Experimental Evidence on Consumption, Saving, and Family Formation Responses to Student Debt Forgiveness

You've expressed explicitly your contempt for matrimony

You've student loans to pay and will not risk the alimony

--Alvvays, "Marry Me Archie"

According to a recent report from the Federal Reserve, the national student debt level in the 4th quarter of 2020 was 1.7 trillion dollars spread across 45 million borrowers (Federal Reserve, 2020). At the same time, over a million student loans enter default each year—affecting a total of nine million borrowers and their families (Hanson, 2020). Student debt has been associated with individual hardships such as bankruptcy (Gicheva & Thompson, 2015), financial distress (Achuleta, Dale, & Spann, 2013; Despard et al., 2016), lower rates of home-ownership (Mezza, Ringo, Sherlund, & Sommer, 2015), and even delays in family formation (Bozick & Estacion, 2014). However, the effects of student debt are not only experienced by the individuals who have incurred it. Rather, the effects of student debt are experienced by non-borrowers as well. For example, Bahadir and Gicheva (2019) found that higher student debt-to-income ratios caused a reduction in state-level consumption. Given the size and breadth of student debt holding, the burdens it can have on individuals and communities, and the potential to address student loan burdens through executive—rather than legislative—action (Minsky, 2022), student debt forgiveness has received increasing attention from policymakers, the media, researchers, and advocacy groups in recent years.

When considering how much to forgive, policy-makers typically focus on universal forgiveness amounts. For example, President Biden recently called for $10,000 in student debt forgiveness, while others, such as Senator Warren, have called for as much as $50,000 in debt

forgiveness. More progressive members of Congress have even called for total debt forgiveness, which would represent a larger amount of spending than the cumulative spending on unemployment insurance over the last 20 years (Looney, 2021). In a recent poll from the Center for Responsible Lending, 63% of respondents supported permanently reducing student loan debt by $20,000, suggesting that some of the policy propositions at play do have broad support across the population (Barnard, 2020).

As policy-makers grapple with whether or not to forgive student debt, for whom to forgive it, and how much to forgive, it is important to explore how student debt forgiveness would relate to household decisions and behaviors. This will allow policymakers to understand what types of burdens would be relieved, as well as what types of opportunities might be pursued, in the absence of student debt. This also helps contextualize student debt forgiveness within a broader array of policy options aimed at relieving economic hardships. With few opportunities to leverage natural experiments on debt forgiveness, we conducted a survey experiment aimed at understanding student debt holders' sensitivity to different levels of student debt forgiveness. In this experiment, which was embedded in a national survey conducted during the COVID-19 pandemic, we asked participants with student debt to imagine a scenario in which the federal government forgave a certain amount of student debt. We then had these participants report on how this would affect their behavioral intentions across an array of consumption, savings, employment, and family formation behaviors. 1,053 participants were randomly assigned to one of four conditions that featured different levels of student debt forgiveness: $5,000; $10,000; $20,000; and all student debt forgiven. Participants could then select different behaviors they expected to undertake if their student debt were forgiven. The response options were intended to capture a wide range of

experiences like working less, changing purchasing behaviors, having children or getting married, saving for different purposes, or returning to school.

Our results demonstrate how extensively student debt affects debt holders' intentions. Specifically, responses to the experiment indicate that respondents perceive that their student debt is influencing behaviors that can have large implications for household economic stability (e.g., emergency savings) and mobility (e.g., saving for a down payment on a home). These results also demonstrate that the amount of student debt forgiveness matters. In particular, setting a student debt forgiveness target too low may not lead to broad-based changes in households' economic behaviors.

Finally, when considering that larger amounts of student debt, as well as household income, may be associated with different financial circumstances, we recognize that the association between debt relief and behaviors may vary across levels of student debt and income. Thus, we interact the treatments with the actual amount of student debt held by individuals, as well as their household income. Here, we find that the proportion of student debt forgiven and the income of the borrower alter the relationships between the amount of debt forgiven and intended behaviors.

Background: Framing Student Debt Forgiveness

Proponents in favor of student debt forgiveness suggest that cancellation could have net benefits for both individuals and the communities in which they live. Recent empirical research and economic models associate student debt forgiveness with increased geographic mobility, income, and GDP and decreased unemployment (DiMaggio, Kalda, & Yao, 2019; Fullwiler, Kelton, Ruetschlin, & Steinbaum, 2018). Proponents also suggest that student debt forgiveness could also help close the racial wealth gap, as Black borrowers tend to have both higher levels of debt and higher rates of default than White borrowers (The Institute for College Access & Success,

2019). While student loans purportedly offer avenues for educational attainment and income growth for low-income Black students, the debt risk carries very different returns for these borrowers. For example, Black borrowers are at greater risk of "predatory" student debt, such as private loans offering less favorable loan terms due to lower income and wealth, are more likely to attend for profit colleges, and have lower college completion rates (Seamster & Charron-Chénier, 2017). Black, as well as Latinx and Asian students, have also been found to have higher debt-to-income ratios when compared to white students (Baker, 2019), which can strain household finances, and limit asset accumulation. Here, debt forgiveness is not only about relieving hardships, but also about removing barriers to wealth accumulation (Hamilton & Zwede, 2019).

However, some economic models, such as Sylvain and Yannelis (2021) suggest that the loan balances of low-income individuals can actually overstate the value of future payments and suggest that other options, such as income-driven repayment plans that often require no payments from low-income households would be the least expensive and the most progressive policy option. The progressivity of this approach would further increase if policymakers took steps to reduce enrollment barriers (see Mueller & Yannelis, 2019a). Skeptics of student loan forgiveness also argue that forgiving debt may cause a moral hazard for future borrowers, who may expect their debt to be forgiven, while also incentivizing higher education institutions to further increase prices without repercussions from consumers (see Cooper, 2019). Furthermore, skeptics often argue that these student debt forgiveness plans tend to be unfair, as the breaks do not apply to previous debt-holders who paid off their student loans (Baum, 2020).

Moreover, the conversations around student debt forgiveness not only focus on *if* student debt should be forgiven but also *who* should get their student debt forgiven and *how much* should be forgiven. When considering *who* should get their student debt forgiven, two core perspectives

emerge each with their own set of philosophical underpinnings. Those in favor of *universal* debt forgiveness tend to see higher education as a public good that should be financed in the same way that we finance K-12 education. Those embracing this "Enlightened Society" perspective (see Bokat-Lindell, 2021)—where all individuals have the freedom to pursue higher education without repercussion—tend to see fewer distinctions between better- and worse-off borrowers, as higher education should be free for all. Forgiving existing student debt is seen as the first step toward this vision.

Conversely, those in favor of *targeted* debt forgiveness tend to see loan cancellation as a way to address economic injustices for worse-off borrowers. Stemming from a "Credentialed Society" perspective (Bokat-Lindell, 2021)—where workers buy more education to qualify for the same jobs despite stagnant wages and rising costs (Collins, 1979)—higher education is seen as having heterogeneous effects. For some, the benefits of higher education far outweigh the costs (e.g., increased earnings outpace debt payments); for others, the inverse is true—especially when considering those who aren't able to graduate, or those with "non-degreed debt" (see Jabbari, Despard, Kondratjeva, Grinstein-Weiss, & Gupta, 2020). Those in favor of targeted debt relief also point out the importance of understanding who owes what. For example, households in the top 40% of income hold almost 60% of the total debt (Baum & Looney, 2020). These households also make 75% of all student debt payments. Alternatively, households in the bottom 40% of income only hold 20% of the outstanding debt and make just 10% of all payments. At the same time, households with graduate degrees owed nearly half of all student debt in 2016. As those who owe the most tend to have the highest incomes and lowest rates of default, proponents of targeted approaches argue that these individuals are not in need of debt forgiveness. As universal approaches tend to be more expensive, proponents of targeted approaches also note fiscal tradeoffs,

as the money used to pay off the "luxuries" of higher earners could instead be used to help lower earners meet basic needs, such as food and housing. In order to better understand the implications of debt forgiveness, we review the research on student debt, student debt forgiveness, and household behaviors.

Literature Review

Student Debt and Household Behaviors

In 2009, Americans collectively owed $772 billion in student loans. By 2019, that number had more than doubled to $1.6 trillion (Hess, 2019). Rising levels of student debt have significant implications for young adults' career and economic behavior, which in turn affects their personal wellbeing, family formation, and economic consumption (Bahadir & Gicheva, 2019). For example, graduates with student debt enter the job market sooner after graduation, are more likely to take jobs unrelated to their major, have lower incomes than their peers without debt (Weidner, 2016), and are less able to launch small businesses (Ambrose et al., 2015) or complete graduate school (Fos et al., 2017). It is unsurprising then that borrowers report lower job satisfaction (Luo & Mongey, 2019). Black borrowers are additionally burdened by persistent job discrimination and wage inequality making them more likely to carry higher debt-to-income rations (see Baker, 2019) and default on their loans (The Institute for College Access & Success, 2019).

Lower net income as a result of student debt, in turn, affects a borrower's housing options. For example, higher levels of debt increase the likelihood that young adults will return to live with their parents (Houle & Warner, 2017; Zhang, 2021). When comparing two cohorts in the National Longitudinal Study of Youth—those born 1965-1974 (NLSY79) and those born 1980-1984 (NLSY97)—Zhang (2021) finds that student debt accounts for 46% of declining homeownership rates. This effect may be greatest for Black young adults (Houle & Warner, 2017). When a

borrower fails to complete college, every $1,000 in student debt decreases their likelihood of homeownership by 5.6% (Gicheva & Thompson, 2015). Overall, households with student debt have half the average home equity of those without (Elliott et al., 2013b).

Student borrowers often struggle to accumulate other assets beyond homeownership. For example, when graduates carry student loans, they have less retirement savings than their peers without debt, even after controlling for income (Elliott et al., 2013a). Median household net worth in 2009 for households with student debt was $174,000 compared to $207,000 among households without debt (Elliott et al., 2013c). Lower savings rates may help to explain why student borrowers also have higher rates of bankruptcy, even though student debt cannot be discharged (Maggio et al., 2019). Utilizing data from the nationally representative Survey of Consumer Finances, Gicheva and Thompson (2015) find that every $1,000 in student debt increases the likelihood of filing for bankruptcy by 0.8% for all borrowers and 3.8% among borrowers who did not complete a bachelor's degree.

Student debt also carries significant mental health implications, especially for borrowers of color. Among college students, carrying student debt is associated with higher levels of financial anxiety (Archuleta et al., 2013). However, this significance disappears after controlling for demographic variables. Further, young Black borrowers are at greater risk of sleeping difficulties than White or Latino borrowers, even after controlling for socioeconomic and occupational differences and the presence of children in the home (Walsemann et al., 2015). This phenomenon may be at least partially explained by the fact that Black students owe significantly more in student loans than their White classmates (Addo et al., 2016).

The racial disparity in educational debt persists even after controlling for parental income (Grinstein-Weiss et al., 2016), but is greatest when controlling for parent net worth (Addo et al.,

2016). At all income levels, Black families have lower net worth than White families because asset accumulation is generational and therefore impacted by decades of discrimination (Darity et al., 2018). As a result, Black families have less overall savings to contribute to their children's college education even though they are more likely to contribute to their children's education at lower income levels (Nam et al., 2015). When parents take on loans to help pay for their children's higher education, they too are at higher risk of depression and poorer mental health (Walsemann et al., 2020).

