Analyzing Student and Family-Level Effects on a Family's Contributions to Fund a College Education

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Table of Contents

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Abstract

We investigate the efficiency of the current financial aid system for prospective college students. The Free Application for Federal Student Aid (FAFSA) form reviews a family's financial information and universities review a student's academic prowess, but neither fully examines students and their family's qualitative factors such as parents' highest education level or intended major. Using the National Center for Education Statistics' National Postsecondary Student Aid Study, we investigate academic, financial, and familial characteristics to determine if they impact a student's level of private loans relative to their total cost of attendance. We find that students with parents who did not receive a college degree are adversely affected by the current financial aid system. In particular, these students take out a greater amount of private loans relative to their total cost of attendance all else equal. Our finding has wider policy implications; changing the current financial aid system to assist disadvantaged students could help reduce intergenerational education inequalities. In addition, colleges could reach a broader range of students by helping the students that currently struggle the most to pay tuition.

1. Introduction

In 2015, 86% of undergraduate college students seeking four-year degrees received some form of financial aid. In 2017, student debt in the United States reached a record high of $1.31 trillion, and 6% of students used private loans to supplement the funding of their postsecondary education (National Center for Education Statistics, 2017). As college prices rise, students have to find alternative sources to fully cover their tuition prices, which has led to more individuals using financial aid and greater student debt overall.

This paper investigates which factors influence the size of private loans that students take out relative to their school's total cost of attendance (COA) to observe whether various types of students are impacted differently by the current financial aid system. Using the National Center for Education Statistics' National Postsecondary Student Aid Study, our findings show that, all else equal, students with parents who do not have a college degree accrue larger private loans relative to their total COA compared to students whose parents have a college degree. There are a few possible explanations for this result. One is that an asymmetry of information leads less educated parents to lack understanding of the complexities of the financial aid system, so their children are unable to receive the most attractive aid package. Another explanation is that less educated parents do not feel that a college education is essential for success and are not willing to provide their child with the necessary funding for a postsecondary education, which causes the student to bear more of the financial burden. Alternatively, some students whose parents have less education may have lower family income and need to use more loans to finance their education.

Prior studies have focused on how financial and racial characteristics affect the amount of debt a student takes on in order to finance their education. Price (2004) shows that lower-income students, as well as Blacks and Hispanics, are at greater risk of having excessive educational debt after college. However, previous works have not directly examined the ways in which broader student and family-level characteristics affect the amount that students and their families actually pay for college relative to the total COA.

Our results indicate that income does not have a significant relationship with private loans to total COA, which shows that the Free Application for Federal Student Aid (FAFSA) is taking family financial information into account. The fact that income is not significant shows that intergenerational educational inequalities are independent of income. There are broader policy implications if this is true; FAFSA could be inadvertently affecting students at the financial margin by not looking at qualitative factors. This is troubling since these students may be the most apprehensive about being unable to pay, know the least about private loans and pay the highest rates on these private loans as a result.

The FAFSA form considers financial characteristics, such as total income and net assets, collected through tax information from two years prior.[1] The form is used to calculate the expected family contribution (EFC), a suggested amount a family should be able to pay out of pocket for college. Financial aid administrators subtract the EFC from a student's total COA to determine their need for federal financial aid (U.S. Department of Education, 2016).

While FAFSA focuses on a family's financial situation, colleges and universities admit students largely based on their academic merits using SAT scores, AP classes and grade point

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[1] Questions asking about parents' highest education level on the FAFSA form are used for state grant purposes in which the schools acknowledge and aim to award first-generation students with additional aid.

averages (GPAs). The information provided through the FAFSA form and the student's college application is used to determine how much merit-based aid to offer an admitted student.

Although two independent processes analyze a family's financial situation and a student's capabilities, the financial aid system is not adequately comprehensive. Universities are failing to utilize all available and relevant information. If colleges adjust how they evaluate the information they receive to determine the extent of aid offered, more families would be able to afford a college education and depend less on private loans. Modifying the financial aid analysis process to become more comprehensive could help students at the financial margin choose a school, as well as influence students who are deciding whether or not to pursue a post-secondary education altogether.

