ONCE IN DEBT, ALWAYS IN DEBT? EFFECTS OF STUDENT LOANS ON DEBT HOLDINGS

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This paper investigates how student loans causally impact debt holdings of individuals in the medium-run using data from the NLSY97. To identify the effect of student loans on debt holdings, I instrument student loan debt with merit grant eligibility, using a triple differences estimation in the first stage. I find that student loans mechanically increase debt holdings at age 25 but decrease them at age 30. Looking at the mechanisms, I find that student loans positively impact the educational outcomes, but do not increase risk aversion or impact mental well-being. The effects are prominent for individuals from below-median income families.

Keywords: Student Loans, Household Debt, Financial Aid.

JEL codes: I22, I23, D14

* Department of Economics, Loyola Marymount University, fulya.ersoy@lmu.edu. I thank Graham Beattie, B. Douglas Bernheim, Raj Chetty, Pascaline Dupas, Caroline Hoxby, Inas Kelly, Benjamin Marx, Isaac Sorkin, and seminar audience at Stanford University for their helpful comments and discussions. This research is conducted with restricted access to Bureau of Labor Statistics (BLS) data. The views expressed here do not necessarily reflect the views of the BLS. This research is approved by Stanford University (IRB protocol # 41345) and Loyola Marymount University (IRB protocol # 2018 FA 32).

I. INTRODUCTION

Student loan debt is currently the second largest type of debt in the United States. Furthermore, both student loan debt and household debt are at their peaks, and keep growing.[1] Although there is evidently a positive correlational relationship between student loan debt and debt holdings at a later age (Fry, 2014), causality has not yet been established.[2] It is essential to know whether a causal relation exists to employ policies that can reduce household debt. If the relationship is causal, reducing student loan debt helps reduce household debt. If student loan debt is a symptom of being prone to debt rather than the cause, other policies such as financial education might work better. This paper attempts to fill this gap in the literature by examining how student loan debt causally impacts debt holdings in the medium-run using an instrumental variables approach. I show that student loans increase debt holdings at age 25 mechanically and decrease debt holdings at age 30.

Conceptually, student loans might impact debt holdings at a later age either positively or negatively through at least four different mechanisms. First, the impact can be purely mechanical. Individuals with student loans might have higher debt holdings at a later age because they still owe some of their student loan debt plus interest. Second, student loans might affect the ability to take loans at a later age by affecting credit scores of individuals. Student loans can help individuals to build good credit scores earlier if individuals repay on time or they can hurt the credit scores if individuals miss payments.[3] Third, student loans might affect the educational outcomes

1. See https://www.newyorkfed.org/microeconomics/hhdc.html and https://www.newyorkfed.org/medialibrary/interactives/householdcredit/data/pdf/HHDC_2018Q2.pdf.

2. Fry (2014) uses Survey of Consumer Finances (SCF) of 2010 to analyze the correlation between student loans and debt holdings. He finds that households with young adult heads who had student loans have less wealth accumulation and are more likely to have other debt such as auto loans and credit card debt compared to other young households even though both groups earn similar levels of income.

3. For example, Brown and Caldwell (2013) documents the trends of credit scores of individuals with and without student loan debt between years 2003 and 2012. The authors show that credit scores of student loan borrowers are similar to that of non-borrowers before the recession. However, after the recession, the credit scores of student loan borrowers are lower than the credit scores of non-borrowers.

of students which in turn cause a change in future debt holdings. Fourth, student loans can impact future debt holdings in either direction through psychological channels. On the one hand, individuals who took student loans might become more averse to debt after experiencing the burden of student loans.[4] On the other hand, favorable terms of student loans might lead individuals who would not borrow otherwise to borrow. If there is a fixed cost associated with borrowing for the first time (Marx and Turner, 2018), then individuals who took out student loans will be more likely to borrow in the future.

To examine how student loans affect debt holdings of individuals later in life, I use public as well as confidential data from the National Longitudinal Survey of Youth 1997 (NLSY97) and employ an instrumental variables strategy based on eligibility for grants. Student loans and grants are two significant sources of financing for college students. Hence, it is likely that an increase in grants will lead to a decrease in student loans, and vice versa. To find an exogenous variation in student loans, I utilize exogenous variation in grants, particularly in state merit-based grant programs. These programs vary substantially regarding start dates and eligibility criteria. I construct the instrument, eligibility for merit-based grants, using individuals' high school state, high school graduation year, and achievement during high school. Eligibility for merit-based grants serves as an instrument for student loans after controlling for all the lower level interactions.

I argue that eligibility for merit-based grants after controlling for all the lower level interactions is a good instrument for student loans. This argument holds only if the instrument correlates with student loans (*relevance*) and it affects debt holdings at a later age purely through its impact on student loans (*exclusion restriction*). To check for the *relevance*, I look at the relationship between merit-based grant eligibility and student loans. I show that being eligible for merit-based grants reduces the amount of student loan debt by $1826 (statistically significant at the 1% level). Since it is not possible to check for the *exclusion restriction*, I explore two potential threats to the validity

4. Debt aversion is documented by Callender and Jackson (2005), Field (2009), and Caetano et al. (2011).

of it. First, the validity of the instrument is under threat if there is selection to the sample. I study two different types of selection bias: manipulation of achievement scores and changes in college enrollment decisions induced by the instrument. I do not find any evidence for either types of selection bias. Second, the validity of the instrument is threatened if the instrument directly affects other outcomes, such as college outcomes or wages, that are correlated with debt holdings in the medium-run. I find that the signs of my reduced form estimates are opposite of what one would expect if merit grant eligibility affected these outcomes directly. Furthermore, the main finding does not change even if I control for college outcomes and wages. All in all, I have evidence suggesting that eligibility for merit grants after controlling for all the lower level interactions is a good instrument for student loans.

My main finding is that student loans increase debt holdings of individuals at age 25 and decrease debt holdings of individuals at age 30; furthermore, the effects operate through different channels. A $1 increase in student loans leads to a $2.32 increase in debt holdings at age 25 (statistically significant at the 1% level), and this effect is purely mechanical. In contrast, a $1 increase in student loans leads to a $0.99 decrease in debt holdings at age 30 (not statistically significant). If I look at debt holdings at age 30 excluding the amount still owed on student loans, a $1 increase in student loans reduces this variable by $1.38 (statistically significant at the 10% level). Further investigation of this effect reveals that reductions happen in credit card debt (statistically significant at the 10% level). When I compare the results based on these instrumental variables regressions with the ordinary least squares ones, it is evident that the two significantly diverge for both the amount of debt at age 30 and the types of debt held at age 30.

The effect of student loans on the debt holdings at age 30 seems to be driven by the effect of student loans on educational attainment and credit constraints. First, I find that an increase in student loans leads to an increase in college GPA (statistically significant at the 5% level). Furthermore, an increase in student loans also increases the highest grade completed, the probability of having a degree and wages at age 30 (though not statistically significant). Second, although I do not

have credit score data, I find suggestive evidence for the credit constraint channel. In particular, I show that the debt reduction at age 30 is only relevant for individuals who are coming from below-median income families, measured at the time of high school graduation. Lastly, I do not find any evidence of that student loans induce debt aversion. An increase in student loans does not increase risk aversion or impact the mental well-being of an individual.

Given that the instrumental variables estimation provides the local average treatment effect for compliers, who the compliers are deserves discussion. As Looney and Yannelis (2016) discusses, the student loan holders are quite heterogeneous. Student loans enable some individuals to pursue higher level degrees and attend more selective schools whereas some nave borrowers of student loans like the idea of having extra financial resources during college without thinking too much about its consequences. Hence the pool of student loan borrowers is positively selected in the former case but negatively selected in the latter. We should not expect the effects of student loans to be the same for these two groups. The students in the former group will be able get the education they might otherwise not get. The students in the latter group will likely to drop out college or get degrees with low returns and might end up accumulating more debt due to their student loans. It is also expected that merit-based grant eligibility affects the student loan take-up of these two groups differently. The students in the former group is more likely to comply with the instrument. My main result and suggestive evidence on the mechanisms are in line with this intuition.

This paper contributes to the limited literature on the effects of student loans. Researchers document that student loans have effects on graduate school decisions (Zhang, 2013; Fos et al., 2017), the type of employment individuals choose (Rothstein and Rouse, 2011), probability of marriage (Gicheva, 2011) and home ownership (Gicheva and Thompson, 2014; Mezza et al., Forthcoming). The current literature is limited both because the datasets which have information about student loans and future outcomes are scarce and because it is hard to find exogenous variation in student

loans.[5] I contribute to the existing literature in two respects. First and foremost, I document the causal effects of student loans on medium-run debt holdings of individuals. Although the literature has investigated the correlations between the two (Cavanagh and Sharpe, 2002; Brown and Caldwell, 2013; Cooper and Wang, 2014; Fry, 2014), to my knowledge, this paper provides the first causal evidence on how student loans affect medium-run debt holdings of individuals. Furthermore, this paper adds to the existing literature by documenting positive effects of student loans on the educational outcomes of the students.

This paper also contributes to the large and growing literature on the effects of grants, particularly state merit-based grants. There is mixed evidence in the literature about the effects of merit grants on the enrollment decisions of students. Some papers document positive effects (Dynarski, 2004; Cornwell et al., 2006) whereas others report null effects (Sjoquist and Winters, 2015; Bettinger et al., 2016). My finding, eligibility for merit-based grants has no statistically detectable effect on college enrollment decisions, is in line with the latter. Similarly, there is mixed evidence regarding the effects of merit-based grants on degree completion. Henry et al. (2004), Dynarski (2008), Scott-Clayton (2011), and Bettinger et al. (2016) find positive effects on degree completion whereas Cohodes and Goodman (2014), Sjoquist and Winters (2015), and Fitzpatrick and Jones (2016) find null or negative effects. Additionally, the literature is limited on how merit-based grants affect outcomes beyond college (Bettinger et al., 2016; Scott-Clayton and Zafar, 2016).

This paper proceeds as follows: Section II. provides details about the NLSY97, state merit-based grant programs, and the empirical strategy. In Section III., I discuss the validity of the instrument.

5. Fos et al. (2017) uses the variation in student debt that remains after controlling for school by cohort fixed effects and uses differences in debt that arise from large changes in tuition at the same school level by only focusing on students who are already enrolled before the tuition change. Rothstein and Rouse (2011) uses a natural experiment, introduction of a no-loans policy in a highly selective college. Gicheva (2011), Zhang (2013), Gicheva and Thompson (2014), and Mezza et al. (Forthcoming) all use instrumental variables approach. Gicheva (2011) and Gicheva and Thompson (2014) uses the variations in the availability of federal and private student loans as an instrument, Zhang (2013) uses variations in the college's tendency to offer grants as an instrument, and Mezza et al. (Forthcoming) uses the changes in tuition rates in students' home state universities.

Section IV. discusses the findings and mechanisms and Section V. concludes.

II. Data and Empirical Strategy

To study the causal impact of student loans on debt holdings of individuals later in life, I exploit potentially exogenous variation in eligibility for state merit-based scholarships. Section II.A. presents the specifics of the data. Section II.B. provides details about the merit-based grant programs which are important for the construction of the instrument. Section II.C. discusses the empirical strategy, an instrumental variables estimation with triple differences as the first stage.

II.A. Data: The NLSY97

Since this paper examines the impact of student loans on debt holdings, I need panel data that contain both educational variables, including the financing of the education, and debt holdings at later ages. I utilize the National Longitudinal Survey of Youth (NLSY97) public-use and confidential geocode data since the NLSY97 is a detailed longitudinal survey satisfying these criteria.

The NLSY97 is an ongoing longitudinal survey that has detailed information about the lives of individuals who were born between 1980 and 1984. 8,984 individuals (and one of their parents) were surveyed in the first round of the survey, which took place in 1997.[6] Age of respondents ranged from 12 to 18 at the first round of the interview. 7,103 individuals were surveyed in the most recent round of the survey which took place between 2015 and 2016.

The NLSY97 has comprehensive data on financing of college. For each of the post-secondary institutions attended, the NLSY97 provides data on whether the individual took a student loan (without distinguishing whether the loan is government-subsidized or private) and the amount of the loan taken. It also has information on what other types of aid (financial assistance from

6. The NLSY97 survey is sponsored and directed by the U.S. Bureau of Labor Statistics and conducted by the National Opinion Research Center at the University of Chicago, with assistance from the Center for Human Resource Research at The Ohio State University.

relatives, grants, college work study, employer assistance) students had during their post-secondary degrees. Although the NLSY97 has information on grants, it does not provide the details on the type of the grant the student had.

The NLSY97 collects in depth information about assets and debt holdings of individuals at age 25 and 30: house debt, vehicle debt, credit card debt, and other business debt. Importantly, the NLSY97 has information on the amount still owed on student loans at age 25 and 30. Furthermore, one can construct wages at age 25 and age 30 using the wage data available in the NLSY97.

The NLSY97 has also extensive data on educational history: state where high school was attended, year of high school graduation, high school GPA (self-reported and based on transcripts) and self-reported SAT/ACT scores.[7] These variables are the key to construct the instrument, eligibility for merit grants. The NLSY97 further provides data on state where college was attended, college start year, type of college attended (public, non-profit, for-profit), enrollment status (full-time, part-time), and degree attempted (AA, BA, etc) for each post-secondary institution attended. It also has information on highest grade attended, highest degree completed and college GPA (self-reported and based on transcripts).

To construct my main sample, I restrict attention to individuals for whom I know state where high school was attended, year of high school graduation and high school GPA since these variables are necessary for the construction of the instrument. This restriction gives me a sample of 7,112 observations. I further restrict the sample to individuals who graduate from high school on 2003 or before, which further reduces the number of observations to 6,722. Not all of the individuals in the NLSY97 sample who finished high school went to college. Hence, I restrict the sample to those who have a college start date. Conditional on enrolling in college, I only focus on individuals for whom the degree attempted at their *first* post-secondary institution is AA, BA, BS, or vocational training since merit grants are not available for graduate degrees. This operation reduces the sample

7. Location variables are only available at the NLSY97 geocode confidential data.

to 4,593 individuals. Appendix Table I displays the summary statistics of this sample.

II.B. State Funded Merit-Based Grant Programs

State merit-based grants are important sources of financial aid for college and they vary substantially across states in terms of start dates, eligibility criteria, and the generosity of the awards. This heterogeneity helps me construct the instrument.

Grants and loans are the two significant sources of financing for college students. There are two different types of grants available to college students: need-based and merit-based. Students' family income, family assets, and family size determine their eligibility for need-based grants while the success of students during high school determines their eligibility for merit-based grants. Need-based grants are predominantly available at the federal level whereas merit-based ones are available at the state level.

There is substantial heterogeneity across states in terms of merit grant programs. Not all states provide merit grants to their students and states that have merit grant programs introduced them at different years. For instance, Arkansas (1991) and Georgia (1993) are two of the earliest states to implement their programs whereas Delaware and Wyoming did not start their programs until 2006. There are also some states, such as Illinois and Maryland, which discontinued their merit grant programs.

The criteria for eligibility for the merit-based grants differ from state to state. Most states have a high school GPA cutoff, and some have an SAT or ACT score cutoff for qualifying. Some of them have a lenient cutoff (for example, Kentucky only requires a high school GPA of 2.5 points) whereas others have strict cutoffs (for instance, Idaho Category A scholarship requires both a high school GPA of 3.5 points and an ACT score of 28 or higher). Table I lists merit requirements for all the states that had an active merit grant plan at least for one year between years 1998 and 2003. Other eligibility requirements might include graduating from a *within-state* high school

and enrolling a *within-state* college, being a *full-time* student, enrolling college within a *specified time* after high school graduation, being in a *four-year* institution, or enrolling a *public* institution. Appendix Table II documents all these other requirements.

The amount of rewards for each merit grant program is also different. These awards generally cover the full tuition and fees if students attend a public institution and they provide similar amounts of support if students attend a private institution. Some states offer various levels of eligibility and might have different rewards depending on the qualification level. Appendix Table III displays the award amounts in each state. As seen from the table, award amounts vary considerably. They range from as low as $1000 one time (Illinois) to $9780 per year (California).

II.C. Empirical Strategy

To study the causal relationship between student loans and debt holdings at a later age, I use an instrumental variables strategy. In particular, I utilize eligibility for merit-based grants as an instrument for student loans after controlling various factors.

