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The Relationship of Institutional Tuition Discounts with Enrollment at Private, Not-for-Profit Institutions

By Nathan E. Lassila

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Empirical studies exploring the impact of student aid on postsecondary enrollment often stop short of the specific examination of institutional tuition discounting. This research uses separate empirical ordinary least squares (OLS) regression models to examine three questions using public choice theory, positing that enrollment decisions may be affected by many variables but will be driven primarily by discounted cost. These questions are: Does a relationship exist between institutional tuition discount and enrollment? Does institutional tuition discount have a measurably different effect on enrollment of different racial or ethnic groups? What is the relationship between institutional tuition discount and enrollment over time? Results provide evidence of a positive relationship between increasing institutional tuition discount and enrollment, and suggest tuition discounting may be effective specifically in increasing minority enrollment.

Colleges compete for students. Many have specific institutional goals, such as increasing enrollments of low-income or other underrepresented students, raising enrollments of students with high academic achievements or other talents, or increasing net revenue from tuition and fees (Redd, 2000). College administrators use institutional tuition discounting (ITD) as a tool to help attract these students to their institution by lowering the price. While there is voluminous research regarding effects of tuition cost and financial aid on undergraduate enrollment, empirical research beyond descriptive analyses specifically addressing the effects of ITD (whether based on need or merit) on the institutional enrollment in college systems is less abundant (Davis, 2003).

Some colleges may have an idea of how ITD affects their enrollment; others lack good data or resources to assess the effectiveness of their actions (Davis, 2003). The intent of this research is to identify relationships between ITD and first-time, first-year enrollment at private, not-for-profit institutions.

Background

Institutional tuition discounting is the art and science of establishing a net price of attendance for postsecondary students at amounts that will maximize tuition revenue while achieving enrollment goals (Davis, 2003). Institutional tuition discounting has grown tremendously in recent years and as greater resources are dedicated to this type of aid (rather than to new facilities or improving instruction); greater scrutiny is needed to assess its effectiveness in attaining enrollment goals. About a quarter of the students enrolled in public colleges and universities and about 60 percent of those in private institutions receive institutional grant aid (The College Board, 2004). Institutional aid to students increased 130% from 1996-97 to 2006-07 (The College Board, 2007). The importance of this form of aid to assist affordability corresponds with the weakening purchasing power of other forms of aid. One example, the Federal Pell Grant, continues to lose purchasing power as occasional increases do not keep pace with increased cost to attend college (St. John, 2005). For example, in

1986-87, the maximum Pell Grant covered 52 percent of average tuition, fees, room, and board at public four-year institutions and 21 percent at private institutions. These figures had declined to 35 percent and 13 percent respectively by 1996-97 and 32 percent and 13 percent in 2007-08. (The College Board, 2007 and 2008).

This research does not attempt to separate need and merit ITD due to difficulty in identifying pure need-based and pure merit-based aid for the many students receiving both. Some grant aid is based only on financial need and some based only on merit, and some are based on a combination of these criteria. When students receive both types of aid under the umbrella of ITD and there is no simple way to draw a line between what is considered need-based and non-need based aid. Ambiguity is even greater for institutional grant aid, particularly at the most selective private colleges and universities that award aid only on the basis of financial need (The College Board, 2007).

National organizations, including the National Association of College and University Business Officers (NACUBO, 2008), the American Association of State Colleges and Universities (2007) and, the National Association of Student Financial Aid Administrators (Redd, 2002) have been or are exploring effects of ITD. Scholarly papers have also been written on this topic (Winston and Zimmerman, 2000; Redd, 2000; and Davis, 2003). Further, research suggests ITD may not fully achieve desired goals and may potentially incur negative externalities. For example, ITD may actually decrease enrollment, fail to result in increased net revenue, deteriorate quality of student profiles at institutions, and decrease resources available for low income students (Redd, 2000; Davis, 2003). If ITD has a limited effect on enrollment, and the possibility of negative impacts exist (especially for students in financial need), possibly its use can be modified while other alternatives are created or emphasized avoiding the negative impacts. Thus, different forms of aid mechanisms, including ITD, should be explored to provide options for federal, state, and institution policymakers to consider when attempting to increase enrollment (St. John and Starkey, 1995).

