DOCUMENT RESUME

ED 449 745 HE 033 746

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TITLE	Comparisons of Undergraduate Borrowing and Its Effects on Graduate School Aspirations and Graduate School Attendance.
PUB DATE	2000-00-00
NOTE	24p.
PUB TYPE	Reports - Research (143)
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	*Academic Aspiration; *Debt (Financial); Educational Trends; Enrollment; *Graduate Students; Higher Education; *Paying for College; *Student Loan Programs; Undergraduate Students

ABSTRACT

The factors that affect graduate school aspirations and attendance were studied in light of the fact that student loan borrowing has more than doubled in the past decade. Using data from two surveys conducted by the Higher Education Research Institute, this study investigated the educational degree aspirations of two separate college cohorts, one from 1985-1989 (n=24,847), before the expansion of loan borrowing, and one from 1994-1998 (n=5,061), after the passage of the 1992 Higher Education Amendments. There appeared to be no negative effects of borrowing on either graduate school aspirations or attendance. In fact, loans appeared to play an active role in degree aspirations and graduate school attendance for those who borrowed between 1994 and 1998. An appendix contains the variable coding for both datasets. (Contains 17 references.) (SLD)

Comparisons of Undergraduate Borrowing and Its Effects on Graduate School Aspirations and Graduate School Attendance

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Abstract. It is important to examine the factors that affect graduate school aspirations and attendance, particularly as student loan borrowing has more than doubled in the past decade. Students who attended school between 1985-1989 and 1994-1998 are compared. There appears to be no negative effect of borrowing on either graduate school aspirations or attendance.

INTRODUCTION.

As the United States approaches mass education for undergraduate attendance, some wonder if the increases there will translate to the graduate arena. Therefore, just as we have examined the pipeline of effects that lead one on or off the path to college, it is also important to examine the factors that may affect graduate school aspirations and attendance. Specifically, what are the effects of undergraduate debt on a student's aspirations and attendance to graduate school and have those effects changed over time? Student loans, initially only 20% of students' aid packages in 1976, have grown to become the major means of paying for one's education. For example, in 1985 loans consisted of 49% of all aid, but have increased to 58% of all aid in 1995 (College Board, 1999). As the number of students borrowing and the amounts of borrowing have increased, particularly with the passage of the 1992 Higher Education Amendments, has borrowing had an impact on students graduate school aspirations or attendance? A very small body of literature has examined the relationship between financial aid and graduate school attendance. Until recently most researchers looked at the effects of aid on persistence. Studies here show conflicting results about the effects of different types of aid, with some questioning the negative effects loans in students' aid packages (Leslie and Brinkman, 1988; St. John, 1989 & 1991; St. John, Kirshstein, & Noell, 1991; Tinto, 1993; Somers, 1994). Thus it seems appropriate to examine the effects of loans and loan debt on graduate school aspirations and attendance, particularly as borrowing has

more than doubled in the past decade (College Board, 1999).

THEORETICAL FRAMEWORK.

Theorists (Rawls, 1971; Le Grand, 1982) have argued that equity cannot be realized until one examines the equity of final outcomes. In higher education, financial aid's role has been framed in terms of access to the doors of higher education and moving students through toward baccalaureate completion. However, equity demands that we look at longer-term outcomes such as graduate school attendance and completion to see if that goal has been met. Aid policy has moved rapidly towards a loan-based system. It is critical for higher education to fully examine the ramifications of this method of funding from an equity viewpoint. As our experience with "mass" loans increases, higher education researchers are able to discover the short *and* long-term effects of borrowing. At best there should be no relationship between borrowing for one's undergraduate education and graduate school aspirations and attendance. If loans encourage graduate school enrollment they are serving a valuable purpose in meeting financial aid's goal of equal access. However, if they serve as a deterrent, particularly for at-risk or under-represented students, the policy of how loans are awarded and to whom must be re-examined.

LITERATURE REVIEW.

In general, studies on graduate school participation have not focused on financial aid. Of the few that do, their findings indicate that student background and collegiate factors other than aid play a more significant role and that there is no association between the amount of debt and student decisions to continue their education (Shapiro, et al, 1991; Pew, 1990; Weiler; 1994, Millett, 1999).

