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ABSTRACT

State Merit Aid Programs and Youth Labor Market Attachment*

This paper examines the impact of state merit-aid programs on the labor market attachment of high school-aged youths. The labor force participation rate of teenagers has fallen substantially in recent decades, coinciding with the introduction of merit-aid programs. These programs reduce the price of attending an in-state public college or university for high-achieving students and have the potential to influence students' allocation of time and effort between labor market activities, human capital development, and other forms of leisure. We examine the influence of these programs based on their generosity, both in the amount of aid provided to a recipient and the percent of students who are recipients of aid, and in their selectivity. Our results suggest that programs that are more selective reduce labor force participation, but are not a significant cause in the decline in teenage labor force participation in recent decades.

JEL Classification: J2, I2

Keywords: merit aid, labor force participation, education, financial aid

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I. Introduction

State merit-aid programs have become an increasingly common form of financial aid for higher education in recent decades. In contrast to need-based aid, these programs provide aid to students who meet specific educational criteria in high school and college and who attend an in-state college or university. The design of these programs, and the resulting incentives, have the potential to significantly influence the behavior of high school students by altering the labor-leisure decisions of youth. For example, as merit aid programs increase the reward for higher levels of educational achievement during high school, students may increase their time spent on schoolwork and reduce work and/or non-school leisure activities.

Understanding the influence of merit aid programs on labor supply is especially relevant, given that the labor force participation rate (LFP) of youth has substantially decreased relative to the overall LFP of all working-age individuals beginning around 2000. As shown in Figure 1, youth LFP has consistently been lower than the overall rate for all adults ages 16 and over. While the LFP of all adults has declined from 67 to 63 percent from 2000 through 2014, youth LFP declined during this period from 52 to 34 percent. Since 2004, youth LFP was lower than in any previous year dating back to 1960.

It is important to understand the decline in youth LFP and the policies that may be influencing the decision to participate in the labor market because of the significant influence of the decline in youth LFP on aggregate trends in LFP, even though youths represent a small percentage of the workforce, and because of the potential influence on future productivity (Aaronson, Park, and Sullivan, 2006). The literature on the return to high school work experience generally finds positive effects on adult wages, although these returns have fallen over time (Baum and Ruhm, 2016). The influence of youth LFP on later productivity and labor market activity would depend on whether youths are replacing time spent working with time spent on the development of human capital.

As shown in Figure 2, this decline in youth LFP occurred during the same period as the expansion of state merit-aid programs. The number of state merit-aid programs increased from 3 in 1995 to 13 in 2000 to 19 in 2005 to 23 in 2012. The potential influence of state merit-aid programs on the decline in youth LFP has received relatively little attention,[1] but Aaronson,

[1] Other possible explanations for the decline in youth LFP include immigration and welfare reform (Aaronson, Park, and Sullivan, 2006).

Park, and Sullivan (2006) document that youth LFP fell faster in states with merit aid programs than in other states between 2000 and 2004.

Given the similar timing of the increase in merit aid programs and the decline in LFP for teens, this research examines the influence of state merit-aid programs, focusing on the generosity and selectivity of these programs, on the labor supply of teenagers. These measures of the generosity and selectivity of state merit-aid programs vary across states and over time, in contrast with most of the prior research on these programs that focuses on the introduction of a merit-aid program in one state or that treats merit-aid programs as homogenous. In particular, we focus on two measures of generosity: the amount of aid available as a percent of the average in-state tuition and fees and the percent of in-state college students receiving merit aid, and two measures of selectivity: the high school grade point average (GPA) and standardized test score requirements that determine eligibility for the merit-aid scholarship. We construct these measures for all states from 1989 through 2013, which we link with the basic monthly Current Population Survey (CPS) to examine labor force participation, employment, hours worked, and hours worked conditional on employment during the academic year for teenagers ages 16 to 18.

Although a sizeable literature on merit-aid programs has developed in recent years, our paper makes two important contributions to the literature. First, building upon the descriptive analysis of teen LFP by Aaronson, Park, and Sullivan (2006), our paper provides a comprehensive analysis of the impact of merit-aid programs on the labor supply decisions of teenagers. Second, our paper focuses on the heterogeneity of merit-aid programs, instead of treating all or a subset of programs as equivalent, and examines measures of the generosity and selectivity of merit-aid programs.

To determine the influence of merit-aid programs, we estimate difference-in-differences specifications comparing the changes over time in labor market outcomes of teenagers among states with merit-aid programs and states without these programs. Our results suggest that introducing a merit-aid program that is highly selective, as characterized by a high school GPA requirement of at least 3.5 for students to be eligible, leads to a reduction in teenage LFP of nearly 4 percentage points. However, merit-aid programs increase LFP for plans with low and moderate levels of generosity and low levels of selectivity. Further, the labor market response occurs on the extensive margin, but not the intensive margin; the estimates for employment are similar to the results for labor force participation and there is little impact of merit-aid programs

on hours worked conditional on employment. Overall, the results suggest that different aspects of merit-aid scholarships influence the labor supply decisions of teens, but these programs explain very little of the observed decline in teen LFP in the past two decades.

II. Background on Merit Aid Programs

a. Description of Merit Aid Programs

Since 1988, 25 states have initiated merit-aid programs. The details of the programs vary across states, but generally consist of financial aid available to students who achieved specific accomplishments in high school, such as a minimum GPA or a minimum standardized test score. The financial aid typically can be used to reduce or eliminate the costs of tuition and/or fees at an in-state public institution.

Table 1 displays an overview of each states' merit-aid program.[2] We define a merit-aid program as one in which the primary eligibility criteria are academic proficiency without a need-based component. For each state that offered a merit-aid program between 1989 and 2013, the table includes the initial and final academic year of the program and the averages across all years of the generosity and selectivity of the state's programs: the maximum amount of aid available for all college expenses as a percent of the average in-state tuition and fees of 4-year public universities, the average percent of in-state college students receiving merit aid, the minimum GPA eligibility requirement, and the minimum standardized test score eligibility requirement.[3]

There is substantial variation in the generosity of merit-aid programs across states, both in the amount of aid provided to a recipient and the percent of students who are recipients of aid. For example, the generosity to recipients varies from 7.0 percent of the average in-state tuition and fees of 4-year public institutions in Illinois to 131.2 percent in Florida. The generosity of the programs in terms of providing aid to the greatest percent of college students varies from an average of 0.6 percent in Illinois to 32 percent in Georgia and Kentucky.[4]

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[2] States not listed in Table 1 did not have a merit-aid program between 1989 and 2013. Further details about each state's merit-aid program are available in Appendix Table 1. Prior research has focused on alternate sets of state programs; we document these differences in Appendix Table 2. The generosity measures for each year are shown in Appendix Tables 3 and 4. The sources of information for each program are shown in Appendix Tables 5 and 6.

[3] The standardized test score requirements are shown as ACT scores. Minimum SAT score requirements are converted into ACT equivalents.

[4] As shown in Appendix Figure 1, these two dimensions of the generosity of programs are positively correlated, with states that provide financial aid to a high percentage of students also providing aid that is a high percentage of tuition and fees. A notable exception is Kentucky, which provides support to a high percentage of students but the support covers a modest percentage of tuition and fees.

The generosity of the programs vary over time as well. Three states have eliminated their merit-aid program, and other states have changed the details of their program over time. For example, Georgia, which is the most widely studied of these programs, reduced the maximum amount of financial aid offered from 113 percent of tuition and fees in 1995-6, which was the first year that the program became universally available, to 73 percent in 2012-13. The percent of college students receiving merit aid in Georgia also fell from 36 percent in 2000 to 27 percent in 2013.

In addition to their generosity, state programs vary in their eligibility requirements. The most commonly used metrics among state merit-aid programs that measure their selectivity are the minimum high school GPA and the SAT or ACT test score required for a student to be eligible for merit-aid scholarships. Eighteen states offer programs that utilize a minimum high school GPA threshold to determine eligibility, as shown in Table 1. These thresholds vary from 2.5 to 3.5. Sixteen states utilize a minimum standardize test score to determine eligibility. These thresholds vary from 15 to 30, with five programs requiring a score of 20 on the ACT (or the ACT-equivalent on the SAT) in the initial year of the program. Sixteen programs, offered in 13 states, have both a minimum high school GPA requirement and a minimum standardized test score requirement.

b. Why Merit Aid Programs Could Influence Pre-High School Graduation Labor Market Outcomes

Merit-aid programs reduce the price of college attendance and, thus, have the potential to influence students' allocation of time and effort between labor market activities and human capital development. A key feature of merit-aid programs, as distinct from need-based aid, is that the price reduction depends upon whether the student exceeds specific educational criteria in high school in order to receive the aid. The value of a merit-aid program to a student depends on the probability that a student qualifies for merit aid and the magnitude of the price reduction, which motivates our emphasis on the generosity and selectivity of merit-aid programs as the defining characteristics of a program.

The probability that a student qualifies for merit aid depends upon the eligibility criteria for the program and the student's academic credentials. There is some uncertainty for students because their academic credentials at the end of high school (in order to initially qualify for merit

aid) are not known when making labor supply decisions. For students who perceive that their probability of receiving merit aid is high, the subsidy reduces the cost of college attendance, which could lower the desire to work during high school to pay for college. Alternatively, for these students, the subsidy could increase labor force participation as students are able to reduce the amount of time studying and are able to work to increase consumption in high school and college. For students who perceive that their probability of receiving merit aid is modest, the opportunity to receive financial aid to lower the cost of college attendance provides a further incentive for these students to devote more time to school activities and less time working. For students with a low perceived probability of receiving merit aid, including students with a low probability of attending college, merit-aid programs are unlikely to influence labor supply decisions except if there is a general equilibrium effect on low-skilled wages.[5]

In states with a merit-aid program that provides aid equal to a high percentage of tuition, fees, and other expenses, the reduction in the price of college attendance is likely to reduce the amount of time spent working. However, in states with less generous programs on this dimension, the influence could be more nuanced. If such programs encourage students to attend college who otherwise might not have attended due to costs and credit constraints, these students might increase their labor supply to earn the difference between the costs of attendance and the value of the merit-aid scholarship. Thus, there is likely to be heterogeneity in the response to merit aid programs, which we investigate in the sections below.

c. Related Literature and the Contribution of this Paper

A growing body of literature examines the influence of state merit-aid programs on college attendance, college graduation, and labor market outcomes after college.[6] The results from this literature generally find that merit-aid programs increase in-state college attendance with mixed evidence on the impacts on overall college attendance and college graduation. Most of this evidence is based on studies of a single state, such as Georgia (Cornwell, Mustard, and Sridhar, 2006), Tennessee (Pallais, 2009), West Virginia (Scott-Clayton, 2011), and Massachusetts (Cohodes and Goodman, 2014). Research that examines multiple states either

[5] There is the possibility that merit-aid programs influence the demand for labor of individuals who do not attend college. If these programs increase college attendance, then the pool of individuals who do not attend college will be smaller and more negatively selected. Thus, it could become less desirable for employers to hire high school dropouts and high school graduates after the introduction and expansion of merit-aid programs.

[6] This is distinct from the literature on the effect on need-based financial aid (e.g., Castleman and Long, 2013).

treats all merit-aid programs as homogenous, provided that they are available to a large portion of high school students in the state (Dynarski 2000, 2004; Conley and Taber, 2011; Fitzpatrick and Jones, 2016), or divides merit-aid programs into two categories (Sjoquist and Winters, 2012, 2015). Our paper contributes to this literature by introducing new measures of generosity that reflect both the breadth and amount of merit-aid scholarships.[7]

Less research examines the influence of state merit-aid programs on students' behavior in high school. Henry and Rubenstein (2002) and Pallais (2009) find that the introduction of merit-aid scholarships in Georgia and Tennessee improved student outcomes on standardized tests in high school, likely due to increased effort in school. Aaronson, Park, and Sullivan (2006) document a decline in teen LFP of 1.7 percentage points in states with merit aid programs compared to other states between 2000 and 2004, but the decline in LFP of 18-19 years olds in school is much smaller and there is no change for 18-19 years olds not in school.

There is a sizable literature on the costs and benefits of employment during high school. In general, employment in high school has positive effects on future employment and earnings (e.g., Hotz, Xu, Tienda, and Ahituv, 2002; Light, 2001; Ruhm, 1997). However, Baum and Ruhm (2016) suggest that the positive returns have fallen over time. These studies tend to examine data from the 1979 and 1997 cohorts of the National Longitudinal Study of Youth, which largely predates the decline in teen LFP. For example, the youngest respondents in the NLSY97 would have attended high school through approximately 2003 (Baum and Ruhm, 2014). There is no consensus on the impact of employment on high school educational outcomes, with different papers finding negative, positive, and no impacts of working (e.g., Eckstein and Wolpin, 1999; Montmarquette, Viennot-Briot, and Dagenais, 2007; Sabia, 2009; Lee and Orazem, 2010).

This paper offers multiple contributions that build upon these literatures. This is the first paper to examine the impact of merit aid programs on teenager's labor market outcomes. We introduce new measures of the generosity and selectivity of merit-aid programs to determine whether there are heterogeneous impacts based on program characteristics. We examine another source of heterogeneity by examining the differential impact of merit aid based on the parents' education, which serves as a proxy for the likelihood that the student would attend college that is

[7] Additionally, research on the institutional responses to merit-aid programs finds that colleges and universities increase tuition and fees (Long, 2004; Griffith, 2011). Our measure of merit aid as a percent of average tuition and fees incorporates these institutional responses.

determined prior to the student entering high school. Additionally, we examine the labor supply response on both the extensive and intensive margins.