Public choice theory predicts market conditions drive individuals' choices when competing alternatives are presented (Ostrom and Ostrom, 1971). Using a public choice conceptual framework, it is assumed that as total cost of college increases, all else being equal, students and their families will choose the college or university offering the lowest cost (Winston and Zimmerman, 2000). There are several examples in education literature that discuss education phenomena using market theory (Hoxby, 1997; Winston and Zimmerman, 2000; Coulson, 1996).

The sample in this research is deliberately limited to private, not-for-profit institutions for two reasons. First, ITD has a longer history of use at private institutions and it may be assumed that this history has allowed for a more mature process that has endured trial and error in an effort to most effectively employ ITD strategies (The College Board, 2006). Second, because these institutions are private, they more closely resemble a free market, unlike public schools that are heavily subsidized by tax dollars that artificially lower published tuition costs and may decrease the effectiveness ITD has in attracting students. While the United States does not have significant competition to resemble a true free market for public education, the private education role in this limited choice framework is an appropriate approximation for effects of market theory (Coulson, 1996 and Witte, 2000). Additionally, limiting the

research to one sector differs from previous research and tightens the focus to institutions funded similarly and facing similar choice, competition, and challenges (Shin and Milton, 2006)¹. However, if evidence of a relationship is found, it may assist enrollment managers not only at private institutions, but also at public institutions as their use of ITD becomes more prevalent.

Following the framework that a rational decision will be based on cost ceteris paribus, in higher education tuition price is one element that is weighed as prospective students consider their college option.

Following the framework that a rational decision will be based on cost *ceteris paribus*, in higher education tuition price is one element that is weighed as prospective students consider their college options. Literature suggests that cost does matter in the student enrollment decision. Changes in price of tuition have been found to effect individual enrollment decisions (Leslie and Brinkman, 1987; Hossler, Braxton, and Coopersmith, 1989; Savoca, 1990; St. John, 1990; Kane, 1995; Heller, 1997; and Paulsen, 2002). Leslie and Brinkman's (1987) meta-analysis of 25 quantitative studies found evidence that increases in tuition resulted in declines in the college participation rate of approximately three-fourths of a percent per \$100 tuition increase. Similarly, St. John (1990) found that a \$1,000 increase in tuition is related to a 2.8% decrease in enrollment. Heller (1997) attempted to address relationships between tuition and enrollment by extensively reviewing literature produced since the 1987 Leslie and Brinkman work. Heller's extension of this previous research took advantage of the large number of student demand studies that gained popularity over the 10-year period. Generally, Heller's findings indicate that as price of college increases, likelihood of enrollment decreases. This simple statement is built upon various methodological approaches and model specifications investigating enrollment of poor students, wealthy students, White students, or minority students.

Other factors may impact enrollment decisions, including geographic location, socioeconomic conditions, reputation, or program offerings (Akerhielm, Berger, Hooker, and Wise, 1998; Rouse, 1994; Manski and Wise, 1983; Pamusch, 1991; Betts and McFarland, 1995; Hsing and Chang, 1996; Heller, 1999; Perna 2000; Beattle, 2002; Kane, 2003; Shin and Milton, 2006; and Titus, 2006). For instance, research suggests that after controlling for unemployment rates, tuition increases have been found to relate to decreases in public enrollments (Kane, 1995). However, although other factors may affect enrollment decisions, tuition price comparatively is more directly under the control of private, not-for-profit college enrollment administrators and their Board of Trustees and can be more easily manipulated to assist the attainment of enrollment goals.

Tuition remediation strategies through various forms of financial aid (merit and/or need-based state and federal grants or loans) have been found to be predictors of individual enrollment decisions (Leslie and Brinkman, 1987; St. John, 1990; Moore, Studenmund, and Slobko, 1991; McPhearson and Schapiro, 1994; Reyes, 1994; Kane, 1995; Heller, 1997; Avery and Hoxby, 2000; and Perna and Titus, 2002). Avery and Hoxby (2000) provide evidence that student decisions are rational in deciding whether to attend college based on financial aid. St. John (1990) modeled the change in probability of enrollment given effects of tuition change, grants, and loans, and found that all variables had a role in effecting enrollment while Moore, Studenmund, and Slobko (1991) found only grant aid was most effective indicating \$1,000 in grant aid increases

