

Effects of Price Discrimination in Higher Education

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I. Introduction

This paper examines the effects of cost, financial aid, and macroeconomic factors on the decision to enroll in college. The decision is a large one, and is influenced by many factors in a prospective student's life. A better understanding of these influential components could lead to improved policy decisions made by universities and aid-granting institutions. In lieu of the rising cost of higher education and the recent economic recession, insights into the incentives that drive the decision to enroll are becoming increasingly significant.

Since 1978, the cost of college (tuition and fees) has increased 1,120 percent, four times faster than the increase in the consumer price index. (Jamrisko 2011) Student loans have been increasing as well, both in per student terms and in the aggregate. In 2010 the total amount of student debt in the U.S. passed the total amount of credit card debt, and in 2012 that debt crossed the \$1 trillion threshold. (Lorin 2012) Despite the increasing financial burden, college enrollment rates continue to climb. This begs the question: are students acting irrationally, or are the other incentives of a college education driving their decision? There are a number of benefits to owning a college degree that cannot be overlooked. The wage premium for college graduates relative to high school graduates has been increasing since 1980, and the owner of a bachelor's degree makes on average 66% more than a high school graduate in their lifetime. (Baum 2010) College graduates also enjoy lower unemployment rates than those with a high school degree. Clearly there are opposing forces at work, and I will use this paper to focus on one factor that has garnered a considerable amount of attention in recent years: price discrimination.

In 1991 the U.S. Justice Department filed a lawsuit against MIT and eight Ivy League schools. The claim, titled *United States v. Brown University*, charged these elite universities with creating a collegiate cartel by agreeing to fix the amount of financial aid offered to students. The two sides took 33 months to reach a settlement, and while it was collusion, not price discrimination which was considered

the illegal act (schools sell services and are therefore exempt under the Robinson-Patman Act), the prestige of the universities involved pushed price discrimination to the forefront of education economics. (Stachtiaris 1994)

Institutions of higher education are in a unique position when it comes to their ability to price discriminate. Schools are able to use financial aid forms to gather critical information, such as income, which allows them to formulate exactly how much money students and their families will be able to contribute, and how much financial aid will be necessary. (Morrison 1992) By using this information, universities are essentially able to charge the full sticker price to those students who can afford it, and a lesser price to those students who cannot. This range of prices provides some insight into how universities have been able to raise the price of an education at such a rapid rate: only those who are able to afford the price are asked to pay it. Between 1992 and 2002, tuition increased 67.9 percent, but grants increased 108.8 percent. So while there was a large increase in sticker price (67.9%), net tuition increased only 49.6 percent. (Doti 2004)

Schools take into account more than student income when determining how much tuition to charge and how much aid to offer. Universities offer scholarships to student athletes to generate revenue via collegiate athletics. They also use merit based aid and scholarships as they compete for high ability and minority students. (Weisbrod 2008) Public universities offer reduced tuition to in-state students because these students have a higher chance of accepting a job within state after graduation, and therefore have a higher chance of generating tax revenue for that state and donating to the university. (Calhoun 2010) The federal government has taken a similar approach with federal aid under the belief that college graduates receive a higher income, which will lead to increased tax revenues and a stronger economy. This viewpoint is not shared by all economists. While there may be some benefit from increased government aid, some argue that increasing aid leads to increased demand which in turn results in increased tuition, neutralizing the effect of public investment that could be spent elsewhere.

In fact, studies show that the relationship between state spending on higher education and economic growth is actually negative. (Vedder 2004) Beneficial or not, Pell Grant expenditure has increased 359% between 1992 and 2012, and the total amount of grant aid and tax benefits awarded at public universities has increased by 381% in the same time period. (The College Board 2012)

I will be estimating the effects of college costs, the availability of financial aid, and the condition of the economy on college enrollment. By using data from the U.S. Census Current Population Survey (CPS), the National Center for Education Statistics (NCES) Integrated Postsecondary Education Data System (IPEDS), and the Bureau of Labor Statistics (BLS) state unemployment statistics, I will be able to make estimates across all 50 states over a period of 11 school years (spanning 2000-2011). This data has the advantage of being relatively large (when compared to previous studies), and includes data from years of both economic strength and economic weakness following the subprime mortgage crisis.

