# Effects of Tuition Price, Grant Aid, and Institutional Revenue on Low-Income Student Enrollment

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***Evidence of greater economic stratification brings challenges to higher education's enrollment of low-income students. With a growing proportion of potential college students coming from low-income households, increasing their post-secondary participation rate is vital in developing and growing the pool of educated individuals for the labor force as educated baby boomers retire. Using a combination of IPEDS, NPSAS:08, U.S. Census, and ACT data, this study analyzes three empirical models for public, private not-for-profit, and all institutions (both public and private not-for-profit institutions combined). Findings support previous scholarship in that price and grant aid affect student enrollment. Adding to the research regarding institutional revenues, findings indicate institutional revenues at private not-for-profits are significant and positively related to low-income enrollment.***

Research has shown that low-income students do not enroll in or complete college at the same rate as their higher-income peers. As the changing demographics and financial policies in the United States bring greater economic stratification, challenges to higher education enrollment and degree production will increase. This poses a problem for an economy that is predicted to require a higher proportion of individuals with a college degree. Policymakers note the United States will need to maintain or likely increase the proportion of individuals with a college credential. At the same time the population that has been less likely to participate in college is increasing as a proportion of the population. This will challenge the country's ability to increase college participation and completion. The purpose of this research is to examine factors associated with enrollment of low-income students. Being from a low-income family has proven to be a major risk factor for college participation and this population is growing. Specifically, this research examines the relationship with tuition costs, effects of specific sources of grant aid, and institutional revenue for public and private not-for-profit, 4-year institutions. Examining institutional revenue as a factor of low-income enrollment, in conjunction with price and aid, hopes to add to the variety of literature examining enrollment trends.

## Background

A growing number of Americans live in poverty. According DeNavas-Walt, Proctor, and Smith of the U. S. Census Bureau (2010), the poverty rate in 2009 (14.3%) was at its highest level since 1994, and the number of people in poverty in 2009 (43.6 million) is the largest it has been in the 51 years that Census data have been published. Most recently, between 2008 and

2009, the poverty rate increased for children under the age of 18 (from 19.0% to 20.7%) and people age 18 to 64 (from 11.7% to 12.9%).

Along with the growth of the general population who are in poverty, low-income student enrollment (defined as Pell grant recipients) in postsecondary education has increased greatly over the past three decades. However, there is a large gap in the ratio of low-income and higher-income students who enroll in post-secondary education (Schultz & Mueller, 2006). While college enrollment rate for students from low-income families has increased over the past 35 years, the rate for students from higher-income families has been much greater. One study indicates an enrollment gap between individuals from low-income families and those from higher-income families. The research notes that 40% of low-income students participate in college while 81% of individuals from higher-income families participate (Engle & O'Brien, 2007). More recently, the National Center for Education Statistics (NCES) indicates that in 2009, immediate college enrollment (i.e., enrollment in the fall following high school graduation) for high school completers from low-income families was 55% compared to 84% of high-income completers (Aud, Hussar, Kena, Bianco, Frohlich, Kemp, & Tahan, 2011). As the proportion of lower income students grows, one important approach to maintain or grow the country's proportion of the population that has a college credential is to increase the percent of low-income students that continue on to college.

Low enrollment rates of low-income students are not necessarily reflective of their academic ability (Baum & Ma, 2007). According to the Baum and Ma (2007), comparing all students that scored in the top quartile on an eighth grade math assessment, thus students of high academic ability, the college completion is staggering among the high achieving students when income levels are examined. Completing college for low-income families (29%) is dramatically lower when compared with high income families (74%).

While there are many challenges for individuals from low-income families concerning college enrollment, financial challenges can be mitigated by policy that reduces costs for these students. Lower cost may counter the fact that low-income students are debt averse and will avoid borrowing to participate in college (Burdman, 2005; Mortenson, 1988). High loans and the aversion to accumulate debt create consequences for higher education degree production. Students with large loans persist at lower rates than those with less loans or no financial need (Bresciani & Carson, 2002). Even at less expensive community colleges, students who borrow may be less likely to persist in their education than non-borrowers (Dowd & Coury, 2006).

From the policy perspective, policymakers note that the U.S. needs more college credentials to maintain and grow the economy. At the same time, the future college enrollment pool is becoming more low-income proportionately. Further, low-income students participate and complete college at lower rates. This jeopardizes the future output of college graduates from the higher education system unless low-income student higher education participation and completion increase.

