Estimating College Consumption Value: Evidence from a Student Survey During COVID-19

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Preliminary and Incomplete (Do not Circulate)

Abstract

The college experience involves much more than credit hours and degrees. Students likely derive utility from in-person instruction and on-campus social activities. Quantitative measures of this consumption value of college have been hard to come by. Leveraging the COVID-19 shock, we elicit students' intended likelihood of enrolling in higher education under different costs and possible states of the world. These states vary in whether or not schooling instruction is in-person, college social life is ongoing, and whether COVID-19 is controlled. We show how such data can be used to recover student's willingness-to-pay (WTP) for college-related activities without making any parametric assumptions about the underlying heterogeneity in WTP. Our data come from a module that we fielded to approximately 1,500 undergraduate students at one of the largest public universities in the United States. We find that the average WTP for in-person instruction (relative to a remote format) represents around 4.6% of the average cost of attending university, while the average WTP for on-campus social activities is 8.5% of the average costs. We also find large heterogeneity in WTP across socioeconomic groups. Results suggest that economically disadvantaged students derive substantially lower consumption value of attending university, but this is primarily due to time and resource constraints. Beyond providing an explanation for why college persistence rates may differ by socioeconomic background, our results have implications for how college costs should be structured.

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1. Introduction

Enrollment in higher education has traditionally been analyzed through the lens of human capital models, where attending college is considered an investment opportunity. However, the "consumption value" of college experiences likely constitutes a key factor underlying post-secondary education decisions. Students do not choose universities or majors based solely on expected financial returns (Gullason, 1989; Alstadsæter, 2011; Wiswall & Zafar, 2015; Boneva & Rauh, 2019; Arcidiacono et al., forthcoming). For example, Pope and Pope (2009) show that football and basketball success increases the number of applications universities receive. Similarly, Alter and Reback (2014) find that many institutions experience changes in applications when they suffer fluctuations in their quality-of-life reputation. These findings have also been tightly connected to colleges' investment decisions by Jacob et al. (2018), who find that universities do in fact actively cater to students' desires for non-academic experiences.

Recently, the role of consumption value in students' educational decisions has gained renewed visibility during the outbreak of COVID-19. Students from more than twenty five U.S. universities have filled lawsuits against their schools demanding partial refunds on tuition and campus fees after the closure of university campuses. They argue that the "true college experience" involves much more than credit hours and degrees, and that they are also paying for in-person interactions with professors, and peers; and for the opportunity to participate in on-campus and extracurricular activities.[1] However, the precise value students put on the various components of their college experience is largely unknown.

The aim of this study is to rigorously recover student's willingness-to-pay (WTP) for college-related activities. In particular, we are interested in determining the consumption value that students assign to in-person classes and social activities while in college. Moreover, we aim to characterize the heterogeneity in the WTP based on students' background characteristics, and to uncover plausible mechanisms that drive certain students to dropout from higher education at higher rates. For example, it could be that first-generation students (those without a college-educated parent) are more likely to work while attending university, which may lead them to derive lower consumption value from campus social life. A lower consumption value could, in turn, make them more likely to dropout from higher education.

[1] See for example, "Students sue colleges for refunds of tuition and fees," CBS news, May 5, 2020. Also, see, for example, "IU student files lawsuit, seeks reimbursement after class moved online due to coronavirus," IndyStar, May 8, 2020.

For this purpose, we surveyed approximately 1,500 undergraduate students at Arizona State University (ASU), one of the largest public universities in the United States, in late April 2020. ASU is a highly diverse institution which makes our sample representative of most public institutions in the US. The survey had two main objectives. First, to document how college students are being impacted by the COVID-19 shock; these results are analyzed in Aucejo et al. (2020). Second – and relevant for this paper – the survey included a module to understand how students' intended enrollment decisions for the Fall 2020 semester would vary across the different states of the world. Specifically, students who were not planning to graduate or transfer after the spring 2020 semester were presented with six different scenarios for the fall, which varied class formats (i.e., in-person vs. remote instruction), restrictions to campus social life, and prevalence of COVID-19. These scenarios were intended to mimic the possible states of the world in which students may find themselves in the fall. They were then asked for the likelihood of continuing their enrollment in each of those cases, under varying levels of schooling costs (which are anchored to the students' own current costs). These data allow us to estimate a simple model of expected utility of enrollment, providing a framework to recover quantitative measures of WTP. In addition to providing quantitative measures of WTPs, our approach has another advantage; since our data collection conducts a kind of "experiment" at the individual student level, it allows us to estimate individual-level preferences, allowing for unrestricted forms of preference heterogeneity (see Wiswall and Zafar, 2018, for related discussion).

We find substantial variation in responses, both across individuals and across scenarios. For example, the average intended likelihood of enrolling in higher education in the "normal" state of the world that mimics the pre-COVID case (in-person instruction, ongoing social activities on campus, and no COVID-19) is 91.0%. There is substantial variation in student responses, with 12% of students reporting a likelihood of 75% or less, and 64% of students reporting a likelihood of 100% (that is, they would enroll for sure). In the state of the world with no in-person instruction, no social activities on campus, and ongoing COVID-19– the state that ended up being realized at ASU in the fall – the average intended likelihood of enrolling was 80.6%. Again, this masks substantial heterogeneity in responses across students, with 28.5% reporting a likelihood of 75% or less of enrolling, and 42.9% reporting a 100% likelihood of enrolling. The likelihood of enrolling in the COVID-state is lower than the reporting likelihood of enrolling in the normal-state for 46.0% of the students, and identical for 46.3% of the students (the remaining 7.7% report a higher likelihood of enrolling in college in the COVID-state). The

heterogeneity in responses also seems to vary systematically by the socioeconomic and demographic characteristics of the students. For example, the mean likelihood of enrolling in college in the normal-state is 90.3% for first-generation students, versus 91.4% for their counterparts. In the COVID-state, this drops to 80.9% for first-generation students (versus 80.5% for their counterparts).

We outline a simple model of college attendance that links student's utility to enrollment probabilities, where their utility can depend on certain amenities in school (in-person instruction, campus life), on whether the pandemic is ongoing or not, and the cost of attendance. We show how the variation in responses across scenarios, combined with variation in college costs that we experimentally manipulate within each scenarios, can be used to quantify the WTP for in-person instruction and social activities in dollar terms. We start with aggregate level estimates, pooling all the data across respondents for estimation. Our results indicate that the average WTP for in-person instruction (relative to a remote format) represents around 4.6% of the average cost of attending ASU, while the average WTP for on-campus social activities is 8.5% of the average costs. The average WTP for in-person instruction appears relatively small, which suggests that most students may perceive remote classes as a reasonably good substitute for in-person classes. On the other hand, on-campus social activities appear be more difficult to replace. Consistent with this, we do find that students who do not think that online classes were a good substitute for in-person instruction have a higher average WTP for in-person instruction (12.2% versus -2.2% for their counterparts; difference significant at the 0.001 level).

The rich data at the individual level allows us to estimate the model at the individual level, and explore the heterogeneity in preferences across students. We find large heterogeneity in WTP across students. For example, the 10^{th} (90^{th}) percentile of the individual-specific estimated WTP for in-person classes is -$1,106 ($2,149). This heterogeneity also seems to vary systematically by student characteristics. For example, first-generation students' average WTP for in-person classes is only $68, representing less than 2% of their average cost, while second-generation students (that is, students with at least one college-educated parent) have an average WTP of $468, roughly 6.5% of their average attendance cost. First-generation students also appear less willing to pay for campus social activities ($263 versus $700 for second generation). Similar patterns emerge across a number of socioeconomic divides; for example, non-white and non-honors students appear less willing to pay for in-person instruction and social activities, respectively.

Measured preferences may diverge across socioeconomic boundaries for a number of reasons. It could be that these measures of willingness-to-pay are driven by deep psychological differences in how students perceive higher education. Conversely, it may be that differential constraints on students' time and resources generates heterogeneity, and that, holding these constraints constant, students actually value both the social and in-person aspects of higher education similarly. In order to investigate the mechanisms underpinning the observed heterogeneity in the WTP, we project student-specific estimates of WTP onto a large set of student characteristics. We find that observable characteristics are able to explain the entire statistical gap in WTP for social activities for first-generation, lower income, and honors students.

Two factors stand out as explaining much of the variation across socioeconomic groups. First, students who work more than 20 hours per week (who tend to be disproportionately lower-income, non-Honors, and first-generation) derive substantially lower consumption value from campus activities. This suggests that time constraints may play an important role in the utility students derive from campus social life. Second, we find that students who report spending more per semester on their education have a higher WTP for social activities. While we cannot fully characterize each student's budget, this result suggests that resource constraints may also play an important role in the utility students derive from campus social life. Even though, we are unable to uncover the exact channels that lead to these correlations, together, these results suggest that socioeconomic differences in students' preference for campus social life are likely driven by constrains, rather than different tastes.

Interestingly, while differences in WTP for campus social life appear to emerge from differential constraints on time and resources, the gap in lower-income students' WTP for in-person instruction remains remarkably robust to the same set of controls. While we cannot rule out the possibility that this gap is explained by some other unobserved factors, the fact that it remains so robust to a wide variety of controls leaves open the possibility of taste differences for some aspects of higher education.

To our knowledge, Gong, Lochner, Stinebrickner, and Stinebrickner (2019) is the only other paper that provides a quantitative measure of the consumption value of college. Their approach, however, is quite different from ours, and uses data on consumption during and after college and desired borrowing amounts. Finally, while their empirical strategy provides an overall measure of consumption value, we intend to take a step further by providing a price for each

of the two arguably most important amenities in college (in-class instruction, and on-campus social activities). Our approach also allows us to characterize the heterogeneity in these WTP measures. There is some work that documents systematic differences in the perceived non-pecuniary returns and valuation of a university education: Delavande, Del Bono, and Holford (forthcoming) find that non-white British students enjoy university lectures less. Likewise, Boneva and Rauh (2019) find that non-pecuniary returns to university are perceived to be lower by first-generation UK students. Our results are qualitatively in line with these findings. Further, our analysis suggests that socioeconomic differences in time/resource constraints are driving the differential WTP for campus activities.