Individual potential students (those who have graduated from high school and are of college age) will be the unit of observation. Whether or not the potential student is enrolled in college will be observed, and a regression will be run on the cost of college, level of financial aid, family income level, and rate of state unemployment, while controlling for other individual characteristics. The cost of college will be approximated by the cost of each student's state flagship university using a composite price of tuition, fees, and housing for in-state students. Likewise the level of financial aid will be approximated using flagship university aid levels and individual income level. The regression will be run on repeated cross sections for the 10 years of available data.

The results of this study show that individuals of different income levels react differently to the rising price of college and the increase of financial aid. Those in the upper income bracket are averse to changes in the sticker price and aid because they have relaxed financial constraints. Those in the lower income bracket react positively to increases in tuition because they are accompanied by increases in financial aid, which they rely on to finance their education. Those in the middle income groups have

mixed results, suggesting that careful attention be paid to this group as policies in higher education evolve.

In the following section I will provide detailed information on the data used. Section 3 will describe the empirical strategy, and section 4 will present the results. I will draw conclusions from the results and discuss possibilities for future work in section 5.

II. Data

The U.S. Census Current Population Survey (CPS) is used as a source of data because it provides a snapshot of the entire United States. Specifically the annual March Social and Economic Supplements are used because of the additional data on educational attainment and income. Observations within the survey are at the individual level, and for the purposes of this paper only those of individuals who have graduated from high school, have not acquired a bachelor's degree, and are of the age when they are considering enrollment (ages 18-20) are included in the sample. Since the CPS data is collected in March, we can be sure that any individual who has graduated high school is not reporting that they are not enrolled because they are on summer break before they enroll in college. The purpose of these restrictions is to capture the portion of the population who are either currently attending a college or university, or those who could be considering enrollment.

Flagship Universities

University of Alaska Fairbanks	University of Montana
University of Alabama	University of North Carolina at Chapel Hill
University of Arkansas	University of North Dakota
University of Arizona	University of Nebraska – Lincoln
University of California: Berkeley	University of New Hampshire
University of Colorado at Boulder	Rutgers, The State University of New Jersey
University of Connecticut	University of New Mexico
University of Delaware	University of Nevada: Reno
University of Florida	State University of New York at Buffalo
University of Georgia	Ohio State University: Columbus Campus
University of Hawaii at Manoa	University of Oklahoma
University of Iowa	University of Oregon
University of Idaho	Penn State University Park
University of Illinois at Urbana-Champaign	University of Rhode Island
Indiana University Bloomington	University of South Carolina
University of Kansas	University of South Dakota
University of Kentucky	University of Tennessee: Knoxville
Louisiana State University	University of Texas at Austin
University of Massachusetts Amherst	University of Utah
University of Maryland: College Park	University of Virginia
University of Maine	University of Vermont
University of Michigan	University of Washington
University of Minnesota: Twin Cities	University of Wisconsin-Madison
University of Missouri: Columbia	West Virginia University
University of Mississippi	University of Wyoming

Data from the National Center for Education Statistics (NCES) Integrated Postsecondary Education Data System (IPEDS) is collected for the flagship public university¹ of each U.S. state. Each flagship university is used as a representative of what that state’s high school graduate would consider when determining whether or not to attend college. Individuals from each state are linked to that state’s flagship university, and although the individual may not attend that university, the assumption is that the institution’s characteristics serve as appropriate proxies for the individual’s educational options. In addition to the IPEDS data, state unemployment rates from the Bureau of Labor Statistics (BLS) are included as an indicator of economic health.

¹ Flagship universities as specified by The College Board *Annual Survey of Colleges*

The full set of data employed in this paper extends from the 2001-2002 school year to the 2010-2011 school year (see Table 1). These years were chosen because they are the most recent available, and because extending the data set before the 2001-02 year reduces the availability of institutional characteristics in the IPEDS data. This repeated cross-sectional data comprised of 50 states and 10 school years combines for 19,243 individual observations. Distribution by state was not altered from the CPS data because the CPS is population-weighted by state. There were between 285 and 2664 individual observations per state, with only California, Florida, New York, and Texas breaking the 1000 observation mark.

