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Can Information Widen Socioeconomic Gaps in Postsecondary Aspirations? How College Costs and Returns Affect Parents' Preferences for their Children

Albert Cheng
University of Arkansas

Michael B. Henderson
Louisiana State University

Paul E. Peterson
Harvard University

Martin R. West
Harvard University

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Can Information Widen Socioeconomic Gaps in Postsecondary Aspirations?

How College Costs and Returns Affect Parents' Preferences for their Children*

Albert Cheng, University of Arkansas

Michael B. Henderson, Louisiana State University

Paul E. Peterson, Harvard University

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Abstract: To estimate whether information can close socioeconomic gaps in parents' aspirations for their child's postsecondary education, we administer a four-armed survey experiment to a nationally representative sample of U.S. parents. After respondents estimate costs of and returns to further education, we ask whether they prefer that their child pursue a four-year degree, a two-year degree, or no further education. Before this question is posed, the treated are first told (1) the net annual costs of pursuing a four-year and two-year degree in their state, (2) the annual returns to four-year and two-year degrees as compared to no further education in their local area, or (3) both costs and returns. We find that information lowers aspirations overall and widens socioeconomic aspiration gaps. These effects do not vary with the magnitude of error between estimated and actual costs and returns. However, we find positive impacts on aspirations among parents who think their child is academically prepared for college.

Keywords: College access; College aspirations; Socioeconomic gaps; College costs and returns; Information

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Can Information Widen Socioeconomic Gaps in Postsecondary Aspirations?
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1. Introduction

About two-thirds of students who completed high school in 2017 enrolled in college during the fall semester immediately after graduation—a rate that has remained virtually unchanged since 2000 (U.S. Department of Education, 2018). This average masks considerable variation in matriculation rates by socioeconomic status (SES), with students from lower-income families or whose parents did not complete college less likely to enroll (Bailey & Dynarski, 2011; Buchmann, & DiPrete, 2006; Chetty et al., 2017). Gaps persist despite the large wage premium associated with college completion and the widespread availability of financial aid (Autor, 2014; Oreopoulous & Petronijevic, 2013).

The study of the relationship between college choice and human, social, and financial capital are the subject of a vast inquiry in economics, education, and sociology (Altonji & Mansfield, 2011; Deming & Dynarski, 2009; Duncan and Murnane, 2011; Hill, Bregman, & Andrade, 2015, Hossler et al., 1999; Hossler & Stage, 1992; Park & Hossler, 2014; Perna, 2006; Sommers et al., 2002). This literature reveals how differences in academic preparation and credit constraints generate socioeconomic disparities in students' and parents' aspirations for postsecondary education.

A more recent line of research in behavioral economics theorizes that low-SES students and their parents may underestimate the returns to post-secondary education and overestimate the associated costs and debt-repayment challenges. This theory had motivated interventions that attempt to close gaps in educational attainment by mentoring and counseling low-SES students both in and after school. These interventions range from lighter-touch approaches that provide

information about college or periodic reminders to meet deadlines during the college application and enrollment processes to more intensive approaches that incorporate the use of mentors, tutors, and regular student-group meetings aimed at better preparing and directing students towards college enrollment (Bird et al., 2019; Carrell & Sacerdote, 2017; Oreopolous et al. 2017; Oreopoulos & Petronijevic, 2019). Many of these programs are costly, however, and only a few have survived the scrutiny of a randomized field trial (Carrell & Sacerdote, 2017; Deming & Dynarski, 2009; Oreopoulos & Petronijevic, 2019; Swanson et al., 2018).

The high cost of these interventions has generated interest in less expensive interventions that give limited doses of information to students and their families. For example, one study shows that the college application and enrollment choices of high-achieving, low-income students may be enhanced by supplying families with information about the application process, including the net costs of attending various institutions of higher education (Hoxby and Turner, 2015). However, a recent effort to deliver the same intervention to a larger sample of students did not influence college enrollment patterns (Gurantz et al, 2019). The potential for low-cost, informational interventions to alter the college aspirations and enrollment decisions of low-SES students therefore remains unclear.

Our work focuses instead on engagement with parents, who are known to influence their children's postsecondary aspirations (Hossler & Stage, 1992; Park & Hossler, 2014; Somers et al., 2002; Perna & Titus, 2005). Low-SES parents, in particular, may be less familiar with scholarships and loans available to low-income households as well as more averse to borrowing (Boatman et al., 2017; Cunningham and Santiago, 2008; Caetano et al., 2011; Hoxby & Avery, 2013; Hoxby & Turner, 2015; Perna & Titus, 2005). Variation in parental access to information about the costs of and returns to a college degree could aggravate socioeconomic disparities in

aspirations. In particular, overestimating the costs of attending college and underestimating the returns could discourage low-SES parents from urging their child to pursue a college degree. As a result, inaccurate information might induce family decisions about human capital investment that are suboptimal for a child's long-run life prospects (Bleemer & Zafar, 2018; Hoxby & Avery, 2013).

Bleemer & Zafar (2018) broke new ground by testing this hypothesis experimentally on nationally representative samples of the adult population. In a three-armed experiment, they provide national average net college costs to one group, and to another group the national average returns to a four-year degree relative to no degree. They identify positive effects of the returns-information treatment on adult aspirations for their children's postsecondary education, especially for low-SES respondents. In a similarly designed experiment, Lergetporer, Werner, & Woessmann (2018) find positive effects on adult aspirations in Germany when offering a choice between pursuing a university degree and an apprenticeship; however, this information does not close socioeconomic-aspiration gaps. In a four-armed experiment that supplies both cost and returns information to one of the treatment groups, Cheng and Peterson (2019) find no average effects on adult aspirations or socioeconomic-gap closing when respondents are permitted to choose among three postsecondary options: a four-year degree, a two-year degree, and no further education.