Overall, we believe that our analysis has the potential to critically contribute to the important ongoing policy debate on the cost of higher education in the U.S, and provide valuable information to administrators on how to structure university fees and services in order to promote campus diversity. Our results clearly indicate that the college experience – in-person instruction and campus life – is valued differently by students, and that treating it as a homogenous good may not be a good assumption. Beyond informing the policy debate, our analysis also sheds light on why certain students might enjoy the college experience less, and may be more likely to drop out from college.

Methodologically, our paper is related to a small but growing literature that uses strategically-designed survey questions in conjunction with structural models to understand decision-making.[2] Our approach hinges on the implicit assumption that stated choices reported in hypothetical scenarios are reflective of what respondents would do in actual scenarios. Historically, there has been concern about the plausibility of this assumption (Diamond and Hausman, 1994; Blumenschein et al., 2008; Hausman, 2012). However, growing evidence shows that the two approaches of using stated choices or actual choices yield similar estimates when the counterfactual scenarios presented to respondents are realistic and relevant for them (Mas and Pallais, 2017; Wiswall and Zafar, 2018). We argue that is the case here: we elicit likelihood of college enrollment in a context where many university-related activities had been disrupted due to the outbreak of COVID-19. Scenarios that would have otherwise been unfathomable prior to early 2020 (such as a state of the world with universities conducting

[2] Examples include Delavande and Zafar (2019) in the context of university choice; Ameriks et al. (2020) in the context of long-term care and savings; Fuster, Kaplan, and Zafar (forthcoming) in the context of spending responses to hypothetical income shocks.

remote teaching and halting campus activities) became realities for students. Moreover, at the time of the survey, students were actively thinking about these possibilities. In fact, we show that students, when surveyed in April, perceived substantial uncertainty about the possible states of the world in Fall 2020. The scenario where COVID was under control, classes were in person, and campus social life continued unrestricted was assigned an average probability of 22%, while the least likely perceived state at the time of the survey was one where COVID was not under control, classes were in person, and campus social life continued unrestricted and was assigned an average probability of 6%. Finally, the closest scenario to the realized state of the nature (i.e. outbreak continues, remote classes, and restricted social activities) was assigned an average probability of 34 percent.

While the assumption underlying our approach is not directly testable, we present several pieces of evidence which should further increase confidence in our approach. First, the heterogeneity in WTPs that we uncover is meaningful and systematic. For example, we find that the estimated individual-level WTP for social activities is positively correlated with the pre-COVID social engagement of students, as one would expect if our approach uncovered meaningful heterogeneity in preferences; this test is similar in spirit to that conducted by Maestas et al. (2018) who show that their estimated WTPs for working conditions using hypothetical scenarios are positively correlated with the actual working conditions of the respondents. Second, we find that the students' intended likelihood of enrolling at ASU in the fall is positively correlated with their subsequent enrollment decisions that we observe in the administrative data. This test, obviously, can only be conducted for the state of the world that was subsequently realized in the fall.

This paper is structured as follows. Section 2 describes the survey instrument and presents summary statistics. Section 3 presents the empirical framework. Section 4 discusses identification issues. Section 5 presents the estimation results. Section 6 concludes.

2. Data

2.1. Survey Administration

Our data come from an original survey of undergraduate students at Arizona State University (ASU), one of the largest public universities in the United States. Like other higher educational institutions in the US, the Spring 2020 semester started in person. However, in early March during spring break, the school announced that instruction would be transitioned online and that students were advised not to return to campus.

The study was advertised on the My ASU website, accessible only through the student's ASU ID and password. Undergraduate students were invited to participate in an online survey about their experiences and expectations in light of the COVID-19 pandemic, for which they would be paid $10. The study was posted during the second to last week of instruction for the spring semester (April 23rd). Our sample size was constrained by the research funds to 1,500 students, and the survey was closed once the desired sample size was reached, which happened within 3 days of posting the survey.

The survey was programmed in Qualtrics. It collected data on students' demographics and family background, their current experiences (both for academic outcomes and non-academic outcomes), and their future expectations. The survey collected data on what these outcomes/expectations would have been in several counterfactual states. Those data are analyzed in Aucejo et al. (2020).

Of particular interest for this study is a module in the survey, in which students were asked about the likelihood that they would enroll at ASU (or any other higher education institution) for the next academic year under different scenarios and at different tuition levels.[3] This module was fielded students who were not planning to graduate or transfer after the spring 2020 semester. The presented scenarios varied depending on the combination of the following factors: (1) COVID-19 ongoing or not; (2) in-person classes or not (i.e., remote learning); (3) return to campus/social life or not; and (4) COVID-19 vaccine or not. Finally, conditional on a combination of (1), (2), (3) and (4), students were asked to report the likelihood of enrolling (on a 0-100 scale) when the cost of attending ASU was changed by -30%, -20%, -10, 0%, 10%, 20%, and 30% (relative to the individual's current net costs). The specific instructions were as follows:

We will next ask you the percent chance (or chances out of 100) that you will enroll at ASU in Fall 2020 in certain situations. In all these cases, assume that you cannot transfer to another college. So if you choose not to enroll at ASU, that means you will not attend any other higher educational institution either.

The first scenario was then presented as follows: "*Consider the case: The COVID-19 outbreak is CONTROLLED by Fall 2020 (and the economy RECOVERS), AND IN-PERSON classes resume in Fall 2020, AND Students CAN RETURN to campus in Fall 2020, and campus life/activities RESUME as*

[3] Each student first reported their total cost of attending ASU net of scholarships.

before. What is the percent chance you will enroll at ASU in Fall 2020 (that is, you will continue your studies here at ASU) if: the cost of an ASU education is x% higher/lower than it was for you last semester." This scenario would have corresponded to the pre-COVID state.

The second scenario, which was consistent with the state when students took the survey and ended up being the state that was realized in the fall, was: "*Consider the case: The COVID-19 outbreak CONTINUES (and the economy is STRUGGLING), AND Classes in Fall 2020 remain ONLINE/REMOTE, AND Students are told to take classes REMOTELY in Fall 2020, and campus life/activities are COMPLETELY RESTRICTED. What is the percent chance you will enroll at ASU in Fall 2020 (that is, you will continue your studies here at ASU) if: the cost of an ASU education is x% higher/lower than it was for you last semester*."

In total, the survey presented students with six different scenarios combined with seven different tuition levels. Table 1 characterizes each of the different scenarios. Since the scenarios had subtle differences, two of them were followed by understanding checks to ensure that students understood what the scenario entailed. Finally, to understand the extent to which students perceived uncertainty about the future state of the world in the fall, the survey also asked: "*We just asked you about what you would plan to do in different situations that could possibly arise in Fall 2020. These related to whether the Covid-19 outbreak is controlled by then, whether teaching resumes in-person, and whether campus life/activities resume in Fall 2020. We would now like to know how likely you think each of these situations are in Fall 2020. For each situation enter an answer between 0 and 100, where 0 means "absolutely no chance" and 100 means "will surely happen". Your answers to the following situations MUST sum to 100.*"

Section 4 discusses the specific parameters that we are able to identify from the different scenarios.

2.2. Sample

A total of 1,564 respondents completed the survey. Ninety respondents were ineligible and dropped from the sample (such as students enrolled in graduate degree programs or diploma programs). Responses in the 1st and 99th percentile of survey duration were excluded leading to a size of 1,446. The 231 students who were planning to graduate or transfer to another institution before the start of the fall 2020 semester were ineligible for the module and hence dropped. Another 8 students with incomplete responses were dropped. Finally, to construct the main analysis sample, we dropped the 274 students who failed either of the two attention check, resulting in a final analysis sample of 933 students. Our results are robust to including students

who failed only one understanding check (217 of the 274 students who failed both checks). The survey took 35 minutes to complete, on average (median completion time was 28 minutes).

Table 2 shows how our sample compares with the broader ASU undergraduate population and the average undergraduate student at other large flagship universities (specifically, the largest public universities in each state). Relative to the ASU undergraduate population, our sample has a significantly higher proportion of first-generation students (that is, students with no parent with a college degree), and a smaller proportion of international students. The demographic composition of our sample compares reasonably well with that of students in flagship universities. Our sample is also positively selected in terms of SAT/ACT scores relative to these two populations. This better performance on admission tests could be explained by the high proportion of Honors students in our sample (22% compared to 18% in the ASU population).[4] The last four columns of Table 2 show how Honors students compare with ASU students and the average college student at a top-10 university. We see that they perform better than the average ASU student (which is expected) and just slightly worse than the average college student at a top-10 university. The share of white Honors students in our sample (60%) is higher than the proportion in the ASU population and much higher than the proportion of white students in the top-10 universities. Overall, we believe our sample of ASU students is a reasonable representation of students at other large public schools, while the Honors students may provide insight into the experiences of students at more elite institutions.

2.3. Descriptive Statistics

This section presents patterns in students' subjective likelihood of returning for the fall semester, with the aim to describe the variation in the data that identifies our WTP estimates. First, to characterize the degree of uncertainty that students were facing at the time of the survey, Figure 1 presents box-plots of the subjective likelihood they place on each scenario being realized. The median probabilities assigned to each scenario are not substantially different. For example, the fact that the median student assigned a likelihood of 20% to the scenario most similar to their pre-pandemic experiences (i.e. covid-19 controlled, in-person instruction, and unrestricted social campus activities) which ex-post was not realized, suggests important levels of uncertainty. Finally, the median student assigned the lowest probability to

[4] The Honors College at Arizona State University is a selective, residential college that recruits academically outstanding undergraduates across the nation.

the least consistent scenario (where the outbreak is still in place and in-person instruction and social activities are reinstated), which further support that they provided thoughtful responses.