Table 1. Enrollment by Year

Year	Not Enrolled	Enrolled	Total	Percent Enrolled
2001-2002	1,873	759	2,632	28.84%
2002-2003	1,778	763	2,541	30.03%
2003-2004	1,645	825	2,470	33.40%
2004-2005	1,613	776	2,389	32.48%
2005-2006	1,702	842	2,544	33.10%
2006-2007	1,663	842	2,505	33.61%
2007-2008	1,686	704	2,390	29.46%
2008-2009	1,712	709	2,421	29.29%
2009-2010	1,711	773	2,484	31.12%
2010-2011	1,601	705	2,306	30.57%
Total:	19,243	8,552	27,795	30.77%

III. Empirical Strategy

I employ an ordinary least squares regression where the observed response *enrolled* is a binary variable which denotes whether or not a subject is enrolled in school. This regression makes use of dummy variables *state* and *year* to control for variation across states and time. In order to identify how students with different levels of income react to changes in price and aid, the population is divided into four groups by family income level, and the regression is run for each group individually. The OLS regression is of the form:

$$\text{enrolled} = \beta_0 + \beta_1 \text{rcost}_{i,j} + \beta_2 \text{perc_fed}_{i,j} + \beta_3 \text{perc_state}_{i,j} + \beta_4 \text{perc_inst}_{i,j} + \beta_5 \text{perc_loan}_{i,j} + \beta_6 \text{ramt_fed}_{i,j} + \beta_7 \text{ramt_state}_{i,j} + \beta_8 \text{ramt_inst}_{i,j} + \beta_9 \text{ramt_loan}_{i,j} + \beta_{10} \text{rfam_inc} + \beta_{11} \text{strd_75}_{i,j} + \beta_{12} \text{unemp}_{i,j} + \beta_{13} \text{zero_inc} + \beta_{14} \text{black} + \beta_{15} \text{asian} + \beta_{16} \text{american_indian} + \beta_{17} \text{hawaiian_PI} + \beta_{18} \text{multirace} + \beta_{19} \text{female} + \beta_{20} \text{state}_i + \beta_{21} \text{year}_j + \mu$$

where $i = 1 \dots 50$ representing state, and $j = 1 \dots 10$ representing year.

The *rcost* variable is a comprehensive figure in IPEDS used by the school's financial aid department and is comprised of in-state tuition and fees, room and board, price of books, and other expenses. The *perc_fed*, *perc_state*, *perc_inst*, and *perc_loan* variables represent the percent of full time first year students who are receiving federal, state, institutional, and loan aid respectively at the flagship university. The *ramt_fed*, *ramt_state*, *ramt_inst*, and *ramt_loan* variables are the average dollar amounts that full time first year students receive of each type of aid, given that they are receiving that aid. The *rfam_inc* variable is the family income of each potential student, and *unemp* is the unemployment level of a given state during a given year. As an indicator of school quality, a measure representing the 75th percentile SAT score, *strd_75*, is included in the regression.² The *zero_inc* variable is a binary indicator of a family income of zero dollars, and *female*, *black*, *asian*, *american_indian*, *hawaiian_PI*, and *multirace* are binary indicators of subject gender and race. Variables which are

² If SAT scores were not reported and ACT scores were, those ACT scores were converted using a conversion table on the ACT's website: <http://www.act.org/solutions/college-career-readiness/compare-act-sat/> (see appendix table 1)

prefixed with an *r* are real dollar amounts which have been adjusted for inflation using the Consumer Price Index. Table 2 presents each variable in further detail.