Across all races, student debt plays an important role in family formation behavior. Among borrowers over age 29, Gicheva (2012) finds that every $10,000 in student debt decreases the likelihood that the borrower is married by 7%. However, the relationship between student debt and marriage is complex as it is also tied to cultural mores around cohabitation. Addo et al. (2019) also compared the '79 and '97 cohorts of the National Longitudinal Study of Youth, finding that while the likelihood of being married by age 34 declined overall among the younger cohort (likely reflecting cultural changes in attitudes towards marriage and cohabitation), student debt had differing effects on generational marital decisions. While women with student debt in the older cohort were less likely to marry or cohabitate, student debt among younger women only decreased the likelihood of marriage, but not cohabitation. Among men, student debt actually increased the likelihood of marriage for the older cohort but had no effects on younger men. Analyzing these same two cohorts, Zhang (2021) estimates that rising student debt accounts for 17% of the difference in marital rates and declining wages accounts for another 18%.

Student Debt *Forgiveness* and Household Behaviors

In 2009, when student loan default rates soared due to the Great Recession, President Obama signed the Income Based Repayment Program (IBR), alternatively called Income Driven

Repayment (IDR), which capped federal student loan payments at 15% of the borrower's income. This ratio was reduced further to 10% in 2010 (Slack, 2012). Overall, the policy reduced default rates and insulated program participants from fluctuating home prices in the two years following passage (Mueller & Yannelis, 2019b). IDR participants are also more likely to own a home, move to a high-income zip code (Herbst, 2019), and engage in higher consumer spending (Mueller & Yannelis, 2019). Weidner (2016) predicts that IDRs improve borrower incomes by an average of 3.5%.

Increasingly, however, advocates are calling for more radical student loan *cancellation* programs, rather than repayment schemes. There is limited but growing evidence that debt cancellation would have further positive microeconomic and macroeconomic effects. For example, Maggio et al. (2019) exploited a series of lawsuits in which defaulted student debt was discharged by an average of $7,901 per borrower. After the discharge, borrowers were more likely to take on new jobs, relocate, and had higher incomes. Researchers at the Levy Institute of Bard College modeled the macroeconomic effects of full student debt cancellation (Fullwiler et al., 2018). They estimate that student debt cancellation could increase the GDP by more than $1 trillion over a ten year period, create 1.2 to 1.5 million new jobs, and reduce unemployment. Further, they estimate minimal effects to inflation and government deficits.

However, researchers differ on the most equitable debt forgiveness scheme. Catherine and Yannelis (2020) argue that full cancellation would disproportionately benefit high-income earners. They find that Black and Hispanic borrowers gain more overall debt reduction than White borrowers through income-driven schemes. Conversely, examining data from the 2016 Survey of Consumer Finances, Steinbaum (2019) compared the effects of Senator Warren's $50,000 student

debt cancellation proposal to Senator Sander's full cancellation proposal and predict that full cancellation would more effectively close the racial wealth gap.

Much of the aforementioned research on student debt forgiveness examines household impacts in certain limited instances of forgiveness or by simulating the balance sheet impacts of various forgiveness proposals. In this study, we examine the issue from an alternate perspective by leveraging a survey experiment designed to test how student debt holders would respond to varying levels of student debt forgiveness. Furthermore, it is important to note that much of the current research on student debt and household behaviors takes into account the amount of student debt and the amount of income. In fact, some of the current policies, such as IDR, take into account the amount of income in determining the amount of relief offered (i.e., through reduced payments). Therefore, to better understand these factors in light of debt relief, we also interact varying levels of student debt forgiveness with both student debt and income levels.

Methods

Study Design

The survey experiment in this study was embedded in the Socio-Economic Impacts of COVID-19 Survey (Roll, Bufe, Chun, & Grinstein-Weiss, 2021), which was a five-wave survey administered over the first year of the COVID-19 pandemic by researchers at Washington University in St. Louis. In this survey experiment, respondents who reported that they had any student debt were asked the following question:

> "Suppose the federal government forgave up to **$X** of your student debt. How would this affect your financial decisions and behaviors? Select all that apply."

Respondents were randomly assigned to see one of four possible values of debt forgiveness in this hypothetical question: $5,000; $10,000; $20,000; or "all" (i.e. "…the federal government

forgave all your student debt"). Of these potential values, we treat the $5,000 debt forgiveness condition as the primary reference group, as this value is roughly half of the lowest amount of debt forgiveness being considered in any of the major debt forgiveness proposals, and comparing responses to higher levels of debt forgiveness thus allows us to assess the sensitivity of respondents' behavioral intentions to the amount of debt forgiven. The $10,000 condition corresponds to the stated policy position of the Biden administration, the total debt forgiveness condition corresponds to the proposal of Senator Sanders, and the $20,000 condition represents a middle value between the two intended to assess the sensitivity to increasing values of forgiveness. In addition, $20,000 represents the point at which debt forgiveness policies would impact the majority of borrowers, as it would forgive the entire loan balance of more than 50% of borrowers (U.S. Department of Education, 2021).

Respondents were then presented with a randomly-ordered list of different options for how their behaviors might change if their debt were forgiven. These options included: (1) "I would work less;" (2) "I would pay down other debts;" (3) "I would purchase more and/or better food;" (4) "I would move to a better home;" (5) "I would spend more on entertainment (e.g., restaurants, bars, vacation);" (6) "I would get married;" (7) "I would make more large purchases;" (8) "I would have a child (including through adoption);" (9) "I would save more for emergencies;" (10) "I would start a business;" (11) "I would start or grow a college fund;" (12) "I would return to school;" (13) "I would save more for retirement;" (14) I would save for a down payment on a home;" and (14) "Other." Respondents could select multiple of these options. For the purposes of this analysis, we exclude the "Other" responses from the study and combine the options for getting married and having a child to capture a general family formation response.

Assumptions

Our study design rests on two core assumptions. First, we assume that—*under the hypothetical scenarios we present*—participants have formed rational expectations about future behaviors. This assumption has been demonstrated in previous research. Most notably, Fuster, Kaplan, and Zafar (2021) use survey experiments that include hypothetical scenarios in which individuals receive unexpected sums of money. Similarly, Fuster and colleagues use randomized differences in amounts to ascertain the effects of money on future behaviors. Indeed, this analytic approach, often referred to as the "reported preference approach" has been widely used in research on financial circumstances, including college choices (Delevande & Zafar, 2019) and workplace preferences (Mas & Pallais, 2017). Moreover, this approach has also been used to understand the impact of potential policies on household spending behaviors, such as Universal Basic Income (Hamilton, Despard, Roll, Bellisle, Hall, & Wright, 2021).

Second, we assume that these rational expectations will match *actual* future behaviors. This assumption has also been demonstrated in previous research. For example, recent research by Wiswall and Zafar (2021) demonstrate how future career and family expectations influence college major choices and that these choices forecast later career and family outcomes. Within an experimental context, Chang, Lusk, and Norwood (2009) found that responses to hypothetical prompts around intended food purchasing behaviors were strongly predictive of actual food purchases. These prior studies indicate that study participants' stated responses to a hypothetical student debt forgiveness policy are proxies for their actual responses to forgiveness, even if there is not a perfect link between stated behavioral intentions and actual future behaviors. We also took steps to create an environment that would solicit self-reports from participants that are more likely to lead to actual behaviors. Specifically, we included a survey pledge at the beginning of

the survey that asked participants to confirm that they would provide accurate responses: *Do you commit to providing your thoughtful and honest answers to the questions in this survey?* Information was only used for participants that responded: *I will provide my best answers.* Honesty priming tasks such as this have been shown to reduce response bias in hypothetical choice experiments and thereby improve their external validity (de-Magistris, Gracia, & Nayga Jr., 2013). We also engaged in a number of data scrubbing techniques to ensure high quality responses, such as removing participants that skipped a large portion of questions or completed the survey in an implausibly short period of time. We also re-affirmed participant anonymity throughout the online survey in order to avoid desirability bias (see Bagozzi et al., 1998). At the same time, we also acknowledge that there will likely be a gap between stated and actual behaviors due to individual cognitive biases (e.g., Bagozzi et al., 1998; Klein, Babey, & Sherman, 1997; Sun & Morwitz, 2010) as well as from external factors like unexpected financial shocks (e.g., Mendenhall et al. 2012). While this is not a risk to the internal validity of the study, caution is still warranted when considering the generalizability of the study. We discuss these and other limitations in more detail below.

Finally, due to the nature of the experiment and the fact that $5,000 is the lowest of the debt forgiveness categories (and therefore the closest to $0), we treat this category as the primary reference group in our study. Nevertheless, we recognize that there are some benefits in this condition—that forgiving a relatively small amount of student debt is still better than forgiving no student debt at all.

Data and Sample

Data for this study come from Wave 4 of the Socio-Economic Impacts of COVID-19 Survey, which was administered between February 4, 2021 and March 18, 2021 through

Qualtrics online panels. The survey sample was constructed using a quota-based sampling procedure that ensured the sample would reflect the U.S. population in terms of gender, age, race/ethnicity, income, and age.[1] In total, the survey had a 13.5% response rate,[2] and after exclusions due to quota requirements and non-response, 4,893 respondents completed the survey. Of these respondents, 1,053 reported that they held student debt and thus participated in the survey experiment.

[INSERT TABLE 1 ABOUT HERE]

Table 1 presents the descriptive statistics for respondents assigned to each of the student debt forgiveness conditions. There were no significant differences between the groups on any of the measured characteristics, indicating that the randomization was successful. On average, student debt holders in this study were around 37 years of age, had incomes of around $66,000 in 2019, and had 0.8 kids. 52% of participants were male; 56% were white, 19% were Black, 18% were Hispanic, and 7% were Asian or another race/ethnicity; 60% were married or living with a partner; and 33% were full-time students and 9% were part-time. Additionally, at the start of the pandemic, 50% were repaying student debt, 17% were delinquent or in default, and 33% had student debt payments in deferment or forbearance. Our sample held around $27,000 in student debt, with 43% holding $5,000 or less in debt, 10% holding between $5,001 and $10,000, 12% holding between $10,001 and $20,000, 19% holding between $20,001 and $50,000, and 16% holding more than $50,000 in debt.

[1] Research has demonstrated that online, non-probability samples using Qualtrics panels generate samples that closely approximate those of the General Social Survey, which is considered the gold standard in survey administration (Zack et al., 2019).

[2] Response rates were calculated using the American Association of Public Opinion Research's RR2 measure (American Association for Public Opinion Research, 2016).

