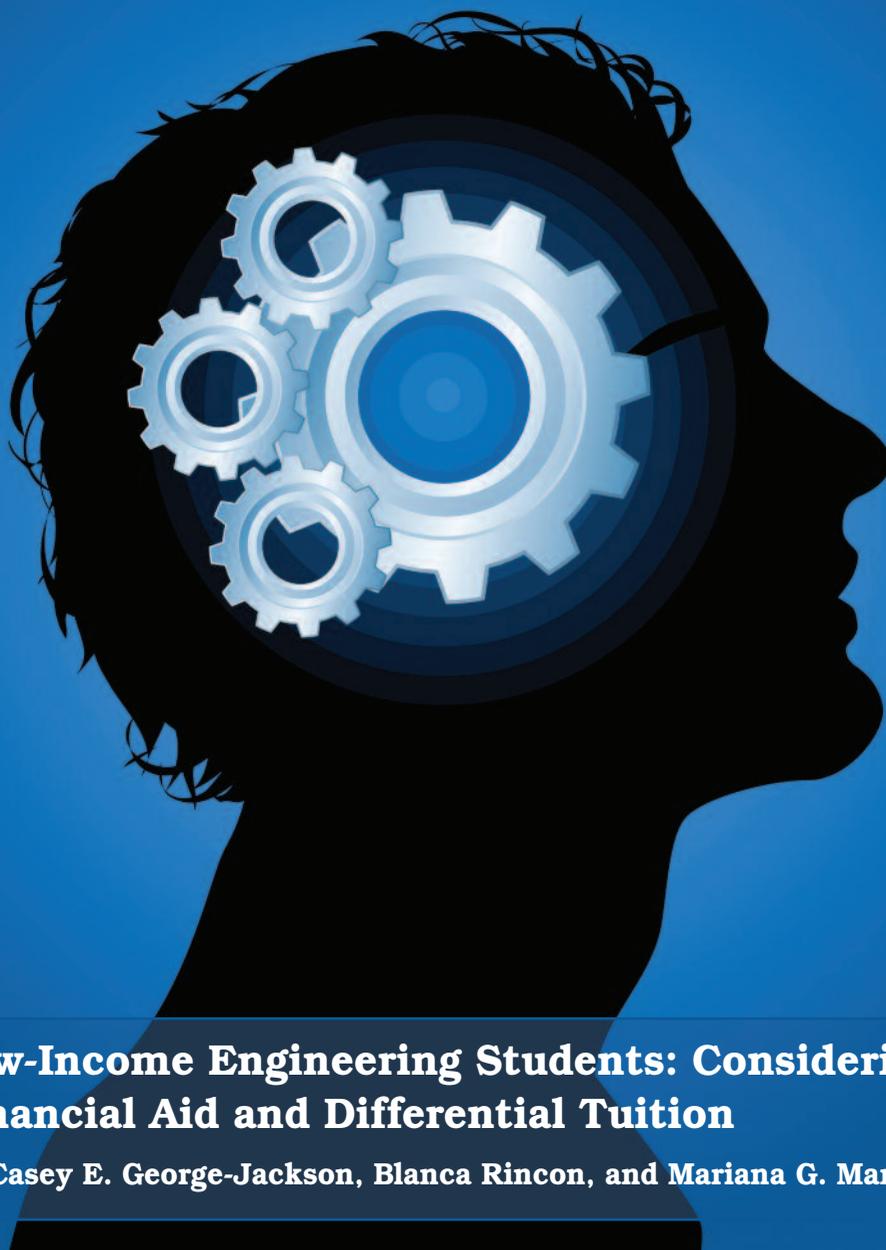


Journal of Student Financial Aid

Volume 42, Number 2

2012



Low-Income Engineering Students: Considering Financial Aid and Differential Tuition

By Casey E. George-Jackson, Blanca Rincon, and Mariana G. Martinez



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MANUSCRIPT SUBMISSION: Submit manuscripts to Jacob P. K. Gross; Editor, Journal of Student Financial Aid & Assistant Professor, Educational Leadership, Foundations & HR Education; College of Education & Human Development; University of Louisville; Room 338A; Louisville, KY 40292; or email jacob.gross@louisville.edu.

NASFAA MEMBERSHIP: Membership in the National Association of Student Financial Aid Administrators includes receiving the Journal of Student Financial Aid. For further information, please contact NASFAA, 1101 Connecticut Avenue, NW, Suite 1100, Washington, DC 20036-4374; phone (202) 785-0453 ext.1; fax (202) 785-1487; e-mail membership@nasfaa.org.

SUBSCRIPTIONS: \$45.00/year. For information or subscription orders write NASFAA, Journal of Student Financial Aid, 1101 Connecticut Avenue, NW, Suite 1100, Washington, DC 20036-4374 or e-mail membership@nasfaa.org.

CHANGE OF ADDRESS: Notices should be sent to NASFAA, Journal of Student Financial Aid, 1101 Connecticut Avenue, NW, Suite 1100, Washington, DC 20036-4374 or via e-mail membership@nasfaa.org.

REPRINTS: Reprints of articles can be obtained in lots of not less than fifty. Back issues of the Journal may be ordered for \$15.00 from NASFAA, 1101 Connecticut Avenue, NW, Suite 1100, Washington, DC 20036-4374. The Journal is also available on microfilm from University Microfilms International, 300 North Zeeb Road, Ann Arbor, Michigan 48106. The Journal is indexed and abstracted in the ERIC monthly bibliographic journal, Current Index to Journals in Education.

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The Journal is published three times a year by the National Association of Student Financial Aid Administrators, 1101 Connecticut Avenue, NW, Suite 1100, Washington, DC 20036-4374.

National Association of Student Financial Aid Administrators

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Editor's Column: Winds of Uncertainty

At NASFAA's National Conference this past July, a record number of professionals in the field came together to discuss affordability and access. As I attended sessions, listened to updates, and spoke with colleagues, I was struck by the ways in which the conference theme—Winds of Uncertainty—seemed apt for the work done by financial aid practitioners. Federal laws guiding aid programs are subject to change, revision, and interpretation, as we saw recently with the gainful employment decision. Public funding of postsecondary education continues to ebb while institutions seek new ways to make up funding shortfalls, including raising tuition for students and their families. Federal regulation of proprietary institutions remains an evolving legislative area, subject to politics, rhetoric, and substantial lobbying efforts. The demographics of prospective and current students continue to shift, with each new class somewhat different from the last. Technology, such as social media, offers new opportunities and challenges for aid practitioners to communicate with constituents.

Although just a small sample of topics discussed at the conference, the preceding is illustrative of the uncertain context in which the important work of helping students finance an education is done. The level of ambiguity and uncertainty in financial aid work is surely striking, but what is more remarkable is that the important job of helping students attain an education is done every day across the nation and globe. Undoubtedly the commitment and dedication of financial aid professionals plays a significant role in this accomplishment.

The mission of this Journal is to share with financial aid practitioners findings from rigorous, scholarly work that helps illuminate persistent questions and push back against uncertainty to the extent possible. We continue this mission in this issue of the Journal with articles addressing pricing, how students pay, and policy. In this issue, we proudly present:

- Our first article, *Low-Income Engineer Students: Considering Financial Aid and Differential Tuition* by **Casey E. George-Jackson, Blanca Rincon, and Mariana Martinez**, looks at the effects of differential tuition pricing on low-income students in engineering and raises questions about how this practice affects access.
- The second article, *Should I Work or Should I Borrow? Counterfactual Analysis on the Effect of Working While Enrolled and Debt on Baccalaureate Completion* by **Pilar Mendoza**, wrestles with questions of how students pay for college, specifically whether debt affects baccalaureate degree completion.

- The *Journal* also offers a book review by **David R. Smedley**, who critically examines contents of the 2012 *Student Financial Literacy: Campus-Based Program Development*.

In different ways, each article contributes evidence that helps us better understand financial aid at the federal, institution, and student level.

Jacob Gross
Editor

Low-Income Engineering Students: Considering Financial Aid and Differential Tuition

By Casey E. George-Jackson, Blanca Rincon, and Mariana G. Martinez

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This paper explores the relationship between tuition differentials and low-income students in Engineering fields at two public, research-intensive universities. Although current reports indicate the need for increased participation within the Science, Technology, Engineering, and Mathematics (STEM) fields, rising tuition prices at the university and program levels may deter low-income students to enroll and persist within STEM, specifically Engineering. The findings reveal that increased costs due to tuition differentials policies are initially offset by financial aid, but over time costs increase, particularly for low-income students. The results highlight the need for comprehensive, time-sensitive financial aid packages that provide students opportunities to complete their postsecondary degrees, particularly in fields with higher tuition rates.

President Obama's 2010 Graduation Initiative, a goal to restore the United States as the leading producer of college degrees, sets the stage to increase the proportion of overall college degrees awarded by 2020 in order to ensure the nation's research and innovation, economic prosperity, and global competitiveness. Simultaneously, several reports have outlined the need to increase the number of Science, Technology, Engineering, and Mathematics (STEM) degrees awarded to domestic students within the U.S., specifically underrepresented students (e.g., women, low-income, and underrepresented racial and ethnic minorities) in STEM¹. In response, recent legislation such as the America Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science (COMPETES) Act of 2007 and of 2010 and the American Recovery and Reinvestment Act of 2009 have invested in early childhood education, improving K-12 Math and Science education, and increasing the maximum Federal Pell Grant award, the latter of which directly affects low-income students in higher education.

While the impact of federal efforts may positively affect students enrollment and degree production, colleges and universities are engaging in practices that may undermine such efforts. Specifically, charging higher

¹ See Committee on Underrepresented Groups and the Expansion of the Science and Engineering Workforce Pipeline (2010); National Science Foundation (2010); President's Council of Advisors on Science and Technology (2012).

tuition rates for specific majors and courses through the use of *differential tuition* policies is practiced by many colleges and universities across the nation, and particularly by the STEM disciplines. The practice is based on the higher costs associated with education delivery and training in certain fields, as well as the assumption that students are willing to invest in higher-cost STEM degrees due to expected financial returns upon graduation (George-Jackson, Kienzl & Trent, 2008). Multiple sub-groups who earn a higher education degree stand to benefit from entering the STEM workforce and the higher earnings associated with STEM majors, particularly low-income students. (Jacobson & Mokher, 2008).

Despite the use of tuition differentials, there is a lack of research on the impact of tuition differentials within STEM, which can be 45% higher than base tuition at some public institutions (Nelson, 2008). Given this current knowledge gap, empirically-based research is needed to inform the potential effects on access and retention within STEM fields for underrepresented, low-income students. This study seeks to investigate the impact of differential tuition policies on low-income undergraduate students' entrance into and persistence in Engineering baccalaureate programs at two public, research universities. Furthermore, this paper seeks to expand current understandings of underrepresented groups in STEM fields—specifically within Engineering and by socio-economic status. As the nation seeks to expand its STEM workforce, it is important to examine the implications of differential tuition policies on student's educational opportunities and outcomes in STEM, particularly in times of economic hardship.

Theoretical Framework and Literature Review

The theoretical framework that informs this study is derived from human capital theory. Human capital theory relates to the means of production, by which additional investment produces extra output. Human capital is interchangeable, but not transferable like land, labor, or fixed capital (Becker, 1964). Within education, this theory suggests that a college degree increases the earning potential of an individual over their life course (Goldrick-Rab, Harris, & Trostel, 2009). Human capital theory has been used to explore how differences in opportunities within higher education are contingent on access to financial resources, including financial aid (Becker, 1964, 1975, 1994; St. John & Starkey, 1995). Specifically, human capital theory suggests that a reduction in the net price (i.e., the sticker price minus grant aid) of college would improve access to higher education for some student populations. At the same time, low-income students are characterized as having a greater level of price sensitivity as compared to their high-income peers (St. John & Starkey, 1995). Price sensitivity occurs when individuals or groups are more likely to respond negatively to increases in the net price of a product or service. In this case, low-income students are less likely to enroll in higher education due to net price increases, while the same increases have less effect on the enrollment decisions of other students.

Although human capital theory has its own limitations, a net-price theory focuses primarily on the direct cost of college (Leslie & Brinkman, 1987) and can be used to explain how reducing the financial burden of higher

education will allow more students to persist to graduation (Goldrick-Rab et al., 2009). St. John and Starkey (1995) recommend that a “high-tuition, high student-aid strategy,” through a net-price theory approach, be the “optimal public finance strategy” (p. 158). Both human capital and net-price theory allows for examination of financial aid and tuition policies that can facilitate retention for low-income students.

Low-Income Students in Higher Education

Since the inception of Pell Grants as a federal financial aid program in the early 1970s, Pell Grants have sought to increase access to higher education by providing low-income students with access to a postsecondary education, regardless of institution type. Pell Grants are unique in that they operate as a voucher aid program, whereby the funds are awarded directly to the student and are portable. In the last two decades, the maximum amount of the Pell Grant has not kept pace with increasing tuition costs or with inflation (Cook & King, 2007). This is mostly attributable to the recent financial burden experienced by many public institutions due to reduced state and federal support which is often transferred to the student via tuition and fee increases (Heller & Rogers, 2006). Subsequently, low- and middle-income students are finding it increasingly hard to gain access to even public universities which were at one time considered to be more affordable (Mumpher, 2003). Heller (2002) suggests that financial aid plays a pivotal role in student’s expectations, plans, and enrollment decisions prior to students applying or enrolling in higher education. This is especially true for lower income students who are more likely to attend college if they expect to receive financial aid (King, 1996). Similarly, the Advisory Committee on Student Financial Assistance (2010) found that 73% of low-income students who graduated from high school in 2004 indicated financial aid was very important, as compared to 30% of their high-income peers. Financial support is also critical for students majoring in STEM fields, specifically highlighting the importance of need-based financial aid that targets low-income students in STEM (e.g., SMART grants) (Committee on Underrepresented Groups and the Expansion of the Science and Engineering Workforce Pipeline, 2010).

There is a need to closely examine the context and profile of students who attend highly selective public research institutions. It is important to note that the low-income and racial and ethnic minority populations who self-select out of such institutions may do so because they believe they cannot afford to it, or are reluctant to place an additional financial burden on their families (Gandara & Contreras, 2009). Furthermore, low-income students who attend these institutions may be disproportionately affected by increasing tuition levels and thus burdened with having to seek additional sources of aid, mainly loans, to fund their education. For most low-income students, the cost of tuition alone does not account for the added economic burden of foregone income or negate the need to work during college (Gandara & Contreras, 2009).

As stated above, low-income students who may benefit the most from earnings associated with occupations in STEM may be the most sensitive to increases in net price. Low-income students’ price sensitivity to changes

in the overall costs of higher education negatively impacts their postsecondary enrollment at a greater rate than for students from other socio-economic backgrounds (Heller, 1997; Lassila, 2012; McPherson & Shapiro, 1991). Higher-costs programs could also result in low-income students' decision to not enroll in college or a specific program at a particular university due to the higher costs associated with pursuing that degree. Callender and Jackson (2008) found that fear of debt disproportionately impacted debt-averse students' degree choice within math, engineering, and technology when controlling for other factors. Debt-averse students typically include those who have accumulated disadvantages such as low-income, first-generation and minority populations (Burdman, 2005).

Tuition Differentials

The practice of tuition differentials charges different rates of tuition to different groups of students, by class status, level of education, specific courses, and most important to this study, by major. Nelson (2008) highlights several reasons why universities choose to adopt tuition differentials, including the cost of program delivery, changes in tuition charges at peer institutions, and reduced state support. Little, O'Toole, & Wetzel (1997) and Wetzel (1995) suggest that departmental or program-based differentials are more equitable for lower income students because only students in high cost- high return fields carry the differential tuition burden. According to the authors' logic, differential tuition policies would reduce the net cost for low-income students within non-STEM fields, as opposed to having a flat-price or cross-subsidy which is a burden for all students regardless of the earning potential of students' chosen field. However, it is unclear if 1) sufficient aid is provided to low-income students in programs that feature differential tuition; or 2) if tuition differentials in high cost-high return STEM majors, such as Engineering, deter or prevent low-income students from entering and persisting in these majors. Furthermore, Wetzel (1995) argues that if tuition differentials are applied during the upper division courses of costly programs, the financial burden in the early years is reduced. As a result, students who may stop out, dropout, or transfer out do so with less debt. Consequently, the higher tuition would come at a time when financial rewards from a particular career decision are closer.

Wetzel (1995) indicates that enrollment impacts on a 5% tuition differential are minor, but impacts of tuition differential over time were not examined. Although tuition differentials for engineering programs at a set of 48 public research institutions averaged about 14% above base tuition in 2007-2008, the lowest differential was only 2% over the base tuition, while the highest differential was 45% above the base tuition (Nelson, 2008). In a time of skyrocketing tuition prices, these differences may impact a students' decision to enroll or persist in STEM majors. Findings from the report also indicate the need to examine the impacts of tuition differentials among low-income students, many of which are also underrepresented racial and ethnic minorities (Wetzel, 1995).

A review of the current literature related to low-income students in higher education and differential tuition reveals a gap in the literature in terms of how such tuition policies can impact low-income students, both in terms of enrollment and persistence to graduation. This paper attempts to contribute to the existing literature by examining the role of tuition differentials in Engineering, one of the STEM fields. Specifically, this study examines the enrollment, financial aid, and degree completion patterns of baccalaureate-seeking, low-income Engineering students at two research universities.

Research Objectives and Data

The study presented here is part of a larger research effort which is funded by the National Science Foundation. Project STEP-UP (STEM Trends in Enrollment and Persistence for Underrepresented Populations) is located at University of Illinois at Urbana-Champaign. The project utilizes three different data components to investigate individual, institutional, and contextual factors that impact underrepresented students in the STEM fields at public, research universities. For the overall project, underrepresented groups of focus include women, students of color, low-income students, and first-generation students. The first component of the project draws on semester-by-semester institutional data of undergraduate students who entered college in Fall 1999. The second component uses qualitative data gathered through interviews with directors and administrators of recruitment and retention programs in the STEM fields. The third component of the project uses online survey data of undergraduate students.