2. Financial Aid Background and Structure

In the 2015-2016 application cycle, over 19.76 million students applied for federal financial aid through the FAFSA form (FAFSA Volume Report, 2017).[2] To complete the form, a family must provide financial information such as income, tax data, and assets. The form determines a student's EFC, which is the amount a student and his or her parents are expected to contribute towards the student's education that year.[3] For the 4.75% of colleges and universities that meet 100% of need-based aid, the total aid package is equal to the difference between the

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[2] There are various types of federal financial aid that students can receive, such as grants, loans and work-study. Grants do not have to be repaid, while loans need to be paid back with interest. Work-study is an on-campus job to help fund a college education. FAFSA helps determine what options a prospective student has with regard to financial aid and aid packages (U.S. Department of Education, 2017).

[3] EFC and actual family contribution (AFC) are not necessarily the same amount. EFC is a suggested amount for how much a family should pay out of pocket for college, but families may not be able or willing to pay that amount for college.

school's total COA and the EFC.[4] For the remaining 95.25%, the sum of the total aid package and the EFC may not equal the total COA.

In theory, the combination of EFC and total financial aid should be sufficient to cover the total COA. However, families often are unable to meet their EFC and unable to pay full tuition even if the school meets 100% of need suggested by FAFSA. If a family is unable to meet the EFC or the school does not meet 100% of need, the student would have to find alternative financing sources like private loans.

There are many reasons why a family may determine that it is unable or unwilling to meet their EFC. One reason is that the EFC calculation accounts for a family's net worth of investments. Although the EFC calculation form explicitly states that this excludes a family's home, it is possible that other relevant assets and investments might not be easily liquidated and are not available to fund a student's education.[5] A family may also choose not to meet the entire EFC because doing so would significantly affect its quality of life. As a result, a family may elect to allocate the financial burden toward the assumed future earnings of the child. For the student, the biggest driver behind taking out private loans may be the difference in the amount the family is expected to contribute and the amount their family actually contributes.

It is crucial to understand the options a student faces in order to finance his or her education and which of these options are offered within the school's total aid package. Federal loans are broken down into subsidized and unsubsidized federal loans, have relatively low interest rates and are found within the student's total aid package. Interest rates for both of these

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[4] For the 2016-2017 school year, only 66 out of 1,388 ranked colleges and universities reported meeting students' full financial need, according to data submitted to U.S. News in an annual survey.
[5] Other real estate investments may be accounted for but difficult to sell quickly, which would lead to a higher and more difficult to reach EFC.

loans were 4.45% as of July 1, 2017 (Federal Student Aid: U.S. Department of Education, 2017). The government pays the interest on subsidized direct federal loans while the student is in school or while the loan is in deferment, but the interest for unsubsidized direct loans begins to accrue as soon as the loan is taken out.

Two benefits of a federal loan include fixed interest rates and the ability to delay payments until after graduation. For subsidized loans, the maximum amount is $3,500 for freshmen, $4,500 for sophomores and $5,500 for juniors and seniors. After exhausting their subsidized eligibility, students can borrow an additional $2,000 in the form of a direct unsubsidized loan. Students who are not eligible for direct subsidized loans may borrow the identical amounts listed above in a direct unsubsidized loan.

Grants and scholarships provided by universities are also a part of the total aid package. Federal Work Study programs count toward the total aid package and provide on-campus, part-time jobs for students with financial need (U.S. Department of Education, 2016). Alternative grants or scholarships provided by the federal government and the school are additional financing sources typically not included in the total aid package. This type of aid is known as "gift aid" since it does not require repayment.