¹ It should be noted that while the research lumps all private institutions together for the purpose of analysis, it is conceded that all private not-for-profits are not in fact similar. They can differ in their selectivity, wealth, prestige, reaction to economic fluctuations, class size, and many other variables. The more important factor in focusing on private not-for-profits in this research is their similarity when compared to their public counterparts in terms of historical use of tuition discounting and pricing strategies.

the probability of student enrollment by nearly 8 percent. Heller (1997) also indicates that as aid decreases, so does enrollment of students in college. Specifically, enrollment was sensitive toward type of aid as grant awards, compared to loans, had greater relationship with increased enrollment.

While much of the research on aid and enrollment views aid generally or examines federal or state aid only, specific focus on ITD decisions is less represented (Davis, 2003). Of recent research focusing on tuition discounting and private institutions, findings indicate that freshmen at institutions with low growth in tuition discount rates increased by 11 percent, while high discounting institutions suffered enrollment decreases by 5 percent from 1990-91 to 1997-98 (Redd, 2000). Further, ITD may actually fail to increase net revenue for colleges, deteriorate quality of institutions (as it does not always lead to students with improved SAT scores), and hurt access for financially needy students (Davis, 2003).

Financial need is not always a condition for ITD, and when coupled with competition for the strongest students, low-income students may suffer (Davis, 2003). Thus, ITD may be used as incentive for students to enroll even if they and their parents could pay the full cost of tuition and fees (Redd, 2000). This suggests deleterious effects of ITD (Winston and Zimmerman, 2000). For instance, recent research suggests that increases in tuition discounting have resulted in lost net revenue of \$300 to \$800 per full-time student (Redd, 2000).

In sum, empirical research has found negative relationships between increasing tuition and enrollment. Also, increased financial aid is positively related to enrollment, specifically aid in the form of grants. While empirical evidence is less developed regarding ITD effects on enrollment, initial findings suggest failure to achieve intended goals, and may result in negative externalities when the tool is employed. Additionally, current research does not specifically address a difference in enrollment based on varying levels of ITD while controlling for other factors.

Method

This research investigates three questions: Does a relationship exist between institutional tuition discount and enrollment? Does institutional tuition discount have a measurably different effect on enrollment of different racial or ethnic groups? What is the relationship between institutional tuition discount and enrollment over time? Separate empirical ordinary least squares (OLS) regression models examine these questions.

Institutions used for the analysis include U.S. four-year private, not-for-profit, degree-granting colleges and universities. Using fall 2004-05 data from the Integrated Postsecondary Education Data System (IPEDS), OLS regression is used to present estimated relationships between average ITD and first-time, first-year college enrollment. Additional data for control variables are obtained from the American Communities Survey and the Bureau of Labor Statistics. These data serve to control for environmental factors that may impact institution enrollment rates.

For the aggregate enrollment analysis, models measure variance in first-time, first-year enrollment given variance in three discount variables (institution, state, and federal tuition discount) and demographic and reputational controls. To address enrollment by race, five separate regression models are estimated using enrollment for each race/ethnicity category as a separate dependent variable. The final question consists of the same 2004-05 variables, but will be

calculated as their change from 1999-00. Thus, six models will examine change in enrollment from 1999-00 to 2004-05 controlling for change in the other independent variables over the same time period.²

The initial sample drawn from IPEDS included 1,262 institutions. Cases without published tuition were removed from the analysis. Upon calculating ITD for the remaining institutions, those with institutional, federal, or state discounts greater than 100% were removed. Lastly, institutions with no reported composite ACT scores were removed to avoid methodological issues due to missing data. The resulting dataset used for the aggregate and five race/ethnicity models is 630 institutions. This same process of elimination was used for the final six models estimating change from 1999-00 to 2004-05. Cases with missing data were removed from the 1999-00 data year. As a result, data used for the final model measuring change over time consists of 427 cases.