In 2010, the Organisation of Economic Cooperation and Development (OECD) reports 40% of U.S. population aged 55 to 64 are the world leaders in holding a college degree when compared to 31 industrialized countries. Conversely, the percent with a college credential for the age group 25 to 34 is similar to aged group 55 to 65; however, the U.S. is not world leaders in holding a college degree for the age group 25 to 34. In fact, several other countries have caught and surpassed the U.S. rate. In addition to our stagnant rate and growing world competition, the population of 25 to 34 year olds in the U.S. is much smaller than the 55 to 64 year olds.

The under-representation of low-income students in higher education poses economic problems to the extent it contributes to the U.S. failing to maintain or increase postsecondary degree production. The likelihood of matching the jobs that will be created over the next decade and the education and training of our adult workers may be low if the proportion of low-income, college age individuals enrolling in higher education does not increase. Further, postsecondary education and training is quickly becoming the only viable path to the American middle class. Estimates suggest that the postsecondary education and training system will fall short by three million or more postsecondary degrees; that kind of breakdown in the ability to meet employers' needs would have a negative impact on the economy and decrease access to a middle class (or greater) career (Carnevale, Smith, & Strohl, 2010).

## Theoretical Framework

Using a public choice theoretical framework, students and their families will choose the college or university offering the lowest cost *ceteris paribus*, meaning while holding everything else as constant (Winston & Zimmerman, 2000). No doubt there are several challenges specifically for low-income students to navigate when considering college including lacking knowledge of how to apply or find financial aid information, being averse to accumulating debt, and of course published cost. The market theory employed herein suggests that all else being equal, cost (as impacted by institutional wealth to subsidize students) will be a deciding factor. In addition to barriers, there are also student preferences such as small or large college, faith based, or location. Again, all things being equal, the research theorizes that cost will play the larger role in enrollment decisions.

There are several examples in education literature that discuss education phenomena using market theory (Coulson, 1996; Hoxby, 1997; Winston & Zimmerman, 2000). Winston and Zimmerman (2000), who investigated the price competition among post-secondary institutions, found institutions with lower tuition prices were considered wealthier colleges and may have an advantage in luring low-income student enrollment over institutions with fewer resources.

A large body of work regarding enrollment responsiveness suggests that increases in cost negatively impact enrollment decisions (Kane, 1995; Heller, 1997; Hossler, Braxton, & Coopersmith, 1989; Leslie & Brinkman, 1987; Paulsen & St. John, 2002; St. John, 1990; Savoca, 1990). Foundational research from Leslie and Brinkman's (1987) meta-analysis of 25 quantita-

tive studies found evidence that tuition increases resulted in declines in the college participation rate of approximately 0.75% 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.

Changes in published price having a negative relationship with enrollment generally, may be exacerbated when examining enrollment rates of low-income students. Low-income students, more so than their more affluent peers, lack specific information on college going (De La Rosa & Tierney, 2006; Kane & Avery, 2004). This leads to perceptions that the published tuition price is too costly and college is out of reach. Yet students and families do not know to take into account that the published tuition price is often subsidized by government and institutional grant aid; thereby, the actual net cost, or the out-of-pocket costs, to students is much lower than the published tuition price.

When need is not met through grant aid, borrowing is considered a solution and borrowing by students has increased dramatically in the past decade. However, there seems to be validity to the perception that certain racial/ethnic groups are more averse to borrowing than other groups (Cunningham & Santiago, 2008). Asian and Hispanic students are less likely to borrow even if they have significant remaining financial debt after receiving grant aid. This pattern for Asian and Hispanic students holds true across income levels, types of institutions attended and whether they attend full- or part-time. Hispanic students and parents have been found to prefer to make college choices based on their current income situation and base their college choices on the "sticker price" of a college education without considering types of aid available. Similarly, Asian parents have indicated that loan debt is a negative situation for students and their families (Cunningham & Santiago, 2008). The sticker shock phenomenon has a substantial effect on college enrollment decisions of low- and middle-income families where cost is a larger determinant of the college-going decision (Kane, 1999; King, 1999; McPherson & Schapiro, 1998).