Shapiro, et al (1991), in their examination of the relationship between debt and plans to attend graduate school in the arts and sciences, found that while gender and ethnicity are significantly related to graduate school plans, debt was not. However, their data, collected by the Consortium on the Finance of Higher Education's (COFHE) Senior Survey, were drawn from students in elite schools. Since there are higher proportions of upper income students at elite institutions and if, as previous data suggests, student outcomes are mitigated by SES level, then this choice of data set reduces the opportunity to determine the impact of loans on lower SES levels.

Additionally, the survey questions college seniors expectations of what they would do after college, but since the survey was given in the students' senior year, their actual behaviors are unknown.

Another study, using 1980 High School and Beyond data, found that undergraduate debt had no association with college graduates' decision to attend graduate school (Weiler, 1994). This study controlled for SES background characteristics as well as aspirations, ability, and major. Seniors who planned on attending graduate school had smaller debts than those who planned on only a baccalaureate degree, but the amount of debt incurred was not a significant predictor of the decision to attend graduate school. Weiler notes that debt levels may relate more to intentions rather than the action of attending graduate school. He speculates that future plans play a minimal role at the times the student borrows as an undergraduate, but only gradually come into play as the student considers options of successively higher levels of debt required by graduate school. This study uses a data base that was designed to examine factors related to transitions from high school to college, and not from college to graduate school. Additionally, the students in this study borrowed between 1980 and 1984, at the early stages of the shift from grants to loans. The effects of larger loan debt are therefore not captured. The cohort was questioned in 1984 and 1986, but graduate school decisions not made within two years of students' assumed graduation in 1984 were also not captured.

Millett's study, using Baccalaureate and Beyond data, uses logistical regression to determine the odds of attending graduate school (Millett, 1999). Debt was not found to be a significant factor, however this data base does not offer rich variety of variables that allow one to control for students' early aspirations and motivations as well as their career intentions.

Of the remaining studies that exist, analyses of medical school students predominate. One study is typical of the efforts here (Jones & Moss, 1994). Student persistence at one medical school was investigated to determine the effect of need-based, non-need based, and no aid. Attendance and persistence was not significantly correlated to the receipt of aid. Problems in these types of investigations become evident when one notes, as in this study, that it was a single institution study that did not investigate the separate effects of grants and loans. Other problems include the snap-shot approach, such that actual graduation rates of aid recipients and non-aid

recipients were not available. Finally, investigating only one career choice of a very select group of students sheds little light on the graduate choices of many other career options available to students.

METHOLOGY

Samples. The current study uses the data collected by the Cooperative Institutional Research Program (CIRP). The comprehensive longitudinal database selected for this study offers a unique set of student and family background characteristics, college environmental variables, and post-collegiate outcomes. The longitudinal design of the data allows comprehensive examination of the short-term and long-term effects of borrowing. The multi-institutional aspects, combined with racial/ethnic over-sampling of minorities and sophisticated weighting techniques to adjust for non-response bias, allow us to examine the effects of borrowing across a broad spectrum of students.

Two samples were used for this study. The first sample consists of students who were surveyed originally as freshmen in 1985, again in 1989. The second sample consists of students who were surveyed as freshman in 1994 and were resurveyed in 1998. The Follow-up surveys of each group, four years after entering college, provide information about degree aspirations and graduate school attendance.

1985-1989 Cohort. In 1985, 546 institutions participated in the CIRP Freshmen survey, a 20% response rate out of the initial 2,741 institutions invited to participate. Data on approximately 280,000 students were collected. A weighted, normative sub-sample of 192,453 students from 372 institutions was used to ensure a representative population of all 1985 first-time full-time entering freshmen in the United States (Astin, Green, Korn, & Schalit, 1985, p. 97). The freshman SIF collected demographic information on students and their families, asking students to report on a wide range of attitudes, expectations and behaviors associated with college attendance. Specific to this study were student reports of parental education, income and careers, the type and amount of aid, concern about finances, expected major and career, and degree aspirations.

The follow-up survey conducted in 1989 linked students responses with the freshmen SIF data providing a longitudinal database that assesses student experiences, values, and achievements as well as how different college environments influence student outcomes (see Hurtado, Astin, Korn & Dey, 1989). In 1989, a randomly selected sub-sample of 86,000 freshmen from 1985 was mailed a follow-up survey. This sample represented

309 four year institutions and produced a total response of 24,847 students (Astin, 1993). This represents a response rate of 28.8 percent.