Average ITD is calculated as described by Baum and Lapovsky (The College Board, 2006) and NACUBO (2008). The models presented use three discount rates (institutional, federal, and state) separately to measure the relationship of each with enrollment. Rates for state and federal grant aid (referred to as state and federal discount) are calculated in the same manner.

$$\text{Institution Average Discount Rate} = \frac{\text{Average Institutional Aid Per Student}}{\text{Published Tuition and Required Fee Rate}}$$

Control variables are similar to those used in prior research on student enrollment decisions and constitute other factors that may affect student decisions beyond cost. Individual factors such as family income and high school achievement levels have predicted likelihood of a student's applying to college (Akerhielm, Berger, Hooker, and Wise, 1998; Rouse, 1994). Institutional traits have previously been controlled for in models regarding effects on enrollment and include tuition levels, financial aid availability, "quality of school" (as measured by the average combined SAT score of incoming freshmen), and endowment value (Manski and Wise, 1983; Pamusch, 1991; Rouse, 1994; Betts and McFarland, 1995; Hsing and Chang, 1996; Heller, 1999; Perna 2000; Beattle, 2002; Kane, 2003; Shin and Milton, 2006; and Titus, 2006). The inclusion of unemployment rate, median household income, composite ACT, endowment value, tuition cost, state population, and institutions four year graduation rate is also derived from use in this previous research.

As mentioned above, a limitation of the research is the inability to distinguish need-based versus merit-based ITD. A second limitation of the research is use of private, not-for-profit enrollment as a dependent variable. The limitation is due to the potential ceiling effect these institutions may provide with self-mandated freshmen class enrollment maximums. While many schools work hard for the enrollments they obtain and are attempting to grow, some institutions, often of a very selective ilk, cap enrollment and thus limit overall growth. If this phenomenon were rampant among institutions in the sample, variance in the dependent variable would be constrained and the relationship between increasing ITD and enrollment would not be fully justified or explained.

² Endowment change was not used in these models because data were not available for 2000. Also, total completions are substituted for graduation rate due to rates not being available for 2000. ACT data were from 2001 as the data were not available in 2000.

Findings *Discount Relationship with Aggregate Enrollment*

To address the first two research questions posed, OLS regression models presented in Table 1 examine ITD's relationship with enrollment. As shown in Table 1, a positive relationship exists between ITD and aggregate enrollment as well as for enrollment of Black and Hispanic students. The model, including state environmental factors and college reputational control variables has an adjusted R^2 (.687) and an unstandardized beta of $\beta = .285$ for ITD. Federal tuition discount is negative for aggregate enrollment as well as for White, Hispanic, and Asian students, but positive for American Indian students. Standardized coefficients in the aggregate model indicate the relative strength for ITD ($b=.093$) which, while small, is among the stronger variables exceeded by graduation rate, federal discount, and average enrollment standardized coefficients.

Table 1: OLS Regression Results for Aggregate Enrollment and Enrollment by Race/Ethnicity

	Coefficients (Standardized in Parentheses)					
	Aggregate Enrollment	White	Black	Hispanic	Asian	American Indian
Institutional Discount (ITD, 2005)	.285 ** (.093)	-.024 (-.007)	.807*** (.184)	.380* (.080)	-.122 (-.022)	-.120 (-.039)
Federal Aid Discount (2005)	-.664 *** (-.140)	-1.830*** (-.296)	.199 (.029)	-.852 * (-.099)	-.799* (-.071)	.781* (.125)
State Aid Discount (2005)	.180 (.049)	.091 (.020)	-.320 (-.062)	.601** (.106)	-.383 (-.057)	.388* (.108)
Population (in millions, 2005)	.001 (.021)	-.002 (-.041)	.004 (.054)	.020** (.281)	.005** (.068)	.003 (.078)
State Median Income estimate (in thousands, 2005)	-.002 (-.037)	-.004 (-.055)	.000 (-.005)	.009*** (.097)	.014*** (.136)	-.006* (-.110)
State Unemployment Rate estimate. (2005)	.001 (.002)	.001 (.001)	.092*** (.146)	-.045 (-.066)	.022 (.029)	-.047* (-.115)
Average. First-Time, First-Year Enrollment (1995-2004)	.001 *** (.711)	.001 *** (.495)	.001 *** (.625)	.001 *** (.481)	.001 *** (.454)	.000 *** (.444)
Endowment (in millions, 2005)	-.002 ** (-.073)	-.003** (-.100)	.002 (.062)	.000 (.004)	.001 (.031)	.003** (.139)
Graduation Rate - Bachelor Degree within 4 Years, Total (2004)	.002** (.095)	.003** (.124)	-.003 (-.100)	-.004** (-.152)	-.002* (-.078)	-.001 (-.064)
ACT Composite 75th Percentile Score (2005)	-.004 (-.036)	.026*** (.182)	-.057*** (-.358)	.010 (.061)	.027*** (.137)	.013 (.122)
Published Tuition (in thousands, 2005)	.006 (.094)	.002 (.032)	.002 (.020)	.014** (.148)	.046*** (.421)	.004 (.067)
Adjusted R^2	.687	.551	.390	.507	.682	.291
	$n = 574$	$n = 556$	$n = 550$	$n = 535$	$n = 503$	$n = 394$