While increases in published tuition are negatively associated with enrollment, financial aid has been found to improve enrollment odds. Avery and Hoxby (2000) found the student enrollment decision to be rational driven by receipt of financial aid. Dynarski (2003) examined the effect of a federal grant program on college enrollment over time. Examining aid options and enrollment data from 1965 to 1982, Dynarksi's research suggests that the elimination of financial aid through the Social Security Student Benefit program was related to significant decreases in college enrollment.

Research suggests that both state and federal grant aid can play a role in increasing enrollment. More specifically, distinctive state aid programs are helpful in encouraging enrollment while not diminishing the effectiveness of federal aid. Singell, Waddell, and Curs (2006) examined the implementation of the merit-based HOPE (Helping Outstanding Pupils Educationally) scholarship in Georgia. They found the implementation of the HOPE scholarship was associated with improved access for low-income students.

Preparation and achievement of rigorous courses are often cited as factors related to enrollment after high school (Adelman, 2006; Choy, 2002; Fitzpatrick & Turner, 2006). Academic preparation in high school has been shown to lead to positive higher education outcomes. Students who take rigorous courses in high school are more likely to enroll and complete college than those who do not (Adelman, 2006; Choy, 2002). However, the effect of aid remains an important predictor of enrollment even when controlled for by other factors such as academic preparation. For instance, an examination of Indiana's Twenty-first Century Scholars Program showed that academic support for low income high school students had a modest influence on college participation. Grant aid however played a large part in the participation decision and seemingly a necessary component to the postsecondary program (St. John, Musoba, Simmons, Chung, Schmit, & Peng, 2004).

Parents' highest educational attainment has a positive relationship to their children's postsecondary options. As parents' education increase, high school graduates are more likely to plan to continue their education immediately after high school, are more likely to enroll within two years, and, if they planned to attend a four-year college immediately after high school, are more likely to do so (Choy, 2002). In this study, the regression models will control for academic preparation and parental education of enrolled low-income students.

As presented, the literature is filled with studies examining the effects of college enrollment. This research attempts to add to that literature by investigating the relationship of institutional wealth with low-income enrollment while also including price and aid variables. If lower college cost is a driver for student decision making, it would make sense that a wealthier college (i.e., those with higher tuition revenue, larger endowment and investment revenue) would be at an advantage than a college with fewer resources. A central economic fact of the higher education market is the differences in schools' revenues create a pronounced hierarchy based on schools' wealth and the student subsidies it is able to provide (Winston & Zimmerman, 2000). While Winston and Zimmerman examine the effect of institutional wealth and price competition, this research will empirically test the relationship between low-income enrollment and institutional wealth.

## Data and Method

Previous research has noted the complicating factors related to cross state analysis of tuition change and enrollment. Different market conditions by state may affect pricing policies largely based on student supply and demand or recession periods (Fitzpatrick & Turner, 2006). Thus, this research attempts to control for these dimensions. One such variable that may affect an institution's cost is its revenue. Investment return and government appropriations are institutional revenue streams that can contribute to lower published tuition. In the past few years, several states have seen the erosion of public dollars to subsidize college costs. Likewise, institutional revenue has seen decreasing returns which may cause some colleges to temporarily limit payout for financial aid.

Institutional revenue is measured using the 2007-08 Integrated Postsecondary Education Data System's (IPEDS) total revenue variable from the Finance Survey. The total revenue variable is the sum of the following amounts: tuition and fees; government appropriations, grants and contracts; private gifts, grants, and contracts; contributions from affiliated entities; investment return (income, gains, and losses); sales and services of educational activities and auxiliary enterprises; hospital revenue; independent operations revenue; and other revenue.

Few empirical studies have examined the relationship between institutional revenues and enrollment. In this research, institutional revenues are examined as a predictor of low-income students' enrollment in the models. Institutional revenues are measured as the sum of state appropriations and revenues from other streams including tuition and fees and investment return. As expected, private not-for-profit colleges have no state appropriations while public institutions have both appropriations and investment returns to a lesser degree.

Demographic shifts may be associated with changes in enrollment such as growth of various subgroups or the population in general. Controlling for state level demographic data such as median household income, percent of state population in poverty, total state population are also part of the analysis.