Conceptually, a student who has been eligible for a merit-based grant is more likely to receive aid through the merit-based grant and will borrow less in student loans. I construct eligibility for merit-based grants variable based on the state where students attended high school, high school graduation date, and academic performance during high school. Based on these criteria, 14.4% of the individuals are eligible for merit grants as seen in Appendix Table IV. Although most of the states have additional criteria for eligibility, such as going college within the state, attending to a public institution, or enrolling full-time, I do not incorporate these criteria into the eligibility variable since these criteria are potentially endogenous. Even after focusing only on the exogenous criteria, eligibility for a merit-based scholarships would not be a valid instrument by itself. Eligible students have above average academic performance, hence they differ from ineligible students. To deal with this issue and similar ones, I control for high school performance, year fixed

effects, whether a state has ever had a merit grant program, and the double interactions. After controlling for these variables, I utilize eligibility for merit-based grants as an instrument for student loans because it exhibits exogenous variation that affects student loans, under the assumption that remaining variation in the eligibility variable does not directly affect debt holdings later in life.[8]

In the first stage, the relationship between student loans and eligibility for merit-based grants is modeled as

$$
\begin{aligned}
SL_{ijt} =& \delta EligibleSTA_{ijt} + \alpha_0 + \alpha_1 EligibleA_i + \alpha_2 EligibleS_j + \sum \alpha_{3t} T_t + \\
& \alpha_4 (EligibleSA_{ij}) + \sum \alpha_{5t} (EligibleA_i * T_t) + \alpha_6 EligibleST_{jt} + \Gamma X_i + \epsilon_{ijt}
\end{aligned} \tag{1}
$$

where i is an individual, j is a state, and t is the year of high school graduation. SL_{ijt} is the amount of student loans, $EligibleA_i$ is a dummy indicating whether the individual has high academic achievement, $EligibleS_j$ is a dummy indicating whether the individual attends a high school in a state where merit-based scholarships are ever offered, $EligibleST_{jt}$ is a dummy indicating whether individual attends a high school where merit based scholarships are offered at the time the individual graduates from high school, $EligibleSA_{it}$ is a dummy which is equal to 1 if both $EligibleS_j$ and $EligibleA_i$ are equal to 1, $EligibleSTA_{ijt}$ is a dummy indicating whether the individual attends a high school in a state where merit-based scholarships are offered at the time the individual graduates from high school and the individual satisfies the academic achievement criteria of that state, and T_t are high school graduation year fixed effects.[9] X_i is a vector of individual characteristics which contains sex, race, and parental income at the time of high school graduation in the main specification.[10]

8. Plausibility of this assumption is discussed in Section III.B..

9. See Appendix A for a detailed description of the construction of these variables. Tabulations for $EligibleST_{jt}$ and $EligibleSTA_{ijt}$ by high school graduation year are given in Appendix Table V.

10. Parental income is only available for 3153 out of 4593 observations. If parental income is missing, it is imputed by the average parental income.

In the second stage, the relationship between debt holdings at a later age and student loans is modeled as

$$
\begin{aligned}
Y_{ijt} =& \gamma \hat{SL}_{ijt} + \beta_0 + \beta_1 EligibleA_i + \beta_2 EligibleS_j + \sum \beta_{3t} T_t + \\
& \beta_4 (EligibleSA_{ij}) + \sum \beta_{5t} (EligibleA_i * T_t) + \beta_6 EligibleST_{jt} + \Theta X_i + \nu_{ijt}
\end{aligned} \tag{2}
$$

where Y_{ijt} represents different versions of debt holdings at a later age and $\hat{SL}_{ijt}$ is the predicted value of the amount of student loans from Equation (1). The coefficient of interest is γ.

Inclusion of parental income at the time of high school graduation as a control is important. We might expect that parental income positively correlates with eligibility for merit grants perhaps because higher income families have more resources to invest in the K-12 education of their children. Furthermore, we might expect that parental income negatively correlates with student loans since wealthier parents have more resources to finance the post-secondary education of their children. Figure I shows how the probability of being eligible for merit-based grants and probability of having student loans change with parental income recorded at the time of high school graduation. In line with what we expect, the probability of having student loans decreases with parental income but eligibility for merit-based grants slightly increases with it. Hence, omitting the parental income variable could seriously bias the instrumental variable estimate of student loans on debt holdings at a later age.

III. Preliminary Analysis

For merit grant eligibility to serve as a good instrument for student loans, there should be a relationship between the two (*relevance*) and merit grant eligibility should affect future outcomes only through its effect on student loans (*exclusion restriction*). In Section III.A., I show how merit grant eligibility relates to student loans. Given it is not possible to test for the exclusion restriction, I present suggestive evidence on its validity in Section III.B.. In particular, I show that merit grant

eligibility does not seem to cause selection bias and my findings do not seem to be driven by the direct effects of merit grant eligibility on outcomes correlated with debt holdings in the medium-run.

III.A. How does the instrument relate to student loans?

Table II shows how eligibility for merit grants relates to student loans after controlling for all lower level interactions. It reports the results from Equation (1). In theory, eligibility for merit-based grants can affect both the propensity to take a student loan and the amount of student loans. In Column (1) and Column (2), the dependent variable is whether an individual has student loans at the first post-secondary institution attended. Being eligible for a state merit-based grant reduces the probability of taking a student loan by approximately 7 percentage points (though not statistically significant). This number corresponds to a 15% decrease in student loan take-up. In Column (3) and Column (4), the dependent variable is the amount of student loan an individual has at his or her first post-secondary institution. Being eligible for a state merit-based grant reduces the amount of student loan borrowing by approximately $1826 (statistically significant at the 1% level). This amount corresponds to a 49% decrease in the amount individuals borrow. As we would expect, these results indicate that there is a statistically significant negative relationship between eligibility for merit grants and student loans.[11]

III.B. Is the instrument valid?

As the intuition would suggest and the previous subsection shows, there is a negative and statistically significant relationship between the instrument, merit grant eligibility after controlling for the lower level interactions, and the amount of student loans. It seems plausible that the instrument is related to debt holdings in the medium-run only through its effects on student loans, making the

11. There is an intermediate step in the relationship between merit grant eligibility and student loans. Individuals who are eligible for merit grants reduce their student loans not merely because they are eligible for merit grants but because they get merit grants. Appendix B investigates this intermediary channel to better understand how the instrument works and the relevant magnitudes.

exclusion of the instrument from the debt holdings in the medium-run equation valid. Although it is not possible to prove this claim, I explore two potential threats for the validity of instrument and find evidence in support of the validity of this claim. The instrument is not valid if there is a selection bias or if the instrument directly impacts outcomes that are correlated with debt holdings at a later age. Section III.B..1 discusses the former and Section III.B..2 discusses the latter.

III.B..1 Does the instrument lead to selection bias?

Manipulation of achievement scores One potential worry about the instrument is that students and teachers might change their behavior upon introduction of merit-based grant programs. Students might retake SAT or ACT exams until they satisfy the eligibility criteria of their states for receiving merit-based grants. Teachers might boost students' grades so that their GPAs satisfy the state cutoffs for eligibility.[12] These types of behavior can lead to selection bias and threaten the validity of the instrument.

To provide evidence on this issue, I look at how the high school GPAs, SAT scores, and ACT scores of the individuals who reside in the states that have an active merit grant program when the individual graduated from high school differ from the others. Table III shows the results. Column (1) shows that graduating from high school in a state with an active merit grant program (i.e. $EligibleST$ being equal to one instead of zero) does not have an influence on high school GPA. Conversely, Columns (2) and (3) document that it has a small negative impact on SAT and ACT scores, respectively. One would expect SAT or ACT scores to increase if students were trying to manipulate their scores by re-taking these exams. The results stay qualitatively the same but become insignificant if I control for sex, race, and family income (Columns (4)-(6)). Hence, manipulation of high school achievement scores does not seem to be an issue for my sample. Using external data from College Board, I also have suggestive evidence showing that SAT score

12. For example, both Henry and Rubenstein (2002) and Sjoquist and Winters (2015) find that Georgia's merit scholarship program increased high school GPAs. Henry and Rubenstein (2002) argues that this increase in GPAs is due to increased effort whereas Sjoquist and Winters (2015) argues that this increase reflects grade inflation.

manipulation does not happen (See Appendix C for details).[13]

College Enrollment Decisions Another potential worry about the instrument is that it might influence college enrollment decisions which would induce a selection into the sample of college-going students. Such a selection would threaten the validity of the instrument. Theoretically, we should not expect the instrument to have a large effect on enrollment. In a standard human capital model, an increase in merit grants will affect neither the opportunity cost of college nor the earnings. It will only decrease interest payments on the loans. Furthermore, merit grant recipients are likely to attend college regardless of merit aid (Ellwood and Kane, 2000). However, if individuals are credit-constrained or if they suffer from behavioral biases such as mental accounting, then an increase in grants might affect college choices. Empirically, there are several papers investigating this issue. Dynarski (2004), Cornwell et al. (2006), and Scott-Clayton (2015) report positive effects whereas Sjoquist and Winters (2015) and Bettinger et al. (2016) detect no effects of state merit-based grant programs on college enrollment.

Does my instrument affect individuals' college choices? To answer this question, I first run a regression of whether an individual ever attended college on merit grant eligibility and all the lower level interactions. Table IV Column (1) shows the result. To construct the sample in Column (1), I restrict attention to individuals for whom I know the state where high school was attended, year of high school graduation, and high school GPA. This sample includes individuals who never go to college as well as individuals for whom the degree aimed at the first college is AA, BA, BS, or vocational training as in my main sample.[14] As Column (1) shows, merit grant eligibility does not statistically significantly influence college enrollment. Since most merit-based grant programs require their recipients to full time attend a public institution, I next explore the influence of being eligible for merit grants on whether an individual chooses a public institution and whether

13. A caveat to this finding is that the score distribution data I have from College Board is not fine enough to adequately test the manipulation hypothesis.

14. The results remain qualitatively the same even if I include individuals for whom the degree aimed is different than AA, BA, BS, or vocational training.

the individual attends college full-time in Column (2) and Column (3), respectively. This sample excludes individuals who never attended college. I find that merit grant eligibility does not statistically significantly affect either of these variables. Given the small and statistically insignificant effects on enrollment, institution choice, and enrollment type, merit grant eligibility is unlikely to cause selection bias into the college-going sample in my setup.

III.B..2 Does the instrument directly affect other outcomes that correlate with debt holdings?

Validity of the instrument also rests upon the idea that the instrument affects debt holdings at a later age only through its effect on student loans. It is shown in the literature that merit-based grants can positively impact outcomes during college due to the fact that most of these merit programs have college GPA requirements for renewal (Scott-Clayton, 2011) or beyond college due to the fact that they can decrease time to graduation and make students start their lives earlier (Scott-Clayton and Zafar, 2016). Merit-based grants might also affect how motivated a student is due to the prestige associated with them. Motivation can affect college outcomes, which in turn can affect labor market outcomes. Furthermore, merit grants might reduce the time spent working, increase the time allocated to studying, and improve college outcomes of the merit grant recipients.

As previous literature and intuition suggest, we expect that merit grants positively impact educational and labor market outcomes. However, I find that my instrument, merit grant eligibility after controlling for the lower level interactions, negatively correlates with education variables and wages at age 30 as shown in Table V (only two of these variables are significant at the 10% level). Note that these negative correlations are in stark contrast with the positive correlations of eligibility based on achievement ($EligibleA$) and the education variables which further suggests that $EligibleA$ picks up variation in merit grant eligibility that is not exogenous. If my instrument was directly affecting these outcomes, I would expect the sign of correlation to be positive rather than negative. These reduced form results suggest that my instrument is picking up potentially exoge-

nous variation in eligibility for merit-based grants. Hence, I do not expect my instrument to affect college outcomes and labor market outcomes directly. Nevertheless, I rerun all the regressions in Section IV.A. by controlling for educational outcomes during college and wages.[15] The results do not change qualitatively.[16]

IV. FINDINGS

In this section, I first present the main results regarding the effect of student loans on debt holdings of individuals at age 25 and age 30. I then compare these causal effects (IV regressions) with the correlational relationships (OLS regressions). Then, I discuss three distinct mechanisms that might explain the results.

IV.A. Do Student Loans Influence Debt Holdings in the Medium Run?

To investigate the effect of student loans on debt holdings, I utilize the specification outlined in Section II.C.. In particular, I instrument the amount of student loans at the first post-secondary institution with eligibility for merit-based grants, controlling for the lower level interactions. Then, I explore the influence of increase in the amount of student loans on various measures of debt at age 25 and age 30.

Although the relationship between eligibility for merit grants and the amount of student loans is strong, it still does not pass the weak instrument test proposed by Staiger and Stock (1997), which specifies the F-statistic in the first stage regression should be greater than 10. Bootstrap provides a way to obtain reliable estimates when instruments are weak. Davidson and MacKinnon (2010) outlines a bootstrap data generating process (DGP) that is valid under heteroskedasticity and works well in finite sample even when the instruments are weak: Wild Restricted Efficient Residual Bootstrap (WRE). This estimator has been shown to outperform both asymptotic methods

15. See Appendix Tables XXI, XXII, and XXIII for 2SLS results. Reduced form results can also be found in Appendix Tables XXIV, XXV, and XXVI.

16. Note that this regression specification over controls since some of the effects of student loans are likely to operate through education channel as discussed in Section IV.C..

and other well-known bootstrap DGPs. Hence, the discussion of statistical significance in this text is based on WRE bootstrap values for the instrumental variables estimations. In the corresponding regression tables, I report both WRE bootstrap p-values and asymptotic p-values.[17] The two p-values turn out to be quite similar in most of the estimations.

Effect of Student Loans on Debt Holdings at Age 25

I find that student loans increase the debt holdings of an individual at age 25 and that this effect is mechanical. Table VI presents the evidence. Column (1) shows that the amount of student loan borrowed at the first post-secondary institution does not affect whether an individual holds debt age 25. However, a $1 increase in student loans leads to a $2.32 increase in debt holdings at age 25 (statistically significant at the 1% level) as shown in Column (2). To explore the mechanisms, I divide the debt holdings at age 25 to two separate parts: the amount still owed on student loans (Column (3)) and the amount of all the other types of debt (Column (4)). A $1 increase in student loans borrowed at the first post-secondary institution leads to a $2.44 increase in the amount still owed on student loans (statistically significant at the 1% level) and it has no effect on the amount of other debt. Hence, the effect of student loans on debt holdings at age 25 seems purely mechanical.[18] It is a little surprising that there is more than a one-to-one relationship between borrowing through student loans and debt still owed on student loans at age 25. Accruing interest and student loan debt borrowed in other post-secondary institutions (either undergraduate or graduate) can explain this finding.[19]

17. WRE bootstrap p-values are calculated by using Stata's "boottest" command. In particular, I use "boottest StudentLoanAmount, reps(999) seed(1122334455) level(90) nograph ptype(equaltail)" command. "boottest" is a post-estimation command that tests linear hypotheses about parameters. If "boottest" is run after a 2SLS estimation, the algorithm bootstraps based on WRE.

18. Reduced form results confirm the findings of the instrumental variables estimation. In particular, being eligible for a merit grant reduces the debt holdings at age 25 by $4,102 (statistically significant at the 1% level) and almost all of this reduction comes from the reduction on the amount still owed on the student loans. See Appendix Table VIII for details.

19. Given federal student loan interest rates (around 5%) and interest rates from the private lenders (between 4% and 12%), it is possible that student loan debt will double in 8 years time.