Table 2. Explanatory Variables

Variable Name	Description	Data Source
rcost	Cost of attendance for full-time, first-time degree/certificate seeking in-state undergraduate students living on campus, including in-state tuition and fees, books and supplies, on campus room and board, and other on campus expenses.	IPEDS
perc_fed	Percentage of full-time, first-time degree/certificate-seeking undergraduate students who received federal grants (grants/educational assistance funds).†	IPEDS
perc_state	Percentage of full-time, first-time degree/certificate-seeking undergraduate students who received state/local grants (grants/scholarships/waivers).††	IPEDS
perc_inst	Percentage of full-time, first-time degree/certificate-seeking undergraduate students who received institutional grants (scholarships/fellowships).†††	IPEDS
perc_loan	Percentage of full-time, first-time degree/certificate-seeking undergraduate students who received student loans.††††	IPEDS
ramt_fed	Average amount of federal grants (grants/educational assistance funds) received by full-time, first-time degree/certificate-seeking undergraduate students.†	IPEDS
ramt_state	Average amount of state/local grants (grants/scholarships/waivers) received by full-time, first-time degree/certificate-seeking undergraduate students.††	IPEDS
ramt_inst	Average amount of institutional grants (scholarships/fellowships) received by full-time, first-time degree/certificate-seeking undergraduate students.†††	IPEDS
ramt_loan	Average amount of student loans received by full-time, first-time degree/certificate-seeking undergraduate students.††††	IPEDS
rfam_inc	Total family income in dollars.	CPS
strd_75	75 th percentile composite SAT score (or converted ACT score).	IPEDS
unemp	Average level of state unemployment over a given year as a percentage.	BLS
zero_inc	Binary variable denoting a reported family income of \$0.	CPS

† Federal grants (grants/educational assistance funds) - Grants provided by federal agencies such as the U.S. Department of Education, including Title IV Pell Grants and Supplemental Educational Opportunity Grants (SEOG). Also includes need-based and merit-based educational assistance funds and training vouchers provided from other federal agencies and/or federally-sponsored educational benefits programs, including the Veteran's Administration, Department of Labor, and other federal agencies.

†† State and local government grants - State and local monies awarded to the institution under state and local student aid programs, including the state portion of State Student Incentives Grants (SSIG).

††† Institutional grants - Scholarships and fellowships granted and funded by the institution and/or individual departments within the institution, (i.e., instruction, research, public service) that may contribute indirectly to the enhancement of these programs. Includes scholarships targeted to certain individuals (e.g., based on state of residence, major field of study, athletic team participation) for which the institution designates the recipient.

†††† Loans to students - Any monies that must be repaid to the lending institution for which the student is the designated borrower. Includes all Title IV subsidized and unsubsidized loans and all institutionally- and privately-sponsored loans. Does not include PLUS and other loans made directly to parents.

The cutoff levels for the income classes have been chosen to align with levels of qualification for need-based aid.³ While aid is determined by a number of factors other than income (such as the value of held assets, the number of dependents in the family, and the amount of merit aid awarded), the level of family income provides a basic idea of how well a student is able to afford a college education. At \$30,000 in family income, the expected family contribution is at its lowest level. \$72,500 is the lowest level of income where students are not eligible for Pell Grants regardless of how many dependents are in the family. At \$180,000, no student in a family would qualify for need based aid at the average public university. Table 3 provides further detail for these income groups.

Table 3. Income Classes

Income Class	Family Income Range	Number of Observations
Lower	\$0 - \$30,000	8323
Lower Middle	\$30,000 - \$72,499	7755
Upper Middle	\$72,500 - \$179,999	8144
Upper	\$180,000 +	1290

IV. Results

Results of the OLS regression described in the previous section are displayed in Table 4. The fact that none of the cost or aid variables were significant for the upper income group suggests two interpretations. The first is that individuals at higher levels of income are able to afford to go to college regardless of what they're asked to pay. If price is indeed not a factor for these upper-income students, no (reasonable) change in sticker price or aid will affect their decision. If cost is still somewhat of a factor in their decision, it will only factor in to where they enroll, not if they enroll. A student may choose to attend one school over the other based on

³ Qualification levels determined by income-based estimations from the Stratagee Corporation: http://www.stratagee.com/resources/efc_quick_reference/1213_efc_quick_reference.html (see Appendix Table 2)

the price or aid package but at the end of the day they will be enrolled somewhere, and this model only picks up enrollment; it does not pick up where that student was enrolled or what they paid. The second interpretation is that high-income students are able to consider more colleges, and therefore the cost and aid availability at the flagship public school is not enough of a consideration for the variables to be significant. Students with higher income can afford to go to more expensive schools, and they can also afford to consider schools farther from their home, where travel could be a significant expense. Both explanations share a similar idea: individuals in high income families who want to go to college and are high enough achieving will end up in college because they will always be able to find a school that will accept them and that they can afford.