The dependent variable low-income enrollment is measured as the enrollment rate of students receiving a federal Pell grant. This is calculated as the percent of Pell grant recipients of total enrollment. The use of Pell grant to identify an institution's low-income enrollment has limitations. It is possible that some students from low-income families do not file for financial aid and thus not only do not receive Pell grant and thus would not be identified in the data. International or undocumented students also would not be included if they are low-income as they are not eligible for federal aid. Finally, low-income enrollment would be understated by students that are low income, but never apply or enroll in college due to factors such as price being perceived as so far out of reach that they never consider applying for college. However, given these limitations, the use of Pell grant recipients as a proxy for low-income students is the best option available from the source data used for the study.

In addition to the total revenue variable of interest, other institutional data for higher education variables are also obtained from the IPEDS. For the year 2007-08, a total of 1,631 four-year degree granting (primarily baccalaureate or above) institutions are included in the analysis (530 public and 1,101 private not-for-profit). Cases with missing data for tuition were removed. Other state-level data are obtained from the National Postsecondary Student Aid Study (NPSAS:08), American College Testing office (ACT), and the U.S. Census Bureau. Descriptive statistics are provided in Table 1. All variables represent the year 2007-08 except the state average ACT score which is for year 2006-07. ACT is lagged as it represents the performance attained in the year prior to the college enrollment year.

## Table 1: Descriptive Statistics

| Variable | Minimum | Maximum | Mean | Standard Deviation |
|---|---|---|---|---|
| Percent enrollment receiving Pell Grant | 0.00% | 94.48% | 25.34% | 14.18% |
| Published tuition (in 100's) | $ 20.60 | $ 392.40 | $ 155.37 | $ 96.18 |
| Average all grants (in 100's) | $ – | $ 326.29 | $ 76.64 | $ 47.72 |
| Average amount of federal grant aid received (in 100's) | $ 4.98 | $ 97.94 | $ 38.58 | $ 9.62 |
| Average amount of institutional grant aid received (in 100's) | $ 0.70 | $ 322.86 | $ 74.72 | $ 56.78 |
| Average amount of state/local grant aid received (in 100's) | $ 2.52 | $ 107.06 | $ 32.35 | $ 17.18 |
| Total revenue in millions (appropriations, investment return, or other sources) | $ – | $5,699.78 | $ 110.28 | $ 359.04 |
| Undergraduate enrollment (in 1,000's) | .01 | 56.91 | 5.42 | 7.37 |
| State population (in 100,000's) | 5.33 | 367.57 | 107.93 | 90.96 |
| State median household income (in 1000's) | $ 37.79 | $ 70.55 | $ 52.50 | $ 7.59 |
| Percent of population in poverty (State Average) | 5.76% | 14.55% | 9.54% | 1.64% |
| ACT composite (State Average) | 18.9 | 23.6 | 21.63 | 1.09 |
| Level of low-income parent's educational attainment (State Average) | 3.1 | 6.5 | 4.08 | .61 |
| Low-income students years of math completed (State Average) | .0 | 3.8 | 3.44 | .41 |
| Percent of low-income students earning Advanced Placement credit (State Average) | 0.00% | 31.80% | 18.33% | 4.55% |

Note: All institutions included are degree granting, granting at least a bachelor's degree. Fifty-four institutions have total enrollment less than 100 students including the lowest, Yeshiva Toras Chaim Talmudical Seminary, with 9 reported students.

Demographic variables obtained from the U.S. Census Bureau are used as state level controls. Population, percent of population in poverty, and median household income are included. As research suggests that K-12 preparation and family educational history are positively associated with college enrollment (Adelman, 2006; Choy, 2002; Fitzpatrick & Turner, 2006; Perna & Titus, 2004), this research attempts to control for preparation using data from NPSAS:08 reflecting college students from families at or below 200% of federal poverty guidelines for 2008.

Parent's educational attainment is measured on a numeric scale indicating level of postsecondary education attained ranging from no education completed to completion of doctoral study. The data represented in this research has a mean of four which corresponds to less than two years of college, a minimum of three indicating vocational or technical training, a maximum of 6.5 which is between those that have at least two years of college with no degree and those completing a bachelor's degree.

This research examines the association between multiple factors and low-income enrollment. The data reflect a linear relationship between the independent and dependent variables and are normally distributed; therefore, ordinary least squares (OLS) regression is suitable for the analysis. In addition to tests for normality, the model also did not suffer from multicolinearity, where two or more variables are highly correlated. Three separate empirical models will be analyzed: 1) for all institutions combined, 2) public only, and 3) private not-for-profit only. Examining each sector individually will provide a comparison of how the endogenous variables may effect enrollment under different enrollment management models varying between public and private institutions.