Effect of Student Loans on Debt Holdings at Age 30

Unlike debt holdings at age 25, student loans do not increase debt holdings at age 30. If anything, they have the opposite effect. Table VII presents the results. The amount of student loan borrowed at the first post-secondary institution does not influence whether an individual holds debt age 30 (Column (1)) or overall debt holdings at age 30 (Column (2)). When I investigate the mechanisms, I find that $1 increase in student loans borrowed at the first post-secondary institution has no effect on the amount still owed on student loans but it decreases the other debt holdings by $1.38 (statistically significant at the 10% level).[20]

Different Types of Debt at Age 30

Given that student loans reduce debt holdings at age 30 through a non-mechanical effect, it is natural to explore which types of loans are affected. Table VIII shows that student loans do not influence the propensity of having house debt or vehicle debt (Columns (1) and (2)), but they influence the probability of having business debt and credit card debt (Columns (3) and (4)). In particular, a $1000 increase in student loan debt reduces whether an individual owes business debt by 2.27 percentage points from a mean of 19.2% (not statistically significant) and whether an individual has rolling credit card debt by 3.23 percentage points from a mean of 47.2% (statistically significant at the 10% level). Column (5) looks at paying back behavior and documents that a $1000 increase in student loans makes individuals 2.84 percentage points more likely to pay according to the schedule compared to a mean of 82.2% (p-value is equal to 0.106).[21] The non-existence of an effect on house debt might have two different interpretations. First, due to

20. Reduced form results confirm the findings of the instrumental variables estimation. In particular, being eligible for a merit grant increases the debt holdings at age 30 excluding the amount still held as student loan debt by $2,702 (statistically significant at the 5% level) and it has no effect on the amount still owed on student loans. See Appendix Table IX for details.

21. The patterns are more prominent in the reduced form regressions. In particular, Appendix Table X depicts that merit eligibility has no effect on house debt and vehicle debt but it increases probability of having business debt by 5.15 percentage points and credit card debt by 7.99 percentage points (both significant at 10% level). It further reduces the probability of paying according to the schedule by 5.33 percentage points (statistically significant at the 10%).

the small size of individuals having mortgages at age 30, I might be unable to detect a significant effect. Second, student loans might induce a reduction in borrowing through decreasing only bad types of debt, but not influencing good types of debt which are backed by property.[22]

IV.B. Comparison of Causal Estimates (IV) to the Correlations (OLS)

In this subsection, I compare the results based on OLS and 2SLS estimations to highlight the differences between the two. One of the motivations of this paper is the existence of a positive correlational relationship between student loans and debt holdings at a later age in the Survey of Consumer Finances data. However, this correlation might be an artifact of various individual and family characteristics. When I compare the results based on OLS and 2SLS estimations, the discrepancy is evident.

Appendix Table XI, Table XII, and Table XIII depict the results of OLS estimations for debt holdings at age 25, debt holdings at age 30, and types of debt at age 30, respectively. Appendix Table XI shows that a $10,000 increase in student loans is associated with 8.55 percentage points increase in the probability of holding debt at age 25 (statistically significant at the 1% level). Furthermore, a $1 increase in student loans correlates with $1.01 increase in debt holdings at age 25 (statistically significant at the 1% level) and this correlation comes through the amount still owed on student loans at age 25. Similarly, Appendix Table XII shows that a $10,000 increase in student loans is associated with 11 percentage points increase in the probability of holding debt at age 30 (statistically significant at the 1% level). Furthermore, a $1 increase in student loans correlates with $1.06 increase in debt holdings at age 30 (statistically significant at the 1% level) and this correlation comes through the amount still owed on student loans at age 30. Appendix Table XIII displays that student loans are positively associated with having vehicle debt. Overall,

22. In line with the first interpretation, Mezza et al. (Forthcoming) finds that a $1000 increase in student loan debt decreases homeownership by 1.8 percentage points. This estimate is quite similar to my estimate of effect of student loans on house debt at age 30 but their estimate is statistically significant potentially due to larger sample size.

I find that although OLS and 2SLS results are qualitatively similar for age 25, they significantly diverge for age 30 both in terms of the amount of debt holdings and types of debt.

IV.C. Potential Mechanisms

Given that I find that debt holdings at age 30 are reduced, this subsection aims to have suggestive evidence on the mechanisms driving this result. First, student loans can affect individuals' academic performance (education channel). Second, student loans can change the debt aversion of individuals and hence their behavior in the financial system (debt aversion channel). Third, student loans can hurt the financial credibility of individuals (credit constraint channel). I find suggestive evidence on that the effects work through the education and credit constraint channels, but not through debt aversion channel.

Educational Outcomes

Student loans might affect performance in school through different means. An increase in student loans might reduce the hours a student spent working which in turn might increase the time allocated to studying. Having student loans might create an additional incentive to complete school and to be successful since the individuals with student loans likely to know that they need to pay their loan back even if they do not graduate but they will end up with lower income if they do not graduate.[23]

Table IX displays how student loans affect various educational outcomes. A $1000 increase in student loans leads to a 0.12 years increase in highest grade completed, 2.50 percentage points increase in the probability of having an Associates Degree or more, and 2.02 percentage points increase in the probability of having a Masters Degree or more as depicted in Columns (1), (2), and (3), respectively (none of the effects are statistically significant). Similarly, a $1000 increase in student loans increases college GPA by 0.04 points (statistically significant at the 5%) according to the self-reported GPA measure and 0.07 points (not statistically significant) according to the GPA measure based on transcript data as shown in Columns (4) and (5), respectively.[24]

It is worth mentioning that my findings are different than findings in the literature. Both Fos et al. (2017) and Zhang (2013) find that student loans have a statistically significant negative effect on having a Masters Degree or above. Zhang (2013) further shows that this result is only relevant for PhDs, professional degrees, and expensive MBA programs. This finding might explain the discrepancy between my result and theirs since I only have a small sample of individuals pursuing

23. Default rate on student loans within the two years of entering repayment is 9% for students who completed their programs whereas it is 24% for students who didn't graduate based on data from the National Student Loan Data System (https://trends.collegeboard.org/student-aid/figures-tables/two-year-student-loan-default-rates-degree-completion-status-over-time).

24. As previously discussed, Table V displays the reduced form results. These results confirm the findings of the instrumental variables estimation. Merit grant eligibility reduces the probability of having an Associates Degree or more by 5.43 percentage points (statistically significant at the 10%) and reduces the self-reported GPA by 0.08 points (statistically significant at the 10%).

those degrees. Furthermore, Rothstein and Rouse (2011) finds negative, small, and insignificant effects of student loans on college GPA as compared to the small and positive effects I observe. However, the results of Rothstein and Rouse (2011) are based on outcomes of students from one of the most selective colleges in the US whereas my sample spans a wide range of colleges which might explain the difference.

Given that I find a positive effect of student loans on educational outcomes, I look at whether there is a positive effect of student loans on wages at age 30 which might be one of the explanations of the reduction in debt holdings.[25] I construct the wages at age 30 using the following question in the NLSY97: "During the previous year, how much income did you receive from wages, salary, commissions, or tips from all jobs, before deductions for taxes or anything else?". Table IX Column (6) depicts the results. A $1000 increase in student loans leads to $1,730 increase in annual wages at age 30 from a mean of approximately $46,000 (not statistically significant).[26] The effect size is quite big but still within reasonable limits. My suggestive finding that student loans lead to higher annual wages at age 30 is line with the finding of Rothstein and Rouse (2011).

Debt Aversion

The burden of student loans might shape debt aversion. Individuals might become more averse to borrowing after experiencing the physical or emotional difficulties of being in debt. This channel might be a potential explanation for the reduction in debt holdings at age 30. The NLSY97 provides suggestive data on risk preferences and mental well-being which allow me to explore this channel.

25. An alternative channel through which positive effects of student loans on education might affect debt holdings in the medium-run is financial sophistication. Unfortunately, I do not have data on financial sophistication of the NLSY97 respondents to explore this channel.

26. Similarly, merit grant eligibility influences wages at age 30 negatively but not statistically significantly as Table V shows.

Table X Columns (1)-(3) display the results on risk preferences.[27] The dependent variable in Column (1) is an ordered categorical variable that measures the risk aversion of individuals based on an hypothetical "guaranteed income" versus "uncertain income" question. Individuals with a score of 1 are risk neutral or risk loving and individuals with a score of 4 are the most risk averse.[28] I find that a $1000 increase in student loans decreases the risk aversion score by 0.10 points from a mean of 3.05 (statistically significant at the 5% level). Column (2) and Column (3) show the self-reported risk assessments for general risk and financial risk, respectively.[29] Individuals with a score of 0 claim that they are unwilling to take any risk and individuals with a score of 10 claim that they are fully prepared to take risks. I find no effect of student loans on these self-reported risk assessments.

Table X Column (4) and Column (5) display the results on mental health in year 2010 and year 2015, respectively.[30] The NLSY97 utilizes the 5-item Mental Health Inventory (MHI-5) to assess the mental health of its respondents.[31] The MHI has been found to be reliable and to correlate

27. The NLSY97 assesses individuals' risk tolerances only once. Risk assessments of most of the respondents were collected in 2010. Data for the respondents who were not interviewed in 2010 were collected in 2011. In 2010, the respondents age between 25 and 29 years old.

28. To construct this variable, individuals are first given a hypothetical choice between a job that would guarantee their current family income for life and another job that would double the current family income for life with 50% chance and that will cut the current family income by *a third* for life with 50% chance. Depending on which job they choose, they are given a different follow-up question. If they choose the first job, they are given a hypothetical choice between the first job and another job that would double the current family income for life with 50% chance and that will cut the current family income by *twenty percent* for life with 50% chance. If they choose the second job, they are given a hypothetical choice between the first job and another job that would double the current family income for life with 50% chance and that will cut the current family income *in half* for life with 50% chance. Depending on their answers to the first and the second questions, I categorize individuals into one of the four categories.

29. The question in Column (2) is "Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?" and the question in Column (3) is "How would you rate your willingness to take risks in financial matters?".

30. In 2010, the respondents age between 25 and 29 years old and they age between 30 and 34 years old in 2015.

31. The five questions asked in this inventory are the following: 1. How much of the time during the last month have you been a happy person?, 2. How much of the time during the last month have you felt calm and peaceful?, 3. How much of the time during the last month have you been a very nervous person?, 4. How much of the time during the last month have you felt downhearted and blue?, and 5. How much of the time during the last month have you have you felt so down in the dumps that nothing could cheer you up?. The answer choices range between 1 "All of the time" and 4 "None of the time".

highly with several other mental health assessments (Multiple Sclerosis Society, 1997). The MHI scores range from 0 to 100, with higher scores indicating better mental health. I find that increase in student loans does not affect mental health scores either in 2010 or in 2015, as shown in Columns (4) and (5), respectively.[32]

All in all, I do not find evidence of that student loans make individuals more averse to risk or negatively affect their mental well-being. This is in line with the literature. Rothstein and Rouse (2011) finds that debt aversion is not an explanatory channel why debt causes students to choose high pay jobs over the public interest jobs by comparing pledges to actual gifts by alumni. Mezza et al. (Forthcoming) also finds that debt aversion cannot explain why student loan debt decreases mortgages and home ownership.

Credit Constraints

Student loans might constrain future borrowing opportunities of individuals by hurting their financial credibility. Although I do not have credit score data to directly explore this mechanism, I have evidence suggesting that this channel is relevant. In particular, I find that the main effects are more prominent for individuals with below-median parental income and the reduction in debt is mainly due to the reduction in house debt for this subgroup. Table XI presents the results for individuals whose parental income at the end of high school graduation year lies below the median of the income distribution. A $1 increase in student loans reduces the debt holdings minus the amount still owed at student loans by $2.26 (statistically significant at the 10% level). In comparison, a $1 increase in student loans increases the debt holdings minus the amount still owed at student loans by $0.24 (not statistically significant) for individuals with above-median parental income as Appendix Table XVII displays. Since students from poorer families is expected to have more difficulty in paying their student loan debt compared to students from richer families,

32. Appendix Table XIV presents the reduced form results for risk preferences and mental well-being.

this finding is indicative of that student loans reduce future borrowing due to credit constraints they introduce. Furthermore, Table XII shows that this reduction in debt for individuals with below-median parental income is mostly driven by a reduction in house debt at age 30 (statistically significant at the 10% level). Again, in comparison, we do not observe such a reduction for individuals with above-median parental income as Appendix Table XVIII shows. Given that mortgage rates strongly correlate with credit scores, this finding further supports the credit constraint explanation.[33]

Evidence from the literature also backs up this suggestive evidence about the credit constraint channel. Fos et al. (2017) finds that the mechanism driving their result of that higher student debt leads to lower probability to enroll in graduate programs is credit constraints and their result becomes weaker with increased family income. Rothstein and Rouse (2011) also finds that credit constraints explain why debt causes students to choose high pay jobs over the public interest jobs. Furthermore, Mezza et al. (Forthcoming) finds that student loan debt has a negative effect on credit scores.

V. Conclusion

In this paper, I analyze how student loans causally impact debt holdings of individuals in the medium run. To do this analysis, I use public and confidential data from the NLSY97 which provides detailed information on schooling, income, and assets. I utilize an instrumental variables strategy in which eligibility for state merit-based grants serves as an instrument for student loans. I argue that eligibility for merit-based grants is a good instrument since it negatively correlates with student loans and it is unlikely to be related to the debt holdings of individuals in the medium-run, except through its effect on student loans. I find that student loans mechanically increase debt

33. The instrument is particularly weak in these regressions due to the small sample size. Appendix Tables XV and XVI present the reduced form results for individuals with below-median parental income and Appendix Tables XIX and XX present the reduced form results for individuals with above-median parental income.

holdings at age 25 and decrease debt holdings at age 30. The latter change happens through a reduction in credit card debt, not through a reduction in house or vehicle debt. When I explore the mechanisms through which student loans shape debt holdings in the medium-run, I find suggestive evidence for the effects of student loans on educational attainment and credit constraints, but not on debt aversion.

While this paper is the first to my knowledge to estimate the causal effect of student debt on future debt holdings, the findings should be interpreted with caution due to the limitations of the data. First, most of the NLSY97 variables are self-reported, hence they might be subject to measurement error and certain biases. Second, due to the small sample size, the first stage estimation is not very strong which leads to difficulty in using asymptotic methods for making inferences. Lastly, since the NLSY97 surveys individuals who are born between 1980 and 1984, age 25 mostly corresponds to the era before the Great Recession and age 30 corresponds to the era after the Great Recession. Hence, it is hard to distinguish whether the change in results from age 25 to 30 is due to age effects or due to the Great Recession.

The findings of this paper are important in terms of policy. Correlational analysis of student loans and debt holdings in the medium run suggests that the two are highly positively correlated. Given this positive relationship and the fast growing student loan debt, policymakers might want to employ policies to reduce student loan debt with the purpose of reducing household debt. As the findings of this paper show, however, reducing student loans might not be a good policy tool for this purpose. Indeed, such a policy might backfire since a decrease in student loans might increase debt holdings in the medium run, especially through increasing bad types of debt.

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TABLES

TABLE I: Eligibility Requirements for State Merit-Based Grants

State	Start	GPA	ACT score	SAT score	Combined Criteria
Alaska	1999				Top 10% of HS class
Arkansas	1991-2001	2.5	19	730	ACT, GPA: (15-16, 3.25+), (17-18, 3+), (19, 2.5+), (20-24, 2.25+), (25-36, 2+)
Arkansas	2002	3	19	730	ACT, GPA: (15-18, 3.25+), (19, 3+), (20-24, 2.75+), (25-36, 2.5+)
California	2001	3			HS GPA
Florida	1997	3	20	970	HS GPA and ACT/SAT scores
Georgia	1993	3	26	1180	HS GPA or ACT/SAT scores
Idaho	2001	3	20		GPA or ACT
Illinois	1999		30	1340	Top 5 % of HS class or ACT/SAT scores
Kentucky	1999	2.5			HS GPA
Louisiana	1998	2.5	20		HS GPA and ACT scores
Maryland	2002	3			HS GPA
Michigan	2000		25	1180	Level 1 or Level 2 on all four tests of MEAP. Level 1 or Level 2 on at least 2 tests and ACT/SAT scores
Mississippi	1996	2.5	15	770	HS GPA and ACT/SAT scores
Missouri	1997		31	1390	ACT/SAT scores
Nevada	2000	3.25			GPA + pass Nevada HS Proficiency Exam
New Jersey	1997			1350	Top 15 % of HS class and SAT scores
New Mexico	1997				
New York	1997				Be in good academic standing
North Dakota	1994		29		ACT score
Oklahoma	1996	2.5			HS GPA
South Carolina	1998	3	24	1100	2-year institutions: GPA , 4-year institutions: at least 2 of the 3 criteria
Tennessee	2003	3	19	890	HS GPA and ACT/SAT scores
Utah	1999	3.5			HS GPA
Washington	1999		27	1200	Top 15% of HS class or ACT/SAT scores
West Virginia	2002	3	21	1000	HS GPA and ACT/SAT scores

This table presents the academic eligibility requirements for state merit-based grants. HS means high school. See Appendix A for more details on how the merit-based grant eligibility based on these criteria is determined. Sources: State webpages, Merit Program websites, Dynarski (2004), and Sjoquist and Winters (2015). I use https://archive.org/web/ to obtain archived copies of relevant state webpages and merit program websites for the periods of interest. Although it would be ideal to have this data for each year in that the merit program is active, I only use the earliest available data since it was not feasible to obtain this data for each year. This is unlikely to be a problem since the criteria do not seem to have much variation across years. Arkansas is an exception since its merit-based grant program became stricter in 2001 by requiring a higher GPA.