The 1994-1998 Cohort. This study utilized data from the Freshmen Survey in 1994, and follow-up questionnaire (the College Student Survey), both of which were collected by the Higher Education Research Institute (HERI) at the University of California, Los Angeles. These surveys offered national longitudinal data for students who began college in the 1994 academic year, and who were resurveyed four years later in 1998. The total sample was 5,061 students who began their post-secondary education at four-year institutions in 1994. Since the type of institution (such as whether students start their post-secondary education in four-year institutions or two-year institutions) decides students' experiences that in turn influence their degree aspirations and graduate school attendance, students from community colleges were excluded from both cohorts in this study.

Analyses. This study investigated the educational degree aspirations of two separate college cohorts as seniors and their plans to attend graduate school. The first cohort attended between 1985 and 1989, prior to the expansion of loan borrowing, and the second cohort attended between 1994 and 1998, after the passage of the 1992 Higher Education Amendments which significantly increased the eligibility and amounts students could borrow. These dependent variables were examined to determine 1) if the total amount of loans borrowed as an undergraduate was related to student aspirations or plans for graduate school attendance, 2) if so, does undergraduate borrowing affect the graduate school degree aspirations of baccalaureate degree holders in 1989 differently than baccalaureate degree holders in 1998, and 3) does undergraduate borrowing affect the enrollment of students into graduate school for students completing their baccalaureate degree in 1989 differently that those in 1998?

Blocked stepwise forward regression was conducted to determine the factors that are related to the dependent variables: degree aspirations in 1989 and 1998. In addition, logistical regression was conducted to determine the odds of attending graduate school, based on the loan variables. All analyses were examined for interaction effects between borrowing and parental income. The key independent variable measuring loans was the amount of loan debt as a senior in 1989 and in 1998. The follow-up survey in 1998 offers an accurate estimate of the

total amount of undergraduate borrowing based on a question asking students to report the total amount they had borrowed for their undergraduate education. The 1989 survey, however, does not offer an exact amount of loan for undergraduate education. To acquire the closest accurate amount of loan in 1989, a new variable was computed based on student responses in 1985 and their responses in 1994 to a nine year follow up of the survey (see detail in Appendix A). .

Since the relationship between borrowing and parental income was not linear, parental income was operationalized as three dummy variables. The low parental income amount ($0 - $30,000) was chosen because in 1985 students whose parents' income was more than $30,000 were frequently ineligible for Pell Grant funds. (Pell Grants is Federal aid that is awarded to the lowest income students.) Parental income of greater than or equal to $75,000 was selected as "high" in part because the analysis of the relationship between borrowing and parental income, while non-linear, showed a distinct break in amount borrowed at that parental income point. Middle income was then created as amounts over $30,000 and less than $75,000.

In addition to controlling for parental income, the regression also controlled for student ethnicity, parental education, student academic abilities (such as high school GPA, SAT verbal and math scores), degree aspirations as a freshman, institution type (such as public colleges, public university, private colleges and private universities, college tuition, and student career choice as a senior. Career choice is an important variable since career choice often determine the level of education necessary to pursue that career. The same variables used in the linear regression were used in the logistic regression.

RESULTS

Educational Aspirations.

Results for the 1985-89 Cohort. Loan debt in 1989 was a significant positive predictor of higher educational aspirations in 1989 until Tuition entered the equation (See Table 1.) The loan beta increased when high parent income enters the equation meaning that fewer high-income students were borrowers. A small interaction effect takes place when SAT Verbal enters the equation. At this point the beta for 1989 Loan Debt decreased

and dropped out of significance. The beta for 1989 Loan debt increased and became significant when college GPA entered the equation, indicating that college GPA acted as a suppressor on borrowing. This occurs because College GPA and 1989 Loan debt are negatively related to one another, yet positively related to degree aspirations. This could mean that those with higher GPAs may be less likely to borrow, perhaps being on merit scholarships. Ultimately, however, 1989 Loan debt fell out of the equations when Tuition entered. This is likely due to the fact that those who were borrowing were attending higher cost colleges.

Parental income was also not a factor in degree aspirations. Low income was briefly significant, but dropped out when Father's education entered. While the variable high parental income came in at step four ($b = .034$, $p < .000$), the beta dropped when 1985 degree aspirations entered ($b = .019$, $p = .044$) then lost significance at the next step when SAT Verbal entered the equation. This indicates that early degree aspirations and one measure of ability ultimately may contribute more to degree aspirations as a senior. Note, however that while some measures of SES were controlled (parental income and education) in this regression, the present research does not address factors that contribute to these early degree aspirations as a freshman.