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$

Discount Relationship with Enrollment by Race/Ethnicity

Results indicate that ITD is positively related to Black ($\beta = .807$, adj. $R^2 = .390$) and Hispanic ($\beta = .380$, adj. $R^2 = .507$) first-time, first-year enrollment, while controlling for state environmental and institution reputational variables. Models for Hispanic and Asian provide the most information in attempting to explain factors effecting enrollment as they have a high adjusted R^2 and several statistically significant variables.

Few variables are consistent across race/ethnicity either in direction of relationship or statistical significance. One exception is average enrollment from fall 1995 to 2004. This variable is statistically significant ($p < .001$) and positive, albeit weak ($\beta = .001$), for all five race/ethnicity models and has the highest standardized coefficient of variables included in the analyses (b range = .444 to .625). This suggests that average enrollment over the past several years is a consistent predictor of current and future enrollment which is not entirely unexpected due to factors such as the ceiling effect private not-for-profits may impose to limit entering classes.

Federal discount is statistically significant for all variables except Black, and while negative for the remaining race/ethnicity variables changes from negative to positive for American Indians. A similar distinction is found for composite ACT score as it is significant for all models except Hispanic and American Indian, and has a positive relationship with the exception of Blacks.

Four of five institutional variables are statistically significant for White and Asian and three of five are significant for Hispanic. Other variables show limited impact on their respective models with two of five institutional variables being significant in each. A similar pattern is found for state environmental variables: None of the variables are significant for White, Black has one, and Hispanic, American Indian and Asian have two— none being consistent across models.

Comparing the two analyses (aggregate enrollment model and five race/ethnicity models) provides little consistency. The exception may be federal discount's negative association with enrollment across all models (except for its relationship with American Indian enrollment). Also, average enrollment is positive and statistically significant in all models.

Discount and Enrollment: Relationship Over Time

The final research question examines change in enrollment over time. Figure 1 depicts raw data for enrollment and the three discount variables over time. While average full-time, first-time enrollment has increased, discount rates have generally decreased since 1999-00. Given these descriptive data, one may hypothesize a negative relationship between ITD and enrollment.

Figure 1: Enrollment Has Increased While Tuition Discounting Has Decreased Since 1999