Middle-income groups do not have the same financial flexibility. Both lower- and upper-middle classes have highly significant, positive family income coefficients. For these individuals the decision on whether or not to enroll hinges largely on income because the price of college, in terms of both cost and opportunity cost, becomes more demanding at lower levels of income. As income increases students are able to afford more schools, which also has a positive enrollment effect. For the lower class group family income is insignificant. At that level of income the only way that a student will be able to attend college is through aid. The difference between a family making \$10,000 and a family making \$20,000 is negligible for a student looking to enroll because neither family will be able to afford to contribute any of that money toward their education.

Table 4. Ordinary Least Squares Regression by Income Level

Lower Income:

<\$30,000
8323 Observations

Lower-Middle Income:

\$30,000 - \$72,499
7755 Observations

Upper-Middle Income:

\$72,500 - \$179,999
8144 Observations

Upper Income:

\$180,000+
1290 Observations

Variable	Coefficient
rcost	.000017***
perc_fed	-.0008641
perc_state	.0009183*
perc_inst	-.0000648
perc_loan	-.0001986
ramt_fed	-.00000455
ramt_state	.00000871
ramt_inst	.0000123*
ramt_loan	.000000288
rfam_inc	-.000000392
strd_75	-.000016
unemp	.0013924
zero_inc	-.037478*
female	.0240525**
black	.0310943**
asian	.2816027***
americanIndian	-.0090725
hawaiianPI	.0213639
multirace	.011243

Variable	Coefficient
rcost	.0000139**
perc_fed	.0018807
perc_state	.0007521
perc_inst	.0000412
perc_loan	-.0003956
ramt_fed	.00000148
ramt_state	-.0000148**
ramt_inst	.00000437
ramt_loan	.00000610
rfam_inc	.00000254***
strd_75	.0005252***
unemp	.0172161**
female	.0783569***
black	.0422988***
asian	.129593***
americanIndian	-.0428168
hawaiianPI	.1434619
multirace	-.0078179

Variable	Coefficient
rcost	-.000000216
perc_fed	-.0038032**
perc_state	.001064**
perc_inst	-.0005853
perc_loan	-.0003309
ramt_fed	.0000229
ramt_state	-.00000114*
ramt_inst	.00000628
ramt_loan	.00000246
rfam_inc	.00000186***
strd_75	.0002928
unemp	.0149228*
female	.1509403***
black	-.0044993
asian	.1023733**
americanIndian	-.0646758
hawaiianPI	-.0352518
multirace	-.0011437

Variable	Coefficient
rcost	.00000930
perc_fed	-.0047257
perc_state	.0018118
perc_inst	.0006811
perc_loan	-.0018828
ramt_fed	-.0000192
ramt_state	-.0000254
ramt_inst	-.00000871
ramt_loan	-.00000148
rfam_inc	.0000000914
strd_75	.0003684
unemp	.0067353
female	.1503791***
black	-.0067424
asian	.0475955
americanIndian	-.0701387
hawaiianPI	.0565355
multirace	-.1704602**

*Significant at the 10% level
**Significant at the 5% level
***Significant at the 1% level

For this reason, the lower income group must rely on aid for educational attainment. The significance of the average amount of institutional aid variable reflects this. Institutional aid consists of scholarships and grants which are often given to low-income, minority, and other types of disadvantaged students. A \$1000 increase in the average amount of institutional aid awarded corresponds to a 1.23% greater chance of enrollment for low-income students. There appears to be a similar response to state aid. A greater proportion of students receiving this type of aid corresponds to an increase in enrollment. The state aid measured here is weighted heavily by the State Student Incentives Grant (SSIG) Program, which is a nation-wide work study program whose implementation varies by state. This program could be a driving factor for low income students: more students receiving work study aid suggests to more part-time job opportunities for low income students to supplement their family income.