Building on this research, we modify Cheng and Peterson's (2019) survey experiment in three ways. First, we limit the analytic sample to a nationally representative sample of parents of school-age children. Second, in a four-armed experiment we provide net cost and returns information that is customized to respondents' household incomes as well as to their state and

commuting zone. Third, we explore whether the effects of information vary based on whether parents believe their child is academically prepared for college.

These alterations—improvements, we believe—generate substantially different results. While earlier studies found positive or at least null effects of cost and returns information on adult aspirations for a child, we detect negative effects. Treatment with information on both costs and returns increases the likelihood of parents choosing no further education for their child and widens socioeconomic-aspiration gaps. Among parents who think their child is prepared for a four-year college experience, however, information increases college aspirations and helps to close socioeconomic disparities.

2. Data and Methods

In this section we discuss the sampling framework, the design of the experiment, and the methods used in the analysis.

2.1 Survey and Sampling

The survey experiment is performed on a sample of 1,859 parents with school-aged children living in their homes who were interviewed online as part of the annual *Education Next* survey of public opinion on American education. The sample includes oversamples of K-12 teachers as well as African American and Hispanic respondents. The survey was administered between May 1 and May 22, 2018 by Knowledge Networks (KN), a GfK company. Using address-based sampling techniques, KN maintains a nationally-representative panel of 55,000 adults who agree to participate in a series of online surveys. Members of the sample who do not have a computer or internet access are provided with these resources. To ensure the sample is nationally representative, survey weights based on demographic and other information obtained

when joining the KN panel adjust for non-response and over-sampling. Respondents have the option to complete the survey in English or Spanish; 293 respondents chose the latter option.[1]

We queried respondents for two pieces of information before administering the experiment. These pieces of information enable us to explore potential mechanisms behind any treatment effects. First, we asked respondents to estimate the annual net costs of enrolling in a public postsecondary two-year and four-year institution in their state. Second, we asked respondents to estimate the annual earnings of those in their community who have no (a) postsecondary education, (b) a two-year degree, and (c) a four-year college degree.

We also obtained a measure of each parents' assessment of how prepared their child is for college by asking the following question near the end of the fifteen-minute survey: "How academically prepared for college-level work do you think your child will be when they finish high school?" Parents could choose from one of four options: "Very prepared", "somewhat prepared", "not too prepared", or "not at all prepared." We create a binary variable that takes the value of one if parents selected "very prepared" and zero otherwise. The "very prepared" versus all others distinction is chosen to divide respondents into categories near the median of the distribution of responses. Although the question was asked post-treatment, its placement late in the survey reduces the likelihood that treatment contaminates parents' assessments of child's readiness. Consistent with this, we show below that there are no statistically significant differences across experimental groups in the share of parents who believe their child is prepared.

[1] See Chang & Krosnick (2009) for an analysis of the KN's online survey strategy. For prior scholarly use of this survey, see Barrows et al. (2016), Chingos et al. (2012), Cheng and Peterson (2019), Lergetporer et al. (2018), and Schueler and West (2016).

2.2 Experimental Design

The experiment was introduced at the start of the survey, immediately following the question that asked respondents to estimate the net costs of and returns to a postsecondary degree. A randomly-selected control group was asked whether they want their child to attend a higher education institution to obtain a four-year degree, a two-year degree, or neither. Before asking the remaining respondents the same question, we divided them into three treatment groups that each received different information about costs and returns to college. In the first treatment condition, respondents were told: (a) the average net costs of two-year and four-year public institutions in their state for students from a household with income similar to that of the respondent; (b) the average annual earnings of employed residents in their commuting zone who have received four-year degrees; (c) the same information for those with two-year degrees; and (c) the same information for those who have no postsecondary education. It is this first treatment condition that we interpret as the most substantively meaningful, as it simultaneously provides parents with information on both the costs and benefits of further education. Similar prior experiments have not typically provided this complete set of information.

To gain insight as to whether cost or returns information has the more powerful impact on preferences, the experiment contains two additional arms that provide either just the customized net costs of further education or just the customized returns information. Appendix A provides the complete wording of survey experiment.

Summary statistics by treatment condition are shown in Table 1. Appendix Table B1 displays results of F-tests that examine covariate balance across all treatment conditions. We fail to reject the null hypothesis that our treatment groups are jointly different from each other based on observable characteristics, including our two key measures for exploring potential

mechanisms for any information effects—child-preparedness and the magnitudes of error in cost and returns estimates.

A novel feature of this experiment is the provision of economic information tailored to the respondents' household income and geographic location. Such information allows respondents to reach judgments about their child's education with more precise economic information than in prior studies. We were able to customize the information because KN obtains from its panel members their household income and geographical location prior to drawing the sample for our survey.

<<Table 1 Here>>

The Integrated Postsecondary Education Data System (IPEDS) database was used to obtain estimates of the net annual costs of attending a public higher education institution in each state by a student's household income for the 2015-2016 academic year. IPEDS estimates the net costs of attending a four-year and a two-year institution for five household income brackets: $0 to $30,000; $30,001 to $48,000; $48,001 to $75,000; $75,001 to $110,000; and more than $110,000.

We used 2016 Public Use Microdata Area (PUMA) data from the American Community Survey to calculate the average earnings of employed individuals ages 18 to 70 by level of educational attainment (four-year, two-year, or no college degree) for every PUMA defined by the U.S. Bureau of the Census (2018). The Census Bureau defines these geographic areas following boundaries of census tracts and counties; each contains at least 100,000 residents. This information enables us to provide respondents information about the likely economic returns on the child's investment in postsecondary education if the child were to continue to live in the same local area upon college completion.

2.3 Analytic Strategy

To estimate differences across experimental arms, we run multinomial logit models with indicators for the three treatment arms of the experiment on the right-hand side and the respondents' preference (i.e., four-year degree, two-year degree, or no college) on the left-hand side. To improve the precision of our estimates and correct for random variation in assignment to experimental arm, these models control for age, household income, educational attainment, ethnic background, gender, marital status, political affiliation, urbanicity, and census region.