III. Methodology

To examine the impact of state merit aid programs on labor market outcomes prior to high school graduation, we compare the changes in these outcomes within states that adopt a merit aid program over time to changes within states that do not adopt a program. We begin by assuming that all merit aid programs are equivalent and estimate the following:

$$Y_{ist} = \alpha_0 + \alpha_1 Merit_{st} + \gamma X_{ist} + \theta_s + \mu_t + \varepsilon_{ist}, \quad (1)$$

where Y denotes the outcome for individual i in state s in year t. The outcomes of interest are labor force participation, employment, and hours worked, hours worked conditional on employment, working more than 10 hours per week, and working more than 20 hours per week during the academic year between the ages of 16 and 18; labor force participation is the primary focus throughout the paper. *Merit* is a binary variable equal to one if a merit-aid program existed in the individual's state of residence at age 18. X is a vector of individual and household characteristics. θ and μ represent state and year fixed effects, respectively. ε denotes a stochastic error term. α and γ denotes parameters to be estimated. α_1, which represents the impact of a merit-aid program, is the parameter of interest.

The above specification is similar to the methodology used in prior, related research, but one limitation is that all state merit-aid programs are treated as equivalent. To address this limitation, Dynarski (2004, 2008) and Fitzpatrick and Jones (2016) define a merit-aid program as one in which at least 30 percent of high school students in the state would be eligible to receive merit aid; all other programs are treated as equivalent to not having a program.[8] Sjoquist and Winters (2012, 2015) split the set of merit-aid programs into strong and weak programs.[9] We

[8] Dynarski (2004) and Fitzpatrick and Jones (2016) focus on states where at least 30 percent of high school students in the state would be eligible to receive merit aid based on their grades and test scores: Arkansas, Georgia, Mississippi, Florida, New Mexico, Louisiana, South Carolina, Kentucky, Nevada, Michigan, West Virginia, Maryland, South Dakota, Tennessee, Wyoming. Dynarski (2004) includes 13 states while Fitzpatrick and Jones (2016) adds two more recent state programs: South Dakota and Wyoming.

[9] Sjoquist and Winters (2012) define strong merit-aid programs as: Florida, Georgia, Kentucky, Louisiana, Nevada, New Mexico, South Carolina, Tennessee, and West Virginia. They define weak merit-aid programs as: Alaska,

replicate the classifications of each of these sets of authors to examine the influence of these alternate definitions on the estimates of the impact of merit-aid programs.[10] Although these different definitions are useful alternatives to treating all merit-aid programs as equivalent, these measures potentially fail to capture important heterogeneity in merit-aid programs that could influence youth labor market outcomes.

We also examine the generosity and selectivity of merit aid programs and estimate the following:

$$Y_{ist} = \beta_0 + \beta_1 Merit_{st} + \beta_2(Merit_{st} \times MaxAid_{st}) + \beta_3(Merit_{st} \times PctReceipients_{st}) + \beta_4(Merit_{st} \times GPA_{st}) + \beta_5(Merit_{st} \times ACT_{st}) + \delta X_{ist} + \vartheta_s + \pi_t + \epsilon_{ist}, \quad (2)$$

where *MaxAid* represents the maximum amount of aid available for all expenses as a percent of the average in-state tuition and fees of 4-year public universities and *PctRecipients* represents the percent of in-state college students receiving merit aid.[11] *GPA* is the minimum GPA requirement and *ACT* is the minimum ACT test score requirement; each are represented by three indicator variables related to the level required to qualify for merit aid.[12] All other variables and parameters are defined analogously as in equation (1). These multiple dimensions of the generosity and selectivity of merit-aid programs measure the amount of aid provided to a recipient, the percent of students who are recipients of aid, and the rigor of the program; thus, these measures represent the probability that a student qualifies for merit aid and the magnitude of the price reduction.

The identifying variation comes from changes within states over time. Thus, we assume that the introduction of, or changes to, the state merit-aid program did not occur at the same time as other state policies affecting youth labor market outcomes and is not correlated with the unobserved determinants of these outcomes within states over time. A potential concern with our identifying assumption is that states may introduce or change a merit-aid program in

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Arkansas, California, Delaware, Idaho, Illinois, Maryland, Massachusetts, Michigan, Mississippi, Missouri, Montana, New Jersey, New York, North Dakota, Oklahoma, South Dakota, Utah, Washington, and Wyoming.

[10] The distinctions between these alternate definitions of merit-aid programs and the preferred measures used in this paper are shown in Appendix Table 2.

[11] Each of these two variables are defined as interaction terms with *Merit*, where the continuous variables are centered on the mean of the sample among states with a merit-aid program in that year (in which *Merit* = 1).

[12] The reference category for these sets of variables are states without a merit-aid program in that year and states without a minimum GPA or standardized test score requirement in that year.

response to prior trends in youth labor market indicators within the state or to prior trends in high school performance or college enrollment that also influence youth labor market outcomes. Although it is not possible to test whether our identifying assumption is true, previous research consistently finds evidence to support this assumption (e.g., Fitzpatrick and Jones, 2016). Further, below, we provide robustness checks and falsification tests that provide evidence consistent with the identifying assumption. For example, we find that the primary estimates are similar if we measure the generosity and selectivity of merit-aid programs by the values in the initial year of the program, which suggests that the estimates are not influenced by changes to the design of merit-aid programs in response to trends in economic or educational attainment after the program is introduced. We also find that the primary estimates are similar after controlling for state programs providing need-based aid, suggesting that the estimates reflect the impact of merit-aid programs, instead of other state programs. The results are also robust to restricting the sample to states that have ever introduced a merit-aid program, which minimizes the potential scope of policy endogeneity and compares states that introduced merit-aid programs during different years and with different levels of generosity and selectivity.

IV. Data

To determine the impact of merit-aid programs on youth labor market outcomes, we examine data from the Current Population Survey (CPS). The CPS is a nationally representative monthly survey of 60,000 households. The survey provides demographic, education, and labor market information for the civilian non-institutional population 16 years and older. For this analysis, the CPS is the most appropriate data source due to the wide range of years available; wide coverage of states; monthly frequency of the data, which allows us, to some extent, to distinguish between the academic year and summer; and large sample size.

The CPS includes detailed questions on labor market outcomes, including whether the individual is participating in the labor force (LFP), employed, and the actual hours of work in the previous week, if employed. Individuals under age 25 are also asked if they are enrolled in school, independent of their labor market status. Additional individual characteristics include age, race, family income, and gender. When we restrict our attention to individuals within primary families, we are also able to control for the highest level of education of a parent, parent's marital status, birth order, and the number of siblings.

We merge details of the merit aid programs with the CPS based on the state of residence reported that month. Table 1 displays the set of states with merit-aid programs. In addition to a binary variable denoting whether the state has a merit-aid program, we create two measures of the generosity of the program. The first is the maximum amount of aid for all expenses (including tuition, fees, and other expenses) as a percent of the average in-state tuition and fees of 4-year public universities in the state weighted by the enrollment at each university. The maximum potential aid is taken over all merit-aid programs in a state each year, as some states have more than one merit-aid program. The second measure is the percent of in-state college students receiving merit aid, which is defined as the sum of all recipients of merit aid divided by the total number of undergraduate students in a public college for each state in each year. We also create two sets of measures of the selectivity of the state's merit-aid program. We define three binary variables that measure the minimum GPA requirements that determine eligibility: having a minimum GPA requirement of at least 2.5 and less than 3, at least 3 and less than 3.5, and at least 3.5. We also define a second set of measures that reflect the minimum standardized test score eligibility requirements. We create three binary variables based on required ACT and SAT-equivalent scores: having a minimum ACT requirement of 20 or less, 21 to 27, and at least 28. We convert SAT score requirements to ACT scores using the information provided in Marco, Abdel-fattah, and Baron (1992).

We restrict the sample to ages 16-18 without a high school diploma. We also focus on respondents during the academic year; thus, we exclude June, July, and August from the analysis.[13] These sample restrictions yield 910,378 observations from 1989 through 2013. We restrict the sample to begin in 1989 since we are able to link parental characteristics with respondents' labor market outcomes for individuals in primary families beginning in 1989, which is important for investigating heterogeneity by parents' educational attainment.[14]

[13] The CPS reference week occurs in the week containing the 12th day of the month. There are four years in this time period in which the Labor Day weekend falls into the reference week, which increases the likelihood that labor market activity during the reference week reflects summer employment in some states, instead of academic year employment. Because of the differences in the starting and ending times for school years across school districts within states and across years, we are not able to define precisely LFP for students in the summer. Instead, we exclude the months where the regional differences in the start and end dates suggest that there will be a large share of students not in school and focus the analysis on the months that are most likely to define the academic year.
[14] Primary families in this analysis refer to the primary household member and their immediate family members. No subfamilies, related or unrelated, are included in the analysis due to matching issues.

Beginning the sample in 1989 is not a significant limitation since only two states offered merit aid then (Illinois and Missouri). For primary families, there are with 783,271 observations.

Table 2 displays the summary statistics of the full sample and of the primary family sample. Overall, 38.5 percent of high school-aged teenagers participated in the labor force during the academic year and 31.4 percent were employed. For those that worked, the average number of hours per week was 17.

Approximately 22 percent of respondents had the potential to receive merit aid. Conditional on a merit-aid program being available in the state when the respondent is 18 years old, the average merit-aid program provides assistance equivalent to approximately 60 percent of in-state tuition and fees and approximately 12 percent of undergraduate students receive aid. Three percent of teenagers, or 13 percent of teenagers in states with a merit-aid program, face a minimum GPA requirement of 2.5 to less than 3.0. Six percent of teenagers, which is 26 percent of teenagers in states with a merit-aid program, have a minimum GPA requirement of 3.0 to less than 3.5. Another three percent of teenagers, or 13 percent in states with merit aid, have a minimum GPA requirement that is greater than or equal to 3.5. Similarly, two percent of teenagers, which is 13 percent of teenagers in states with a merit-aid program, have the potential to receive a merit-aid scholarship that includes a minimum ACT score requirement of 20 or lower. Two percent of youths, which is 11 percent of teenagers in states with a merit-aid program, face a minimum ACT requirement of 21 to 27. Seven percent of youths, which is 30 percent of teenagers in states with a merit-aid program, face a minimum ACT requirement of 28 or higher. Of the students that have the potential to receive merit aid, slightly more than one-third have a strong merit-aid program available, as classified by Sjoquist and Winters (2012), and nearly half have a broad merit-aid program available, as classified by Dynarski (2004) and Fitzpatrick and Jones (2016).

The characteristics of primary families are very similar to the full sample, except that respondents in the primary family sample are more likely to be white. For the additional variables, over one-fourth of the sample lives in a one-parent household and three-fourths of the sample live in a house owned by a parent. Fifteen percent have a sibling in college and the average birth order is 1.4.

V. Results

a. Labor Force Participation

Table 3 displays the estimates of the impact of state merit-aid programs on teenage labor force participation during the academic year. The first column includes the estimates from equation (1), which only includes a binary variable indicating whether a state has a merit-aid program. These estimates suggest that a merit-aid program increases labor force participation of teenagers by 1.7 percentage points. The second column includes indicators for whether the state has a strong or weak merit-aid program, as classified by Sjoquist and Winters (2012). Interestingly, these estimates suggest that the result from the first column is driven by states with weak merit-aid programs. The third column includes a binary variable denoting whether the state has a broad merit-aid program, as classified by Dynarski (2004) and Fitzpatrick and Jones (2016).[15] These estimates suggest that a broad program has little influence on teenage labor force participation.

The fourth column is our preferred specification; it includes estimates from equation (2) that add the measures of the generosity and selectivity of merit-aid programs. These estimates suggest that a merit-aid program with no GPA or test score requirement, which provides the average amount of aid to the average percent of undergraduate students, increases teen labor force participation by 3.2 percentage points. Interestingly, the share of tuition and fees covered and the share of students receiving benefits, which are both measures of the generosity of the program, do not statistically affect the labor supply decision while the measures of selectivity, the GPA and test requirements, do. The more rigorous the GPA requirement, the lower the probability of participating in the labor force. Relative to a state with a merit-aid program without a minimum GPA requirement, a GPA requirement of 3.5 or higher lowers the probability of participating in the labor force by over six percentage points. A GPA of 3 to less than 3.5 lowers the probability of participating in the labor force as a teenager by approximately four percentage points, while a relatively low GPA requirement of 2.5 to less than 3 does not statistically alter the labor force participation decision. These results show that a state with a merit-aid program that requires at least a 3.5 GPA reduces teen LFP by 3.6 percentage points relative to a state without a merit-aid program.

[15] The reference category for states with broad merit-aid programs includes states that do not have a merit-aid program and merit-aid programs in which less than 30 percent of high school students qualify.