To examine the extent to which our study sample was reflective of the broader population of student debt holders in the U.S., we compared our sample to student debt holders who participated in the Federal Reserve's nationally representative Survey of Household Economics and Decisionmaking (see Appendix A). We find that our sample of student debt holders is similar to the U.S. population as a whole in terms of age, income, race/ethnicity, gender, family structure, and student debt amount. However, our survey does have substantially higher rates of full-time students (33% to 14%).[3]

Analytic Approach

As the survey experiment randomized student debt holders into four different experimental conditions, we can estimate the average treatment effects of a given level of student debt forgiveness by testing the effects of the treatment conditions against each other (e.g., the effect of $5,000 of forgiveness vs $10,000 of forgiveness, $10,000 of forgiveness vs. $20,000, or the effect of $20,000 of forgiveness vs complete debt forgiveness). We assess the significance of these effects using chi-square tests.[4]

We also explore the extent to which a household's income and student debt amount impact their responsiveness to different levels of debt forgiveness. To do this, we estimate two sets of logistic regression models of the following forms:

$$ln\left(\frac{Pr(Y_i=1)}{Pr(Y_i=0)}\right) = \beta_0 + \beta_1 Treat_i + \beta_2 Ln\_SD_i + \beta_3 (Treat * Ln\_SD)_i + X_i\delta \quad (1)$$

$$ln\left(\frac{Pr(Y_i=1)}{Pr(Y_i=0)}\right) = \beta_0 + \beta_1 Treat_i + \beta_2 Ln\_Inc_i + \beta_3 (Treat * Ln\_Inc)_i + X_i\delta \quad (2)$$

[3] Nevertheless, when applying American Community Survey weights to our sample, our estimates are highly similar to the unweighted results presented in this paper. See Appendix B for the weighted results of our main analysis.
[4] Using this pairwise comparison approach, the minimum detectable effect size we can pick up (assuming a Type I error rate of 0.05 and a Type II error rate of 0.2) is roughly 0.12, which is just slightly above the common threshold for a "small" effect size (0.1).

where the coefficient of interest, β_3, captures the interaction between the amount of student debt forgiven ($Treat_i$) and the natural log of student debt amount (Ln_SD_i) in Equation 1, and the interaction between the amount of student debt forgiven and the natural log of 2019 household income (Ln_Inc_i) in Equation 2. We focus on pre-pandemic (i.e., 2019) earnings as households' pre-pandemic earnings may be a better indicator of a household's typical income level than their income during the pandemic, which may have been influenced by short-term factors like job loss, stimulus payments, and increased unemployment benefits. *X* is a vector of household demographic and financial controls including respondent's age, logged 2019 household income (in Equation 1), logged student debt amount (in Equation 2), the number of children in the household, respondent's gender, respondent's race/ethnicity, a binary variable capturing whether the respondent was married or living with a partner, a binary variable capturing whether the respondent had a bachelor's degree or higher, a categorical variable capturing whether the respondent was currently enrolled in school on a full-time or part-time basis, and a categorical variable capturing the status of the respondent's student debt payments (e.g., delinquent/in default, in repayment, in forbearance). These control variables were chosen because they may confound the relationship between the amount of student debt forgiven and our interaction variables. For example, older households may have been in repayment longer than younger households and have higher incomes. If they are in income-driven repayment plans, they may have fewer years left of paying off their student debt before it is, in essence, forgiven through the terms of the repayment plans. Similarly, households with student debts in forbearance or default may respond differently to debt forgiveness than households currently required to make payments, but may also have lower incomes. In these instances, controlling for age or student debt repayment status allows us to better isolate the relationship between income, forgiveness

amount, and reported behaviors. For each of these models, we report both the average effects of the interactions as well as the predictive margins of the estimates at different levels of respondents' logged student debt amount or logged household income.

Results

Average Treatment Effects of Student Debt Forgiveness Amounts

In Table 2, we report how student debt holders assigned to each debt forgiveness condition said their behaviors would change if their debt were forgiven. Following our previously stated assumptions, results should be interpreted as *expected* or *stated* future behaviors, not actual behaviors. Overall, relatively few people in any condition said they would work less (between 7-8%), indicating that people generally do not plan to reduce their labor (and, presumably, their incomes) in the absence of student debt payments. On the other hand, saving for emergencies, saving for retirement, paying down other (non-student) debts, and saving for a home were commonly reported expected behaviors across treatment conditions. This pattern of results suggests that one of the primary effects of student debt is its tendency to crowd out household savings for both short- and long-term purposes and increase other household liabilities.

The results in Table 2 also demonstrate that the level of debt forgiveness matters. Compared to the $5,000 debt forgiveness condition, even the relatively modest $10,000 forgiveness condition, as proposed by the Biden administration, nearly doubled the rates of households saying that they would purchase more or better food compared (16.27% vs. 9.13%; $p < 0.05$), return to school (15.08% vs. 7.60%; $p < 0.01$), or get married/have a child (16.27% vs.

9.51%; $p < 0.05$).[5] The $20,000 forgiveness condition had slightly stronger effects than the $10,000 condition in many cases, as respondents in this condition were significantly more likely than those in the $5,000 condition to report that they would make a large purchase like an appliance (16.12% vs. 9.89%; $p < 0.05$) and save for emergencies (42.86% vs. 34.6%; $p < 0.05$). However, the results of tests comparing the $20,000 condition to the $10,000 condition (rather than the $5,000) showed no significant differences on any expected behaviors.

Turning to the complete debt forgiveness condition, we see that total debt forgiveness would lead to large and significant expected behavioral shifts relative to the $5,000 condition. The rate of respondents reporting that they would purchase more/better food more than doubles (20.00% vs. 9.13%; $p < 0.001$), while the reported rate of saving for retirement nearly doubles (44.15% vs. 23.57%; $p < 0.001$). Similarly, respondents in the complete debt forgiveness condition were more likely to report that they would spend more on entertainment (19.62% vs 11.41%; $p < 0.01$), make a large purchase (16.60% vs. 9.89%; $p < 0.05$), save for emergencies (50.57% vs. 34.6%; $p < 0.001$), and save for a down payment on a home (24.91% vs. 17.87%; $p < 0.05$). The complete debt forgiveness condition was also significantly more effective than the $10,000 or $20,000 forgiveness conditions at motivating changes in expected savings behaviors, including saving for emergencies, saving for retirement, and saving for a down payment on a home.

Of note, though paying down other debts was the most commonly-reported expected behavior that participants in any condition reported they would engage in, it was also a behavior that was insensitive to the amount of debt forgiven. This may indicate that, regardless of the debt

[5] As a robustness check, we ran additional logistic regression analyses that estimating the relationship between debt forgiveness and getting married/having a child while controlling for marital status and the presence of children. These results did not differ notably from our original results. Results available upon request.

forgiveness offered, people would be likely to shift their savings on their student debt payments into other debt payments as a first priority. We also observe that some of the relationships between debt amount and expected behavioral changes were non-linear. For example, reported intentions to return to school were significantly different for the $10,000 relative to the $5,000 condition, but not for the $20,000 and All Debt Forgiven conditions, which are only directionally more effective at driving this behavior relative to the $5,000 condition. Even though "select multiple" question types do not force respondents to make choices between stated behavioral changes, it is possible that respondents intuitively do this in some cases, such that higher amounts will open up greater opportunities that respondents pursue instead of (not in addition to) alternative opportunities. For instance, those in $20,000 condition may be more likely to make a large purchase than those in the $10,000 condition (who cannot afford a large purchase with their money), which may in turn make those in the $20,000 condition feel that they are less able to start a business, as that money is already theoretically spent. At the same time, given the lack of statistically significant differences between the $10,000 and $20,000 conditions, caution is warranted when interpreting these patterns.

The Interaction between the Amount of Student Debt Forgiven and Student Debt Held

In Tables 3a and 3b, we report how the amount of student debt held interacts with the amount of student debt forgiven. In many cases, the interaction between the natural log of student debt amount held and student debt forgiven is positive and significant. This is particularly true for education-related behaviors like returning to school or saving for college. Relative to the $5,000 debt forgiveness condition, borrowers with higher student debts in higher debt forgiveness conditions have roughly 20-30% higher odds of expecting to make these behavioral changes—a

pattern that we see reflected in a slightly more attenuated fashion for emergency savings, entertainment spending, and moving/improving homes.

To explore these relationships in more detail, Figures 1a and 1b present the predictive margins of the logistic regression described in Equation 1 above, in which the student debt forgiveness condition to which respondents were assigned is interacted with the natural log of their student debt amount.[6] These results show some interesting patterns. First, we see that as their student debt held increased, participants in higher debt forgiveness conditions were generally more likely to report expecting to use forgiveness as an opportunity to save for emergencies, save for retirement, save for a down payment, or pay down other debts. In particular, respondents offered the largest amounts of debt forgiveness ($20,000 and total forgiveness) appeared very sensitive to the amount of student debt held when it came to savings and paying down debt. Interestingly, the relationship between expecting to save for college or return to school was relatively flat for the total forgiveness condition, but was relatively dynamic for those in the less generous forgiveness conditions. Those with relatively small amounts of debt were highly likely to expect to use the forgiveness to make these kinds of investments, while those with high amounts of debt were much less like to do so, as compared to those in other conditions. Rates of intended entertainment spending decreased for those in the lowest forgiveness condition as their debt increased, while entertainment spending increased for those with high debt in the full forgiveness condition. Finally, the relationship between debt forgiveness amount and expected behaviors like food purchases, moving/improving a home,

[6] For ease of illustration, we collapsed natural log values between 0 and 6—or roughly between $1 and $400—of both student debt and household income in Figures 1a, 1b, 2a, and 2b. The motivation for this is that the behavioral change associated with, say, holding $100 of student debt and $400 of debt is likely not economically meaningful. The point estimates for that value should thus be considered the average point estimate for having an income or debt about between these natural log values. We also collapsed natural log values of income and student debt greater than 12, as the highest log values of income and debt were, respectively, 12.9 and 12.2.

making large purchases, and getting married or having a child appeared relatively insensitive to student debt amount.

The Interaction between Household Income and Student Debt Forgiven

In Tables 4a and 4b, we report how the amount of household income interacts with the amount of student debt forgiven. In contrast to the student debt interactions, the most prominent effects of the income interactions are for moving and improving homes. Relative to the $5,000 debt forgiveness condition, borrowers who have higher debt amounts and receive higher amounts of forgiveness have roughly 25-35% higher odds of reporting that they would move/improve their homes. We see a similar pattern for reported rates of returning to school and, for the total debt forgiveness condition, of saving for college.

Figures 2a and 2b present the predictive margins of the logistic regression described in Equation 2 above, in which the student debt forgiveness condition to which respondents were assigned is interacted with the natural log of their 2019 household income. Interestingly, as income increases, respondents in every condition were more likely to say they would use student debt forgiveness to pay down other debts, while the patterns are much less uniformly positive for other measured behaviors. As income increases, households offered $5,000 of forgiveness become much less likely to say they would return to school or move to a better home, while this relationship is relatively flat for the other conditions. Expected rates of starting or growing a college fund decreases for those in the $5,000 forgiveness condition as their income increases, though the relationship between this behavior and income is somewhat positive in the higher forgiveness conditions. Regardless of forgiveness condition, expected rates of starting a business decline somewhat as income increases. In terms of saving for retirement, the relationship between income and both $5,000 and complete debt forgiveness was flat, while it was positive

for $10,000 and $20,000 of forgiveness. The relationship between saving for emergencies, household income, and debt forgiveness indicates that, at lower household incomes, higher amounts of debt forgiveness are strongly associated with emergency savings, but as income increases the reported rates of emergency savings for all conditions converged. There did not appear to be strong relationships between income, debt forgiveness amount, and reported intentions to save for a down payment, purchase more/better food, make a large purchase, spend more on entertainment, or get married/have a child.

In Appendix C, we examine both student debt and household income interactions using alternate specifications of debt and income. Specifically, we use a categorical measure of student debt that better corresponds to our hypothetical debt forgiveness amounts (e.g., $0-$5,000, $5,001-$10,000, etc.), and a measure of income that is indexed to the area median income in the respondent's zip code. These results are broadly similar to the results presented in the main analysis, though descriptively the relationships between income/debt amount, debt forgiveness condition, and stated household behaviors appear somewhat less pronounced and relatively flat as compared to the models using logged income/debt amounts.

Discussion

As policymakers grapple with whether to forgive student debt, who should get debt forgiveness, and how much should be forgiven, we explore how different levels of student debt forgiveness would relate to household decisions and behaviors. This allows policymakers to understand what types of burdens would be relieved as well as what types of opportunities would be pursued. In doing so, we help contextualize the student debt forgiveness debate within a broader array of policy options aimed at relieving economic hardships. While there have been experiments that examine the impact of receiving sums of money (see Fuster, Kaplan, & Zafar,

2021; Hamilton, Despard, Roll, Bellisle, Hall, & Wright, 2021), this is—to our knowledge—the first experiment to examine potential debt forgiveness scenarios. Student debt forgiveness is fundamentally different from receiving sums of money due to the unique credit and liquidity constraints associated with student debt, as well as associated behavioral biases. For example, credit constraints associated with student debt can make it more difficult to take out a home loan; recurring payments can constrain liquidity and put individuals at risk of financial hardships; and long payoff lengths can discourage family formation behaviors (Houle & Warner, 2017; Gicheva & Thompson, 2015; Jabbari, Despard, Kondratjeva, Gupta, & Grinstein-Weiss, 2020). Indeed, as the impacts of student debt are uniquely different from income, liquidity, and savings (Despard, Perantie, Taylor, Grinstein-Weiss, Friedline, & Raghavan, 2016), we can assume the impacts of student debt forgiveness will also be unique.