A student's need to take out private loans could reflect two factors: 1) total financial aid covers less than the full difference between their total COA and EFC or 2) the EFC is an unrealistic estimate of what the family is actually willing and/or able to pay. Private loans are given to students by institutions such as banks, state agencies or schools and are based on the student and cosigner's credit profiles. These unsubsidized loans can require students to begin payments while still in school and may not have any deferment plan options. Additionally,

private loans have fixed or variable interest rates that are typically much higher than those of federal loans. Using Discover (2017) as a proxy for the average interest rate for private loans, the range of rates is 6.24%-12.49% for fixed rate loans. For variable rate loans, the interest rate is calculated as the 3-Month LIBOR rate plus an additional rate based on the credit profile of the applicant.[6] Although private loans are more expensive and less desirable, approximately 6% of students take out private loans to finance their education (National Center for Education Statistics).

3. Literature Review

Hoxby (2009) helps explain why some students are willing to take out private loans to finance a more expensive college education. Her paper discusses how an increase in competition is not what is currently driving an increase in selectivity among the best universities. Rather, students' elasticity of demand for going to prestigious schools has increased while their elasticity in choosing a local school has decreased. The paper suggests that students used to attend local schools regardless of their abilities and the school's characteristics. Now, students' decisions are driven by a school's selectivity.

Hoxby's paper also discusses how there are cases where a student will choose to attend a less selective school despite being admitted to a more selective school, and that these students' college decisions may be affected by omitted variables. This idea of omitted variables in terms of college decisions may be connected to how much a student and their family are willing to spend on college. By looking at some of these omitted variables, we can see if colleges are using all available information and if they are allocating aid efficiently.

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[6] The 3-Month LIBOR rate is the average interest rate of loans with a maturity of 3 months to which a collection of banks in London lend to one another in USD (Discover, 2017).

Past studies have examined factors that lead to students' choices to take out or avoid student loans (Cunningham and Santiago, 2008). Some studies have examined the relationship between educational debt burden and student race, ethnicity, gender and family income four years after students receive their bachelor's degree (Price, 2004). The results indicate strong effects of family income, race and ethnicity on excessive educational debt burden among student borrowers. Students from lower-income backgrounds, Blacks and Hispanics have a significantly higher risk of accumulating excessive educational debt burden four years after receiving their baccalaureate degree. Students with high educational debt were also found to have lower average salaries after graduating compared to students with less debt. These past studies have primarily looked at race, gender and income, so this paper reviews additional familial characteristics like parents' education level, family size and whether a sibling attended college first.

Additionally, some studies have examined how debt impacts students' decisions regarding their majors and post-graduate occupations (Rothstein and Rouse, 2007). Students who are expected to have greater debt after graduating are more likely to major in economics or engineering, two areas that typically lead to high-paying jobs post-graduation. Students majoring in areas like the humanities, history or sociology are less likely to have excessive student debt. Thus, it is rational to presume that the amount of debt a student is willing to accrue in college is influenced by decisions regarding their course of study or future compensation.

Brown, Scholz and Seshadri (2009) discuss how some families "underinvest" in their children's education while taking into account parental education and income. Brown finds that a student's educational achievement is positively correlated with their parents' education levels. If parents are unable to financially support their child through or after college, then they are more

likely to underinvest. Relatively poor or selfish parents that believe they will never receive some return for funding their child's education can rationally underinvest even if they have the financial means to pay for school. This helps to explain why some families choose to not pay their full EFC even when they have the ability to do so. In these cases, students are forced to find other sources of funding like private loans to pay for their education.

These studies all demonstrate that a variety of factors influence where a student decides to go to school, how much a family is willing to pay to attend that school and how much a student has to take out in private loans. Although many of the studies focus on debt in general, there seems to be a gap in the literature on the effects of taking out private loans on students.

4. Data

Our paper uses data from the National Center for Education Statistics' (NCES) 2011–12 National Postsecondary Student Aid Study (NPSAS). The NPSAS is a comprehensive dataset containing financial aid, enrollment and demographic information based on student-level records. NPSAS is a cross-sectional study with a two-stage sampling design. Institutions are sampled first and students are then selected from the sampled institutions' enrollment lists. The survey is designed to be nationally representative of students attending Title IV postsecondary institutions during an academic year. Data come from multiple sources, including institutional records and government databases. Detailed data on participation in student financial aid programs are extracted from institutional records. Data on family circumstances, demographics, education, work experiences and student expectations are collected from students through a web-based multi-mode interview (computer-assisted telephone (CATI) and self-administered).