The coefficients for test score requirements display a different pattern than the coefficients for GPA requirements. A minimum ACT score requirement between 21 and 27, the middle group in terms of rigor, increases participation in the labor force. A score requirement over 27 decreases LFP by almost 2 percentage points, which is not enough to completely offset the positive effect of having a merit aid program. In combination, a merit-aid program with the most selective thresholds, requiring at least a 3.5 GPA and at least a 28 on the ACT, reduces teen LFP by 5.3 percentage points, relative to a state without a merit-aid program.[16]

The fifth column displays the estimates from equation (2) for the sample of individuals within primary families. These estimates are similar to those in the fourth column, which suggests that the results are robust to restricting the sample to individuals within primary families. Thus, below, we utilize the additional information about parental characteristics in this sample to examine the heterogeneity of the impact of merit-aid programs based on parents' education.

b. Other Labor Market Outcomes

Table 4 displays the results for employment status, hours worked, hours worked conditional on employment, and two threshold measures of hours. In general, except for the conditional hours of work, these results are similar qualitatively to those for labor force participation, albeit slightly less precisely estimated. A merit aid program with no GPA or standardized test score requirements, with the average amount of aid and percent recipients, leads to an increase in the probability of working and hours worked, while higher GPA requirements work to offset this effect. High school-aged youths in a state that introduces a merit-aid program with a minimum GPA requirement of at least 3.5, with the average amount of aid and percent recipients and no standardized test score requirement, are 3 percentage points less likely to be employed, work 0.7 hours less per week, are 3 percentage points less likely to work more than 10 hours per week, and are 2 percentage points less likely to work more than 20 hours per week. Interestingly, a state merit-aid program and the differences in the generosity or selectivity of the program have no statistically significant impact on hours worked conditional on

[16] Eighty percent of youths who reside in a state with a merit-aid program that requires a GPA of at least 3.5 also live in a state that requires an ACT score of at least 28, while the remaining twenty percent reside in a state with a merit-aid program that does not require a minimum ACT score. Thirty-four percent of youths who reside in a state with a merit-aid program that requires an ACT score of at least 28 also reside in a state that requires a GPA of at least 3.5, while the remaining sixty-six percent live in a state that does not require a minimum GPA.

working, except for having the a ACT score requirements between 21 and 27. This result suggests that the influence of merit-aid programs on hours worked is primarily due to the influence on employment.

c. Heterogeneity by Gender and Parent's Education Level

In addition to examining the intensive margin, we also examine heterogeneity in the impact of merit-aid programs by gender and by parents' educational attainment, as a proxy for students' likelihood of going to college.[17] Cataldi et al. (2018) find that, among high school students whose parents had not attended college, 72 percent later attended college. In contrast, for high school students whose parents had graduated from college, 93 percent later attended college.

These results, shown in Table 5, provide some interesting insights. In general, females are more responsive to the criteria for the merit aid plans than males. A merit aid program, with the average level of generosity and no GPA or ACT requirements, increases the likelihood of a female participating in the labor force by 4.4 percentage points and a male by 1.9 percentage points. A GPA requirement of over 3.5 lowers the probability of teenage females participating in the labor force by almost 8 percentage points compared to a 6 percentage points decrease for males. A moderate GPA requirement of 3.0 to less than 3.5 does not statistically alter the labor force participation decision of males but lowers female's participation by almost 6 percentage points. Both male and female LFP responds positively to test scores between 21 and 27, but only females have a significant negative response to a merit-aid program that requires at least a score of 28 on the ACT exam, lowering the probability of participating by almost 3 percentage points.

A merit aid program without GPA and ACT score requirements does not significantly alter the LFP decision of students whose parents have a high school diploma, while it increases the probability of being in the labor force for students whose parents did not complete high school, attended some college, or completed a college degree. All students, regardless of parents' education, are less likely to participate in the labor force when the GPA requirement is 3.5 or higher. High test scores requirements, above a 27, matter more for students with less-educated parents, relative to students with college-educated parents. These results suggest that

[17] Educational attainment, rather than income, is used to stratify the analysis as parental income for families with children approaching college age may be influenced by financial aid requirements.

although there are some differences in the response of students based on their parent's educational attainment, merit aid requirements influence teen labor force participation across all groups of students. A possible explanation for this result is increased attention to the importance of grades and test scores due to the merit aid program.

d. Robustness

The results described above pertain to all individuals between the ages of 16 and 18 who have not completed a high school degree. We examine the robustness of these results to alternate definitions of the sample and alternate definitions of the merit-aid variables. These results are shown in Table 6 for LFP. The results are similar to those from our preferred specification, shown in column 4 of Table 3, when we restrict the sample to students currently in high school (thus, excluding dropouts), youths age 17 and 18, and students age 17 and 18 currently in high school. Instead of using time-varying measures of the amount of aid and the percent recipients for each merit-aid program, we examine the robustness of the results to using these measures for the initial year that the program was introduced. As shown in column 4, the results are robust to these alternate measures. As shown in column 5, the results are also robust to defining the generosity of the merit-aid program in terms of the remaining out-of-pocket expenses for recipients, instead of the amount of aid available to recipients. As shown in column 6, the results are robust to including an additional control variable for whether a state offers need-based aid. Further, as shown in column 7, the results are robust to restricting the sample to states that have ever introduced a merit-aid program.

e. Impact on National Trends

These results suggest that the characteristics of a state's merit aid plan have the potential to influence the labor-leisure decisions of high school students. Figure 3 simulates what the national labor force participation rates would look like for these high school students under different merit aid plan scenarios: Highly selective (3.5 GPA or higher and greater than a 27 on ACT), least selective (GPA requirement less than 3.0 and ACT score less than 21), and no merit aid plans. In general, the participation rate would be approximately five percent lower if every state had a highly selective plan and approximately four percent higher if every state had the lowest required credentials. However, the actual LFP trend aligns closely with the scenario in

which there are no merit aid programs, as the influence of high and low selectivity plans are offsetting. This pattern changed somewhat during the Great Recession, as the responsiveness to the highly selective plans increased. Overall, while merit aid program impact the labor market within states, the effect on the macro-economy is limited.

VI. Conclusion

Merit-aid programs reduce the price of college attendance and, thus, have the potential to influence students' allocation of time and effort between labor market activities and human capital development. However, what is unique about this price reduction is that it depends upon whether the student exceeds specific educational criteria in high school in order to receive the aid; thus, there is uncertainty about the amount. To understand whether and how these programs might influence youths' labor market activities, we examine the impact of the generosity and selectivity of states' merit-aid programs on a variety of labor market outcomes. Programs with the average level of generosity and no selectivity requirements increase youth LFP. Increases in the generosity of these programs generally has little influence on youth LFP. However, programs that are highly selective, because of GPA or ACT requirements, reduce LFP.

The increase in state merit-aid programs has been occurring during a period in which youth LFP has rapidly fallen and is now at its lowest level in over 50 years. Overall, our results suggest that, while differences in state merit-aid programs influence the labor supply of high school-aged youth, the introduction and expansion of merit-aid programs has not been a cause of this large decline in youth LFP due to the heterogeneity in these state programs. This finding points to the importance of examining the differences across state programs.

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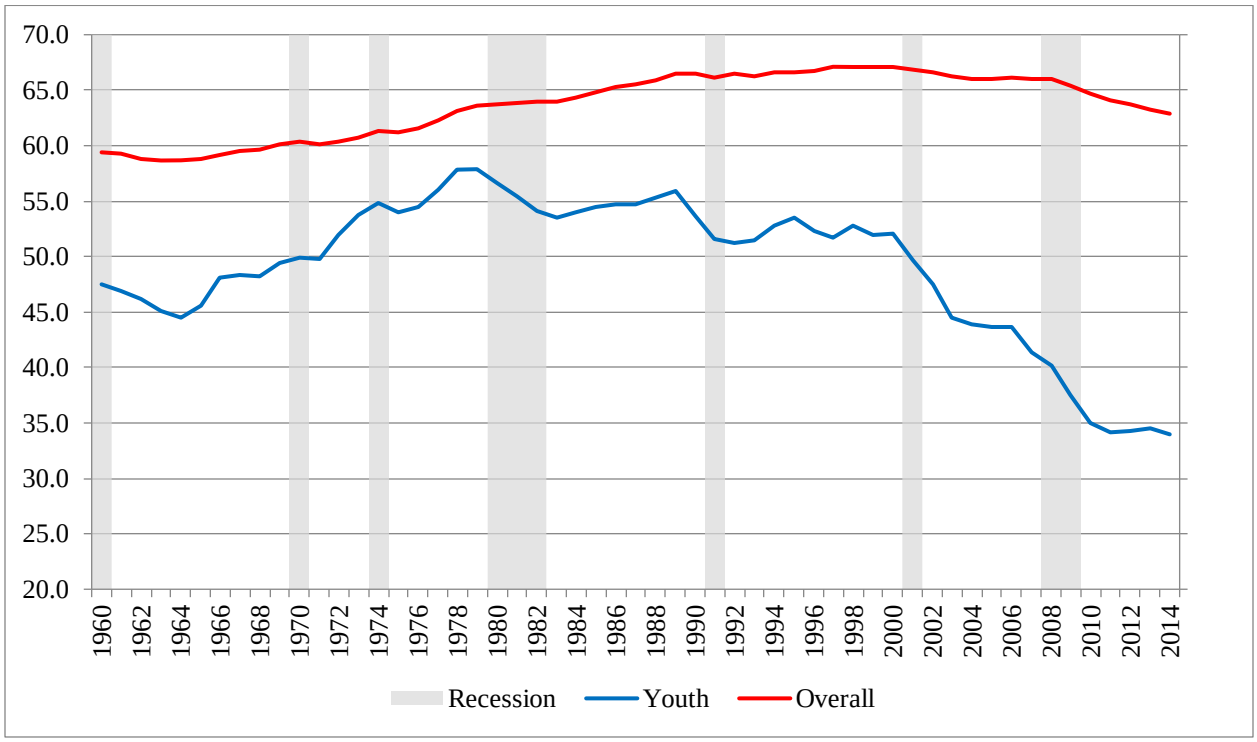
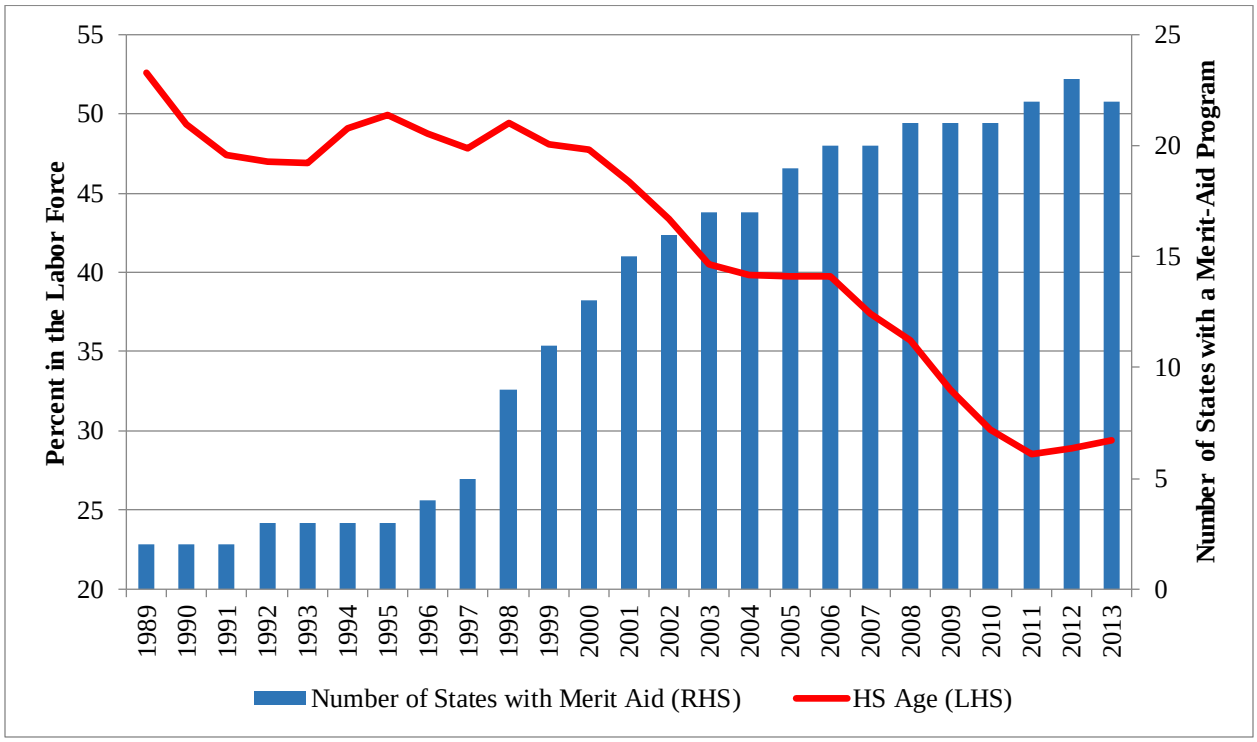
Figure 1
Labor Force Participation Rates Since 1960