TABLE II: Merit Eligibility and Student Loans

	(1)	(2)	(3)	(4)
	Having Student Loans		Amount of Student Loans	
EligibleSTA	-0.0692	-0.0724	-1856.4	-1826.3
	(0.0491)	(0.0451)	(650.0)	(649.8)
EligibleS	-0.0909	-0.0815	-613.7	-468.1
	(0.0761)	(0.0712)	(766.0)	(690.8)
EligibleST	0.0375	0.0389	-400.2	-321.1
	(0.0627)	(0.0620)	(547.5)	(520.0)
EligibleSA	0.0231	0.0145	1097.5	954.4
	(0.0431)	(0.0411)	(680.5)	(673.1)
EligibleA	0.128	0.155	3394.8	3710.0
	(0.166)	(0.168)	(3126.7)	(3268.5)
Mean of Dep. Var.	0.447	0.447	3762.8	3762.8
Controls	No	Yes	No	Yes
N	4233	4233	4160	4160

OLS estimations. Standard errors are in parentheses (clustered at the high school state level). $EligibleSTA$ (merit grant eligibility) is a dummy indicating whether the individual attends a high school in a state where merit-based scholarships are offered at the time the individual graduates from high school and the individual satisfies the academic achievement criteria of that state, $EligibleST$ is a dummy indicating whether the individual attends a high school where merit-based scholarships are offered at the time the individual graduates from high school, $EligibleSA$ is the interaction of $EligibleS$ and $EligibleA$, $EligibleS$ is a dummy indicating whether the individual attends a high school in a state where merit-based scholarships are ever offered, and $EligibleA$ is a dummy indicating whether the individual has high academic achievement. All regressions include high school graduation year dummies and the interactions of high school graduation year dummies with Eligible A. The construction of these variables is explained in detail in Appendix Section A. Controls are sex, race, family income at the time of high school graduation. $p < 0.10$, $p < 0.05$, $p < 0.01$.

TABLE III: Manipulation of Achievement Scores

	(1)	(2)	(3)	(4)	(5)	(6)
	HS GPA	SAT	ACT	HS GPA	SAT	ACT
EligibleST	-0.00590	-36.09	-0.663	0.0243	-16.52	-0.0646
	(0.0428)	(12.56)	(0.610)	(0.0402)	(10.84)	(0.431)
EligibleS	-0.0162	38.03	0.558	-0.0130	37.16	0.311
	(0.0746)	(12.93)	(0.622)	(0.0780)	(11.14)	(0.402)
HS Graduation Year 1998	-0.0300	-80.82	-3.404	-0.0486	-100.7	-3.271
	(0.111)	(42.85)	(2.195)	(0.102)	(36.96)	(1.987)
1999	-0.0430	-72.25	-3.098	-0.0641	-86.23	-3.381
	(0.112)	(44.58)	(2.114)	(0.106)	(40.15)	(1.896)
2000	-0.0668	-83.42	-2.483	-0.0660	-98.31	-2.870
	(0.116)	(46.40)	(2.127)	(0.109)	(42.63)	(1.902)
2001	-0.0374	-86.67	-3.033	-0.0522	-109.1	-3.308
	(0.111)	(45.34)	(2.222)	(0.105)	(39.84)	(1.978)
2002	-0.0527	-63.37	-3.361	-0.0583	-83.24	-3.764
	(0.107)	(44.50)	(2.248)	(0.102)	(39.63)	(2.049)
2003	-0.139	-84.63	-2.971	-0.129	-109.0	-3.477
	(0.120)	(52.46)	(2.174)	(0.115)	(46.49)	(1.959)
Mean of Dep. Var.	2.862	1059.8	22.02	2.862	1059.8	22.02
Controls	No	No	No	Yes	Yes	Yes
N	5995	1985	1636	5995	1985	1636

OLS Estimations. Standard errors are in parentheses (clustered at the high school state level). $EligibleST$ is a dummy indicating whether the individual attends a high school where merit-based scholarships are offered at the time the individual graduates from high school and $EligibleS$ is a dummy indicating whether the individual attends a high school in a state where merit-based scholarships are ever offered. HS stands for high school. Controls are sex, race, family income at the time of high school graduation. $p < 0.10$, $p < 0.05$, $p < 0.01$.

TABLE IV: Merit Eligibility and College Enrollment

	College Enrollment	Public	Full-Time Enrollment
EligibleSTA	0.0269	0.0225	-0.0150
	(0.0318)	(0.0362)	(0.0308)
EligibleS	0.0490	0.0237	-0.0581
	(0.0260)	(0.0362)	(0.0467)
EligibleST	-0.0335	-0.0694	0.0375
	(0.0244)	(0.0410)	(0.0409)
EligibleSA	-0.0484	0.0432	0.0207
	(0.0297)	(0.0446)	(0.0335)
EligibleA	0.275	-0.102	0.247
	(0.103)	(0.132)	(0.0575)
Mean of Dep. Var.	0.773	0.768	0.824
N	5995	4566	4241

OLS Estimations. Standard errors are in parentheses (clustered at the high school state level). $EligibleSTA$ is merit grant eligibility. See Table II for variable definitions. All regressions include high school graduation year dummies, the interactions of high school graduation year dummies with Eligible A, and controls. Controls are sex, race, family income at the time of high school graduation. $p < 0.10$, $p < 0.05$, $p < 0.01$.

TABLE V: Merit Eligibility & Educational Attainment, Achievement, and Wages

	(1)	(2)	(3)	(4)	(5)	(6)
	Highest	AA or	MA or	College GPA		Wages at
	Grade	more	more	Self	Transcript	Age 30
EligibleSTA	-0.306	-0.0543	-0.0427	-0.0755	-0.172	-3292.9
	(0.220)	(0.0313)	(0.0329)	(0.0398)	(0.129)	(3449.7)
EligibleS	0.150	0.00670	0.0250	-0.00356	-0.00648	4138.7
	(0.0789)	(0.0287)	(0.0126)	(0.0343)	(0.0747)	(1878.3)
EligibleST	-0.378	-0.0233	-0.0210	-0.00942	-0.0258	-3139.3
	(0.153)	(0.0363)	(0.0199)	(0.0250)	(0.0758)	(2443.2)
EligibleSA	0.0248	-0.0234	-0.00814	0.0579	0.0176	-1549.1
	(0.171)	(0.0279)	(0.0331)	(0.0505)	(0.0990)	(2732.6)
EligibleA	2.803	0.388	0.510	0.0775	1.301	8972.5
	(0.521)	(0.146)	(0.155)	(0.147)	(0.849)	(18116.3)
Mean of Dep. Var.	15.20	0.539	0.121	3.028	2.359	45370.3
N	4569	4590	4590	3765	2520	3043

OLS Reduced Form Estimations. Standard errors are in parentheses (clustered at the high school state level). See Table II for variable definitions. All regressions include high school graduation year dummies, the interactions of high school graduation year dummies with Eligible A, and controls. Controls are sex, race, family income at the time of high school graduation. $p < 0.10$, $p < 0.05$, $p < 0.01$.

TABLE VI: Effect of Student Loans on Debt Holdings at Age 25

	(1) Having Debt	(2) Debt Amount	(3) Still Owed Student Loans	(4) Debt-Student Loans Owed
Student Loan Amount	-0.000000783	2.319	2.434	-0.115
	(0.0000227)	(1.007)	(0.658)	(0.648)
Asymptotic P-value	0.972	**0.0210**	**0.000**	0.859
Bootstrap P-value	0.987	**0.002**	**0.002**	0.863
EligibleS	-0.00607	157.4	-270.8	428.1
	(0.0268)	(1661.5)	(1011.4)	(1024.0)
EligibleST	-0.00343	460.3	1465.9	-1005.6
	(0.0434)	(1619.4)	(927.1)	(1135.5)
EligibleSA	-0.0518	-1300.6	-1358.6	58.08
	(0.0308)	(1724.2)	(926.8)	(1139.8)
EligibleA	0.0572	3747.2	3274.6	472.5
	(0.204)	(7489.1)	(5967.5)	(5112.1)
First Stage F-stat	8.067	8.067	8.067	8.067
Mean of Dep. Var.	0.783	15575.7	7163.8	8411.8
N	3656	3656	3656	3656

2SLS estimations where merit grant eligibility ($EligibleSTA$) is the instrument. Standard errors are in parentheses (clustered at the high school state level). See Table II for variable definitions. All regressions include high school graduation year dummies, the interactions of high school graduation year dummies with Eligible A and controls. Controls are sex, race, family income at the time of high school graduation. To ensure comparability across columns, I restrict the sample to individuals for whom I have data on both debt at age 25 and the amount owed on student loans at age 25.

TABLE VII: Effect of Student Loans on Debt Holdings at Age 30

	(1) Having Debt	(2) Debt Amount	(3) Still Owed Student Loans	(4) Debt-Student Loans Owed
Student Loan Amount	-0.00000971	-0.990	0.392	-1.383
	(0.0000306)	(1.615)	(1.448)	(0.758)
Asymptotic P-value	0.751	0.540	0.786	**0.068**
Bootstrap P-value	0.749	0.579	0.793	**0.062**
EligibleS	-0.0373	-996.1	-236.0	-760.1
	(0.0333)	(2587.1)	(1953.3)	(1223.4)
EligibleST	0.000128	-1468.6	-726.8	-741.8
	(0.0335)	(2422.9)	(1886.1)	(1337.2)
EligibleSA	0.00432	-2751.6	-194.7	-2557.0
	(0.0467)	(3259.9)	(2354.4)	(1553.5)
EligibleA	0.144	56240.5	20114.0	36126.5
	(0.301)	(34635.8)	(17168.6)	(28422.2)
First Stage F-stat	6.458	6.458	6.458	6.458
Mean of Dep. Var.	0.767	21283.5	10752.1	10531.3
N	3456	3456	3456	3456

2SLS estimations where merit grant eligibility ($EligibleSTA$) is the instrument. Standard errors are in parentheses (clustered at the high school state level). See Table II for variable definitions. All regressions include high school graduation year dummies, the interactions of high school graduation year dummies with Eligible A, and controls. Controls are sex, race, family income at the time of high school graduation. To ensure comparability across columns, I restrict the sample to individuals for whom I have data on both debt at age 30 and the amount owed on student loans at age 30.

TABLE VIII: Effect of Student Loans on Different Types of Debts at Age 30

	(1) Have House Debt	(2) Have Vehicle Debt	(3) Owe Other Business Debt	(4) Owe Credit Card Debt	(5) Payments Acc. to Schedule
Student Loan Amount	-0.0180	0.000237	-0.0227	-0.0323	0.0284
	(0.0173)	(0.0265)	(0.0188)	(0.0212)	(0.0200)
Asymptotic P-value	0.299	0.993	0.228	0.127	0.155
Bootstrap P-value	0.296	0.977	0.170	**0.086**	0.106
EligibleS	-0.0279	-0.0539	-0.0719	-0.0865	0.0236
	(0.0337)	(0.0361)	(0.0314)	(0.0336)	(0.0328)
EligibleST	-0.0294	0.0352	0.0149	0.0400	-0.0107
	(0.0359)	(0.0305)	(0.0311)	(0.0338)	(0.0338)
EligibleSA	-0.0398	0.00250	0.0652	0.00109	0.00784
	(0.0320)	(0.0441)	(0.0268)	(0.0536)	(0.0400)
EligibleA	0.151	-0.0565	0.0841	0.121	-0.00593
	(0.195)	(0.335)	(0.201)	(0.399)	(0.223)
First Stage F-stat	6.894	5.487	7.755	9.822	7.626
Mean of Dep. Var.	0.341	0.535	0.192	0.472	0.822
N	3592	2761	3626	2176	3622

2SLS estimations where merit grant eligibility ($EligibleSTA$) is the instrument. Standard errors are in parentheses (clustered at the high school state level). See Table II for variable definitions. All regressions include high school graduation year dummies, the interactions of high school graduation year dummies with Eligible A, and controls. Controls are sex, race, family income at the time of high school graduation. Student loan amount is divided by $1000 for ease of interpretation. Hence, the estimated coefficients reflect the effect of a $1000 in student loans.

TABLE IX: Effect of Student Loans on Educational Attainment, Achievement, and Wages

	(1)	(2)	(3)	(4)	(5)	(6)
	Highest	AA or	MA or	College GPA		Wages at
	Grade	more	more	Self	Transcript	Age 30
Student Loan Amount	0.115	0.0250	0.0202	0.0391	0.0745	1730.4
	(0.105)	(0.0150)	(0.0172)	(0.0266)	(0.0719)	(1784.5)
Asymptotic P-value	0.273	**0.0960**	0.241	0.142	0.300	0.332
Bootstrap P-value	0.310	0.110	0.282	**0.036**	0.1642	0.360
EligibleS	0.243	0.0315	0.0410	0.0204	0.152	5164.1
	(0.0803)	(0.0211)	(0.0177)	(0.0479)	(0.0977)	(2328.8)
EligibleST	-0.419	-0.0267	-0.0192	-0.00250	-0.116	-2451.2
	(0.166)	(0.0353)	(0.0233)	(0.0403)	(0.0734)	(2549.9)
EligibleSA	-0.116	-0.0522	-0.0321	0.0178	-0.114	-2473.8
	(0.158)	(0.0269)	(0.0304)	(0.0522)	(0.0844)	(2704.4)
EligibleA	2.605	0.364	0.485	-0.0581	0.946	651.3
	(0.660)	(0.152)	(0.174)	(0.237)	(1.418)	(24617.5)
First Stage F-stat	8.061	7.894	7.894	8.228	4.457	5.885
Mean of Dep. Var.	15.40	0.574	0.129	3.031	2.418	46138.8
N	4141	4157	4157	3703	2321	2794

2SLS estimations where merit grant eligibility ($EligibleSTA$) is the instrument. Standard errors are in parentheses (clustered at the high school state level). See Table II for variable definitions. All regressions include high school graduation year dummies, the interactions of high school graduation year dummies with Eligible A, and controls. Controls are sex, race, family income at the time of high school graduation. Student loan amount is divided by $1000 for ease of interpretation. Hence, the estimated coefficients reflect the effect of a $1000 in student loans.

TABLE X: Effect of Student Loans on Risk Preferences and Mental Well-being

	(1)	(2)	(3)	(4)	(5)
Dependent Variable:	Averse to Risk	Open to Take General Risks	Open to Take Financial Risks	MHI-5 Score 2010	MHI-5 Score 2015
Categories:	(1: Risk Neutral/Loving, 4: Most Risk Averse)	(0: Unwilling to take any risks, 10: Fully Prepared to take risks)			
Student Loan Amount	-0.101	0.00513	0.0110	0.592	-0.416
	(0.0582)	(0.0942)	(0.123)	(0.696)	(0.970)
Asymptotic P-value	**0.0840**	0.957	0.929	0.395	0.668
Bootstrap P-value	**0.0380**	0.957	0.963	0.404	0.575
EligibleS	-0.0147	-0.0383	0.00641	-0.110	1.249
	(0.0952)	(0.146)	(0.155)	(1.104)	(0.664)
EligibleST	0.00489	-0.0719	-0.0362	0.121	-0.496
	(0.0882)	(0.153)	(0.174)	(0.949)	(0.943)
EligibleSA	-0.122	0.0898	-0.0438	1.047	-1.121
	(0.0666)	(0.157)	(0.168)	(1.192)	(1.116)
EligibleA	1.136	-0.330	-1.305	-0.859	2.103
	(0.791)	(0.905)	(1.329)	(7.154)	(8.736)
First Stage F-stat	6.481	5.926	6.012	6.201	4.833
Mean of Dep. Var.	3.054	5.673	4.073	72.19	73.45
N	3598	3700	3693	3409	3232

2SLS estimations where merit grant eligibility ($EligibleSTA$) is the instrument. Standard errors are in parentheses (clustered at the high school state level). See Table II for variable definitions. All regressions include high school graduation year dummies, the interactions of high school graduation year dummies with Eligible A, and controls. Controls are sex, race, family income at the time of high school graduation. Columns (4) and (5) additionally control for MHI-5 score of respondent in 2000. Student loan amount is divided by $1000 for ease of interpretation. Hence, the estimated coefficients reflect the effect of a $1000 in student loans.

