuition price, which could increase student applications and the proportion of admitted applicants who attend. In the longer run, the size of the endowment, the fraction of students admitted, the acceptance rate, and the fraction of alumni who donate are frequent ingredients in popular rankings of college quality. Monks and Ehrenberg (1999) shows that rankings have an effect on the quality of the entering class of students. Student quality, in turn, may affect alums' later ability and willingness to contribute to their alma mater.

[3] Using data from a private university, Meer and Rosen (2010) showed that alumni are more likely to make charitable donations to their alma mater if younger members of their family attend that institution, consistent with the notion that legacy admissions increase affinity and giving.

The paper is organized as follows. Section 2 presents background information on charitable giving and the returns to selective colleges. Section 3 describes the AWC data, while Sect. 4 explains the empirical strategy used to address the research question. Section 5 presents the empirical results, and Sect. 6 concludes.

Prior Research

Charitable donations are puzzling, at first glance, since some theory predicts that free-riding among rational consumers should reduce donations to low levels. Altruism may be introduced into the models, but in that case public funding should result in one-to-one crowd out of giving by altruistic private donors (Andreoni 1990; Ribar and Wilhelm 2002). In actuality, complete crowd-out is almost never observed. Several theories attempt to explain this inconsistency, including "warm glow" giving, donors' desire to influence the organization, and donors' sense of obligation to pay for services they use (Kingma and McClelland 1995; Ribar and Wilhelm 2002; Crumpler and Grossman 2008). Donations may also stem from rational self-interest if donors expect to get something in return for their donations, even if that is an intangible like "fitting in" with social norms (Keating et al. 1981; Croson et al. 2009). On the specific issue of alumni giving, Meer and Rosen (2009a) provide evidence that charitable giving to one's alma mater is consistent with a self-interested motive.[4]

Indeed, families may have strong economic incentives to donate prior to an admissions decision, presuming that families believe it will affect their children's probabilities of admission to high-quality institutions. Human capital theory suggests that students should prefer the college or university that offers the greatest lifetime earnings advantage less the costs of attendance. Brewer et al. (1999) suggest that there is a significant economic return to attending an elite private institution, and there is some evidence that this premium increased over time.[5] More recently, Hoekstra (2009) uses the discontinuity in admissions probability to a flagship state university, finding earnings gains of 20 % for white men.[6] If this is the case, competition over scarce entry slots to elite colleges should rise, as well as tuition. Indeed, tuition has risen faster than inflation over the past three decades, rising by 4.7 % annually in real terms during the 1980s, 2.9 % during the 1990s, and 2.6 % during the 2000s (The College Board 2009).

4 A related literature, not reviewed here, examines multiple determinants of alumni giving, using micro data on individual and household characteristics, proxies of satisfaction with prior academic experiences, school athletic performance, and other variables (Meer and Rosen 2009b; Monks 2003; Clotfelter 2003; Holmes 2009).

5 Black and Smith (2004) find that non-experimental estimates of the effect of college quality on later outcomes are sensitive to functional form, while Black and Smith (2006) use multiple proxies of college quality and argue that the existing literature may actually understate the effects of college quality on wages.

6 Dale and Krueger (2002) find mixed evidence on the impact of attending a selective college on subsequent labor market earnings: the average SAT score at one's college does not affect later earnings, except for students from lower-income households. However, attending a college with a higher *tuition* does appear to increase labor market earnings for all, and more for students from lower-income households. The authors are cautious about interpreting the relationship between tuition and later outcomes as evidence that these institutions are higher quality and thus their graduates meet with better success later in life. It may be that despite controls for student and family characteristics, those students who choose to attend colleges with higher tuitions come from families that are better off in ways that are unobservable to the econometrician, and thus these students might be expected to have better labor market outcomes due to their families' resources rather than their colleges' quality.

As mentioned above, tuition does not necessarily represent the actual price of attending an institution. Many elite institutions, AWC included, practice need-blind admissions, which means that admissions decisions are determined first, without consideration of a students' ability to pay. Financial aid is then offered to qualifying students, effectively lowering tuition costs for those students. About half of students at AWC pay less than the full tuition or "sticker price." However, even full-tuition price represents a substantial subsidy at most public and private institutions in the United States (Winston 1999). The average price to cost ratio at private institutions in the US is 45.9 %. At institutions that rank in the top 10 % of subsidies to students, the average price to cost ratio is 20.1 %. Most selective private colleges and universities are counted in that top 10 % ranking. At AWC, the sticker price represents about 30–40 % of the per-student operating costs of the college. Since there is no negotiated price above the sticker price, pre-admission donations may implicitly allow for price discrimination at prices above the stated tuition level.