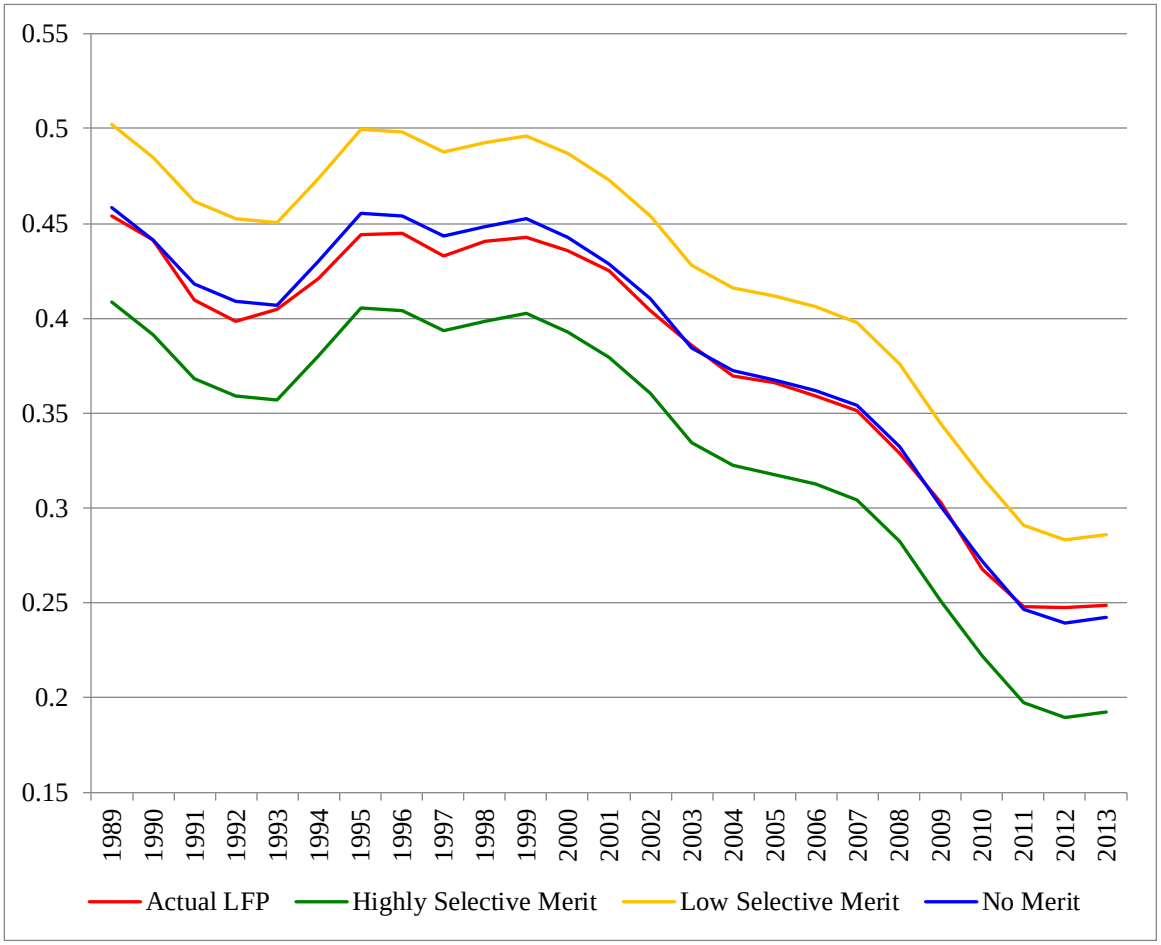
Notes: Youth labor force participation rates refer to individuals ages 16 through 24. The overall labor force participation rates includes all adults ages 16 and over.
Source: Haver Analytics/Bureau of Labor Statistics

Figure 2
The Decline in Youth Labor Force Participation and the Increase in State Merit-Aid Programs



Notes: High school age refers to ages 16 through 18.
Source: Current Population Survey, author's calculations.

Figure 3
Predicted Labor Force Participation under Different Merit Aid Program Characteristics



Notes: This figures shows predicted labor force participation rates of teenagers during the academic year. Highly selective merit-aid programs include a minimum GPA of 3.5 or higher and greater than 27 on the ACT exam. Least selective merit-aid programs include a minimum GPA below 3.0 and a minimum ACT score below 21.

Table 1: Overview of Merit Aid Programs

State	Start Year	End Year	Max Aid (%)	Students Receiving Aid (%)	GPA	ACT Score
Alaska	2000		69.15	5.39	2.5	21
Arkansas	2011		70.93	25.62	2.5	19
Delaware	2012		27.03	9.91	2.75	
Florida	1998		131.19	18.96	3.5	28
Georgia	1996		102.27	32.20	3	
Idaho	2002		11.40	14.14	3	20
Illinois	1988	2005	6.99	0.62		30
Kentucky	2000		48.86	32.28	2.5	
Louisiana	1999		121.59	22.52	2.5	20
Massachusetts	2006		16.86	4.74		
Michigan	2001	2008	10.51	11.16		
Mississippi	1997		62.68	23.28	2.5	15
Missouri	1988		55.79	3.08		30.2
Montana	2006		34.78	1.56	3	20
Nevada	2001		64.04	19.65	3.1	
New Jersey	1998	2006	114.52	1.46		28
New Mexico	1998		77.78	15.02		
New York	1998		29.94	1.96		
North Dakota	2011		23.01	8.07	3	24
South Carolina	1999		67.50	18.63	3	23.6
South Dakota	2005		20.74	8.20	3	24
Tennessee	2005		86.13	25.34	3	20.8
Utah	2000		70.89	3.09	3.3	
West Virginia	2003		96.02	12.76	3	21.5
Wyoming	2007		96.20	25.38	2.5	19

Notes: This table provides an overview of all states that implemented a merit-aid program between 1989 and 2013. The Start Year indicates the end date of the first academic year that has students covered by merit aid. Max Aid (%) refers to the average amount of aid for all expenses as a percent of the average in-state tuition and fees of 4-year public universities. Students Receiving Aid (%) is the average percent of in-state college students receiving merit aid. Max Aid (%) and Students Receiving Aid (%) represents the generosity of state merit aid programs, while GPA and ACT Score represents the selectivity of these programs. The averages of the generosity and selectivity are taken over all programs that a state offers over all years that a program exists for the state between 1989 and 2013. A full description of the programs is available in the appendix.

Table 2. Descriptive Statistics: 1989-2013

Variable	Full Sample Mean (Std. Dev.)	Primary Mean (Std. Dev.)
Labor Market Outcomes		
Labor Force Participation (School Year)	0.3846	0.3891
	(0.4865)	(0.4876)
Employed (School Year)	0.3142	0.3226
	(0.4642)	(0.4675)
Hours Worked | Employed (School Year)	17.0464	16.2619
	(9.8931)	(9.1895)
Merit Aid Program		
Merit Aid	0.2190	0.2172
	(0.4135)	(0.4123)
Maximum Merit Aid (as a % of Tuition and Fees)	13.2789	13.0804
	(32.2592)	(31.9987)
Students receiving merit aid (%)	2.5801	2.5232
	(7.0092)	(6.9229)
Requirements		
GPA Requirements		
$2.5 \leq GPA < 3$	0.0289	0.0284
	(0.1677)	(0.1660)
$3 \leq GPA < 3.5$	0.0578	0.0572
	(0.2334)	(0.2323)
$GPA \geq 3.5$	0.0283	0.0278
	(0.1660)	(0.1644)
ACT Score Requirements		
Test score ≤ 20	0.0291	0.0287
	(0.1680)	(0.1670)
$21 <$ Test score ≤ 27	0.0246	0.0244
	(0.1548)	(0.1543)
Test score ≥ 28	0.0667	0.0661
	(0.2493)	(0.2484)
Strong Program	0.0823	0.0795
	(0.2748)	(0.2705)
Broad Program	0.1069	0.1056
	(0.3090)	(0.3073)
Merit Aid Program | Merit Aid= 1		
Maximum Merit Aid (as a % of Tuition and Fees)	60.2465	60.2214
	(43.3621)	(43.3030)
Students receiving merit aid (%)	11.7828	11.6165
	(10.7672)	(10.7247)

Variable	Full Sample Mean (Std. Dev.)	Primary Mean (Std. Dev.)
Requirements | Merit Aid=1		
GPA Requirements | Merit Aid=1		
2.5 ≤ GPA < 3	0.1322	0.1306
	(0.3387)	(0.3370)
3 ≤ GPA < 3.5	0.2641	0.2635
	(0.4408)	(0.4405)
GPA ≥ 3.5	0.1295	0.1280
	(0.3357)	(0.3341)
ACT Test Score Requirements | Merit Aid=1		
Test score ≤ 20	0.1327	0.1323
	(0.3393)	(0.3388)
21 < Test score ≤ 27	0.1122	0.1124
	(0.3156)	(0.3159)
Test score ≥ 28	0.3041	0.3042
	(0.4600)	(0.4601)
Demographics		
Female	0.4825	0.4716
	(0.4997)	(0.4992)
Married	0.0068	0.0000
	(0.0822)	(0.0048)
White	0.6880	0.7202
	(0.4623)	(0.4489)
Black	0.1257	0.1090
	(0.3315)	(0.3117)
Hispanic	0.1263	0.1146
	(0.3322)	(0.3185)
Other Race/Ethnicity	0.0600	0.0570
	(0.2375)	(0.2318)
Primary Sample Variables		
One Parent Household		0.2535
		(0.4350)
Parent's Own House		0.7674
		(0.4225)
Sibling in College		0.1501
		(0.3572)
Birth Order		1.4091
		(0.6489)
Highest Parental Education		
Less than High School		0.0968
		(0.2957)

	Full Sample	Primary
Variable	**Mean (Std. Dev.)**	**Mean (Std. Dev.)**
High School		0.2730
		(0.4455)
Some College		0.2987
		(0.4577)
College or higher		0.3308
		(0.4705)
Sample Size	910,378	781,250

Notes: Standard deviations in parentheses. The samples include individuals ages 16-18 (high-school aged teenagers) without a high school diploma during the academic year (September through May) between 1989 and 2013.

Table 3. The Impact of Merit-Aid Programs on Teenage Labor Force Participation

	(1)	(2)	(3)	(4)	(5)
	Merit Only	Strong/Weak Programs	Broad Programs	Generosity and Selectivity	Generosity and Selectivity – Primary Family
Merit Aid Program					
Merit Aid	0.0170*			0.0316**	0.0315**
	(0.0085)			(0.0121)	(0.0124)
Strong Merit Aid		0.0021			
		(0.0175)			
Weak Merit Aid		0.0245***			
		(0.0076)			
Broad Merit Aid			0.0054		
			(0.0125)		
Maximum Aid				0.0002	0.0002
(% of Tuition and Fees)				(0.0001)	(0.0001)
Students receiving				-0.0007	-0.0008
merit aid (%)				(0.0007)	(0.0007)
Merit Aid Requirements					
GPA Requirements					
2.5 ≤ GPA < 3				-0.0096	-0.0098
				(0.0334)	(0.0346)
3 ≤ GPA < 3.5				-0.0399**	-0.0392*
				(0.0198)	(0.0210)
GPA ≥ 3.5				-0.0678***	-0.0691***
				(0.0132)	(0.0136)
ACT Score Requirement					
Test score ≤ 20				0.0187	0.0175
				(0.0202)	(0.0209)
21 < Test score ≤ 27				0.0442**	0.0417**
				(0.0179)	(0.0198)
Test score ≥ 28				-0.0167**	-0.0125
				(0.0077)	(0.0082)
Constant	0.5344***	0.5338***	0.5348***	0.5337***	0.5120***
	(0.0138)	(0.0136)	(0.0139)	(0.0131)	(0.0135)
Observations	910,378	910,378	910,378	910,378	783,271
R-squared	0.0948	0.0948	0.0947	0.0951	0.0955

Notes: Robust standard errors are shown in parentheses and clustered by state. The samples include individuals ages 16-18 (high-school aged teenagers) without a high school diploma during the academic year (September through May) between 1989 and 2013. The last column is restricted to the primary family sample. Additional variables not shown are age, race/ethnicity (black, Hispanic, other race/ethnicity; white is omitted), female, state, year, and month fixed effects. Additional variables not shown for the primary sample regression include whether there is one parent in the household, whether the household owns a house, whether there is a sibling in college, and birth order. All models include year, state, and month fixed effects

*** p<0.01, ** p<0.05, * p<0.1

Table 4: The Impact of Merit-Aid Programs on Teenage Labor Market Outcomes

	(1)	(2)	(3)	(4)	(5)
	Employed	Hours Worked	Hours Worked | Employed	Work > 10 Hours	Work > 20 Hours
Merit Aid Program					
Merit Aid	0.0266**	0.5231*	0.1735	0.0199*	0.0145*
	(0.0118)	(0.2621)	(0.2777)	(0.0112)	(0.0086)
Maximum Aid	0.0002*	0.0041	-0.0011	0.0002	0.0001
(% of Tuition and Fees)	(0.0001)	(0.0034)	(0.0035)	(0.0001)	(0.0001)
Students receiving merit aid	-0.0004	-0.0062	0.0139	-0.0002	-0.0000
(%)	(0.0007)	(0.0185)	(0.0171)	(0.0007)	(0.0006)
Merit Aid Requirements					
GPA Requirements					
2.5 ≤ GPA < 3	-0.0174	-0.2818	0.4527	-0.0128	-0.0075
	(0.0301)	(0.6980)	(0.6355)	(0.0301)	(0.0218)
3 ≤ GPA < 3.5	-0.0380*	-0.7896*	-0.1892	-0.0344*	-0.0202
	(0.0195)	(0.4479)	(0.4822)	(0.0197)	(0.0155)
GPA ≥ 3.5	-0.0568***	-1.1969***	-0.2664	-0.0501***	-0.0337***
	(0.0109)	(0.3120)	(0.4490)	(0.0118)	(0.0095)
ACT Score Requirement					
Test score ≤ 20	0.0283	0.6170	0.3587	0.0308	0.0159
	(0.0187)	(0.4511)	(0.4607)	(0.0198)	(0.0137)
21 < Test score ≤ 27	0.0443**	0.9317**	0.8191**	0.0457**	0.0253*
	(0.0190)	(0.4258)	(0.4015)	(0.0190)	(0.0137)
Test score ≥ 28	-0.0092	-0.1695	0.3903	-0.0039	-0.0065
	(0.0062)	(0.1667)	(0.2528)	(0.0063)	(0.0059)
Constant	0.3940***	8.8342***	23.9557***	0.3351***	0.2323***
	(0.0116)	(0.2454)	(0.3374)	(0.0102)	(0.0066)
Observations	910,378	900,086	275,781	900,086	900,086
R-squared	0.1012	0.0854	0.1381	0.0805	0.0536