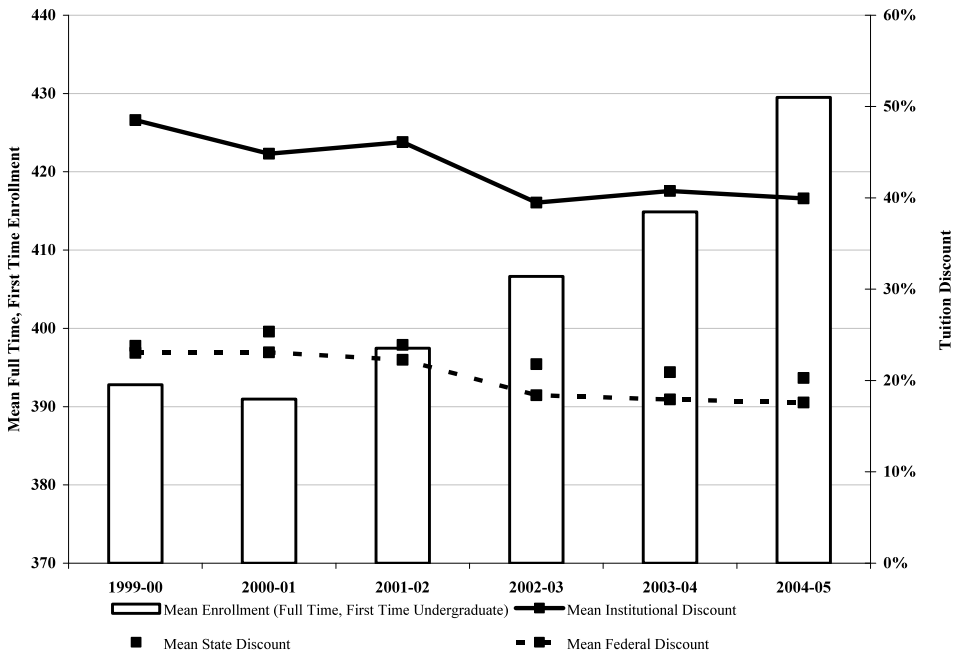


Table 2 presents the final models in this research. As shown, change in ITD has no statistically significant relationships with changes in either aggregate enrollment or enrollment disaggregated by race/ethnicity.³ Only two financial aid-related relationships appear in the regression models. The two exceptions are the positive relationship between federal discount and Black ($\beta = 64.288$) and state discount with American Indian ($\beta = 5.733$) first-time, first-year enrollments.

Table 2: OLS Regression Results for Enrollment Change from 1999-00 to 2004-05

	Coefficients (Standardized in Parentheses)					
	Aggregate Enrollment	White	Black	Hispanic	Asian	American Indian
Institutional Discount (ITD) -Change	-72.164 (-.124)	-31.282 (-.075)	-13.687 (-.090)	-2.117 (-.025)	-4.242 (-.060)	-1.023 (-.088)
Federal Discount - Change	117.032 (.098)	8.844 (.010)	64.288 ** (.205)	-1.915 (-.011)	6.509 (.045)	-2.765 (-.116)
State Discount - Change	-2.140 (-.002)	-2.851 (-.004)	-26.037 (-.088)	10.338 (.064)	2.818 (.020)	5.773 ** (.258)
Population - Change	-.006 (-.023)	-.011 (-.061)	.003 (.050)	.008 *** (.215)	-.001 (-.039)	.001 ** (.157)
Median Family Income - Change	2.199 (.070)	1.255 (.055)	.159 (.019)	.438 (.096)	.277 (.072)	.104 ** (.165)
Unemployment - Change	-4.798 (-.031)	-4.006 (-.035)	.884 (.021)	-.091 (-.004)	.120 (.006)	-.109 (-.035)
Total Completions - Change	.339*** (.409)	.233 *** (.389)	.013 (.060)	.020 ** (.170)	.012 * (.119)	.001 (.056)
ACT - Change	4.492 (.060)	4.644 (.086)	-.267 (-.014)	.662 (.061)	.481 (.052)	.004 (.003)
Tuition Price - Change	.005 (.079)	.000 (.008)	.000 (.017)	.001 * (.112)	.001 ** (.162)	.000 * (.111)
Adjusted R ²	.171	.147	.001	.091	.029	.075

n = 352.

*p < 0.05. **p < 0.01. ***p < 0.001

Discussion

This research investigates three questions regarding ITD and its relationship with undergraduate enrollment. Understanding the relationship between ITD and enrollment is important for institutions because of potential positive and/or negative effects of employing the tool.

A few conclusions can be drawn from the findings of the research. The research suggests there is a positive relationship between ITD and enrollment when examining effects on aggregate enrollment at private not-for-profit institutions. However, when disaggregating enrollment by race/ethnicity, the relationship only remains statistically significant for Black and Hispanic students. This may suggest that ITD is more effective in increasing targeted subgroup enrollment or has been employed more for these populations as institutions make efforts to increase diversity of enrollment and attract this growing population to their college.

While previous research suggests concerns that ITD may be limiting the enrollment of financially needy students or not effective at attracting high

quality students, this research's findings suggest institutions may be successfully using discounting to enroll students of color—a different subgroup (Davis, 2003).⁴ A positive relationship between discount and a specific subgroup's enrollment (in this research race/ethnicity) lends some support to previous research suggesting the effect of ITDs on enrollment of low-income students (identified as Pell Grant recipients) at institutions (Redd, 2000). The support of these findings for the effect of discount on enrollment, suggests that future research estimate effects on a range of dependent variables representing student characteristics to see how the student body may be changing or diversifying rather than merely growing.