Data

We use administrative data on annual donations from 1999 to 2009 for 32,365 alumnae of AWC. All donations are adjusted to constant 2008 dollars using the Consumer Price Index. We further construct four dummy dependent variables to indicate whether an alum's annual donation exceeded $0, $1,000, $5,000, and $10,000, respectively. The larger figures align with donation amounts that are given special recognition by AWC, and are thus more likely to be "noticed" by college personnel. The data also include the gender and birthdate of alums' children, and we use the latter to impute the age of an alum's oldest child in each year between 1999 and 2009.

Table 1 reports summary statistics. The first column includes the full sample of 329,524 alumna-by-year observations. Across the entire period, alums gave in 45 % of the observations, but most of these gifts were small. The same percentages are 7.9 % for gifts over $1,000, and less than 2 % for higher amounts. Across these gift years, alumnae report having a child of any age in 23 % of the alumna-by-year observations.[7]

Figure 1 presents time-series data on the proportion of alumnae who make a gift of any size. In the full sample, the overall giving rate dipped in the wake of the financial crisis of 2008, highlighting the need to control for annual shocks to giving behavior. In addition to the full sample, we calculate proportions for alumnae with no children (long dashes), those with only male children (small dashes), and for alums with any girls (dotted line). Alumnae with children, regardless of gender, are more likely to donate than alumnae without children. This is partly due to the fact that those without children are younger, on average, and age may affect donation behavior through mechanisms such as income and wealth.

There is also a difference in probability of giving by child gender. Alumnae with at least one daughter are more likely to donate to AWC than alumnae with only sons. This alone does not indicate that donating is motivated by a desire to affect one's daughter's probability of admission. Indeed, having a daughter may simply reinforce one's opinion that there is value in young women having the choice of a single-sex educational environment,

[7] Overall, 21 % of alumnae in the sample report having a child, which is considerably lower than the proportion in the population (in the 1990 census, 61 % of college-educated women over 21-years-old reported having at least one child). Because alumnae self-report data to AWC, it may indicate that the subsample of alumnae with (known) children maintains closer contacts with AWC. Thus, our results are best generalized to the subset of motivated and engaged alumnae. Later, we consider the related issue of whether child gender is random.

Table 1 Summary statistics for pooled alumna-by-year observations (1999–2009)

Variable	Full sample	Oldest child is male, ages 0–25 in gift year	Oldest child is female, ages 0–25 in gift year	
Gift > $0	0.448	0.566	0.565	
Gift ≥ $1,000 (constant 2008)	0.079	0.105	0.121	*
Gift ≥ $5,000 (constant 2008)	0.019	0.024	0.034	**
Gift ≥ $10,000 (constant 2008)	0.010	0.012	0.021	**
Has any child in gift year	0.231	–	–	
Has child aged 0-25 in gift year	0.099	–	–	
Class at AWC				
Pre-1950s	0.095	–	–	
1950s	0.124	0.002	0.002	
1960s	0.140	0.077	0.079	
1970s	0.161	0.441	0.485	**
1980s	0.186	0.407	0.366	**
1990s	0.196	0.074	0.067	
2000s	0.099	–	–	
Alumna-by-year observations	329,524	15,773	16,588	
Unique alumnae	32,365	1,678	1,767	

Notes see text for variable definitions. ** (*) indicates that the difference between alums with male and female children is statistically significant at 1 % (5 %)

and increase affinity with AWC. In the following analyses, we will focus on the child-age-by-gender pattern—especially around the age of application and admission—in alumnae donations to see if there is support for the idea that donations are partly motivated by their daughters' potential admission. The final columns in Table 1 provide a closer look at observations in which the oldest child of alumae is between 0 and 25 years old. The second column contains summary statistics for alums whose oldest child is a male, while the third column includes alums whose oldest child is female. These data suggest that alums whose oldest child is female are more likely to donate at higher levels.

Empirical Approach

A. Estimation

If alums are self-interestedly donating to their alma mater to increase their child's probability of acceptance, then the probability of a donation should increase as that child enters the age group when college outcomes are determined. AWC provides a unique quasi-experimental setting in which to test that, since only alums with at least one female child could possibly be motivated by the desire to improve admissions odds.