Other positive predictors of higher aspirations in 1989 were father's and mother's education, being African American, a high SAT Verbal or Math Score, 1985 Degree Aspirations, Tuition, and College GPA.

As expected, careers likely to require graduate school attendance such as those in law, medicine, college teacher, research scientist and high school teacher entered positively. Careers that do not require graduate degrees, such as those in business, art, engineering, farming, nursing and other health professions entered negatively. The R^2 was able to account for 19% of the variance.

Table 1. Effect of 1989 Loan Debt on 1989 Educational Aspirations

Variables Entered	Loan Debt Beta at Each Step
Block 1	
1. Mother's Education	.02*
2. African American	.02*
3. Father's Education	.02*
4. Parents' Income > $75K	.03**
5. Caucasian	.03**
Block 2	
6. 1985 Degree Aspiration	.02*
7. SAT Verbal	.01
8. High School GPA	.01
9. SAT Math	.01
Block 3	
10. College GPA	.02*
11. Lawyer	.02*
12. Doctor	.02*
13. College Teacher	.02*
14. Research Scientist	.02*
15. College Tuition	-.00
16. Business	-.00
17. Artist	-.00
18. Engineer	-.00
19. Nurse	-.00
20. Health Professional	-.00
21. Farmer/Forrester	-.00
22. Clergy	-.00
23. High School Teacher	-.00

*p ≤ .05, **p ≤ .01

Results for the 1994-98 Cohort. The 1998 Loan debt variable was a significant positive predictor of higher degree aspirations in 1998 (See Table 2). The significant effects of 1998 Loan debt on degree aspirations are consistent in the model, indicating the opposite of what the research question suggested. That is, not only did loan debt NOT have a negative affect on degree aspirations, but it, in fact, contributes to higher degree

aspirations. A small interaction effect takes place when the career, secondary education teacher, entered the equation. At this point the beta and its significance level for 1998 Loan Debt decreased. The interaction effect indicates that there is a positive correlation between secondary teacher and Loan debt, meaning these students may have higher amount of loans in 1998. Another interaction effect occurs when College Tuition entered the equation. This is due to the positive correlation between Tuition and Loan debt, meaning that those who have to pay high tuition are more likely to borrow.

Parental income was not a significant factor in degree aspirations. The positive effects of father's education, being African American, degree aspirations as a freshman, tuition, and college GPA remained stable in the equation. Interestingly, the beta of attending a private college increased when high school GPA entered the equation (b=.09, p=.000), indicating that high school GPA acted as a suppressor on attending a private college.

As indicated earlier in the results of 1985-1989 cohort, careers likely to require graduate school attendance such as those in law, medicine, college teacher, and research scientist have positive effect on degree aspirations. In contrast, careers that do not require graduate degrees, such as those in business, and engineering affect degree aspiration negatively. These results are almost identical with those of 1985-1989 cohorts. The R^2 in this equation explains 11% of the total variance of degree aspiration.

Table 2. Regression Predicting Graduate School Aspirations in 1998 (n=5061)

Step	Multiple R	Variable Entering	Beta Entry	r	Beta after Block 1	Beta after Block 2	Beta after Block 3	Beta after Block 4
		Block 1						
1.	.00	Father's Education	.07	.07	.08**	.04**	.03*	.03*
2.	.01	White/Caucasian	-.06	-.04	-.04**	.03	-.02	-.02
3.	.01	Gender (female)	.03	.02	.02*	.01	.00	.00
4.	.01	African American	.03	.05	.03*	.05**	.04**	.04**
		Block 2						
5.	.02	Degree Aspiration in 1994	.10	.12	.10**	.10**	.07**	.07**
6.	.03	High School GPA	.09	.08	.09**	.07**	.01	.01
7.	.03	SAT Verbal	.06	.07	.08**	.06**	.01	.01
		Block 3						
8.	.05	Lawyer	.13	.15	.14**	.13**	.13**	.13**
9.	.07	Doctor(MD)	.13	.14	.14**	.12**	.12**	.12**
10.	.08	College GPA	.12	.16	.16**	.14**	.10**	.10**
11.	.09	Research Scientist	.09	.09	.09**	.07**	.08**	.08**
12.	.10	College Teacher	.08	.08	.08**	.07**	.07**	.07**
13.	.10	Private Colleges	.07	.08	.08**	.09**	.04**	.04**
14.	.11	Engineer	-.06	-.03	-.09**	-.10**	-.06**	-.06**
15.	.11	Clergy	.04	.03	.04**	.04**	.04**	.04**
16.	.11	Business	-.04	-.09	-.09**	-.08**	-.04**	-.04**
17.	.11	College Tuition	.03	.12	.11**	.10**	.03*	.03*
		Block 4						
18.	.11	Total Amount of Loans	.03	.03	.04**	.04**	.03**	.03**