Notes: See notes on Table 3. *** p<0.01, ** p<0.05, * p<0.1

Table 5: Heterogeneity in the Impact of Merit-Aid Programs on Teenage Labor Force Participation by Parents' Education

	(1)	(2)	(3)	(4)	(5)	(6)
	Male	Female	Less than High School	High School	Some College	BA or higher
Merit Aid Program						
Merit Aid	0.0192*	0.0443***	0.0408**	0.0190	0.0306*	0.0345***
	(0.0105)	(0.0152)	(0.0184)	(0.0142)	(0.0173)	(0.0119)
Maximum Aid	0.0001	0.0003**	0.0002	0.0004***	0.0002	-0.0000
(% of Tuition and Fees)	(0.0001)	(0.0001)	(0.0003)	(0.0001)	(0.0002)	(0.0001)
Students receiving merit aid (%)	-0.0012	-0.0001	-0.0005	-0.0019*	-0.0013	0.0004
	(0.0008)	(0.0006)	(0.0012)	(0.0009)	(0.0008)	(0.0007)
Merit Aid Requirements						
GPA Requirements						
2.5 ≤GPA < 3	0.0016	-0.0210	0.0487	0.0098	0.0046	-0.0515
	(0.0341)	(0.0345)	(0.0363)	(0.0493)	(0.0313)	(0.0328)
3 ≤GPA < 3.5	-0.0216	-0.0590***	-0.0018	-0.0014	-0.0400*	-0.0752***
	(0.0214)	(0.0211)	(0.0262)	(0.0291)	(0.0209)	(0.0233)
GPA≥ 3.5	-0.0593***	-0.0776***	-0.0817***	-0.0422*	-0.0699***	-0.0768***
	(0.0112)	(0.0174)	(0.0227)	(0.0218)	(0.0151)	(0.0144)
ACT Score Requirement						
Test score ≤ 20	0.0080	0.0296	-0.0923***	0.0209	0.0211	0.0362
	(0.0222)	(0.0218)	(0.0280)	(0.0299)	(0.0198)	(0.0218)
21 <Test score ≤27	0.0489**	0.0392**	-0.0169	0.0178	0.0476**	0.0650***
	(0.0215)	(0.0169)	(0.0364)	(0.0238)	(0.0178)	(0.0240)
Test score ≥28	-0.0052	-0.0276**	-0.0322*	-0.0190*	-0.0250*	0.0102
	(0.0066)	(0.0110)	(0.0190)	(0.0100)	(0.0134)	(0.0100)
Constant	0.5606***	0.5177***	0.5104***	0.5387***	0.5425***	0.4960***
	(0.0130)	(0.0133)	(0.0168)	(0.0126)	(0.0199)	(0.0297)
Observations	471,110	439,268	76,172	213,260	233,342	258,476
R-squared	0.0965	0.0978	0.0983	0.1109	0.1006	0.0782

Notes: See Notes on Table 3. The analysis by parent's education utilizes the primary family sample. *** p<0.01, ** p<0.05, * p<0.1

Table 6
Robustness Checks- Labor Force Participation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	In HS	Age 17-18	Age 17-18 in HS	Aid as a Share of Initial Tuition and Fees	Total Cost	Includes Need Based Merit	States with a Merit Program in any year
Merit Aid Program							
Merit Aid	0.0308**	0.0316***	0.0319***	0.0263**	0.0285**	0.0309**	0.0322**
	(0.0123)	(0.0109)	(0.0117)	(0.0122)	(0.0119)	(0.0121)	(0.0123)
Maximum Aid	0.0002	0.0002	0.0002			0.0002	0.0002
(% of Tuition and Fees)	(0.0001)	(0.0002)	(0.0002)			(0.0001)	(0.0001)
Students receiving merit	-0.0006	-0.0006	-0.0003			-0.0007	-0.0006
aid (%)	(0.0007)	(0.0009)	(0.0009)			(0.0007)	(0.0006)
Merit Aid Requirements							
GPA Requirements							
$2.5 \leq GPA < 3$	-0.0122	-0.0179	-0.0263	-0.0175	-0.0093	-0.0094	-0.0069
	(0.0335)	(0.0367)	(0.0380)	(0.0349)	(0.0334)	(0.0334)	(0.0329)
$3 \leq GPA < 3.5$	-0.0391*	-0.0419**	-0.0410	-0.0447**	-0.0389*	-0.0400**	-0.0363*
	(0.0222)	(0.0206)	(0.0249)	(0.0211)	(0.0204)	(0.0198)	(0.0199)
$GPA \geq 3.5$	-0.0687***	-0.0780***	-0.0817***	-0.0661***	-0.0589***	-0.0679***	-0.0636***
	(0.0144)	(0.0171)	(0.0206)	(0.0111)	(0.0098)	(0.0131)	(0.0137)
ACT Score Requirements							
Test score ≤ 20	0.0166	0.0262	0.0255	0.0226	0.0184	0.0186	0.0177
	(0.0213)	(0.0245)	(0.0267)	(0.0211)	(0.0199)	(0.0203)	(0.0198)
$21 <$ Test score ≤ 27	0.0431**	0.0467**	0.0445*	0.0497**	0.0422**	0.0445**	0.0433**
	(0.0198)	(0.0184)	(0.0222)	(0.0191)	(0.0183)	(0.0179)	(0.0175)
Test score ≥ 28	-0.0115	-0.0179*	-0.0104	-0.0199**	-0.0171**	-0.0165**	-0.0199***
	(0.0081)	(0.0095)	(0.0109)	(0.0082)	(0.0069)	(0.0077)	(0.0069)
Initial year generosity (%)				0.0002*			
				(0.0001)			

Maximum Aid (% of Total Cost)				-0.0006	-0.0006		
				(0.0006)	(0.0007)		
Need-based Aid						0.0004	
						(0.0003)	
Constant	0.4695***	0.4476***	0.4147***	0.5337***	0.5336***	0.5338***	0.5067***
	(0.0110)	(0.0114)	(0.0112)	(0.0131)	(0.0131)	(0.0130)	(0.0107)
Observations	836,954	546,358	483,960	910,378	910,378	910,378	427,428
R-squared	0.0962	0.0770	0.0838	0.0951	0.0951	0.0951	0.0909

Notes: See notes on Table 3. *** p<0.01, ** p<0.05, * p<0.1

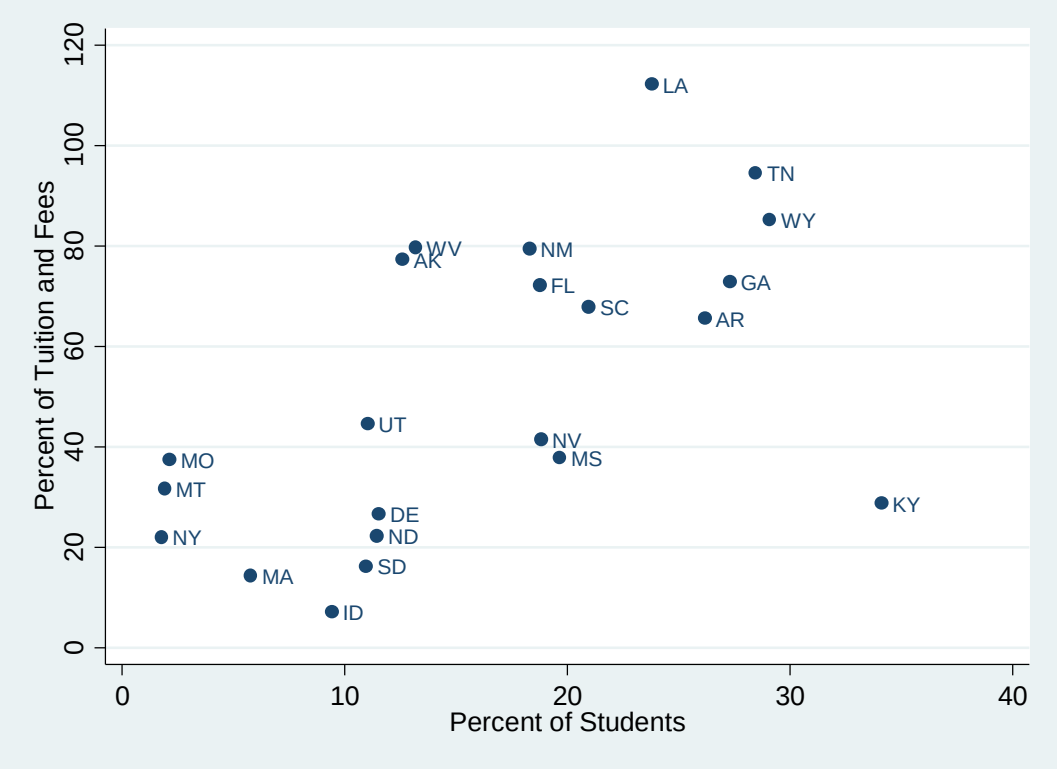
State Merit Aid Programs and Youth Labor Market Attachment

David E. Frisvold and Melinda Pitts

Appendix

For Online Publication

Appendix Figure 1: The Relationship between Both Measures of the Generosity of Merit Aid Programs across States



Notes: This figure displays the relationship between two measures of generosity of merit-aid programs, the maximum amount of merit aid as a percent of tuition and fees of the enrollment-weight average in-state public colleges and universities and the percent of students at in-state public colleges and universities receiving merit aid for 2013.

Appendix Table 1: Overview of Merit-Aid Programs

State	Program	Start Year	End Year	Program Description	Need Component	Other Programs
Alaska	University of Alaska Scholars Program	2000		$1375 scholarship per semester to undergraduate students enrolled in public four year institutions in Alaska; for 8 semesters. Eligibility criterion: Top 10% of all graduating seniors from Alaska high schools.	No	
	Alaska Performance Scholarship	2012		$2378 to $4755 scholarship per year (prorated for halftime enrollment) to students, with qualifying unmet costs of attendance after considering all other financial aid, enrolled in accredited university or college; for 8 semesters. Eligibility criterion: High school GPA, ACT/ SAT score, and specified high school curriculum.	No	
Arkansas	Arkansas Academic Challenge Scholarship	1992		Lesser of annual tuition or fixed amount (up to 1999), varying amounts (from 2000) of scholarship for different years, to students, enrolled at public or private college or university; for 8 semesters (16 semesters for part-time students). Eligibility criterion: High school GPA, ACT score, pre-collegiate core curriculum (up to 2010); high school GPA or ACT score, and pre-collegiate core curriculum (from 2011).	Yes (up to 2010); No (from 2011)	Arkansas Governor's Scholars Program
California	Cal Grant A - Entitlement and Competitive	2002		Tuition and fees to students, enrolled at least halftime at California State University and University of California schools (partial tuition and fees for students enrolled in independent postsecondary institutions), having financial need and family income and assets below established ceilings. Eligibility criterion: High school GPA.	Yes	Cal Grant A - Transfer Entitlement, Cal Grant B - Transfer

State	Program	Start Year	End Year	Program Description	Need Component	Other Programs
	Cal Grant B - Entitlement and Competitive	2002		Up to $1551 stipend during first year to low-income students enrolled at least halftime in an undergraduate academic program at a postsecondary institution, having financial need and family income and assets below the established ceilings. After first year, stipend plus tuition and fees in the same amount as Cal Grant A. Eligibility criterion: High school GPA.	Yes	Entitlement, Cal Grant C
Delaware	Student Excellence Equals Degree (SEED)	2007		Tuition assistance (after other financial aid received is deducted from tuition cost) to fulltime students in associate degree programs at Delaware Technical Community College, or in Associate in Arts programs at University of Delaware; for 6 semesters. Eligibility criterion: High school GPA, or ACT score (for home-schooled students)	No	
	Inspire Scholarship	2012		Tuition assistance (after other financial aid received is deducted from tuition cost) up to $3000 per year to fulltime students in degree programs at Delaware State University; for 6 semesters. Eligibility criterion: High school GPA.	No	
Florida	Florida Academic Scholars	1998		Tuition and allowable fees scholarship of fixed cost per credit hour, based on institution type, to students, enrolled at postsecondary institutions; for maximum 120 semester hours. Eligibility criterion: High school GPA, SAT/ ACT score (up to 1999); additional requirement of community service hours (from 2000).	No	Gold Seal Vocational Scholars
	Florida Medallion Scholars	1998		Tuition and allowable fees scholarship (100% for 2 year institutions and 75% for 4 year institutions) of fixed cost per credit hour, to students, enrolled at postsecondary institutions; for maximum 120	No	