## Findings

Results from three OLS regression analyses are shown in Table 2. A review of the results indicates that the relationship with low-income student enrollment is similar whether looking at all institutions combined or public and private not-for-profit institutions separately. Five of the primary variables of interest are statistically significant in models representing all institutions and private nonprofits only and four are statistically significant for public institutions only sharing the same directional relationship in all three models. One of the control variables, total undergraduate enrollment, was also statistically significant indicating a negative relationship with low-income enrollment.

Similar to previous research, higher tuition has a statistically significant, negative relationship with low-income student enrollment, regardless of sector (Heller, 1997; Hossler, Braxton, & Coopersmith, 1989; Kane, 1995; Leslie & Brinkman, 1987; Paulsen, & St. John, 2002; St. John, 1990; Savoca, 1990). Additionally, total grant aid received is positively related to enrollment. This suggests that increasing aid from all sources to lower net tuition may positively impact low-income student enrollment. Interestingly, while total aid received is positive, individual aid sources separately do not have the same directional relationship. Federal grant aid is not statistically significant in any of the models while state grant aid and institutional grant

## Table 2: OLS Regression Results on Low-Income Student Enrollment

| | Coefficients (Standardized on Bottom) | | |
|---|---|---|---|
| | **All Institutions** | **Private Institutions** | **Public Institutions** |
| Published tuition (in 100's) | -.048 *** | -.090 *** | -.107 *** |
| | -.355 | -.486 | -.197 |
| Average amount of all grant aid received (in 100's) | .088 *** | .036 ** | .295 *** |
| | .318 | .106 | .353 |
| Average amount of federal grant aid received (in 100's) | -.007 | .052 | .028 |
| | -.005 | .040 | .013 |
| Average amount of institutional grant aid received (in 100's) | -.086 *** | -.040 ** | -.091 ** |
| | -.375 | -.167 | -.137 |
| Average amount of state/local grant aid received (in 100's) | -.069 *** | -.050 * | -.110 ** |
| | -.090 | -.068 | -.114 |
| Total revenue in millions (appropriations, investment return, other sources) | .002 * | .002 * | -.001 |
| | .052 | .071 | -.013 |
| Undergraduate enrollment (in 1,000's) | -.621 *** | -.940 *** | -.356 *** |
| | -.353 | -.209 | -.288 |
| State population (in 100,000's) | .010 * | .001 | .024 *** |
| | .068 | .003 | .192 |
| Median household income (in 1,000's) | .155 *** | .188 | .000 |
| | .090 | .101 | .000 |
| Percent of population in poverty | 1.88 | 1.862 *** | .391 |
| | .238 | .215 | .059 |
| ACT composite (2007) | -.034 | .535 | -.132 |
| | -.003 | .042 | -.012 |
| Level of low -income parent's educational attainment (State Average) | -.445 | -.861 | -1.537 |
| | -.021 | -.037 | -.086 |
| Low-income students years of math completed (State Average) | .112 | -.352 | 4.549 * |
| | .004 | -.010 | .176 |
| Percent of low-income students earning Advanced Placement credit (State Average) | .029 | .123 | -.224 |
| | .010 | .040 | -.092 |
| Adjusted R2 | 0.306 | 0.389 | 0.305 |
| N | 1,631 | 530 | 1,101 |

Dependent variable: Percent Students Receiving Pell Grant
* p <.05, ** p < .01, *** p < .001
Data were tested and found no problems associated with multicolinearity.

aid have a statistically significant, negative relationship with low-income student enrollment. This may suggest that each aid source alone does not impact the enrollment decision, but the packaging and accumulation of all grant aid sources does.

The relationship between Pell grant and enrollment of low-income students in this research may lack statistical significance for multiple reasons. This research examines a snapshot in time where change or variance in Pell grant received is limited. Thus with such little room due to a federal maximum, institutional variance in the Pell grant variable is small. For example, a similar low-income student attending a similar institution would receive the same average Pell grant. Thus, there is limited variance to be measured between institutional enrollment and Pell grant amount. Also, as Pell grant average is measured at an institutional level, the average award across institutions would be relatively the same whether enrolling one student or 100 students as the average by institution is essentially dictated by federal policy. Again, there would be minimal variance explained between the institutional Pell grant average and enrollment level. However, total grant aid includes greater variability in the average amount received as it includes differing state and institutional aid policies.