Out of 123,600 total eligible sample members, approximately 91 percent (N=111,060) had sufficient data to meet the requirements of the study.

NPSAS:12 is valuable because it has a relatively complete set of variables, the sample size is expansive and it breaks down parents' highest education level into ten categories. Examining our continuous variables of interest shows that the dataset has practical information.

Table 1: Descriptive Statistics

Variable	Mean	Stan. Dev	Minimum	Maximum
Ratio of Private Loans to Student Budget	28.87	24.48	0.00	100.00
Family Size	4.03	1.35	2.00	13.00
Age	26.38	9.53	15.00	85.00
Total Income	57,700.86	62,203.57	100.00	1,000,000.00
Credit Card Balance	3,455.07	5,785.38	50.00	100,000.00
Private Loans	5,825.58	5,653.57	500.00	60,000.00
EFC	13,044.44	15,408.11	0.00	213,224.00
Student Budget (Total COA)	16,476.84	12,369.06	1,757.00	123,792.00
SAT Math	499.83	107.18	200.00	800.00
SAT Verbal	497.37	104.29	200.00	800.00
GPA	294.94	78.17	0.00	400.00

Notes: the above table includes descriptive statistics for the continuous variables in our main regression. Descriptive statistics for parents' highest education level can be found in section 5.2.1. Descriptive statistics for categorical variables like race and institution type can be found in the appendix.

For variables that can have extreme ranges such as total income and credit card balance, the survey sets a maximum value for respondents to select.[7] The most unexpected statistic is the average age of the respondent being over twenty-six years old. We believe that the mean is skewed higher due to older respondents going back to school, as 25.4% of respondents are older than thirty years old. GPA has been multiplied by 100, so a 400.00 response corresponds to a 4.00 GPA. The private loan data show that students who need alternative sources to fund their education will use almost $6,000 on average in private loans.

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[7] For example, a family that has $1,500,000 in income would choose the $1,000,000 option.

Due to the private nature of the NPSAS data, the raw data for each respondent rarely is accessible. Instead, researchers utilize the National Center for Education Statistics' "DATALAB" web system to conduct their analysis. This system allows researchers to download summary statistics and perform linear regressions. When using data from the survey, the web system modifies the true sample size to minimize disclosure risk of individual survey responses, so a random sample of 5,100 respondents is used for our regression. We are restricted from merging additional data with NPSAS data, and the system does not have the capabilities to run probit regressions. The platform is also not conducive for verifying results with robustness checks. As a result, we are limited in the approaches that we can use to analyze data. For example, we cannot separate the effects of older survey respondents because we cannot regress the data based on age. Another limitation of the data is that there is no specific indication of the university a student attends beyond a two-year vs four-year institution.

5. Empirical Framework

5.1 Dependent Variable

Ideally, we would want to look at the following function:

$$AFC / EFC = f \text{ (family traits, financial traits, academic / student traits, school traits)}$$

Using Actual Family Contribution / Expected Family Contribution (AFC / EFC) would show what types of students actually contribute less than their EFC while controlling for the cost of college. We do not observe AFC in our dataset, but if a school accurately estimates EFC, then it is reasonable to estimate that $EFC - AFC = 0$. If a school does not accurately estimate the EFC, then it is reasonable to assume that Private Loans = EFC - AFC since private loans come at a greater cost to the student. If a student uses private loans to fund their education, it is reasonable

to assume that the student has exhausted less expensive alternatives such as federal loans, grants and borrowing from family and friends.

It would be insufficient to only look at private loan levels because that would not control for the cost of the desired school. For example, a $10,000 private loan to attend a school with a tuition of $20,000 is quite different from a $10,000 loan to a student with $70,000 in tuition. As a result, we use **Private Loans / Total COA** as our dependent variable.[8]

Private Loans / Total COA = f (family, financial, academic / student, institutional)

We use total COA rather than tuition because there are additional costs, like buying books, that are not reflected in the tuition price.[9] If a student is unable to fully cover their total COA through family assistance and their financial aid package, he or she will look to private loans to cover the remainder.[10]

5.2 Independent Variables

Our independent variables are grouped into four categories: family, financial, student/academic, and institutional traits.