State	Program	Start Year	End Year	Program Description	Need Component	Other Programs
				semester hours. Eligibility criterion: High school GPA, SAT/ ACT score (up to 2012); additional requirement of community service hours (from 2013).		
Georgia	HOPE Scholarship, Zell Miller Scholarship	1994		Tuition, approved mandatory fees (capped at the same amount allowed for 2003-04 award year and prorated for private institutions), and book allowance of up to $150 per semester to students, enrolled in degree seeking programs at postsecondary institutions; for 127 semester hours. Payment of mandatory fees and book allowance are eliminated from 2012. Eligibility criterion: High school GPA, or college preparatory curriculum numeric average (up to 2012); high school GPA (from 2013).	Yes (up to 1995); No (from 1996)	HOPE Grant
Idaho	Idaho Promise Scholarship Category B	2002	2014	Maximum award of $600 per year to fulltime students under age of 22, enrolled at postsecondary institutions; for 4 semesters. Eligibility criterion: High school GPA, or ACT/ SAT score.	No	Idaho Promise Scholarship Category A
Illinois	Merit Recognition Scholarship	1988	2005	A $1000 scholarship during first year of enrollment, disbursed in two installments, to undergraduate students, enrolled at least halftime at an institution of higher learning. Eligibility criterion: High school GPA at or above 95th percentile in class, or ACT/ SAT score at or above 95th percentile in State.	No	
Kentucky	Kentucky Educational Excellence Scholarship	2000		Scholarship of $125 to $2000 per year (prorated for part-time students), based on high school GPA, with additional bonus of $36 to $500 based on ACT score, to students, enrolled at postsecondary institutions; for 8 semesters. Students eligible for	No; Yes, for supplement part only (from	

State	Program	Start Year	End Year	Program Description	Need Component	Other Programs
				free or reduced price lunch during any year in high school may receive $200 to $300 supplemental amount for each AP or IB exam scores. Eligibility criterion: High school GPA.	2009)	
Louisiana	Taylor Opportunity Program for Students (TOPS) - Opportunity, Performance, Honors	1999		Tuition and certain fees scholarship, and additional amount ($400 per year for performance award and $800 per year for honors award), to students, enrolled fulltime in postsecondary institutions and certain cosmetology and proprietary schools; for 4 years. Eligibility criterion: High school core curriculum, core curriculum GPA, and ACT score.	No	
Maryland	Maryland HOPE Scholarship	2003	2006	$3000 scholarship to students, enrolled fulltime in 4 year eligible institutions, and $1000 scholarship to students, enrolled fulltime in 2 year eligible institutions, having total family income not more than $95,000; for 4 years. Recipients should perform a service obligation of employment within the state for 1 year for each year that a recipient has a scholarship awarded. Eligibility criterion: High school GPA and service commitment after graduation.	Yes	Distinguished Scholar Program
Massachusetts	John & Abigail Adams Scholarship	2006		Tuition (not including fees) scholarship to students, enrolled fulltime in public college or university, who score highest 25% in Massachusetts Comprehensive Assessment System (MCAS) English Language Arts and Mathematics test in their districts; for a maximum of 8 semesters. Eligibility criterion: Highest 25 percent in district on the 10th grade Massachusetts Comprehensive Assessment System (MCAS) English Language Arts and Mathematics test, and scored in Advanced category in one test	No	

State	Program	Start Year	End Year	Program Description	Need Component	Other Programs
				and Proficient or Advanced on the other test.		
Michigan	Michigan Merit Scholarship	2001	2007	A $2500 to $3000 scholarship, paid in 2 years, to students enrolled in approved postsecondary institutions. Eligibility criterion: Qualifying results in the Michigan Educational Assessment Program (MEAP) test in the subject areas of reading, writing, mathematics, and science.	No	
	Michigan Promise Scholarship	2008	2008	A $4000 scholarship (subject to proration) to students awarded associate's degree or 2-year certificate of completion in vocational training programs, or completed 50% or more of the academic requirements for bachelor's degree at approved postsecondary institutions. Eligibility criterion: Michigan Educational Assessment Program (MEAP) test in the subject areas of reading, writing, mathematics, and science, postsecondary education requirements (completion of associate degree or 50% of academic requirements for bachelor's degree), and college GPA.	No	
Mississippi	Mississippi Resident Tuition Assistance Program (MTAG)	1997		Up to $500 scholarship per year during 1st and 2nd years, and up to $1,000 scholarship per year during 3rd and 4th years to students, enrolled fulltime at approved postsecondary institutions, who receive less than the full Federal Pell Grant; for up to 8 semesters (12 trimesters). Eligibility criterion: High school GPA and ACT/ SAT score.	No	
	Mississippi Eminent Scholars Fund Program (MESG)	1997		Up to $2500 scholarship per year (not exceeding tuition and fees) to students, enrolled fulltime at approved postsecondary institutions; for up to 8 semesters (12 trimesters). Eligibility criterion: High	No	

State	Program	Start Year	End Year	Program Description	Need Component	Other Programs
				school GPA and ACT/ SAT score.		
Missouri	Bright Flight Program	1988		Up to $3000 ($2000 before 2011) scholarship to top 3% of all Missouri students taking ACT/ SAT, enrolled full time in participating schools; for up to 10 semesters. Eligibility criterion: ACT/ SAT state percentile rank.	No	
Montana	High School MERIT Scholarship	2006		$1000 scholarship per semester to 1 student from each accredited Montana high school, attending a postsecondary institution; for 8 semesters (4 semesters for 2 year school). Eligibility criterion: High school GPA or ACT/ SAT score (additional tittle IV selective service requirements for male only).	No	
	Merit AT-LARGE Scholarship	2006		$1000 scholarship per semester to students enrolled at postsecondary institutions; for 8 semesters (4 semesters for 2 year school). Eligibility criterion: High school GPA or ACT/ SAT score (additional tittle IV selective service requirements for male only).	No	
Nevada	Nevada Millennium Scholarship	2001		Tuition scholarship of $40 per credit hour for lower division course and $60 per credit hour for upper division course, to students enrolled at community colleges; of $60 per credit hour, to students enrolled at state colleges; of $80 per credit hour, to students enrolled at other eligible institutions; up to 12 credit hours per semester. Total scholarship amount per student is capped at $10,000. Eligibility criterion: Pass all areas of the Nevada High School Proficiency Exam, high school GPA (up to 2009); additional requirement of completion of core curriculum (from 2010).	No	

State	Program	Start Year	End Year	Program Description	Need Component	Other Programs
New Jersey	Outstanding Scholar Recruitment Program (OSRP)	1998	2006	$2500 to $7500 scholarship, based on SAT score and high school class rank, to students enrolled in public or private four year institutions. Eligibility criterion: High school class rank and SAT score.	No	New Jersey Student Tuition Assistance Reward Scholarship II (NJSTARS II)
	New Jersey Student Tuition Assistance Reward Scholarship (NJSTARS)	2005		Tuition assistance (after other financial aid received is deducted from tuition cost) up to 18 credit hours per semester to fulltime students enrolled at their home county community college; for 5 semesters. Eligibility criterion: Top 15% of high school class at the end of either junior or senior year.	No	
New Mexico	New Mexico Legislative Lottery Scholarship	1998		Tuition scholarship starting from second semester of enrollment, to students, enrolled fulltime at public postsecondary institutions; for 7 semesters (3 for community college). Eligibility criterion: College GPA.	No	
New York	Scholarships for Academic Excellence	1998		Up to 2000 scholarships of $1500 and 6000 scholarships of $500 to fulltime students in undergraduate program at postsecondary institutions. Eligibility criterion: Regents test scores, or class rank, or locally developed assessment test of English and mathematics.	No	
North Dakota	North Dakota Academic Scholarship, North Dakota Career and Technical Education Scholarship	2011		$750 per semester scholarship to students, enrolled fulltime at accredited public, private, or tribal college or university; for 8 semesters. Eligibility criterion: High school GPA, ACT score, and core curriculum.	No	North Dakota Scholars Program
Oklahoma	Oklahoma's Promise	1997		Tuition (not including fees) scholarship to students, who complete Promise curriculum, satisfy GPA	Yes	

State	Program	Start Year	End Year	Program Description	Need Component	Other Programs
				requirement, whose parent's income is no more than $50,000 at the time of enrollment in 8th, 9th, or 10th grade, enrolled at public postsecondary institutions (partial tuition scholarship at private institutions). Eligibility criterion: High school GPA and core curriculum.		
South Carolina	LIFE Scholarship	1999		Up to $4700 scholarship (not to exceed cost of attendance), plus $300 book allowance per year, to students, enrolled fulltime at 4 year institutions; up to cost of tuition, plus $300 book allowance per year (total amount not to exceed $5000) to students, enrolled fulltime at 2 year institutions; for 8 consecutive terms (10 if 5 year program, 4 if 2 year program). Eligibility criterion: High school GPA and SAT/ ACT score (up to 2001); any 2 of high school GPA, SAT/ ACT score, and top 30% of graduating class.	No	Palmetto Fellows Scholarship
	South Carolina HOPE Scholarship	2003		Up to $2500 scholarship (not to exceed cost of attendance), plus $300 book allowance for the first academic year, to students, enrolled fulltime at 4 year institutions. Eligibility criterion: High school GPA.	No	
South Dakota	South Dakota Opportunity Scholarship	2005		$1000 scholarship per year from 1st to 3rd year, and $2000 during 4th year to students, enrolled at accredited postsecondary institutions. Eligibility criterion: ACT/ SAT score, high school course requirement with no final grade below "C", and high school GPA.	No	
Tennessee	HOPE, GAMS, and ASPIRE	2005		Fixed amount scholarships per semester, based on eligibility criteria and institution type, to students, enrolled at postsecondary institutions; for 120	No; Yes, for supplement	Wilder-Naifeh Technical

State	Program	Start Year	End Year	Program Description	Need Component	Other Programs
				semester hours. Eligibility criterion: ACT/ SAT score, or high school GPA.	al part only	Skills Grant
	Access Award	2005		Non-renewable fixed amount scholarship per semester for freshman year, based on institution type, to students, whose annual adjusted gross family income is $36,000 or less, enrolled at postsecondary institutions. Eligibility criterion: High GPA and ACT/ SAT score.	Yes	
Utah	New Century Scholarship	2000		Maximum of $1250 scholarship per semester to students, who earn associate degree by the date of their class's high school graduation, enrolled fulltime at 4 year public college or university within the Utah System of Higher Education; for 4 semesters or 60 credit hours. Eligibility criterion: High school GPA and completion of all coursework for associate degree or math and science curriculum.	No	
	Regents' Scholarship – Base Award, Exemplary Academic Achievement Award, Utah Educational Savings Plan Supplemental Award	2008		Maximum of $1000 onetime payment, or $1250 scholarship per semester to students, who complete the Utah Scholars Curriculum and meet GPA and ACT requirements, enrolled at one of the Utah System of Higher Education institutions; for up to 4 semesters. Eligibility criterion: High school GPA, ACT score, and core curriculum with no grade below "C" in required core courses.	No	
Washington	Washington Promise Scholarship	2000	2005	Scholarship up to the value of fulltime annual resident tuition rates charged by Washington's community colleges, to low and middle income students having family income of no more than	Yes	Washington Scholars Program

State	Program	Start Year	End Year	Program Description	Need Component	Other Programs
				135% of the state's median family income, enrolled at least halftime at public or private accredited college or university; for 2 years. Eligibility criterion: ACT/ SAT score, or top 15% of the class.		
West Virginia	West Virginia PROMISE Scholarship	2003		Tuition scholarship up to $4750 per year to students, enrolled at postsecondary institutions; for 8 semesters (no more than 4 total semesters for 2 year degree program). Eligibility criterion: High school overall GPA, core GPA, core curriculum, and ACT/ SAT test score (minimum ACT/ SAT sub-score from 2005).	No	
Wyoming	Hathaway Scholarship - Provisional Opportunity, Opportunity, Performance, and Honors	2007		$800 to $1600 scholarship per semester to students, enrolled at certain post-secondary institutions, for equivalent of 8 fulltime semesters (no more than 4 at community college). Eligibility criterion: High school GPA and SAT/ ACT score (up to 2008); additional core curriculum requirement (from 2009).	No; Yes, for supplemental part only	

Notes: This table includes programs in which eligibility is determined by merit and programs in which eligibility is also determined by need. The analysis throughout the paper focuses only on the merit-based programs.

Appendix Table 2: Comparison of Merit-Aid Program Definitions

	This Paper	Broad Programs	Strong Programs	Weak Programs	Avg. Max Aid (%)	Avg. Students Receiving Aid (%)
Alaska	X			X	69.15	5.39
Arkansas	X	X		X	70.93	25.62
Delaware	X			X	27.03	9.91
Florida	X	X	X		131.19	18.96
Georgia	X	X	X		102.27	32.20
Idaho	X			X	11.40	14.14
Illinois	X			X	6.99	0.62
Kentucky	X	X	X		48.86	32.28
Louisiana	X	X	X		121.59	22.52
Massachusetts	X			X	16.86	4.74
Michigan	X	X		X	10.51	11.16
Mississippi	X	X		X	62.68	23.28
Missouri	X			X	55.79	3.08
Montana	X			X	34.78	1.56
Nevada	X	X	X		64.04	19.65
New Jersey	X			X	114.52	1.46
New Mexico	X	X	X		77.78	15.02
New York	X			X	29.94	1.96
North Dakota	X			X	23.01	8.07
South Carolina	X	X	X		67.50	18.63
South Dakota	X	X	X		20.74	8.20
Tennessee	X	X	X		86.13	25.34
Utah	X			X	70.89	3.09
West Virginia	X	X	X		96.02	12.76
Wyoming	X			X	96.20	25.38

Notes: This table compares the definitions of the generosity of merit-aid programs to other categorizations: broad programs from Dynarski (2004) and Fitzpatrick and Jones (2016) and strong and weak programs from Sjoquist and Winters (2012).