This study utilizes data from the first study component—namely longitudinal data on first-time, full-time, in-state freshmen who matriculated to one of two public, research universities located in two different Midwestern states in the Fall of 1999 and filed a Free Application for Federal Student Aid (FAFSA) for the 1999-2000 award year (n=6,307). The data were originally compiled as part of a larger collection effort of several public institutions' data coordinated by the Andrew W. Mellon Foundation's Public University Database project. The two universities in this study were selected due to their similarity to one another and the fact that differential tuition policies in each campus's Engineering program existed prior to 1999, the year that student-level observations begin in the dataset. Information on students' socio-demographic background, academic preparation, major, and financial aid is featured in the dataset. The data follow students for up to six academic years, beginning in 1999-2000, and with observations ending when students complete a bachelor's degree or when they leave the institution.² Archived tuition data, including differential charges by major, was obtained from the institutions' websites and were merged with the Mellon data file.

² Students who drop out, stop out, or transfer out cannot be distinguished in this dataset.

The following research questions guide this study:

1. What are the rates of participation in Engineering undergraduate programs at two public, research universities by socio-economic status?
2. What is the actual cost of pursuing a degree in Engineering at two public, research universities by socio-economic status?
3. How does financial aid (e.g., Pell Grants, state aid, institutional aid) fluctuate over time for low-income and other students in Engineering and non-Engineering fields?
4. What are the graduation rates for students in Engineering and non-Engineering majors, by socio-economic status?

Approximately 11,500 students enrolled in the two universities in Fall 1999, but in order to answer the research questions central to this study, the data are restricted in two important ways. First, the data are restricted to students who filed the FAFSA for the 1999-2000 academic year (n=7,607). The data obtained from students who filed for FAFSA provided information on students' financial aid including whether or not a student received a Pell Grant, which serves as an indicator of low-income status. Both of these pieces of information were crucial to conducting this study. Second, of the students who filed the FAFSA, 83% paid in-state tuition and had complete financial aid information (n=6,307). Given that there was a large difference in the out-of-state tuition rates between the two universities and that the majority of FAFSA-filers were in-state students, the researchers restricted the analysis to in-state students. Rather than conducting separate analyses to examine institution-specific differential tuition rates, the data from the two institutions were merged to increase the number of low-income students in Engineering, particularly as the profiles of the universities and the in-state tuition rates were comparable.

The two universities featured in the study both charged differential tuition for Engineering majors, as compared to other majors, for each academic year featured in the dataset. The average 1999-2000 tuition and fees for in-state students majoring in Engineering was \$6,400, as compared to \$5,938 for students in other majors. The average 2004-2005 tuition and fees for in-state students majoring in Engineering was \$8,818, as compared to \$8,266 for their peers.

Results and Discussion

Descriptive statistics were used to create a profile of the students in the database (see Table 1). Of the 6,307 students in the data, 51.8% were female. Both campuses are Predominantly White Institutions, with the racial and ethnic composition of the two campuses as follows: 69.2% White, 11% Asian, 10.6% Black, 6.8% Latino, 0.5% Native American, and 1.8% of another race or ethnicity. Over 80% of students graduated within six years. In addition, 19.7% of students of all students initially majored in Engineering. Nearly 20% (n=1,217) of students received a Pell Grant,

Table 1. Socio-demographic Information, 1999-2000

Variables	All Students		Pell Recipients	
	N	%	N	%
Gender				
Male	3,043	48.2	546	44.9
Female	3,264	51.8	671	55.1
Total	6,307	100.0	1,212	100.0
Race and Ethnicity				
Asian	695	11.0	199	16.4
African American	670	10.6	314	25.8
Latino	429	6.8	125	10.3
Native American	34	0.5	6	0.5
Other	112	1.8	16	1.3
White	4,367	69.2	557	45.8
Citizenship Status				
U.S. Citizen	5,999	95.1	1,077	88.5
Permanent Resident	308	4.9	140	11.5
Graduation Status				
Graduated	5,262	83.4	913	75.0
Still Enrolled (Fall 2005)	38	0.6	16	1.3
Did Not Graduate, Not Enrolled	1	16.0	288	23.7
Initial Major				
Engineering	1,245	19.7	186	15.3
Non-Engineering	5,062	80.3	1,031	84.7
Pell Grant Status (1999-2000)				
Received Pell	1,217	19.3		
Did Not Receive Pell	5,090	80.7		

Source: Project STEP-UP, 2011; Authors' Calculations

indicating low-income status. Of the Pell students, 55.1% were female. African American students are overrepresented within Pell Grant recipients: 45.8% were White, 25.8% were African American, 16.4% were Asian, 10.3% were Latino, 0.5% were Native American, and 1.3% were of another race/ethnicity. Seventy-five percent of Pell recipients graduated within six-years.

Table 2 provides information on students' initial choice of major by whether or not they received a Pell Grant in their first year of study. In comparison to Non-Engineering students, slightly fewer Pell Grant recipients initially declared a major in Engineering (20.8% versus 15.3%, respectively). In other words, nearly 85% of Pell Grant recipients initially entered a Non-Engineering field. The difference in the type of initial major pursued by socio-economic status could be due to a variety of reasons, including students' concerns about or sensitivity to the higher cost of pursuing a degree in Engineering, students' educational and career goals, and/or limited access to adequate academic preparation in math and science at the high school level. Unfortunately, the dataset does not provide information on the motivations for students' choice of major.

Net price was computed by adding major-specific tuition, books, room and board³ and other known costs, minus total grant aid, which includes Pell Grants, Supplemental Educational Opportunity Grants (SEOG), state grants, institutional grants, and other aid. Table 3 summarizes the average net price for students for each academic year by their initial major and Pell Grant status, the associated standard deviations, and the percent change from the previous year's net price. The number of observations decreases each academic year due to students not filing for FAFSA, and changes in students' status (i.e., transferring out, stopping out, or dropping out of the two universities featured in the study).

The net price for each category of students was lowest in their first year of study (1999–2000), and in general, students' net price increased each academic year for the first four years of study, and then reduces considerably in the fifth year, before increasing dramatically in the sixth

Table 2. Initial Major by Pell Status

	No Pell	Pell	Total
Engineering	1,059	186	1,245
<i>% Within Major</i>	85.1	14.9	100.0
<i>% Within Pell Status</i>	20.8	15.3	19.7
Non-Engineering	4,031	1,031	5,062
<i>% Within Major</i>	79.6	20.4	100.0
<i>% Within Pell Status</i>	79.2	84.7	80.3
Total	5,090	1,217	6,037
<i>% of Total</i>	80.7	19.3	100.0

Source: Project STEP-UP, 2011; Authors' Calculations

³ The appropriate on-campus or off-campus room and board values, obtained from IPEDS, were used in the calculation of net price, according to whether or not the student lived in a residence hall each academic year.

Table 3. Net Price by Initial Major and Pell Status

	Engineering				Non-Engineering			
	No Pell		Pell Recipient		No Pell		Pell Recipient	
	N	Mean (Std. Dev) % Change from Prior Year	N	Mean (Std. Dev) % Change from Prior Year	N	Mean (Std. Dev) % Change from Prior Year	N	Mean (Std. Dev) % Change from Prior Year
1999-2000	1,061	\$12,287 (\$3,426)	188	\$6,058 (\$3,210)	4,038	\$12,529 (\$2,943)	1,049	\$5,962 (\$2,727)
2000-2001	653	\$14,272 (\$4,059) 16.2%	169	\$8,628 (\$4,169) 42.4%	2,480	\$14,673 (\$3,629) 17.1%	961	\$8,633 (\$3,991) 44.8%
2001-2002	604	\$16,734 (\$4,242) 17.3%	150	\$11,404 (\$4,992) 32.2%	2,261	\$16,480 (\$3,855) 12.3%	858	\$10,786 (\$4,371) 24.9%
2002-2003	596	\$18,187 (\$4,549) 8.7%	142	\$13,312 (\$4,936) 16.7%	2,213	\$17,902 (\$4,021) 8.6%	823	\$12,660 (\$4,386) 17.4%
2003-2004	187	\$13,307 (\$6,781) -26.8%	69	\$8,136 (\$6,671) -38.9%	460	\$12,570 (\$6,134) -29.8%	269	\$8,224 (\$5,276) -35.0%
2004-2005	11	\$22,515 (\$3,442) 69.2%	2	\$22,321 (\$1,785) 174.3%	25	\$19,454 (\$4,910) 54.8%	7	\$19,758 (\$2,307) 140.2%

Source: Project STEP-UP, 2011; Authors' Calculations

year of study. While the majority of students graduated after the fourth year of study, their final academic year was their most expensive year in terms of net price. As expected, low-income students' net price, regardless of major, was lower than other students' net price for each academic year, except for 2004–2005, when non-Pell recipients not majoring in Engineering had the lowest net price. Pell Grant recipients who majored in Non-Engineering fields had the lowest average net price for the academic

years 1999–2000, 2001–2002, and 2002–2003. For 2000–2001 and 2003–2004, Pell Grant recipients majoring in Engineering had the lowest net price of all groups of students. By 2003–2004 Engineering Pell students' net price was \$6,040, or 30% of the average family income (\$19,460) for Pell recipients during the 2003–2004 academic year (U.S. Department of Education, 2004). In the final year of observations, students majoring in Non-Engineering who did not receive a Pell Grant had the lowest net price; however caution should be used when interpreting this finding due to the low number of observations for the 2004–2005 academic year (n=45).

In terms of percent changes from the prior year of study, low-income students experience a greater percent change in net price than other students in the first four years of study. For instance, Pell Grant recipients' net price in 2000–2001 was over 40% higher than the previous year, whereas non-Pell Grant recipients experienced an increase in net price of less than 20%. In real-dollar amounts, Pell Grant Engineering students' net price increased \$2,570 between 1999–2000 and 2000–2001, compared to \$1,985 for other students majoring in Engineering. As shown by the difference in net price, financial aid fluctuated each year for all students; however even incremental increases for low-income students can have negative impacts on their postsecondary outcomes.

Financial Aid Sources and Amounts

Table 4 summarizes financial aid sources and amounts by initial major and Pell status for 1999–2000. As expected, the average Expected Family Contribution (EFC)—which is used to calculate financial need—of Pell recipients was much lower than that of other students, with the average EFC for Pell Recipients being \$1,086 versus \$18,817 for non-Pell Recipients. As such, the average financial need of low-income students was more than \$12,500 higher than the financial need of other students. On average, Pell recipients received more financial aid, specifically grants, scholarships, and work study from federal, state, and institutional sources as compared to their counterparts. Students from higher income backgrounds took out slightly more loans, on average, than low-income students (\$2,385 versus \$1,971, respectively). The amount of aid awarded to Pell recipients on top of the Pell Grant suggests that additional tuition charges for Engineering majors at the two institutions in this study is not burdensome at the time of initial enrollment. However, the data only includes students who enrolled at the two universities and does not contain information about applicants or admitted students who did not enroll.

Examining financial aid sources and amounts by initial major for the first year of study reveals additional and important details about variations in aid by source, Pell Grant status, and major. Financial need for those who initially majored in Engineering and did not receive a Pell Grant was negative for the first year of study. Despite the lack of demonstrated financial need, Engineering majors who did not receive a Pell Grant still received over \$4,500 in financial aid, with the majority coming from Grants and Scholarships (\$2,566) and Loans (\$1,933). Comparatively, non-Pell Grant recipients who majored in Non-Engineering received \$1,863 in

Table 4. Financial Aid Information by Initial Major and Pell Status (1999-2000)

	All Students						Engineering			Non-Engineering		
	No Pell			Pell Recipient			No Pell			Pell Recipient		
	N	Mean (Std. Dev)	N	Mean (Std. Dev)	N	Mean (Std. Dev)	N	Mean (Std. Dev)	N	Mean (Std. Dev)	N	Mean (Std. Dev)
Expected Family Contribution	4,653	\$18,817 (\$17,004)	1,271	\$1,086 (\$1,575)	945	\$19,822 (\$17,173)	186	\$1,217 (\$1,028)	3,708	\$18,561 (\$16,954)	1,031	\$1,062 (\$1,654)
Student Need	4,653	\$261 (\$11,716)	1,271	\$12,738 (\$1,799)	945	-\$650 (\$12,653)	186	\$12,888 (\$1,123)	3,708	\$493 (\$11,455)	1,031	\$12,711 (\$18,894)
Total Aid Awarded	4,998	\$4,466 (\$4,332)	1,271	\$10,813 (\$2,254)	1,031	\$4,548 (\$4,219)	186	\$10,845 (\$2,569)	3,967	\$4,445 (\$4,361)	1,031	\$10,807 (\$2,193)
Grants & Scholarships	4,998	\$2,008 (\$2,690)	1,271	\$8,134 (\$2,355)	1,031	\$2,566 (\$2,954)	186	\$8,720 (\$2,777)	3,967	\$1,863 (\$2,599)	1,031	\$8,029 (\$2,256)
Loans	4,998	\$2,385 (\$3,690)	1,271	\$1,971 (\$1,721)	1,031	\$1,933 (\$3,320)	186	\$1,606 (\$1,715)	3,967	\$2,503 (\$3,772)	1,031	\$2,037 (\$1,714)
Work Study	4,998	\$72 (\$292)	1,271	\$707 (\$513)	1,031	\$49 (\$237)	186	\$519 (\$490)	3,967	\$79 (\$304)	1,031	\$741 (\$509)
Total Federal Aid	4,998	\$2,371 (\$3,626)	1,271	\$4,795 (\$2,011)	1,031	\$1,814 (\$3,122)	186	\$3,937 (\$1,884)	3,967	\$2,516 (\$3,732)	1,031	\$4,950 (\$1,995)
Total State Aid	4,998	\$381 (\$744)	1,271	\$3,183 (\$1,748)	1,031	\$488 (\$744)	186	\$3,223 (\$1,768)	3,967	\$353 (\$742)	1,031	\$3,175 (\$1,745)
Total Institutional Aid	4,998	\$1,273 (\$2,252)	1,271	\$2,425 (\$2,679)	1,031	\$1,724 (\$2,539)	186	\$3,126 (\$2,887)	3,967	\$1,156 (\$2,156)	1,031	\$2,299 (\$2,621)
Total Other Aid	4,998	\$441 (\$1,231)	1,271	\$410 (\$997)	1,031	\$522 (\$1,282)	186	\$559 (\$1,163)	3,967	\$420 (\$1,217)	1,031	\$383 (\$962)
Total Pell Aid	4,998	\$0 (\$0)	1,271	\$2,062 (\$929)	1,031	\$0 (\$0)	186	\$1,887 (\$932)	3,967	\$0 (\$0)	1,031	\$2,094 (\$925)
Total SEOG Aid	4,998	\$21 (\$177)	1,271	\$141 (\$479)	1,031	\$10 (\$118)	186	\$68 (\$355)	3,967	\$24 (\$189)	1,031	\$154 (\$498)

Source: Project STEP-UP, 2011; Authors' Calculations

Grants and Scholarships. Pell Grant recipients majoring in Engineering had the lowest amount of loans in 1999–2000, at \$1,606. Although specific information on grants and scholarships is not available in the dataset, some of the awards may be comprised of merit-based scholarships, particularly for middle and upper-income students who are more likely to have had resources and curricula in their high schools that would create opportunities for them to excel on merit-based measures. Engineering students, regardless of income status, had fewer loans as compared to non-Engineering students. Non-Pell Engineering majors received the least amount of federal aid (\$1,814), compared to other students.

At \$12,888, Pell Recipients majoring in Engineering had the highest calculated financial need, while Pell Recipients in other majors had the second highest calculated student need (\$12,711). Pell Recipients in Engineering also receive the highest amount of financial aid (\$10,845), of which grants and scholarships make up \$8,720, state aid comprises \$3,223, and institutional aid comprises \$3,126. However, it is important to note that Pell Recipients in non-Engineering majors received the second-highest amount in each of these categories. Pell Recipients in Non-Engineering majors had the lowest EFC and received the most in Pell and total federal aid. The difference in institutional aid offered to Pell Recipients in Engineering suggests a concerted effort by the universities featured in the study to recruit and provide support for low-income students in Engineering; however a specific program at either institution at the time is unknown. The results show that Pell Recipients, regardless of major, received more state aid than non-Pell students, which may be the results of need-based financial aid programs offered by the states where the two universities are located.

Table 5 provides additional information for Pell Grant recipients in Engineering and non-Engineering by highlighting fluctuations in financial aid across the first four years of study.⁴ Student need of low-income students remains approximately the same across all four years of study, as was the total aid awarded. However, the mix of financial aid varied from year to year. Total Pell Aid declines slightly for both groups of students between the first and second academic year, but then increases for the final two years of study. Perhaps most troubling is the increasing amount of loans taken out each year by all low-income students, regardless of their major, which doubles across the four academic year. Non-Engineering low-income students' loans are greater than low-income students in Engineering, suggesting that the differential tuition featured in Engineering majors may not result in these Pell Grant recipients relying on student loans to cover the differential tuition. However, it is important to keep in mind that other sources, such as federal aid, may help to make up the difference in cost of attendance for Engineering majors.

⁴ As the number of observations of Pell Grant recipients in Engineering decreases in 2003–2004 and 2004–2005, this table is restricted to the first four years of observations. The authors can be contacted for the results of the full analysis.