Thus, we embedded an experiment in a survey that asked participants with student debt to imagine a scenario in which the federal government forgave a certain amount of student debt and then asked them to report how this would affect their decisions and behaviors. 1,053 student debt holders with characteristics that broadly reflect U.S. borrowers as a whole were randomly assigned to one of four conditions that featured different levels of student debt forgiveness: $5,000; $10,000; $20,000; and all student debt forgiven.

First, we explore the variation in the outcomes across debt forgiveness groups. The results demonstrate how extensively student debt affects debt holders. The most common expected behavioral changes across all groups involved household balance sheets, including paying down other debts (44%), saving for emergencies (42%), saving for retirement (30%), and saving for a down payment on a home (20%). Additionally, we also observed that around 10% of student debt holders expected to invest in themselves or their families by returning to school, saving for college,

or starting a business if they received debt forgiveness. Conversely, and contrary to the fears of some policymakers, the least common expected behavioral change was working less (7%). These results demonstrate that student debt can limit borrowers' ability to (a) effectively manage their current financial circumstances, (b) plan for the future, and (c) invest in their own human capital. When considering reported rates of human capital investments along with the fact that relatively few respondents planned on working less, the argument can be made that debt forgiveness could not only have positive effects for borrowers—helping increase their chances of social mobility—but also that debt forgiveness could have positive externalities through increased economic productivity.

When considering differences across debt forgiveness groups, we found that larger amounts of debt forgiveness were positively associated with expecting to purchase more or better food and save for emergencies. This demonstrates the extent to which student debt may be limiting borrowers' ability to meet their basic needs. Additionally, there was some evidence that debt forgiveness could influence rates of returning to school or family formation, both of which are seen as important mechanisms for economic growth. Finally, there were some expected behavioral changes that were only associated with total debt forgiveness. These changes tended to be associated with long-term goals, such as making large purchases, moving to a better home, or saving for retirement. Here, student debt may be acting as a credit constraint or a barrier in future orientations towards savings.

Second, we interact the treatments with the actual amount of debt held by individuals and their income. Starting with student debt amounts, some policy-makers have suggested that the amount of debt held matters when considering forgiveness. Here, we find that as the amount of student debt increases, individuals with larger amounts of their student debt forgiven are more

likely to expect to pay down other debts, save for emergencies and retirement, and save for a down payment on a new home. This demonstrates that as the amount of student debt forgiven makes up a larger proportion of student debt held, borrowers with more student debt are more likely to improve their current financial situations—through debt reductions, savings increases, and long-term asset accumulation—with debt forgiveness. Conversely, as amount of student debt increases, individuals that are only forgiven $5,000 in student debt are less likely to expect to save for retirement, save for a down payment on their homes, or an invest in economic mobility than other treatment groups, indicating that targeting a forgiveness amount too low may not have substantial social mobility impacts. In other words, with student debt forgiveness, you get what you pay for. Finally, as the amount of student debt increases, individuals that have all their student debt forgiven are more likely to expect to purchase more/better food and spend more on entertainment, which may signal improved quality of life for high debt holders that are given complete debt forgiveness.

Considering borrowers' income, policy-makers have also suggested that not all debt-holders experience the same hardships, and therefore debt forgiveness should also consider their income. We find that as the amount of income increases, individuals with larger amounts of their student debt forgiven are more likely to expect to save for retirement, save for a down payment on a home, make a large purchase, and get married or have a child. This demonstrates that larger amounts of debt forgiveness may encourage higher earning borrowers to plan for the future, accumulate assets, and form families. Conversely, as the amount of income increases, individuals that only receive $5,000 of forgiveness are more likely to expect to pay down other debts and save for emergencies and less likely to save for retirement, save for a down payment on a home, move to a better home, return to school/save for college, start a business, make a large purchase, or spend more on entertainment. Here, small amounts of debt forgiveness may encourage higher earners to

reduce other areas of debt, but will not encourage them to plan for the future, accumulate assets, increase their human capital or meet other consumption goals. Additionally, as borrowers' income increases, individuals that have all of their student debt forgiven are more likely to expect to make a large purchase and spend more on entertainment, which may signal improved quality of life for high earners that are given complete debt forgiveness.

Finally, it is important to note that we also examined race/ethnicity as potential moderators with debt forgiveness by interacting race/ethnicity with debt forgiveness categories. While we did not find significant effects, it is possible that the absence of effects was due to a lack of power of our study (i.e., we did not have enough power to pick up interaction effects across four treatments and five categories of race/ethnicity). Future research should continue to explore the role of race/ethnicity in student debt and loan forgiveness policies. Recent analyses by the Roosevelt Institute (Eaton et al., 2021) suggest that full student debt cancellation would make significant strides towards closing racial wealth gaps.

Implications

Aside from philosophical considerations, implicit in policy proposals are assumptions that student debt forgiveness will reduce or remove a substantive "drag" on household finances, potentially leading to behaviors that will improve short- and long-term economic conditions and outlooks. Yet, without posing the question, there is little evidence that demonstrates how borrowers would respond to different debt forgiveness proposals. In posing this question, we offer novel insights into student debt forgiveness policies.

We find that borrowers would strengthen their household balance sheets by reducing other sources of debt and saving more. This could have far-reaching effects. For example, borrowers' debt-to-income ratios would decrease while their liquid assets would increase, which

would improve two of the most critical underwriting criteria for mortgages. In addition to saving more, we demonstrate that borrowers would further invest in themselves by returning to school or starting a business.

However, our findings suggest the amount of forgiveness should be at least $10,000 – especially for borrowers with high amounts of debt. Full forgiveness may boost emergency and retirement savings – two important federal government policy objectives reflected in key initiatives (e.g., Consumer Financial Protection Bureau's "Start Small Save Up", the "Ready" national public service campaign for disaster preparedness) and tax policies (e.g., Individual Retirement Accounts, 401k plans).

Our findings also inform ideas about different distributive schemes that frame policy choices. One approach is to support debt forgiveness as a targeted, means-tested policy. Forgiving debt would reduce repayment burden and thus create financial slack needed to smooth consumption—a natural extension of existing income-driven repayment (IDR) policy predicated on assumptions concerning ability-to-repay. In fact, forgiveness could be tacked onto existing IDR policy wherein borrowers' repayments would be set to a maximum of 10% of gross pay for a standard 10-year term with any remaining principal written off at the end of this term. This approach would help remediate a breach in the social contract of college education, i.e., that graduates will enjoy an earnings premium.

Another approach is universal and unconditional loan forgiveness. We find that higher amounts of loan forgiveness may make saving, homeownership, and family formation more likely among those with higher incomes. This approach supports policy goals of using student loan forgiveness as a tool to promote long-term household financial stability and economic growth by strengthening balance sheets and boosting demand across a wide range of borrowers.

Limitations

Nevertheless, this study is not without its limitations. First, this study creates a hypothetical scenario involving debt forgiveness and collects information on future behaviors. While stated intentions are often indicative of future behaviors in hypothetical settings (Chang, Lusk, & Norwood, 2009), discrepancies can exist between intentions and behaviors that bias forecasts (e.g., Bagozzi, 1998; Sun & Morwitz, 2010). One common approach to reducing this bias in the context of hypothetical public policies is by prompting respondents to consider the consequentiality of their decisions; for example, by informing them that their responses will be important in influencing policymakers' actions (e.g., Vossler & Watson, 2013). However, this approach is much more practical for policies decided on at the local level than a national policy like student debt forgiveness. Instead, we use an honesty prompt in our survey to prime respondents to give accurate answers, and exclude anyone who did not provide an affirmative answer to this honesty prompt from the sample. This approach has been shown to reduce bias in hypothetical choice survey (de-Magistris, Gracia, & Nayga Jr, 2013). At the same time, it is likely that the hypothetical nature of the student debt forgiveness experiment still introduces bias into our results and thus limits the external validity of our findings.

Beyond individual cognitive biases influencing these results, external factors may also lead to a discrepancy between stated intentions and actions. In the context of other public benefit policies, Mendenhall and colleagues' (2012) research on the earned income tax credit (EITC) demonstrates that external factors (e.g., unexpected emergencies and bills) can lead to gaps between intended usage of the EITC and actual usage of the credit. Thus, while our survey experiment is a necessary step in understanding how future policy options might impact policy recipients, it is important for future research on student debt forgiveness to follow up after a

policy is enacted to determine the degree to which these intentions match up with actions. Additionally, a core purpose of this study was not simply to generalize about how student debt holders will respond to forgiveness, but rather to understand the extent to which different levels of debt forgiveness lead to changes in stated behaviors. As we explored this relationship experimentally, we are confident in the internal validity of our findings.

Another limitation stems from the fact that, due to sample and survey constraints, we limited our treatment to four categories and our outcomes to binary responses of general behaviors. While Senator Warren has proposed $50,000 in student debt forgiveness, the majority of borrowers have $20,000 or less in student loans. With a limited sample, we therefore include a "total debt forgiveness" category that encapsulates those higher amounts of student debt. Thus, future research should consider additional treatment categories (e.g., $50,000) to better understand nuances the effects of debt forgiveness policies. Future research should also consider including more detailed responses (e.g., responses with defined amounts and/or timeframes) to provide a more nuanced understanding of the relationships between debt forgiveness and borrower behaviors. This study also lacked a true "control" group that received no forgiveness whatsoever, as this approach would have been conceptually difficult to implement within the context of our research questions (i.e., it is difficult to ascertain reported behavior changes to an absence of a stimulus). Rather, we used a relatively small amount of debt forgiveness ($5,000) as a reference group in our analyses, as this amount is half of the lowest amount of forgiveness commonly discussed in policy circles. Future studies could consider testing behavioral responses to even lower amounts or alternative (and less valuable) debt remediation schemes as proxies for a control group.

A final limitation comes from the fact that this study was done using an online survey conducted during the COVID-19 pandemic. Although randomization allows us to control for potential biases associated with the treatment (i.e., internal validity), it is possible that the overall relationships in this study are open to potential biases in their generalizability (i.e., external validity) both in terms of study population and survey timing. For example, the 13.5% response rate to the survey introduces the possibility of non-response bias in our findings, as does the fact that the survey was administered online, thus excluding those without any stable source of internet access. While our supplemental analyses suggest that our study sample is similar to other nationally representative datasets (see Appendix A), and while our results do not change after the application of sample weights derived from U.S. Census data (see Appendix B), these factors still limit the extent to which we can generalize our findings. Additionally, we are unable to conduct robustness checks in terms of survey timing. As many loans were in forbearance during COVID-19, it is possible that people's attitudes towards student debt may change after the forbearance runs out. However, it is important to keep in mind that all forbearance policies had relatively short time-horizons, and thus it is unlikely that borrowers would conceive these polices as long-term and adjust their perceptions of student debt forgiveness accordingly. It is also possible that the larger economic impacts of COVID-19 may limit the generalizability of the findings to times of social and economic stability. Yet, these larger economic impacts can be seen as precipitating the public discourse on student debt forgiveness policies. Here, the timeliness of this experiment in terms of the broader public discourse on debt forgiveness may be seen as outweighing the limitations in generalizability due to the unique context of the time period in which the study was conducted. Nevertheless, future research should continue to explore debt forgiveness policies after the pandemic subsides.