*p ≤ .05, **p ≤ .01

Graduate School Attendance.

Results for the 1985-89 Cohort. The second analysis for the 1985-1989 cohort was a logistic regression predicting the likelihood of graduate school attendance. Students responded in the spring of 1989, most likely their senior year, to the questions whether or not they planned on attending graduate school in the fall of 1989. Table 3 shows the results of the multivariate logit model for the 1985-1989 cohort, listing the estimated coefficient and standard error of each variable. In terms of model fit, 83% of the 12,376 students were correctly classified. Of the students who do not attend graduate school, 95% were correctly classified. Of the

students who attend graduate school, 33% were correctly classified. The goodness-of-fit statistics show that the model fits the data well, and is also statistically significant (df=33, X^2=2300.23) at the .000 level.

The 1989 Loan debt variable was not a significant predictor of graduate school attendance. Variables that were significant predictors were being male, father's education, high school GPA, 1985 degree aspirations, and college GPA. In addition, choosing a career in law, medicine, teaching (college or K-12), wanting to be a member of the clergy, or a research scientist, all entered positively. Two careers that entered this equation positively, but entered the aspiration regression negatively are engineering and health professions. As indicated in the linear regression, careers in business, art, and nursing entered negatively.

Table 3. Logit Estimate Results for Student's Attendance at Graduate School (N=12,376)

	b sig	Std. Error
Student background characteristics		
Gender		
Female	-.11*	.06
Race		
White/Caucasian	-.01	.16
African American	.18	.20
Asian American/Asian	-.18	.19
Hispanic/Latinos	-.07	.22
Parental income		
Low	-.07	.08
Medium	.07	.06
Mother's education	-.00	.02
Father's education	.05**	.02
High school GPA	.08***	.02
SAT verbal	.00	.00
SAT math	-.00	.00
Degree aspiration in 1985	.17***	.02
College characteristics		
Tuition	-.00	.00
Public college	.24	.34
Public university	-.07	.34
Private college	.39	.34
Private university	.52	.34
College GPA	.44***	.03
Probable career in 1989		
Artist	-.36**	.13
Business	-.48***	.08
Clergy	1.07***	.27
College teacher	1.39***	.11
Doctor (MD or DDS)	1.98***	.11
Education (secondary)	.58***	.11
Education (elementary)	.29***	.12
Engineer	.25*	.11
Farmer or forester	-.65	.43
Health professional	1.26***	.12
Lawyer	1.48***	.09
Nurse	-.98**	.33
Research scientist	1.88***	.12
Financial aid		
Total amount of loans received in 1989	-.00	.00

* ≤ 05, ** ≤.01, ***≤.001

Results for the 1994-98 Cohort. Table 4 presents the results of the logistic regression model, which shows the estimated coefficient, and standard error for each of the independent variables. In terms of model fit, overall, 82 % of the 5266 students were correctly classified. Of the students who do not attend graduate school, 94% were correctly classified. Of the students who attend graduate school, 36% were correctly classified. The goodness-of-fit statistics show that the model fits the data well, and is also statistically significant (df=33, X^2 =992.230) at the .001 level. The logistic regression predicting the likelihood of graduate school attendance in 1998 revealed a different story from that of 1985-1989. In contrast to the non-significant effect of the 1989 Loan debt on graduate school attendance, the 1998 Loan debt was a significant positive predictor on graduate school attendance. A student's gender, racial/ethnicity, family income, father's and mother's education, SAT verbal and math were not significant predictors in attending graduate school. High school GPA, degree aspiration in 1994, college GPA, and choosing a career in law, medicine, teaching (college or secondary), or being a member of health professional, or a research scientist are significant positive predictors in graduate school attendance. However, careers in business, nursing are negative predictors in attending graduate school at .001 and .05 level respectively.