Table 5. Financial Aid Information for Pell Grant Recipients (1999-2003)

	1999-2000			2000-2001			2001-2002			2002-2003						
	Engineering	Non-Engineering		Engineering	Non-Engineering		Engineering	Non-Engineering		Engineering	Non-Engineering					
	N	Mean (Std. Dev)	N	Mean (Std. Dev)	N	Mean (Std. Dev)	N	Mean (Std. Dev)	N	Mean (Std. Dev)	N	Mean (Std. Dev)				
Expected Family Contribution	186	\$1,217 (\$1,028)	1,031	\$1,062 (\$1,654)	167	\$2,655 (\$3,574)	942	\$2,048 (\$3,926)	145	\$3,148 (\$4,214)	842	\$2,486 (\$4,365)	139	\$3,673 (\$5,059)	810	\$2,636 (\$3,391)
Student Need	186	\$12,888 (\$1,123)	1,031	\$12,711 (\$1,894)	167	\$12,547 (\$2,856)	942	\$12,383 (\$3,051)	145	\$12,986 (\$4,251)	842	\$13,167 (\$3,500)	139	\$13,547 (\$5,004)	810	\$13,542 (\$3,534)
Total Aid Awarded	186	\$10,845 (\$2,569)	1,031	\$10,807 (\$2,193)	168	\$10,490 (\$3,467)	944	\$10,811 (\$3,108)	148	\$11,363 (\$5,294)	844	\$12,093 (\$4,628)	141	\$11,985 (\$5,738)	815	\$12,203 (\$4,590)
Grants & Scholarships	186	\$8,720 (\$2,777)	1,031	\$8,029 (\$2,256)	168	\$7,754 (\$3,521)	944	\$7,334 (\$2,985)	148	\$7,901 (\$4,617)	844	\$7,708 (\$3,618)	141	\$7,962 (\$4,7307)	815	\$7,672 (\$3,788)
Loans	186	\$1,606 (\$1,715)	1,031	\$2,037 (\$1,714)	168	\$2,038 (\$1,950)	944	\$2,661 (\$1,994)	148	\$2,917 (\$2,606)	844	\$3,688 (\$2,909)	141	\$3,710 (\$3,317)	815	\$4,076 (\$3,286)
Work Study	186	\$519 (\$490)	1,031	\$741 (\$509)	168	\$697 (\$691)	944	\$816 (\$698)	148	\$545 (\$1,063)	844	\$696 (\$1,131)	141	\$313 (\$855)	815	\$454 (\$1,019)
Total Federal Aid	186	\$3,937 (\$1,884)	1,031	\$4,950 (\$1,995)	168	\$4,465 (\$2,386)	944	\$5,474 (\$2,376)	148	\$5,438 (\$3,703)	844	\$6,515 (\$3,533)	141	\$5,738 (\$3,837)	815	\$6,581 (\$3,766)
Total State Aid	186	\$3,223 (\$1,768)	1,031	\$3,175 (\$1,745)	168	\$2,773 (\$1,889)	944	\$2,934 (\$1,872)	148	\$2,655 (\$2,101)	844	\$3,061 (\$1,947)	141	\$2,465 (\$1,973)	815	\$2,818 (\$1,950)
Total Institutional Aid	186	\$3,126 (\$2,887)	1,031	\$2,299 (\$2,621)	168	\$2,960 (\$2,867)	944	\$2,175 (\$2,583)	148	\$2,846 (\$3,426)	844	\$2,253 (\$3,011)	141	\$3,282 (\$3,576)	815	\$2,505 (\$2,796)
Total Other Aid	186	\$559 (\$1,163)	1,031	\$383 (\$962)	168	\$293 (\$1,021)	944	\$228 (\$935)	148	\$423 (\$1,188)	844	\$265 (\$1,068)	141	\$499 (\$1,478)	815	\$300 (\$1,1742)
Total Pell Aid	186	\$1,887 (\$932)	1,031	\$2,094 (\$925)	168	\$1,611 (\$1,265)	944	\$1,853 (\$1,268)	148	\$1,749 (\$1,520)	844	\$2,046 (\$1,473)	141	\$1,724 (\$1,642)	815	\$2,022 (\$1,607)
Total SEOG Aid	186	\$68 (\$355)	1,031	\$154 (\$498)	168	\$182 (\$579)	944	\$228 (\$608)	148	\$279 (\$890)	844	\$236 (\$814)	141	\$141 (\$626)	815	\$185 (\$700)

Source: Project STEP-UP, 2011; Authors' Calculations

Graduation Status

The final descriptive analysis performed investigates differences in persistence and degree completion by first and last major, and Pell Grant status (see Table 6). The vast majority (83.4%) of students completed their degrees within six academic years. Few differences are found between the six-year graduation rates of students by socio-economic status, and whether or not they initially majored in Engineering or completed a degree in Engineering. Minimal movements between Engineering and Non-Engineering majors provides further evidence that the net price of completing a degree in Engineering was not burdensome to low-income students at the two institutions featured in this study. Thirteen percent of students who initially majored in Engineering or who received a degree in Engineering were low-income students, as compared to approximately 18% in non-Engineering fields. Slightly fewer Pell Recipients completed a degree in Engineering as compared to those who initially declared this major. Only 38 students of the original 6,356 remained enrolled at the original institution of study after six academic years. Over 80% of these students were pursuing degrees in Non-Engineering majors. However, given the low number of observations, this result should be interpreted with caution.

An additional 1,007 students of the original set of students had not completed a degree within six academic years and were no longer enrolled. Unfortunately, the data used in the study does not allow for students who transfer out, drop out, or stop out to be distinguished. Despite this limitation, the results show that of the students who did not graduate, were no longer enrolled, and majored in Engineering, approximately 25% were Pell Recipients as compared to 30% Pell Recipients in non-Engineering.

Limitations

The data used for this study only utilizes data from two public, four-year, predominantly white, doctoral-granting, research universities, thus generalizations should be made with caution. The researchers also restricted the sample in a number of ways, including the decision to only examine in-state residents and students who filed for FAFSA. In addition, using Pell as a proxy for low-socio-economic status excludes other low-income students who did not file for financial aid or those who may be ineligible to apply for FAFSA, such as undocumented students, but who would likely also be adversely affected by differential tuition policies. Detailed sources and amounts of financial aid, within each category highlighted in Tables 4 and 5, was not available in the original dataset, limiting our understanding the exact mix of funding that each student received.

Given that the data represents a cohort of students who entered in the 1999–2000 academic school year, the study does not capture the impact of the most recent tuition increases, which have been exacerbated by higher tuition differentials. For instance, the difference between base tuition and tuition in Engineering fields at one of the two universities featured in the study was nearly \$5,000 for the 2011–2012 academic year, an increase in approximately 900% since 1999–2000. The data used in this study does not

Table 6. Six-year Graduation Status by First Major, Last Major, and Pell Status

	First Major			Last Major		
	No Pell	Pell Recipient	Total	No Pell	Pell Recipient	Total
Graduated Within Six Years						
Engineering	916	137	1,053	745	111	856
<i>% Within Major</i>	87.0	13.1	100.0	87.0	13.0	100.0
<i>% Within Pell Status</i>	21.1	15.0	20.0	17.1	12.2	16.3
Non-Engineering	3,433	776	4,209	3,604	802	4,406
<i>% Within Major</i>	81.6	18.6	100.0	81.8	18.2	100.0
<i>% Within Pell Status</i>	78.9	85.0	80.0	82.9	87.8	83.7
Total	4,349	913	5,262	4,349	913	5,262
<i>% of Total</i>	82.6	17.4	100.0	82.6	17.4	100.0
Still Enrolled						
Engineering	4	3	7	4	2	6
<i>% Within Major</i>	57.1	42.9	100.0	66.7	33.3	100.0
<i>% Within Pell Status</i>	18.2	18.8	18.4	3.0	12.5	15.8
Non-Engineering	18	13	31	18	14	32
<i>% Within Major</i>	58.1	41.9	100.0	56.3	43.8	100.0
<i>% Within Pell Status</i>	81.8	81.3	81.6	81.8	87.5	84.2
Total	22	16	38	22	16	38
<i>% of Total</i>	57.9	42.1	100.0	57.9	42.1	100.0
Did Not Graduate, Not Enrolled						
Engineering	139	46	185	114	41	155
<i>% Within Major</i>	75.1	24.9	100.0	73.5	26.5	100.0
<i>% Within Pell Status</i>	19.3	16.0	18.4	15.9	14.2	15.4
Non-Engineering	580	242	822	605	247	852
<i>% Within Major</i>	70.6	29.4	100.0	71.0	29.0	100.0
<i>% Within Pell Status</i>	80.7	84.0	81.6	84.1	85.8	84.6
Total	719	288	1,007	719	288	1,007
<i>% of Total</i>	71.4	28.6	100.0	71.4	28.6	100.0

Source: Project STEP-UP, 2011; Authors' Calculations

include comparisons to other STEM fields, such as the Physical Sciences, nor the proliferation of tuition differentials in other (non-STEM) fields in recent years (e.g., Architecture, Business, Honors Programs, and Education).

Furthermore, even though the purchasing power of the Pell Grant has not kept up with the rate of tuition increases or inflation, the maximum award has increased in value over the last decade. In 1999–2000, when the maximum Pell Grant was \$3,125, 9.8 million students applied for the Pell Grant and 3.7 million students received the grant (U.S. Department of Education, 2000). Ten years later, in 2009–2010, the maximum Pell Grant was \$5,350, nearly 20 million students applied for the grant, and 8.1 million students received the grant. Recent legislation has increased the maximum Pell Grant amount further to \$5,550 for the 2011–2012 academic year (U.S. Department of Education, 2011).

Implications and Conclusion

Despite these limitations, this study explores how differential tuition pricing may impact low-income students' postsecondary degree completion in Engineering, with a focus on how the source and amount of financial aid can reduce the financial burden to completing postsecondary degrees, even in higher costs majors. The results suggest that the higher cost of enrolling in Engineering programs that feature tuition differentials may be offset by the amount of financial aid awarded to low-income students, but that the source of aid varies across the course of undergraduate study. It is important to note that the net price of attendance to pursue Engineering at the two institutions featured in this study still required a significant amount of low-income students' household incomes, and given changes in financial aid, the net price of attendance does fluctuate over time, particularly for students who do not complete a degree in four years. While a high-tuition, high-aid strategy may offset the higher cost of majoring in Engineering for low-income students, Hu and Hossler (2000) encourage us to rethink this strategy at both public and private institutions of higher education, by considering both students' willingness and ability to pay for their college degree. Furthermore, high-tuition, high-aid strategies are rarely carried out with sufficient funding, which limits the affordability of higher education for low-income students, who are most sensitive to increases in costs of postsecondary education. The latter is likely to impact students' entrance into the universities like the ones featured in this study, as well as their declaration of Engineering majors.

Several practical implications are offered based on the results of this study. In relation to human capital theory and low-income students' price sensitivity levels, the findings draw attention to the need for higher education institutions to examine policies of differential tuition pricing to ensure that adequate financial aid is offered to students interested in pursuing those majors. Postsecondary institutions are encouraged to review their tuition and financial aid policies to determine the benefits and consequences of charging differential tuition rates, particularly for students that are likely to be adversely impacted by differential tuition policies. If possible, funds may be allocated towards need-based financial aid programs at the department, college, and/or institutional level to

strengthen financial aid packages in addition to Pell Grant aid, particularly as costs continue to increase in relation to the value of the Pell Grant award.

Specific to increasing underrepresented students entrance into Engineering, adopting new or modifying existing recruitment programs, including programs aimed at low-income students should be considered. Recruitment into Engineering remains critical to increasing current representation levels of students of color and low-income students. While providing retention services to undergraduate students continues to be important, recruitment and outreach programs such as bridge programs, middle and high school science competitions, and Engineering awareness programs may be key to increasing representation, and ultimately degree completion in Engineering for some underrepresented groups. Finally, the current downward trend of admitting low-income students at four-year institutions further reinforces the need to focus on increasing educational opportunities and creating pathways of access to selective institutions for low-income and minority students (Swail, Cabrera, & Lee, 2004).

Given the complex uses and forms of tuition differential policies and practices, the widening gap between base and differential tuitions, and an overall increase in tuition costs, examining data that is able to capture these recent changes is necessary to understand how differential tuitions may be pricing out low-income students from enrolling in high-cost, high-return fields. There is also a need to explore whether tuition differentials impact low-income students' postsecondary decision and actions, such as whether or not to attend college, pursue a STEM degree, enroll in a less selective institution or program which may be perceived as being more affordable, or attend a community college.

Given that low-income students are debt averse and have higher levels of price sensitivity than other types of students, researchers and university administrators should investigate students' willingness and ability to pay given differential tuition rates and fluctuations in financial aid over the course of a college degree. In this sense, the results of the study lend themselves to future research on how high school students and their families perceive and react to tuition rates, including differential tuition, and the costs of college attendance. In addition to possible empirical investigations, universities should evaluate their current pre-college financial aid counseling and information provided to students and families to assess the extent to which differential tuition charges are understood, as well as to identify ways to reduce potential sticker shock. Without knowing how students and their families perceive, understand, and react to tuition differentials during the college selection process, institutions may remain at a disadvantage in terms of recruiting low-income students into high-cost fields such as Engineering. High schools, particularly high school counselors, may wish to incorporate a college financial literacy component into their repertoire of services for high school students. A program of this nature could help educate students and their families about potential tuition differentials and how to negotiate these complex policies while reducing short-term and long-term financial burdens.

Changes in federal and state support of higher education have produced an uncertain economic climate which may disproportionately impact populations who are likely to benefit the most from additional training and education. As such, any gains made in improving representation among traditionally underrepresented populations within STEM may have been stifled if not completely eradicated within the last decade. Future analysis should be aimed at contextualizing tuition differential policies to determine the economic landscape that the institution and students are operating in. Through contextualization and analysis of tuition and financial aid policies, researchers can work towards highlighting any unintended consequences or impacts of institutional practices.

References

- Advisory Committee on Student Financial Assistance (2010). *The rising report of inequality: How inadequate grant aid limits college access and persistence*. Report to Congress and the Secretary of Education. Washington, DC. Retrieved May 29, 2012, from [http://www2.ed.gov/about/bdscomm/list/acsfa/rpijunea.pdf](http://www2.ed.gov/about/bdscomm/list/acsfa/rpijune.pdf)
- Becker, G. S. (1964). *Human capital: A theoretical and empirical analysis with special reference to education*. New York: National Bureau of Economic Research.
- Becker, G. S. (1975). *Human capital: A theoretical and empirical analysis with special reference to education* (2nd ed.). New York: National Bureau of Economic Research.
- Becker, G. S. (1994). *Human capital: A theoretical and empirical analysis with special reference to education* (3rd ed.). New York: National Bureau of Economic Research.
- Burdman, P. (2005). *The student debt dilemma: Debt aversion as a barrier to college access*. A Discussion Paper for the Institute for College Access and Success. Retrieved May 23, 2012, from <http://cshe.berkeley.edu/publications/docs/ROP.Burdman.13.05.pdf>
- Callendar, C., & Jackson, J. (2008). Does the fear of debt constrain choice of university and subject of study? *Studies in Higher Education*, 33(4), 405–429.
- Committee on Underrepresented Groups and the Expansion of the Science and Engineering Workforce Pipeline. (2010). *Expanding underrepresented minority participation: America's science and technology talent at the crossroads*. Washington, DC: National Academies Press.
- Cook, B. J., & King, J.E. (2007). *Status Report on the Pell Grant Program*. American Council on Education, Center for Policy Analysis. Washington, DC. Retrieved May 7, 2012, from <http://www.acenet.edu/AM/Template.cfm?Section=Publications&Template=/CM/ContentDisplay.cfm&ContentFileID=3434>
- Gandara, P., & Contreras, F. (2009). *The Latino education crisis: The consequence of failed social policies*. Cambridge, MA: Harvard University Press.
- George-Jackson, C. E., Kienzl, G. S., & Trent, W. T. (2008). *Underrepresented students entering STEM fields*. Paper presented at the annual meeting of the Association for the Study of Higher Education. November 5–8, 2008. Jacksonville, FL.
- Goldrick-Rab, S., Harris, D. N., & Trostel, P. A. (2009). Why financial aid matters (or doesn't) for college success: Toward a new interdisciplinary perspective. In Smart, J.C. (Ed), *Higher Education: Handbook of Theory and Research*, Vol. 24, (p.1–45), New York: Springer.

- Heller, D. E. (1997) Student price response in higher education: An update to Leslie and Brinkman. *Journal of Higher Education*, 68(6), 624–659.
- Heller, D. E. (Ed.) (2002). *Condition of access: Higher education for lower income students*. Westport, CT: Praeger Publishers.
- Heller, D. E., & Rogers, K. R. (2006). Shifting the burden: Public and private financing of higher education in the United States and implications for Europe. *Tertiary Education and Management*, 12(2), 91–117.
- Hu, S., & Hossler, D. E. (2000). Willingness to pay and preference for private institutions. *Research in Higher Education*, 41, 685–701.
- Jacobson, L. G., & Mokher, C. (2008). Pathways to Boosting the Earnings of Low-Income Students by Increasing Their Educational Attainment. Prepared for the Bill & Melinda Gates Foundation by The Hudson Institute and CNA.
- King, J. E. (1996). *The decision to go to college: Attitudes and experiences associated with college attendance among low-income students*. Washington, DC: College Board.
- Lassila, N. E. (2012). Effects of tuition price, grant aid, and institutional revenue on low-income student enrollment. *Journal of Student Financial Aid*, 41(3), 24–41.
- Leslie, L. L., & Brinkman, P. T. (1987). Student price response in higher education: The student demand studies. *Journal of Higher Education* 58(2), 181–204.
- Little, M. W., O’Toole, D., & Wetzel, J. (1997). The price differential’s impact on retention, recruitment, and quality in a public university. *Journal of Marketing for Higher Education*, 8(2), 37–51.
- McPherson, M. S., & Shapiro, M. O. (1991) Does student aid affect college enrollment? New evidence on a persistent controversy. *American Economic Review*, 8(1), 309–18.
- Mumpher, M. (2003). The future of college access: The declining role of public higher education in promoting equal opportunity. *The ANNALS of the American Academy of Political and Social Science*, 585, 97–117.
- National Science Foundation (2010). *Science and engineering indicators 2010*. (NSB 10–01) Arlington, VA: National Science Foundation.
- Nelson, G. R. (2008). *Differential tuition by undergraduate major: Its use, amount, and impact at public research universities* (Doctoral dissertation). Retrieved from, <http://digitalcommons.unl.edu/cehsedaddiss/5/>

President's Council of Advisors on Science and Technology (2012). *Engage to excel: Producing one million additional college graduates with degrees in science, technology, engineering, and mathematics*. Executive Office of the President of the United States of America. Retrieved May 21, 2012, from http://www.whitehouse.gov/sites/default/files/microsites/ostp/pcast-engage-to-excel-final_feb.pdf

Project STEP-UP (n.d.). STEM Trends in enrollment and persistence for underrepresented populations. University of Illinois at Urbana-Champaign. <http://stepup.education.illinois.edu/>

St. John, E. P., & Starkey, J. B. (1995). An Alternative to Net Price: Assessing the Influence of Prices and Subsidies on Within-Year Persistence. *The Journal of Higher Education*, 66(2), 156–186.