Conclusion

As policy-makers consider how to deal with the roughly 1.7 trillion dollars in student debt, it is important to ask what difference loan forgiveness would make in the lives of student debt holders. We answer this question through a novel survey experiment drawn from a national sample of households. These results show three things. First, confirming previous research, our results demonstrate how extensively student debt affects individuals. Overall, responses to the hypothetical forgiveness policies indicate that student debt is influencing decisions that have implications for household economic stability (e.g., emergency savings), social mobility (e.g., returning to school), as well as family formation (e.g., getting married, having a child) and economic growth (e.g., starting a business). Second, we extend the previous literature by demonstrating that the level of student debt forgiveness matters. In particular, lower amounts of student debt forgiveness may not lead to broad-based changes in households' economic behaviors, while larger amounts may yield changes in savings behaviors and human capital investments *without* leading to large changes in labor supply. Finally, our results demonstrate that the amount of student debt and the borrower's income levels matter in the relationship between debt forgiveness and household behaviors. Here, borrowers with more debt are more likely to improve their current financial situations—through debt reductions, savings increases, and asset accumulations—with larger amounts of debt forgiveness. A similar relationship exists for higher earning borrowers. By demonstrating the burdens that could be relieved, as well as the opportunities that could be pursued, our findings can inform future policy discussions for whether or not student debt should be forgiven, how much, for who, and under what circumstances.

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Table 1: Descriptive Statistics, by Experimental Condition

	$5,000 Forgiven	$10,000 Forgiven	$20,000 Forgiven	All Debt Forgiven
Characteristic		% or Mean (SD)		
Sample Proportion	24.98	23.93	25.93	25.17
Age	37.17	36.00	37.60	37.49
	(12.38)	(11.81)	(12.62)	(12.37)
Total Income in 2019 ($)	64202.59	68502.42	65486.85	64433.57
	(58358.72)	(65968.68)	(57945.53)	(60283.87)
Race/Ethnicity				
White (Non-Hispanic)	57.79	53.97	57.14	56.60
Black (Non-Hispanic)	17.49	21.83	18.32	18.87
Asian/Other (Non-Hispanic)	6.46	7.14	7.69	6.04
Hispanic	18.25	17.06	16.85	18.49
Male	54.75	50.00	50.18	51.32
Student Status				
Non-Student	55.89	53.17	61.90	60.00
Part-Time Student	10.27	7.94	9.16	9.43
Full-Time Student	33.84	38.89	28.94	30.57
Educational Attainment				
No BA	36.88	36.90	33.70	33.58
BA or Greater	63.12	63.10	66.30	66.42
Number of Dependents	0.79	0.75	0.80	0.80
	(1.06)	(0.98)	(1.07)	(1.05)
Married/Living with a Partner	60.84	61.51	59.71	60.00
Current Student Debt ($)	24732.98	27556.74	28634.94	27077.04
	(37982.06)	(44625.05)	(42366.66)	(44491.77)
Student Debt Repayment Status				
In Repayment	50.19	50.00	48.35	52.83
Delinquent/Default	14.83	17.06	18.32	17.36
In Forbearance	34.98	32.94	33.33	29.81
Observations	263	252	273	265

Note: No differences between groups are significant at the 5% level.

Table 2: Expected Behavior Change Following Student Debt Forgiveness, by Experimental Condition

	$5,000 Forgiven (a)	$10,000 Forgiven (b)	$20,000 Forgiven (c)	All Debt Forgiven (d)
Outcome		%		
Work Less	7.60	7.54	7.33	7.92
Pay Down Other Debts	47.91	43.65	42.86	43.40
Purchase More/Better Food	9.13	16.27[a]	15.02[a]	20.00[aaa]
Move to a Better Home	9.51	13.49	11.36	14.72
Spend More on Entertainment	11.41	15.48	15.75	19.62[aa]
Get Married/Have a Child	9.51	16.27[a]	13.55	13.21
Make a Large Purchase	9.89	13.10	16.12[a]	16.6[a]
Save for Emergencies	34.6	40.08	42.86[a]	50.57[aaa,b]
Return to School	7.60	15.08[aa]	11.72	11.70
Save for College	12.17	9.13	8.79	13.96
Start a Business	8.75	11.51	7.33	13.58
Save for Retirement	23.57	24.21	29.30	44.15[aaa,bbb,ccc]
Save for a Down Payment on a Home	17.87	15.48	19.78	24.91[a,bb]
Observations	263	252	273	265

'a' superscripts indicate that the outcome is significant relative to the $5,000 Forgiven group. a: $p < .05$, aa: $p < .01$, aaa: $p < .001$

'b' superscripts indicate that the outcome is significant relative to the $10,000 Forgiven group. b: $p < .05$, bb: $p < .01$, bbb: $p < .001$

'c' superscripts indicate that the outcome is significant relative to the $20,000 Forgiven group. c: $p < .05$, cc: $p < .01$, ccc: $p < .001$

Table 3a. The Interaction between Student Debt Forgiveness, Student Debt Held, and Expected Behavior Change (Logistic Regression)

	Work Less	Pay Other Debts	Food	Move / Improve Home	Entertain-ment	Marriage / Child	Large Purchase
Experimental Condition (Ref = $5,000 Forgiven)							
$10,000 Forgiven	1.213	1.493	2.663	0.496	0.693	1.336	0.598
	(0.783)	(0.740)	(1.686)	(0.298)	(0.406)	(0.773)	(0.414)
$20,000 Forgiven	0.352	0.233*	1.919	0.497	0.426	1.389	1.279
	(0.254)	(0.139)	(1.258)	(0.299)	(0.263)	(0.813)	(0.803)
All Debt Forgiven	0.710	0.547	1.288	0.446	0.447	1.158	0.614
	(0.463)	(0.300)	(0.849)	(0.272)	(0.271)	(0.707)	(0.434)
Student Debt Amount (Log)	0.863*	1.071	0.992	0.846**	0.885*	0.879*	0.947
	(0.060)	(0.045)	(0.063)	(0.051)	(0.050)	(0.054)	(0.058)
Debt Forgiveness*Debt Amount (Log)							
$10,000 Forgiven*Debt Amount (Log)	0.963	0.929	0.950	1.180*	1.109	1.042	1.115
	(0.096)	(0.053)	(0.075)	(0.095)	(0.083)	(0.081)	(0.093)
$20,000 Forgiven*Debt Amount (Log)	1.175	1.150*	0.995	1.160	1.184*	1.022	1.046
	(0.113)	(0.075)	(0.079)	(0.093)	(0.089)	(0.080)	(0.080)
All Debt Forgiven*Debt Amount (Log)	1.068	1.048	1.093	1.225*	1.218**	1.046	1.151
	(0.100)	(0.064)	(0.086)	(0.098)	(0.091)	(0.084)	(0.096)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1053	1053	1053	1053	1053	1053	1053

Notes: Odds ratios reported. Controls include age, household income in 2019, number children in household, gender, race/ethnicity, marital/partner status, educational attainment, student enrollment status, and student debt repayment status. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 3b. The Interaction between Student Debt Forgiveness, Student Debt Held, and Expected Behavior Change (Logistic Regression)

	Save for Emergency	Return to School	Save for College	Start a Business	Save for Retirement	Save for Down Payment
Experimental Condition (Ref = $5,000 Forgiven)						
$10,000 Forgiven	1.353	0.578	0.263*	0.357	0.512	0.450
	(0.673)	(0.367)	(0.165)	(0.217)	(0.311)	(0.279)
$20,000 Forgiven	0.920	0.679	0.185**	0.270*	0.715	0.385
	(0.473)	(0.436)	(0.118)	(0.175)	(0.415)	(0.241)
All Debt Forgiven	0.587	0.273	0.179**	0.397	1.666	0.746
	(0.312)	(0.190)	(0.117)	(0.239)	(0.904)	(0.428)
Student Debt Amount (Log)	1.029	0.843*	0.831**	0.787***	0.988	0.964
	(0.044)	(0.057)	(0.047)	(0.055)	(0.047)	(0.047)
Debt Forgiveness*Debt Amount (Log)						
$10,000 Forgiven*Debt Amount (Log)	0.990	1.215*	1.156	1.169	1.088	1.075
	(0.056)	(0.104)	(0.098)	(0.094)	(0.074)	(0.077)
$20,000 Forgiven*Debt Amount (Log)	1.055	1.161	1.215*	1.165	1.077	1.140
	(0.061)	(0.101)	(0.101)	(0.099)	(0.070)	(0.081)
All Debt Forgiven*Debt Amount (Log)	1.156*	1.302**	1.312**	1.197*	1.056	1.093
	(0.070)	(0.119)	(0.108)	(0.094)	(0.065)	(0.072)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1053	1053	1053	1053	1053	1053

Notes: Odds ratios reported. Controls include age, household income in 2019, number children in household, gender, race/ethnicity, marital/partner status, educational attainment, student enrollment status, and student debt repayment status. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 4a. The Interaction between Student Debt Forgiveness, Household Income, and Expected Behavior Change (Logistic Regression)

	Work Less	Pay Other Debts	Food	Move / Improve Home	Entertain-ment	Marriage / Child	Large Purchase
Experimental Condition (Ref = $5,000 Forgiven)							
$10,000 Forgiven	1.116	0.621	2.772	0.164	0.489	1.213	0.569
	(1.335)	(0.574)	(2.965)	(0.164)	(0.488)	(1.358)	(0.660)
$20,000 Forgiven	0.360	0.876	1.062	0.077*	1.266	0.704	0.333
	(0.531)	(0.870)	(1.284)	(0.089)	(1.288)	(0.916)	(0.423)
All Debt Forgiven	2.084	1.172	2.376	0.093*	0.307	0.786	0.311
	(2.358)	(1.086)	(2.569)	(0.095)	(0.320)	(0.888)	(0.377)
2019 Household Income (Log)	0.942	1.069	0.948	0.746***	0.859	0.988	0.903
	(0.086)	(0.073)	(0.086)	(0.060)	(0.067)	(0.086)	(0.078)
Debt Forgiveness*Household Income (Log)							
$10,000 Forgiven*Household Income (Log)	0.989	1.027	0.958	1.267*	1.117	1.039	1.093
	(0.121)	(0.090)	(0.102)	(0.132)	(0.111)	(0.116)	(0.125)
$20,000 Forgiven*Household Income (Log)	1.108	0.989	1.055	1.350*	1.018	1.086	1.181
	(0.160)	(0.093)	(0.125)	(0.158)	(0.103)	(0.138)	(0.145)
All Debt Forgiven*Household Income (Log)	0.927	0.965	1.009	1.369**	1.206	1.073	1.195
	(0.110)	(0.085)	(0.108)	(0.145)	(0.124)	(0.121)	(0.141)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1053	1053	1053	1053	1053	1053	1053

Notes: Odds ratios reported. Controls include age, student debt amount, number children in household, gender, race/ethnicity, marital/partner status, educational attainment, student enrollment status, and student debt repayment status. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 4b. The Interaction between Student Debt Forgiveness, Household Income, and Expected Behavior Change (Logistic Regression)

	Save for Emergency	Return to School	Save for College	Start a Business	Save for Retirement	Save for Down Payment
Experimental Condition (Ref = $5,000 Forgiven)						
$10,000 Forgiven	4.467	0.264	0.170	0.280	0.440	0.548
	(4.307)	(0.270)	(0.190)	(0.334)	(0.454)	(0.545)
$20,000 Forgiven	7.492*	0.183	0.041	0.047	0.336	0.219
	(7.688)	(0.216)	(0.068)	(0.079)	(0.380)	(0.254)
All Debt Forgiven	4.165	0.103*	0.139	0.134	2.056	0.708
	(4.061)	(0.114)	(0.158)	(0.158)	(1.903)	(0.690)
2019 Household Income (Log)	1.109	0.779**	0.855*	0.926	0.949	0.919
	(0.085)	(0.066)	(0.063)	(0.073)	(0.069)	(0.068)
Debt Forgiveness*Household Income (Log)						
$10,000 Forgiven*Household Income (Log)	0.884	1.248*	1.157	1.097	1.086	1.037
	(0.081)	(0.132)	(0.127)	(0.129)	(0.107)	(0.101)
$20,000 Forgiven*Household Income (Log)	0.852	1.273*	1.321	1.301	1.141	1.174
	(0.083)	(0.152)	(0.208)	(0.205)	(0.122)	(0.130)
All Debt Forgiven*Household Income (Log)	0.930	1.344**	1.242*	1.248	1.023	1.078
	(0.086)	(0.153)	(0.137)	(0.143)	(0.091)	(0.103)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1053	1053	1053	1053	1053	1053