Appendix Table 3: Maximum Merit Aid as Percent of Tuition and Fee in Public 4-year institutions

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Alabama																									
Alaska												94	90	87	80	73	68	62	58	55	52	49	46	75	77
Arizona																									
Arkansas																							79	68	66
California																									
Colorado																									
Connecticut																									
Delaware																								27	27
District of Columbia																									
Florida										159	152	151	147	147	149	145	142	141	142	138	136	107	98	74	72
Georgia								113	113	112	112	111	111	110	110	109	106	105	103	101	96	93	88	73	73
Hawaii																									
Idaho														16	15	14	13	14	12	12	12	8	7	7	7
Illinois	11	10	10	9	8	8	8	7	7	7	6	6	6	5	4	4	4								
Indiana																									
Iowa																									
Kansas																									
Kentucky												85	79	73	65	56	49	43	40	37	35	33	32	30	29
Louisiana											132	128	128	127	125	123	122	121	121	120	119	117	115	114	112
Maine																									
Maryland																									
Massachusetts																		20	20	18	16	16	15	15	14
Michigan													13	12	11	10	9	10	9	11					
Minnesota																									
Mississippi									97	88	87	85	73	67	67	63	60	56	53	51	50	47	44	41	38
Missouri	130	115	102	89	81	71	66	61	59	56	53	51	48	43	37	34	34	32	30	29	28	28	40	38	37
Montana																		37	37	37	36	35	33	32	32

Nebraska																
Nevada				79	77	71	82	77	73	69	63	59	53	45	42	42
New Hampshire																
New Jersey	152	143	134	124	112	103	94	87	81							
New Mexico	76	76	76	77	78	78	79	79	78	78	78	77	78	79	79	80
New York	26	38	37	37	36	31	31	30	30	30	30	27	26	24	23	22
North Carolina																
North Dakota														24	23	22
Ohio																
Oklahoma																
Oregon																
Pennsylvania																
Rhode Island																
South Carolina		54	43	56	49	68	74	68	63	90	84	80	74	72	70	68
South Dakota								26	25	23	22	20	20	18	17	16
Tennessee								84	86	90	88	83	78	72	101	95
Texas																
Utah			114	106	96	87	80	73	66	63	59	56	53	49	47	45
Vermont																
Virginia																
Washington																
West Virginia						100	100	100	100	100	100	100	100	91	85	80
Wisconsin																
Wyoming										107	105	101	96	91	88	85

Notes: These values are the amount of aid for all expenses as a percent of the average in-state tuition and fees of 4-year public universities, averaged over all programs offered by the state in a given year.

Appendix Table 4: Percentage of undergraduate students receiving merit aid

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Alabama																									
Alaska												1.5	2.5	3.7	4.3	5.1	5.4	5.3	5.6	5.3	5.4	5.2	4.9	8.6	12.6
Arizona																									
Arkansas																							26.2	24.5	26.2
California																									
Colorado																									
Connecticut																									
Delaware																								8.3	11.5
District of Columbia																									
Florida										6.8	10.4	14.0	17.1	18.0	18.9	20.0	21.2	22.3	23.3	24.1	23.8	23.0	21.5	20.2	18.8
Georgia								33.0	34.8	34.8	36.1	35.6	33.4	32.6	33.2	35.1	34.9	33.7	33.4	29.6	28.8	27.8	27.6	27.9	27.3
Hawaii																									
Idaho														16.4	16.0	14.8	14.6	15.0	15.0	16.1	11.5	14.5	14.5	11.8	9.4
Illinois	0.7	0.7	0.7	0.7	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.7	0.9	0.9	0.9	0.8	0.9								
Indiana																									
Iowa																									
Kansas																									
Kentucky												14.1	23.1	28.5	34.6	36.3	37.2	36.9	36.8	35.7	35.2	33.9	33.0	32.5	34.1
Louisiana											14.9	18.0	21.6	23.9	23.3	23.1	24.1	27.8	24.8	23.3	22.1	22.6	22.1	22.5	23.8
Maine																									
Maryland																									
Massachusetts																		1.6	2.8	3.8	4.3	6.4	6.6	6.6	5.8
Michigan													10.0	11.7	11.7	11.3	11.2	8.8	16.2	8.4					
Minnesota																									
Mississippi									23.4	24.0	24.5	25.5	26.6	26.7	23.1	24.1	23.8	25.6	24.4	23.9	24.1	19.4	18.7	18.2	19.7
Missouri	1.3	1.9	2.4	2.6	2.8	2.8	3.1	3.4	3.7	3.8	4.0	3.9	3.9	3.8	3.6	3.5	3.5	3.4	3.5	3.5	3.2	2.8	2.5	2.1	2.1

Montana									0.6	0.8	1.6	1.7	2.1	1.8	1.9	1.9
Nebraska																
Nevada				7.5	13.7	19.9	24.5	24.4	24.1	23.1	23.7	21.2	19.2	17.4	18.2	18.8
New Hampshire																
New Jersey	0.5	0.9	1.3	1.7	1.8	1.7	1.7	1.8	1.8							
New Mexico	0.2	6.7	16.2	15.1	15.6	15.7	16.1	16.5	16.9	17.4	17.1	17.1	17.1	16.8	17.6	18.3
New York	0.4	1.0	1.6	2.2	2.5	2.5	2.4	2.4	2.3	2.2	2.2	2.1	2.0	1.9	1.8	1.8
North Carolina																
North Dakota														5.1	7.7	11.4
Ohio																
Oklahoma																
Oregon																
Pennsylvania																
Rhode Island																
South Carolina		11.9	13.2	13.2	14.9	18.6	19.6	20.5	21.1	21.4	21.7	20.8	20.9	20.4	20.4	21.0
South Dakota								2.8	4.7	6.9	8.9	9.7	9.7	9.5	10.6	11.0
Tennessee								16.7	21.0	24.3	26.4	28.4	27.8	27.1	27.9	28.5
Texas																
Utah			0.1	0.3	0.4	0.6	0.7	1.0	1.4	2.0	3.1	4.2	5.4	5.9	7.1	11.0
Vermont																
Virginia																
Washington																
West Virginia						5.9	11.1	14.0	16.1	16.1	13.8	13.2	12.3	12.4	12.3	13.2
Wisconsin																
Wyoming										11.9	20.1	25.7	30.4	30.8	29.6	29.1

Notes: These values are the percent of in-state college students receiving merit aid, averaged over all programs offered by the state in a given year.

Appendix Table 5: Data Sources

State	Program	Data Source
Alaska	University of Alaska Scholars Program	1. UA Scholars Program *website* http://www.alaska.edu/scholars/ 2. UA in Review – *various issues*
	Alaska Performance Scholarship	1. Alaska Commission on Postsecondary Education *website* http://acpe.alaska.gov/FINANCIAL_AID/Grants_Scholarships/Alaska_Performance_Scholarship 2. Alaska Statutes, Title 14, Chapter 43, Article 12 3. Alaska Administrative Code, Title 20, Chapter 16, Article 2 4. Alaska Performance Scholarship Outcomes Report – *various issues*
Arkansas	Arkansas Academic Challenge Scholarship	1. College for You, Arkansas Department of Education *website* http://scholarships.adhe.edu/ 2. Arkansas Academic Challenge Scholarship Rules and Regulations – *various issues*, Arkansas Administrative Rules, Department of Higher Education, Financial Aid Division 3. Arkansas Code Annotated, Title 6, Subtitle 6, Chapter 85 4. State of Arkansas General Assembly Regular Session Bill – Act 352 of 1991 (Senate Bill 299), Act 362 of 1991 (House Bill 1501), Act 188 of 1995 (Senate Bill 96), Act 858 of 1999 (House Bill 1411), Act 1836 of 2001 (Senate Bill 595), Act 1798 of 2003 (House Bill 1854), Act 606 of 2009 (House Bill 1002)
California	Cal Grant A - Entitlement and Competitive	1. California Student Aid Commission *website* http://www.csac.ca.gov/doc.asp?id=568 2. Cal Grants *website* http://www.calgrants.org/ 3. "The Cal Grant Entitlement: Increasing Access to Financial Aid," Policy Issue Report, Institute for Higher Education Leadership and Policy, California State University, Sacramento, 2002
	Cal Grant B - Entitlement and Competitive	
Delaware	Student Excellence Equals Degree (SEED)	1. Delaware Technical Community College *website* https://www.dtcc.edu/admissions-financial-aid/financial-aid-scholarships/types-aid/seed 2. Delaware Code, Title 14, Chapter 34, Subchapter XIV
	Inspire Scholarship	1. Delaware State University *website* http://www.desu.edu/admissions/inspire-scholarship

State	Program	Data Source
		2. Delaware Code, Title 14, Chapter 34, Subchapter XV
Florida	Florida Academic Scholars	1. Office of Student Financial Assistance, Florida Department of Education *website* http://www.floridastudentfinancialaid.org/SSFAD/bf/bffacts.htm 2. The 1997 Florida Statutes, Title XVI, Chapter 240, Part IV, Section 40201 – 40242 3. Harkreader, S., Hughes, J., Tozzi, h., and Vanlandingham, G. 2008. "The Impact of Florida's Bright Futures Scholarship Program on High School Performance and College Enrollment," *Journal of Student Financial Aid*, 38(1), pp. 5-12
	Florida Medallion Scholars	
Georgia	HOPE Scholarship, Zell Miller Scholarship	1. Georgia Student Finance Commission (GSFC) *website* http://www.gsfc.org/gsfcnew/HopeProgramm.cfm?sec=3 2. GAcollege411 website https://secure.gacollege411.org/Financial_Aid_Planning/HOPE_Program/_default.aspx 3. HOPE Scholarship Program at Public Institutions, Regulations – 100, GSFC – *various issues* 4. HOPE Scholarship Program at Private Institutions, Regulations – 200, GSFC – *various issues* 5. Zell Miller Scholarship Program at Public and Private Institutions, Regulations – 4000, GSFC – *various issues* 6. HOPE Scholarship Joint Study Commission Report, Carl Vinson Institute of Government 7. HOPE Scholarship and HOPE Grant Standard Undergraduate Award Amounts for Fiscal Year, GSFC – *various issues*
Idaho	Idaho Promise Scholarship Category B	1. Legislature of the State of Idaho – Senate Bill No. 1237 (First Regular Session – 1999), Senate Bill No. 1034 (First Regular Session – 2001) 2. Idaho Administrative Code, IPADA 08, Title 01, Chapter 05 3. Idaho State Board of Education *Meeting Minutes*
Illinois	Merit Recognition Scholarship	1. Illinois Administrative Code, Title 23, Subtitle A, Chapter XIX, Part 2761
Kentucky	Kentucky Educational Excellence Scholarship	1. Kentucky Higher Education Assistance Authority (KHEAA) *website* https://www.kheaa.com/website/kheaa/kees?main=1 https://www.kheaa.com/website/kheaa/kees?main=1&part=kypr.065 2. "A Study of Kentucky Educational Excellence Scholarship," Kentucky Legislature – Legislative Research Commission, Office of Education Accountability, Research Report No. 386

State	Program	Data Source
		3. KEES Data Report – *various issues* 4. KHEEA and KHESLC Annual Report – various issues
Louisiana	Taylor Opportunity Program for Students (TOPS) - Opportunity, Performance, Honors	1. Louisiana Office of Student Financial Assistance website http://www.osfa.la.gov/ 2. TOPS Report, Louisiana Board of Regents – *various issues*
Maryland	Maryland HOPE Scholarship	1. Office of the Student Financial Assistance Annual Report – *various issues* 2. General Assembly of Maryland – Senate Bill 231 (1997 Regular Session), Senate Bill 131 (1999 Regulars Session)
Massachusetts	John & Abigail Adams Scholarship	1. Office of Student Financial Assistance, Massachusetts Department of Higher Education *website* http://www.mass.edu/osfa/programs/adams.asp 2. Goodman, J., 2008. "Who merits financial aid?: Massachusetts' Adams Scholarship," *Journal of Public Economics*, 92, pp. 2121-2131
Michigan	Michigan Merit Scholarship	1. Michigan Merit Award Annual Report – *various issues* 2. "State Financial Aid Funding for State Postsecondary Education," House Fiscal Agency, Michigan House of Representatives, 2008 3. Michigan Merit Award Scholarship Act (Act 94 of 1999) 4. "Merit Award Program," Senate Fiscal Policy Issue Paper, A Series of Papers Examining Critical Issues Facing the Michigan Legislature, 2002 5. Harrison, B., 2012. "The Effects of Merit Awards on District-Level High School Graduation: Evidence From Michigan, " Master's Thesis, University of Tennessee
	Michigan Promise Scholarship	1. Michigan Promise Grant Act (Act 479 of 2006)
Mississippi	Mississippi Resident Tuition Assistance Program (MTAG)	1. RiseUpMS website http://riseupms.com/state-aid/mtag/
	Mississippi Eminent Scholars	1. RiseUpMS website http://riseupms.com/state-aid/mesg/