Using the full sample of data, our empirical strategy is to examine how alumnae donations vary with age of the oldest child and, in particular, how child gender and age interact. We focus on the relationship between donations and the sex of the oldest child, rather than other children. First, regardless of family size, alums have an oldest child if they have any children at all. Thus, we avoid introducing sample selection by focusing on oldest children. Second, if alums donate with the objective of influencing admissions

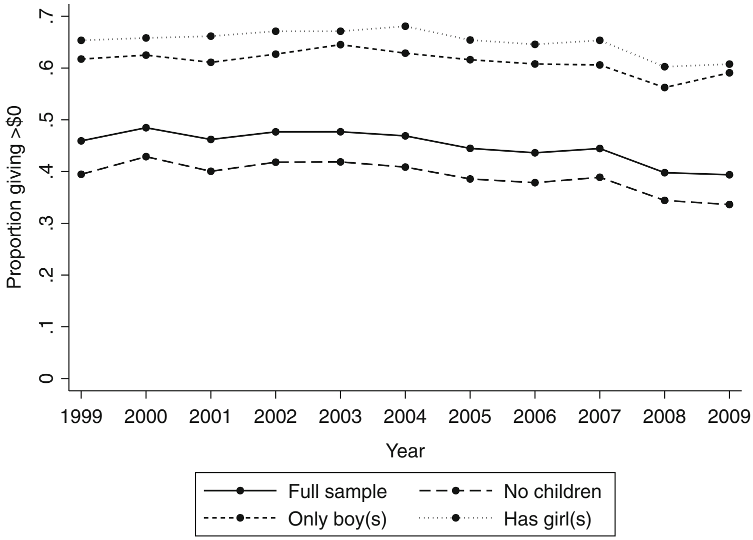

Fig. 1 Proportion of alumnae who gave, 1999–2009. *Notes* the full sample includes all alumnae in a gift year. "No children" indicates that an alumna did not report having a child in any gift year. "Only boy(s)" indicates that an alumna had a child in any gift year, and no female children. "Has girl(s)" indicates that an alumna has a child in any gift year, and at least one child is female. Apart from new alumnae entering as a result of graduation, the composition of each group is constant across gift years

outcomes, then donation behavior is likely to be affected by the perceived success or failure of that strategy with prior children who went through the admissions process at AWC or other institutions. If an alum had an older son, then she would not have had the opportunity to form an opinion about whether donating to AWC was an effective way to improve admissions odds. Thus it seems cleaner to assess whether the gender of the first child affects donation probabilities, before the alum has a chance to participate in the admissions process either at AWC or another institution.

We estimate Eq. (1) by ordinary least squares:

$$G_{it} = \alpha + \sum\nolimits_{k=0}^{26} [\beta^k C_{it}^k + \lambda^k C_{it}^k F_i] + A_i \delta + \mu_t + \varepsilon_{it} \quad (1)$$

where G is a binary giving outcome, equal to one if alumna i gave a specified amount in gift year t.[8] Each C_{it}^k is a dummy variable indicating that an alumna i has a child aged k in gift year t, where C_{it}^{26} indicates a child aged 26 or older. The dummy variables C_{it}^k are also fully interacted with a dummy variable indicating that the child is female (F_i).[9] The regression also includes dummy variables for each year (μ_t) to capture general trends in giving behavior, perhaps due to macroeconomic cycles. In initial specifications, a vector of time-invariant variables (A_i) includes the class year of alumnae, to control for alumae age effects on giving. The regression is estimated with 329,524 pooled alumna-by-year observations. The heteroskedasity-robust standard errors are adjusted for clustering within 32,365 alumnae.

8 Unlike non-linear alternatives such as a logit, the interaction terms in the linear probability model have a straightforward interpretation as marginal effects (Ai and Norton 2003). Because of the ease of computation and interpretation, this paper employs linear models.

9 For 77 alumnae, child age is available but gender is missing. These observations are excluded from the analysis.

In Eq. (1), the estimates of λ^k are interpreted as marginal probabilities of giving for alums with a girl of age k, relative to alums with a boy of the same age. Their signs and statistical significance allow us to test whether the child-age profile for alumnae donations is the same for alums with an oldest female or male child. We are particularly interested in whether estimates of λ^k: (1) are positive and statistically significant during pre-college years, especially during the period of college planning and applications; (2) revert to zero during post-admissions years; and (3) only exist for relatively larger gifts. The estimates are unbiased to the extent that the age-by-gender interactions are uncorrelated with the error term, conditional on other independent variables. This seems quite likely, presuming that child gender is a lottery.[10]

However, there are two reasons why the oldest child's gender might be correlated with observed or unobserved characteristics of families that also determine giving behavior. First, parents may engage in active child sex selection. Second, there may be sample selection in self-reporting of personal data such as child age and gender to AWC. We revisit these possibilities below. Nonetheless, to guard against bias and improve statistical precision, we also report estimates of Eq. (1) that include a wider range of time-invariant and time-varying variables that may be correlated with giving.[11]

The additional time-invariant variables include a full set of dummy variables for the college major and race and ethnicity of alumnae. Other variables, while nominally time-varying, are only reported in the AWC dataset for the last known value.[12] We use these data to create marital status dummy variables; state or country of residence dummy variables; and indicators of (1) whether the alum has any relative who graduated from AWC, (2) whether the alum has a seasonal address (a wealth proxy), and (3) whether the alum is on a do-not-solicit list. Finally, additional time-varying control variables include an indicator of whether it is a reunion year for an alum (since reunions occur every five years), the number of children of the alum in the gift year, and the fraction of children in the gift year who are female.