Notes: Odds ratios reported. Controls include age, student debt amount, number children in household, gender, race/ethnicity, marital/partner status, educational attainment, student enrollment status, and student debt repayment status. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Figure 1a. Treatment Effects on Expected Behavior Change, by Logged Student Debt Amount

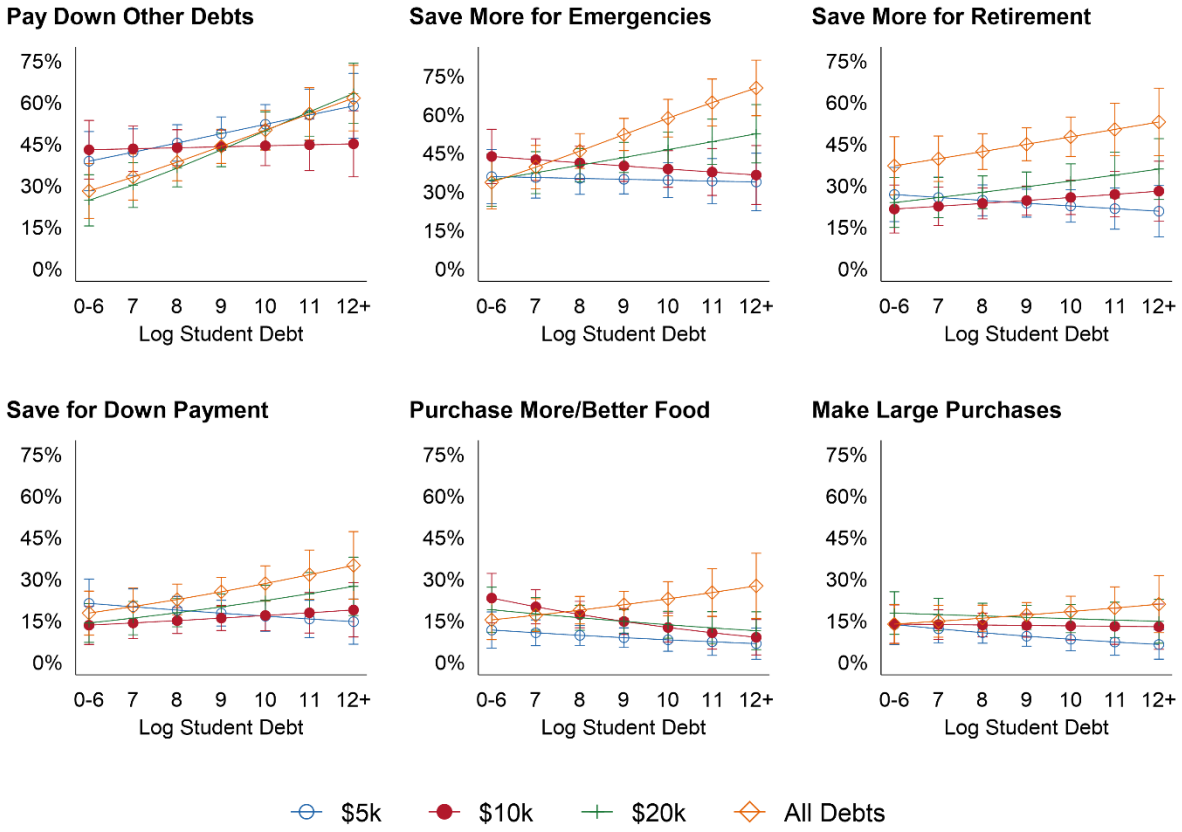
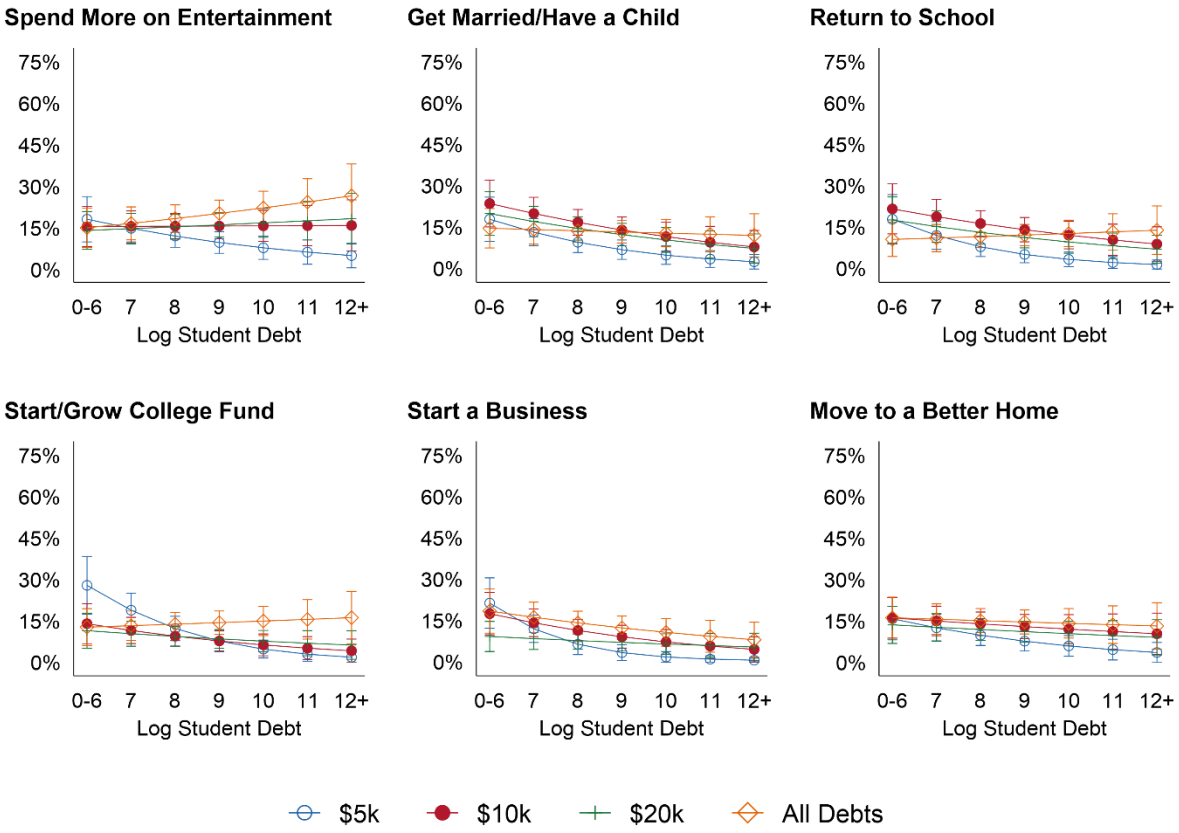


Figure 1b. Treatment Effects on Expected Household Behaviors, by Logged Student Debt Amount



Notes: Estimates in Figures 1a-1b are based on predictive margins calculated from logistic regression models, which are the predicted probabilities of a given outcome being equal to 1 holding other covariates constant. Models control for age, logged 2019 household income, logged student debt amount, number of children in the household, gender, race/ethnicity, marital/partner status, educational attainment, school enrollment status, and the status of student debt payments (e.g., delinquent/in default, in repayment, in forbearance). N=1,053. Bars around each point estimate correspond to 95% confidence intervals.

Figure 2a. Treatment Effects on Expected Household Behaviors, by Logged 2019 Household Income

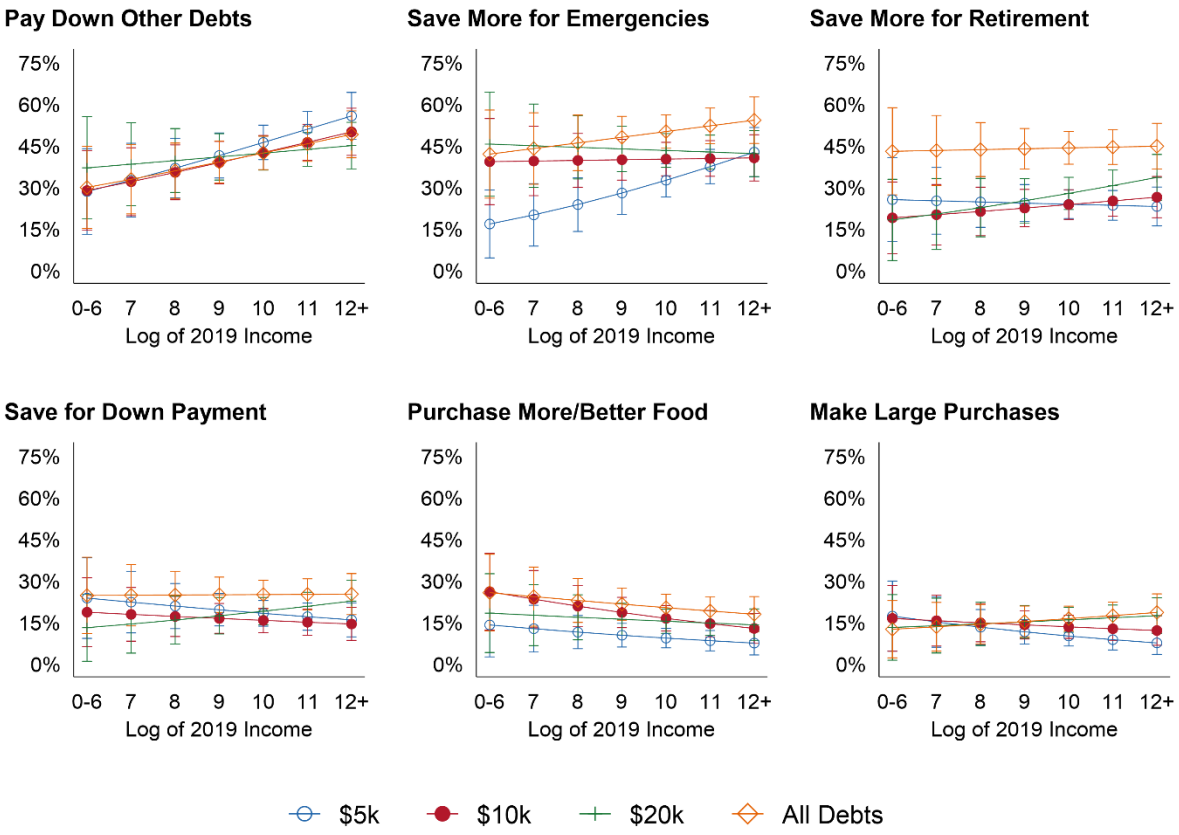
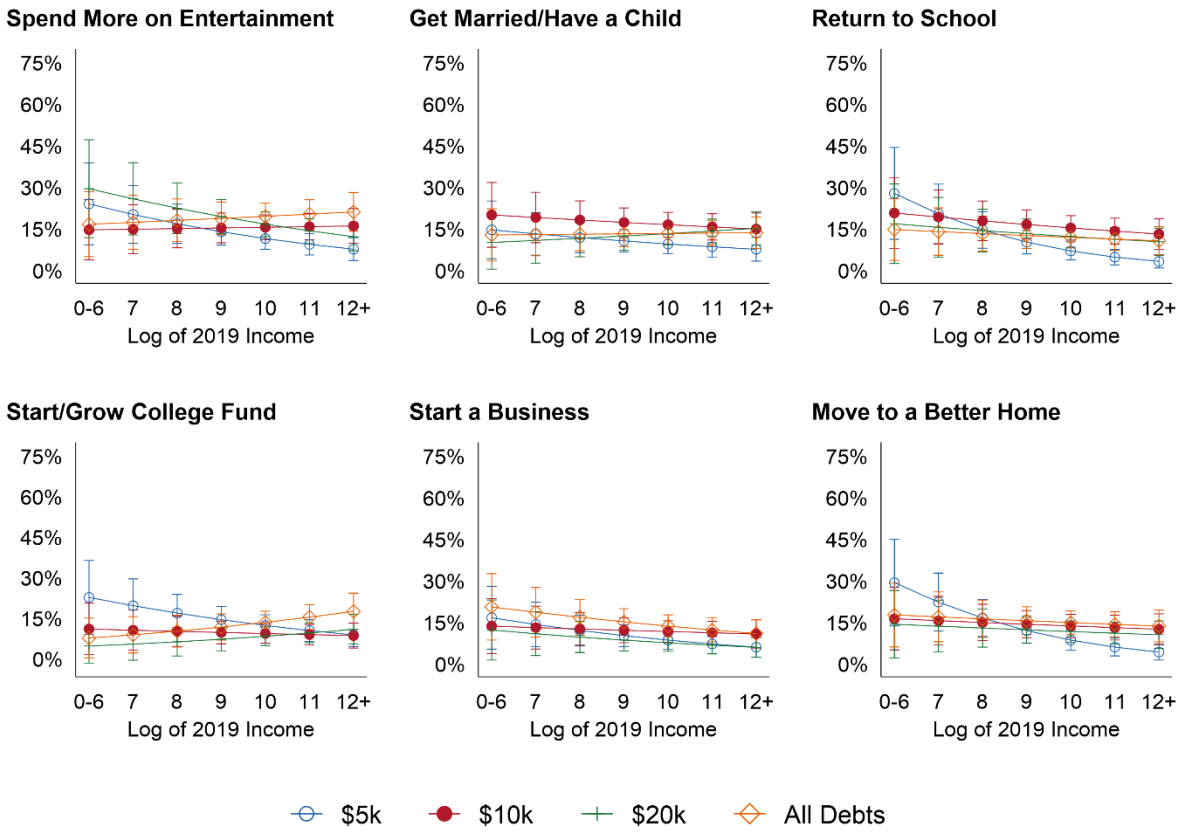