Swail, W. S., Cabrera, A. F., & Lee, C. (2004). *Latino youth and the pathway to college*. Washington, DC: Pew Hispanic Center.

U.S. Department of Education. (2000). *1999–2000 Title IV/Federal Pell Grant Program: End of year report*. Washington, DC. Retrieved November 4, 2011, from <http://www2.ed.gov/finaid/prof/resources/data/1999-2000pell.pdf>

U.S. Department of Education. (2004). *2003–2004 Title IV/Federal Pell Grant Program: End of year report*. Washington, DC. Retrieved November 4, 2011, from <http://www2.ed.gov/finaid/prof/resources/data/pell0304.pdf>

U.S. Department of Education. (2011). *Fiscal Year 2012 budget summary—February 14, 2011*. Washington DC. Retrieved November 4, 2011, from <http://www2.ed.gov/about/overview/budget/budget12/summary/edlite-section2d.html>

Wetzel, J. N. (1995). *The effect of tuition differentials on student enrollment patterns and university revenues*. Final report of an FIPSE sponsored project, Richmond, VA: Virginia Commonwealth University, ED414833.

This material is based upon work supported by the National Science Foundation (NSF) under Grant No. 0856309. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the NSF. An earlier version of this article was presented at the 2011 Annual Conference of the Association of the Study of Higher Education. The authors would like to acknowledge David Tandberg for his review.

Should I Work or Should I Borrow? A Counterfactual Analysis on the Effect of Working While Enrolled and Debt on Baccalaureate Completion

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Using the 2007-2008 National Postsecondary Student Aid Study, this study tested positively the hypothesis that college students are either likely to acquire debt above the national median or work more than 30 hours a week in order to graduate from a four year degree within six years. These results resonate with the theory of academic capitalism, in which higher education has become a private good that students have to purchase despite governmental programs to provide students with financial aid in the form of grants. This finding has important implications for college affordability.

Loans are the main federal strategy to make college affordable for U.S. citizens, and debt is part of college students' reality. However, it is unclear to what degree student loans promote college attainment (Dowd, 2008). In fact, Hossler, Ziskin, Gross, Kim and Cekic (2009) conducted a comprehensive review of studies on financial aid and noted that:

Surprisingly, perhaps the most important limitation of research on the effects of financial aid on retention is that there are very few studies of the effects of financial aid on graduation. In addition, there is a dearth of research on the effects of...loan debt on persistence and graduation... (p. 391).

Moreover, they demonstrate that the research on financial aid in general is inconclusive due to many contradictory results. Several authors have attributed these mixed results to a series of methodological limitations and biases, most notable the lack of adequate control for self-selection or the endogeneity of aid (Cellini, 2008; Chen, 2008; Dowd, 2008; Hossler, et al., 2009). Similarly, it is unclear the effect of work intensity while enrolled in higher education (Perna, 2010) despite the assumption based on theoretical models of student retention that working 10 to 20 hours on campus will increase integration and persistence (Pascarella & Terenzini, 2005). In light of these challenges and gaps of knowledge, the purpose of this study is to estimate the effect of both debt and working in college on college graduation, while controlling for self-selection bias.

The process of marketization of higher education (academic capitalism) started with changes in student financial aid policy in 1972, when the Higher Education Act of 1965 was amended to give aid to students rather

than institutions, inducing a competition for federally subsidized student tuition dollars among academic institutions. By the 1980s and 1990s, higher education was increasingly conceptualized as a private good, which justified the notion that students should pay for their postsecondary education. This ideology has resulted in an emphasis on federal student loans in the last decades (Slaughter & Rhoades, 2004). In particular, the increase in student borrowing can be attributed to two amendments to the Higher Education Act in the early 1990s, which included increased loan limits and expanded eligibility for loan programs (Education Resources Institute & Institute for Higher Education Policy, 1995). Overall, these changes represent a shift from public to private financing of higher education, making the primary beneficiaries of a college education those who can afford it or are willing to acquire education debt (Callender & Jackson, 2005; Heller & Rogers, 2006; Johnstone, 2004).

However, a postsecondary degree brings benefits not only for individuals but also society (Kim, 2007), which questions the federal initiatives favoring education as a private good. Income is higher and unemployment rates are lower among those with a college degree. In 2008, the median family income for those with a bachelor's degree or more was \$101,099, compared to \$49,414 for those with a high school diploma (College Board, 2009). According to the National Center for Education Statistics (NCES), in 2005, unemployment rates among individuals over 25 years old with a baccalaureate degree was 2.3%, 4.5% among those with some college education but no degree, and 5.1% among those with a high school diploma. Individuals with college degrees enjoy better health, greater life expectancies, and improved qualities of life (Baum & Payea, 2004; Bowen, 1997; Institute for Higher Education Policy, 1998). Also, those with postsecondary degrees are more likely to engage in civic activities (Bowen, 1997). For postsecondary institutions, successful degree completion of their students validates their mission, attracts students to enroll, and fosters public support, especially from the state, alumni, and parents. The economic competitiveness of the country increasingly depends on a skilled workforce with a postsecondary education who are capable of dealing with the demands of the global market. Also, opening the doors of postsecondary education to disadvantaged groups is an effective means to reduce social inequalities (Bowen, 1997; Chen & DesJardins, 2010; Kim, 2007; Park, 1996).

According to the U.S. Census Bureau, minorities are one-third of the American population and are expected to become the majority in 2042, with the nation projected to be 54% minority in 2050. Thus, it is imperative that the government tailors their postsecondary education efforts towards policies that ensure postsecondary attainment for the youth, especially minorities, who will be the base of the future workforce of this country. However, there are significant postsecondary attainment gaps in the U.S. among population groups. In 2008, among the total population between ages 25 and 29, 27% had at least a bachelor's degree. Nonetheless, 33% of Whites, 17% of Blacks and 11% of Hispanics in this age group had at least a bachelor's degree. Melguizo (2008) found a consistent graduation gap of 20 points between African Americans and Hispanics in relation to Whites, with African Americans and Hispanics

showing completion rates of 47% and 46% respectively, whereas Whites have a graduation rate of 67%.

There are a variety of reasons behind these gaps including lack of aspirations and support, poor academic preparation, lack of adequate engagement and commitment, and financial circumstances (Chen, 2008). This study focuses on the latter, and that is, college affordability. In the United States, the real cost of a college education has climbed almost 30% in the past 10 years and shows no sign of stabilizing in the near future (Cellini, 2008). Paying for college is more challenging for low income families (Swail, Redd, & Perna, 2003). According to a 2007 report from NCES, the percentage of African American, Native American, Hispanic and other Pacific Islander families with children in poverty were higher than White and Asian families (Kewal-Ramani, Gilbertson, Fox & Provasnik, 2007). In 2006, the median household income of African American families was \$31,969, and \$37,781 for Hispanics. In contrast, White households had a median income of \$52,423 (DeNavas-Walt, Proctor, & Smith, 2007). To meet the costs of college, the majority of students apply for financial aid and many students work while enrolled. Studies consistently show that retention rates are higher for students who work a modest number of hours per week (10 to 15). Unfortunately, the proportion of full-time, traditional-age undergraduates working between 20 and 34 hours per week has increased to about 21% in 2007. Today nearly one in 10 full-time, traditional-age undergraduates is employed at least 35 hours per week (Perna, 2010).

According to the College Board (2009), in 2009-2010, published in-state tuition and fees at public four-year institutions rose 6.5% and 4.3% at private non-for-profit institutions compared to the rates in 2008-2009. However, only one third of students paid the full cost of higher education, while two thirds paid less due to financial aid and tax discounts. Students' financial need has risen over the past decade. In particular, even after taking into account family contributions and all available grants and loans, low-income students are especially likely to face substantial unmet need (Long & Riley, 2007). Furthermore, in recent years, financial aid policies have shifted emphasis from increasing the educational opportunity for low-income students towards focusing on affordability concerns for students who come from middle-income families. As a result, loans, merit-based aid and education tax credits are increasingly replacing need-based aid (The National Center for Public Policy and Higher Education, 2006). In the last decade, grant aid to full time students increased an average of 3.4% per year after adjusting for inflation, while federal loans grew 4.0% a year. In 2008-09, full time undergraduate students received an average of \$10,185 in financial aid, consisting of \$5,041 in grant aid and \$4,585 in federal loans (College Board, 2009). Among 2007-08 graduates receiving a bachelor's degree, 66% graduated with loan debt. The median debt for all bachelor's degree recipients was \$11,000. But for two-thirds of borrowers who earned a bachelor's degree, the median loan debt was \$20,000, and another 10% had borrowed \$40,000 or more (College Board, 2008). Clearly, financial aid that does not meet the financial needs of students can have a negative effect on persistence due to dissatisfaction with those financial circumstances. This compromises students' commitments to

participate in their college environment, affecting integration into the academic community. Students who drop out of college because of financial hardships are more challenged financially than if they had never entered college because of the accumulated debt (Kim, 2007).

The Impact of Financial Aid and Working While on Education Attainment

Despite the abundance of contradictory results and methodological challenges in financial aid research, there are a few results that are consistent in the literature. Studies on the relationship between financial aid and college student outcomes are as varied as the forms of financial aid available (i.e., grants, loans, merit-based, need based, etc.) and outcomes (i.e., enrollment, retention, completion, job placement, etc). However, most of the research has focused on college initial enrollment and retention (e.g., Callender & Jackson, 2005; Dynarski, 2004; McDonough & Calderone, 2006; Mendoza & Mendez, in press ; Paulsen & St. John, 2002; Perna, 2000; St. John, Cabrera, Nora, & Asker, 2000; Singel, 2002). A common theme across these studies is that different types of financial aid impact students differently by socio-economic statuses (Chen & DesJardins, 2010; Dowd, 2008; Mendoza & Mendez, in press; Nora, Barlow, & Crisp, 2005) as well as U.S. immigrant and citizenship status (Pachon & Zarate, 2005; Tornatzky, Cutler, & Lee, 2002).

Overall, there seems to be a positive correlation between low-income and minority student persistence and adequate financial aid; however, this effect changes by race/ethnicity (Chen & DesJardins, 2010). St. John, Paulsen, and Carter (2005) explain that this differential responsiveness to aid may be due to some culturally constructed value of aid and price, independent of the associated direct effects. From a rational-choice perspective, students engage in a cost-benefit analysis that shapes their commitment to continue with their program degree. This analysis includes student satisfaction with their ability to pay for college and perceptions of their financial reality (St. John, Hu, & Weber, 2001-2002). For some students, taking on the burden of a loan negatively affects this perception, which then creates a negative effect on college outcomes such as initial enrollment or persistence. This is consistent with previous studies indicating that low-income and minority students are much less willing to borrow to attend college (e.g. Olivas, 1985; St. John et al., 2005).

These assertions agree with the notions of social and cultural capital surrounding students' college decisions in light of financial aid. Access to information about financial aid options (social capital) as well as the cultural meaning of money and a college education (cultural capital) are factors that shape students' decision to apply for financial aid and acquire debt. For example, past researchers have explored how social networks surrounding students (i.e., school counselors, teachers, peers, and family members) either facilitate or hinder valuable information on college opportunities and respective funding options, which ultimately affects students' college going decisions (Archer & Hutchings, 2000; McDonough, 1994; McDonough & Calderone, 2006; Nora, Barlow & Crisp, 2005; Perna, 2000; St. John, 2003, 2006; St. John et al., 2000; Tierney & Venegas, 2006; Trent, Lee, & Owens-Nicholson, 2006).

On the other hand, studies highlighting the socially constructed meaning of money emphasize the borrowing beliefs and values of students as well as the associated behaviors from those beliefs (Callender & Jackson, 2005; McDonough & Calderone, 2006). For example, an important consideration is students' attitude towards risk and rewards of borrowing in order to attend college, particularly as it relates to potential for loan default and high debt burden (Gladieux & Perna, 2005). African Americans and Latinos as well as low income students have higher risk aversion compared to other groups and thus, may miss the opportunities to access or continue higher education (Price, 2004). Risk aversion is associated with the psychological stress of future loan repayment (Archer & Hutchings, 2000; Nora et al., 2005) and students' perceptions of their ability to pay for college (Cabrera, Stampen, & Hansen, 1990; Metcalf, 2005; St. John et al., 2000). In the same vein, Dowd (2008) discusses the notion that students' self-efficacy in relation to college achievement and future earnings affects their decision to acquire debt. Also, as an aspect of cultural capital, research has shown that a measure for willingness to acquire debt for college is whether or not parents have a property mortgage or own a home. This finding indicates that for some, debt is a worthwhile investment that will pay off with future returns (Dowd, 2008). Degree completion and non-completion are also significantly related to borrowing tendencies, with degree completions at public and private colleges being associated with doubled loan amounts between the freshman and senior year (Price & Davis, 2006).

Studies have shown inconclusive results regarding the impact of loans on persistence. For example, in one study, loans had a negative effect on retention at one four-year institution (DesJardins, Ahlburg & McCall, 2002); however, in another study, government-subsidized loans had positive effects on persistence at another institution (Singell, 2002). In a study by the University System of Maryland and the University of Wisconsin System, loans have no significant effect on persistence (Titus, 2007). Some studies suggest that as the amount of debt increases, the probability of persisting at four-year colleges decreases (Somers & Cofer, 1997). However, other findings suggest exceptions and mixed results that show moderate or weak connections to persistence (Cofer & Somers, 1999; Dowd & Coury, 2006). These are just a few examples of studies showing inconclusive results regarding the effects of loans on persistence.

Research on financial aid has been inconclusive in great part because of omitted variable bias and the fact that statistical estimates are generally confounded by interactions between students' career expectations, enrollment choices, financing strategies and self selection to certain types of aid. These interactions are also affected by differential risks of indebtedness or willingness to incur debt due to varying cultural and social values across groups by social class and race/ethnicity (Cellini, 2008; Chen, 2008; Dowd, 2008; Hossler et al., 2009). In particular, the possibility of self-selection bias influencing the analysis of the impact of student loans is significant given that loans must be repaid. In light of these criticisms, recent studies have started to address these issues in their analysis using techniques such as propensity score matching, fixed effects and even history analysis (Chen & DesJardins, 2010; Mendoza & Mendez, 2008;

Mendoza & Mendez, in press). Another source of bias is related to the fact that studies normally do not account for the fact that students tend to change financial aid packages from term to term (Chen, 2008).

There is a general consensus in the literature indicating that working between 10 to 15 hours a week while enrolled is beneficial for students, especially if they work on campus (Perna, 2010). However, based on an extensive review of the literature of studies on college student employment conducted before 2003, Riggert, Boyle, Petrosko, Ash and Rude-Parkins (2006) argued that this literature also presents a host of contradictory results. In particular, these studies concluded that working while enrolled is beneficial, neutral or detrimental to the progress of students in college regardless of whether students work off-campus or on-campus and the amount of hours worked per week. They attributed these inconsistencies to methodological challenges and lack of clear conceptual frameworks. More recent studies have found that working 20 hours a week or more negatively impact the academic performance of students (Kulm & Cramer, 2006; Miller, Danner, & Staten, 2008).

The reality is that most college students are now increasingly working longer hours than the recommended to meet the costs of college attendance (Riggert, et al., 2006). According to NCES, in 2007, 45 % of undergraduates between the ages of 16 and 24 attending college full time worked while enrolled. Of these, about 21 % worked between 20 and 35 hours a week and nearly 1 in 10 full-time, traditional-age undergraduate is employed at least 35 hours per week. Moreover, after controlling for attendance status, the distribution of undergraduates by the number of hours worked is similar at community colleges and four-year public and private institutions (Perna, 2010). Given the proliferation of working while enrolled and the inconclusive results from previous studies, there is a clear need for research in this area in order to understand the extent of the implications of student employment.

Research Design

Theoretical Framework

This study uses Rong Chen's framework on the differential effects of financial aid on student persistence (2008). This framework integrates different approaches to the issue of student retention including sociological, psychological, economic, and organizational perspectives. Based on an extensive literature review on student retention, Chen's model is based on the premise that the effects of financial aid on persistence should be studied by subgroups of students characterized by socio-demographic variables such as socio-economic status and race/ethnicity. In particular, Chen recommends including in the analysis interaction terms between subgroups of students and various forms of financial aid in order to damper main effects bias.

Chen's framework identifies the following eight constructs that impact student persistence: 1) Student background characteristics such as gender, age, race/ethnicity, family income, and parental education. 2) Educational aspiration. 3) Pre-college preparation including academic measures such as high school GPA, ACT/SAT scores, and curriculum. 4) College experience including major, GPA as well as social and academic integration. 5) Organi-

zational characteristics such as type of institution attended. 6) Financial factors such as students' perceptions about college costs, price, financial aid, and labor market conditions. 7) Time in college or class level. Lastly, 8) interactions between groups (i.e., income levels, race/ethnicity, and time in college) with types of financial aid.