B. Is Gender a Lottery?

Table 2 shows that 6,787 alums report having at least one child. Among 52.5 %, the oldest child is female. This is higher than the US population mean of about 49 % (Dahl and

[10] Even if the gender of the oldest child is random, research suggests that children's gender may affect family size and structure. Butcher and Case (1994) find that women in the United States from cohorts born in 1920–1940, and who had any sisters, had fewer years of education than women with only brothers. Dahl and Moretti (2008) find that, in the United States, a first-born daughter has more siblings than a first-born son, and that women with a first-born daughter are more likely to be divorced than women with a first born son. The latter findings suggest that first-born daughters are less well-off than first born sons. Our estimates control for the number of children an alum has as well as the gender composition of her children. Unfortunately we cannot control for marital status at the time of the gift, since we only know marital status as of the time when the alum last updated her records. In any case, to the extent that first-born girls are less well-off than first born boys, one would expect this to bias the estimates *away* from finding that mothers of eldest daughters are more likely to donate than mothers of oldest sons.

[11] Alumnae fixed effects might also be included to control for alumna-specific, time-invariant heterogeneity. We estimated such a variant of Eq. (1), but the standard errors (and confidence intervals) on the female interaction terms were considerably larger, and consistent with large positive or negative effects. Given their imprecision, we do not report the results here.

[12] The administrative data are collected at points when the AWC and alumnae come into contact; for example, when alumnae fill out a survey for reunions, or if alumnae contact the institution to update records. The records are typically over-written with new information.

Table 2 Proportion female, among first, second, and third children

	Full sample
First child	0.525 [6787]
Second child	
First child male	0.499 [2512]
First child female	0.496 [2297]
Third child	
First/second children male	0.507 [606]
First/second children mixed	0.509 [497]
First/second children female	0.497 [531]

Notes sample includes 6,787 alumnae who report having at least one child, excluding multiples. Sample sizes are in brackets

Moretti 2008). While consistent with sex selection, it is more plausibly attributed to sample selection in the reporting of child data to AWC. Since the time of donation is a point of contact with AWC when records may be updated, it makes sense that if alumnae are more likely to donate if they have an oldest daughter, the college is also more likely to be informed about their children.

Further, there is little evidence in these data that alumnae are acting on a preference for one gender over another. Table 2 further shows that among the subset of alums with at least two children (4,809) and at least three children (1,634), there appears to be no relation between the gender of the second child and the gender of first or the gender of the third child and the gender mix of the first two. If there was a sex preference among alumnae and alums were using sex-selective technologies, then one would expect a difference in the proportion female by sex of the older children. Though not reported here, we also find no evidence of differences in gender mix among racial and ethnic subgroups.[13]

Given the circumstantial evidence of sample selection in self-reporting of child data, we suspect that the subsample of alums with female children is more "attached" to AWC (since data is requested when donating, attending a reunion, or another AWC activity). In terms of external validity, therefore, our results are perhaps best generalized to the subset of engaged and motivated alums. However, it is less likely a threat to internal validity, since we find it implausible that higher giving among alums with female children relative to male children—but only for pre-college adolescents, and only for the largest of gifts—could indicate something other than strategic behavior.

Results

As a simple approach to identification, Fig. 2 illustrates the raw data. It graphs the proportion of alums donating a given amount by the age of the oldest child. The solid and dashed lines reflect, respectively, the samples in which the oldest child is male or female. The first panel shows the probability of giving any gift, the second panel a gift of over $1,000, the third a gift of over $5,000, and the fourth a gift of over $10,000. One suspects that relatively larger donations will be perceived by alumnae as more effective in increasing an admissions probability, in part because larger donors at AWC are publicly recognized by categories of amounts.

The probability of giving any gift increases with the age of the oldest child, to which we attach no particular causal interpretation. It may proxy the increasing incomes and wealth

[13] Almond and Edlund (2008) and Abrevaya (2009) report evidence of male-biased sex ratios among US-born children of some groups of Asian parents.