Figure 2b. Treatment Effects on Expected Household Behaviors, by Logged 2019 Household Income



Notes: Estimates in Figures 2a-2b are based on predictive margins calculated from logistic regression models, which are the predicted probabilities of a given outcome being equal to 1 holding other covariates constant. Models control for age, logged 2019 household income, logged student debt amount, number of children in the household, gender, race/ethnicity, marital/partner status, educational attainment, school enrollment status, and the status of student debt payments (e.g., delinquent/in default, in repayment, in forbearance). N=1,053. Bars around each point estimate correspond to 95% confidence intervals.

Appendix A
Survey Representativeness

Table A1. Comparison of Borrowers in the Socio-Economic Impacts of COVID-19 Survey (SEICS) to Borrowers in the 2020 Survey of Household Economics and Decision-making (SHED)

	SEICS	SHED
Age	37.08	35.93
Total Income in 2019 ($)	$65,622.70	$60,000-$74,000
Race/Ethnicity		
White (Non-Hispanic)	56.41%	57.42%
Black (Non-Hispanic)	19.09%	18.14%
Asian/Other (Non-Hispanic)	6.84%	9.49%
Hispanic	17.66%	14.95%
Male	42.45%	43.66%
Student Status		
Non-Student	57.83%	78.23%
Part-Time Student	9.21%	7.45%
Full-Time Student	32.95%	14.21%
Educational Attainment		
No BA	35.23%	44.06%
BA or Greater	64.77%	55.94%
Any Child Dependents	45.39%	31.78%
Married/Living with a Partner	60.49%	58.44%
Current Student Debt ($)	$27,010.28	$28,400[7]
N	1,053	1,759

[7] Average amount of debt per borrower for 2019-2020 graduates (College Board, 2021)

Appendix B
Applying Census Weights to Main Results

In this appendix, we re-estimate the main results of our study (in Table 2) after applying population weights derived from the Census Bureau's 2019 American Community Survey (1-Year Estimates) in order to assess the generalizability of our results. Specifically, we weighted our sample in terms of age, educational attainment, gender, presence of children, marital status, income, race/ethnicity, and Census division. The results are in Table B1 below. Significant differences are assessed using Wald tests, which allow us to test differences in weighted outcomes. As a note, the number of observations in this analysis differ slightly from those in the main analysis due to a small number of missing responses on the weighting variables.

Table B1: Self-Reported Behavior Change Following Student Debt Forgiveness, by Experimental Condition (Census Weights)

	$5,000 Forgiven (a)	$10,000 Forgiven (b)	$20,000 Forgiven (c)	All Debt Forgiven (d)
Outcome		%		
Work Less	9.35	5.57	8.09	7.32
Pay Down Other Debts	50.86	42.17	44.44	44.88
Purchase More/Better Food	9.60	16.65[a]	16.60[a]	21.85[aaa]
Move to a Better Home	7.34	14.07[a]	12.34[a]	12.90[a]
Spend More on Entertainment	10.97	19.31[aa]	17.82	19.81[aa]
Get Married/Have a Child	8.16	16.80[aa]	12.30	13.3
Make a Large Purchase	8.35	13.44	12.86	14.70[a]
Save for Emergencies	35.75	42.06	43.71	53.22[aaa,b,c]
Return to School	5.76	14.15[aa]	12.95[aaa]	10.10
Save for College	13.10	8.29	7.44[a]	15.05[b,cc]
Start a Business	8.15	9.00	7.32	12.11
Save for Retirement	19.15	29.42[aa]	34.08[aaa]	36.20[aaa]
Save for a Down Payment on a Home	13.50	11.93	20.23[a,b]	22.80[aa,bb]
Observations	262	251	264	250

Note: This table presents the same results as Table 2 from the main analysis, but this analysis employs weights from the Census Bureau's 2019 American Community Survey 1-Year Estimates to increase the generalizability of the results.

'a' superscripts indicate that the outcome is significant relative to the $5,000 Forgiven group. a: $p < .05$, aa: $p < .01$, aaa: $p < .001$

'b' superscripts indicate that the outcome is significant relative to the $10,000 Forgiven group. b: $p < .05$, bb: $p < .01$, bbb: $p < .001$

'c' superscripts indicate that the outcome is significant relative to the $20,000 Forgiven group. c: $p < .05$, cc: $p < .01$, ccc: $p < .001$

Appendix C
Alternate Student Debt and Income Measures for Predictive Margins

In the main analysis, we examined the relationship between student debt forgiveness, student debt amount/household income, and self-reported household behavior change by interacting the level of forgiveness with the logged values of student debt and household income. In this appendix, we examine these relationships using two alternate ways of constructing the student debt and household income variables. First, we constructed a categorical measure of student debt with ranges that corresponded to our hypothetical forgiveness amounts ($5,000, $10,000, $20,000, and total) as well as $50,000 to provide an intermediate value between $20,000 and total forgiveness. This approach may provide a more intuitive way of understanding the relationship between student debt amount, debt forgiveness, and household behaviors. The results are in Figures C1a-1c. Second, rather than using a direct measure of household income as in the main analysis, we used a calculated measure of a respondent's percent of their area median income, i.e., how their income compares to the median income in their zip code of residence. We then categorized respondents' percent of area median income following the definitions of the U.S. Department of Housing and Urban Development: 0-49% (very low income), 50-79% (low income), 80-119% (moderate income), 120-169% (middle income), 170+% (high income). The results are in Figure C2a-2c.[8]

[8] Of note, these estimates also differ from those in the main analysis as these estimates do not control for demographic and financial covariates, as having categorical variable interactions with the treatments in addition to an array of covariate controls caused certain variables to have zero cells in the logistic regressions.

Figure C1a. Treatment Effects on Expected Household Behaviors, by Category of Student Debt Amount

Figure C1b. Treatment Effects on Expected Household Behaviors, by Category of Student Debt Amount