Models analyzing change over time provide no statistically significant support for ITD. However, this may be due to the limitation discussed previously regarding enrollment ceilings at many institutions. Failure to produce statistical significance may only mean that ITD does not greatly influence continual, cumulative growth of enrollments over time at private, not-for-profit institutions. It may however mean that what ITD is doing is changing is the profile of the students enrolled.

Comparing the aggregate cross-sectional and longitudinal models shows a differing direction of relationship for statistically significant discount variables. In the 2004-05 cross-section, federal discount is negative in all models (with the exception of the positive relationship with American Indian enrollment). However, in the model looking at change over time, the relationship is positive for Black enrollment. ITD is positive for statistically significant variables in the cross-section, but is no longer significant in the longitudinal model. State discount is negatively associated with all enrollments, positive in two models looking at relationship with enrollment by race, and positive for American Indian enrollment in the longitudinal model.

The inconsistent statistical relationship of discount variables may be a product of the decreasing value these forms of aid have maintained over time. While these discount variables have remained flat or decreased over time, institutions tuition and fees have increased. Thus, the value of even a flat discount rate is diminishing as the costs not covered are increasing in real dollars.

This research provides useful information to private not-for-profit institutions and public institutions as their use of ITD grows. For public institutions, the variance in enrollment may be greater as they may be less prevalent to strictly cap enrollment of incoming freshmen. Thus, to provide greater detail regarding the specific impact ITD has for public institutions, they should be included or examined separately in future research.

While ITD may be an effective tool for private not-for-profit enrollment managers to employ in an effort to increase enrollment or attract specific subgroups, the impact of negative externalities must be reconciled. Essentially, this research provides evidence for one side of the cost benefit equation, i.e., that ITD is positively related to aggregate enrollment. Armed with this information, enrollment managers must weigh potential negative externalities in a cost benefit analysis to determine if discounting should be used at all, and if so, to what degree should discounts be awarded.

References

- Akerhielm, K., Berger, J., Berger, M. H., Wise, D. (1998). *Factors related to college enrollment*. Department of Education, Washington, DC. Office of the Under Secretary.
- Avery, C., Hoxby, C. M. (2000). *The college admissions project: Counselor report*. Harvard University.
- Beattle, I. R. (2002). Are all “adolescent econometricians” created equal? Racial, class, and gender differences in college enrollment. *Sociology of Education*, 75:19–43.
- Betts, J. R., and McFarland, L. L.(1995). Safe port in a storm: The impacts of labor market conditions on community college enrollments. *Journal of Human Resources*, 30(4):741–765.
- Coulson, A. (1996, June 12). Markets versus monopolies in education: The historical evidence. *education policy analysis archives*. 4(9). Retrieved from <http://epaa.asu.edu/epaa/v4n9.html>
- Davis, J. S. (2003). *Unintended consequences of tuition discounting*. Lumina Foundation. 5(1).
- Heller, D. E. (1997). Student price response in higher education: An update on Leslie and Brinkman. *Journal of Higher Education*, 68(6): 624–659.
- Heller, D. E. (1999). The effects of tuition and state financial aid on public college enrollment. *The Review of Higher Education*, 23(1), 65–89.
- Hillman, N. (2007). *Tuition discounting at AASCU institutions*. *Policy Matters*, 4(2).
- Hossler, D., Braxton, J., and Coopersmith, G. (1989). Understanding student college choice. In J. C. Smart (Ed.), *Higher education: Handbook of theory and research*. 5, 231–288. New York: Agathon Press.
- Hoxby, Caroline. (1997). *How the changing market structure of higher education explains college tuition*. NBER Working Paper 6323.
- Hsing, Y. and Chang, H. S. (1996). Testing increasing sensitivity of enrollment at private institutions to tuition and other costs. *The American Economist*, 40(1), 40-45.
- Jespen, T. J. (1995). *Rising public college tuition and college entry: How well do public subsidies promote access to college?* Working Paper Series No. 5164. Cambridge, MA: National Bureau of Economic Research.
- Kane, Thomas J. (2003). *A quasi-experimental estimate of the impact of financial aid on college-going*. Working Paper 9703. From <http://www.nber.org/papers/w9703>.
- Leslie, L. L., and Brinkman, P. T. (1987). Student price response in higher education.” *Journal of Higher Education*, 58(2):181.
- Manski, C. F. and Wise, D. A. (1983). *College choice in America*. Cambridge, Mass: Harvard University Press.
- McPhearson, M. S. and Schapiro, M. O. (1994). *Keeping college affordable: Government and educational opportunity*. Washington: The Brookings Institution.
- Moore, R.L., Studenmund, A.H., and Slobko, T. (1991). The effect of the financial aid package on the choice of a selective college. *Economics of Education Review*, 10(4), 311-321.