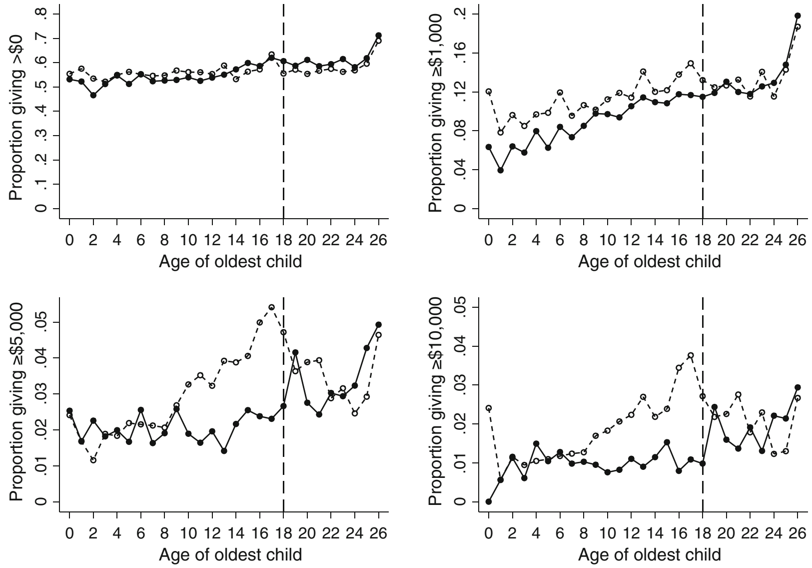

Fig. 2 Proportion of alumnae who gave, by age and gender of oldest child. *Notes* the sample includes all alumnae whose oldest child was 0–26 years old between 1999 and 2009. The *dotted line* indicates alumnae whose oldest child is female, and the *solid line* males

of alumnae. But at the highest thresholds of giving ($5,000 and $10,000), a distinct pattern emerges: the probability of donating for alums with an oldest girl diverges—at around 10 years old—from the probability of donating for alums whose oldest child is a boy. The difference peaks when the children are 17 years old. The probabilities converge again when the oldest child is over 18 years old, the typical age at which children begin college in the United States.

Figure 2 only reports raw means of the underlying data, without adjustment for year effects or other covariates. Table 3 reports estimates of λ^0–λ^{25}, the regression-adjusted gaps between the two lines at each child age. The odd columns do not include additional control variables, while even columns control for a complete set of time-invariant and time-varying variables. The results in columns (1–4) suggest that alumnae with an oldest girl instead of a boy are no more likely, on average, to donate relatively smaller amounts. In contrast, columns (5–8) suggest that alumnae with an oldest girl are relatively more likely to give larger amounts when the child is 11 or older. When the oldest child is 11, for example, alumnae with girls are 1.9 percentage points more likely to donate an amount greater than $5,000, and 1.2 percentage points more likely to donate greater than $10,000. The magnitudes of both estimates are robust to the inclusion of additional control variables.[14]

[14] As an additional robustness check, we re-estimated Eq. (1) using the log of the annual gift amount as a dependent variable (and therefore excluding all observations in which the annual gift is zero). In this specification the interaction terms are interpreted as the percentage increase in giving when a child of a specified age is female rather than male, conditional on making a gift of any size. As with the linear probability specifications in Table 3, the coefficient magnitudes are large and statistically significant just before 18, but not thereafter. For example, alums with a female 17-year-old give approximately 23 % more than alums with a male child of the same age; thereafter the coefficients are smaller and statistically insignificant. The full results are available from the authors.