We estimate heterogeneous effects by child readiness for college and by the magnitude of error in estimates for the costs and returns to a college degree. To do this, we add to our model terms that interact treatment condition with the indicator for parent perceptions of child's readiness for college or the continuous difference between the estimated and actual values of the costs and returns to a postsecondary degree.

2.4 Comparison to Prior Research

Our experimental design seeks to improve upon prior studies that have tested how information about college costs and returns affects parental college aspirations. We highlight the contributions of three related experiments and our modifications to their research design.

Bleemer and Zafar (2017) conduct a three-armed survey experiment that treats a nationally representative sample of adults with either net college cost or economic returns information of a four-year degree relative to not pursuing further education. They find positive effects of returns—but not cost—information on adult aspirations that reduce gaps by adult SES. The study is limited, however, by the absence of an option allowing respondents to choose that their child pursue a two-year degree and the lack of a treatment arm that provides cost and returns information simultaneously.

In the second study, Lergetporer et al. (2018) conduct a similar three-armed experiment on a nationally representative sample of German adults. They asked respondents to choose between a university degree or an apprenticeship — a dichotomy that rightly characterizes the German system with its well-established vocational education system. Respondents who received information about the wage premium to earning a university degree became more likely to prefer the university option. Unlike Bleemer and Zafar (2017), however, Lergetporer et al. (2018) found larger treatment effects for higher-income than lower-income families, widening socioeconomic-aspiration gaps. Information about financial aid similarly raised postsecondary aspirations and widened social gaps.

In the third study, Cheng and Peterson (2019) provide a nationally representative sample of U.S. adults with a two-year degree option and include an additional experimental arm that includes simultaneous treatment with cost and returns information. Unlike the other two studies, they do not find evidence that cost and returns information either alters overall adult postsecondary aspirations for their children or contributes to any closing of the socioeconomic-aspiration gap.

All three prior studies provide parents with information on average returns nationwide, even though these vary by region (Baum, 2014). We instead adjust for regional differences by providing returns information tailored to the commuting zone in which the respondent resides. Also, the three prior studies average net costs of attending public colleges nationwide, even though sticker prices vary across states and the amount of financial aid depends greatly on household income (Baum & Johnson, 2015). To adjust for such diversity, we provide estimates of net costs at public institutions based on the respondents' household income and state of residence.

We further theorize that parents' postsecondary aspirations depend not only on perceptions of the costs and returns to earning a degree but also on their perceptions of the probability that their child will complete college. Families who recognize that the returns to a college degree outweigh the costs may still rationally prefer that their child not pursue a postsecondary education if they do not expect the child to succeed. Their assessment of a child's likely college completion may well be indicated by parents' perceptions as to whether their child is academically prepared for college-level work. In all prior experiments that provide economic information about college costs and returns, this probabilistic factor is not discussed.[2]

3. Results

In this section, we report treatment effects for all respondents and estimate heterogeneities by two proxies for SES: parental education and household income. We also report treatment effects interacted with (1) pre-treatment estimates of postsecondary education costs and returns and (2) parent evaluations of their child's academic readiness for college. Before turning to these results, we first examine respondents' pre-treatment estimates of college costs and returns.

3.1 Baseline Estimates of College Costs and Returns

The first three rows of Table 2 show respondents' pre-treatment estimates of earnings for workers with a four-year degree, two-year degree, and no postsecondary degree. This data can be presented in terms of Relative College Earnings (RCE)—that is, the ratio of earnings for workers with a four-year degree to earnings for other workers. As shown in the next two rows,

[2] Bleemer and Zafar (2017) do show that beliefs about the magnitude of the wage premium for earning a four-year degree for the general population seem to influence beliefs about the magnitude of the wage premium for their specific child.

respondents estimate that the RCE relative to workers with two-year degrees and workers with no degrees is 1.62 and 1.30, respectively.

Respondents' estimates of the RCE for a four-year degree compared to no postsecondary education are, on average, considerably less than the actual RCE of 2.56, as computed using the American Community Survey 2016 data. The estimated RCE for four-year degree-holders relative to two-year degree holders similarly falls short of the actual ratio of 1.56. Eighty-five percent of the respondents underestimate the value of a four-year degree relative to no further education and 70 percent underestimate the value of the four-year degree relative to the two-year degree. Low-SES respondents—those without a bachelor's degree and with household incomes below $68,000—offer modestly less accurate RCE estimates than do higher-SES respondents, though the proportion of parents who underestimate RCE is similar across groups. The table's bottom three rows confirm that respondents both underestimate the earnings of four-year degree holders and overestimate the earnings of two-year degree holders and people without a college degree—a pattern that drives the underestimation of RCE.

<<Table 2 Here>>

Panel B of Table 2 reports parental estimates of college net costs. As shown in the first two rows, parents estimate the annual net cost of a four-year public institution to be about $21,000. This represents an overestimate by about $6,000. The corresponding estimate for a two-year public institution is about half that amount, around $10,000, which is quite close to the actual net cost. While 56 percent of respondents overestimate the cost of a four-year degree, only 35 percent overestimate the cost of a two-year degree.

We also found differences in estimated net costs by SES. Average estimates of the costs of a four-year institution by parents without a college degree and lower-income parents are lower

than their degree-holding and higher-income counterparts. As a result, the proportion of parents overestimating four-year costs is higher among degree-holders and those from higher-income backgrounds, and the error in four-year cost estimates—namely, difference in estimated costs minus true costs—is also higher among these parents. On the other hand, cost estimates for two-year institutions are much higher among parents from low-SES backgrounds, and these parents are more likely to overestimate the costs for these institutions. Overall, it appears that the relatively accurate estimates of two-year college costs in the full sample is driven by a combination of overestimates by low-SES families and underestimates by high-SES families.