In addition, this study used literature on college student debt (Archer & Hutchings, 2000; Dowd, 2008; Hossler et al., 2009; Nora et al., 2005; Price, 2004) to determine the factors associated with student debt. As such, the constructs that impact students' indebtedness used in this study are: 1) Social capital in the form of information about borrowing that students might acquire through peers, family members, counselors or other sources such as the Internet and whether or not the student has proficiency in English to comprehend such information. 2) Cultural capital associated with the value of borrowing as a means to acquire assets and future returns. This construct is associated with family values about a college education as an investment, which translates into the willingness to acquire debt and the expectation of receiving parental help for loan repayment. 3) Unmet need defined as price of going to college minus expected family contribution and grants. And 4) expected returns in the form of better future earnings due to a college education; in particular, those expecting a professional degree are likely to incur more debt (Dowd, 2008). The following summary describes how this study expands and operationalizes Chen's (2008) eight constructs and college student debt.

Student Individual Characteristics

There is a general consensus in the literature that demographic characteristics play an important role on student outcomes (Dowd, 2008; Hossler et al., 2009). The most studied individual characteristic within the financial aid area of research is income. Overall, several studies have shown a strong positive correlation between student enrollment, retention and graduation with income (Chen & DesJardins, 2008; McDonough & Calderone, 2006). More recent studies are finding that income moderates the impact of financial aid on student outcomes (DesJardins & McCall, 2010; Mendoza, Mendez & Malcolm, 2009; Mendoza & Mendez, in press). However, the definition of income depends on whether the student is independent or dependent. Therefore, several studies controlled for dependency status in their analysis and included individual or parental income accordingly (Arulsevan, Mendoza, Boginski, & Pardalos, 2009; Kim, 2007). Ishitani (2006) found that students with family incomes over \$50,000 are more likely to graduate in any period than those from lower income families.

Socio-economic status is associated with individual income but embraces a series of characteristics that translate into students' values, attitudes and behaviors towards postsecondary education. For example, level of parental education is a factor that influences college outcomes. In particular, research has consistently shown that first-generation students have different college enrollment and persistence behaviors than those with at least one parent having a bachelor's degree (Levine & Nidiffer, 1996; Paulsen & St John, 2002). Race/ethnicity has been found to impact the role

of financial aid on student retention. In particular, African American, Native American and Hispanic students are less likely to enroll, persist and graduate from college. Moreover, they are less likely to benefit from financial aid such as loan and merit-based aid (e.g. Arbona & Nora, 2007; Chen & DesJardins, 2010; Hu & St. John, 2001). However, income moderates the effect of race/ethnicity on financial aid outcomes (Mendez & Mendoza, 2008; Mendez, Mendoza, & Malcolm, in press; Mendoza & Mendez, in press). Finally, only a few studies have controlled for gender and age. However, there is evidence that age is negatively correlated with student achievement (Arulselvan, et al., 2009; Chen & DesJardins, 2008). In regards to the influence of gender, previous works report conflicting results of the effect of gender on student outcomes but some studies have shown that women tend to have higher probability of attainment than men (DesJardins, Ahlburg & McCall, 2002).

Academic Aspirations

Students' highest degree expected by students influence their level of commitment to obtaining a degree (Burton & Ramist, 2001; Kim, 2007; Tinto, 1987). Therefore, measures of academic aspirations are important factors in student retention and graduation. From an economic perspective, the more likely students are to benefit from a college degree, the more likely they are to aspire to complete their education. In this sense, a college education is viewed as an investment (Kim, 2007).

Pre-college Preparation

High school academic preparation has been considered an important factor affecting student performance in college (Astin, Tsui, & Avalos, 1996; Bowen & Bok, 1998; Burton & Ramist, 2001; Pascarella & Terenzini, 1991). Several measures have been used to control for students' pre-college preparation such as high school rank, high school GPA and standardized ability test such as ACT scores. From all these, recent studies have shown that only ACT scores appear to have an independent effect on college performance (DesJardins et al., 2002). Human capital theory assumes that students' ability lowers educational costs and increases the demand for education (DesJardins & McCall, 2010; Dynarski, 1999; Stampen & Cabrera, 1988).

College Experiences

According to Tinto's theory of college student retention (1993), students bring to college individual characteristics that impact their initial commitment to the entering institution, which in turn, affects their future commitments to the institution. This continued commitment depends on the level of social and academic integration they experience over time. The greater a student's commitment is to the institution; the greater the chances that the student will persist through graduation. However, Braxton (2000) tested Tinto's theory and concluded that academic integration was not a factor in students' commitments and that the experiences of residential students are very different from commuter students. Nevertheless, research continues to demonstrate that college GPA is a strong predictor of

persistence and graduation (Chen & DesJardins, 2008; DesJardins et al., 2002; Mendoza & Mendez, in press; Mendoza, Mendez & Malcolm, 2009). In addition, academic integration is commonly found to be related to student retention. Common measures of academic integration include level of student participation in study groups, social contact with faculty, meeting with an academic advisor, or talking with faculty about academic matters outside of class. Social integration is commonly measured as whether students participate in a variety of social activities such as fine arts and social events, intramural and varsity sports, clubs and student organizations (Kim, 2007). Other important measures of students' level of involvement are related to work experiences while enrolled, living arrangements and enrollment status. In particular, whether students are enrolled part time or full time and whether students live on-campus or off-campus affect integration (Braxton, 2000; Kim, 2007).

Institutional Characteristics

Students enrolled in different colleges within an institution have different experiences, which can result in different graduation rates based on the fit of students academically and socially. Students' fit and integration relate to institutional climate, which has been found to be a significant predictor of student dropout rates (Weidman, 1989). Studies have measured institutional climate by aggregating individual values of students' academic and social integration during college. Other institutional variables used include enrollment size, institutional selectivity, major, institutional control (public versus private), tuition, and percentage of minorities enrolled (Astin & Oseguera, 2002; Kim, 2007). For example, Melguizo (2008) found that students attending more selective institutions are more likely to graduate. This is also true for African American and Hispanic students, which supports the argument that minorities do benefit from attending elite institutions (Alon & Tienda, 2005).

Time in College

The temporal dimension of college outcomes is increasingly gaining attention in the literature (Chen, 2008; Chen & DesJardins, 2010). Several studies have shown that retention patterns differ by academic class level. In fact, most of attrition takes place during the freshman year (Mendoza & Mendez, in press; Nora et al., 2005). Delayed enrollment after high school graduation has a significant association with dropout or graduation rates (Ahlburg, McCall, & Na, 1997; DesJardins et al., 2002). This study used a terminal measure for both debt (cumulative debt) and a terminal measure of persistence (graduation) at the end of the observation period in order to avoid temporal bias.

Other Factors

In addition, this study used literature on college student debt (Archer & Hutchings, 2000; Dowd, 2008; Hossler et al., 2009; Nora et al., 2005; Price, 2004). As such, the constructs that impact students' indebtedness used in this study are: 1) Social capital in the form of information about borrowing that students might acquire through peers, family members,

counselors or other sources such as the Internet as well as whether students have proficiency in English to comprehend such information. 2) Cultural capital associated with the value of borrowing as a means to acquire assets and future returns such as owning a home or having a home mortgage. This construct is associated with family values about a college education as an investment, which translates into the willingness to acquire debt and the expectation of receiving parental help for loan repayment. 3) Unmet need defined as price of going to college minus expected family contribution and grants. And 4) expected returns in the form of better future earnings due to a college education; in particular, those expecting a professional degree are likely to incur more debt (Dowd, 2008). Finally, this study included covariates related to students' employment experiences as well as reasons to work while enrolled.

Data Source, Sample and Population

This study used the 2007-2008 National Postsecondary Student Aid Study (NPSAS:08) collected by NCES to produce reliable national estimates of characteristics related to financial aid for postsecondary students such as how students and their families pay for postsecondary education, and to describe some demographic and other characteristics of those enrolled. Dating back to 1987, the survey is administered every three to four years and is the most inclusive, nationally representative survey related to postsecondary financial aid. The ultimate goal of these surveys is to address policy questions around the rise of financial aid programs in the last two decades (Wei, Berkner, He, Lew, Cominole & Siegel, 2009). NPSAS:08 is a complex survey representative of those enrolled in all types and levels of postsecondary institutions in the nation NPASAS:08 variables used in this study are listed in Table 1.

The sample for this study included U.S. dependent undergraduate students enrolled for the first time in a four-year degree granting institution in the academic year 2002-2003 seeking their first bachelor's degree and with any amount of debt (weighted N=2,489.5). U.S. dependent students were selected because foreign students do not qualify for most financial aid. The decision not to include independent students was based on the notion that these students tend to be nontraditional students and thus, behave very differently than dependent students, especially in relation to finances and other areas such as career goals, attendance patterns, and type of institutions attended (Arulselvan, et al., 2009). In addition, in order to target traditional students this study included dependent students that have been enrolled for the first time in postsecondary education for six years at the time when the survey was conducted.

Hypotheses

The burden of debt depends on the financial circumstances of individuals and the perceptions about it. For example, a debt of \$40,000 is perceived differently for someone with a family income of \$100,000 than for someone with a family income of \$50,000. Therefore, I used a relative measure of debt in order to reflect these differences. In particular, I created the measure *Debt/EFC*, where *Debt* refers to the cumulative undergraduate debt amount by the end of 2008 and *EFC* is the Expected Family Contribution index in 2007-2008, which is used by the federal

Table 1. Covariates Used to Build the Models Based on Theoretical Constructs

Construct	Variable
Student individual characteristics (including cultural capital)	Age as of 12/31/07
	Race/ethnicity (with multiple) and gender
	English is the primary language
	Parent's highest education level
	Parents own home or pay mortgage
Pre-college preparations	Adjusted Gross Income (AGI)
	Earned Advanced Placement credit in high school
	Grade point average in high school
	Delayed enrollment into PSE-number of years
Academic aspirations	SAT derived combined score
	Highest level of education ever expected
College experiences	Residence while enrolled
	Attendance pattern
	Grade point average
	Field of study: undergraduate
Institutional characteristics	Carnegie-Basic classification collapsed
	Percentage of minorities
Finances including related cultural and social capital	Student budget (attendance adjusted)
	Other financial support received
	Aid total amount
	Help from parents: tuition and nontuition
	Job: earnings from work while enrolled (excluding work-study/assistantship)
	Expect help with repaying student loans
	Information about financial aid
Job experiences and reasons for working	Job: related to major (degree)
	Job affects school: helped with career preparation (student)
	Job affects school: limited access to campus facilities (student)
	Job affects school: limited the class schedule (student)
	Job: effect on grades (student)
	Job: hours worked per week (excluding work-study/assistantship)
	Job: located primarily on or off campus
	Primary role as student or employee (including work-study/assistantship)
	Reason for working: earn spending money
	Reason for working: gain job experience
	Reason for working: minimize debt
Reason for working: parents' expectations	
Reason for working: pay educational expenses	
Reason for working: pay living expenses	
Reason for working: to send money home	

government to determine financial need of college students and allocate aid accordingly. The Expected Family Contribution (EFC) is how much money a dependent student's family is expected to contribute to college education for one year. It is based on family taxed and untaxed income, assets, and benefits (i.e., unemployment or Social Security) as well as family size and the number of family members who will attend college or career school during the year in question. For example, a $Debt/EFC=2$ means that the student's cumulative undergraduate debt is twice as much as what her family is expected to contribute for college on a given year. I calculated this number for all cases in the dataset and found out that the median was four; that is a debt of four times students' EFC. In addition, after preliminary exploratory analysis, I found that there were significant differences in graduation rates when students worked more than 30 hours a week. Given this and the purpose of this study, I formulated the following three hypotheses:

- I. Students with a ratio $Debt/EFC$ above the median are more likely to graduate within six years.
- II. Students with a ratio $Debt/EFC$ above the median work less than 30 hours a week (excluding work-study) while enrolled.
- III. Students who work less than 30 hours a week (excluding work-study) while enrolled are more likely to graduate within six years.

Analysis

The main analytical strategy was descriptive statistics and a quasi-experimental design using propensity score stratification (Morgan & Winship, 2007). Propensity score techniques are particularly useful to damper self-selection bias in by mimicking an experimental design with randomized assignments to the variable of interest. This study followed the methodology suggested by Hahs-Vaughn and Onwuegbuzie (2006) for conducting propensity score analysis using complex survey data. A detailed description of the analysis is provided in the Appendix.

Limitations

Most of the limitations of this study are common limitations in social science research such as the impossibility to accurately measure all explanatory variables. Also, given that the dataset was not specifically designed for this study, it suffered from omitted variables. In particular, the dataset did not include measures of social and academic integration. Nevertheless, the variables available in the dataset are extensive and I tried to include as many covariates as possible in the calculation of the propensity scores, which is one of the advantages of this methodology. Another limitation is that the dataset is cross-sectional, which is particularly problematic given that students could change their financial aid from term to term. To damper this limitation, I decided to use a terminal measure related to the treatment at the end of the six year period of the survey, and that is cumulative debt. Also, I measured the final outcome, graduation, as opposed to retention, which also changes from term to term. Another limitation is that some of the variables were based on self-reported information.

A final limitation has to do with methodological constraints. Given that the treatment must be dichotomous based on the methodology employed in this study, I decided to include only students with any amount of debt and create a treatment that would place students in two groups, those with Debt/EFC above or below the median. This prevented me from drawing conclusions between students with debt and no debt. A better design would have been to have a categorical treatment variable to compare students with various degrees of debt, including no debt.

Results

First I present an overview of frequencies and means of the dependent, treatment, and covariate variables (Tables 2 & 3) followed by a discussion of crosstabulations between the dependent and treatment variables by income and race/ethnicity and gender (Tables 4, 5, 6, & 7). Then I present the results from the counterfactual models (Tables 8, 9, & 10). All the descriptive statistics and crosstabulations are weighted to reflect population estimates.

Descriptive Statistics Summary

More than half of the students in the sample completed their degree program in six years by 2007-2008 (60.8%). In this same year, 35.7% of students had a ratio of Debt/EFC above the median, which is four times what families were expected to pay during that year. Also, 30.8% of students worked more than 30 hours a week (see Table 2).

In 2007-2008, the estimated mean cost of attendance for students in this study was about \$16,264, who received on average an estimated amount of \$10,997 in financial aid, including loans. However, 5.2% of students did not have information about financial aid. The estimated mean of the EFC for these students that year was \$10,644. Most of the students, 80.6%, expected help from parents to pay tuition and/or other expenses; but only 26.5% expected help with repaying their loans. The students in the dataset had an average cumulative debt on all undergraduate loans of \$21,905 (see Table 3).

More than half of students worked while enrolled (about 58%) and did so almost 19 hours a week on average and earned an estimated mean of \$5,952 excluding work-study in 2007-2008. From these, 82.0% of students worked to meet the expenses of going to college including earning spending money, minimizing debt, paying educational and living expenses, and sending money home. However, students worked for other reasons as well, such as gaining job experience (43.7%) or to meet parents' expectations (23.5%). Based on students' reports, for 52.1% of students said their jobs were not related to their major, for 33.3% their jobs did not help them with career preparation, for 65.6% their jobs were located off campus, for 32.5% their jobs had negative effects on their grades, for 64.8% their jobs affected class scheduling, and for 53.8% their jobs affected access to campus facilities.

Based on the Carnegie-Basic classification of postsecondary institutions, doctoral granting institutions enrolled the largest number of the students in the sample (50.2%). The estimated mean of percentage of minorities at

Table 2. Estimated Frequencies of Categorical Variables

Variable	Estimate (%)	Standard Error (%)
Completed degree program in 2007-2008		
Yes	60.8	1.5
Debt/EFC		
Above the median (4)	35.7	1.2
Work Intensity		
More than 30	30.8	1.3
Race/ethnicity and gender		
American Indian or Alaska Native or Pacific Islander	1.0	0.2
Asian male	2.9	0.5
Asian female	2.0	0.3
Black or African American male	4.5	0.5
Black or African American female	7.5	0.7
Hispanic or Latino male	4.5	0.5
Hispanic or Latino female	6.8	0.7
White male	34.7	1.2
White female	34.4	1.3
Other	1.7	0.3
English is the primary language		
No	8.9	0.8
Parents' highest education level		
Do not know parents' education level	1.5	0.3
Did not complete high school	3.0	0.4
High school diploma or equivalent	20.4	1.0
Less than two years of college	11.1	1.1
Associate's degree	9.7	0.7
2 or more years of college but no degree	5.3	0.6
Bachelor's degree	26.1	1.2
Graduate degree	22.9	1.9
Parents own home or pay mortgage		
No	13.4	0.8
Earned Advanced Placement credit in high school		
No	76.4	1.1
Grade point average in high school		
1.0-1.4 (D to C)	1.4	0.4
2.0-2.4 (C to B)	17.9	1.5
3.0-3.4 (B to A)	80.8	2.4
Highest level of education ever expected		
Bachelor's degree	29.9	1.2
Post-BA or post-master certificate	2.4	0.4
Master's degree	49.2	1.3
Doctoral degree	6.3	0.7
First-professional degree	11.8	0.9

Table 2 cont. Estimated Frequencies of Categorical Variables

Variable	Estimate (%)	Standard Error (%)
Residence while enrolled		
On campus	17.2	1.0
Off campus	58.4	1.4
Living with parents	17.0	1.0
Attended more than one institution	7.4	0.6
Attendance pattern		
Full-time/full year, 1 institution	43.6	1.4
Full-time/full year, 2+ institution	4.1	0.4
Full-time/part year	21.3	1.2
Part-time/full year, 1 institution	14.2	0.9
Part-time/full year, 2+ institution	1.5	0.2
Part-time/part year	15.5	1.0
Field of study: undergraduate		
Humanities	13.2	0.9
Social/behavioral sciences	15.0	0.8
Life sciences	9.4	0.8
Physical sciences	1.3	0.3
Math	0.8	0.2
Computer/information science	2.4	0.5
Engineering	7.6	0.7
Education	9.6	0.7
Business/management	20.4	1.0
Health	5.8	0.5
Vocational/technical	1.1	0.2
Other technical/professional	13.4	0.9
Carnegie-Basic classification collapsed		
Research & Doctoral	50.2	2.1
Master's	39.1	2.0
Baccalaureate	10.7	0.7
Help from parents: tuition and nontuition		
No help from parents	19.4	1.0
Help with tuition only	5.1	0.5
Help with nontuition expenses only	31.0	1.3
Help with both tuition & nontuition	44.5	1.3
Expect help with repaying student loans		
Yes	26.5	1.0
Information about financial aid		
No	5.2	0.6
Other financial support received		
Yes	10.4	0.8