Table 3 Effects of age-of-oldest-child-by-female interactions on giving

	Gift >$0		Gift ≥$1,000		Gift ≥$5,000		Gift ≥$10,000	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female*age 0	0.0136 (0.079)	−0.0171 (0.078)	0.0530 (0.044)	0.0447 (0.046)	−0.0023 (0.024)	−0.0034 (0.025)	0.0236 (0.017)	0.0250 (0.018)
Female*age 1	0.0448 (0.052)	0.0321 (0.053)	0.0347 (0.024)	0.0313 (0.028)	−0.0010 (0.014)	−0.0003 (0.015)	−0.0006 (0.008)	0.0016 (0.010)
Female*age 2	0.0655 (0.043)	0.0557 (0.044)	0.0304 (0.023)	0.0299 (0.027)	−0.0112 (0.011)	−0.0099 (0.013)	0.0002 (0.009)	0.0027 (0.011)
Female*age 3	0.0074 (0.039)	−0.0064 (0.040)	0.0250 (0.020)	0.0226 (0.024)	0.0002 (0.011)	0.0006 (0.012)	0.0032 (0.007)	0.0052 (0.008)
Female*age 4	−0.0003 (0.035)	−0.0151 (0.037)	0.0145 (0.020)	0.0107 (0.023)	−0.0022 (0.010)	−0.0023 (0.012)	−0.0047 (0.008)	−0.0031 (0.009)
Female*age 5	0.0495 (0.033)	0.0379 (0.034)	0.0341 (0.018)	0.0328 (0.021)	0.0048 (0.009)	0.0055 (0.011)	0.0004 (0.007)	0.0024 (0.008)
Female*age 6	0.0011 (0.030)	−0.0120 (0.032)	0.0346 (0.018)	0.0322 (0.022)	−0.0041 (0.009)	−0.0038 (0.011)	−0.0010 (0.007)	0.0008 (0.008)
Female*age 7	0.0238 (0.029)	0.0181 (0.030)	0.0211 (0.016)	0.0211 (0.020)	0.0048 (0.008)	0.0057 (0.010)	0.0026 (0.006)	0.0047 (0.007)
Female*age 8	0.0207 (0.028)	0.0128 (0.029)	0.0197 (0.016)	0.0182 (0.019)	0.0012(0.008)	0.0016 (0.009)	0.0023 (0.006)	0.0040 (0.007)
Female*age 9	0.0383 (0.026)	0.0291 (0.027)	0.0020 (0.016)	0.0000 (0.019)	0.0005 (0.008)	0.0010 (0.010)	0.0072 (0.006)	0.0089 (0.007)
Female*age 10	0.0218 (0.025)	0.0143 (0.026)	0.0139 (0.015)	0.0127 (0.019)	0.0135 (0.008)	0.0143 (0.010)	0.0106 (0.006)	0.0125 (0.007)
Female*age 11	0.0349 (0.024)	0.0299 (0.026)	0.0241 (0.015)	0.0238 (0.018)	0.0187* (0.008)	0.0199* (0.009)	0.0124* (0.006)	0.0145* (0.007)
Female*age 12	0.0132 (0.025)	0.0112 (0.026)	0.0079 (0.015)	0.0085 (0.018)	0.0125 (0.008)	0.0137 (0.009)	0.0113* (0.006)	0.0134* (0.008)
Female*age 13	0.0349 (0.025)	0.0336 (0.026)	0.0249 (0.017)	0.0242 (0.019)	0.0246** (0.008)	0.0256** (0.009)	0.0178** (0.007)	0.0197* (0.008)
Female*age 14	−0.0461 (0.025)	−0.0397 (0.026)	0.0091 (0.016)	0.0098 (0.018)	0.0169* (0.008)	0.0183 (0.010)	0.0102 (0.006)	0.0123 (0.007)
Female*age 15	−0.0401 (0.025)	−0.0303 (0.025)	0.0122 (0.016)	0.0143 (0.018)	0.0150 (0.009)	0.0165 (0.010)	0.0085 (0.007)	0.0108 (0.008)
Female*age 16	−0.0208 (0.025)	−0.0113 (0.026)	0.0187 (0.017)	0.0209 (0.019)	0.0258** (0.009)	0.0275** (0.010)	0.0264** (0.007)	0.0287** (0.008)
Female*age 17	0.0055 (0.024)	0.0181 (0.025)	0.0311 (0.017)	0.0343 (0.019)	0.0305** (0.010)	0.0326** (0.010)	0.0265** (0.008)	0.0290** (0.008)
Female*age 18	−0.0568* (0.025)	−0.0480 (0.026)	0.0160 (0.017)	0.0174 (0.018)	0.0201* (0.009)	0.0218* (0.010)	0.0171* (0.007)	0.0193* (0.008)
Female*age 19	−0.0201 (0.025)	−0.0061 (0.026)	0.0052 (0.017)	0.0082 (0.018)	−0.0055 (0.010)	−0.0034 (0.011)	−0.0027 (0.008)	−0.0003 (0.009)
Female*age 20	−0.0628* (0.025)	−0.0472 (0.026)	−0.0045 (0.017)	−0.0012 (0.019)	0.0110 (0.009)	0.0129 (0.010)	0.0066 (0.007)	0.0089 (0.008)
Female*age 21	−0.0221 (0.026)	−0.0075 (0.027)	0.0130 (0.018)	0.0159 (0.019)	0.0150 (0.009)	0.0166 (0.010)	0.0140 (0.007)	0.0162* (0.008)
Female*age 22	−0.0172 (0.027)	−0.0062 (0.027)	−0.0018 (0.017)	0.0001 (0.019)	−0.0014 (0.009)	−0.0003 (0.010)	−0.0011 (0.007)	0.0007 (0.008)
Female*age 23	−0.0486 (0.027)	−0.0384 (0.027)	0.0169 (0.019)	0.0197 (0.020)	0.0025 (0.010)	0.0050 (0.010)	0.0102 (0.007)	0.0130 (0.008)
Female*age 24	−0.0138 (0.028)	−0.0012 (0.028)	−0.0131 (0.019)	−0.0092 (0.020)	−0.0077 (0.010)	−0.0050 (0.010)	−0.0097 (0.007)	−0.0069 (0.008)
Female*age 25	−0.0204 (0.028)	−0.0166 (0.028)	−0.0034 (0.020)	0.0007 (0.021)	−0.0135 (0.011)	−0.0104 (0.011)	−0.0083 (0.008)	−0.0053 (0.008)