3.2 Baseline Aspirations

In Table 3, Panel A, we report postsecondary aspirations for the control group. About three-quarters prefer the four-year option for their child. Seventeen percent prefer the two-year option, and 6 percent indicate they prefer no further education for their child. There are major socioeconomic disparities in these aspirations. Respondents with bachelor's degrees are 25 percentage points more likely than those without that degree to prefer the four-year option, and higher-income parents are 10 percentage points more likely than lower-income parents to do the same.

<<Table 3 Here>>

3.3. Baseline Assessments of Child Preparedness

Panel B of Table 3 reports the proportion of parents who consider their child "very prepared" for college-level academic work. Forty percent of all parents share think their child is "very prepared" for college, but there are substantial disparities in these perceptions by SES. For example, 56 percent of respondents with a bachelor's degree believe their child is "very prepared," as compared to just 30 percent of those without a bachelor's degree.

3.4. Experiment Results.

Contrary to prior research using national averages, the overall effect on aspirations of customized economic information about both costs and returns is to increase by four percentage points the likelihood a parent prefers "no college" to either a two-year or four-year degree (Table 4, column 1)—a 66 percent increase over the control-group. We also observe a 6-percentage-point decline in the likelihood of preferring a two-year degree (with a corresponding, if insignificant increment of four percentage points in preferences for "no college") when only returns information is provided. The shift away from further education when respondents are provided with information about both the costs of and returns to postsecondary education comes mainly at the expense of aspirations to pursue the four-year degree, as the share of those aspiring to a two-year degree remains quite constant when respondents are given that information.

<<Table 4 Here>>

These negative impacts of information on college aspirations are concentrated among low-SES parents. Parents who do not themselves have a bachelor's degree are six percentage points more likely to select the "no college" option when provided information on both costs and returns. Among lower-income parents, the information increases the likelihood of not aspiring for further education by 10 percentage points. No information effects are observed among high-SES parents.

The widening of these socioeconomic-aspiration gaps appears to be driven not only by shock at learning college costs but by disappointment at the returns from an advanced degree. The returns-only treatment has a negative impact on four-year degree aspirations for lower-education and lower-income parents, while the cost-only treatment reduces aspirations only for lower-income parents.

This pattern of results is initially surprising in light of respondents' baseline estimates of the returns to a four-year degree. As reported above, respondents on average underestimated the earnings advantage of four-year degree holders over those with less education, and this underestimation was, if anything, more pronounced among those from low-SES backgrounds. Yet information on the actual returns leads fewer respondents, particularly from low-SES backgrounds, to aspire to a four-year degree for their child. One possible explanation is that parents have doubts as to whether their child will experience the earnings advantage suggested by data on all degree-holders. Our survey item probing parents' perceptions of their child's preparation for college-level work provides a partial test of this hypothesis.

3.5. Effect Heterogeneity by Child Preparedness.

If parents think their child is well prepared, information on both costs and returns increases preferences for a four-year degree by seven percentage points, a sharp contrast from the downward, if statistically insignificant, six percentage-point shift in preferences for the four-year degree among those who think the child is not prepared (Table 5). Economic information about costs and returns also widens socioeconomic-aspiration gaps if parents do not think their child is very well prepared for college. The information has a negative effect on college aspirations of lower-income parents of unprepared students, decreasing the likelihood of preferring a four-year degree by 17 percentage points and increasing the likelihood of preferring no postsecondary education by 10 percentage points. No significant impact is observed for high-income parents. Among parents without a college degree who think their child is not "very prepared", the likelihood of preferring a four-year degree drops by nine percentage points (a large but imprecisely estimated effect), as compared to a negligible increase of half a percentage point for better educated parents.

<<Table 5 Here>>

By contrast, the effects of treatment with both cost and returns information on low-income parents who perceive their child to be well prepared is to shift upward the likelihood of a preference for a four-year degree by 6 percentage points, a sharp contrast to the negative impact of this information on those who perceive their child as unprepared. Among parents without a bachelor's degree, similar (if not always statistically significant) contrasts between parents who perceive their child as prepared rather than not prepared are evident.

The effects of economic information on the aspirations of students perceived to be prepared appears to be driven by information on returns from the investment, not the costs. Among these parents, the returns-only treatment amplifies the likelihood of pursuing a four-year degree by 16 percentage points (Table 6). The likelihood that parents with lower educational attainment will aspire to a four-year degree for their children increases by 24 percentage points, if their child is thought to be prepared. For lower-income parents, the increase is 19 percentage points. Meanwhile, the costs-only treatment has a much smaller differential effect by perceptions of the child's level of preparation (Table 7).

<<Table 6 Here>>

<<Table 7 Here>>

Finally, we note that the coefficient on the indicator for parents who believe their child is prepared for college is more often insignificant in our models. This suggests that among respondents in the control group, evaluations of their child's level of preparedness were generally not predictive their postsecondary aspirations after controlling for the other demographic characteristics included in our models. There are two exceptions to this pattern:

higher-income parents and parents with a bachelor's degree who believe their child is prepared for college are less likely to prefer the two-year option.

3.6. Effect Heterogeneity by Baseline Estimates of Costs and Returns

Although we hypothesized that those who seriously underestimate returns or overestimated costs would respond disproportionately to the presentation of more accurate economic information, such was not the case. Despite errors in estimating costs and returns, parental response to treatment does not vary with the size of the error in these estimates, as shown in Tables 8 and 9. This is consistent with the results of Bleemer and Zafar (2018) and suggests that the heightened salience of the information provided, as opposed to information-based updating of expectations, is the more likely mechanism for the effects reported above.

4. Discussion

Our results suggest that interventions that attempt to increase college enrollment need to be sensitive not only to a prospective applicant's economic situation but also to their readiness to pursue a college degree. If students are not perceived to be prepared, then family support for college enrollment may wither and students may find themselves unable to continue to pursue the degree. Our results are quite consistent with the high drop-out rates among college students in their first year (U.S. Department of Education, 2018).