Table 2 cont. Estimated Frequencies of Categorical Variables

Variable	Estimate (%)	Standard Error (%)
Job: related to major		
No	52.1	1.2
Job affects school: helped with career preparation		
No	33.3	1.2
Job affects school: limited access to campus facilities		
No	46.2	1.3
Job affects school: limited the class schedule		
No	35.2	1.2
Job: effect on grades		
Positive effect	18.3	0.9
Negative effect	32.5	1.2
No effect	25.7	1.0
Job: located primarily on or off campus		
On campus	8.3	0.7
Off campus	65.6	1.4
Both on and off campus	4.2	0.5
Primary role as student or employee		
Student working to meet expenses	82.0	1.1
Employee who decided to enroll in school	1.6	0.3
Reason for working: earn spending money		
Yes	62.5	1.3
Reason for working: gain job experience		
Yes	43.7	1.3
Reason for working: minimize debt		
Yes	41.1	1.3
Reason for working: parents' expectations		
Yes	23.5	1.1
Reason for working: pay educational expenses		
Yes	54.8	1.3
Reason for working: pay living expenses		
Yes	64.7	1.4
Reason for working: to send money home		
Yes	4.3	0.4

Table 3. Estimated Means of Continuous Variables

Continuous Variables	Mean Estimate	Standard Error
Age as of 12/31/07	22.3	0.0
Adjusted Gross Income (AGI)	68,576.9	1106.4
Delayed enrollment - number of years	0.03	0.006
SAT derived combined score	1,003.1	6.2
Grade point average	290.3	1.8
Percentage of minorities at institution	23.6	0.7
Student budget (attendance adjusted)	16,264.1	288.4
Aid total amount	10,997.0	229.9
Job: earnings from work while enrolled (excluding work-study/assistantship)	5,952.1	203.3
Job: hours worked per week (excluding work-study/assistantship)	18.7	0.4
Amount still owed on all undergraduate loans	21,905.4	367.4
Expected Family Contribution (EFC composite)	10,644.3	259.0

students' institutions was 23.6%. Students' GPA and SAT score estimated mean was 2.9 and 1003.1, respectively. The vast majority of students did not delay enrollment to postsecondary institutions after high school graduation and the mean age estimate in 2007-2008 was 22.3 years old. Only 17.2% of students lived on campus by the time of the survey and 43.6% attended full time at one institution. The most popular fields of study were business/management (20.4%) followed by social/behavioral sciences (15.0%), humanities, (13.2%), and other technical/professional (13.4%). The majority of students expected to have a graduate degree (70.1%), particularly 49.2% expected to earn a master's degree. In terms of academic performance in high school, 23.6% earned Advanced Placement credit and 80.8% had a GPA above B.

Overall, 69.1% of students were White, 12.0% African American, 11.3% Latinos, 4.9% Asian, and 1.0% American Indian or Alaska Native or Pacific/Islander. The distribution across gender was different for African Americans and Hispanics, with 3% and 2.8% more females in both cases respectively. English was not the primary language of 8.9% of students. In terms of socio-economic status, 13.4% of students' parents did not own a home or pay mortgage, and the highest education level for 51.0% of students' parents was a bachelor's or graduate degree. The mean estimate of the adjusted gross income of students in the set was \$68,577.

Cross-tabulations Summary

The distribution of income levels across race/ethnicity and gender varied significantly among students in the dataset with a few identifiable patterns (see Table 4). White students from both sexes were evenly distributed in all

Table 4. Racial/Ethnic and Gender Distribution by Income Levels

Race/Ethnicity	Income Levels (%)				
	\$25,000 or less	\$25,001-\$50,000	\$50,001-\$75,000	\$75,001-\$100,000	\$100,001 or more
Asian male	33.3	39.8	12.1	9.0	5.9
Asian female	27.5	43.6	9.0	14.4	5.6
African American male	28.4	26.5	14.8	15.6	14.7
African American female	21.7	45.7	14.6	9.1	8.9
Hispanic or Latino male	31.9	16.5	30.9	8.0	12.7
Hispanic or Latino female	21.4	34.9	16.4	11.9	15.4
White male	10.1	22.2	21.3	24.8	21.7
White female	9.9	25.5	24.3	20.1	20.1

income brackets above \$25,000 (about 20-25% in each income bracket). However, about 10% of White students had an income of \$25,000 or less, which represents the group with the lowest percentage of students in the lowest income bracket. Except for White students, there were significant sex differences within race/ethnic groups and across income levels. The group with the largest representation in the lowest income bracket was Asian males (33.3%). The biggest sex disparities within groups were found among Hispanics and African Americans. Around 40-60% of students of all races/ethnicities regardless of sex fell within the income bracket \$25,001-\$75,000 and around 20-45% fell within the bracket \$75,001-\$100,000.

The racial/ethnic and gender distribution of students who completed their degree program in 2007-2008 by income levels mirrors the racial/ethnic and gender distribution by income described in the previous paragraph except for a few exceptions (see Table 5). In other words, students who graduated were not underrepresented or overrepresented in their respective racial/ethnic, gender, and income group by more than 5%. I calculated these percentages by subtracting the overall percentage of each racial/ethnic group in Table 4 from the corresponding percentage in Tables 5, 6, and 7. The few exceptions were Hispanic males in the income bracket \$50,001-\$75,000, who were overrepresented by 14.7% and underrepresented by 12.5% in the income bracket \$25,000 or less and by 6.3% in the next income bracket (\$25,001-\$50,000). African Americans from both sexes were underrepresented also in the lowest income bracket by 6.2% (females) and 6.4% (males). Finally, Asian American females were underrepresented in the income bracket \$25,001-\$50,000 by 8.8%.

The distribution of Debt/EFC above the median by race/ethnicity, gender, and income indicate that the higher the income, the less Debt/EFC for all groups (see Table 6). The largest overrepresentation of students based on income was concentrated in the lowest income bracket (\$25,000 or less) for all groups. In particular, African American males were

Table 5. Racial/Ethnic and Gender Distribution of Students Who Completed Their Degree Program in 2007-2008 by Income Levels

Race/Ethnicity	Income Levels (%)				
	\$25,000 or less	\$25,001-\$50,000	\$50,001-\$75,000	\$75,001-\$100,000	\$100,001 or more
Asian male	35.8	36.0	13.4	8.3	6.5
Asian female	28.4	34.7	13.3	14.2	9.4
African American male	22.0	29.7	15.8	14.3	18.1
African American female	15.5	47.1	15.6	10.7	11.1
Hispanic or Latino male	19.4	10.2	45.6	7.9	16.8
Hispanic or Latino female	16.8	36.1	16.9	14.5	15.7
White male	7.8	22.1	19.6	25.6	24.9
White female	8.5	24.1	22.7	24.3	20.4

Table 6. Racial/Ethnic and Gender Distribution of Students with Debt/EFC Above the Median (4) by Income Levels

Race/Ethnicity	Income Levels (%)				
	\$25,000 or less	\$25,001-\$50,000	\$50,001-\$75,000	\$75,001-\$100,000	\$100,001 or more
Asian male	54.0	37.8	5.5	0.0	2.7
Asian female	43.3	53.3	3.4	0.0	0.0
African American male	56.0	36.1	7.9	0.0	0.0
African American female	33.5	55.1	5.2	5.9	0.3
Hispanic or Latino male	54.0	21.8	22.8	1.4	0.0
Hispanic or Latino female	42.8	41.7	10.7	4.7	0.0
White male	30.3	42.0	17.3	8.5	1.9
White female	29.6	43.0	17.1	7.3	3.0

Table 7. Racial/Ethnic and Gender Distribution of Students Who Work More Than 30 Hours a Week by Income Levels

Race/Ethnicity	Income Levels (%)				
	\$25,000 or less	\$25,001-\$50,000	\$50,001-\$75,000	\$75,001-\$100,000	\$100,001 or more
Asian male	52.4	21.6	2.3	0.0	23.6
Asian female	18.3	70.2	6.0	0.1	5.4
African American male	24.4	29.9	11.3	16.0	18.3
African American female	20.4	32.2	16.0	21.0	10.4
Hispanic or Latino male	49.1	12.6	25.7	3.8	8.9
Hispanic or Latino female	36.2	32.8	5.0	1.9	24.0
White male	9.1	24.9	19.1	29.7	17.2
White female	11.0	25.3	29.6	14.4	19.7

overrepresented in this income bracket by 27.6%, followed by Hispanic, White, and Asian males. Asian and African American females had the lowest over-representation in this income bracket (15.8% and 11.7%, respectively). White students were the only group that continued with the similar rates of overrepresentation in the income bracket of \$25,001-\$50,000 while the rest of the groups dropped to a rate of overrepresentation below 10%. All groups shifted to be underrepresented in the next income brackets. Whites had the largest representation among students who came from families with incomes above \$75,001.

The racial/ethnic and gender distribution of students who worked more than 30 hours a week while enrolled by income levels indicate that White students were the only group that was not underrepresented or overrepresented in any income bracket by more than 6% (see Table 7). On the contrary, in the lowest income bracket, Asian males were overrepresented by 19.1% and Hispanics by 14.8% (females) and 17.1% (males). The sex representation among Asians shifted in the next income bracket (\$25,001-\$50,000). In this case, males were underrepresented by 18.2% while females were overrepresented by 26.6%. African American females were underrepresented in this income bracket by 13.5%. Asian males and Hispanic females followed similar patterns in the next income brackets, \$50,001-\$75,000 and \$75,001-\$100,000. Both groups were underrepresented by 9.8% (Asian males) and 11.4% (Hispanic females). However, there was an overrepresented by 17.7% for Asian males and 8.6% for Hispanic females for incomes above \$100,001. Finally, African American females in the income bracket \$75,001-\$100,000 were overrepresented by 11.9%. The rest of the groups were over or underrepresented by less than 5.7%.

Counterfactual Models Results

In order to determine the effect of the propensity scores in the models, a separate analysis was run using logistic regressions without stratifying the sample by propensity scores. This analysis indicated that the treatment is not significant in any of the three models when run without the propensity scores; however, the treatments were significant in the three models when the propensity scores were included.

All hypotheses were confirmed by the models. In particular:

- ◆ Hypothesis I: Students with a Debt/EFC greater than the median were 1.6 times more likely to graduate within six years than students with a smaller Debt/EFC (treatment p-value = 0.021) as shown in Table 8.
- ◆ Hypothesis II: Students with a Debt/EFC greater than the median were 1.5 times more likely to work less than 30 hours a week (excluding work-study) while enrolled than students with a smaller Debt/EFC (treatment p-value = 0.032) as shown in Table 9.
- ◆ Hypothesis III: Students who worked less than 30 hours a week (excluding work-study) while enrolled were 1.4 times more likely to graduate in six years than students who worked more than 30 hours a week while enrolled (treatment p-value = 0.009) as shown in Table 10.

These results indicate that students that were willing to acquire a debt of four times their EFC or more by the end of the sixth year and worked less than 30 hours a week while enrolled were more likely to graduate in six years. However, 30.8% of students worked more than 30 hours a week, had a smaller debt than four times their EFC, and were less likely to graduate in six years. In other words, most students acquired debt in order to obtain a bachelor's degree. However, some students might not be willing to acquire enough debt to help them graduate, and that is according to this study, four times what their families can contribute to their education. These students might work instead, but if they work more than 30 hours a week, they are at risk of not graduating within six years.

Discussion

As federal loans continue to be one of the major strategies from the government to increase postsecondary attainment, studies like this one are needed to inform policymakers on the effectiveness of student loans. The results of this study indicate that student loans promote attainment to some degree given that by 2007-2008, 60.8% of students who have borrowed completed their bachelor's degree within six years. However, 39.2% of students had debt and had not graduated within six years from a four-year degree, the average cumulative debt on all undergraduate loans was \$21,9057, and 73.5% of students did not expect help from their parents or legal guardians to repay student loans.

The burden of debt is reflected when cumulative college debt is compared with what families are expected to contribute to their children's college education annually as defined by the federal government through the EFC index. In particular, this study indicates that in 2007-2008, 35.7% of students that have acquired college loans since 2002-2003 had a debt four times bigger than what their families are expected to pay during that year. Students with this amount of debt or higher are more likely to graduate in six years. However, students with debt less than this amount are more likely to work while enrolled more than 30 hours a week and less likely to graduate in six years. This agrees with previous studies indicating that working 20 hours a week or more negatively impact the academic performance of students (Kulm & Cramer, 2006; Miller et al., 2008). Overall, 21% of full-time, traditional-age undergraduates worked 20-34 hours per week and 10% more than 35 hours a week in 2007 (Perna, 2010). However, according to this study, 30.8% of dependent students who enrolled for the first time in 2002-2003 in a four-year institution and acquired student loans worked more than 30 hours a week while enrolled. Of these, the vast majority, 82.0%, worked to meet the costs of going to college despite all types of financial aid received, including loans, and help from parents to cover college expenses. Some students who worked while enrolled indicated that their job had a negative impact on their academic performance. In particular, 32.5% of working students reported that work had a negative effect on grades, 64.8% said that it affected class scheduling, and 53.8% indicated that it affected access to campus facilities.

Regardless of race/ethnicity and gender, the lowest income bracket had the largest proportion of students with Debt/EFC above the median

Table 8. Parameter Estimates Hypothesis I

DV: Completed degree program in 2007-2008 (Ref: No)

Treatment: Debt/EFC in 2007-2008 (Ref: above 4=median)

Parameter	Design Effect	ExpB	95% CI for ExpB		Sig.
			Lower	Upper	
Treatment: Debt by EFC	2.372	0.639	0.437	0.934	0.021
		1/0.639=1.6			
English is the primary language	1.856	0.784	0.521	1.181	0.243
Parent's highest education level	1.660	0.991	0.948	1.036	0.685
Earned Advanced Placement credit in high school	2.324	1.091	0.784	1.520	0.604
Grade point average in high school	2.160	1.099	0.953	1.267	0.192
SAT derived combined score	1.755	1.000	1.000	1.001	0.224
Residence while enrolled	1.334	0.788	0.686	0.905	0.001
Attendance pattern	2.317	1.215	1.113	1.326	0.000
Grade point average	1.776	1.009	1.007	1.011	0.000
Carnegie-Basic classification collapsed	3.187	0.958	0.750	1.224	0.731
Percentage of minorities	2.712	0.998	0.991	1.006	0.653
Student budget (attendance adjusted)	1.254	1.000	1.000	1.000	0.293
Other financial support received	1.691	0.950	0.663	1.361	0.778
Job: earnings from work while enrolled (excluding work-study/assistantship)	1.585	1.000	1.000	1.000	0.013
Information about financial aid	2.029	0.899	0.513	1.577	0.710
Job: hours worked per week (excluding work-study/assistantship)	1.325	0.994	0.981	1.006	0.338
Job affects school: limited the class schedule	1.382	0.709	0.550	0.914	0.008
Job affects school: limited access to campus facilities	1.708	0.949	0.720	1.250	0.708
Primary role as student or employee (including work-study/assistantship)	1.383	1.143	1.020	1.281	0.021
Reason for working: pay educational expenses	1.908	1.189	0.895	1.580	0.232
Job: related to major	1.738	1.077	0.882	1.316	0.464
Job: effect on grades	1.582	1.140	0.989	1.315	0.071
	Cox & Snell	0.140			
Pseudo R Squares	Nagelkerke	0.190			
	McFadden	0.113			
	No	44.7%			
Predicted Percent Correct	Yes	83.1%			
	Overall	68.0%			

Table 9. Parameter Estimates Hypothesis II

DV: Working Intensity in 2007-2008 (Ref: more than 30 hours a week)

Treatment: Debt/EFC in 2007-2008 (Ref: above 4=median)

Parameter	Design Effect	ExpB	95% CI for ExpB		Sig.
			Lower	Upper	
Treatment: Debt by EFC	1.973	0.643	0.429	0.963	0.032
		1/0.643=1.5			
English is the primary language	1.436	1.116	0.695	1.791	0.650
Adjusted Gross Income (AGI)	0.785	1.000	1.000	1.000	0.061
Earned Advanced Placement credit in high school	1.308	0.950	0.714	1.266	0.727
Delayed enrollment into PSE-number of years	0.726	1.036	0.740	1.450	0.838
SAT derived combined score	1.526	1.000	0.999	1.000	0.450
Highest level of education ever expected	1.898	0.918	0.822	1.025	0.127
Residence while enrolled	1.285	1.236	1.062	1.438	0.006
Attendance pattern	2.319	0.894	0.816	0.980	0.016
Grade point average	1.471	1.003	1.000	1.005	0.017
Carnegie-Basic classification collapsed	1.619	0.671	0.550	0.818	0.000
Percentage of minorities	1.643	0.996	0.989	1.002	0.193
Other financial support received	1.465	1.580	1.000	2.496	0.050
Aid total amount	1.055	1.000	1.000	1.000	0.107
Help from parents: tuition and nontuition	2.041	1.287	1.123	1.474	0.000
Job: earnings from work while enrolled (excluding work-study/assistantship)	2.310	1.000	1.000	1.000	0.000
Expect help with repaying student loans	1.500	0.676	0.499	0.916	0.012
Information about financial aid	1.506	1.581	0.892	2.802	0.116
Job: related to major	1.646	0.723	0.541	0.967	0.029
Job affects school: helped with career preparation	1.334	1.257	0.961	1.644	0.095
Job affects school: limited access to campus facilities	1.631	0.566	0.432	0.743	0.000
Reason for working: gain job experience	1.622	1.098	0.805	1.497	0.555
Job: effect on grades	1.647	1.422	1.202	1.682	0.000
Reason for working: pay educational expenses	1.371	1.073	0.800	1.439	0.638
Job: located primarily on or off campus	1.704	0.541	0.421	0.695	0.000
Reason for working: earn spending money	1.561	1.124	0.798	1.583	0.501
Reason for working: minimize debt	1.442	0.850	0.642	1.125	0.253
Reason for working: pay living expenses	1.384	0.944	0.682	1.308	0.729
	Cox & Snell	0.307			
Pseudo R Squares	Nagelkerke	0.433			
	McFadden	0.297			
	No	90.1%			
Predicted Percent Correct	Yes	50.1%			
	Overall	77.8%			