The significant and positive cost variable may seem counterintuitive at first glance. Students in the lower two income brackets who have substantial financial constraints should not react positively to price increases. This finding in fact demonstrates the consequences of price discrimination in higher education. As mentioned earlier in this paper, students in the lowest income group are unable to afford a college education without financial aid. The difference between a \$20,000 tuition and a \$25,000 tuition is negligible because a prospective student will not be able to afford either. For the lower-middle income students we expect similar indifference to price changes, although perhaps not to such a strong degree. Students in both groups will be relying on some type of aid to pay for college.

The positive cost effect is a result of the relationship between price and aid. Higher tuition results in more money available for aid, and that aid is being focused on those low-

income students who need it most. The Doti study on net tuition demonstrates this link: between 1992 and 2002, for every \$1 increase in tuition, the average net tuition increase ranged between \$0.35 at low selectivity colleges and \$0.57 at high selectivity colleges. (Doti 2004) These are average values for all income levels, those at lower incomes pay even less in net tuition. The large tuition discounts (difference between tuition and net tuition) are the result of financial aid, some of which is funded through these tuition increases. To focus on the effect for lower income groups, I calculated the discount rate (difference between net price and cost of attendance as a percentage of sticker price) for those students attending the 50 flagship universities with incomes lower than \$30,000 for the 2008-09, 2009-10, and 2010-11 school years (the only years when net price was available). This average discount rate was positive and significant at the 5% level when regressed against price. A \$1000 increase in cost corresponds to a 0.8% increase in discount rate for lower income students.⁴ In other words, schools with higher costs provide more financial aid to low income students as a percentage of the total cost than lower-priced counterparts, so while the sticker price may be higher, the actual student contribution may not be.

The significance of the positive unemployment coefficient is of special interest considering that previous literature has linked macroeconomic factors such as inflation and growth to college enrollment, but has failed to find the significance of unemployment. (Ewing 2010, Buss 2004) The positive coefficient on unemployment is likely a result of the decreased opportunity cost of attending college when jobs are scarcer. Just as economic growth is linked

⁴ It is worth noting that this is likely a low estimation in terms of the average effect across schools due to decreases in state appropriations for higher education at public research universities in the years leading up to this three year sample. (Baum et al. 2010)

to a strong labor market, which increases the opportunity cost of college, high unemployment is a symptom of a weak labor market. (Ewing 2010) Students who may have joined the work force under better market conditions instead chose to go to school in hopes of improving their chances of employment. Unemployment is not significant for the lowest income group, which is likely due to the lack of opportunities available to that group. Someone of low income who would not be going to college under better macroeconomic conditions is probably not someone whose academic achievements will draw enough aid to finance a college education. Those individuals in the middle income groups have a better chance of affording such a decision. Unemployment is insignificant for the upper income group as well, but not as a result of financial constraints. For the majority of upper-income individuals, college is an expectation more than a choice. For this reason, those who are academically strong enough to be accepted will enroll regardless of their job prospects.

The positive standardized test score coefficient, a variable that was included as a measure of school quality, shows the enrollment effect of improving programs over time. Cost conscious students in the lower-middle income range who are on the fence about college enrollment are likely to consider the flagship public university because it offers a relatively inexpensive education. If the state school in question is improving academically it will convince more uncertain individuals to apply because the benefits of attending college are greater at more prestigious universities.

The state aid variables for the middle income groups represent an increased focus on low-income individuals and an interesting question of balance with educational policy implications. The positive impact of having a higher percentage of students receiving state aid

has a common sense explanation, but the negative impact of higher aid (per student receiving aid) is less obvious. What this result represents has more to do with the allocation of aid across groups than the amount of aid per student. When there is an emphasis on lower income students these students receive more aid, which leaves less aid for other income levels. If the emphasis on low income students is less extreme, they will receive less aid, and the funds will be distributed to a larger group. What we observe is an interaction between the percentage of students who receive aid and the amount that each individual receives. A large amount of aid per student has a negative effect on middle-income students because it means that the disbursement of aid is focused, and there is less of a chance that they will receive any aid at all.