Nor do we find evidence that the provision of information helps parents update their beliefs about college costs and returns in ways that would increase their postsecondary aspirations. That is, we fail to find any effect heterogeneity by the magnitude of error in the respondents' estimates of postsecondary costs and returns. Notably, Bleemer and Zafar (2018) found the same patterns, suggesting that parents do not alter their aspirations because information biases are corrected but because the provision of cost and returns information

elevates the salience of economic information by priming parents to consider college choice through a more economic lens.

Our results also help to explain the limited success of many information-based interventions that have attempted to increase college matriculation rates among low-SES populations. The issue may be deeper than just improving the quantity of information about particular colleges and universities or the ease with which students may enroll. Although such information may be influential for highly prepared students (Hoxby &Turner, 2015; but see Gurantz et al., 2019), it could have minimal effect—or even prove to be counter-productive—if applied indiscriminately regardless of applicants' readiness for postsecondary education.

This study has a number of limitations. A survey experiment in which information is conveyed on a computer screen is a weak intervention. Although it may approximate email, mail, and advertising interventions, it may not generalize to stronger interventions such as mentoring and intensive assistance with navigating the multiple hurdles involved in applying for further education (Carrell & Sacerdote, 2017; Oreopoulos & Petronijevic, 2019; Swanson et al., 2018). Also, the proxies for SES used in this investigation are simple dichotomous indicators of household income and parent education. More research is needed to explore potential heterogeneities among better differentiated SES groups. Our measures of costs and returns, though a substantial improvement on the literature, remain customized only to the fifty states and broad categories of income (in the case of costs) and to the respondents' local labor market (in the cases of returns). More precise information might alter our findings in either direction.

Moreover, our study is unable to speak to whether students actually matriculate into college. A parent that expresses a preference for their child to pursue postsecondary education is one thing, but whether that child ultimately enrolls in a degree program is another. On the other

hand, it is important to reiterate that parents are one of the key factors in their child's college choice decision (Park & Hossler, 2014). Furthermore, prior research has demonstrated an empirical link between parent postsecondary aspirations and their child's matriculation into postsecondary education (Hossler & Stage, 1992; Somers et al., 2002; Perna & Titus, 2005).

Finally, we have a weak measure of academic preparedness. Although this information was obtained well after the experiment was administered, and the preparedness indicator is balanced across the arms of the experiment, the question was nonetheless posed post-treatment and responses could potentially have been influenced by participation in the experiment. In future research, it could be useful to supplement parents' perceptions with metrics based on course grades and test-score performance. Still our study is the first survey experiment to estimate effects on parental aspirations of customized information about costs and returns to further education, and it is the first to differentiate the student more prepared for college from the less prepared one. Such variables appear critical to include in theoretical models of college choice.

5. Conclusions

Contrary to prior research, we find that information on costs and returns to further education *decreases* the likelihood of parents preferring their child pursue further education and *widens* the socioeconomic-aspiration gap—unless parents think their child is "very prepared" for college. As in Lergetporer, Werner, and Woessmann (2018), these results suggest caution when assuming that better information about college costs and benefits will necessarily lead to a closing of socioeconomic gaps in postsecondary enrollment. There is even a possibility that it can widen gaps in certain circumstances. It is reasonable to infer that any positive impacts of

economic information about college are likely to depend on perceptions of whether the student is likely to complete college or not.

The study also implies that the first step toward increasing college enrollment and graduation rates is to prepare students more adequately for the further education opportunities available to them. Unless students are prepared for college-level work, students and their parents may become discouraged, and the anticipated returns to a college degree may not be realized. Information and academic preparation may need to work in tandem. If so, efforts that are more intensive than merely providing economic information may be required to achieve an appropriate postsecondary education for all.

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Table 1: Sample Characteristics

	Baseline Group (1)	Costs and Returns (2)	Costs (3)	Returns (4)
Age	39.75	39.95	39.34	40.41
Income	98.93	102.02	109.27	101.99
Female	1.58	1.54	1.57	1.56
Marital Status	0.78	0.80	0.79	0.84
Metropolitan Area	0.87	0.90	0.86	0.85
Employed	0.79	0.77	0.78	0.80
Household Size	4.16	4.08	4.01	4.07
Political Affiliation				
Independent	0.06	0.04	0.04	0.05
Democrat	0.51	0.50	0.53	0.50
Republican	0.43	0.46	0.42	0.45
Education Level				
Less than High School	0.11	0.11	0.08	0.09
No College	0.25	0.23	0.26	0.23
Some College	0.27	0.26	0.29	0.29
B.A. Degree or Higher	0.37	0.39	0.37	0.39
Ethnic Background				
White	0.55	0.59	0.58	0.61
Black	0.14	0.10	0.10	0.08
Asian	0.20	0.22	0.22	0.21
Hispanic	0.09	0.08	0.08	0.09
More than one Race	0.01	0.01	0.01	0.01
Region				
Northeast	0.17	0.19	0.19	0.13
Midwest	0.24	0.20	0.20	0.21
South	0.37	0.36	0.38	0.39
West	0.23	0.25	0.24	0.27
Observations	473	438	470	478

Note: Sampling weights included.

Table 2: Baseline Postsecondary Aspirations

	Full Sample	By Educational Attainment		By Household Income	
		B.A. Holders	No B.A.	Higher Income	Lower Income
Panel A: Beliefs about Returns					
Estimated earnings of workers without a college degree ($)	30366	30625	30207	32656	26478
Estimated earnings of workers with a two-year degree ($)	36738	37222	36441	39362	32276
Estimated earnings of workers with a four-year degree ($)	47396	49913	45848	51433	40528
Estimated RCE compared to workers with no degree	1.62	1.67	1.57	1.67	1.60
Estimated RCE compared to workers with a two-year degree	1.30	1.33	1.29	1.32	1.29
Proportion underestimating RCE compared to workers with no degree	0.85	0.88	0.83	0.86	0.82
Proportion underestimating RCE compared to workers with a two-year degree	0.70	0.72	0.70	0.72	0.68
Estimated returns minus actual returns					
No degree	11358	10592	11829	12798	8912
Two-year degree	5253	3956	6050	6665	2851
Four-year degree	-2903	-4384	-1991	-1194	-5810
Panel B: Beliefs about Costs					
Estimated annual net cost of four-year institution	20691	24088	18599	23579	15759
Estimated annual net cost of two-year institution	10383	10176	10510	10938	9436
Estimated minus actual cost of four-year public institution	5714	6433	5272	6035	5166
Estimated minus actual cost of two-year public institution	309	-1235	1260	-552	1779
Proportion overestimating net cost of four-year institution	0.56	0.61	0.53	0.59	0.50
Proportion overestimating net cost of two-year public institution	0.35	0.30	0.39	0.31	0.42
Observations	1,859	1,000	859	1,185	674

Note: Sampling weights included.