TABLE XI: Effect of Student Loans on Debt Holdings at Age 30, Subsample: Below Median-Parental Income

	(1) Having Debt	(2) Debt Amount	(3) Still Owed Student Loans	(4) Debt-Student Loans Owed
Student Loan Amount	-0.0000298	0.730	2.990	-2.260
	(0.0000357)	(3.180)	(2.906)	(1.656)
Asymptotic P-value	0.404	0.818	0.303	0.172
Bootstrap P-value	0.370	0.837	0.220	**0.060**
EligibleS	-0.0470	-1138.5	116.6	-1255.0
	(0.0507)	(2580.8)	(2628.7)	(2046.9)
EligibleST	-0.0503	768.9	2071.6	-1302.6
	(0.0698)	(6072.5)	(4942.2)	(3746.8)
EligibleSA	0.0287	-2803.8	-312.6	-2491.2
	(0.0604)	(6125.4)	(5151.8)	(3460.3)
EligibleA	0.426	66765.2	51085.2	15680.0
	(0.338)	(41947.7)	(30225.9)	(16344.7)
First Stage F-stat	2.614	2.614	2.614	2.614
Mean of Dep. Var.	0.777	21393.4	11938.8	9454.6
N	1167	1167	1167	1167

2SLS estimations where merit grant eligibility ($EligibleSTA$) is the instrument. Standard errors are in parentheses (clustered at the high school state level). See Table II for variable definitions. The sample is restricted to individuals whose parental income at the end of high school graduation year lie below the median of the income distribution. All regressions include high school graduation year dummies, the interactions of high school graduation year dummies with Eligible A, and controls. Controls are sex, race, family income at the time of high school graduation. To ensure comparability across columns, I restrict the sample to individuals for whom I have data on both debt at age 30 and the amount owed on student loans at age 30.

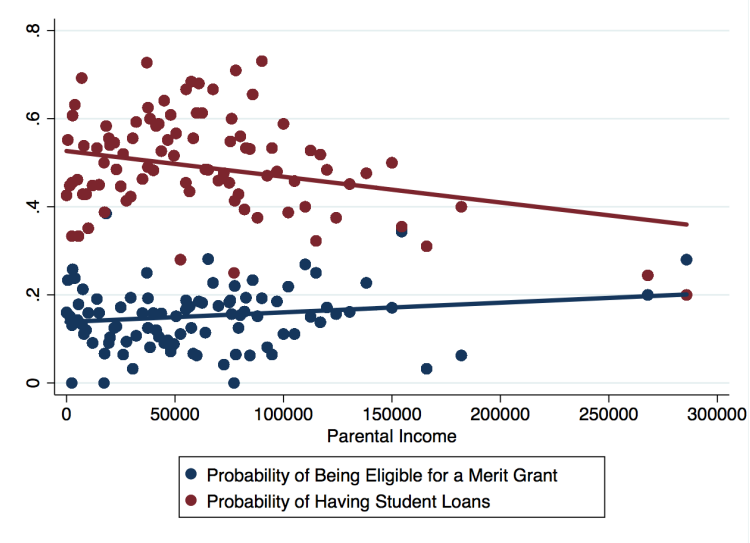
TABLE XII: Effect of Student Loans on Different Types of Debts at Age 30, Subsample: Below-Median Parental Income

	(1) Have House Debt	(2) Have Vehicle Debt	(3) Owe Other Business Debt	(4) Owe Credit Card Debt	(5) Payments Acc. to Schedule
Student Loan Amount	-0.0754	-0.0418	-0.0140	-0.00878	0.0205
	(0.0575)	(0.0477)	(0.0371)	(0.0375)	(0.0388)
Asymptotic P-value	0.190	0.381	0.706	0.815	0.598
Bootstrap P-value	**0.052**	0.232	0.477	0.789	0.545
EligibleS	0.0108	-0.200	-0.0767	-0.0727	0.0966
	(0.0676)	(0.0813)	(0.0409)	(0.0782)	(0.0313)
EligibleST	-0.157	0.0512	0.0637	0.0749	-0.0567
	(0.0780)	(0.0775)	(0.0685)	(0.0473)	(0.0747)
EligibleSA	-0.0654	0.0871	0.0663	0.0989	-0.0634
	(0.0972)	(0.0823)	(0.0497)	(0.0818)	(0.0562)
EligibleA	0.373	-0.0457	0.393	-0.170	-0.431
	(0.761)	(0.193)	(0.330)	(0.919)	(0.344)
First Stage F-stat	2.344	2.206	2.597	1.996	2.505
Mean of Dep. Var.	0.294	0.517	0.198	0.515	0.812
N	1226	902	1235	664	1235

2SLS estimations where merit grant eligibility ($EligibleSTA$) is the instrument. Standard errors are in parentheses (clustered at the high school state level). See Table II for variable definitions. The sample is restricted to individuals whose parental income at the end of high school graduation year lie below the median of the income distribution. All regressions include high school graduation year dummies, the interactions of high school graduation year dummies with Eligible A, and controls. Controls are sex and race, family income at the time of high school graduation. Student loan amount is divided by $1000 for ease of interpretation. Hence, the estimated coefficients reflect the effect of a $1000 in student loans.

FIGURES

FIGURE I: Relationship between Eligibility for Merit-Based Grants, Student Loans and Parental Income



APPENDIX:
ONCE IN DEBT, ALWAYS IN DEBT? EFFECTS OF STUDENT LOANS ON DEBT HOLDINGS

Fulya Ersoy

A Details on Constructed Variables

To construct the instrument, merit grant eligibility ($EligibleSTA$), I use information on state merit-based grant programs listed in Table I and data from the NLSY97 on the state where students attended high school, high school graduation year, and academic achievement during high school. The instrument is equal to 1 if an individual attends a high school in a state where merit-based scholarships are offered at the time the individual graduates from high school and the individual satisfies the academic achievement criteria of that state. Some of the states (California, Maryland, Oklahoma, and Washington to be precise) have a need-based criterion in addition to the merit one. I do not incorporate the need-based criterion in constructing the instrument. I also do not take into account the additional requirements listed in Appendix Table II since whether a student satisfies these requirements is likely to be endogenous. Appendix Table IV presents the summary statistics for this variable.

Determining whether students satisfy the eligibility criteria of their states is not straightforward for three reasons. First, the academic eligibility criterion varies state by state and sometimes it is not well-defined. For these cases, I proceed as follows. If the criterion is "top X% of HS class" as in the case of Alaska, Illinois, New Jersey, and Washington, I calculate the empirical distribution of high school GPA for the relevant state and use that GPA as the eligibility cutoff. If the criterion is "ACT/SAT score should be more than X^{th} percentile of the state score distribution" as in the case of Georgia, Illinois, Michigan, Missouri, North Dakota, and Washington, I look up the ACT/SAT score for those percentiles and build the criteria accordingly. If the criterion is somewhat subjective as in the case of Michigan, Nevada, and New York, I determine a reasonable

criterion based on GPA. Second, two different high school GPA measures are available in the NLSY97: self-reported and transcript-based. If transcript-based GPA is available, I use it as high school GPA. If it is not available, I use self-reported GPA as the high school GPA of the individual. Third, SAT and ACT scores reported in the NLSY97 are somewhat coarse. For SAT scores, I know whether an individual's score is in the range of $[X, X + 200)$ where $X \in \{400, 500, ..., 1400\}$. For ACT scores, I know whether an individual's score is in the range of $[X, X + 5]$ where $X \in \{7, 13, 19, 25, 31\}$.

Merit grant eligibility ($EligibleSTA$) is an instrument for student loans only after controlling for all the lower level terms. Here, I define these terms for completeness. $EligibleS$ is a dummy variable indicating whether an individual attends a high school in a state where merit-based scholarships are ever offered and $EligibleST$ is a dummy variable indicating whether an individual attends a high school in a state where merit-based scholarships are offered at the time the individual graduates from high school. $EligibleA$ is a dummy variable indicating whether the individual has high academic achievement. This variable is not state-dependent. I construct this variable such that it is equal to one under one of the following three conditions: 1. if the instrument is equal to one, 2. if the student has a high school GPA higher than or equal to 3.25 and the student has a high SAT/ACT score (an SAT score of 1000 or above or an ACT score of 19 or above), 3. if the student has a high school GPA higher than or equal to 3.5 and the student does not report ACT/SAT scores. $EligibleSA$ is the interaction of $EligibleS$ with $EligibleA$. Appendix Table IV presents the summary statistics for these variables.

Having Student Loans and *Student Loan Amount* variables are constructed based on the information from the first post-secondary institution attended. *Having Student Loans* is equal to one if the student borrowed through student loans in any of terms of any of the years attending his or her first post-secondary institution. *Student Loan Amount* is the sum of the amounts the student borrowed through student loans in any of terms of any of the years attending his or her first post-secondary institution.

To construct *Having Merit Grants* variable, I use information from the NLSY97, Table I, and Appendix Table II jointly. The variable is equal to zero if an individual is not eligible for merit-based grants, if the individual reports not having any grants in the NLSY97, or if the individual fails to satisfy at least one of the criteria listed in Appendix Table II. For example, for an individual who graduated from a high school in New Mexico, this variable would have been equal to zero if he went to college in a different state, he enrolled part-time, he didn't start college immediately after high school graduation, or he chose a private institution. If the individuals are eligible for merit-based grants ($EligibleSTA = 1$), report having grants, and satisfy all the criteria relevant for the state where they attended high school, then the variable is equal to one. Appendix Table IV presents the summary statistics for this variable.

To construct *Amount of Merit Grants* variable, I use Appendix Table III and tuition data from the National Center for Education Statistics (NCES). The variable is equal to zero if an individual does not have merit-based grants. Otherwise, the award amount is calculated based on the awards reported in Appendix Table III for the state where the individual attended high school. The award might vary based on the type of institution, enrollment status, and type of degree. For the cases where the award amount is specified as "Tuition and Fees" in Appendix Table III, I obtain within-state tuition and fees information from the NCES for the first post-secondary institution the individual attended for the year the individual started college. Then, I calculate the total award amount by multiplying years spent in the first post-secondary institution and award amount per year unless it is a one-time award. For individuals spending more than 4 years (2 years) in a 4-year institution (2-year institution), I calculate the total award amount by multiplying award amount per year with four (two) since students can only get merit-based grants for normal program duration. If the calculated amount of merit-based grants turns out to be greater than the total grant amount reported in the NLSY97 (which was the case for 163 individuals), I replace the calculated amount of merit-based grants by the total grant amount reported in the NLSY97. Appendix Table IV presents the summary statistics for this variable.

B RELATIONSHIPS BETWEEN MERIT GRANT ELIGIBILITY, MERIT-BASED GRANTS, AND STUDENT LOANS

To understand the relationship between merit grants and student loans better, I first look at how merit grant eligibility relates to the propensity of having merit-based grants and the amount of merit-based grant students hold. Then, I investigate how merit-based grants affect student loans, using merit grant eligibility as an instrument.

How does merit grant eligibility relate to holding merit-based grants and the amount of merit-based grants?

Investigating how merit grant eligibility relates to merit-based grants is helpful to understand how the instrument works. However, the NLSY97 only provides data on overall grants and does not have data on whether an individual has merit-based grants or the amount of these grants. To address this shortcoming, I construct two variables using the educational history of an individual from the NLSY97 and information on merit-based grant programs: *Having Merit Grants* and *Amount of Merit Grants*. Individuals will not have merit-based grants if they are not eligible for merit-based grants or if they report not having any grants in the NLSY97. Not all of the remaining individuals will get merit-based grants. The individuals also need to satisfy the additional eligibility criteria listed in Appendix Table II to be categorized as having merit-based grants. To determine the amount of merit-based grants, I use Appendix Table III and data from the National Center for Education Statistics (NCES) on the tuition and fees of each post-secondary institution.[34] Based on these calculations, 9.6% of the individuals in my sample have merit-based grants and the average merit-based grant amount is $414 as reported in Appendix Table IV.

Appendix Table VI shows how merit grant eligibility relates to merit-based grants after controlling for all lower level interactions. In Columns (1) and (2), the dependent variable is whether an

34. See Appendix A for a detailed description of the construction of these two variables.

individual has merit-based grants at the first post-secondary institution. We see that being eligible for a state merit-based grant increases the probability of having merit-based grants by approximately 67 percentage points (statistically significant at the 1% level). In Columns (3) and (4), the dependent variable is the amount of merit -based grants an individual has at the first post-secondary institution. We see that being eligible for a state merit-based grant increases the amount of merit-based grants by approximately $2900 (statistically significant at the 1% level). These results show the strong and statistically significant linkage between eligibility for merit grants and merit-based grants themselves.

How do merit-based grants affect student loans?

Finally, to better understand the magnitudes, I look at how merit-based grants influence student loans. To do so, I instrument merit-based grants with merit grant eligibility and run a 2SLS regression. Table VII presents the results. In Columns (1) and (2), the dependent variable is whether an individual has student loans at the first post-secondary institution and the endogenous variable is whether the individual has merit-based grants at the first post-secondary institution. I find that having merit-based grants reduces the probability of having student loans by 10 percentage points (though not statistically significant). In Columns (3) and (4), the dependent variable is the amount of student loans at the first post-secondary institution and the endogenous variable is the amount of merit-based grants at the first post-secondary institution. I find that a $1 increase in merit-based grants leads to a 62-cent decrease in student loans (statistically significant at the 1% level).

Since student loans and merit grants are two different ways of financing postsecondary education, it is important to understand the complementarities between the two from a policy perspective. This finding suggests that student loans and merit grants are not perfect substitutes. Increasing merit grants by $1 decreases student loans only by 62 cents. This finding is in line with the finding of Marx and Turner (2018) about the effect of need-based grants on student loans. By using data from City University of New York students and utilizing a regression discontinuity design, the

authors find that $1 increase in Pell Grant aid reduces first-year students' borrowing by 43 cents.