The significance of the percent receiving federal aid variable was surprising. Federal aid policy is made at the national level, not at the state level, so federal aid should be distributed in the same manner regardless of where the student is living. The significance of the variable is most likely an indication that there is an effect for individuals living in poorer states where more people are receiving need-based federal aid. The interpretation for this variable is somewhat uncertain, but the negative coefficient could be a result of less availability of other types of aid in states where a lot of students qualify for federal aid. A higher number of low-income students could leave less aid available for the upper-middle income group.

The gender effect witnessed in the regression is consistent with previous literature. Women across all levels of income are more likely to enroll than men, reflecting increased accessibility and the overall greater proportion of women in college than men. (Jacobs 1996) The fact that there is a positive effect for low-income black individuals is surprising considering that previous literature has found that there is no income effect for black students in college

enrollment. (Lucia 2009) This outcome could be the result of universities targeting underprivileged minority students to increase diversity. As previous literature suggests, Asian Americans are more likely to attend college, a result reflected in the positive regression coefficients. (Brown 2003)

V. Conclusions

The high tuition, high aid model of price discrimination that has been implemented seemingly universally across higher education has critical implications on the composition of college students. These policies which aim to make college education more accessible to those with lower incomes have positive and negative consequences, and a balance of these effects is vital to the U.S. higher education system. For low income students price discrimination is essential, and many would not be able to afford to continue their education without it. For upper income students these policies are of little consequence. Their relative wealth affords them the ability to purchase an education even as the sticker price continues to soar. Where the results of this strategy come into question is at the middle of the income spectrum.

As this study reveals, there are negative consequences of high prices and high aid. While rising tuition costs may not affect upper income students and may benefit low income students in the form of increased aid, the impact on the middle class is not as clear. If increased aid which is available as a result of increased tuition and publicly funded scholarships and grants is not distributed in a way that takes into account the increased pressures put on middle income families, there could be serious ramifications. If public spending and rising prices are justified by increased accessibility for the lower class there needs to be a careful

balancing so as not to discourage those at intermediate income levels from enrolling. As policy makers and aid granting institutions search for a proper equilibrium, studies of this nature will be vital, and those in the profession of higher education should encourage further research.

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Appendix

Table 1. Concordance between ACT Composite Score and Sum of SAT Critical Reading and Mathematics Scores

SAT CR+M (Score Range)	ACT Composite Score	SAT CR+M (Single Score)
1600	36	1600
1540–1590	35	1560
1490–1530	34	1510
1440–1480	33	1460
1400–1430	32	1420
1360–1390	31	1380
1330–1350	30	1340
1290–1320	29	1300
1250–1280	28	1260
1210–1240	27	1220
1170–1200	26	1190
1130–1160	25	1150
1090–1120	24	1110
1050–1080	23	1070
1020–1040	22	1030
980–1010	21	990
940–970	20	950
900–930	19	910
860–890	18	870
820–850	17	830
770–810	16	790
720–760	15	740
670–710	14	690
620–660	13	640
560–610	12	590
510–550	11	530