Table 3: Baseline Aspirations and Assessments of Child's Academic Preparedness

	Full Sample	By Educational Attainment		By Household Income	
		B.A. Holders	No B.A.	Higher Income	Lower Income
Panel A: Baseline Aspirations of Control Group					
Prefers a Four-Year Degree	76.6	91.7	66.5	80.7	69.9
Prefers a Two-Year Degree	16.7	5.3	25.4	13.8	23.3
Prefers No College	6.0	2.9	8.1	5.5	6.8
Observations	471	265	206	304	167
Panel B: Assessments of Child's Academic Preparedness					
Very Prepared	39.7	56.0	29.5	43.0	33.7
Somewhat Prepared	46.7	37.3	52.5	45.8	48.4
Not too Prepared	10.7	5.2	14.2	9.0	13.8
Not at all Prepared	2.9	1.5	3.7	2.2	4.1
Observations	1,839	1,108	844	1,176	663

Note: Sampling weights included.

Table 4: Results of Experiment

		By Educational Attainment		By Household Income	
	(1) Full Sample (N = 1,785)	(2) B.A. Degree (N = 949)	(3) No B.A. Degree (N = 836)	(4) Higher Income (N = 1,125)	(5) Lower Income (N = 660)
Panel A: Cost and Returns					
Prefers Four Year	-0.035	0.019	-0.067	0.029	-0.109*
	(0.033)	(0.026)	(0.050)	(0.035)	(0.060)
Prefers Two Year	-0.005	-0.028	0.007	-0.030	0.009
	(0.028)	(0.020)	(0.043)	(0.030)	(0.052)
Prefers No College	0.040*	0.009	0.060*	0.001	0.100**
	(0.023)	(0.017)	(0.036)	(0.022)	(0.048)
Panel B: Returns					
Prefers Four Year	0.020	0.043	0.007	0.051	-0.005
	(0.033)	(0.026)	(0.050)	(0.033)	(0.060)
Prefers Two Year	-0.056*	-0.034	-0.070*	-0.047	-0.083
	(0.028)	(0.021)	(0.042)	(0.029)	(0.052)
Prefers No College	0.036	-0.009	0.063*	-0.004	0.088**
	(0.023)	(0.017)	(0.035)	(0.022)	(0.044)
Panel C: Cost					
Prefers Four Year	-0.029	-0.016	-0.033	0.031	-0.097*
	(0.032)	(0.024)	(0.049)	(0.034)	(0.058)
Prefers Two Year	0.021	0.022	0.013	0.005	0.026
	(0.027)	(0.018)	(0.043)	(0.028)	(0.052)
Prefers No College	0.009	-0.006	0.020	-0.036	0.071
	(0.022)	(0.017)	(0.035)	(0.024)	(0.044)

Notes: Coefficients are marginal effects estimated after fitting a multinomial logit model. Models control for respondent's age, income, educational attainment, ethnicity, gender, marital status, employment status, household side, political affiliation, urbanicity of residence, and U.S. census region. *p<0.1; **p<0.05; ***p<0.001; Superscripts a, b, and c indicate that treatment effects are significant at the 0.1, 0.05, 0.01 levels, respectively, for parents who indicate that their child is very prepared for college-level academic work.

Table 5: Effects of Cost and Returns Treatment by Child Preparedness for College-Level Academic Work

		By Education Level		By Household Income	
	(1) Full Sample	(2) Bachelor's Degree	(3) No Bachelor's Degree	(4) Higher Income	(5) Lower Income
Prefers Four-Year					
Cost & Returns Treatment	-0.057	0.005	-0.085	0.026	-0.169**
	(0.039)	(0.033)	(0.058)	(0.040)	(0.073)
Cost & Returns Treatment × Child	0.127*	0.025	0.158	0.046	0.230*
Very Prepared	(0.071)	(0.048)	(0.115)	(0.078)	(0.135)
Very Prepared	0.006	0.019	0.010	0.080	-0.091
	(0.045)	(0.035)	(0.071)	(0.049)	(0.083)
Prefers Two-Year					
Cost & Returns Treatment	0.017	-0.029	0.036	-0.028	0.066
	(0.032)	(0.025)	(0.050)	(0.033)	(0.063)
Cost & Returns Treatment × Child	-0.121*	0.011	-0.184*	-0.048	-0.202
Very Prepared	(0.068)	(0.040)	(0.111)	(0.075)	(0.127)
Very Prepared	-0.044	-0.053*	-0.044	-0.109**	0.034
	(0.039)	(0.028)	(0.061)	(0.045)	(0.072)
Prefers No College					
Cost and Returns Treatment	0.039	0.024	0.050	0.002	0.103*
	(0.029)	(0.023)	(0.043)	(0.026)	(0.059)
Cost & Returns Treatment × Child	-0.005	-0.035	0.026	0.002	-0.028
Very Prepared	(0.044)	(0.030)	(0.071)	(0.039)	(0.091)
Very Prepared	0.038	0.034	0.034	0.029	0.058
	(0.031)	(0.023)	(0.041)	(0.028)	(0.066)
Observations	1,785	949	836	1,125	660

Notes: Coefficients are marginal effects estimated after fitting a multinomial logit model. Models also include indicator variables for the returns only and costs only treatments and their interaction with parents' assessment of preparedness; coefficient estimates for these indicator variables are reported in Tables 6 and 7, respectively. Models control for respondent's age, income, educational attainment, ethnicity, gender, marital status, employment status, household side, political affiliation, urbanicity of residence, and U.S. census region. *p<0.1; **p<0.05; ***p<0.01; Superscripts a, b, and c indicate that treatment effects are significant at the 0.1, 0.05, 0.01 levels, respectively, for parents who indicate that their child is very prepared for college-level academic work.