C SAT SCORE MANIPULATION

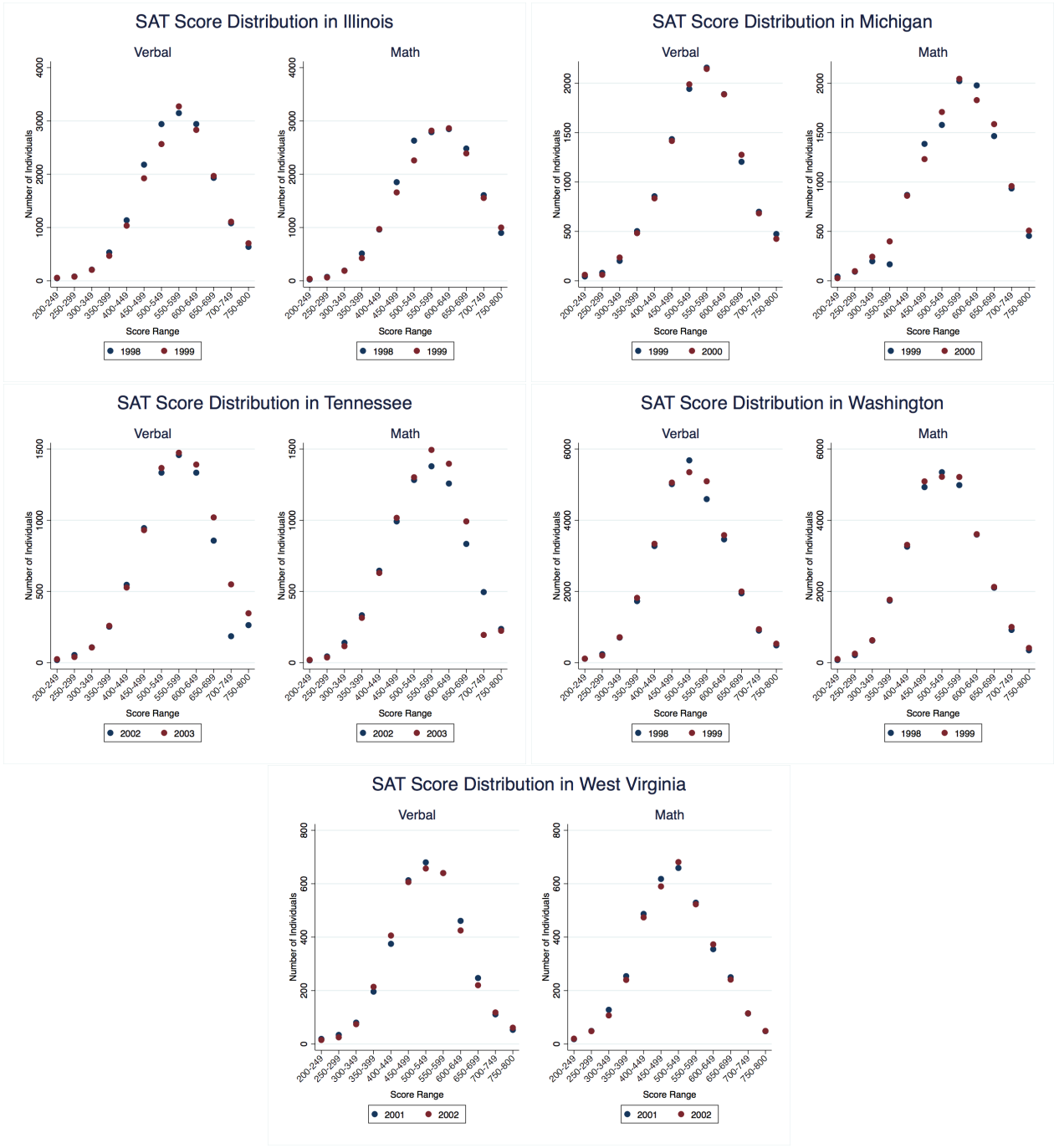
Onee can test whether the introduction of state merit-based grants leads to jumps in the distribution of achievement test scores around score thresholds by using external data. I contacted College Board to request SAT score distributions for each state for each year. Although I need a fine distribution of scores for a proper test of jumps in the distribution, College Board was only able to provide me SAT score distributions at 50 point increments for each state from 1998 till 2008. Additionally, the distributions are separate for verbal and math scores whereas a proper test would require total score distributions since the thresholds for merit grant programs are in terms of total scores. Given the time frame of College Board data, start date of merit-based grant programs in my sample, and achievement requirements in Table I, I expect to be able to detect SAT score manipulations only in 5 states: Illinois (1999), Michigan (2000), Tennessee (2003), Washington (1999), West Virginia (2002). The thresholds are 1340, 1180, 890, 1200, and 1000 for Illinois, Michigan, Tennessee, Washington, West Virginia, respectively.

Keeping in mind the caveat of the coarse nature of the data and non-existence of data on total score distributions, I do not find evidence of SAT score manipulation. Appendix Figure I displays the SAT score distributions for the year the merit grant program was introduced and the year before. Each of the subfigures belong to a different state: Illinois, Michigan, Tennessee, Washington, West Virginia, respectively. For each of the subfigures, the left panel shows the distribution of verbal scores and the right panel shows the distribution of math scores. Overall, the figures do not suggest a coherent story. For example, for Washington we see a clear jump from 500-549 range to 550-559 range for verbal scores whereas for Tennessee we see an overall shift in the distribution of verbal scores towards better scores. For Michigan, it looks like there are two jumps in the distribution of math scores, one from 450-499 range to 500-549 range and one from 600-649 range to 650-699 range. In Tennessee, the number of students in 700-749 score range considerably dropped for math

score distribution after the introduction of merit grant program. Even though some of these jumps in the distributions seem large, similar jumps in magnitude are present when I plot the SAT score distributions for the years other than the merit grant programs introduced (as a placebo check).

When I formally test whether the distributions for the year that the merit grant program was introduced and the distribution for the year before are different from each other using chi-square independence test, I find that all of the comparisons are statistically different. However, placebo tests reveal that the distributions of any consecutive years are also always statistically significantly different from each other regardless of which year is selected. The patterns suggest that although there is considerable variation in SAT score distributions across years, it is not systematically tied to the introduction of state merit-based grant programs.

FIGURE I: SAT Score Distributions



D APPENDIX TABLES

TABLE I: Summary Statistics

	Observations	Mean	St Dev	Min	Max
Demographics					
Male	4593	0.465	0.499	0	1
Ethnicity					
White	4593	0.566	0.496	0	1
Hispanic	4593	0.188	0.391	0	1
Black	4593	0.235	0.424	0	1
Mixed	4593	0.0109	0.104	0	1
Family Income @ HS End Year	3153	64770.8	63299.7	0	425586
Education					
High School GPA	4593	2.975	0.596	.42	4.17
College GPA (transcript)	2520	2.359	1.068	0	4
College GPA (self-reported)	3765	3.028	0.636	0	4
Full-Time	4236	0.825	0.380	0	1
College Type					
Public	4532	0.769	0.422	0	1
Private Non Profit	4532	0.148	0.355	0	1
Private For Profit	4532	0.0832	0.276	0	1
Highest Grade	4569	15.20	2.358	7	20
Highest Degree					
GED or HS	4590	0.461	0.499	0	1
Associate or Bachelor	4590	0.418	0.493	0	1
Masters	4590	0.0967	0.296	0	1
PhD or Professional	4590	0.0244	0.154	0	1

	Observations	Mean	St Dev	Min	Max
Having Grants	4233	0.684	0.465	0	1
Having Student Loans	4233	0.447	0.497	0	1
Grant Amount	4059	7053.6	13222.5	0	161000
Student Loan Amount	4160	3762.8	7815.8	0	172000
Age 25					
Having					
Debt	4164	0.789	0.408	0	1
Student Loan Debt	4314	0.409	0.492	0	1
Vehicle Debt	2898	0.547	0.498	0	1
House Debt	4262	0.154	0.361	0	1
Credit Card Debt	2446	0.720	0.449	0	1
Other Business Debt	4299	0.197	0.398	0	1
Amount of					
Debt	4164	15863.3	21859.0	0	370000
Student Loan Debt	4156	7145.5	16630.2	0	250000
Vehicle Debt	2898	6911.3	10725.1	0	250000
House Debt	4262	20528.2	58547.7	0	325000
Credit Card Debt	2446	2645.0	4562.6	0	50000
Other Business Debt	4186	886.6	7766.7	0	370000
Annual Wages	3139	29751.3	19501.4	0	130254
Age 30					
Having					
Debt	3891	0.772	0.420	0	1
Student Loan Debt	4024	0.509	0.500	0	1
Vehicle Debt	3031	0.531	0.499	0	1
House Debt	3969	0.330	0.470	0	1

	Observations	Mean	St Dev	Min	Max
Credit Card Debt	2302	0.473	0.499	0	1
Other Business Debt	4006	0.196	0.397	0	1
Amount of					
Debt	3891	21536.6	30881.3	0	370000
Student Loan Debt	3906	10741.9	24096.8	0	300000
Vehicle Debt	3031	8012.2	11712.2	0	100000
House Debt	3969	51739.0	87706.7	0	325000
Credit Card Debt	2302	2661.3	5332.8	0	83300
Other Business Debt	3915	1163.3	10088.7	0	370000
Annual Wages	3043	45370.3	32978.7	0	212641

Summary Statistics of individuals for whom data on high school graduation year, state of high school, and high school GPA are available and who have some post-secondary education. *HS* means High School. *Full-Time* is equal to 1 if a student enrolls the first post-secondary institution as a full time student. *College Type* indicates the type of the first post-secondary institution. *Having Grants* or *Having Student Loans* is equal to 1 if a student has grants or student loans in the first post-secondary institution, respectively. Similarly, *Grant Amount and Student Loan Amount* correspond to the amounts at the first post-secondary institution. *Having Student Loan Debt* at Age 25 and or Age 30 is equal to 1 if the individual still holds some student loan debt from any post-secondary institutions attended. Similarly, the *Amount of Student Loan Debt* at Age 25 or at Age 30 corresponds to the amount of student loan debt the individual still holds from all the post-secondary institutions attended.

TABLE II: Other Eligibility Requirements for State Merit-Based Grants

State	Same State	Full Time	Gap	Four-Year	Public
Alaska	Yes	Yes	Immediate	No	Yes
Arkansas	No	Yes	1 year	Yes	No
Arkansas	No	Yes	1 year	Yes	No
California	Yes	No	Immediate	No	No
Florida	Yes	No	3 years	No	No
Georgia	Yes	No	N/A	No	No
Idaho	Yes	Yes	N/A	No	Yes
Illinois	No	No	N/A	No	No
Kentucky	Yes	?	N/A	?	No
Louisiana	Yes	Yes	1 year	?	No
Maryland	Yes	Yes	N/A	No	No
Michigan	No	?	N/A	?	?
Mississippi	Yes	Yes	N/A	No	No
Missouri	Yes	Yes	Immediate	?	No
Nevada	Yes	Yes	N/A	No	Yes
New Jersey	Yes	Yes	2 years	Yes	No
New Mexico	Yes	Yes	Immediate	No	Yes
New York	Yes	Yes	Immediate	No	No
North Dakota	Yes	Yes	N/A	?	Yes
Oklahoma	Yes	No	3 years	No	No
South Carolina	Yes	Yes	N/A	No	No
Tennessee	Yes	No	1 year	No	No
Utah	Yes	Yes	Immediate	No	No
Washington	Yes	?	N/A	?	No
West Virginia	Yes	Yes	2 years	No	No

This table presents the eligibility requirements other than achievement for state merit-based grants. *Same State* indicates whether a student needs to graduate from high school and enroll college within the merit granting state, *Full Time* indicates whether a student should be a full-time college student, *Gap* demonstrates until when a student should enter college after high school graduation, *Four-Year* indicates whether a student needs to enroll a four-year institution, and *Public* shows whether a student needs to be in a public institution to be eligible for the merit-based grant. California, Maryland, Oklahoma, and Washington have some income ceilings in addition to these requirements which are not incorporated in the variable construction. For the fields marked with "?", no information is available.See Appendix A for more details on how these requirements are used to construct *Having Merit Grants* variable. Sources: State webpages and Merit Program websites. I use https://archive.org/web/ to obtain archived copies of relevant state webpages and merit program websites for the periods of interest. Although it would be ideal to have this data for each year in that the merit program is active, I only use the earliest available data since it was not feasible to obtain this data for each year. This is unlikely to be a problem since the criteria do not seem to have much variation across years.

TABLE III: Award Amounts for State Merit-Based Grants

State	Award Amounts
Alaska	$1375 per semester
Arkansas	$2500 in Freshman year, $2750 in Sophomore year, $3000 in Junior year, $3500 in Senior year
California	Tuition and Fees with a max of $9780 per year for private institutions
Florida	$3465 per semester for 4-year institution, $2160 per semester for two year institution
Georgia	Tuition and Fees+$300 per year for Public Institutions, $3500 per year for Private Institutions Full Time Enrollment, $1750 per year for Private Institutions Part Time Enrollment
Idaho	$250 per semester for 2 years
Illinois	$1000 one time
Kentucky	Min $125 per year, Max $1000 per year, depends on HS GPA and ACT score
Louisiana	Tuition and Fees for public institutions, Average public Tuition and Fees for private institutions
Maryland	$3000 per year for 4-year institution, $1000 per year for 2-year institution
Michigan	$2500 one time
Mississippi	$500 in Freshman Year and Sophomore Year, $1000 in Junior and Senior Year
Missouri	$3000 per year
Nevada	Tuition and Fees
New Jersey	$5000 per year
New Mexico	Tuition and Fees
New York	$1500 per year
North Dakota	Tuition and Fees
Oklahoma	Tuition and Fees for public institutions, Average public Tuition and Fees for private institutions
South Carolina	Tuition and Fees+$300 per year with a max of $5000 per year
Tennessee	$3000 per year for 4-year institution, $1500 per year for 2-year institution
Utah	$1250 per semester for a maximum of 2 years
Washington	$1225 per year if college start year 1999, $1542 per year if college start year 2000 and afterwards (both for a max of 2 years)
West Virginia	Tuition and Fees with a max of $4750 per year

This table presents the award amounts for state merit-based grants. See Appendix A for more details on how these award amounts are used to construct *Amount of Merit Grants* variable. Sources: State webpages, Merit Program websites, and Dynarski (2004). I use https://archive.org/web/ to obtain archived copies of relevant state webpages and merit program websites for the periods of interest. Although it would be ideal to have this data for each year in that the merit program is active, I only use the earliest available data since it was not feasible to obtain this data for each year. This is unlikely to be a problem since the grant amounts do not seem to have much variation across years for the programs offering fixed amounts and I am able to capture the variation in grants for programs that pay for tuition and fees.

TABLE V: Tabulations of Eligibility by High School Graduation Year

HS Graduation Year	$EligibleST_{jt} = 0$	$EligibleST_{jt} = 1$	$EligibleSTA_{ijt} = 0$	$EligibleSTA_{ijt} = 1$
1997	25	5	29	1
1998	369	131	464	36
1999	601	293	815	79
2000	556	384	816	124
2001	436	507	762	181
2002	435	499	754	180
2003	172	180	290	62
Total	2594	1999	3930	663

$EligibleST_{jt}$ is equal to 1 if an individual attends a high school in as state where merit-based scholarships are offered at the time the individual graduates from high school. $EligibleSTA_{ijt}$ is equal to 1 if an individual attends a high school in a state where merit-based scholarships are offered at the time the individual graduates from high school and the individual satisfies the academic achievement criteria of that state. HS stands for high school.

TABLE IV: Summary Statistics for the Constructed Variables

	Observations	Mean	St Dev	Min	Max
Merit Grant Eligibility (EligibleSTA)	4593	0.144	0.351	0	1
EligibleST	4593	0.435	0.496	0	1
EligibleSA	4593	0.228	0.419	0	1
EligibleS	4593	0.604	0.489	0	1
EligibleA	4593	0.339	0.473	0	1
Having Merit Grants	4593	0.0958	0.294	0	1
Merit Grant Amount	4587	413.9	2139.9	0	36312

Summary statistics of individuals for whom data on high school graduation year, state of high school and high school GPA are available and who have some post-secondary education. These variables are not readily available in the NLSY97. I construct them using information in Table I, Appendix Table II, and Appendix Table III in addition to the NLSY97 data. *Merit Grant Eligibility* ($EligibleSTA$) is a dummy indicating whether the individual attends a high school in a state where merit-based scholarships are offered at the time the individual graduates from high school and the individual satisfies the academic achievement criteria of that state, $EligibleST$ is a dummy indicating whether the individual attends a high school where merit-based scholarships are offered at the time the individual graduates from high school, $EligibleSA$ is the interaction of $EligibleS$ and $EligibleA$, $EligibleS$ is a dummy indicating whether the individual attends a high school in a state where merit-based scholarships are ever offered, and $EligibleA$ is a dummy indicating whether the individual has high academic achievement. *Having Merit Grants* is equal to 1 if an individual is predicted to have merit-based grants and the *Merit Grant Amount* is the predicted amount of merit-based grants. The construction of these variables is explained in detail in Appendix A.

TABLE VI: Merit Eligibility and Merit-Based Grants

	(1)	(2)	(3)	(4)
	Having Merit Grants		Amount of Merit Grants	
EligibleSTA	0.668	0.667	2901.7	2882.9
	(0.0404)	(0.0406)	(301.6)	(298.9)
EligibleS	-0.000831	-0.000803	-4.490	6.607
	(0.00109)	(0.00156)	(9.560)	(14.18)
EligibleST	0.00121	0.000413	6.544	3.443
	(0.00162)	(0.00151)	(13.89)	(14.97)
EligibleSA	-0.00246	-0.00257	-6.041	-6.315
	(0.00474)	(0.00468)	(27.53)	(29.51)
EligibleA	-0.0544	-0.0531	-239.5	-228.6
	(0.0412)	(0.0409)	(179.7)	(160.7)
Mean of Dep. Var.	0.0958	0.0958	413.9	413.9
Controls	No	Yes	No	Yes
N	4593	4593	4587	4587

OLS estimations. Standard errors are in parentheses (clustered at the high school state level). $EligibleSTA$ is merit grant eligibility. See Appendix Table IV for variable definitions. All regressions include high school graduation year dummies, the interactions of high school graduation year dummies with Eligible A, and controls. Controls are sex, race, family income at the time of high school graduation. $p < 0.10$, $p < 0.05$, $p < 0.01$.