Table 10. Parameter Estimates Hypothesis III

DV: Completed degree program in 2007-2008 (Ref: Yes)

Treatment: Working Intensity in 2007-2008 (Ref: more than 30 hours a week)

Parameter	Design Effect	ExpB	95% CI for ExpB		Sig.
			Lower	Upper	
Treatment: Work Intensity	1.748	0.721 1/0.721=1.4	0.565	0.920	0.009
English is the primary language	1.791	1.093	0.735	1.626	0.659
Parent's highest education level	1.743	0.971	0.928	1.016	0.205
Adjusted Gross Income (AGI)	0.741	1.000	1.000	1.000	0.001
Earned Advanced Placement credit in high school	2.321	0.620	0.444	0.866	0.005
Grade point average in high school	1.921	0.815	0.723	0.919	0.001
Delayed enrollment into PSE-number of years	1.474	1.643	0.897	3.009	0.107
Highest level of education ever expected	2.594	0.856	0.768	0.954	0.005
Residence while enrolled	1.283	1.287	1.119	1.480	0.000
Attendance pattern	1.971	0.654	0.585	0.730	0.000
Percentage of minorities	2.534	1.000	0.993	1.007	0.920
Student budget (attendance adjusted)	1.339	1.000	1.000	1.000	0.063
Other financial support received	1.852	1.672	1.123	2.490	0.012
Aid total amount	1.336	1.000	1.000	1.000	0.191
Help from parents: tuition and nontuition	1.779	1.377	1.193	1.589	0.000
Expect help with repaying student loans	1.879	0.797	0.602	1.056	0.113
Information about financial aid	1.959	1.659	0.967	2.845	0.066
Expected Family Contribution (EFC composite)	1.495	1.000	1.000	1.000	0.119
	Cox & Snell	0.140			
Pseudo R Squares	Nagelkerke	0.190			
	McFadden	0.113			
	No	44.7%			
Predicted Percent Correct	Yes	83.1%			
	Overall	68.0%			

whereas those with higher income (above \$75,001) had the smallest proportion. This indicates that low income is a critical component for students to acquire high levels of debt regardless of race/ethnicity and gender. In fact, all groups of students with a Debt/EFC above the median were overrepresented by more than 10% in the lowest bracket income (\$25,000 or less) and also underrepresented by more than 10% among those with income above \$75,001. These statistics reflect the fact that low-income students are especially likely to face substantial unmet financial need (Long & Riley, 2007), which force them to acquire larger amounts of debt than their peers with higher income.

However, as indicated in recent studies (Mendez & Mendoza, 2008; Mendez, Mendoza, & Malcolm, in press; Mendoza & Mendez, in press), within income brackets, I found significant differences by race/ethnicity and gender. Minority groups had the largest representation of students with income less than \$25,001 in this study. For example, African American males had the highest overrepresentation whereas African American females had the lowest representation in the lowest income bracket (less than \$25,001). In particular, 28.4% of African American males had an income \$25,000 or less; but 56.0% of them had a Debt/EFC above the median (27.6% difference). On the contrary, 21.7% of African American females were in this income and 33.5% had a Debt/EFC above the median (11.7% difference).

Overall, a larger proportion of low income students, including minority students, had Debt/EFC above the median than students with higher income. This result might seem against the concept of debt aversion found by others among low-income and certain minority groups (Arbona & Nora, 2007; Chen & DesJardins, 2010; Hu & St. John, 2001; Price, 2004). However, these studies are about college enrollment or persistence, whereas this study used a population that had been enrolled for at least six years in college; therefore, the students in this study were those who have already beaten the odds and committed to a college degree by enrolling and persisting for six years. In this case, the notion of self-efficacy in relation to college debt discussed by Dowd (2008) is more appropriate to interpret the results of this study, in which the higher the self-efficacy of students, the more willing they are to acquire debt. I argue that the students in this study, including minorities and low income, have a relatively high self-efficacy concept given their academic achievement of enrolling and staying enrolled for six years in college. Therefore, given that low-income students have higher need for financial aid, they are willing to acquire larger proportions of debt to meet the costs of staying enrolled.

Previous studies have found gap disparities in graduation rates by income and race/ethnicity (Arbona & Nora, 2007; Chen & DesJardins, 2010; Hu & St. John, 2001; Ishitani, 2006). This study found further disparities within race/ethnicity by gender and income levels. Overall, as is the case with Debt/EFC, the higher the income was, the larger the proportion of students who have graduated by 2007-2008. In particular, all groups were overrepresented in the income bracket above \$75,001. On the contrary, students who graduated by 2007-2008 were underrepresented in the lowest income for all groups (except for Asian males and females).

Hispanic males were underrepresented by 12.5% in the lowest income bracket, making it the group with the lowest proportion of students who have graduated, followed by African Americans. There is a sharp gender gap among Hispanics and graduation rates, in which Hispanic women were underrepresented by 4.6% compared to 12.5% of Hispanic males in the lowest income bracket.

These results resonate with Slaughter and Rhoades' (2005) theory of academic capitalism, in which higher education has become a private good that students have to purchase through monetary means despite governmental programs to provide students with financial aid in the form of grants (e.g., Federal Pell Grants). Particularly problematic are the implications of academic capitalism as it refers to college affordability for lower income students and minority groups. As it has been highlighted in previous works, these students are less likely to acquire college debt, or acquire large amounts of debt, to fulfill their academic and professional aspirations (e.g., Chen, 2008; Chen & DesJardins, 2010; Mendoza & Mendez, in press). According to this study, these students might work long hours instead, which is likely to interfere with academic progress and attainment. Policy makers and tax payers should re-evaluate the overemphasis on loans in current financial aid policies in order to close the achievement gap among groups. Otherwise, as the minority population continues to grow in the United States, the nation will lack an educated workforce capable of competing in the global economy.

Appendix

The goal of counterfactual models is to look at the effect of some causes of particular outcomes rather than to find all possible causes, recognizing that we cannot have a perfect causal understanding of a given outcome due to the impossibility of knowing and measuring all possible variables involved (Morgan & Winship, 2007). Moreover, counterfactual models not only focus on some causes but also on selected effects (Morgan & Harding, 2006). Propensity score matching is a quasi-experimental counterfactual model that is increasingly attracting the attention of social scientists working with observational data, including research related to financial aid (Dowd 2008; Hossler et al., 2009; Reynolds & DesJardins, 2009; Titus, 2007). Propensity score matching techniques are particularly useful to dampen self-selection bias in financial aid research by mimicking an experimental design with randomized assignments of financial aid to students.

Causal effects are best estimated when treatment is assigned randomly to cases and comparisons are made against a control group. However, this is not possible in most observational studies in which the researcher has no control over treatment assignment and individuals freely self-select into the treatment group as is the case with students choosing financial aid, for example. Therefore, any observed differences might be because of treatment effects or due to pre-existing differences (Hahs-Vaughn & Onwuegbuzie, 2006). Rosenbaum and Rubin (1983) proposed to use a conditional probability of being assigned to the treatment group given predetermined characteristics. This conditional probability is known as the propensity score. Once the propensity score is obtained for each case in the dataset, cases receiving treatment are compared with control cases that share a similar propensity score in light of a desirable outcome.

This study followed step by step the methodology suggested by Hahs-Vaughn and Onwuegbuzie (2006) for conducting propensity score analysis using complex survey data. Such methodology includes the following steps: 1) Define the covariates in the analysis based on a theoretical model or previous research. 2) Conduct an informative but informal step to verify preliminary differences in the treatment and control groups. 3) Compute the propensity scores by modeling the treatment as the dependent variable of relevant covariates identified in step one using logistic regression and saving the predicted probabilities for each case from such regression. These probabilities are the propensity scores. All relevant covariates are retained in this model despite whether they are significant or not because the goal is not to achieve statistical significant inferences but to obtain scores that balance the data as explained in step five. 4) Create quintiles through ranking the cases by their propensity scores and five dummy variables for each quintile. 5) Balance the data over the propensity scores by reviewing the confounding of the covariates within quintiles. This is done by regressing each covariate as the dependent variable and the treatment as independent variable along with four of the five quintile dummy variables. Non-statistically significant treatment variables indicate balance. If balance is not achieved, the propensity score model needs to be revisited by modifying covariates or including interaction or quadratic

terms, for example. 6) Estimate the treatment effect by incorporating the quintile dummy variables in the main model along with other pertinent covariates as well as strata, cluster and normalized weights.

Models Specification

I ran one model for each of the three hypotheses. All models were logistic regressions given that they all have a dichotomous dependent variable. The models had three parts, the treatment, the covariates related to the dependent variable, and the propensity scores related to the treatment. After conditioning the dataset and removing outliers, I built the models manually based on model statistics and the theoretical framework. In particular, diagnostics statistics, pseudo R-squared indicators and percentage predicted as well as multicollinearity tests were used in order to find the optimal models. The final models for each hypothesis were those including the covariates that indicated the lowest VIF values for the corresponding treatments. Given the complex design of the sample used in this study, in order to obtain results generalizable to the entire population, the principal models were run with normalized, strata, and cluster weights using the Complex Samples add-on module of IBM SPSS. Given that the propensity score model is not inferential but rather a means to balance the data on the treatment variable across strata, there was no need to include weights in such analysis.

The first model (for hypothesis I) had a dependent variable indicating whether students in the sample graduated or not by the end of 2007-2008. The treatment (T) was whether they had a Debt/EFC above the median or not. The covariates (represented by the vector X) were those that resulted in the best fitted model and the lowest VIF value for the treatment, the vector P included dummy variables representing the quintile to which students belong based on their propensity score:

$$\text{Log}(Y_{Degree}) = \alpha T_{Debt/EFC} + \bar{\beta} \bar{X}_{Degree} + \bar{\delta} \bar{P}_{Debt/EFC} + \varepsilon_1$$

Similarly, the second model (for hypothesis II) had a dependent variable indicating whether students worked more than 30 hours or less, the treatment was the same as in model one, thus, the propensity scores are the same ones as well. The covariates included variables related to the effects of working while enrolled:

$$\text{Log}(Y_{Working}) = \alpha T_{Debt/EFC} + \bar{\beta} \bar{X}_{Working} + \bar{\delta} \bar{P}_{Debt/EFC} + \varepsilon_2$$

The last model (for hypothesis III) had a dependent variable indicating whether students graduated or not as in model one, but the treatment this time was whether they work more than 30 hours a week or not. Therefore, given that the treatment was different than in the previous two models, I calculated different propensity scores accordingly for this case. The covariates were those related to the dependent variable, which were the same ones as the ones in the first model:

$$\text{Log}(Y_{Degree}) = \alpha T_{Working} + \bar{\beta} \bar{X}_{Degree} + \bar{\delta} \bar{P}_{Working} + \varepsilon_3$$

References

- Ahlburg, D. A., McCall, B. P., & Na, I. (1997). *Time to drop out from college: A hazard model of college dropout with endogenous waiting time*. Working paper. Minneapolis, MN: Industrial Relations Center, University of Minnesota.
- Alon, S., & Tienda, M. (2005). Assessing the “mismatch” hypothesis: Differentials in college graduation rates by institutional selectivity. *Sociology of Education*, 78(4), 294-315.
- Arbona, C., & Nora, A. (2007). The influence of academic and environmental factors on Hispanic college degree attainment. *The Review of Higher Education*, 30(3), 247-269.
- Archer, L., & Hutchings, M. (2000). “Bettering yourself”? Discourses of risk, cost and benefit in ethnically diverse young working-class non-participants’ constructions of higher education. *British Journal of Sociology of Education*, 21(4), 555-574.
- Arulsevan, A., Mendoza, P., Boginski, V., & Pardalos, P. (2009). Predicting the nexus between secondary education affordability and student success: An application of network-based approaches. In N. Memon & Alhajj, R. (Eds), *Advances in Social Network Analysis and Mining* (pp. 149-154). Washington, DC: IEEE Computer Society.
- Astin, A. W., & Oseguera, L. (2002). Degree attainment rates at American colleges and universities. Los Angeles: UCLA, Higher Educational Research Institute.
- Astin, A. W., Tsui, L., & Avalos, J. (1996). Degree attainment rates at American colleges and universities: Effects of race, gender, and institutional type. Los Angeles: UCLA, Higher Educational Research Institute.
- Bowen, W. G., & Bok, D. (1998). *The shape of the river: Long-term consequences of considering race in college and university admissions*. Princeton, NJ: Princeton University Press.
- Braxton, J. M. (2000). *Reworking the student departure puzzle*. Nashville, TN: Vanderbilt University Press.
- Burton, N. W., & Ramist, L. (2001). *Predicting success in college: SAT studies of classes graduating since 1980*. New York: College Entrance Examination Board.
- Baum, S., & Payea, K. (2004). *Education pays 2004: Trends in higher education series*. Washington, DC: College Board.
- Bowen, H. R. (1997). *Investment in learning: The individual and social value of American higher education*. Baltimore, MD: Johns Hopkins University Press.
- Cabrera, A. F., Stampen, J. O., & Hansen, W. L. (1990). Exploring the effects of ability to pay on persistence in college. *Review of Higher Education*, 13(3), 303-336.

- Callender, C., & Jackson, J. (2005). Does the fear of debt deter students from higher education? *Journal of Social Policy*, 34(4), 509–540.
- Cellini, S. R. (2008). Causal inference and omitted variable bias in financial aid research: Assessing solutions. *The Review of Higher Education*, 31(3), 329-354.
- Chen, R. (2008). Financial aid and student dropout in higher education: A heterogeneous research approach. In J. C. Smart (Ed.), *Higher education: Handbook of theory and research, Vol. 23*, (pp. 209–239). New York: Springer.
- Chen, R., & DesJardins, S. L. (2008). Exploring the effects of financial aid on the gap in student dropout risks by income level. *Research in Higher Education*, 49(1), 1-18.
- Chen, R., & DesJardins, S. L. (2010). Investigating the impact of financial aid on student dropout risks: Racial and ethnic differences. *Journal of Higher Education*, 81(2), 209-237.
- Cofer, J., & Somers, P. (1999, April). *A national study of persistence at two-year colleges*. Paper presented at the annual meeting of the American Educational Research Association, Montreal, Quebec, Canada.
- College Board. (2008). *Trends in students aid 2008*. Washington, DC: The College Board.
- College Board. (2009). *Trends in students aid 2009*. Washington, DC: The College Board.
- DeNavas-Walt, C., Proctor, C. D., & Smith, J. (2007). *Income, Poverty, and Health Insurance Coverage in the United States: 2006* (U.S. Census Bureau, Current Population Reports, P60-233). Washington, DC: U.S. Government Printing Office.
- DesJardins, S. L., Ahlburg, D. A., & McCall, B. P. (2002). A temporal investigation of factors related to timely degree completion. *Journal of Higher Education*, 73(5), 555–581.
- DesJardins, S. L., & McCall, B. P. (2010). Simulating the effects of financial aid packages on college student stopout, reenrollment spells, and graduation chances. *The Review of Higher Education*, 33(4), 513-541.
- Dowd, A. C. (2008). Dynamic interactions and intersubjectivity: Challenges to causal modeling in studies of college student debt. *Review of Educational Research*, 78(2), 232-259.
- Dowd, A. C., & Coury, T. (2006). The effect of loans on the persistence and attainment of community college students. *Research in Higher Education*, 47(1), 33-62.
- Dynarski, S. M. (1999). *Does aid matter? Measuring the effect of student aid on college attendance and completion*. (NBER Working Papers 7422). Cambridge, MA: National Bureau of Economic Research.

- Dynarski, M. (2004). The new merit aid. In C. Hoxby, (Ed.), *College choices: The economics of which college, when college, and how to pay for it.* (p. 63-100). Chicago: University of Chicago Press.
- Education Resources Institute & Institute for Higher Education Policy. (1995). *College debt and the American family.* Washington, DC.
- Gladieux, L., & Perna, L. (2005). *Borrowers who drop out: A neglected aspect of the college student loan trend.* National Center Report No. 05–2. San Jose, CA: National Center for Public Policy and Higher Education.
- Hahs-Vaughn, D. L., & Onwuegbuzie, A. J. (2006). Estimating and using propensity score analysis with complex samples. *Journal of Experimental Education, 75*(1), 31-65.
- Heller, D. E., & Rogers, K. R. (2006). Shifting the burden: Public and private financing of higher education in the united states and implications for Europe. *Tertiary Education and Management, 12*, 91-117.
- Hossler, D., Ziskin, M., Gross J. P., Kim, S., & Cekic, O. (2009). Student aid and its role in encouraging persistence. *Higher Education: Handbook of Theory and Research, 389-425.*
- Hu, S., & St. John, E. P. (2001). Student persistence in a public higher education system: Understanding racial/ethnic differences. *Journal of Higher Education, 72*, 265-286.
- Institute for Higher Education Policy. (1998). *Reaping the benefits: Defining the public and private value of going to college.* Washington, DC: Author.
- Ishitani, T. T. (2006). Studying attrition and degree completion behavior among first-generation college students in the United States. *The Journal of Higher Education, 77*(5), 861-885.
- Johnstone, D. B. (2004). The economics and politics of cost sharing in higher education: Comparative perspectives. *Economics of Educational Review, 23*, 403-410.
- Kewal-Ramani, A., Gilbertson, L., Fox, M. A., & Provasnik, S. (2007). *Status and trends in the education of racial and ethnic minorities* (NCES 2007-039), 177. Washington, DC: U. S. Government Printing Office.
- Kim, D. (2007). The effect of loans on students' degree attainment: differences by student and institutional characteristics. *Harvard Educational Review, 77*(1), 64-100.
- Kulm, T. L., & Cramer, S. (2006). The relationship of student employment to student role, family relationships, social interactions and persistence. *College Student Journal, 40*(4), 927-938.
- Levine, A., & Nidiffer, J. (1996). *Beating the odds: How the poor get to college.* San Francisco: Jossey-Bass.