Table 6: Effects of Returns Treatment by Child Preparedness for College-Level Academic Work

		By Education Level		By Household Income	
	(1) Full Sample	(2) Bachelor's Degree	(3) No Bachelor's Degree	(4) Higher Income	(5) Lower Income
Prefers Four-Year					
Returns Treatment	-0.025	0.022	-0.046	0.042	-0.109
	(0.038)	(0.035)	(0.056)	(0.038)	(0.069)
Returns Treatment	0.187**, c	0.013	0.285**, b	0.085b	0.304**, a
× Child Very Prepared	(0.070)	(0.053)	(0.114)	(0.074)	(0.124)
Very Prepared	0.006	0.019	0.010	0.080	-0.091
	(0.045)	(0.035)	(0.071)	(0.049)	(0.083)
Prefers Two-Year					
Returns Treatment	-0.034	-0.045*	-0.034	-0.056*	-0.014
	(0.032)	(0.026)	(0.048)	(0.033)	(0.059)
Returns Treatment	-0.080b	0.038	-0.152b	0.017	-0.179b
× Child Very Prepared	(0.062)	(0.043)	(0.101)	(0.066)	(0.113)
Very Prepared	-0.044	-0.053*	-0.044	-0.109**	0.034
	(0.039)	(0.028)	(0.061)	(0.045)	(0.072)
Prefers No College					
Returns Treatment	0.059**	0.022	0.080**	0.015	0.123**
	(0.026)	(0.025)	(0.038)	(0.027)	(0.053)
Returns Treatment	-0.107**	-0.051	-0.133	-0.103**, b	-0.124
× Child Very Prepared	(0.051)	(0.033)	(0.087)	(0.048)	(0.094)
Very Prepared	0.038	0.034	0.034	0.029	0.058
	(0.031)	(0.023)	(0.041)	(0.028)	(0.066)
Observations	1,785	949	836	1,125	660

Notes: Coefficients are marginal effects estimated after fitting a multinomial logit model. Models also include indicator variables for the costs and returns and costs only treatments and their interaction with parents' assessment of preparedness; coefficient estimates for these indicator variables are reported in Tables 5 and 7, respectively. Models control for respondent's age, income, educational attainment, ethnicity, gender, marital status, employment status, household side, political affiliation, urbanicity of residence, and U.S. census region. *p<0.1; **p<0.05; ***p<0.01; Superscripts a, b, and c indicate that treatment effects are significant at the 0.1, 0.05, 0.01 levels, respectively, for parents who indicate that their child is very prepared for college-level academic work.

Table 7: Effects of Costs Treatment by Child Preparedness for College-Level Academic Work

		By Education Level		By Household Income	
	(1) Full Sample	(2) Bachelor's Degree	(3) No Bachelor's Degree	(4) Higher Income	(5) Lower Income
Prefers Four-Year					
Cost Treatment	-0.054	-0.052*	-0.048	0.025	-0.152
	(0.038)	(0.029)	(0.057)	(0.040)	(0.069)
Cost Treatment	0.063	0.058	0.044	-0.022	0.134
× Child Very Prepared	(0.063)	(0.047)	(0.100)	(0.068)	(0.122)
Very Prepared	0.006	0.019	0.010	0.080	-0.091
	(0.045)	(0.035)	(0.071)	(0.049)	(0.083)
Prefers Two-Year					
Cost Treatment	0.018	0.021	0.007	-0.009	0.044
	(0.032)	(0.021)	(0.050)	(0.033)	(0.061)
Cost Treatment	0.019	0.007	0.037	0.065	-0.021
× Child Very Prepared	(0.055)	(0.035)	(0.089)	(0.060)	(0.112)
Very Prepared	-0.044	-0.053*	-0.044	-0.109**	0.034
	(0.039)	(0.028)	(0.061)	(0.045)	(0.072)
Prefers No College					
Cost Treatment	0.036	0.031	0.041	-0.016	0.108**
	(0.026)	(0.021)	(0.039)	(0.028)	(0.054)
Cost Treatment	-0.083*	-0.065**	-0.081	-0.043[a]	-0.113
× Child Very Prepared	(0.044)	(0.032)	(0.070)	(0.044)	(0.087)
Very Prepared	0.038	0.034	0.034	0.029	0.058
	(0.031)	(0.023)	(0.041)	(0.028)	(0.066)
Observations	1,785	949	836	1,125	660

Notes: Coefficients are marginal effects estimated after fitting a multinomial logit model. Models also include indicator variables for the costs and returns treatments and returns only and their interaction with parents' assessment of preparedness; coefficient estimates for these indicator variables are reported in Tables 5 and 6, respectively. Models control for respondent's age, income, educational attainment, ethnicity, gender, marital status, employment status, household side, political affiliation, urbanicity of residence, and U.S. census region. *p<0.1; **p<0.05; ***p<0.01; Superscripts a, b, and c indicate that treatment effects are significant at the 0.1, 0.05, 0.01 levels, respectively, for parents who indicate that their child is very prepared for college-level academic work.