Figure 2 shows average likelihood of returning to ASU conditional on different scenarios and students' characteristics (i.e. gender, lower vs. higher income, and non-Honors vs Honors). In general, students report high enrollment probabilities across scenarios, however there are important variations. For example, if we compare Panels (a) and (c) of Figure 2, students are less likely to enroll when in-person instruction and social activities are not allowed conditional on a context where the outbreak is under control. On the other hand, Panel (e) shows that students are substantially less likely to enroll if in-person instruction and social activities are in place when the outbreak is not controlled. Finally, all panels of Figure 2 show that Honors students, on average, seem more likely to enroll than non-Honors students in most scenarios, consistent with a higher consumption value for attending college.

In order to characterize within individual variation, Figure 3 presents a scatter plot of the probability of enrolling in following two scenarios: covid-controlled/remote-instruction/social-campus-activities-*restricted* vs covid-controlled/remote- instruction/social-campus-activities-*allowed*. The majority of points are above the 45 degree line, indicating that students value social activities more when COVID-19 is under control. The fact that few observations lie on or near the 45 degree line suggests within-individual variation in the probability of enrollment across scenarios is relatively large.

Finally, Figure 4 presents average enrollment probabilities conditional on the status quo scenario (i.e. covid-controlled/in-person-instruction/social-campus-activities-allowed) at different net attendance costs. On average, students are highly sensitive to increases in fees, and almost completely unresponsive to a reduction in them. For example, if university attendance costs would have been 20% higher (lower), the average student enrollment likelihood would decrease (increase) 24 percentage points (0 percentage points).

In summary, students' subjective likelihood of returning for the fall semester shows important variation both within and across students, suggesting that the elicited probabilities capture meaningful information with which to recover measures of willingness-to-pay.

3. Empirical Framework

We propose simple model of expected utility of enrollment that provides a framework to recover quantitative measures of WTP for different college-related activities. In particular, our model intends to recover how utility of college enrollment varies under different scenarios.

Let U_{ij} denote student i's utility from enrolling at ASU under state/scenario s. The utility from enrollment is given by: $U_{is} = u_i(X_s) + \epsilon_{is}$, where $u_i(X_s)$ denotes the preferences of individual i over the vector of characteristics X_s that are related to a specific scenario s (e.g., in-person classes vs remote teaching, campus activities/life vs cancellation of campus activities/life). Finally, ϵ_{is} corresponds to the additional student's preference component for enrolling conditional on scenario s.

We specify ϵ_{is} as: $\epsilon_{is} = \delta_i + \varepsilon_{is}$, where δ_i denotes unobserved and invariant students' characteristics while ε_{ij} is an idiosyncratic taste shock. It is common for choice models to assume that ε_{is} is i.i.d. Type I extreme value, and independent of preferences represented by $u_i(X_s)$. Therefore, the probability that individual i chooses to enroll in college conditional on scenario s, is given by:

$$ProbEnr_{i,s} = \frac{exp(u_i(X_s) + \delta_i)}{1 + exp(u_i(X_s) + \delta_i)}.$$

If we assume a linear and separable utility specification, then we can parametrize the utility function as:

$$u_i(X_s) = \alpha_0 + \alpha_1 NoCOVID_s + \alpha_2 InPersonClass_s + \alpha_3 CampusLife_s + \alpha_4 CampusLife_s NoCOVID_s + \alpha_5 Vaccine_s + \alpha_6 CostASU_{si}$$

where "NoCovid" is an indicator denoting that the outbreak has been controlled; "InPersonClass" refers to having in-person classes (instead of remote classes); "CampusLife" denotes that campus social activities are allowed (instead of being restricted); "Vaccine" refers to the existence of a vaccine at the beginning of the term; and "CostASU" refers to student-specific university fees as specified in the scenario.[5]

The dependent variable, $ProbEnr_{i,s}$, is the student's reported likelihood of enrolling in scenario s, elicited on a 0-100 scale (which we scale down to 0-1). Therefore, we estimate the model following the fractional response approach developed by Papke and Wooldridge (1996), which

[5] As we discuss in the identification section, the scenarios used for the empirical analysis *only* allow us to recover WTP for in-person instruction in a situation where COVID-19 is *under control*.

is well suited for situations where the dependent variable takes values between 0 and 1. Moreover, it does not require manipulation of the data when probabilities of enrollment take the extreme values (0 or 1). The parameters of the model are estimated via quasi-maximum likelihood, where the Bernoulli log-likelihood function is given by:

$$l_{i,s}(\alpha, \delta) = ProbEnr_{i,s} log\left[\frac{exp(u_i(X_s)+\delta_i)}{1+exp(u_i(X_s)+\delta_i)}\right] + \left(1 - ProbEnr_{i,s}\right)\left(1 - log\left[\frac{exp(u_i(X_s)+\delta_i)}{1+exp(u_i(X_s)+\delta_i)}\right]\right) (1)$$

For fractional data, the Bernoulli quasi maximum likelihood estimator is efficient in a class of estimators containing all quasi-maximum likelihood estimators in the linear exponential family and weighted non-linear least squares estimators.

From this estimation, we derive the willingness-to-pay for social life without COVID as:

$$WTP_{social} = -\frac{\alpha_3 + \alpha_4}{\alpha_6}$$

And the willingness to pay for in-person instruction as:

$$WTP_{inperson} = -\frac{\alpha_2}{\alpha_6}$$

4. Identification

Our scenarios vary whether there is in-person instruction vs remote teaching, campus activities/life vs cancellation of campus activities/life, whether COVID-19 is ongoing or not, and whether a vaccine for COVID-19 exists. The set of hypothetical scenarios presented to the students do not include *all* the possible combination of options, which would have required presenting an unreasonably large number of scenarios (10 to be specific). This is not feasible since that would have increased survey length considerably, and also imposed a large cognitive load on respondents, reducing response reliability. In addition, certain scenarios might not have looked plausible in practice. For example, presenting students with a scenario where COVID-19 is ongoing, classes are remote, but campus social life is fully resumed is not very realistic. Therefore, we elicit students' enrollment probabilities in six different scenarios, and at seven hypothetical tuition fees for each scenario. Table 1 shows the exact variation across the six scenarios. These allow us to identify WTP for in-person classes (relative to remote classes) and campus activities (relative to full-cancellation of campus life) in a situation where the pandemic is *under control*.[6] We are also able to identify how the presence of a vaccine and having the

[6] The six scenarios shown to the students do not allowed us to separately identify WTP for in-person instruction and campus activities while COVID-19 is *not* under controlled.

pandemic under control itself impact students' willingness to for college enrollment. However, these are not the focus of this paper.

The fact that we recovered 42 observations per student (i.e. 6 scenarios combined with 7 different tuition fees) makes possible to identify key parameters from within individual variation, which allows us to overcome many possible threats to identification due to omitted variable bias.

5. Results

5.1. Overview

Table 3 presents willingness-to-pay estimates for in-person classes, and social life in college in a situation where COVID-19 is under control. Results are presented for the whole sample and conditional on several subgroups of the student population in order to provide an initial characterization of the heterogeneity in WTP.[7] Column (1) of Table 3 shows that students on average are willing to pay $287 more per year in order to have in-person classes (relative to remote classes), this represents approximately 4.6% of the average cost of attending university. However, this result masks important heterogeneity across groups of the student population. For example, the willingness-to-pay of second generation students is $468, representing 6% of their average cost while for first generation students WTP is only $68 representing 2% of their average cost. Similar patterns can be found when comparing nonwhite vs white, and lower vs. higher income students, which is consistent with qualitative evidence from Delavande et al. (forthcoming), who find that non-white British university students enjoy classes and lectures less than their white peers. While a WTP of 4.6% of the average cost may modest, it is important to keep in mind that remote classes are designed to work as a reasonable substitute for in-person instruction.[8]

Column (2) of Table 2 displays WTP for on-campus social activities. We find that students, on average, are willing to pay $522 (approximately 8.5% of the average cost) to have access to

[7] Second generation students correspond to those who have at least a parent with a college degree, and lower-income students are defined as those with below-median parental income (i.e. $80,000)

[8] Table A2 provides evidence that our baseline specification is not driven by students' inability to realistically consider the proposed scenarios by restricting the sample to only scenarios in which a student placed a positive likelihood of realization. If students' responses were strongly biased in scenarios which they did not perceive as realistic, then we would expect the estimates in Table A2 to be very different than in Tables 3 and Table A1. However, we see that, while some estimates do change, the key qualitative results remain robust in this selective sample, suggesting that the scenarios were in-fact realistic and relevant to the students.

such activities. This is 1.8 times larger than for in-person classes. The relatively low dollar value students on average place on in-person instruction suggests that many perceive online instruction as a close substitute. A plausible explanation for the substantially larger WTP for campus social life is a lack of direct substitutes. In terms of heterogeneity in WTP, it is also notable that first generation students assigned substantially lower value to on-campus social activities than second generation students ($263 vs. $700). Perhaps counter to existing tropes, high achieving students (i.e. Honors) seem to value social activities substantially more than lower achieving students.[9]

A number of factors could potentially explain the relatively large gaps in preference for in-person learning and campus social life. Most obviously, students from different socio-economic backgrounds may face different constraints on their time and resources. For example, students with less family resources may be more likely to supplement their income by working, and thus have less time to participate in campus activities, or live with their family and so be less likely to participate in campus events. Conversely, it is possible that differences in willingness-to-pay reflect deeper differences in taste. We explore these possibilities in the next section

Finally, we also report WTP for a COVID-19 vaccine and for a controlled in Appendix Table A1. Our findings indicate that students are willing to pay roughly $2000 (1/3 of the average university fees) for each scenario. This suggests that students view the pandemic as having large effects on the value of higher education, even after accounting for social restrictions and educational mode. This large residual effect could be explained in part by a perception of lower returns to human capital due to bad labor markets.[10]

5.2 Heterogeneity in WTP: A Closer Look

In order to further characterize the heterogeneity in preferences, we estimated model eq (1) separately for each individual, which allows us to nonparametrically characterize the willingness-to-pay distribution.[11] Table 4 shows several moments of the WTP distribution for

[9] Table A3 demonstrates that low student effort on the survey is unlikely to explain our results by including observations from students who failed 1 of the 2 attention checks. If it were the case that low survey attention was correlated with strongly biased responses and this correlation explained our results, we would expect that that expanding the number of low-effort students in the sample would change the estimates in a meaningful way. However, we see that the estimates in Table A3 are very close to those in Tables 2 and A2.