5.2.1 Family Traits

Family traits = f (parents' highest level of education, family size, siblings in college)

Parents' highest education level, family size, siblings in college and marital status of a student's parents could all impact a family's financial situation significantly.

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[8] The actual ratio of private loans to total COA is multiplied by 100 to get the output. If the dependent variable is 100, this would imply that private loans were equal to total COA and the actual ratio is 1:1.

[9] Some studies use the term "student budget" instead of total COA, which is misleading. While student budget sounds like a student's disposable income, it is actually the sum of all expenses associated with attending college, the same as total COA.

[10] For NPSAS:12 surveyed students that need more assistance than just their financial aid federal loans, 28.87% of their total COA is funded through private loans.

Table 2: Parents' Highest Education Level Percentage Breakdown

	Survey	2015 Census
Do not know	3.5%	0.0%
Did not complete high school	6.9%	10.6%
High school diploma or equivalent	25.4%	30.4%
Vocational / technical training	5.0%	N/A
Some college but no degree	14.6%	16.4%
Associate's degree	7.5%	10.6%
Bachelor's degree	19.9%	19.9%
Advanced degree	17.2%	12.1%
Total	100.0%	100.0%

Notes: the omitted variable in our regression is "Did not complete high school." This table combines all levels higher than a Bachelor's degree from the survey to match the census data.

As Table 2 shows, the distribution of parents' highest education levels of students in the sample is similar to that determined by U.S. Census Bureau, 2015 Population Survey.[11] The census survey breaks down the ages within each education attainment level. The 45-64 age range represents the age of the parents with a child in college, given that the majority of students are 18-22 years old and that most parents have children before they turn 42 years old.

We predict that students with parents whose highest education level is low will have a higher percentage of private loans relative to total COA due to an asymmetry of information.[12] Parents who have not themselves been through the college application process may be unfamiliar with the FAFSA form and the financial aid process in general. This could result in their child not applying for or receiving any federal aid, which would force the student to take out private loans. Parents with less experience may neglect the federal financial aid process altogether and rely solely on private loans. If highest level of education and future earnings are

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[11] Parents' highest education level is defined in the NCES dataset as "the highest level of education achieved by either parent of the student."

[12] We omit "Did not complete high school" and use it as our reference category when examining parents' highest education level in our regression.

correlated (James Et. Al, 1989), then having highly educated parents may lead to greater family income. However, given that the EFC calculation incorporates family income, parents' education levels could be driving the need for private loans beyond what is estimated when considering family income independent of parental education.

The effect of family size and whether another sibling attended college first on private loans to total COA is unclear. After supporting one child through college, it is reasonable to believe that a family has less funds available to put toward other children's college education. This creates added pressure on the family to find alternative options to meet its EFC. However, it could also decrease the need for private loans if financing an earlier sibling's education lowered the family's assets, resulting in higher grants of federal aid and a lower EFC.

Parents may not want to pay for their children's education if they believe their child is not fit for a college environment or if they do not believe that college is a worthwhile investment (Brown et. al, 2004). The ability to measure levels of parents' willingness to pay for their child's college education would be instrumental to conducting more thorough research, but the current dataset does not include any quantifiable metrics for willingness to pay.

Similarly, divorce can play a major role in a family's ability and willingness to pay their child's tuition. A divorce can lead to a loss of wealth for a family, leaving less capital to pay for school. Estranged parents may also be less likely to contribute to their child's college education (Fabricius et. al, 2003). Unfortunately, our dataset does not indicate parent's marital status, so we are unable to control for this aspect.[13]

5.2.2 Financial Traits

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[13] The only scenario where we would encounter a problem is when a school requires the financial info of an estranged parent who refuses to support their child's education. However, we do not expect these infrequent situations to significantly impact our results.