- Long, B., & Riley, E. (2007). Financial aid: A broken bridge to college access? *Harvard Educational Review*, 77(1), 39-63.
- McDonough, P. M. (1994). Buying and selling higher education: The social construction of the college applicant. *Journal of Higher Education*, 65(4), 427-446.
- McDonough, P. M., & Calderone, S. (2006). The meaning of money: Perceptual differences between college counselors and low-income families about college costs and financial aid. *American Behavioral Scientist*, 49(12), 1703-1718.
- Melguizo, T. (2008). Quality matters: Assessing the impact of attending more selective institutions on college completion rates of minorities. *Research in Higher Education*, 49, 214-236.
- Mendez, J. P., & Mendoza. (2008). The implications of financial aid packages on African American student retention. *National Association of Student Affairs Professionals Journal*, 11(1), 46-65.
- Mendez, J. P., Mendoza, P., & Malcolm, Z. (in press). The impact of financial aid on Native American student persistence in higher education. *Journal of Diversity in Higher Education*.
- Mendoza, P., & Mendez, J. P. (in press). The Oklahoma Promise Program: A national model to promote college persistence. *Journal of College Student Retention: Research, Theory & Practice*.
- Mendoza, P., Mendez, J. P., & Malcolm, Z. (2009). Financial aid and persistence in community colleges: Assessing the effect of state and federal financial aid programs in Oklahoma. *Community College Review*, 37(2), 112-135.
- Metcalf, H. (2005). Paying for university: The impact of increasing costs on student employment, debt and satisfaction. *National Institute Economic Review*, 191, 106-117.
- Miller, K., Danner, F., & Staten, R. (2008). Relationship of work hours with selected health behaviors and academic progress among a college student cohort. *Journal of American College Health*, 56(6), 675-679.
- Morgan, S. L., & Harding, D. J. (2006). Matching estimators of causal effects: Prospects and pitfalls in theory and practice. *Sociological Methods and Research*, 35, 3-60.
- Morgan, S. L., & Winship, C. (2007). *Counterfactuals and causal inference: Methods and principles for social research*. New York, NY: Cambridge University Press.
- National Center for Public Policy and Higher Education. (2006). *Measuring up: The national report card on higher education*. San Jose, CA: National Center for Public Policy and Higher Education.

- Nora, A., Barlow, E., & Crisp, G. (2005). Student persistence and degree attainment beyond the first year in college: The need for research. In A. Seidman (Ed.), *College student retention: Formula for student success* (pp. 129-154). Westport, CT: American Council on Education.
- Olivas, M.A. (1985). Financial aid packaging policies: Access and ideology. *Journal of Higher Education*, 56, 462-475.
- Pachon, H. P., & Zarate, M. E. (2005). *Perspectives of college costs, benefits, and financial aid among California Latino youth*. Los Angeles, California: Tomas Rivera policy institute and SallieMae fund.
- Park, K. H. (1996). Educational expansion and educational inequality on income distribution. *Economics of Education Review*, 15(1), 51–58.
- Pascarella, E. T., & Terenzini, P. T. (1991). *How college affects students: Findings and insights from twenty years of research*. San Francisco, CA: Jossey-Bass.
- Pascarella, E. T., & Terenzini, P. T. (2005). *How college affects students: A third decade of research*. San Francisco, CA: Jossey-Bass.
- Paulsen, M. B., & St. John, E. P. (2002). Social class and college costs: Examining the financial nexus between college choice and persistence. *Journal of Higher Education*, 73(2), 189–236.
- Perna, L. W. (2000). Differences in the decision to attend college among African Americans, Hispanics, and Whites. *Journal of Higher Education*, 71(2), 117-141.
- Perna, L.W. (Ed.). (2010). *Understanding the working college student: New research and its implications for policy and practice*. Sterling, VA: Stylus Publishing.
- Price, D. V. (2004). Educational debt burden among student borrowers: An analysis of the Baccalaureate & Beyond Panel, 1997 follow-up. *Research in Higher Education*, 45(7), 701–737.
- Price, D. V., & Davis, R. J. (2006). Institutional grants and baccalaureate degree attainment. Washington, DC: National association of student financial aid administrators.
- Riggert, S. C., Boyle, M., Petrosko, J. M., Ash, D., & Rude-Parkins, C. (2006). Student employment and higher education: Empiricism and contradiction. *Review of Educational Research*, 76(1), 63-92.
- Singell, L. D. (2002). Come and stay awhile: Does financial aid effect enrollment and retention at a large public university? Eugene, OR: University of Oregon.
- Slaughter, S., & Rhoades, G. (2004). *Academic capitalism and the new economy markets, state, and higher education*. Baltimore, MD: John Hopkins University Press.

Slaughter, S., & Rhoades, G. (2005). Markets in higher education: Students in the seventies, patents in the eighties, copyrights in the nineties. In P. G. Altbach, R. O. Berdahl, & P. J. Gumpert (Eds.), *American higher education in the twenty-first century: Social, political, and economic challenges* (2nd ed., pp. 486-516) Baltimore, MD: John Hopkins University Press.

Somers, P., & Cofer, J. (1997). Singing the student loan blues: Multiple voices, multiple approaches? Sallie Mae/TERI Conference on Student Debtload, Washington, DC.

St. John, E. P. (2006). Contending with financial inequality and academic success: Rethinking the contributions of qualitative research to the policy discourse on college students. *American Behavioral Scientist*, 49, 1604-1619.

St. John, E. P., Cabrera, A. F., Nora, A., & Asker, E. H. (2000). Economic influences on persistence reconsidered: How can finance research inform the reconceptualization of persistence models? In J. M. Braxton (Ed.), *Reworking the student departure puzzle*. Nashville: Vanderbilt University Press.

St. John, E. P., Hu, S., & Weber, J. (2001). State policy and the affordability of public higher education: The influence of state grants on persistence in Indiana. *Research in Higher Education*, 42, 401-428.

St. John, E. P., Paulsen, M. B., & Carter, D. F. (2005). Diversity, college costs, and postsecondary opportunity: An examination of the financial nexus between college choice and persistence for African Americans and Whites. *The Journal of Higher Education*, 76(5), 545-549.

Stampen, J. O., & Cabrera A. F. (1988). The targeting and packaging of student aid and its effect on attrition. *Economics of Educational Review*, 7(1), 29-46.

Swail, W., Redd, K., & Perna, L. (2003). Retaining minority students in higher education: A framework for success. *ASHE-ERIC Higher Education Reports*, 30(2), 1-172.

Tierney, W. G., & Venegas, K. M. (2006). Fictive kin and social capital: The role of peer groups in applying and paying for college. *American Behavioral Scientist*, 49(12), 1687-1702.

Tinto, V. (1987). *Leaving college: Rethinking the causes and cures of student attrition*. Chicago, IL: University of Chicago Press.

Tinto, V. (1993). *Leaving college: Rethinking the causes and cures of students' attrition*. 2nd Ed. Chicago: The University of Chicago Press.

Titus, M. A. (2007). Detecting selection bias using propensity score matching and estimating treatment effects: An application to the private returns to a Master's degree. *Research in Higher Education*, 48(4), 487-521.

Tornatzky, L. G., Cutler, R., & Lee, J. (2002). *College knowledge*. Claremont, CA: Tomas Rivera policy institute and SallieMae fund.

Trent, W. T., Lee, H. S., & Owens-Nicholson, D. (2006). Perceptions of financial aid among students of color: Examining the roles(s) of self-concept, locus of control, and expectations. *American Behavioral Scientist*, 49(12), 1739-1759.

Wei, C., Berkner, L., He, S., Lew, S., Cominole, M., & Siegel, P. (2009). 2007-08 national postsecondary student aid study. Institute of Educational Sciences (IES). Retrieved from <http://nces.ed.gov/pubs2009/2009166.pdf>

Weidman, J. C. (1989). Undergraduate socialization: A conceptual approach. In J. C. Smart (Ed.), *Higher education: Handbook of theory and research* (Vol. 5, pp. 289–322). New York: Springer.

Book Review: *Student Financial Literacy: Campus-Based Program Development*

By David R. Smedley

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Published in 2012, Dorothy B. Durband (Texas Tech University) and Sonya L. Britt (Kansas State University) present in their new edited volume, *Student Financial Literacy: Campus-Based Program Development*, a wide range of perspectives on how to implement successful financial literacy programs on college campuses. This could not be a timelier book, particularly in light of recent statutory efforts to improve “program integrity” through additional consumer disclosures, along with the creation of college costs “watch lists” and “net price calculators.” Despite these national efforts, many students and families may still be unaware about the financial costs of postsecondary education, have limited resources on campus to help them learn about financial literacy, or be unaware of resources available to them from governments, community organizations, professional associations and guaranty agencies (Dodaro, 2011; Government Accountability Office, 2011; Hung, Mihaly & Young, 2010; Smedley, 2011, 2012).

This challenge is amplified when students enter postsecondary education not necessarily cognizant of the practicalities of money, credit and finance. Oftentimes, basic responsibilities are often missing like managing their own bank accounts or knowing the differences between a debit cards and credit cards (let alone more advanced finance matters like consumer loans, automobile loans, and mortgages). In some cases, these challenges are exacerbated when parents continue to handle financial matters pertaining to the tuition bill while the student is enrolled in postsecondary education. Parental involvement in the student’s postsecondary education may not only restrict the student’s own financial literacy, but it may complicate matters for schools given Family Educational Rights and Privacy Act (FERPA) requirements, where the rights on records revert to the student once the student reaches the age of 18 or starts classes in postsecondary education. Durband and Britt’s edited volume highlights the challenges that schools face in the development of financial literacy programs and services. The book makes clear that there are at least two structural impediments to implementing successful financial literacy programming and services on campus: identifying the appropriate office on campus to serve as the financial literacy provider, and the problem of the lack of holistic professional development and training.

Most (but not all) of the authors in this volume assume that a “student affairs” office will be responsible for implementing financial literacy programming. They often discuss this with the assumption that a student aid office is not part of that context. The volume illustrates that there are often firewalls between related units typically called “enrollment management” (e.g, student aid, admissions, and registrar) and units

typically included in “student affairs” constructs (e.g., student life, career services, support/oversight of student organizations, student housing, etc.). This bifurcation is typical of traditional student affairs theory. However, a student aid office has natural symmetry with financial literacy because of statutory requirements to provide debt management counseling for federal loans and to provide guidance with respect to private loans (a subject that the authors in this volume glaringly ignore, and which is expected to be included in forthcoming legislative changes). Many student aid offices try to avoid being saddled with the responsibility for financial literacy citing lack of budgetary resources or organizational infrastructure as problems. While these may be barriers, they ignore the reality that the student aid office is especially well-poised to be the program manager of such content.

Regardless of where the financial literacy program is housed on campus, the authors of the various chapters do a very good job of walking through steps that offices could take when developing financial literacy programming. For example, they provide various suggestions regarding types of programming, marketing strategies, formulating justifications for the recruitment of financial infrastructure, assessment of financial literacy programs once implemented, and research opportunities that such programming presents. They often frame these discussions in terms of student development theory, which places a high premium on peer development (Newton, Ender & Gardner, 2010). The use of peer trainers, they note, tends to lead to greater involvement by students, but may not be feasible for smaller institutions with limited budgetary means. I would like to have seen more discussion that tackles the practical challenges aid administrators and student affairs professionals have when navigating a bifurcated organizational context, particularly when an “enrollment management” organizational unit exists separate from other “student affairs” units.

One way to help bridge this gap would be by providing a more detailed description of the programs that are already available for schools to potentially rely upon in the creation of their own financial literacy programming and services. There are references to the highly regarded financial education programs at the University of Georgia and Texas Tech University, as well as some discussion of programming at Kansas State University. The authors also note that Cooperative Extensions of land-grant institutions have historically been involved in this kind of service provision, yet there is no suggestion of a central place to go to for schools who are considering the development of financial literacy programs and services.

The reason for this lack of discussion is likely due to the second structural impediment highlighted in the book: the lack of holistic resources on training and professional development for administrative units in higher education. There is no central clearinghouse where an aid administrator can go to look up information on financial literacy programs and services, yet there are tremendous resources schools could use to develop their own programs. For example, many state governments and agencies and departments of the US government have developed financial literacy

programs and services that provide content for various professional audiences, and have curriculum requirements in K-12 education (Council for Economic Education, 2012). While the authors consistently refer to the National Endowment for Financial Education (NEFE) as a main resource, its material is focused on the high-school cohort/first-time college student. Financial education for various students populations (e.g., graduate students, students in professional education programs, married students, students in life partnerships and cohabitating relationships) have specific educational needs that go unexamined in this volume. Similarly, given the heightened attention to postsecondary education for military families (i.e., active duty, veterans, and their families) as a result of the Post 911 Veterans Educational Assistance Act of 2008, and the politics of program integrity in higher education relating to military families, it would have been propitious to develop some attention to resources that governments, the private sector, and schools have developed for military families.

Similarly, the book could have offered a more exhaustive list of resources for consideration. Although the authors provide resources in their appendices, the lists are fairly slim. Since one of the ways to implement a successful financial literacy program rests with the institution's ability to tailor programming and services to meet students' needs, it would have been useful to have included a wider array of resources incorporated into the volume. For instance, the Association of American Medical Colleges has produced excellent material on financial education for students pursuing medical education, but this is not incorporated into the book's resource list.

An egregious omission is that the book does not discuss the tremendous resources available on financial literacy by guaranty agencies. Even though the Health Care and Reconciliation Act of 2010 effectively ceased the Federal Family Education Loan Program (FFELP) after June 30, 2010, FFELP loans continue to be serviced. Some guaranty agencies have also been awarded contracts by the US Department of Education to additionally service Direct Loans. The Higher Education Act was amended in 2008 to require guarantors to work with schools to develop and make available high quality educational programs and materials to provide training to students about budgeting, financial management, and financial literacy, which must be provided before, during, and after the student's enrollment. These efforts often fall within the realm of default reduction activities that may be funded by the guarantor's default reduction/prevention account. Many guaranty agencies are doing extremely good work in this vein (e.g., USA Funds' Life Skills Program and Texas Guaranteed stand out as exemplars) and some resources may even be available through banks as part of their compliance with the Community Reinvestment Act. Since schools have established relationships with guarantors, and since this material is free and often comes with options for "train-the-trainer" provision, these can be valuable resources that are unfortunately not discussed in this volume.

One concluding point is worth highlighting because it will help financial aid professionals bridge the gap with student affairs and other bifurcated units

on campus. The author of the foreword makes an erroneous point when she notes that “college students lack an understanding that student aid is really a loan and that they really do not have to take all the money that is made available.” Student loans are a loan, of course, but gift aid is not a loan unless there is a stipulation that the gift aid converts to a loan according to some condition(s). Given prevailing angst about the potential of new regulation for “standardization of award letters” and standardization of terminology, it’s important to get basic concepts right.

One thing that is evident from this volume is that we lack a centralized clearinghouse of information from which aid administrators can tap into and identify financial literacy resources. This presents an opportunity for the student aid community (e.g., schools, lenders in the private education loan market, guaranty agencies, and philanthropic organizations) to embrace this challenge and become leaders in the development of a coordinated effort for effective financial literacy counseling and teaching services. Through the development of new committees to study this issue in our professional associations (and perhaps establishing cross-association super-committees), there could emerge an opportunity to create a national clearinghouse of financial literacy resources from governments, community-based organizations, religious organizations, professional associations, banking and lending organizations, and educational institutions. Student aid offices have a vested interest in student financial literacy programming and services because it may very well be the avenue by which student aid is rescued from the vagaries of “processing” and “packaging”, algorithms of need analysis algebra, and the merit-aid wars, towards a renewed consensus for full resourced counseling so that our social infrastructure is strengthened. Student aid has an interest in financial literacy because student aid is a teaching profession, strengthened and undergirded by effective counseling. Despite some of the limitations noted in this review, *Student Financial Literacy: Campus-Based Program Development* can be a useful resource in facilitating these important discussions and collaborations.

References

Council for Economic Education (2012). *Survey of the States: Economics and personal finance, education in our nation's schools*. New York: Council for Economic Education.

Dodaro, G. (2011). *Financial literacy: the Federal government's role in empowering Americans to make sound financial choices: Congressional testimony*. Testimony before the Subcommittee on Oversight of Government Management, the Federal Workforce, and the District of Columbia, Committee on Homeland Security and Government Affairs, US Senate (GAO-11-504T).

Government Accountability Office (2011). *Opportunities to reduce potential duplication in government programs, save tax dollars, and enhance revenue* (GAO-11-318SP). Washington, D.C. Retrieved on July 31, 2012 from <http://www.gao.gov/new.items/d11318sp.pdf>

Hung, A., Mihaly, K., & Young, J. (2010). *Federal financial and economic literacy education programs, 2009*. RAND Corporation. Retrieved on July 31, 2012 from <http://www.eric.ed.gov/ERICWebPortal/detail?accno=ED509841>

Newton, F. B., & Ender, S. C. (2010). *Students helping students: A guide for peer educators on college campuses* (2nd ed.). San Francisco: Jossey-Bass.

Smedley, D. (2011). Exploring financial literacy counseling resources. *Student Aid Transcript: The Magazine of NASEFAA*. Volume 22, No. 1.

Smedley, D. (2012). *Financial literacy: A list of resources from governments, guaranty agencies, community-based organizations, professional associations, and recent publications*. The George Washington University, Office of Student Financial Assistance. Retrieved on July 31, 2012 from <http://gwired.gwu.edu/finaid-g/FinancialLiteracy/>

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