Table 4. **Logit Estimate Results for Student's Attendance at Graduate School (N=5,061)**

	b sig	Std. Error
Student background characteristics		
Gender		
Female	.05	.08
Race		
White/Caucasian	-.01	.20
African American	.40	.24
Asian American/Asian	.12	.23
Hispanic/Latinos	.27	.24
Parental income		
Low	-.21	.13
Medium	-.13	.08
Mother's education	.02	.02
Father's education	.00	.02
High school GPA	.08*	.03
SAT verbal	-.00	.00
SAT math	.00	.00
Degree aspiration in 1994	.12**	.04
College characteristics		
Tuition	-.00	.00
Public college	-.26	.17
Public university	-.09	.17
Private college	-.05	.09
College GPA	.53***	.05
Probable career in 1998		
Artist	.52	.22
Business	-.79***	.15
Clergy	.44	.44
College teacher	1.34**	.18
Doctor (MD or DDS)	1.56**	.14
Education (secondary)	.34*	.17
Education (elementary)	-.28	.19
Engineer	.08	.18
Farmer or forester	-.44	.62
Health professional	1.40**	.15
Lawyer	1.94**	.14
Nurse	-.17*	.59
Research scientist	1.47**	.15
Financial aid		
Total amount of loans received in 1994	1.47E-05**	4.389E-6

* ≤ 05, ** ≤.01, ***≤.001

The Effects of Loan Debt on Degree Aspirations and Graduate School Attendance

The results of the 1985-1989 cohorts clearly suggest that borrowing does not negatively impact degree aspiration in 1989, regardless of parental income. In fact, borrowings initial relationship predicting degree aspirations was positive. Although borrowing did enter the linear regression equation, its effects on degree aspirations were mediated by the costs of attendance. That is, the effect of borrowing was significantly reduced when tuition entered. These results do not vary by parental income level and in fact once all variables were controlled, the effect of being from a high income family were mediated in turn by aspirations as a freshman. Neither did the 1989 Loan debt affect students' decisions to attend graduate school. In 1989, 19.8% of the first cohort sample planned on graduate school attendance. Clearly these students were not deterred from this goal by prior loan debt.

The results of the 1994-1998 cohorts are more favorable than those of 1985-1989 cohorts, showing that significant positive effect of Loan debt on degree aspirations, as opposed to the non-significant effect of parental income. The significant positive effect of the 1998 Loan debt on degree aspiration is consistent in the blocked stepwise regression model. In addition, Loan debt is a statistically significant predictor in attending graduate school at the .001 level.

DISCUSSION.

The increased borrowing in the past decade has led some to question the impact of loan debt on graduate school aspirations and attendance. It appears that loan debt has not significant effect on graduate school aspirations or attendance for students who borrowed between 1985 and 1989. These results uphold those found by Schapiro and Millet. It was anticipated that increased borrowing after the passage of the 1992 Higher Education Amendments may act as a deterrent to degree aspirations and graduate school attendance for those who borrowed between 1994 and 1998. In contrast, there were significant positive effects of loans on these two outcome variables. In other words, loans in this second data set play an active role in degree aspirations and attending graduate school. This is a role that appears to become stronger as it has become easier to borrow and as loan levels have increased.

One way to understand these results is to think about the volume of borrowing. With nearly 60% of aid now being delivered as student loans, borrowing has become commonplace. Increased tuition costs combined with an expanded loan program means that more students are eligible to borrow. Whereas borrowing used to be relatively infrequent, today the peer norm is to use loans to pay for one's education. So despite the undergraduate debt that some students may have accumulated, their aspirations may remain high because borrowing is now the norm. Additionally, financial aid policy being what it is, and college costs being what they are, today's students may be left with little choice but to borrow.

Understanding these results also requires looking at loan debt in context to today's society. As common as student loan borrowing has become, credit card use is even more common, with 64 percent of students having at least one such card (Educational Resources Institute, 1998). A recent study found that while most students use credit cards responsibly and do not accumulate large amounts of credit card debt, 22 percent of students with credit cards have used them to pay for education-related expenses. Despite the responsible behavior of most students, some students exhibit credit card behavior that could lead to high debt levels (Education Resources Institute, 1998). The widespread acceptance of borrowing through credit cards may contribute to an overall relaxed attitude about student loan borrowing as well.