Financial traits = f (total income, credit card balance)

We expect total income to have different impacts on the ratio of private loans taken out in relation to total COA. Higher income will result in a higher EFC, which may mean more student loans are needed. However, once total income increases to the point where the EFC is equal to or greater than the COA, further increases in total income will mean the family has more disposable income to pay the student's COA.

We expect parental credit card balances to have a positive impact on the ratio of private loans taken out in relation to total COA. Credit card balances can be used as a proxy for how much the student and their family need to rely on loan financing. Higher credit card balances usually indicate a more strained financial situation, so it is reasonable to expect that a high credit card balance is positively associated with the amount of private loans taken out by a student.[14]

5.2.3 Institutional Traits

Institutional traits = f (institution type)

Our ideal analysis would include variables like school selectivity, location, student body size and academic focus. Each variable would provide more clarity on the prestige of a school and help explain a student's ensuing borrowing habits. Unfortunately, our dataset does not reveal these variables.

The main institutional characteristic we can include is the type of institution the surveyed students are attending. We use the variable "NPSAS Institution Sector," which breaks down institutions into five types: Public 4-year (28.36%), Private nonprofit 4-year (11.65%), Public

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[14] We do not have complete enough data to test this theory, but it should be kept in mind.

2-year (38.12%), Private for profit (12.89%) and Other / Attended more than one school

(8.98%). For our regression, we use the Public 4-year category as our benchmark.

5.2.4 Academic / Student Traits

Academic traits = f (GPA, SAT Math, SAT Verbal, AP, IB, major)

Student traits = f (race, age, gender)

Academic variables like GPA, SAT Math score, SAT Verbal score and enrollment in

AP/IB courses are used to estimate the impact of a student's near-term academic performance on

their ability and willingness to pay their EFC. We expect GPA to have a direct relationship with

the ratio of private loans to total COA due to prior academic success. For a given EFC, students

that succeeded in high school may have an increased willingness to borrow to attend a more

prestigious, expensive college or university. Choice of major is also expected to have a direct

relationship with this ratio (Rothstein and Rouse, 2007). There is reason to believe that GPA

could have a negative relationship with the ratio of private loans to total COA because higher

GPA could result in more grants from a school, which would decrease the amount the student

and family need to pay of their EFC; however, reward-based grants are not solely based on high

school academics, so there are too many other contributing factors for us to infer that GPA and

the ratio of private loans to total COA would have a negative relationship. We break down SAT

scores into SAT verbal and SAT math to investigate whether a strength in one area over the other

leads to different levels of private loans relative to total COA. We look at SAT, and not ACT,

results because the data set converts a student's ACT score to an equivalent SAT score.

We examine race, gender and age to evaluate student-level characteristics. Price (2004)

shows that students of certain races, such as Blacks and Hispanics, are more at risk of having

excessive educational debt after college. If so, then they may have a higher percentage of private loans relative to their total COA as well.

6. Results

$$\text{Private Loans to Total COA} = \alpha_{\text{family}} + \alpha_{\text{financial}} + \alpha_{\text{institutional}} + \alpha_{\text{academic}} + \alpha_{\text{student}} + \varepsilon_i$$

Table 3: OLS Regression Results

Number of Observations	5,100
Adjusted R-squared	0.039
Intercept	-3.620
	(3.120)

Parents' Highest Education Level (left) / **Academic** (right)

Parents' Highest Education Level	Coef.	Academic	Coef.
Do not know either parent's education level	0.924	Grade point average	-0.002
	(0.760)		(0.002)
High school diploma or equivalent	1.382 **	SAT derived math score	0.003
	(0.570)		(0.003)
Vocational/technical training	2.386 *	SAT derived verbal score	-0.004
	(1.210)		(0.003)
Associate's degree	4.706 **	Took APs	-0.256
	(1.840)		(0.433)
Some college but no degree	1.609 **	Took IBs	0.545
	(0.650)		(1.306)
Bachelor's degree	1.047	Major field of study with a focus on STEM fields	
	(0.810)	Math/Computer/Sci/Engineering/Tech	0.222
Master's degree or equivalent	1.400 **		(0.637)
	(0.690)	Social/Behavioral Sciences	1.284
Doctoral degree - professional practice	0.168		(1.227)
	(0.870)	Undecided or not in a degree program	-0.560
Doctoral degree - research/scholarship	-0.646		(0.725)
	-0.78		