TABLE VII: Effect of Merit-Based Grants on Student Loans

	(1)	(2)	(3)	(4)
	Having Student Loans		Amount of Student Loans	
Having Merit Grants	-0.102	-0.107		
	(0.0748)	(0.0692)		
Amount of Merit Grants			-0.620	-0.615
			(0.231)	(0.232)
EligibleS	-0.0910	-0.0815	-616.7	-463.4
	(0.0752)	(0.0704)	(756.5)	(680.3)
EligibleST	0.0376	0.0389	-395.8	-318.4
	(0.0621)	(0.0613)	(539.8)	(514.6)
EligibleSA	0.0230	0.0143	1095.1	949.5
	(0.0424)	(0.0404)	(667.6)	(660.4)
EligibleA	0.121	0.149	3226.3	3562.5
	(0.166)	(0.168)	(3095.6)	(3220.2)
Mean of Dep. Var.	0.447	0.447	0.448	0.448
Controls	No	Yes	No	Yes
N	4233	4233	4159	4159

2SLS estimations where EligibleSTA is the instrument. Standard errors are in parentheses (clustered at the high school state level). See Appendix Table IV for variable definitions. All regressions include high school graduation year dummies, the interactions of high school graduation year dummies with Eligible A, and controls. Controls are sex, race, family income at the time of high school graduation. $p < 0.10$, $p < 0.05$, $p < 0.01$.

TABLE VIII: Merit Eligibility and Debt Holdings at Age 25

	(1) Having Debt	(2) Debt Amount	(3) Still Owed Student Loans	(4) Debt-Student Loans Owed
EligibleSTA	0.0131	-4102.2	-4774.0	671.8
	(0.0435)	(1471.2)	(1531.7)	(1368.1)
EligibleS	-0.00304	-545.2	-1011.8	466.5
	(0.0279)	(971.7)	(1108.2)	(1132.8)
EligibleST	-0.0120	-779.6	556.2	-1335.7
	(0.0362)	(1038.5)	(1085.0)	(1042.4)
EligibleSA	-0.0467	873.4	890.8	-17.42
	(0.0392)	(2290.5)	(1702.2)	(1395.7)
EligibleA	-0.0275	14105.3	14790.1	-684.8
	(0.182)	(7144.8)	(6358.1)	(2974.3)
Mean of Dep. Var.	0.783	15575.7	7163.8	8411.8
N	4045	4045	4045	4045

OLS Reduced Form Estimations. Standard errors are in parentheses (clustered at the high school state level). See Appendix Table IV for variable definitions. All regressions include high school graduation year dummies, the interactions of high school graduation year dummies with Eligible A, and controls. Controls are sex, race, family income at the time of high school graduation. To ensure comparability across columns, I restrict the sample to individuals for whom I have data on both debt at age 25 and the amount owed on student loans at age 25. $p < 0.10$, $p < 0.05$, $p < 0.01$.

TABLE IX: Merit Eligibility and Debt Holdings at Age 30

	(1) Having Debt	(2) Debt Amount	(3) Still Owed Student Loans	(4) Debt-Student Loans Owed
EligibleSTA	0.0268	1992.4	-709.9	2702.3
	(0.0451)	(2446.4)	(2423.0)	(1066.4)
EligibleS	-0.0225	-1225.2	-859.1	-366.1
	(0.0268)	(1991.7)	(2050.8)	(876.6)
EligibleST	-0.0119	-1470.6	-588.9	-881.8
	(0.0239)	(1892.0)	(1808.9)	(1176.7)
EligibleSA	0.00356	-2480.5	578.0	-3058.5
	(0.0523)	(3249.9)	(2753.8)	(1540.0)
EligibleA	0.0907	41760.8	17718.8	24042.1
	(0.122)	(27951.3)	(17425.5)	(22333.8)
Mean of Dep. Var.	0.767	21283.5	10752.1	10531.3
N	3816	3816	3816	3816

OLS Reduced Form Estimations. Standard errors are in parentheses (clustered at the high school state level). See Appendix Table IV for variable definitions. All regressions include high school graduation year dummies, the interactions of high school graduation year dummies with Eligible A and controls. Controls are sex, race, family income at the time of high school graduation. To ensure comparability across columns, I restrict the sample to individuals for whom I have data on both debt at age 30 and the amount owed on student loans at age 30. $p < 0.10$, $p < 0.05$, $p < 0.01$.

TABLE X: Merit Eligibility and Different Types of Debts at Age 30

	(1) Have House Debt	(2) Have Vehicle Debt	(3) Owe Other Business Debt	(4) Owe Credit Card Debt	(5) Payments Acc. to Schedule
EligibleSTA	0.0142	0.0157	0.0515	0.0799	-0.0533
	(0.0314)	(0.0503)	(0.0277)	(0.0436)	(0.0274)
EligibleS	-0.0223	-0.0450	-0.0500	-0.0418	0.00812
	(0.0296)	(0.0342)	(0.0255)	(0.0226)	(0.0243)
EligibleST	-0.0202	0.0206	0.0151	0.0269	-0.0128
	(0.0368)	(0.0319)	(0.0229)	(0.0308)	(0.0216)
EligibleSA	-0.0495	0.00335	0.0395	-0.0459	0.0244
	(0.0351)	(0.0502)	(0.0272)	(0.0431)	(0.0332)
EligibleA	0.0364	-0.0524	-0.0586	-0.259	0.154
	(0.154)	(0.293)	(0.142)	(0.176)	(0.140)
Mean of Dep. Var.	0.330	0.531	0.196	0.473	0.813
N	3969	3031	4006	2302	4001

OLS Reduced Form Estimations. Standard errors are in parentheses (clustered at the high school state level). See Appendix Table IV for variable definitions. All regressions include high school graduation year dummies, the interactions of high school graduation year dummies with Eligible A, and controls. Controls are sex, race, family income at the time of high school graduation. $p < 0.10$, $p < 0.05$, $p < 0.01$.

TABLE XI: Student Loans and Debt Holdings at Age 25

	(1) Having Debt	(2) Debt Amount	(3) Still Owed Student Loans	(4) Debt-Student Loans Owed
Student Loan Amount	0.00000856	1.011	0.965	0.0460
	(0.00000111)	(0.0850)	(0.0655)	(0.0311)
EligibleS	-0.00673	249.3	-167.5	416.8
	(0.0285)	(1178.5)	(808.4)	(1084.0)
EligibleST	0.00475	-684.6	179.9	-864.5
	(0.0341)	(1058.2)	(846.3)	(858.2)
EligibleSA	-0.0488	-1720.5	-1830.3	109.8
	(0.0297)	(1814.6)	(1036.8)	(1106.2)
EligibleA	0.000776	11646.2	12146.8	-500.7
	(0.167)	(4949.0)	(4651.8)	(2997.3)
Mean of Dep. Var.	0.793	16086.0	7631.8	8454.2
N	3656	3656	3656	3656

OLS Estimates. Standard errors are in parentheses (clustered at the high school state level). See Appendix Table IV for variable definitions. All regressions include high school graduation year dummies, the interactions of high school graduation year dummies with Eligible A, and controls. Controls are sex, race, family income at the time of high school graduation. To ensure comparability across columns, I restrict the sample to individuals for whom I have data on both debt at age 25 and the amount owed on student loans at age 25. $p < 0.10$, $p < 0.05$, $p < 0.01$.

TABLE XII: Student Loans and Debt Holdings at Age 30

	(1) Having Debt	(2) Debt Amount	(3) Still Owed Student Loans	(4) Debt-Student Loans Owed
Student Loan Amount	0.0000109	1.061	1.008	0.0525
	(0.000000605)	(0.106)	(0.0872)	(0.0417)
EligibleS	-0.0325	-525.0	-94.51	-430.5
	(0.0253)	(1675.9)	(1665.4)	(1003.8)
EligibleST	0.0127	-212.7	-349.6	137.0
	(0.0230)	(1874.3)	(1618.8)	(1225.3)
EligibleSA	0.00940	-2245.9	-42.76	-2203.1
	(0.0414)	(2815.3)	(2224.8)	(1447.5)
EligibleA	-0.00992	40946.9	15520.8	25426.1
	(0.101)	(32322.8)	(17554.3)	(25998.4)
Mean of Dep. Var.	0.782	22456.2	11484.6	10714.9
N	3456	3456	3456	3456

OLS Estimates. Standard errors are in parentheses (clustered at the high school state level). See Appendix Table IV for variable definitions. All regressions include high school graduation year dummies, the interactions of high school graduation year dummies with Eligible A, and controls. Controls are sex, race, family income at the time of high school graduation. To ensure comparability across columns, I restrict the sample to individuals for whom I have data on both debt at age 30 and the amount owed on student loans at age 30. $p < 0.10$, $p < 0.05$, $p < 0.01$.

TABLE XIII: Student Loans and Types of Debt Holdings at Age 30

	(1) Have House Debt	(2) Have Vehicle Debt	(3) Owe Other Business Debt	(4) Owe Credit Card Debt	(5) Payments Acc. to Schedule
Student Loan Amount	0.00221	0.00351	0.00154	0.00156	-0.000918
	(0.00133)	(0.00125)	(0.000946)	(0.00128)	(0.000873)
EligibleS	-0.0242	-0.0520	-0.0655	-0.0680	0.0173
	(0.0285)	(0.0347)	(0.0217)	(0.0244)	(0.0224)
EligibleST	-0.0177	0.0371	0.0279	0.0548	-0.0285
	(0.0347)	(0.0238)	(0.0198)	(0.0292)	(0.0201)
EligibleSA	-0.0338	0.00217	0.0715	0.00304	0.0000618
	(0.0320)	(0.0447)	(0.0229)	(0.0446)	(0.0320)
EligibleA	0.0316	-0.0729	-0.0485	-0.297	0.155
	(0.158)	(0.304)	(0.153)	(0.178)	(0.142)
Mean of Dep. Var.	0.341	0.535	0.192	0.472	0.822
N	3592	2761	3626	2176	3622

OLS Estimates Standard errors are in parentheses (clustered at the high school state level). See Appendix Table IV for variable definitions. All regressions include high school graduation year dummies, the interactions of high school graduation year dummies with Eligible A, and controls. Controls are sex, race, family income at the time of high school graduation. Student loan amount is divided by $1000 for ease of interpretation. Hence, the estimated coefficients reflect the effect of a $1000 in student loans. $p < 0.10$, $p < 0.05$, $p < 0.01$.

TABLE XIV: Merit Eligibility and Risk Aversion and Mental Well-being

Dependent Variable:	(1) Averse to Risk	(2) Open to Take General Risks	(3) Open to Take Financial Risks	(4) MHI-5 Score 2010	(5) MHI-5 Score 2015
Categories:	(1: Risk Neutral/Loving 4: Most Risk Averse)	(0: Unwilling to take any risks) 10: Fully Prepared to take risks)			
EligibleSTA	0.173	-0.0862	-0.0356	-0.978	1.183
	(0.0798)	(0.157)	(0.204)	(1.154)	(1.294)
EligibleS	0.0450	-0.0120	0.0628	-0.546	1.336
	(0.0484)	(0.123)	(0.114)	(0.834)	(1.045)
EligibleST	-0.00153	-0.0360	-0.0308	-0.0967	-0.776
	(0.0538)	(0.141)	(0.139)	(0.685)	(0.892)
EligibleSA	-0.186	0.0763	-0.0746	1.460	-1.528
	(0.0889)	(0.166)	(0.201)	(1.303)	(1.336)
EligibleA	0.723	-0.934	-1.655	1.456	-0.748
	(0.598)	(0.990)	(1.166)	(5.411)	(3.188)
Mean of Dep. Var.	3.061	5.650	4.038	72.10	73.29
N	3980	4090	4082	3757	3562

OLS Reduced Form Estimations. Standard errors are in parentheses (clustered at the high school state level). See Appendix Table IV for variable definitions. All regressions include high school graduation year dummies, the interactions of high school graduation year dummies with Eligible A, and controls. Controls are sex, race, family income at the time of high school graduation. Columns (4) and (5) additionally control for MHI-5 score of respondent in 2000. $p < 0.10$, $p < 0.05$, $p < 0.01$.

TABLE XV: Merit Eligibility and Debt Holdings at Age 30, Subsample: Below-Median Parental Income

	(1) Having Debt	(2) Debt Amount	(3) Still Owed Student Loans	(4) Debt-Student Loans Owed
EligibleSTA	0.0701	-2084.0	-6777.9	4693.9
	(0.0600)	(5599.2)	(4876.7)	(2195.9)
EligibleS	-0.0430	-1680.9	-1028.4	-652.5
	(0.0342)	(2390.2)	(2196.0)	(1461.1)
EligibleST	-0.0332	-309.4	-528.7	219.3
	(0.0316)	(2707.3)	(1976.1)	(2106.8)
EligibleSA	0.00888	-140.4	4558.1	-4698.5
	(0.0617)	(6844.4)	(6121.5)	(2908.5)
EligibleA	0.288	44448.3	37400.5	7047.8
	(0.200)	(39225.8)	(41354.3)	(3713.2)
Mean of Dep. Var.	0.777	21393.4	11938.8	9454.6
N	1347	1347	1347	1347

OLS Reduced Form Estimations. The sample is restricted to individuals whose parental income at the end of high school graduation year lie below the median of the income distribution. Standard errors are in parentheses (clustered at the high school state level). See Appendix Table IV for variable definitions. All regressions include high school graduation year dummies, the interactions of high school graduation year dummies with Eligible A, and controls. Controls are race and family income at the time of high school graduation. To ensure comparability across columns, I restrict the sample to individuals for whom I have data on both debt at age 30 and the amount owed on student loans at age 30. $p < 0.10$, $p < 0.05$, $p < 0.01$.

TABLE XVI: Merit Eligibility and Different Types of Debts at Age 30, Subsample: Below-Median Parental Income

	(1) Have House Debt	(2) Have Vehicle Debt	(3) Owe Other Business Debt	(4) Owe Credit Card Debt	(5) Payments Acc. to Schedule
EligibleSTA	0.0782	0.0906	0.0492	0.0225	-0.0336
	(0.0615)	(0.0871)	(0.0615)	(0.0875)	(0.0680)
EligibleS	0.00755	-0.135	-0.0628	-0.0591	0.0918
	(0.0368)	(0.0616)	(0.0396)	(0.0489)	(0.0312)
EligibleST	-0.0547	0.0477	0.0636	0.0839	-0.0796
	(0.0385)	(0.0506)	(0.0451)	(0.0501)	(0.0427)
EligibleSA	-0.128	0.0332	0.0429	0.0864	-0.0406
	(0.0702)	(0.0929)	(0.0691)	(0.0771)	(0.0668)
EligibleA	-0.181	0.00106	0.123	-0.370	-0.114
	(0.170)	(0.124)	(0.316)	(0.386)	(0.342)
Mean of Dep. Var.	0.283	0.512	0.203	0.513	0.804
N	1411	1033	1420	713	1420

OLS Reduced Form Estimations. The sample is restricted to individuals whose parental income at the end of high school graduation year lie below the median of the income distribution. Standard errors are in parentheses (clustered at the high school state level). See Appendix Table IV for variable definitions. All regressions include high school graduation year dummies, the interactions of high school graduation year dummies with Eligible A, and controls. Controls are sex, race, family income at the time of high school graduation. $p < 0.10$, $p < 0.05$, $p < 0.01$.