From a Rawlsian viewpoint, then, this study shows that borrowing does not hamper the aspirations and graduate school attendance of students from any income level and the requirements of equal outcomes are met. With the impact of Title Wave II and the potential for increased numbers of students in higher education institutions, finding successful ways to financially support students' educational aspirations is crucial. There has been much controversy over the relative fairness of loans versus grants (Woodhall, 1993). Those who favor student loans argue that, since loan repayments can be used to finance future students, loans are more efficient and even more equitable because they allow more students to receive greater amounts of financial aid than is the case for grants. Additionally, some argue that loans are more equitable than grants because loans are eventually paid back by those who benefit from the increased education, while federal grants are gifts given to college-going students from the taxpayer. Funding through grants it is argued, represents an unfair benefit for those who will reap higher incomes in the future. These results indicate that loans seems to be a fair method of

helping students pay for college that does not discourage further education. What seems surprising is that, as borrowing has become more commonplace, undergraduate experience borrowing may actually encourage higher degree aspirations and graduate school attendance. Students could see student loans as "enablers" of graduate education, a vision that far exceeds the Title IV policy framers' hopes for fair college access.

What is unclear is how well students will be able to handle a combined undergraduate and graduate school debt. Obviously, post-collegiate income will be a strong determinant and students with lower post-collegiate income may find repayment difficult. For example, in this study, those who planned careers in teaching 1998 also tended to have higher loan debt. State and national programs are available that offer loan relief for those who teach in certain low income areas or who teach certain subjects (math). Yet, these measures may not be enough to help teachers or others in low-income occupations who find themselves with high student loan debt.

Researchers should now look to the combined effects of undergraduate and graduate school borrowing. Graduate and professional school loan borrowing has also accelerated dramatically since 1992, with more than a million graduate and professional students now borrowing nearly $8 billion per year (Educational Resources Institute, 1996). The Educational Resources Institute reports that average debt levels are especially high for students attending professional schools in medicine, dentistry, and law. Disturbingly, they report that minority students are the groups most likely to borrow at the graduate and professional level. Graduate school attendants choosing lower-paying, public service-oriented jobs may have the toughest time repaying their loans, however managed care may seriously cut into the income of those in the medical professions, jeopardizing their ability to repay their loans.

Federally mandated flexible payment plans and loan consolidation options do make repayment easier and that may explain why loan default have been decreasing while borrowing has been increasing. However, a long eye is important when examining the effects of student loan debt. For example, the effects of undergraduate and graduate borrowing for students in the second cohort of this study must take into consideration Master's study (2000 graduates), MD degrees (2002 and beyond if one considers residency), and Ph.Ds (2005 graduates), in addition to time to get into repayment.

Despite the fact that student borrowing of educational loans has increased significantly over the past decade, student's degree aspiration and choices to attend graduate school are not constrained by their debt. With the majority of aid now being delivered as student loans, borrowing has become commonplace. One might speculate that students would choose to delay attending graduate school until they are able to repay some or their entire loan. However, this does not appear to be the case. Furthermore, initial concerns about the differential effects of borrowing based on the income of the student or the student's ethnicity appear to be unfounded. Despite this good news, student loan debt should continue to be monitored, as those who have borrowed heavily in the past decade, complete their graduate school careers and enter repayment.

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Appendix A: Variable Coding for the 1985-1989 dataset:

Variable	Coding
Family Background	
Gender	Coded 1=male, 2=female
Race	
African American	Coded 1=non-Blacks, 2=Blacks
White/Caucasian	Coded 1=non-Whites, 2=Whites
Asian	Coded 1=non-Asian, 2=Asian
Latinos	Coded 1=non-Latinos, 2=Latinos
Family Income	
Low Income	$30,000 or less
Middle Income	$74,999 or less
High Income	$75,000 or more
Father's education	Coded 1=high school graduate or less, 2=some college, 3=college degree, 4=some graduate school or more
Mother's education	Coded 1=high school graduate or less, 2=some college, 3=college degree, 4=some graduate school or more
Academic Ability	
High school GPA	Coded 1=C^+ or less, 2=B, 3= A^- or B^+, 4=A
SAT Math	Coded by actual scores
SAT Verbal	Coded by actual scores
Degree Aspirations as a freshman	Coded 1=less than college degree, 2=college degree, 3=master, 4=ph.D or professional degree
College Experience	
College tuition	Coded by the actual number
Public 4-year college	Coded 1=no, 2=yes
Public 4-year university	Coded 1=no, 2=yes
Private 4-year college	Coded 1=no, 2=yes
Private 4-year university	Coded 1=no, 2=yes
College GPA (average undergraduate grade)	Coded 1=C^+ or less, 2=B, 3= A^- or B^+, 4=A
Probable Career	
Artist	Coded 1=no, 2=yes
Business	Coded 1=no, 2=yes
Clergy	Coded 1=no, 2=yes
College teacher	Coded 1=no, 2=yes
Doctor (MD or DDS)	Coded 1=no, 2=yes
Education (secondary)	Coded 1=no, 2=yes
Education (elementary)	Coded 1=no, 2=yes
Engineer	Coded 1=no, 2=yes
Farmer or forester	Coded 1=no, 2=yes
Health professional	Coded 1=no, 2=yes
Lawyer	Coded 1=no, 2=yes
Nurse	Coded 1=no, 2=yes
Research scientist	Coded 1=no, 2=yes