Table 2. Expected Family Contribution Quick Reference Guide

Adjusted Gross Income (AGI)	Expected Family Contribution based on number of dependent children			
	One	Two	Three	Four
\$30,000	\$556	\$0	\$0	\$0
\$32,500	\$987	\$231	\$0	\$0
\$35,000	\$1,418	\$662	\$0	\$0
\$37,500	\$1,849	\$1,093	\$397	\$0
\$40,000	\$2,269	\$1,524	\$828	\$17
\$42,500	\$2,673	\$1,955	\$1,259	\$448
\$45,000	\$3,076	\$2,360	\$1,689	\$879
\$47,500	\$3,318	\$2,764	\$2,108	\$1,310
\$50,000	\$3,776	\$3,167	\$2,511	\$1,740
\$52,500	\$4,228	\$3,421	\$2,915	\$2,144
\$55,000	\$4,760	\$3,880	\$3,134	\$2,547
\$57,500	\$5,286	\$4,348	\$3,593	\$2,951
\$60,000	\$5,910	\$4,880	\$4,015	\$3,176
\$62,500	\$6,486	\$5,427	\$4,547	\$3,634
\$65,000	\$7,220	\$6,050	\$5,037	\$4,063
\$67,500	\$7,935	\$6,652	\$5,660	\$4,595
\$70,000	\$8,797	\$7,385	\$6,193	\$5,093
\$72,500	\$9,659	\$8,130	\$6,926	\$5,716
\$75,000	\$10,521	\$8,992	\$7,590	\$6,258
\$80,000	\$12,244	\$10,715	\$9,314	\$7,668
\$85,000	\$13,968	\$12,439	\$11,038	\$9,391
\$90,000	\$15,692	\$14,163	\$12,761	\$11,115
\$95,000	\$17,191	\$15,834	\$14,485	\$12,839
\$100,000	\$18,680	\$17,323	\$16,092	\$14,562
\$105,000	\$20,168	\$18,811	\$17,581	\$16,107
\$110,000	\$21,023	\$19,666	\$18,435	\$16,961
\$115,000	\$22,657	\$21,183	\$19,952	\$18,478
\$120,000	\$24,291	\$22,700	\$21,469	\$19,995

(AGI)	Number of dependent children			
	One	Two	Three	Four
\$125,000	\$25,929	\$24,623	\$22,986	\$21,512
\$130,000	\$27,563	\$25,736	\$24,506	\$23,029
\$135,000	\$29,198	\$27,371	\$26,023	\$24,548
\$140,000	\$30,832	\$29,005	\$27,540	\$26,065
\$145,000	\$32,466	\$30,639	\$29,057	\$27,582
\$150,000	\$34,101	\$32,274	\$30,573	\$29,099
\$155,000	\$35,688	\$33,861	\$32,161	\$30,569
\$160,000	\$37,267	\$35,449	\$33,748	\$32,039
\$165,000	\$38,784	\$37,008	\$35,336	\$33,449
\$170,000	\$40,301	\$38,525	\$36,877	\$34,742
\$175,000	\$41,818	\$40,042	\$38,394	\$36,154
\$180,000	\$43,335	\$41,559	\$39,910	\$37,565
\$185,000	\$44,852	\$43,076	\$41,349	\$38,976
\$190,000	\$46,369	\$44,593	\$42,761	\$40,387
\$195,000	\$47,933	\$46,157	\$44,219	\$41,845
\$200,000	\$49,497	\$47,721	\$45,677	\$43,303
\$205,000	\$51,061	\$49,264	\$47,135	\$44,762
\$210,000	\$52,624	\$50,722	\$48,593	\$46,220
\$215,000	\$54,188	\$52,181	\$50,051	\$47,678
\$220,000	\$55,752	\$53,639	\$51,510	\$49,136
\$225,000	\$57,316	\$55,097	\$52,968	\$50,594
\$230,000	\$58,773	\$56,517	\$54,388	\$52,014
\$235,000	\$60,172	\$57,916	\$55,787	\$53,414
\$240,000	\$61,572	\$59,316	\$57,187	\$54,813
\$245,000	\$62,971	\$60,715	\$58,586	\$56,213
\$250,000	\$64,371	\$62,115	\$59,986	\$57,612
\$425,000	\$99,999	\$99,999	\$99,999	\$99,999

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The student <u>would qualify</u> for need-based financial aid at:	
Blue and Bold	<u>ELIGIBLE</u> at 2 year public, 4 year public, 4 year private colleges, and for Federal PELL Grants*
Green	<u>ELIGIBLE</u> at 2 year public, 4 year public, and 4 year private colleges
Yellow	<u>ELIGIBLE</u> at 4 year public and 4 year private colleges
Orange	<u>ELIGIBLE</u> at 4 year private college