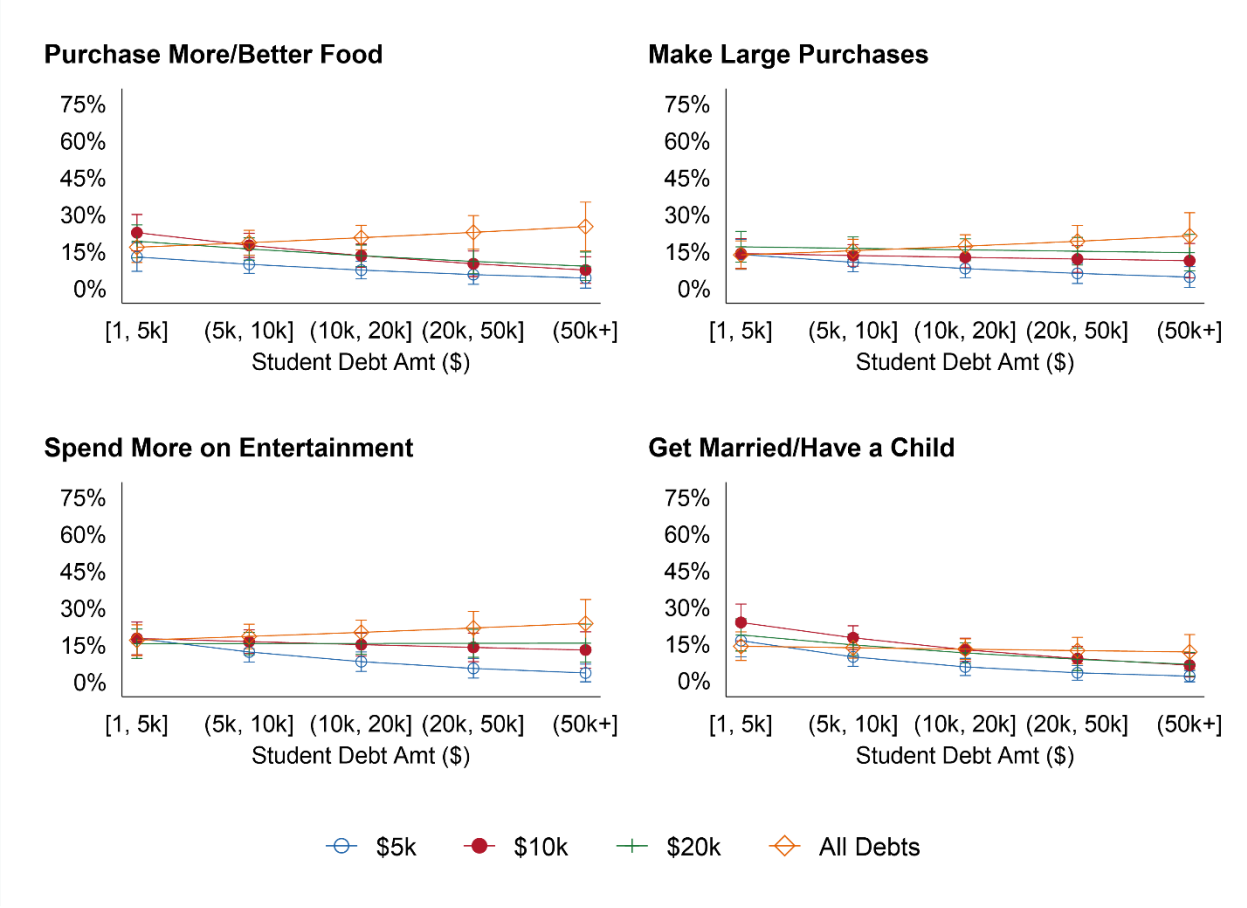
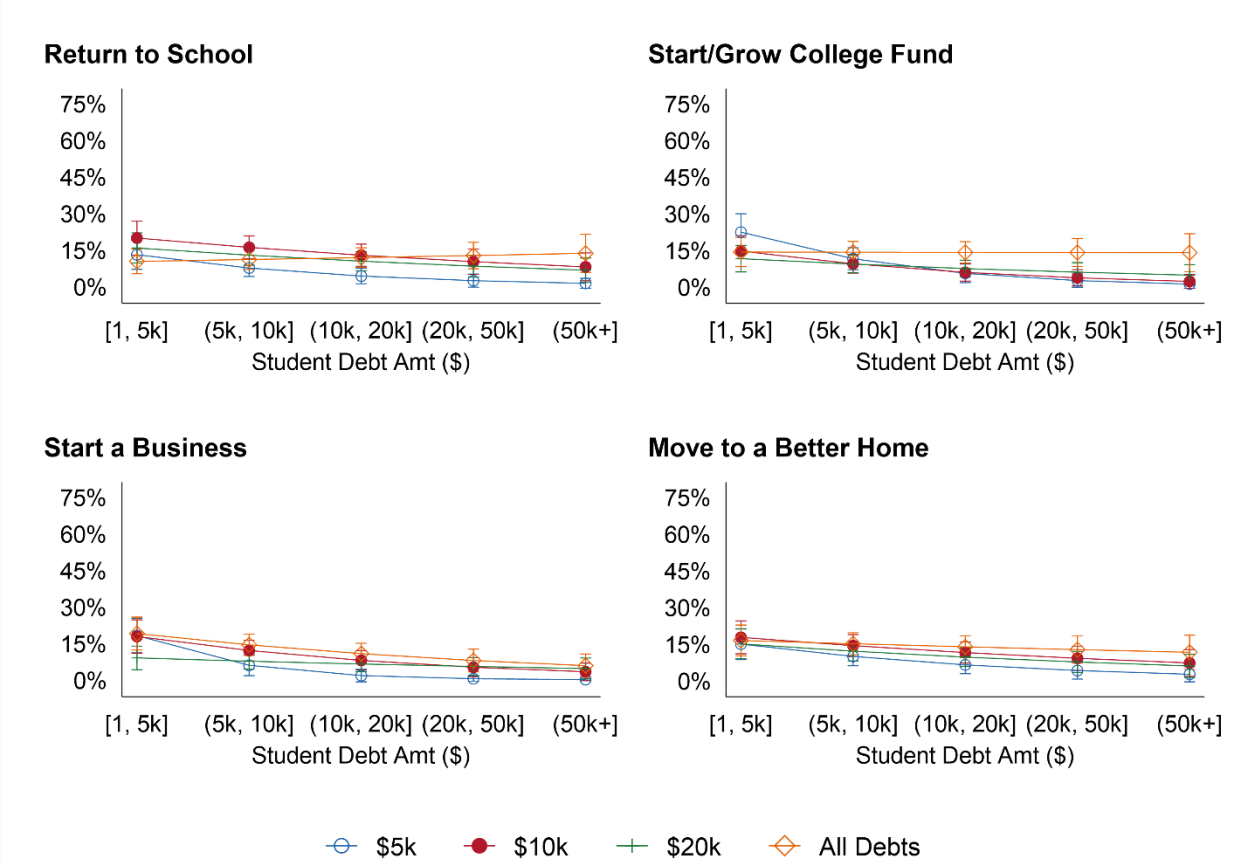


Figure C1c. Treatment Effects on Expected Household Behaviors, by Category of Student Debt Amount



Estimates in Figures B1a-B1c are based on predictive margins calculated from logistic regression models, which are the predicted probabilities of a given outcome being equal to 1 holding other covariates constant. N=1,053. Bars around each point estimate correspond to 95% confidence intervals.

Figure C2a. Treatment Effects on Expected Household Behaviors, by Household Percent of Area Median Income

Figure C2b. Treatment Effects on Expected Household Behaviors, by Household Percent of Area Median Income

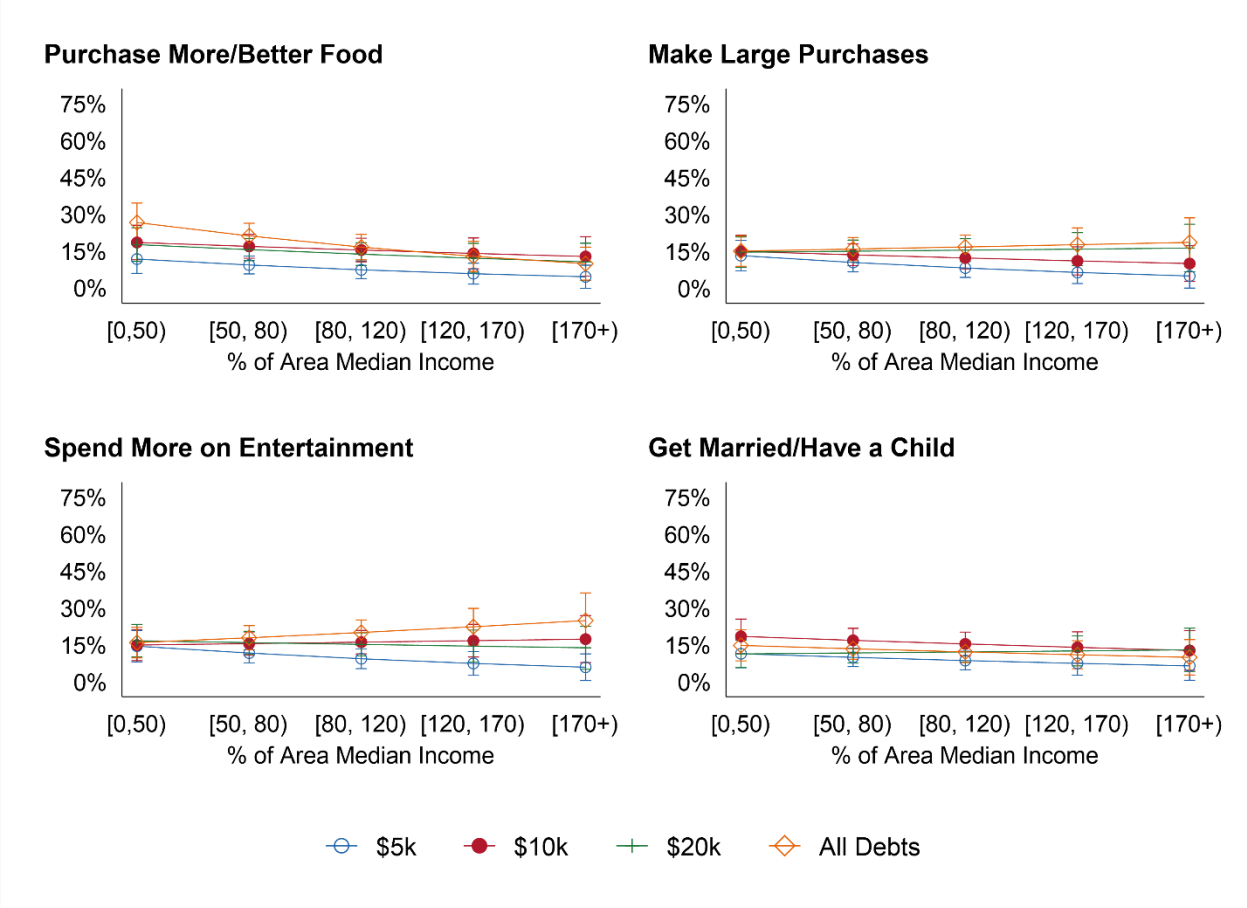
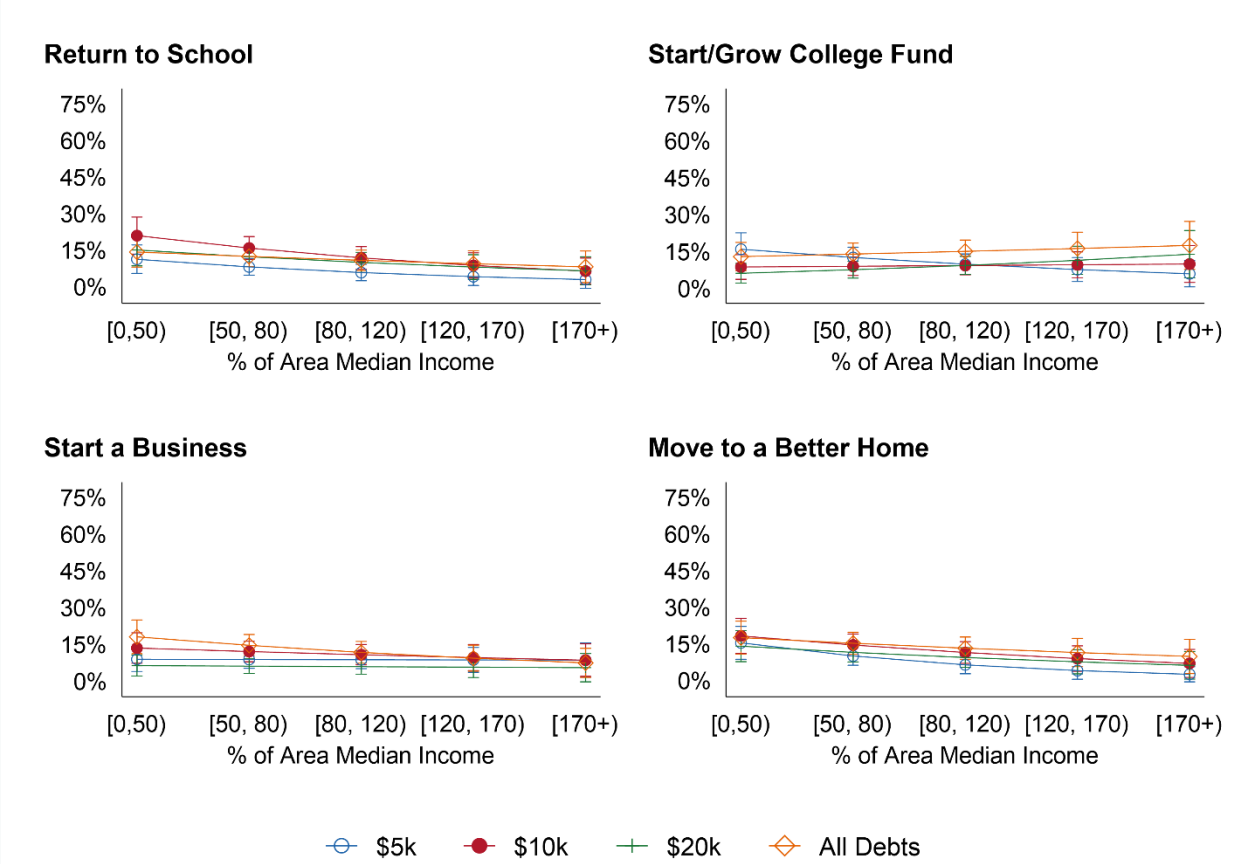


Figure C2c. Treatment Effects on Expected Household Behaviors, by Household Percent of Area Median Income



Estimates in Figures C2a-C2c are based on predictive margins calculated from logistic regression models, which are the predicted probabilities of a given outcome being equal to 1 holding other covariates constant. N=1,053. Bars around each point estimate correspond to 95% confidence intervals.