TABLE XVII: Effect of Student Loans on Debt Holdings at Age 30, Subsample: Above-Median Parental Income

	(1) Having Debt	(2) Debt Amount	(3) Still Owed Student Loans	(4) Debt-Student Loans Owed
Student Loan Amount	0.0000126	-0.0672	-0.312	0.244
	(0.0000526)	(2.266)	(2.408)	(1.357)
Asymptotic P-value	0.810	0.976	0.897	0.857
Bootstrap P-value	0.861	0.961	0.825	0.813
EligibleS	0.000913	2347.9	707.7	1640.2
	(0.0362)	(3968.2)	(3946.5)	(1955.4)
EligibleST	0.0397	-1258.3	-474.4	-783.9
	(0.0519)	(3834.4)	(4078.0)	(2346.4)
EligibleSA	-0.0566	-6541.8	-2000.1	-4541.7
	(0.0549)	(3446.6)	(2803.5)	(2305.0)
EligibleA	0.460	60313.6	50324.8	9988.9
	(1.571)	(66252.0)	(70746.1)	(40558.6)
First Stage F-stat	1.565	1.565	1.565	1.565
Mean of Dep. Var.	0.772	22777.6	11147.3	11630.4
N	1232	1232	1232	1232

2SLS estimations where merit grant eligibility ($EligibleSTA$) is the instrument. Standard errors are in parentheses (clustered at the high school state level). See Appendix Table IV for variable definitions. The sample is restricted to individuals whose parental income at the end of high school graduation year lie above the median of the income distribution. All regressions include high school graduation year dummies, the interactions of high school graduation year dummies with Eligible A and controls. Controls are sex, race, family income at the time of high school graduation. To ensure comparability across columns, I restrict the sample to individuals for whom I have data on both debt at age 30 and the amount owed on student loans at age 30.

TABLE XVIII: Effect of Student Loans on Different Types of Debts at Age 30, Subsample: Above-Median Parental Income

	(1) Have House Debt	(2) Have Vehicle Debt	(3) Owe Other Business Debt	(4) Owe Credit Card Debt	(5) Payments Acc. to Schedule
Student Loan Amount	0.00115	0.0425	-0.00580	0.00688	0.0382
	(0.0303)	(0.0594)	(0.0330)	(0.0254)	(0.0360)
Asymptotic P-value	0.970	0.474	0.861	0.787	0.289
Bootstrap P-value	0.987	0.523	0.779	0.775	0.132
EligibleS	-0.0616	0.0691	-0.0402	-0.0975	0.0125
	(0.0511)	(0.0659)	(0.0442)	(0.0428)	(0.0612)
EligibleST	0.00656	0.0448	-0.00350	0.0767	-0.00854
	(0.0679)	(0.0560)	(0.0584)	(0.0451)	(0.0722)
EligibleSA	-0.0138	-0.0784	0.0259	-0.0504	0.0779
	(0.0451)	(0.0748)	(0.0444)	(0.0678)	(0.0638)
EligibleA	0.304	-0.0272	0.262	0.111	-0.262
	(0.386)	(0.0524)	(0.437)	(0.484)	(0.444)
First Stage F-stat	1.756	1.298	2.122	4.545	2.106
Mean of Dep. Var.	0.294	0.517	0.198	0.515	0.812
N	1264	1054	1276	887	1277

2SLS estimations where merit grant eligibility ($EligibleSTA$) is the instrument. Standard errors are in parentheses (clustered at the high school state level). See Appendix Table IV for variable definitions. The sample is restricted to individuals whose parental income at the end of high school graduation year lie above the median of the income distribution. All regressions include high school graduation year dummies, the interactions of high school graduation year dummies with Eligible A, and controls. Controls are sex and race, family income at the time of high school graduation. Student loan amount is divided by $1000 for ease of interpretation. Hence, the estimated coefficients reflect the effect of a $1000 in student loans.

TABLE XIX: Merit Eligibility and Debt Holdings at Age 30, Subsample: Above-Median Parental Income

	(1) Having Debt	(2) Debt Amount	(3) Still Owed Student Loans	(4) Debt-Student Loans Owed
EligibleSTA	-0.0183	75.39	389.7	-314.3
	(0.0747)	(3008.4)	(3157.9)	(1796.5)
EligibleS	0.00355	2231.5	1011.1	1220.4
	(0.0470)	(3696.7)	(3744.9)	(1892.3)
EligibleST	0.0430	-1287.0	-503.7	-783.3
	(0.0428)	(3753.7)	(3706.4)	(1698.6)
EligibleSA	-0.0513	-5946.7	-1963.5	-3983.1
	(0.0753)	(3821.4)	(3098.1)	(2493.2)
EligibleA	0.850	59847.9	42174.0	17674.0
	(0.0584)	(4671.9)	(4252.0)	(1623.0)
Mean of Dep. Var.	0.772	22777.6	11147.3	11630.4
N	1314	1314	1314	1314

OLS Reduced Form Estimations. The sample is restricted to individuals whose parental income at the end of high school graduation year lie above the median of the income distribution. Standard errors are in parentheses (clustered at the high school state level). See Appendix Table IV for variable definitions. All regressions include high school graduation year dummies, the interactions of high school graduation year dummies with Eligible A, and controls. Controls are race and family income at the time of high school graduation. To ensure comparability across columns, I restrict the sample to individuals for whom I have data on both debt at age 30 and the amount owed on student loans at age 30. $p < 0.10$, $p < 0.05$, $p < 0.01$.

TABLE XX: Merit Eligibility and Different Types of Debts at Age 30, Subsample: Above-Median Parental Income

	(1) Have House Debt	(2) Have Vehicle Debt	(3) Owe Other Business Debt	(4) Owe Credit Card Debt	(5) Payments Acc. to Schedule
EligibleSTA	0.00514	-0.0663	0.00589	-0.00775	-0.0621
	(0.0428)	(0.0857)	(0.0505)	(0.0561)	(0.0399)
EligibleS	-0.0479	0.00145	-0.0301	-0.0588	-0.00226
	(0.0501)	(0.0567)	(0.0411)	(0.0387)	(0.0377)
EligibleST	0.00160	0.0544	0.000122	0.0544	-0.0124
	(0.0642)	(0.0598)	(0.0411)	(0.0418)	(0.0407)
EligibleSA	-0.0301	-0.0123	0.0250	-0.0792	0.0764
	(0.0478)	(0.0650)	(0.0458)	(0.0773)	(0.0409)
EligibleA	0.332	-0.0479	0.209	0.271	0.107
	(0.269)	(0.0530)	(0.288)	(0.342)	(0.0588)
Mean of Dep. Var.	0.400	0.561	0.169	0.441	0.838
N	1351	1122	1363	927	1364

OLS Reduced Form Estimations. The sample is restricted to individuals whose parental income at the end of high school graduation year lie above the median of the income distribution. Standard errors are in parentheses (clustered at the high school state level). See Appendix Table IV for variable definitions. All regressions include high school graduation year dummies, the interactions of high school graduation year dummies with Eligible A, and controls. Controls are sex, race, family income at the time of high school graduation. $p < 0.10$, $p < 0.05$, $p < 0.01$.

TABLE XXI: Student Loans and Debt Holdings at Age 25 with Additional Controls

	(1) Having Debt	(2) Debt Amount	(3) Still Owed Student Loans	(4) Debt-Student Loans Owed
Student Loan Amount	-0.0000151	2.534	2.649	-0.115
	(0.0000263)	(1.473)	(0.983)	(0.962)
Asymptotic P-value	0.566	**0.0850**	**0.00700**	0.905
Bootstrap P-value	0.620	**0.010**	**0.008**	0.893
EligibleS	0.0171	405.9	152.1	253.8
	(0.0304)	(1902.6)	(1374.4)	(911.0)
EligibleST	-0.00743	434.5	1260.3	-825.9
	(0.0274)	(1445.9)	(985.0)	(681.2)
EligibleSA	-0.0831	886.5	1060.0	-173.5
	(0.0415)	(2698.3)	(1639.0)	(1908.3)
EligibleA	-0.232	2766.9	3153.7	-386.9
	(0.182)	(6414.3)	(6191.6)	(4062.1)
First Stage F-stat	8.080	8.080	8.080	8.080
Mean of Dep. Var.	0.783	15575.7	7163.8	8411.8
N	1723	1723	1723	1723

2SLS estimations where EligibleSTA is the instrument. Standard errors are in parentheses (clustered at the high school state level). See Appendix Table IV for variable definitions. All regressions include high school graduation year dummies, the interactions of high school graduation year dummies with Eligible A, and controls. Controls are sex, race, family income at the time of high school graduation, whether the individual has an associate degree or above, college GPA, and wages at age 25. To ensure comparability across columns, I restrict the sample to individuals for whom I have data on both debt at age 25 and the amount owed on student loans at age 25.

TABLE XXII: Student Loans and Debt Holdings at Age 30 with Additional Controls

	(1) Having Debt	(2) Debt Amount	(3) Still Owed Student Loans	(4) Debt-Student Loans Owed
Student Loan Amount	-0.0000177	-1.221	0.487	-1.708
	(0.0000328)	(1.636)	(1.530)	(0.933)
Asymptotic P-value	0.590	0.456	0.750	**0.067**
Bootstrap P-value	0.535	0.440	0.733	**0.066**
EligibleS	-0.0171	-2752.3	-1222.2	-1530.1
	(0.0410)	(2871.4)	(2279.8)	(1711.6)
EligibleST	-0.0308	-1053.1	-484.7	-568.4
	(0.0300)	(2396.4)	(1840.9)	(1548.2)
EligibleSA	-0.00700	-1284.5	834.9	-2119.4
	(0.0398)	(3481.7)	(2575.7)	(1826.9)
EligibleA	0.192	42221.7	-1939.3	44161.0
	(0.299)	(36428.4)	(11579.8)	(35937.7)
First Stage F-stat	5.412	5.412	5.412	5.412
Mean of Dep. Var.	0.767	21283.5	10752.1	10531.3
N	1733	1733	1733	1733

2SLS estimations where EligibleSTA is the instrument. Standard errors are in parentheses (clustered at the high school state level). See Appendix Table IV for variable definitions. All regressions include high school graduation year dummies, the interactions of high school graduation year dummies with Eligible A, and controls. Controls are sex, race, family income at the time of high school graduation, whether the individual has an associate degree or above, college GPA, and wages at age 30. To ensure comparability across columns, I restrict the sample to individuals for whom I have data on both debt at age 30 and the amount owed on student loans at age 30.

TABLE XXIII: Effect of Student Loans on Different Types of Debts at Age 30 with Additional Controls

	(1) Have House Debt	(2) Have Vehicle Debt	(3) Owe Other Business Debt	(4) Owe Credit Card Debt	(5) Payments Acc. to Schedule
Student Loan Amount	-0.0224	0.00368	-0.00652	-0.0227	0.0190
	(0.0210)	(0.0258)	(0.0146)	(0.0230)	(0.0190)
Asymptotic P-value	0.286	0.886	0.656	0.323	0.318
Bootstrap P-value	0.318	0.899	0.661	0.270	0.306
EligibleS	-0.0532	-0.0615	-0.0434	-0.101	0.0170
	(0.0413)	(0.0457)	(0.0255)	(0.0416)	(0.0343)
EligibleST	0.00703	0.0402	-0.00612	0.0328	-0.0171
	(0.0410)	(0.0296)	(0.0207)	(0.0320)	(0.0294)
EligibleSA	-0.0239	0.0192	0.0289	-0.0121	0.0431
	(0.0496)	(0.0576)	(0.0212)	(0.0598)	(0.0360)
EligibleA	-0.0218	-0.219	0.187	0.189	0.0625
	(0.221)	(0.314)	(0.162)	(0.385)	(0.219)
First Stage F-stat	6.107	5.624	6.588	6.248	6.559
Mean of Dep. Var.	0.341	0.535	0.192	0.472	0.822
N	1774	1459	1785	1225	1786

2SLS estimations where EligibleSTA is the instrument. Standard errors are in parentheses (clustered at the high school state level). See Appendix Table IV for variable definitions. All regressions include high school graduation year dummies, the interactions of high school graduation year dummies with Eligible A, and controls. Controls are sex, race, family income at the time of high school graduation, whether the individual has an associate degree or above, college GPA, and wages at age 30. Student loan amount is divided by $1000 for ease of interpretation. Hence, the estimated coefficients reflect the effect of a $1000 in student loans.

TABLE XXIV: Merit Eligibility and Debt Holdings at Age 25 with Additional Controls

	(1) Having Debt	(2) Debt Amount	(3) Still Owed Student Loans	(4) Debt-Student Loans Owed
EligibleSTA	0.0223	-4531.1	-4678.5	147.4
	(0.0508)	(1834.9)	(1535.1)	(1797.3)
EligibleS	0.0251	-1632.9	-1967.6	334.6
	(0.0245)	(1155.3)	(1002.2)	(1043.2)
EligibleST	-0.00966	1645.7	2475.4	-829.6
	(0.0291)	(946.8)	(968.9)	(862.3)
EligibleSA	-0.0846	1423.6	1701.3	-277.8
	(0.0418)	(2765.5)	(1805.3)	(2010.9)
EligibleA	-0.266	7776.7	8441.6	-664.9
	(0.140)	(7066.3)	(6354.9)	(3071.5)
Mean of Dep. Var.	0.783	15575.7	7163.8	8411.8
N	1850	1850	1850	1850

OLS Reduced Form Estimations. Standard errors are in parentheses (clustered at the high school state level). See Appendix Table IV for variable definitions. All regressions include high school graduation year dummies, the interactions of high school graduation year dummies with Eligible A, and controls. Controls are sex, race, family income at the time of high school graduation, whether the individual has an associate degree or above, college GPA, and wages at age 25. To ensure comparability across columns, I restrict the sample to individuals for whom I have data on both debt at age 25 and the amount owed on student loans at age 25. $p < 0.10$, $p < 0.05$, $p < 0.01$.

TABLE XXV: Merit Eligibility and Debt Holdings at Age 30 with Additional Controls

	(1) Having Debt	(2) Debt Amount	(3) Still Owed Student Loans	(4) Debt-Student Loans Owed
EligibleSTA	0.0302	2024.2	-774.3	2798.4
	(0.0526)	(2748.7)	(2755.3)	(1421.1)
EligibleS	-0.00232	-1844.0	-1975.6	131.6
	(0.0283)	(2051.0)	(1997.7)	(1249.0)
EligibleST	-0.0318	-1032.0	-339.9	-692.1
	(0.0294)	(2296.0)	(1962.2)	(1614.6)
EligibleSA	-0.0209	-2145.9	1644.0	-3789.9
	(0.0457)	(3358.0)	(3026.5)	(1859.8)
EligibleA	0.0920	35259.6	442.2	34817.4
	(0.129)	(34609.1)	(9941.2)	(35405.8)
Mean of Dep. Var.	0.767	21283.5	10752.1	10531.3
N	1859	1859	1859	1859

OLS Reduced Form Estimations. Standard errors are in parentheses (clustered at the high school state level). See Appendix Table IV for variable definitions. All regressions include high school graduation year dummies, the interactions of high school graduation year dummies with Eligible A, and controls. Controls are sex, race, family income at the time of high school graduation, whether the individual has an associate degree or above, college GPA, and wages at age 30. To ensure comparability across columns, I restrict the sample to individuals for whom I have data on both debt at age 30 and the amount owed on student loans at age 30. $p < 0.10$, $p < 0.05$, $p < 0.01$.

TABLE XXVI: Merit Eligibility and Different Types of Debts at Age 30 with Additional Controls

	(1) Have House Debt	(2) Have Vehicle Debt	(3) Owe Other Business Debt	(4) Owe Credit Card Debt	(5) Payments Acc. to Schedule
EligibleSTA	0.0462	-0.00746	0.00659	0.0435	-0.0341
	(0.0434)	(0.0538)	(0.0281)	(0.0462)	(0.0325)
EligibleS	-0.0271	-0.0653	-0.0423	-0.0551	-0.00112
	(0.0317)	(0.0389)	(0.0210)	(0.0245)	(0.0259)
EligibleST	-0.00344	0.0386	-0.0000499	0.0215	-0.0186
	(0.0474)	(0.0355)	(0.0200)	(0.0296)	(0.0239)
EligibleSA	-0.0468	0.0263	0.0291	-0.0611	0.0647
	(0.0547)	(0.0546)	(0.0227)	(0.0500)	(0.0350)
EligibleA	-0.0656	-0.202	0.166	-0.00127	0.102
	(0.282)	(0.278)	(0.176)	(0.210)	(0.169)
Mean of Dep. Var.	0.330	0.531	0.196	0.473	0.813
N	1904	1560	1915	1282	1916

OLS Reduced Form Estimations. Standard errors are in parentheses (clustered at the high school state level). See Appendix Table IV for variable definitions. All regressions include high school graduation year dummies, the interactions of high school graduation year dummies with Eligible A, and controls. Controls are sex, race, family income at the time of high school graduation, whether the individual has an associate degree or above, college GPA, and wages at age 30. $p < 0.10$, $p < 0.05$, $p < 0.01$.