[10] Aucejo et al. (2020) show that in fact students expect long-run negative effects of the pandemic in their future wages.

[11] It is important to keep in mind that per student we elicit 35 enrolment probabilities across different scenarios.

the overall sample and a number of socioeconomic subgroups. We find that even within subgroup, there is abundant heterogeneity, with almost all demographic groups having a 90-10 split of more than $2,000. There is even a meaningful share of students with negative willingness to pay for both in-person and on-campus social activities, leaving the median across most groups around $0. Figures 5 plots the cumulative density function of WTP for in-person classes and campus related social activities for the whole sample.[12] These CDFs show that more than 40% assign a positive value to the factor in question, more than double the share that assigned negative value. Finally, it is important to highlight that a large share of students assign zero WTP (relative to their alternatives) to both campus amenities. This suggests that, for some students, remote instruction constitutes a good substitute for in-person classes and that social activities on campus may not be valuable. Interestingly, WTP for the two factors is not statistically correlated, and having a negative WTP for one factor does not significantly predict the likelihood of negative WTP for the other factor. In summary, the evidence shows large heterogeneity in WTP for key amenities of the college experience, suggesting that, some of the most ubiquitous structures of higher education (i.e. in-person classes and campus social activities) are not necessarily well suited for an important share of students. In the next section, we explore why this may be.

5.3. Heterogeneity in WTP: Mechanisms

In order to evaluate plausible mechanisms behind the large heterogeneity in willingness-to-pay for in-person classes and on-campus social activities, we projected our individual estimates of WTP on three broad groups of covariates: demographics (i.e., gender, socioeconomic background, race, first generation and honors), economic related factors (i.e., working while attending university, number of hours work, total cost of attending ASU per year, loans, and scholarships), and non-economic factors (i.e., attendance to social events per week, study hours per week, proxies for student risk tolerance and patience, ACT scores, and parental education). Table 5 provides summary statistics of the economic and non-economic factors, conditional on the various demographic groups.

The first three columns of Table 6 show OLS coefficients from regressing individual estimates of WTP for on-campus social activities onto these three broad groups of covariates. Column (1) serves as a benchmark showing the level of heterogeneity in WTP across demographic groups. Lower income and first generation students tend to derive lower consumption value for

[12] Cumulative density functions conditional on subgroups of the population are shown in Figures 6.

social activities while the opposite is true for Honors students. Column (2) shows that an important predictor of WTP for on-campus social activities is working more than 20 hours per week while attending college. Additionally, we find that students' total expenditure on education is positively associated with WTP for campus social life. Together, the economic covariates explain almost 70% of the gap in WTP that we observed for first generation students. This suggests that time and resource constraints may be an important factor in understanding why lower income and first generation students derive low consumption value from such activities. Finally, column (3) adds the non-economic covariates, further helping to explain heterogeneity across groups of the student population. In particular, the coefficient on first generation students is now closer to zero. The findings from this specification are reassuring in magnitude and support the conclusion that our estimates of WTP are in fact capturing the extent that students' value campus related activities. For example, we find that students which attend more social events per week derive higher WTP for on campus activities.

Finally, the last three columns of Table 4 repeat the analysis, but for in-person classes. Column (4) shows that while Honors students show the largest willingness-to-pay for in-person classes, lower income show the lowest WTP. Our covariates seem to show a lower explanatory power for in-person WTP. Perhaps, the most relevant result is that including non-economic covariates reduce by more than 60% the WTP of Honors students. Finally, the fact that students with higher ACT show a higher WTP for in-person classes suggests that more academically prepared/motivated students derive higher utility for this type of amenity.

6. Conclusions

This paper shows that students' willingness-to-pay for in-person classes represents 4.6% of the average cost of attending Arizona State University, while university related social activities are valued almost twice as much. We argue that these differences are driven by the fact that in-person classes can be better substituted by remote teaching, however campus social activities may be more difficult to replace. We also find large heterogeneity in WTP across groups of the student population. In particular, economic and non-economic related covariates play an important role on explaining such heterogeneities. For example, students that work more than 20 hours per week derive a substantially lower consumption value from on-campus activities. This suggests that constraints may prevent many students to enjoy the amenities that universities provide to them. These results have important implications on how university fees should be structured in order to increase diversity on higher education campuses.

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TABLES AND FIGURES

October 5, 2020

Table 1: Scenarios

	COVID Controlled	In Person Instruction	Normal Campus Social	Vaccine
Scenario 1	1	1	1	0
Scenario 2	0	0	0	0
Scenario 3	1	0	0	0
Scenario 4	1	0	1	0
Scenario 5	0	1	1	0
Scenario 6	0	1	1	1

Notes: Table characterizes each of the 6 scenarios participants were asked to consider.

Table 2: Summary Statistics

	Survey All	ASU	P-value (1)-(2)	Flagship Univ.[d]	P-value (1)-(4)	Survey Honors	P-value (6)-(2)	Top-10 Univ.[e]	P-value (6)-(8)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Female	0.51	0.48	0.05	0.50	0.55	0.53	0.11	0.50	0.41
Black	0.04	0.04	0.56	0.07	0.00	0.02	0.02	0.07	0.00
White	0.62	0.49	0.00	0.61	0.31	0.61	0.00	0.39	0.00
Hispanic	0.20	0.24	0.00	0.12	0.00	0.14	0.00	0.12	0.50
Int. Students	0.02	0.09	0.00	0.06	0.00	0.01	0.00	0.12	0.00
First Generation[a,b]	0.37	0.28	0.00	-	-	0.20	0.00	-	-
Family Income[a,c]	103	111	0.00	-	-	127	0.00	-	-
Freshman[a]	0.27	0.27	0.74	-	-	0.34	0.02	-	-
Sophomore[a]	0.30	0.24	0.00	-	-	0.37	0.00	-	-
Junior[a]	0.33	0.22	0.00	-	-	0.26	0.12	-	-
Senior[a]	0.10	0.28	0.00	-	-	0.04	0.00	-	-
SAT Verbal 25th %tile	620	532	0.00	548	0.00	680	0.00	711	0.00
SAT Verbal 75th %tile	730	644	0.00	645	0.00	750	0.00	774	0.00
SAT Math 25th %tile	600	542	0.00	556	0.00	690	0.00	733	0.00
SAT Math 75th %tile	750	661	0.00	671	0.00	780	0.00	797	0.00
ACT 25th %tile	25	22	0.00	23	0.00	29	0.00	32	0.00
ACT 75th %tile	32	28	0.00	29	0.00	34	0.00	35	0.00
Sample Size	933	60,108		1,339,304		238		81,118	

Notes: Data in columns (2), (3) and (8) is from IPEDS 2018. The flagship universities are the 4-year public universities with the highest number of undergraduate students in each state. Means for these columns are weighted by total number of undergraduates in each institution. ACT and SAT data are weighted averages of 2018-2015 years from IPEDS. P-value columns show the p-value of a difference in means test between the two columns indicated by the numbers in the heading.

[a] Data in the ASU column from a different source. This data includes everyone taking at least one class for credit during the Spring semester of 2018 and attended ASU as their first full-time univeristy. Income and first generation variables for the ASU data are constructed with the data of the first available year, which it is not the first year of college for most of the sample.

[b] Students with no parent with a college degree.

[c] Family income in thousands of dollars.

[d] The largest public universities in each state.

[e] Top 10 universities according to the US News Ranking 2020.

Table 3: WTP Estimates

	N	Avg. Cost	WTP In Person	p-value	WTP Social	p-value
All	933	6,173	287 (114) [4.64%]		522 (111) [8.45%]	
Females	476	6,250	373 (102) [5.97%]	0.218	369 (89) [5.91%]	0.018
Males	457	6,093	210 (85) [3.45%]		648 (77) [10.63%]	
Lower Income	407	3,597	68 (76) [1.90%]	0.000	280 (70) [7.78%]	0.000
Higher Income	526	8,167	530 (102) [6.49%]		756 (89) [9.26%]	
First Gen.	342	3,339	68 (73) [2.05%]	0.001	263 (66) [7.88%]	0.000
Second Gen.	591	7,813	468 (95) [5.99%]		700 (84) [8.96%]	
Nonwhite	351	5,211	72 (116) [1.39%]	0.015	508 (102) [9.76%]	0.858
White	582	6,753	413 (80) [6.12%]		531 (72) [7.86%]	
Non-honors	695	5,839	252 (72) [4.32%]	0.319	441 (65) [7.55%]	0.008
Honors	238	7,150	418 (150) [5.84%]		825 (129) [11.53%]	

Notes: WTP reported in dollars. Standard errors in parentheses derived via delta-method. WTP as a percent of average cost in brackets. Sample includes scenarios 1-6.