Institutional revenues have a statistically significant positive relationship with low-income enrollment for models including all institutions and private not-for-profit only. While private institutions' revenues are based on investment earning and other revenue streams, public revenues come from both sources but are predominately state appropriations. For the cases used in the three models, mean state appropriations to private nonprofits are zero while publics have a mean of over $86 million. Private not-for-profit mean revenue from other sources is $115 million compared to public institutions mean of $15 million. It would initially appear that the revenues from non-government sources drive the statistical relationship as it is statistically significant in the private nonprofit model and for all institutions. These revenues are typically from endowment income and other investment activities. Typically, a percentage of endowment revenues are spent down in the form of financial aid and, thus, may be the reason for the positive relationship with low-income enrollment as institutions with high revenue are redistributing it toward financial aid with the intent to increase low-income student access.

Increased enrollment is not related with greater low-income enrollment. This finding suggests that simple enrollment increases may not contribute to a proportional increase in low-income students. While the number and percent of the U.S. population in poverty has grown over time, this has not seemed to impact the rate of enrollment of low-income students.

## Discussion

Previous research, as well as current policy discussion, has indicated the importance of the United States to increase the proportion of the population with a college degree. Over the decades the U.S. has lost its leading position in terms of the population with a college degree. According to data from the OECD, the U.S. was a leader for those aged 55 to 64 with

40% of the population attaining some postsecondary credential (OECD, 2010). However, when looking at a younger age cohort, 25 to 34, while the percent of the population attaining a degree has remained relatively the same, U.S. has lost its position as many countries have surpassed or caught up to the U.S. rate of attainment. Additionally, while the U.S. percentage attaining a college credential has remained at a similar rate, this does not reflect the drop in raw numbers as the younger cohort reflects a smaller total compared to the baby boom generation.

The need for college educated individuals to spur innovation and replace retiring baby boomers will be further challenged by the growth of low-income students who have traditionally attended and completed college at lower rates. To increase the rate of enrollment and completion of this subgroup, policy options should be explored to determine what may account for an increase in participation.

The negative relationship between low-income enrollment and published tuition may suggest that institutions with higher tuition and low levels of grant aid see lower rates of enrollment of the low-income population. This could be the effect of student sticker shock or a rational decision based on costs being too high or insufficient grant aid. To lower costs, institutions use one or all financial aid sources including federal, state, and/or institutionally funded grant aid. Grant aid lowers the net price paid and according to this research and previous scholarly work, has a positive relationship with enrollment. Previous scholarly work also note key findings that financial aid, specifically grants that do not have to be paid back, had a positive effect on access and persistence, and encouraged students to enroll in more expensive institutions(Avery & Hoxby, 2000; Dynarski, 2003).

Another detriment of high published tuition is that it often will eliminate that institution from a list of choices for a low-income student before the student even communicates with any institution. This early "table sweep" is due to lack of knowledge related to financing college. High tuition may be a barrier to low-income student enrollment as they may not understand the financial aid that is available to lower net price (Johnstone, 1999). Further, states with high tuition, high aid policy may still lose students that should attend a four-year college to less expensive two-year institutions due to this lack of financial aid knowledge (Johnstone, 1999). While it is reasonable to suggest many financial and non-financial factors play a role in the enrollment decision by students, pricing policies are among the only factors that are under the direct control of postsecondary education policy makers in state governments, the federal government, and in public and private colleges and universities (Heller, 2001).

The findings indicate that total grant aid is a statistically significant contributor to the rate of low-income enrollment, though individual aid sources do not share the same relationship. This suggests that each option on its own does not contribute to greater low-income student enrollment, but the grant aid package as a whole does. One example of the reason for this relationship may be that the federal needs analysis formula does not guarantee that a student will have all demonstrated financial need met. Thus, total Pell grant may be less than total financial need leading to fiscal

constraints that may limit the college options a low-income student will consider if college is chosen at all (Fitzpatrick & Turner, 2006). The models use of total grant aid includes greater variability in the average amount received as it includes the differing state and institutional aid policies by state and institutions.

Previous research has shown the disparity in price paid for an education between wealthy and less wealthy institutions (Winston, 1999). Winston (1999) found that students enrolled at the wealthiest 10% of institutions paid $.20 for each dollar of institutional educational spending while students in the poorest 10% paid $.78 for each dollar of educational spending. Thus, institutional revenue was found to have an effect on price paid.