Table 8: Treatment Effects by Four-Year Returns Error Magnitude

	(1) Prefers Four Year	(2) Prefers Two Year	(3) Prefers No College
Cost and Returns Treatment	-0.032	0.001	0.032
	(0.033)	(0.029)	(0.023)
Cost and Returns Treatment × Returns Error	0.001	0.000	-0.001
	(0.002)	(0.001)	(0.001)
Returns Treatment	0.022	-0.054*	0.032
	(0.033)	(0.028)	(0.023)
Returns Treatment × Returns Error	0.001	0.000	0.000
	(0.002)	(0.001)	(0.001)
Cost Treatment	-0.027	0.024	0.003
	(0.032)	(0.027)	(0.023)
Cost Treatment × Returns Error	0.002	-0.001	-0.001
	(0.002)	(0.001)	(0.001)
Returns Error	0.000	0.000	0.000
	(0.001)	(0.001)	(0.001)

Notes: N = 1,796. Coefficients are marginal effects estimated after fitting a multinomial logit model. Models control for respondent's age, income, educational attainment, ethnicity, gender, marital status, employment status, household side, political affiliation, urbanicity of residence, and U.S. census region. *p<0.1; **p<0.05; ***p<0.01; Superscripts a, b, and c indicate that treatment effects are significant at the 0.1, 0.05, 0.01 levels, respectively, for parents who indicate that their child is very prepared for college-level academic work. Returns error is computed by subtracting actual returns from estimated returns.

Table 9: Treatment Effects by Four-Year Cost Error Magnitude

	(1) Prefers Four Year	(2) Prefers Two Year	(3) Prefers No College
Cost and Returns Treatment	0.017	-0.046*	0.029
	(0.028)	(0.025)	(0.022)
Cost and Returns Treatment × Cost Error	0.000	-0.001	0.001
	(0.001)	(0.001)	(0.001)
Returns Treatment	0.022	-0.049**	0.027
	(0.026)	(0.023)	(0.022)
Returns Treatment × Cost Error	0.000	0.000	0.000
	(0.001)	(0.001)	(0.001)
Cost Treatment	-0.009	-0.018	0.027
	(0.027)	(0.023)	(0.022)
Cost Treatment × Cost Error	-0.001	0.001	0.000
	(0.001)	(0.001)	(0.001)
Cost Error	0.002*	0.000	-0.002*
	(0.001)	(0.001)	(0.001)

Notes: N = 1,796. Coefficients are marginal effects estimated after fitting a multinomial logit model. Models control for respondent's age, income, educational attainment, ethnicity, gender, marital status, employment status, household side, political affiliation, urbanicity of residence, and U.S. census region. *p<0.1; **p<0.05; ***p<0.01; Superscripts a, b, and c indicate that treatment effects are significant at the 0.1, 0.05, 0.01 levels, respectively, for parents who indicate that their child is very prepared for college-level academic work. Cost error is computed by subtracting actual cost from estimated cost.

Appendix A

Survey Questions

Q1. Many students receive grants and scholarships to help pay their college costs, but the average student still has to pay the remaining costs of tuition and living expenses to go to college. What is your best guess as to the average amount students in your state from a family with an income [INCOME] have to pay each year for a four-year bachelor's degree at a public college or university?

Q2. How about a two-year associate's degree at a public junior or community college? What is your best guess as to the average amount students in your state from a family with an income [INCOME] have to pay each year for a two-year associate's degree at a public community college?

Q3. How much would you guess a typical worker with a four-year bachelor's degree earns each year on average in your area (before taxes)?

Q4. How much would you guess a typical worker with a two-year associate's degree earns each year on average in your area (before taxes)?

Q5. How much would you guess a typical worker without either a four-year bachelor's degree or a two-year associate's degree earns each year on average in your area (before taxes)?

Q6. Thinking about your oldest child under the age of 18, do you want that child to go to a community college to earn a two-year degree, a university to earn a four-year degree, or neither?

1. Community college to earn a two-year degree
2. University to earn a four-year degree
3. Neither

Additional Information Provided to Respondents Depending on Treatment Condition

Respondents who were randomly-assigned to receive information on the returns to a college degree were told:

> Workers in your local area who have a four-year bachelor's degree typically earn [average annual earnings of four-year degree holders in PUMA] each year over the course of their working lives. Those who have a two-year associate's degree typically earn [average annual earnings of two-year degree holders in PUMA]. Those without either a four-year bachelor's degree or a two-year associate's degree typically earn [average annual earnings non-degree holders in PUMA].

Respondents who were randomly-assigned to receive information on the costs of a college degree were told:

> According to recent estimates, it costs a student from a family with an income [respondent's income bracket] in your state [net cost of four-year institution in respondent's state] per year to complete a four-year bachelor's degree at a public university, while it costs [net cost of two-year institution in respondent's state] per year to complete a two-year associate's degree at a public community college in your state. These are average costs (including tuition, fees, and room and board) after deducting the amount that students typically receive in scholarships and grants.

Appendix B

Table B1: Mean Characteristics of Baseline Group and Randomization Check

	F-Statistic For Joint Test of Balance across All Treatment Groups	P-value
Age	0.787	0.501
Income	0.556	0.644
Female	0.253	0.859
Marital Status	1.025	0.380
Lives in Metropolitan Area	1.207	0.306
Employed	0.399	0.754
Household Size	0.418	0.740
Error Magnitude in Cost Estimate		
Four Year Institution	0.129	0.943
Two Year Institution	0.395	0.757
Error Magnitude in Returns Estimate		
Four-Year Degree	0.257	0.856
Two-Year Degree	1.440	0.229
No Postsecondary Degree	0.754	0.520
Child Preparedness	0.397	0.755
Political Affiliation		
Independent	0.152	0.929
Democrat	0.828	0.478
Republican	0.964	0.409
Education Level		
Less than High School	0.317	0.813
No College	0.346	0.792
Some College	1.039	0.374
At least B.A. Degree	0.295	0.829
Ethnic Background		
White	0.396	0.756
Black	1.474	0.220
Asian	0.498	0.684
Hispanic	0.276	0.843
More than one Race	0.419	0.739
Region		
Northeast	2.093	0.099
Midwest	0.911	0.435
South	0.300	0.825
West	0.395	0.756

Notes: Total sample size is 2,129.