Table 4: Moments of Individual WTP Distribution

	WTP Social						WTP In Person					
	Mean	Med	10^{th} P	90^{th} P	%>$10	%<-$10	Mean	Med	10^{th} P	90^{th} P	%>$10	%<-$10
All	527	4	-246	1,941	0.49	0.21	244	0	-1,262	2,017	0.42	0.34
Female	460	0	-277	1,737	0.46	0.23	251	0	-1,309	2,086	0.40	0.35
Male	598	18	-166	2,064	0.52	0.19	236	0	-1,201	1,855	0.45	0.32
Lower Income	326	0	-166	1,101	0.43	0.22	75	0	-1,083	1,225	0.38	0.36
Higher Income	682	42	-263	2,495	0.53	0.20	374	0	-1,318	2,665	0.46	0.32
First Gen	296	0	-199	1,121	0.42	0.23	108	0	-924	993	0.41	0.32
Second Gen	660	27	-285	2,376	0.53	0.19	322	0	-1,408	2,632	0.43	0.35
Nonwhite	570	11	-385	2,260	0.50	0.23	144	0	-2,145	1,703	0.42	0.37
White	501	1	-156	1,850	0.48	0.19	304	0	-1,020	2,021	0.42	0.31

Notes:

Table 5: Covariate Summary Statistics

	All	Female	Male		Lower income	Higher income		Non-white	White		First gen.	Second gen.		Non-Honors	Honors	
Economic																
Working (0/1)	0.66	0.69	0.63	(0.042)	0.67	0.65	(0.551)	0.61	0.69	(0.007)	0.71	0.63	(0.020)	0.69	0.58	(0.001)
Work 20+ hrs (0/1)	0.41	0.45	0.37	(0.016)	0.45	0.38	(0.036)	0.32	0.47	(0.000)	0.49	0.37	(0.000)	0.49	0.19	(0.000)
Annual edu spend ($1000s/year)	17.4	17.4	17.5	(0.933)	14.6	19.6	(0.000)	17.1	17.7	(0.651)	14.2	19.3	(0.000)	15.1	24.3	(0.000)
Loans ($1000s/year)	3.3	3.4	3.1	(0.586)	3.3	3.2	(0.920)	2.6	3.6	(0.038)	3.7	3.0	(0.113)	3.4	2.8	(0.225)
Scholarships ($1000s/year)	7.4	7.6	7.1	(0.419)	8.2	6.7	(0.025)	7.7	7.2	(0.441)	7.9	7.1	(0.237)	5.9	11.7	(0.000)
Cost above instate (0/1)	0.43	0.44	0.41	(0.395)	0.29	0.53	(0.000)	0.35	0.47	(0.000)	0.28	0.51	(0.000)	0.40	0.51	(0.002)
Non-Economic																
College father (0/1)	0.53	0.48	0.59	(0.001)	0.29	0.72	(0.000)	0.47	0.57	(0.004)	0.00	0.84	(0.000)	0.47	0.72	(0.000)
College mother (0/1)	0.51	0.47	0.55	(0.020)	0.28	0.69	(0.000)	0.42	0.56	(0.000)	0.00	0.80	(0.000)	0.44	0.69	(0.000)
Social events (per week)	4.4	4.5	4.3	(0.355)	4.1	4.7	(0.011)	4.2	4.5	(0.212)	4.3	4.5	(0.347)	4.3	4.9	(0.016)
Study hrs (per week)	16.5	16.5	16.5	(0.954)	16.4	16.6	(0.719)	16.6	16.5	(0.927)	15.4	17.2	(0.010)	16.7	16.1	(0.434)
Act (1-36)	20.7	19.0	22.5	(0.000)	18.1	22.7	(0.000)	21.8	20.1	(0.062)	17.3	22.7	(0.000)	18.1	28.4	(0.000)
Risk tol (1-7)	4.3	4.1	4.6	(0.000)	4.2	4.4	(0.157)	4.2	4.3	(0.186)	4.4	4.3	(0.196)	4.3	4.1	(0.054)
Patience (1-7)	4.8	4.8	4.7	(0.547)	4.8	4.7	(0.637)	4.5	4.9	(0.000)	4.8	4.7	(0.326)	4.8	4.8	(0.787)

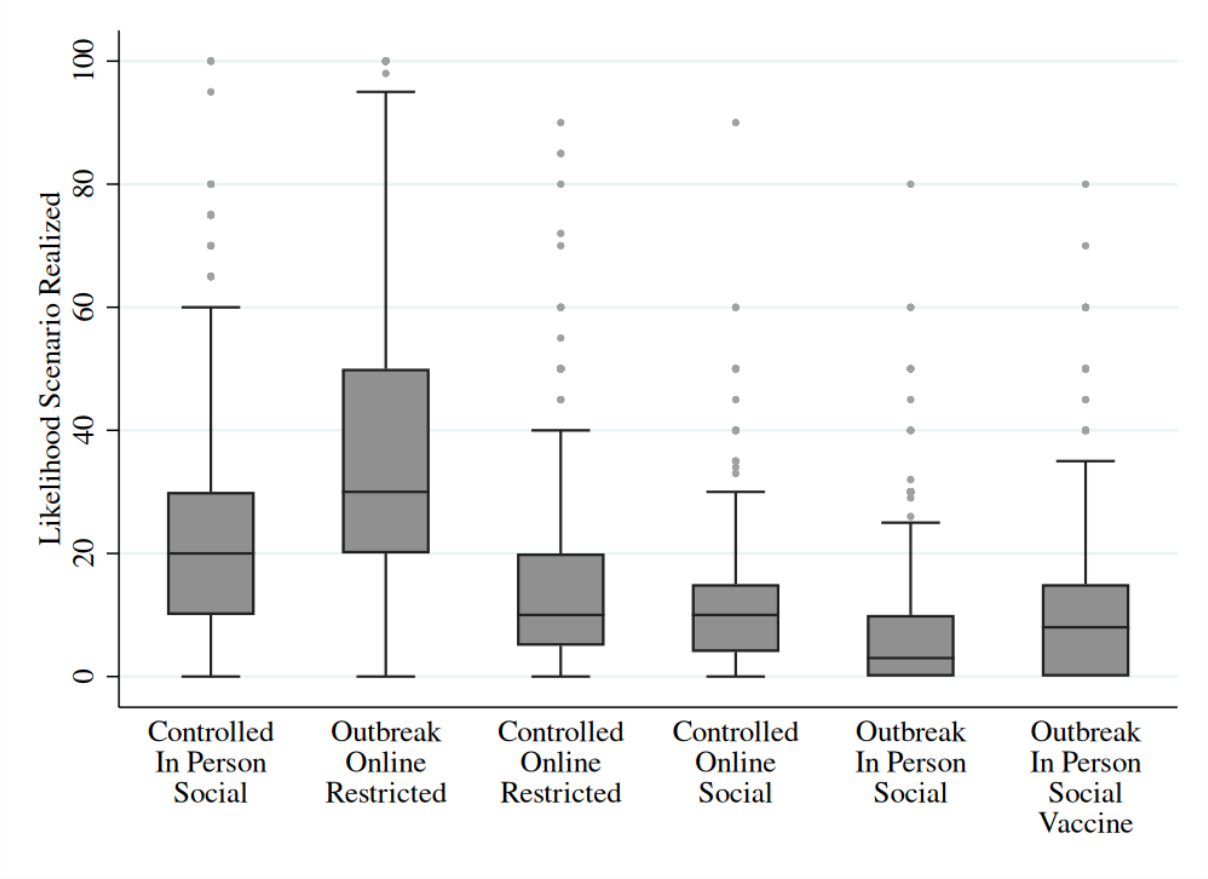
Notes: Table displays mean covariate levels for various demographic divisions. P-values for equality of means in parentheses.

Table 6: Explaining Gaps in Individual WTP

	WTP Social (1)	WTP Social (2)	WTP Social (3)	WTP In Person (4)	WTP In Person (5)	WTP In Person (6)
Demographic						
Female	-103	-115	-105	33	19	20
	(91)	(88)	(91)	(118)	(118)	(118)
Lower income	-238**	-104	-83	-226*	-236*	-222
	(99)	(94)	(94)	(132)	(134)	(136)
Nonwhite	138	125	111	-106	-76	-56
	(104)	(101)	(101)	(131)	(133)	(133)
First gen.	-213**	-68	-44	-54	-70	-166
	(93)	(88)	(205)	(128)	(126)	(287)
Honors	239**	108	104	175	141	64
	(121)	(127)	(129)	(160)	(176)	(184)
Economic						
Working (0/1)		21	0		-31	-45
		(126)	(125)		(171)	(171)
Work 20+ hrs (0/1)		-197*	-224**		24	76
		(111)	(111)		(165)	(166)
Annual edu spend ($1000s/year)		16***	16***		-4	-5
		(4)	(4)		(4)	(4)
Loans ($1000s/year)		-20**	-19**		13	15
		(9)	(9)		(12)	(12)
Scholarships ($1000s/year)		-9	-8		12	10
		(9)	(9)		(8)	(8)
Cost above instate (0/1)		462***	426***		146	158
		(101)	(101)		(142)	(143)
Non-Economic						
College father (0/1)			13			-101
			(159)			(213)
College mother (0/1)			38			-49
			(142)			(211)
Social events (per week)			29**			21
			(14)			(16)
Study hrs (per week)			-1			-0
			(4)			(5)
Act (1-36)			-1			10**
			(4)			(5)
Risk tol (sd)			41			-46
			(46)			(57)
Patience (sd)			-76*			103*
			(40)			(55)
College Year FE	Y	Y	Y	Y	Y	Y
N	929	929	929	929	929	929
r^2	0.041	0.113	0.124	0.015	0.020	0.030