State	Program	Data Source
	Fund Program (MESG)	2. Mississippi Legislature Regular Session – House Bill 537 (1997), House Bill 661 (1998), Senate Bill 2629 (2002)
Missouri	Bright Flight Program	1. Missouri Department of Higher Education *website* http://dhe.mo.gov/ppc/grants/brightflight.php 2. Missouri Statutes, Chapter 173, Section 250 3. Rules of Department of Higher Education, Division 10, Chapter 2, Title 6 CSR 10-2.080
Montana	High School MERIT Scholarship	1. Montana University System website http://mus.edu/Prepare/Pay/Scholarships/Governors_Best_and_Brightest_Scholarship.asp#merit 2. Governor's Best and Brightest Scholarship Annual Report – *various issues* 3. Montana Legislature, House Bill No. 435, 2005 Legislative Session
	Merit AT-LARGE Scholarship	
Nevada	Nevada Millennium Scholarship	1. Nevada State Treasurer website http://www.nevadatreasurer.gov/GGMS/GGMS_Home/ 2. Statutes of Nevada – Senate Bill No. 496 – Committee on Finance, Chapter 536 (1999), Senate Bill No. 113 – Committee on Human Resources and Facilities, Chapter 297 (2001), Senate Bill No. 503 – Committee on Finance, Chapter 471 (2003), Senate Bill No. 4 – Committee of the Whole, Chapter 10 (2005), Senate Bill No. 5 – Committee of the Whole, Chapter 5 (2007), Assembly Bill No. 96 – Committee on Education, Chapter 38 (2009) 3. Nevada Revised Statutes, Chapter 396, Section 911 - 945 4. Millennium Scholarship Baseline Study, Office of the Nevada State Treasurer, March 2003 5. Annual Report, Office of the Nevada State Treasurer – *various issues*
New Jersey	Outstanding Scholar Recruitment Program (OSRP)	1. "Outstanding Scholar Recruitment Program: An Evaluation," A Report by the Institute of Higher Education Policy, 2004 2. State of New Jersey 214th Legislature, Senate, No. 1524
	New Jersey Student Tuition Assistance Reward Scholarship (NJSTARS)	1. Higher Education Student Assistance Authority *website* http://www.hesaa.org/Pages/NJGrantsHome.aspx 2. New Jersey Statutes, Title 18A, Chapter 59 3. "New Jersey Student Tuition Assistance Reward Scholarship," A Report by the Higher Education Student Assistance Authority, 2006
New Mexico	New Mexico	1. New Mexico Higher Education Department (HED) *website*

State	Program	Data Source
	Legislative Lottery Scholarship	http://www.hed.state.nm.us/students/lotteryscholarship.aspx 2. New Mexico Administrative Code, Title 5, Chapter 7, Part 20 3. State of New Mexico Legislative Education Study Committee *memorandums* http://www.nmlegis.gov/lcs/lesc/lescdocs/LESC%20A-Z%20Catalog.pdf 4. HED Annual Report – *various issues*
New York	Scholarships for Academic Excellence	1. Higher Education Services Corporation *website* http://www.hesc.ny.gov/pay-for-college/financial-aid/types-of-financial-aid/nys-grants-scholarships-awards/nys-scholarships-for-academic-excellence.html 2. Official Compilation of Codes, Rules and Regulations of the State of New York, Title 8, Chapter II, Subchapter 1, Part 145, Subpart 145-9 3. Laws of New York, Education, Title 1, Article 13, Section 605-A
North Dakota	North Dakota Academic Scholarship, North Dakota Career and Technical Education Scholarship	1. North Dakota University System *website* http://www.ndus.nodak.edu/students/paying-for-college/grants-scholarships/ 2. North Dakota Century Code, Title 15, Chapter 15.1-21
Oklahoma	Oklahoma's Promise	1. Oklahoma State Regents for Higher Education *website* http://www.okhighered.org/okpromise/ 2. Oklahoma Statutes, Title 70, Chapter 45, Section 2601 - 2605 3. Oklahoma's Promise Year-End Report – various issues
South Carolina	LIFE Scholarship South Carolina HOPE Scholarship	1. South Carolina Commission on Higher Education (CHE) *website* http://www.che.sc.gov/Students,FamiliesMilitary/PayingForCollege/WhatFinancialHelpIsAvailable/ScholarshipsGrantsforSCResidents.aspx 2. South Carolina Code of Laws, Title 59, Chapter 149 3. CHE Meeting *memorandums* http://www.che.sc.gov/MeetingsEvents/CommissionandCommitteeMeetingsMaterials/FullCommissionMeetingsArchive.aspx 4. CHE *memorandums* http://www.che.sc.gov/DataPublications/SearchtheCHEDocumentCatalog.aspx 5. "Summary Report on South Carolina Scholarships and Grants, 1988 – 2005," A Report of

State	Program	Data Source
		the South Carolina Commission on Higher Education
South Dakota	South Dakota Opportunity Scholarship	1. South Dakota Opportunity Scholarship website http://sdos.sdbor.edu/ 2. South Dakota Opportunity Scholarship Annual Report – *various issues*
Tennessee	HOPE, GAMS, and ASPIRE	1. Tennessee Student Assistance Corporation *website* http://www.tn.gov/collegepays/mon_college/lottery_scholars.htm 2. Rules of Tennessee Student Assistance Corporation, Chapter 1640-1-19 3. Tennessee Education Lottery Scholarship Program Annual Report – *various issues* 4. Ness, E., and Noland, B. 2007. "Targeted Merit Aid: Implications of the Tennessee Education Lottery Scholarship Program," *Journal of Student Financial Aid*, 37(1), pp. 7-17
	Access Award	
Utah	New Century Scholarship	1. Utah System of Higher Education *website* http://higheredutah.org/newcenturyscholarship/ 2. Utah Administrative Code, Rule R765-604 3. Kearl, C., 2012, "A Study of Utah's New Century Scholarship (NCS) Program," All Graduate Theses and Dissertations, Paper 1436, Utah State University
	Regents' Scholarship – Base Award, Exemplary Academic Achievement Award, Utah Educational Savings Plan Supplemental Award	1. Utah System of Higher Education *website* http://higheredutah.org/regentsscholarship/ 2. Utah Administrative Code, Rule R765-609
Washington	Washington Promise Scholarship	1. Revised Code of Washington, Chapter 28B.119 2. Governor Gary Locke *website* http://www.digitalarchives.wa.gov/GovernorLocke/educate/promise.htm 3. "Washington Promise Scholarship Program Evaluation," Washington Higher Education Coordinating Board, 2002 4. "1999 Washington Promise Scholarship – An Overview from the Higher Education Coordinating Board," Washington Higher Education Coordinating Board, 1999

State	Program	Data Source
West Virginia	West Virginia PROMISE Scholarship	1. College Foundation of West Virginia *website* https://secure.cfwv.com/Financial_Aid_Planning/Scholarships/Scholarships_and_Grants/West_Virginia_PROMISE.aspx 2. West Virginia Legislative Rule, Title 133, Series 7 3. West Virginia Comprehensive Financial Aid Report – *various issues* 4. West Virginia Higher Education Report Card – *various issues* 5. Final Report of the PROMISE Scholarship Ad-Hoc Advisory Committee, West Virginia Higher Education Policy Commission
Wyoming	Hathaway Scholarship - Provisional Opportunity, Opportunity, Performance, and Honors	1. Wyoming Department of Education *website* http://edu.wyoming.gov/beyond-the-classroom/college-career/scholarships/hathaway/ 2. Wyoming Statutes, Title 21, Chapter 16, Article 13 3. Wyoming Department of Education Rules, Chapter 38

Appendix Table 6: Merit Aid Recipient Data Sources

State	Program	Source
Alaska	University of Alaska Scholars Program	1) UA in Review
	Alaska Performance Scholarship	1) Alaska Performance Scholarship Outcomes Report
Arkansas	Arkansas Academic Challenge Scholarship	1) Arkansas Department of Higher Education Financial Aid Report 2) Report on Financial Aid Programs administered by the Arkansas Department of Higher Education 3) Higher Education in Arkansas, Report Prepared for Governor Huckabee and the Arkansas Legislature
California	Cal Grant A	1) Cal Grant Statistics, 2) Cal Grant Program Recipients, 3) Preliminary Grant Statistics Report, 4) Facts at Your Fingertips – Grant and Loan Programs, California Student Aid Commission
	Cal Grant B	
Delaware	Student Excellent Equals Degree (SEED)	
	Inspire Scholarship	
Florida	Florida Medallion Scholars	1) Florida Bright Futures Scholarship Statistical Reports
	Florida Academic Scholars	
Georgia	HOPE Scholarship	1) Georgia Student Finance Commission Annual Report 2) Senate Budget and Evaluation Office, Section 40: Regents, University System of Georgia 3) Sjoquist & Walker (2010): "Informing Lottery Budget Decisions: HOPE and Pre-K", FRC Report No. 215
Idaho	Idaho Promise Scholarship Category B	1) Meeting Archives, Business Affairs and Human Resources – Finance, Idaho State Board of Education, April Regular Meeting
Illinois	Merit Recognition Scholarship	1) Illinois Student Assistance Commission Data Book 2) Illinois Detailed Annual Report of Revenues and Expenditures
Kentucky	Kentucky Educational Excellence Scholarship	1) Kentucky Educational Excellence Scholarship Data Report 2) Kentucky Higher Education Assistance Authority Annual Report

State	Program	Source
Louisiana	Taylor Opportunity Program for Students (TOPS)	1) TOPS Report: Analysis of the TOPS Program
Maryland	Hope Scholarship	1) Office of Student Financial Assistance Annual Report, Maryland Higher Education Commission
Massachusetts	John & Abigail Adams Scholarship	1) Massachusetts Department of Elementary and Secondary Education *news release*
Michigan	Michigan Merit Scholarship	1) Michigan Merit Award Annual Report 2) Student Financial Services Bureau Annual Report 3) Fiscal Focus: State Financial Aid Funding for Postsecondary Education, House Fiscal Agency, State of Michigan House of Representatives
	Michigan Promise Scholarship	
Mississippi	Mississippi Resident Tuition Assistance Program (MTAG)	1) Annual Report of the State Supported Student Financial Aid Programs, 2) Executive Summary of the Student Financial Aid Programs, 3) Mississippi IHL System Profile, Board of Trustees of State Institutions of Higher Learning, Mississippi Office of Student Financial Aid
	Mississippi Eminent Scholars Fund Program (MESG)	
Missouri	Bright Flight Program	1) Missouri Department of Higher Education Statistical Summary
Montana	High School MERIT Scholarship	1) Governor's Best and Brightest Scholarship Program Annual Report of the Advisory Council
	Merit AT-LARGE Scholarship	
Nevada	Nevada Millennium Scholarship	1) Office of the Nevada State Treasurer Annual Report 2) Financial Aid Report, Nevada System of Higher Education 3) Governor Guinn Millennium Scholarship Data Sheet, Nevada System of Higher Education, Office of Academic and Student Affairs
New Jersey	Outstanding Scholar Recruitment Program (OSRP)	1) Higher Education Student Assistance Authority Annual Report 2) Frequently Requested Statistical Tables, Office of Research and Accountability, State of New Jersey Office of the Secretary of Higher Education 3) Accountability in Higher Education: Annual System-wide Report, New Jersey Commission of Higher Education
	New Jersey Student Tuition Assistance Reward Scholarship (NJSTARS)	
New Mexico	New Mexico Legislative Lottery Scholarship	1) New Mexico Higher Education Department Annual Report 2) Staff Report: Legislative Lottery Scholarship, State of New Mexico Legislative Education Study Committee 3) Legislative Lottery Scholarship Report

State	Program	Source
New York	Scholarships for Academic Excellence	1) Annual Report, New York State Higher Education Services Corporation
North Dakota	North Dakota Academic Scholarship, North Dakota Career and Technical Education Scholarship	1) ND Academic and Career and Technical Education Scholarships 2012 Highlights, North Dakota Legislative Branch 2) ND Academic Scholarship, and ND Career and Technical Education Scholarship Progress Overview, North Dakota University System
Oklahoma	Oklahoma's Promise	1) Oklahoma's Promise Year End Report
South Carolina	LIFE Scholarship	1) South Carolina Commission on Higher Education Memorandum (CHE Meeting) 2) South Carolina Commission on Higher Education Annual Scholarship Year-End Summary Reports of Award by Institution
	South Carolina HOPE Scholarship	
South Dakota	South Dakota Opportunity Scholarship	1) South Dakota Opportunity Scholarship Annual Report 2) State of South Dakota Governor's Budget
Tennessee	HOPE, GAMS, and ASPIRE	1) Tennessee Education Lottery Scholarship Program Annual Report
	Access Award	
Utah	New Century Scholarship	1) New Century and Regents' Scholarship Annual Report 2) Utah System of Higher Education Data Book
	Regents' Scholarship	
Washington	Washington Promise Scholarship	1) Financial Aid Update, 2) Washington Promise Scholarship Program Evaluation, Washington Higher Education Coordinating Board
West Virginia	West Virginia PROMISE Scholarship	1) Financial Aid Comprehensive Report, 2) West Virginia Higher Education Report Card, West Virginia Higher Education Policy Commission
Wyoming	Hathaway Scholarship	1) Hathaway Scholarship Statistics 2) Wyoming State Treasurer Annual Report