- National Association of College and University Business Officers. Tuition discounting study: Frequently asked questions. Retrieved April 4, 2008, from <http://www.nacubo.org/x549.xml?ss=pf>.
- Ostrom, V. and Ostrom, E. (1971). Public choice: A different approach to the study of public administration. *Public Administration Review*. 31(2), 203-216.
- Pampusch, A. (1991, Fall). What strategy for women's colleges? *Planning for Higher Education*, 20(1), 24-28.
- Paulsen, M. B., and 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 college enrollment among African Americans, Hispanics, and Whites. *Journal of Higher Education*, 71(2), 117–141.
- Perna, L. W., and Titus, M. (2002). *Understanding the barriers to college access for low-income students: The role of state context*. Paper presented at the 19th annual NASSGAP/NCHELP Financial Aid Research Conference, Denver.
- Redd, K. E. (2000). *Discounting toward disaster: Tuition discounting, college finances, and enrollments of low-income undergraduates*. USA Group Foundation: New Agenda Series. 3(2).
- Redd, K. E. (2002). Funding and distribution of institutional grants in 1999-2000. Results from the 2001 Survey of Undergraduate Financial Aid Policies, Practices, and Procedures. *Journal of Student Financial Aid*, 32(2).
- Reyes, S. (1994). *The college enrollment decision: The role of the guaranteed student loan*. Unpublished paper, Harvard University, Cambridge, Mass.
- Rouse, C.E. (1994). What to do after high school: The two-year versus four-year college enrollment decision. In R. G. Ehrenberg (Ed.) *Choices and consequences: contemporary policy issues in education*. Ithaca, NY: ILR Press, 59-88.
- Savoca, E. (1990). Another look at the demand for higher education: Measuring the price sensitivity of the decision to apply to college." *Economics of Education Review*, 9(2), 123.
- Shin, J. and Milton, S. (Winter 2006). Rethinking tuition effects on enrollment in public four-year colleges and universities. *The Review of Higher Education*. 29 (2), 213–237.
- St. John, E. P. (1990). Price response in enrollment decisions: An analysis of the High School and Beyond Sophomore Cohort. *Research in Higher Education*, 31(4), 161.
- St. John, E. P. and Starkey, J. B. (1995). An alternative to net price. *Journal of Higher Education*. 66 (2), 156-186.
- St. John, E. P. (2005). *Affordability of postsecondary education: Equity and adequacy across the 50 states*. Report prepared for: Renewing Our Schools, Securing Our Future and A National Task Force on Public Education.
- The College Board. (2004). *Trends in student aid*. Trends in Higher Education Series. [Electronic version] Retrieved from http://www.collegeboard.com/prod_downloads/press/cost04/TrendsInStudentAid2004.pdf

The College Board. (2006). *Tuition discounting: Not just a private college practice*. [Electronic version] Retrieved from http://www.collegeboard.com/prod_downloads/press/tuition-discounting.pdf

The College Board. (2007). *Trends in student aid*. Trends in Higher Education Series. www.collegeboard.com.

Titus, M. A. (2006). Understanding college degree completion of students with low socioeconomic status: The influence of the institutional financial context. *Research in Higher Education*, 47(4).

Winston, G. C. and Zimmerman, D. J. (July/August 2000). *Where is aggressive price competition taking higher education? Change*. Also <http://www.williams.edu/wpehe/DPs/DP-56.pdf>.

Witte, J. F. (2000). *The market approach to education: An analysis of America's first voucher program*. Princeton University Press.