Appendix A: Variable Coding for the 1985-1989 dataset (*continued*)

Variable	Coding
The 89 Loan Debt[1]	Coded by the actual number
Degree Aspiration	Coded 1=less than college degree, 2=college degree, 3=master, 4=ph.D or professional degree
Graduate School Attendance	Coded 0=no, 1=yes

[1] The Loan debt in 1989 was calculated in two ways. If students attended graduate school, their total amounts of loan were calculated by multiplying the amount of loan in 1985 by 3.5. For the students who did not attend graduate school, it was assumed that the total amount of loan the student reported in 1994 was used only for their undergraduate education.

Appendix B: Variable Coding for the 1994-1998 dataset:

Variable	Coding
Family Background	
Gender	Coded 1=male, 2=female
Race	
African American	Coded 1=non-Blacks, 2=Blacks
White/Caucasian	Coded 1=non-Whites, 2=Whites
Asian	Coded 1=non-Asian, 2=Asian
Latinos	Coded 1=non-Latinos, 2=Latinos
Family Income	
Low Income	$30,000 or less
Middle Income	$74,999 or less
High Income	$75,000 or more
Father's education	Coded 1=high school graduate or less, 2=some college, 3=college degree, 4=some graduate school or more
Mother's education	Coded 1=high school graduate or less, 2=some college, 3=college degree, 4=some graduate school or more
Academic Ability	
High school GPA	Coded 1=C^+ or less, 2=B, 3= A^- or B^+, 4=A
SAT Math	Coded by actual scores
SAT Verbal	Coded by actual scores
Degree Aspirations as a freshman	Coded 1=less than college degree, 2=college degree, 3=master, 4=ph.D or professional degree
College Experience	
College tuition	Coded by the actual number
Public 4-year college	Coded 1=no, 2=yes
Public 4-year university	Coded 1=no, 2=yes
Private 4-year college	Coded 1=no, 2=yes
Private 4-year university	Coded 1=no, 2=yes
College GPA (average undergraduate grade)	Coded 1=C^+ or less, 2=B, 3= A^- or B^+, 4=A
Probable Career	
Artist	Coded 1=no, 2=yes
Business	Coded 1=no, 2=yes
Clergy	Coded 1=no, 2=yes
College teacher	Coded 1=no, 2=yes
Doctor (MD or DDS)	Coded 1=no, 2=yes
Education (secondary)	Coded 1=no, 2=yes
Education (elementary)	Coded 1=no, 2=yes
Engineer	Coded 1=no, 2=yes
Farmer or forester	Coded 1=no, 2=yes
Health professional	Coded 1=no, 2=yes
Lawyer	Coded 1=no, 2=yes
Nurse	Coded 1=no, 2=yes
Research scientist	Coded 1=no, 2=yes

Appendix B: Variable Coding for the 1994-1998 dataset (*continued*)

Variable	Coding
The 89 Loan Debt[2]	Coded by the actual number
Degree Aspiration	Coded 1=less than college degree, 2=college degree, 3=master, 4=ph.D or professional degree
Graduate School Attendance	Coded 0=no, 1=yes

[2] The Loan debt in 1989 was calculated in two ways. If students attended graduate school, their total amounts of loan were calculated by multiplying the amount of loan in 1985 by 3.5. For the students who did not attend graduate school, it was assumed that the total amount of loan the student reported in 1994 was used only for their undergraduate education.

HE033746

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