Table 3 continued

	Gift >$0		Gift ≥$1,000		Gift ≥$5,000		Gift ≥$10,000	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Reunion year	–	0.0438** (0.002)	–	0.0276** (0.001)	–	0.0081** (0.001)	–	0.0044** (0.000)
Any AWC relative	–	0.0447** (0.004)	–	0.0285** (0.003)	–	0.0087** (0.002)	–	0.0053** (0.001)
Seasonal address	–	0.1248** (0.012)	–	0.1863** (0.018)	–	0.0607** (0.011)	–	0.0354** (0.008)
Do-not-solicit	–	−0.3667** (0.007)	–	−0.0612** (0.004)	–	−0.0127** (0.002)	–	−0.0066** (0.001)
Number of children	–	0.0044 (0.004)	–	−0.0003 (0.003)	–	0.0013 (0.002)	–	0.0007 (0.001)
Fraction female children	–	0.0012 (0.015)	–	−0.0033 (0.014)	–	−0.0026 (0.007)	–	−0.0034 (0.006)
Adjusted R^2	0.079	0.168	0.056	0.092	0.016	0.031	0.010	0.020

Note ** (*) indicates statistical significance at 1 % (5 %). Robust standard errors, clustered by alumna, are in parentheses. Each column's regression includes 329,524 observations. All regressions include a constant, dummy variables indicating the age of oldest child (from zero to 26 or more), interactions of a female dummy and all age dummies, and dummy variables indicating gift year and class year. Regressions in even columns further include the listed variables, as well as dummy variables indicating major, race and ethnicity, state or country of residence, and marital status

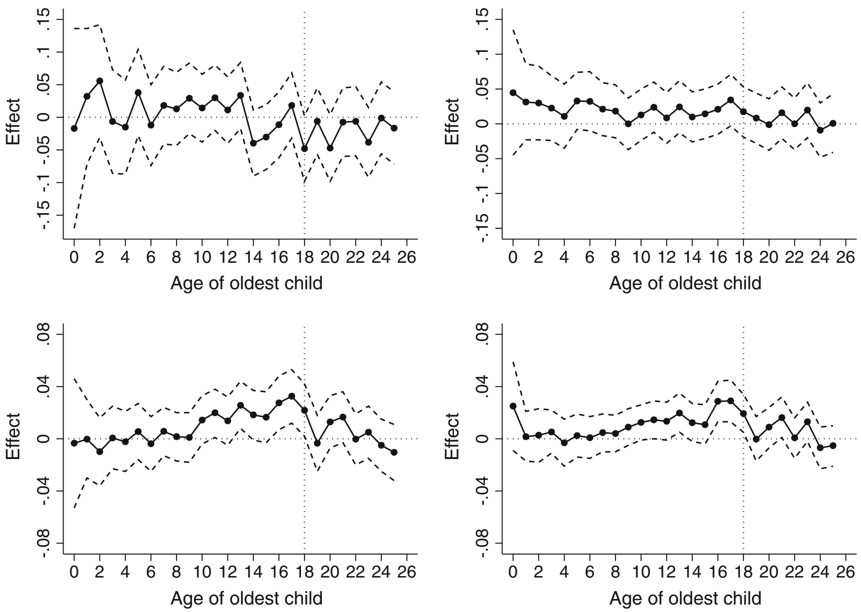

Fig. 3 Effects of female-by-age-of-oldest-child interactions on alumnae giving. *Notes* the *solid lines* indicate coefficient estimates of gender interactions (λ^0–λ^{25}), interpreted as marginal probabilities, from regressions in Table 3 (*even columns*). The *dashed lines* indicate the coefficients' 95 % confidence intervals