Family (left) / **Student** (right)

Family	Coef.	Student	Coef.
		Age as of 12/31/2011	0.252 *
Dependent students: Have siblings in college	0.555		(0.129)
	(0.560)	Female	0.373
Dependent students: Family size	0.008		(0.345)
	(0.130)	Race/ethnicity (with multiple) without foreign students	
First sibling to go to college	0.094	Black or African American	0.695
	(0.370)		(0.990)

Financial (left)

Financial	Coef.	Student (cont.)	Coef.
Total income (Continuous)	0.000	Hispanic or Latino	-0.296
	(0.000)		(0.659)
Credit cards: balance due on all credit cards	0.000	Asian	-1.091
	(0.000)		(0.795)

Institutional (left)

Institutional	Coef.	Student (cont.)	Coef.
Private nonprofit 4-year	1.357	American Indian or Alaska Native	-1.020
	(0.850)		(1.366)
Public 2-year	-2.155 **	Native Hawaiian/other Pacific Islander	-1.558 **
	(0.370)		(0.724)
Private for profit	1.993 **	More than one race	-0.045
	(0.840)		(0.799)
Others or attended more than one school	0.331	Foreign students	-1.782 *
	(2.600)		(1.006)

** $p < 0.05$ * $p < 0.10$

standard errors in parentheses

Table 3 shows the effects of parents' highest level of education, compared to parents that did not complete high school, as well as other academic, financial and institutional variables on private loans to total COA. The analysis shows that parents' education is significant for all students applying to college, regardless of financial positioning. Students with less educated parents, with the exception of parents with master's degrees, have an increased private loan share of total COA.

The significance of these variables may stem from an informational asymmetry problem. Less educated parents have never experienced a college application process, let alone today's increasingly complex financial aid system, so they struggle to guide their child through the process. Parents' lack of understanding about various financial aid options available to them, such as PLUS Loans, causes the student to take on more of the financial burden themselves, leading to a higher percentage of private loans relative to total COA.[15]

Table 4: Ratio of PLUS Loans to Total Aid Correlations

Parents' Highest Education Level	
Do not know	-0.026
Did not complete high school	-0.044
High school diploma or equivalent	-0.055
Vocational / technical training	-0.011
Some college but no degree	-0.001
Associate's degree	0.008
Bachelor's degree	0.046
Advanced Degree	0.032

As Table 4 shows, for parents who have at least earned an associate's degree, there is a positive correlation between highest education levels and the ratio of Direct PLUS Loans to total aid.

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[15] A PLUS loan is a loan taken out by a parent in order to help finance a student's education and to minimize the amount of private loans in their child's name.

Another possible driver for these significant results is that parents with lower levels of education may not value higher education as much as more educated parents. Parents that have had financial success without a college degree might be less inclined to pay their child's expensive tuition because they don't believe higher education is a worthwhile investment. They may question the merit of paying large amounts of money in college tuition when they managed without a degree. The student may disagree and would then have to seek other sources of financing in order to pay his or her total COA, resulting in a higher percentage of private loans.

The regression shows that parents with a master's degree have a positive relationship with a student's private loans to total COA. One finding that contradicts our initial hypothesis that higher education levels for parents would cause students to take out less private loans is a parent with a master's degree. Our belief was that parents with higher education levels see the value of higher education and have a better understanding of how to effectively finance one's education. One possible rationale for this result is that the variable is defined as "the highest level of education achieved by either parent of the student." Therefore, only the parent with the higher level of educational attainment is observed in the regression.