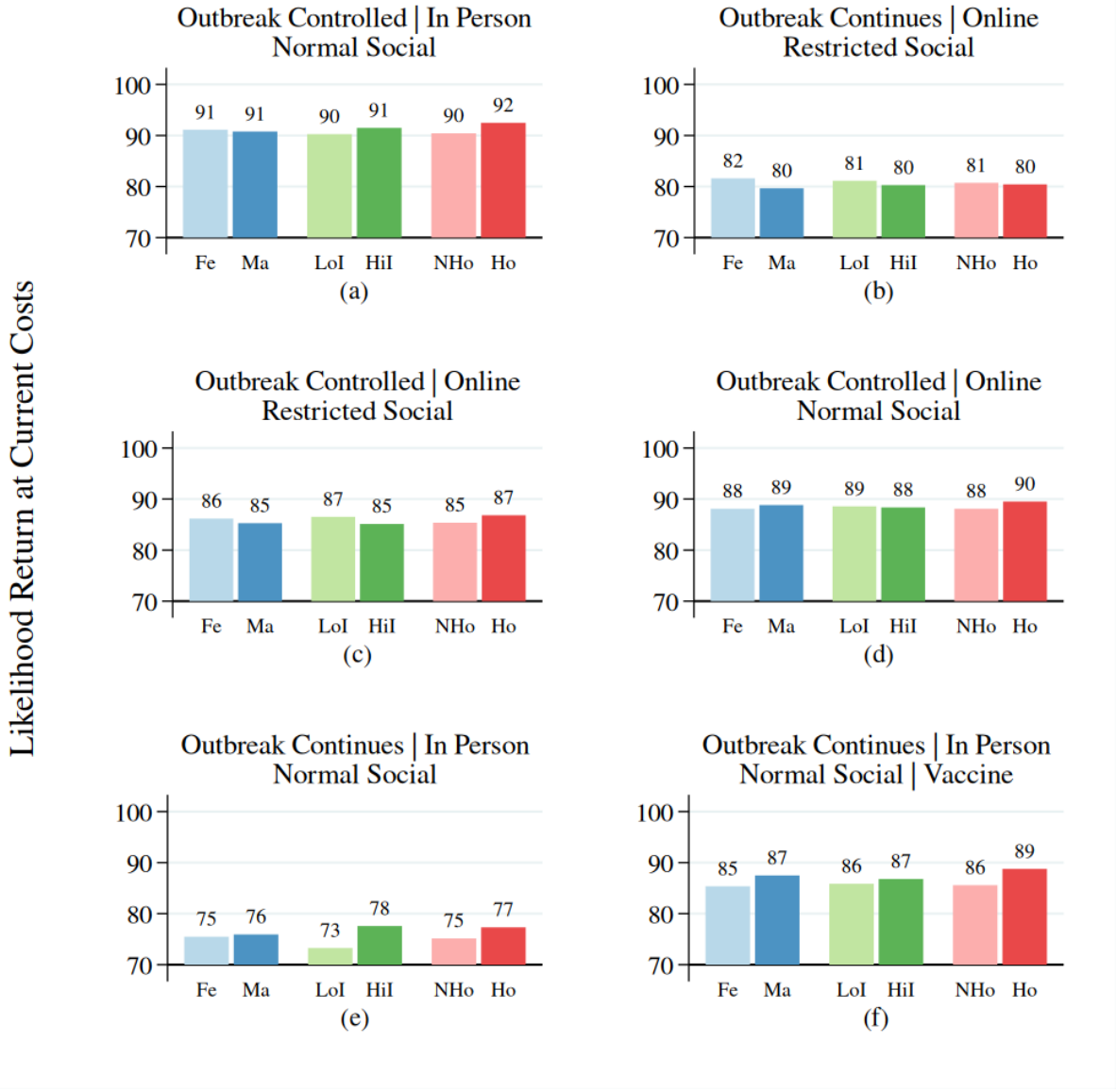
Notes: Estimates in dollars.

Figure 1: Perceived Scenario Likelihood



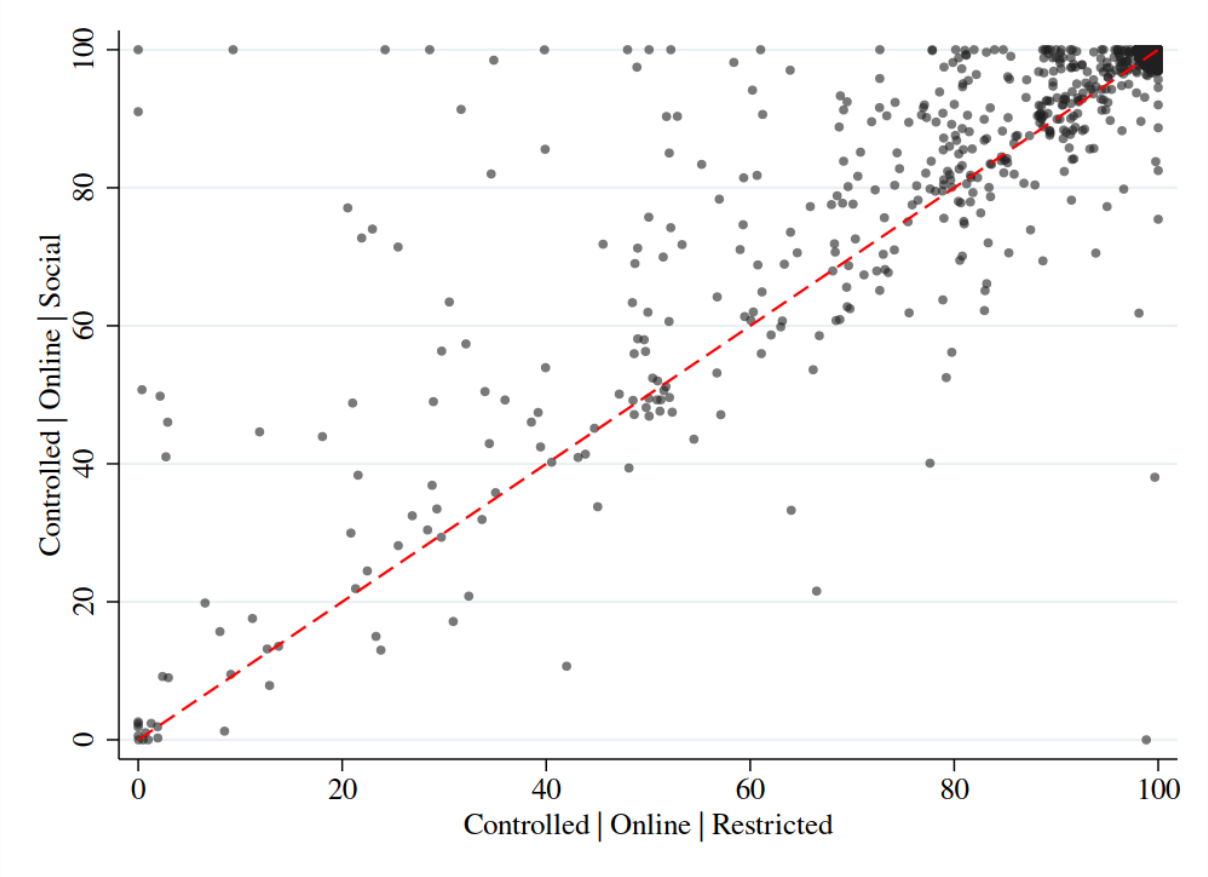
Notes:

Figure 2: Mean Likelihood Return



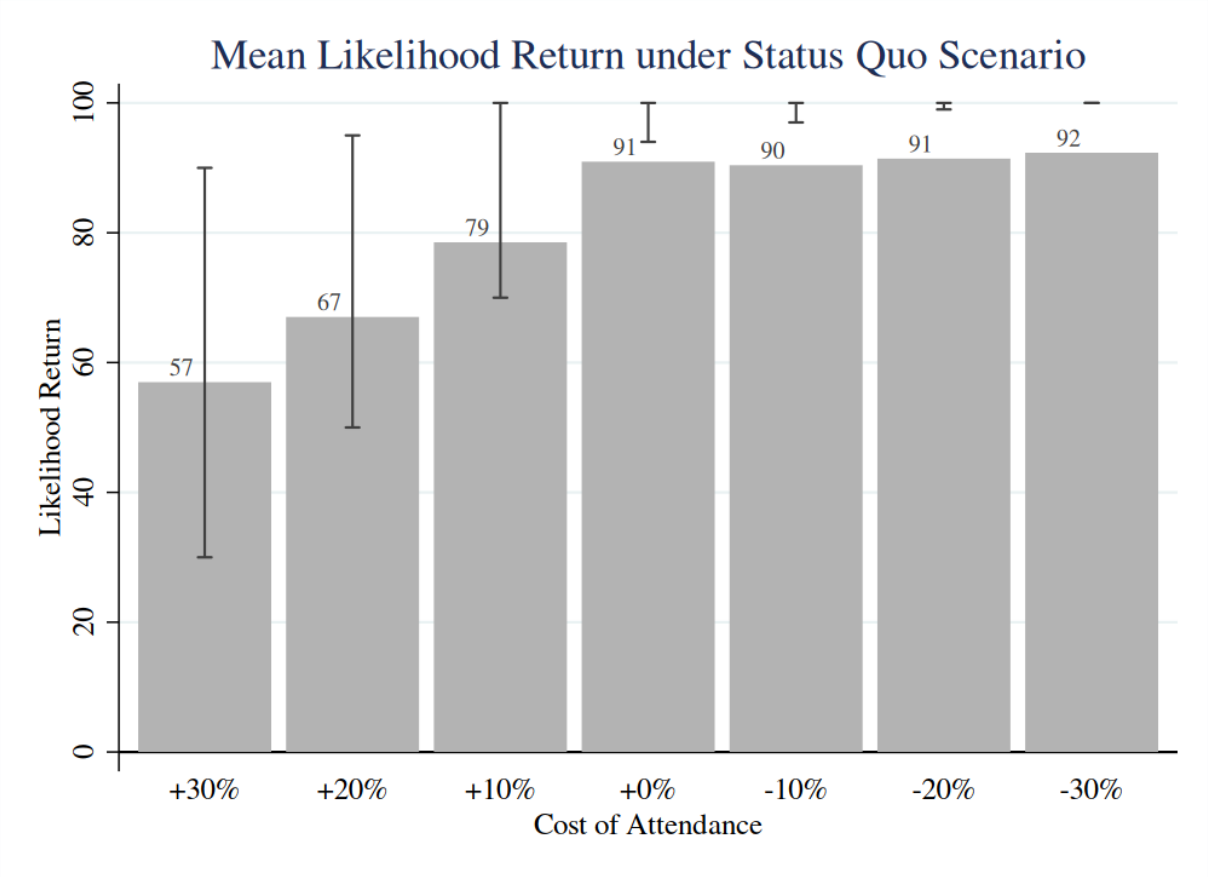
Notes: Fe: Female, Ma: Male, LoI: Lower Income, HiI: Higher Income, NHo: Non-Honors, Ho: Honors