A primary variable of interest in this study, institutional revenues, is statistically significant and positive for the model including all institutions and the model for private not-for-profit institutions only. Thus, institutions may be encouraging college enrollment of low-income students by subsidizing student costs with funds derived through institutional revenues. Generally, public institutions receive state appropriations and private nonprofit institutions rely on investment revenue. However, this is not to discount growth in public institutions endowment which has led to increased institutional aid that could curb costs or be used for need based aid. The recession has affected both of these revenue options in recent years. Public institutions have experienced budget cuts or freezes and private not-for-profit have seen decreased endowment value which reduces the funds that are used for tuition subsidy and need-based aid.

The positive relationship between higher revenues and low-income enrollment may be a reflection of trends over the past decades. Per capita revenues have increased for all sectors of education but the greatest growth has been primarily at private nonprofits and research universities. This includes revenue from tuition and appropriations from government. Over the same time, institutional grant aid funding has increased in terms of spending of discretionary revenue (Wellman, Desrochers, & Lenihan, 2008).

Previous research has examined the advantage of wealthier schools, and hypothesized effects on enrollment noting the advantage of being able to provide greater subsidies to students (Winston & Zimmerman, 2000). As private not-for-profit institutions have relied on the creation and funding of endowments for longer, it may contribute to the reason this variable is statistically significant for private nonprofits but not publics. However, having access to large resources doesn't mean an institutions total enrollment will increase. For instance, private not-for-profit institutions have an inflexible access to providing financial aid due to donor restrictions. Such restrictions limit an institution's full capacity to subsidize their students; in other words, the more an institution expands the total number of students, the less subsidy amount each student receives (Winston & Zimmerman, 2000). Thus, the use of subsidy may be used to support need-based aid and increase low-income access as supported in this research or to target

other demographic groups, and thereby, changing the composition of their student body not simply expanding it.

There is evidence that the institutions that serve the majority of low-income students are overwhelmingly those that have the least to invest in their success, and more low-income students are being concentrated in these institutions (Wellman, et al., 2008). This may be true of the raw numbers of low-income students enrolling in college. However, the findings in this research indicate that four year institutions exhibit a relationship between higher revenues and enrolling a higher rate of low-income students. This evidence could provide policymakers and university administrators evidence of the positive effect four-year institutions with higher revenues can have on lower income students' college participation.

## Conclusion

This research suggests that higher education policy can have a role in increasing low-income student enrollment. Increasing published tuition may have a negative effect on the enrollment of low-income students. However, when that published tuition is mitigated by grant aid, the lower net tuition may lead to increased enrollment. Additionally, higher published tuition alone is not necessarily a problem as affluent students, able to pay the full price, contribute to an institution's operational costs and to the ability of institutions to provide institutional grant aid to students of lesser means. This model of higher education would be considered high tuition, high aid. It is important for states with this policy framework is to ensure that need-based grant aid keeps up with inflation or risk becoming a high tuition, moderate- or low-aid state. This latter condition would lead to lesser low-income enrollment as suggested by the findings in this research.

Evidence from this research suggests that institutional revenues have a positive relationship with enrollment of low-income students at four-year institutions, specifically private not-for-profit. While revenues at institutions are restricted in the amount to be used toward financial aid, targeted use of these revenues may be useful for increasing enrollment of the growing low-income population.

Other policy strategies, which would be of lower cost to state and institutions than increasing grant aid or tuition subsidy, could be employed to increase the rate of low-income enrollment. All students, especially low-income students, would benefit from a strategy to increase awareness of concepts regarding published tuition versus net tuition, sources of aid and scholarships, cumulative debt by sector, and generally assistance with the Free Application for Federal Student Aid (FAFSA).

Further, the financial aid award process could be streamlined and made more predictable. One example would be to simplify the student aid application process by eliminating the FAFSA and obtaining all needed financial information from the Internal Revenue Service. Financial aid should be provided as clearly, transparently, and simply as possible (The College Board, 2008).

Finally, communication with families and students about college opportunity should be early, proactive, encouraging, sustained and accurate (The College Board, 2008). An information campaign should be created and sustained and begin in middle school for students and their parents. Proper enrollment decisions and the basic consideration of the possibility of a college are only possible if armed with information and an easily understandable process.

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