Foreign students are less likely to take out private loans relative to their total COA. The most viable explanation for this is that the EFC of foreign students is being fully met by their families, eliminating the need for any loans.

One key consideration that cannot be observed in the regression is the difference between a student applying for and enrolling at an institution. For example, two students could both apply and be accepted by their state's public university. It may be the top school for one admitted student. The other student may have also been accepted by a more prestigious, expensive private

university, but the in-state public university was the only school the family could afford without going into severe debt. The two students end up going to the same school, but their rationales are very different.[16] It is not possible to distinguish between students given this dataset. In addition, some families may not think it is possible to meet their EFC, while other families may not believe enough in their child or in a college education to match that number. It is difficult to differentiate between the families who *want* to contribute their EFC and the families that *can* pay their EFC but choose not to.

The significance of age could be the result of upward bias. Our analysis does not include variables like "attended college previously" or "returning to school for new degree." Given that 25.4% of the respondents are over thirty years old, adding either of these variables could have reduced the explanatory power of our age variable.

7. Summary of Findings

The results confirm our hypothesis that the financial aid system and the EFC formula need to specifically account for qualitative factors like parents' highest education level. We observe that schools primarily review academic prowess when determining how to allocate their own financial aid in terms of grants and scholarships, while the FAFSA form reviews a family's financial standing to determine a student's eligibility for federal aid. However, the system lacks focus on non-financial characteristics of the parents, who are major contributors in terms of funding a student's college education. We recommend that colleges pay more attention to information about applicants' parents and their education levels to understand how qualitative factors might impact students and their ability to fund their college education. With this

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[16] Avery and Hoxby (2004) explain the rationale behind students' college choice decisions. Prospective college students are sensitive to tuition, room and board, preferring lower costs. Students ultimately prefer attending the most selective school from which they were accepted.

information, schools would gain a better understanding of how parents might contribute to their child's education costs, which would allow schools to more appropriately allocate their available aid. By more efficiently awarding financial aid, colleges and universities could help their financially struggling students and ease the financial burden associated with attending their institution, ultimately creating greater access for students who might currently be unable to enroll.

The government can help slow down intergenerational education inequalities and assist adversely affected students by more effectively weighting qualitative characteristics. With a new evaluation system, the government could create a more accurate measure for EFC, ultimately decreasing students' need for private loans.

8. Suggestions for Further Exploration

We believe that understanding the motives behind the differences in expected and actual family contributions warrants further exploration. Our findings could help more expensive colleges and universities attract quality students that often cannot afford high tuition if these schools change their financial aid allocations to favor students with less educated parents. Being able to correctly identify a student's EFC and recognize the trends and behaviors associated with families unable to pay their EFC could lead to a change that help students that are currently disadvantaged by the financial aid system. Similarly, noting which kinds of students are lost in the enrollment process due to an inability to cover their total COA could open college admissions processes up to a wider, and possibly stronger, pool of applicants.

Further studies should look at a student's school selection decision when there is a large difference between expected and actual family contribution. Our paper focused on the financing

structure for a student's education with the student already enrolled in the institution. Additional studies should aim to investigate how a student's decision to attend a particular school may be affected by their EFC and how this relates to what "value" they ultimately receive from attending that school. This investigation would provide greater clarity on a student's rationale for choosing different institutions based on tuition costs and financial aid packages. In addition, it would be interesting to track how an increase in grants and work-study programs affects the amount of private loans taken out by students, and if these programs can be more appropriately distributed so students can bear less of the burden of educational debt.

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A. Appendix

Table 5: Institution Type Percentage Breakdown

Public 4-year	28.36%
Private nonprofit 4-year	11.65%
Public 2-year	38.12%
Private for profit	12.89%
Other or attended more than one school	8.98%

Notes: the omitted variable in our regression is "Public 4-year."

Table 6: Race / Ethnicity Percentage Breakdown

White	57.88%
Black or African American	16.09%
Hispanic or Latino	16.03%
Asian	5.60%
Other	4.40%

Notes: "Other" contains American Indian, Alaska Native, Native Hawaiian, Pacific Islander, and more than one race