Figure 3: Likelihood Return under Current Prices



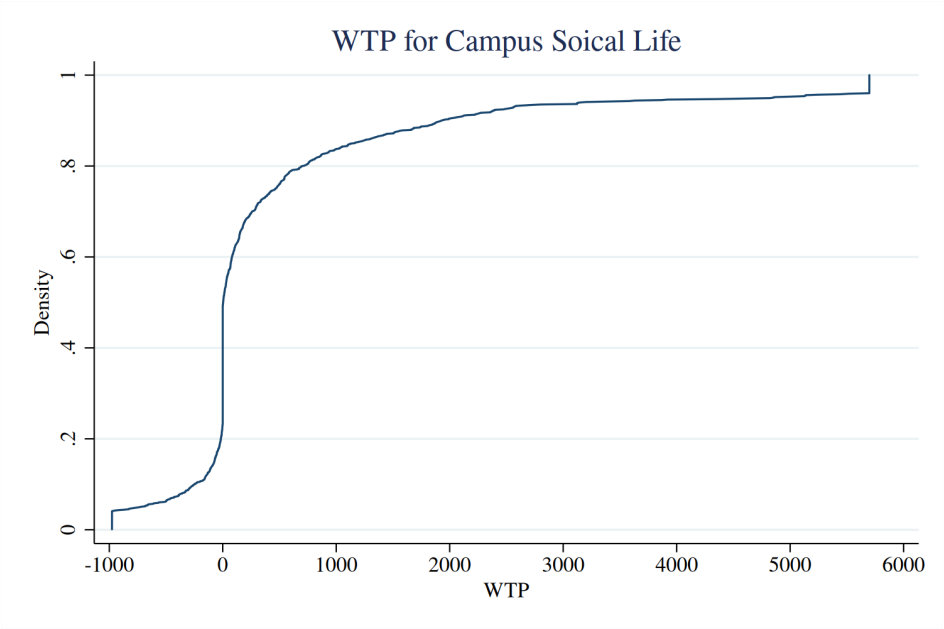
Notes:

Figure 4: Mean Likelihood Return

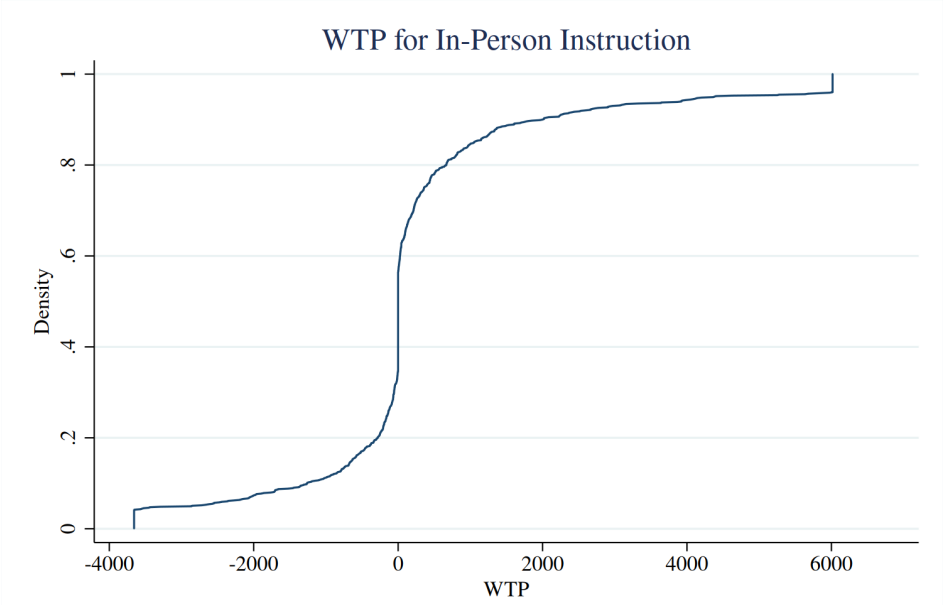


Notes: I bars represent IQR.

Figure 5



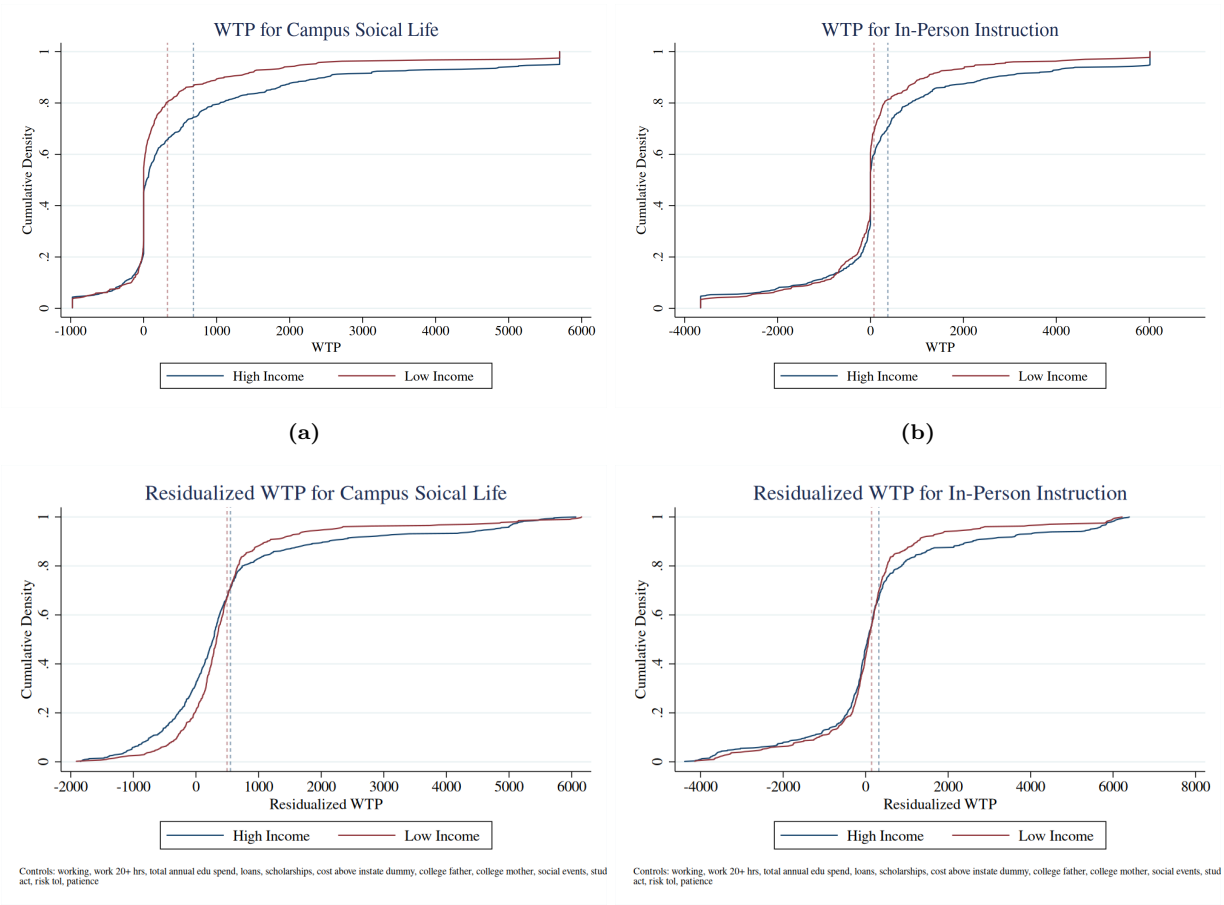
(a)



(b)

Notes:

Figure 6



Notes:

1 Appendix

Table A1: WTP Estimates

	N	Avg. Cost	WTP No COVID	p-value	WTP Vaccine	p-value
All	933	6,173	2,211 (116) [35.82%]		1,657 (110) [26.85%]	
Females	476	6,250	2,469 (122) [39.51%]	0.001	1,657 (101) [26.51%]	0.977
Males	457	6,093	1,976 (93) [32.44%]		1,653 (87) [27.12%]	
Lower Income	407	3,597	1,767 (90) [49.14%]	0.000	1,433 (82) [39.83%]	0.017
Higher Income	526	8,167	2,508 (115) [30.71%]		1,741 (99) [21.32%]	
First Gen.	342	3,339	1,335 (82) [39.97%]	0.000	1,051 (74) [31.48%]	0.000
Second Gen.	591	7,813	2,748 (110) [35.18%]		2,003 (96) [25.64%]	
Nonwhite	351	5,211	2,495 (136) [47.88%]	0.008	2,010 (118) [38.58%]	0.000
White	582	6,753	2,061 (91) [30.51%]		1,462 (81) [21.64%]	
Non-honors	695	5,839	2,003 (83) [34.30%]	0.000	1,465 (73) [25.09%]	0.000
Honors	238	7,150	2,944 (173) [41.17%]		2,345 (151) [32.80%]	

Notes: WTP reported in dollars. Standard errors in parentheses derived via delta-method. WTP as a percent of average cost in brackets. Sample includes scenarios 1-6.