To better interpret the results, Fig. 3 plots the estimates of λ^0 to λ^{25} and the corresponding 95 % confidence intervals. The graphed coefficients correspond to regressions in the even columns of Table 3, those controlling for additional variables. The confidence intervals for any gift and for gifts of greater than $1,000 encompass zero at every age, implying no strategic behavior. This is not so for higher gifts amounts. The magnitude of the coefficients peaks when female children are 17. The point estimates suggest that alumnae with a 17 year-old girl are 3.3 percentage points more likely to donate greater than $5,000, and 2.9 percentage points more likely to donate greater than $10,000. The magnitudes are substantial, considering that the baseline percentages for alumnae with 17-year-old boys are 2.3 and 1.1 %, respectively. One might attribute the rising probabilities to the growing affinity of alumnae for AWC, the product of having a daughter rather than a son. However, Table 3 and Fig. 3 confirm that large-gift giving probabilities abruptly converge, just after the usual starting age of universities and colleges.

Table 3 highlights some additional determinants of giving that are consistent across dependent variables. Alumnae are more likely to give in a reunion year, consistent with increased solicitation efforts. Wealthier alums, as proxied by a seasonal address, are more likely to give, as are alums with any relative who attended AWC. The latter result is broadly consistent with Meer and Rosen (2010), although we cannot separately determine the quantity and type of AWC relatives. Finally, the number and gender composition of children in a gift year is unrelated to giving.

If strategically-timed donations are intended to affect admissions probabilities, then the incentive to make those donations should be higher in years when the admission process is more competitive. AWC's acceptance rate fell from around 46 % in the late 1990s and earlier years, to 35 % by 2009, suggesting that admittance became increasingly challenging in the later period.[15] To assess whether results are period-specific, we re-estimated all regressions in a subsample of data from 1987 to 1998. In general, there is no evidence of differences in giving between alumnae with girls and boys in the earlier period, regardless of the donation amount (full results are available from the authors). Pooling the sample across earlier and later years (1987–2009) produces results that are consistent with this paper's findings, though with attenuated magnitudes. Overall, the results suggests that strategic donations are a relatively recent phenomenon at AWC, most plausibly driven by the increasingly competitive admissions process at AWC and its closest competitors in the market for higher education.

Conclusions

This paper examined whether alumni donations are partly motivated by a desire to increase the probability of their children's admission. Meer and Rosen (2009a) show that donations to "Anon U.," a private research university, are higher if an alum has a child in the 14–18 year age range who eventually applies to Anon U. In this paper, we use data from AWC, a private women's college, in a unique quasi-experimental analysis. Only those alums who have a daughter could possibly be motivated to donate in order to affect a child's probability of admission. We leverage this institutional feature to identify plausibly self-interested giving behavior.

We find that an alumna who has a teenage daughter, as opposed to a teenage son, is around 3 percentage points more likely to make large donations of at least $5,000. This analysis uses relatively recent data from 1999 to 2009. We find that the difference in the probability is not evident in an earlier period when AWC accepted a higher fraction of applicants. It is easy to imagine many reasons why child age alone may affect the probability of donating, and it similarly easy to imagine why child gender alone may affect the probability of donating. However, it is harder to imagine why the probability of donating a very large amount of money to a women's college should be different for parents with teenage girls compared to boys, unless the donation is intended to have an effect on the probability of a child being admitted to the institution.

The data further reinforce the conclusion of Meer and Rosen (2009a) that some donations are not strictly altruistic, but are plausibly motivated by the implicit quid pro quo of college admissions. From a broader policy perspective, it is important to contemplate not simply whether admissions probabilities are perceived to be (or are) affected by donations, but whether and to what extent they should be. To a great extent donations are what allow high quality selective institutions to maintain need-blind admissions policies. Research suggests that attending highly selective institutions has an impact on future earnings of students from low-income backgrounds who could not attend such institutions without substantial financial aid. Since selective institutions charge students who receive financial aid less than the stated tuition, donations are a way to effectively charge some families more than the stated tuition. Under some conditions, economic models suggest

[15] Evidence that the percent admitted fell is only suggestive that admissions became more selective. One would like to know whether more selective criteria were used or whether the applicant pool changed. It is possible, for example, that some sort of publicity led to an increase in applications from individuals who were less qualified, reducing the acceptance rate, but not changing the probability of admittance for qualified applicants. It is unclear how "self-interested" donations might respond to changes in selectivity versus changes in the applicant pool.

that price discrimination—charging different prices to different consumers—can lead to more efficient outcomes. Whether the implicit relationship between admissions and giving at selective institutions is such a case is an important question in higher education policy.

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