Table A2: WTP Estimates: Exclude 0 Likelihood Scenarios

	N	Avg. Cost	WTP In Person	p-value	WTP Social	p-value	WTP No COVID	p-value	WTP Vaccine	p-value
All	933	6,354	339 (127) [5.34%]		474 (122) [7.47%]		1,898 (137) [29.88%]		1,415 (137) [22.27%]	
Females	476	6,463	377 (107) [5.84%]	0.599	398 (95) [6.15%]	0.282	2,215 (133) [34.28%]	0.000	1,601 (119) [24.78%]	0.025
Males	457	6,241	304 (89) [4.87%]		532 (81) [8.52%]		1,623 (103) [26.01%]		1,254 (100) [20.09%]	
Lower Income	407	3,744	138 (77) [3.68%]	0.002	247 (70) [6.61%]	0.000	1,445 (92) [38.59%]	0.000	1,217 (89) [32.51%]	0.094
Higher Income	526	8,311	543 (108) [6.53%]		699 (95) [8.41%]		2,201 (129) [26.48%]		1,464 (117) [17.61%]	
First Gen.	342	3,416	77 (74) [2.26%]	0.000	206 (68) [6.03%]	0.000	1,171 (88) [34.29%]	0.000	1,008 (84) [29.52%]	0.000
Second Gen.	591	7,957	535 (100) [6.72%]		660 (88) [8.29%]		2,276 (119) [28.61%]		1,560 (109) [19.61%]	
Nonwhite	351	5,370	116 (120) [2.17%]	0.018	572 (109) [10.65%]	0.271	2,458 (147) [45.77%]	0.000	1,961 (134) [36.52%]	0.000
White	582	6,940	464 (85) [6.69%]		426 (76) [6.14%]		1,590 (101) [22.91%]		1,110 (95) [16.00%]	
Non-honors	695	6,004	319 (77) [5.31%]	0.709	374 (69) [6.23%]	0.002	1,724 (93) [28.72%]	0.000	1,306 (88) [21.75%]	0.017
Honors	238	7,309	383 (153) [5.24%]		838 (135) [11.47%]		2,447 (178) [33.48%]		1,739 (159) [23.80%]	

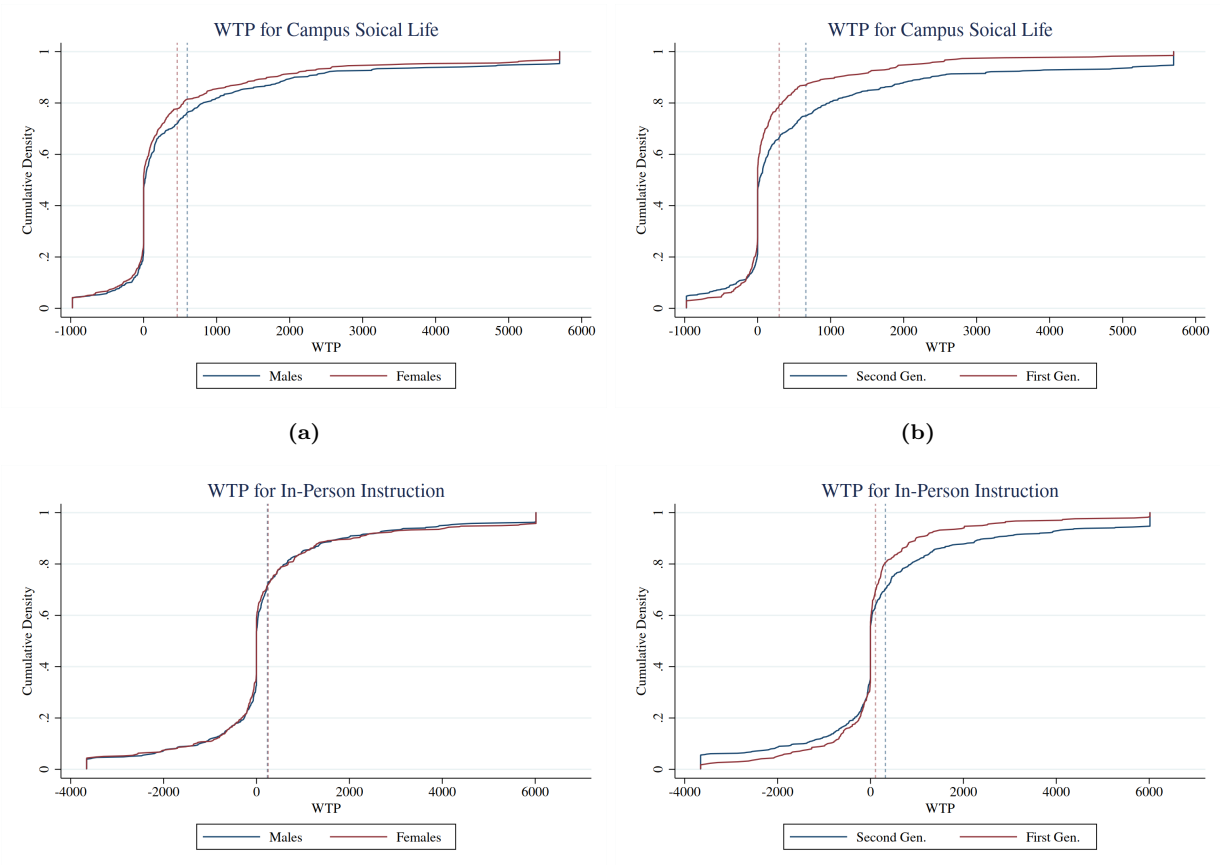
Notes: Sample restricted to scenerios with positive subjective likelihood. WTP reported in dollars. Standard errors in parentheses derived via delta-method. WTP as a percent of average cost in brackets.

Table A3: WTP Estimates: Include One Failed Check Obs

	N	Avg. Cost	WTP In Person	p-value	WTP Social	p-value	WTP No COVID	p-value	WTP Vaccine	p-value
All	1,150	6,267	271 (108) [4.33%]		517 (105) [8.25%]		2,112 (109) [33.71%]		1,583 (104) [25.25%]	
Females	582	6,016	301 (96) [5.01%]	0.651	360 (86) [5.99%]	0.011	2,280 (111) [37.90%]	0.024	1,544 (93) [25.66%]	0.558
Males	568	6,524	243 (85) [3.73%]		654 (76) [10.02%]		1,957 (91) [30.00%]		1,617 (85) [24.79%]	
Lower Income	513	3,528	11 (69) [0.31%]	0.000	289 (64) [8.18%]	0.000	1,526 (77) [43.26%]	0.000	1,244 (71) [35.27%]	0.000
Higher Income	637	8,473	593 (103) [7.00%]		744 (89) [8.78%]		2,581 (114) [30.46%]		1,789 (99) [21.11%]	
First Gen.	436	3,467	69 (74) [1.99%]	0.001	226 (68) [6.52%]	0.000	1,311 (80) [37.81%]	0.000	1,071 (73) [30.89%]	0.000
Second Gen.	714	7,977	450 (93) [5.65%]		749 (82) [9.39%]		2,669 (105) [33.46%]		1,902 (92) [23.85%]	
Nonwhite	445	5,331	109 (111) [2.05%]	0.059	502 (99) [9.42%]	0.841	2,568 (127) [48.17%]	0.000	2,010 (110) [37.71%]	0.000
White	705	6,858	365 (78) [5.33%]		526 (70) [7.68%]		1,859 (86) [27.11%]		1,343 (77) [19.58%]	
Non-honors	878	6,025	240 (72) [3.98%]	0.290	436 (65) [7.24%]	0.003	1,976 (80) [32.80%]	0.000	1,446 (71) [24.01%]	0.000
Honors	272	7,048	402 (135) [5.70%]		837 (116) [11.88%]		2,642 (153) [37.48%]		2,110 (134) [29.94%]	

Notes: Sample restricted to scenerios with positive subjective likelihood. WTP reported in dollars. Standard errors in parentheses derived via delta-method. WTP as a percent of average cost in brackets.

Figure A1

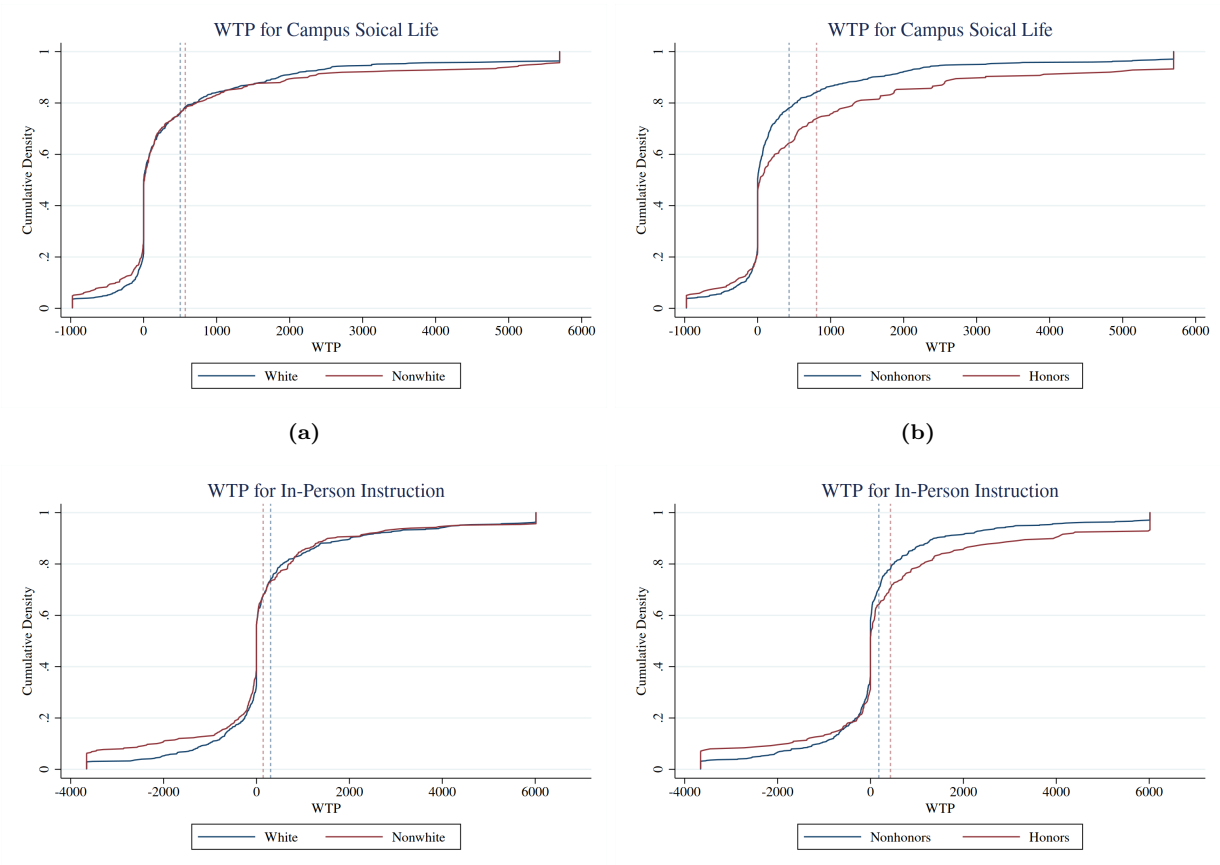


(a) **(b)**

(c) **(d)**

Notes:

Figure A2



Notes: