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AN EXAMINATION OF FORCES IMPACTING ENROLLMENT LEVELS IN U.S. COLLEGES AND UNIVERSITIES

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Over time the numbers of students who enter colleges and universities with the intent to further their academic careers has continued to rise sharply. This has placed a significant burden on our nation's institutions of higher education. To meet this growing demand, academicians must understand what influences bear on enrollment levels and how these factors might provide insight to aid in the management process. This paper examines the trends in enrollment levels in our nation's institutions and the forces that shape those enrollment levels. Data are collected for a sample of colleges and universities across the nation and a model is designed to identify those characteristics that might explain enrollment levels. This is accomplished by identifying those characteristics, both personal and institutional, that are associated with enrollment levels. In this manner, a demand function for education will be presented with enrollments serving as the response variable. Given the cross-sectional nature of the data Park's test is conducted to detect the presence of heteroscedasticity. Weighted Least Squares is then applied to the data to identify the proper functional form.

INTRODUCTION

Despite rapid increases in college tuition, enrollment in our nation's institutions of higher education continues to rise. The number of students in degree-granting institutions rose by 17% from 1979 to 1989. Between 1989 and 1999 the increase was just under 10%, rising from 13.5 million to 14.8 million. Today there are slightly over 17 million students enrolled in our nation's public and private institutions of higher education (U.S. Census Bureau, August 2006). High school graduation classes are expected to peak in 2009. However, those states with a growing population due to in-migration can expect rising student enrollments for at least another decade. This trend is placing added financial pressures on schools and state legislators to find sufficient funds to support this escalation in attendance levels.

This problem is compounded by the changing background and diverse socio-economic structure from which many of these students originate. The increasing share of students who are first-generation enrollees from non-English families or who promise to be academically marginal students place added burden on the financial constraints of state budgets as well as those of private universities. According to Joyce E. Smith, Executive Director of the National Association for College Admission Counseling, "When the increases are largely first-generation, non-English speaking or poor students, most college don't want to take them on. They view it as an added burden" (Gose, 2005).

Squabbles among universities as to who will serve select sectors of the student population are also escalating in intensity. The debate often centers on who will serve low-income students who, it is expected, will account for a larger share of the anticipated increases.

It should be recognized that enrollment trends are not consistent across all cohorts or among various geographical areas. Although these disparities are not the subject of this paper, a few statistical comparisons should prove of interest. According to various reports by the U.S. Department of Education and the U.S. Census Bureau, over the past two decades, the number of women enrolled increased by 15% while men added only 5% to their numbers. Part-time enrollment increased by merely 2% compared to a 15% rise in full-time students. In 2006 57.8 % of all individuals between 25 and 29 years of age completed at least some college (National Center for Educational Statistics, 2006).

Colleges in slow-growing states such as Alabama, South Dakota and Vermont are eager to relieve the pressure on other states facing a capacity crunch (Gose, 2005). South Dakota State University has established a formal arrangement with Santa Ana College, a two-year institution in California, in which the University, at its own expense, flies students to Brookings, South Dakota to view the campus and interview with faculty and staff. The students are offered a tuition much lower than that incurred by other out-of-state students.

In a more general sense, in October 2006, 65.8 percent of high school graduates from the class of 2006 were enrolled in colleges or universities, according to the U.S. Department of Labor's Bureau of Labor Statistics. Since 2001, the college enrollment rate for recent high school graduates has been trending upward.

Literature Review

Considerable research has been conducted in the past regarding trends in enrollments and the supposed causes of those trends. However, no general consensus seems to emerge. This lack of accord among researchers highlights the need for further investigation. For example, Hsing and Chang (1996) measured the sensitivity of enrollment to changes in tuition. They concluded that enrollment levels are becoming increasingly sensitive to tuition changes. The elasticity measures rose from 0.261 to 0.557 throughout the 1990s. They also found that there existed considerable difference between the general functional form and the log-linear model in terms of predicting enrollments. The former produced coefficients with smaller standard errors and higher t-values, while the logarithmic form could be rejected at only the 5% level. Further, tuition and 'other costs' played a large role in forming enrollments.

In an earlier work Mixon and Hsing (1994) argues that

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removal of the tuition variable from the model resulted in significant statistical improvements. Instead, they claim, perceived selectivity, NCAA participation in sports, class size and job-market consideration upon graduation were more significant in explaining enrollment.

Hossler (2004) acknowledges that we are in an era in which tuition is becoming even more important as a source of income to both public and private schools. Summers (2004) found that increases in financial aid and increases in tuition each increases colleges' net tuition revenues. Although his sample set included only small, private liberal arts colleges, his findings tend to dispute those of Mixon and Hsing.

Predictions of future enrollment levels also seem to be in some dispute. While most researches agree that the trend in enrollments is unmistakably on the rise, McKibber and Faust (1999) aren't quite so certain. They contend that changes in population and birth rates will serve as a major defining force in determining college participation rates. These effects will, on the other hand, not prove to be uniformly distributed through the nation's schools. These regional fluctuations in birth rates make it difficult to predict future enrollment levels. This problem is greatly exaggerated by the fact that interstate migration of both students who choose an out-of –state college as well as females of child-bearing ages seems on the rise. The projected decline in the number of high-school graduates also complicates the estimation process. With a reduction in the "raw materials" for college-bound students, it is only reasonable to anticipate lower applications.

During the late 1980's the number of high school graduates decreased by nearly 200,000. From 1979 through 1989 the decline reached almost 700,000 (Hoover). Nevertheless, enrollments did not decline sharply as feared by many college admissions offices. The dreaded dearth of applications failed to materialize thanks to an increase in the proportion of first-time, first-year college enrollments. During that same period the number of enrollments went down by only 14,000 students. This small, temporary dip in enrollments is explained in part by increased participation of non-white, low-income families who benefit from government programs designed specifically to assist that particular cohort (Stinebrickner and Stinebrickner, 2003).

To the contrary, Gladieux and Ewail (1999) conclude that the provision of financial aid is an inadequate method to provide access for minority and low-income students while Reed (2000) provides evidence that the provision of financial aid at private college may raise the number of low-income graduates. McPherson and Shapiro (1998) stress the importance of financial aid for enrollment management purposes and how its use can affect students from various income, racial and educational levels.

These conflicting findings occur not because of a lack of data. Colleges often have an abundance of information (Morest and Bailey, 2005). The problem lies in the fact that focused research is not the norm as practiced by most institutional-research offices. Schools simply do not have the tools or staff whose primary function it is to properly analyze these data or to draw inferences these data might afford.

Enrollment also depends on student retention, a concern of imminent importance to academic administrators. Stinebrickner and Stinebrickner emphasize the need to understand the causes of high attrition rates, especially among students from low-income families, as a factor in explaining relative and absolute graduation rates. If enrollment is to be managed, the conditions that lead to a low retention rate must be understood and dealt with properly. Many Second-Chance programs have been implemented in several states in the effort to increase retention rates (Yorke and Thomas, 2003). As the name implies, their purpose is to encourage students to remain in college or encourage them to return in the event they have dropped out. These strategies are more often offered to minority students who have become casualties in their academic pursuits.

Barefoot (2004) noted that only a very few elite research institutions have managed to escape the overriding compulsion to stem the virtual 'tidal wave' of students dropouts. She emphasized the need to consider means to abate this loss of potential college graduates.

Technology has also allowed new approaches to promote retention. A recent study (Dupin-Bryant, 2004) examined the factors that might impact the probability of retention in on-line courses. She concluded that the prior level of education and experience with computers contributed heavily in the explanation of retention patterns.

Model and Data Description

The database for this study consists of 110 randomly selected colleges and universities across the nation. There are 53 public schools and 47 private colleges. The data apply only to on-campus students and do not address those students that are taking classes solely on-line. The sources for these data include Peterson's Guide to 4-year Colleges, U.S. News and World Report, the website for the American Association of University Professors and the U.S. Department of Education. A model is developed to explain enrollment levels in order to isolate those variables that best explain the demand for education at U.S. institutions of higher learning.

Standard economic theory tells us that the quantity demanded for a product or service is a function of several variables including, but not necessarily limited to, price, income of consumers, number of consumers, tastes and preferences and prices of related goods. Variables are selected to capture each of these factors. The model to estimate then becomes the standard multivariate model as described in Equation (1)

$$E = \beta_0 + \sum \beta_i X_{ij} + \varepsilon_i \quad (1)$$

where $\sum \beta_i X_{ij}$ is a vector of explanatory variables and

i = 1…n
j = 1…k

Identifying those regressors to include in the model is tricky. Past studies have chosen to use the school's acceptance

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rate and level of student aid (Summers, 2004). St. John (1993) found a relation between aid and tuition and enrollment levels, while, Gladieux and Ewail concluded that student aid had no significant impact on enrollments. Weiler (1990) stressed the number of applications received by a school as a means of explaining enrollments. With this discord among researchers it is difficult to isolate specific variables that might serve as predictors. For this study the following variables were chosen:

Variable	Description
Salary	The median salary of tenured full professors
Tuition	Measured in dollars
Room and board	Measured in dollars
Enrollment	Measured as full-time students
Acceptance rate	Measured as the percentage of applicants that are allowed to enroll
Retention rate	Measured as the percentage of freshmen who return for their sophomore year
Dollar amount of aid per student	Measured in dollars
Median personal income	Median personal income in the state in which the college or university is located
Per-capita income	The per-capita income in the state in which the college or university is located
Tuition minus aid	Measures the tuition of the college minus the average amount of financial aid students receive
Tuition plus room and board minus aid	Measures the sum cost of tuition and room and board less aid

While many variables might have served in this capacity, these were chosen for several reasons: 1) not all are accounted for in previous studies either as a whole or individually, 2) it seemed intuitive that each could serve as a predictor, and, of course, 3) their availability. Other variables are used in alternative models as a comparison of the primary model.

Empirical Analysis

Table 1 contains some of basic statistics for each variable. It can be seen that the median tuition is almost $11,000 with room and board at $6,500. Enrollment averages almost 4,000 students. Mean tuition is found to be over $14,000 with a standard deviation slightly under $11,000. However, since most students receive some aid and do not pay the full tuition, especially at private institutions, a variable is included to measure the average tuition actually paid by students after receiving their aid allowance. This measure, tuition minus aid, amounts to only $1,535. The median for faculty salaries is $76,800 with a standard deviation of $18,750

Not shown in the table are the numbers of private and public colleges. There were 53 private and 57 public schools included in the study.

Table 1: Basic Descriptive Statistics

Variable	N	Mean	StDev	Minimum	Q1	Median	Q3
Salary	110	98.71	18.75	45.50	65.30	76.80	86.90
Tuition	110	14620	10874	2784	4307	10924	23485
Room and Board	94	6690	1624	2910	5782	6502	7560
Enrollment	109	5780	5112	496	1953	3715	8013
Acceptance Rate	110	6556	2037	1300	5600	7000	7925
Retention Rate	109	78.95	10.54	54.00	71.00	79.00	86.50
Dollar Amount of Aid Per Student	96	13890	7154	1063	7577	12613	19967
Median Personal Income	110	43015	5199	26728	38972	42788	45071
Per Capita Income	110	33962	8357	24293	30429	32627	35761
Tuition Minus Aid	96	1535	4925	-9758	-2740	1521	5569
Variable	**Maximum**						
Salary	234.20						
Tuition	41,975						
Room and Board	11297						
Enrollment	96608						
Acceptance Rate	99.00						
Retention Rate	98.00						
Dollar Amount of Aid Per Person	27292						
Median Personal Income	56045						
Per Capita Income	53368						
Tuition Minus Aid	16739						

Several variables of interest showed no correlation with enrollment levels and were therefore not included in the model. These variables tended to fall into two categories: those measuring personal income and those peculiar to the particular institution. With reference to the first, it might be presumed in a prior manner that income measures would affect one's ability to attend a school of higher education. Surprisingly, that does not seem to be the case in the present study. A regression fit with enrollment as the response variable using as explanatory variables median personal income in the state in which the institution is located, total personal in that state and per capita income produced no significant results. The proposed explanations for these failures are discussed below.

Concerning the second category of insignificant variables, institutional-specific characteristics such as tuition seemed to play no role in determining enrollment levels. It would also

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seem in an a prior sense that tuition and tuition minus aid would serve as significant explanatory variables. However, in the subsequent analysis both were found to be insignificant and highly correlated with other explanatory variables. They were therefore dropped from the model. These points are also more fully discussed below.

Potential for Heteroscadasticity

The use of several RHS variables in conjunction with these cross-sectional data lead one to suspect the presence of heteroscedasticity. It is reasonable to fear that the variance of the squared errors, σ_e^2, might be proportional to one of those RHS variables.

Heteroscadasticity will leave the coefficient estimate unbiased. Thus, in repeated sampling the mean of the estimator, $E(\hat{\Theta})$, will equal the true value of the unknown parameter, Θ.

The estimator will also retain its property of consistency. Therefore, as the sample size is increased the value of the statistic, $\hat{\Theta}$, will approach the parametric value and the estimator's variance will approach zero.

However, the quality of efficiency is lost if heteroscadasticity exists. The estimator carries a larger variance. Thus, the estimate is likely to be farther from the true population coefficient than would be the case in the absence of heteroscadasticity. While it may be that its variance approaches zero as the sample size increases (consistent), it carries a higher variance. Heteroscadasticity underestimates these variances or standard deviations and results in a downward bias of the error terms. This will inflate the t-statistics and increase the likelihood of a Type I error in hypothesis testing.

Tests for Heteroscadasticity

Heteroscadasticity occurs when the error term is proportionally related to one of the RHS variables, Z, as seen in (2)

$$\sigma_i^2 = \sigma^2 Z_i^2 \qquad (2)$$

There are many tests researchers can use to test for heteroscadasticity.

The one selected for this study is that as developed by R. Park (Park). This is accomplished by regressing the log of the squared residual from Equation (1) on the log of the suspected variable.

$$\ln e_i^2 = \hat{\beta}o + \hat{\beta}_i \ln Z_{ij} + \nu_i \qquad (3)$$

Where Z is a suspected explanatory variable. As noted below, net tuition plus room and board was selected for the test. t-tests were then conducted to isolate any significant relationship between that error squared and the right-hand side variables. The coefficient for net tuition plus room and board proved significant confirming net tuition plus room and board as the proportion variable.

A common criticism of the Park test is that the error term from (3) may itself be heteroscadasticity. However, Glejser (1969) has shown that the Park test will accurately detect heteroscadasticity.

Weighted Least Squares

Presume that we begin with a general model having just two regressors such as that expressed in Equation (4).

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon \qquad (4)$$

All variables in the model are divided by the Z variable as shown in Equation (5).

$$\frac{Y}{Z} = \frac{\beta_0}{Z} + \beta_1 \frac{X_1}{Z} + \beta_2 \frac{X_2}{Z} + \frac{\varepsilon}{Z} \qquad (5)$$

where $\frac{\varepsilon}{Z} = u$, the adjusted error term, u, meets the classical assumptions. That is, it is homoscadastic. Since the magnitude of the error terms is related to the Z variable as seen in (2), dividing through by Z reduces the size of the error term, scaling it down in exact proportion to its standard deviation. The resulting error terms all have the same standard deviation. Thus,

$$\frac{Y}{Z} = \frac{\beta_0}{Z} + \beta_1 \frac{X_1}{Z} + \beta_2 \frac{X_2}{Z} + u \qquad (6)$$

Using net tuition plus room and board as the weighting factor, the results of the Weighted Least Squares model are shown in table 2.

Table 2: WLS Regression Results (n = 89)

	Unstandardized Coefficients		Standardized Coefficient		
Model 1	B	Standard Error	Beta	t-value	p-value
Constant	-16772	5370.993		-3.123	0.003
Room and Board	1.350	0.461	0.308	2.927	0.005
Retention Rate	366.901	79.081	0.550	4.640	0.000
Dollar Amount of Aid	-0.845	0.122	-0.882	-6.907	0.000
Tuition Plus Room and Board Minus Aid	-0.337	0.149	-0.279	-2.257	0.027

The Adjusted R^2 is 0.497

Due to the danger of multicollinearity among the independent variables, their Variance Inflation Factors were calculated. They are shown in table 3.

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Table 3: Collinearity Statistics

	Tolerance	VIF
Room and Board	0.584	1.711
Retention Rate	0.459	2.177
Dollar Amount of Aid	0.395	2.529
Tuition Plus Room and Board Minus Aid	0.424	2.361

As a given rule, a VIF ≥ 4 is an arbitrary but common cut-off criterion for deciding when a given independent variable displays "too much" multicollinearity. Values above 4 suggest a multicollinearity problem. Some researchers use the more lenient cutoff of 5.0 or even 10.0 when deciding whether multicollinearity is a problem. The researcher may wish to drop the variable with the highest VIF if multicollinearity is indicated and theory warrants. Given the low values for these VIFs, multicollinearity does not seem to be problematic.

The tolerance level (coefficient) for each independent variable is also given. This value is one minus the squared multiple correlation between all independent variables:

$$\sum_{i=1}^{k} X_i \text{ and } \sum_{j=1}^{k} X_j$$

Where $i \neq j$ and k is the number of regressors. If collinearity exists the tolerance coefficient will approach zero. If the tolerance coefficient approaches 1, this signals that collinearity is not an issue. Again, as merely a customary rule of thumb, if the tolerance coefficient is less than 0.20, multicollinearity is present. Table 3 indicated that the model does not suffer from any significant multicollinearity.

Returning to table 2 we find all variables are significant at acceptable alpha levels. The retention rate carries a p-value of 0.00 justifying the emphasis academic administrators place on ensuring their students return to their respective colleges and universities. Hossler (2004) notes that we have reached an era in which tuition dollars are becoming a more important source of income for many schools. Thus, anything administrators can do to bolster their retention rates is considered in a positive light. Wetzel, et al., (1999) noted that substantial administrative efforts are devoted to maintaining and promoting retention by building an "institutional commitment." However, he warns that colleges and universities with an open admission policy may find that attrition is a more serious issue. This conclusion is based on the contention that marginal students are less likely to continue their education.

Tinto (1975, 1982, 1987) offers seminal work in the examination of institutional commitment. His work formulates a model of student retention based on the characteristics of both the student and the institution. He contends that a student's propensity to return to the same institution is based on two factors. The first and most important is the student's drive to obtain a degree. According to Tinto, the second, and perhaps lesser factor, is the intent to obtain a degree at a particular institution. Thus, the two major components affecting enrollment levels are students' decisions to initially enroll at a particular institution and the level of their institutional commitment. Apparently, administrative actions to retain students are crucial to the acquisition of tuition dollars and the overall welfare of the school.

Of importance, tuition did not report in as a significant variable as one might expect. This is likely due to the fact that students and their families do not base their demand decisions on the 'sticker price' of education. Most students receive some kind of aid in their educational pursuits. It may be alleged that the amount of aid received by the student is also an instrumental factor if determining enrollment levels. Willie (1986) acknowledged that aid can increase enrollment numbers, but cautioned that they may adversely affect net tuition. The cost associated with aid might exceed additional tuition even though enrollment increases. Summers, on the other hand, concluded that increases in aid and increases in tuition each enhanced net tuition revenues. He further found that aid is distributed in a manner to boost enrollment and augment net tuition revenues. However, Breneman argued that the effect of unfunded institutional aid on net tuition revenue is a prior indeterminate. Both of these studies, although seminal in the field, were conducted some time ago. It is reasonable to presume that changing attitudes and conditions over this time period have re-shaped the forces that affect the interrelationship among variables inherent in studies of this nature.

The findings in this study tend to support Summer's conclusions. Aid does indeed have an affect on enrollment. In the present model, net tuition plus room and board minus aid proved highly significant and carried a negative sign. This can be interpreted to suggest that as tuition and/or room and board rise faster than aid, thereby increasing this variable, enrollment goes down. That is, if tuition and/or room and board increase more than proportionately to aid, increasing the variable, enrollment falls unless student aid keeps pace. Given the increasing importance students tend to assign to the amount of aid they receive these results are expected.

Unlike tuition plus room and board minus aid, tuition minus aid was not significant and was removed from the model for that reason as well as the fact that it shows a high degree of correlation with other variables in the model. The lack of significance suggests that students and their parents are becoming smarter buyers. Not only do they account for tuition as one of the cost of education as was the case some time ago (Leslie and Brinkman, 1987), but now they recognize the burden imposed by housing and general living expenses. This signals a rise in the level of sophistication in consumer demand practices since the Leslie and Brinkman study. Students will continue their academic programs in the face of rising tuition and living expenses if increases in aid offset the higher costs. It is the net payment students face in making their decisions regarding which school to attend or whether to attend school at all. This points to the economic savvy and financial sophistication students demonstrate in college choice. Credit should also most likely be given to the parents in this decision

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process since it is they who often 'foot the bill' for their offspring's education.

When computing the direct costs of room and board it is advisable to use those costs net of what the student would encounter if he/she did not attend school. However, since such living costs are not available in each town or city in which the college or university is located, this practice was not followed and direct room and board costs are used in the model.

Finally, the mean dollar amount of aid promised to prospective students serves as an explanatory factor. The variables discussed above compare the dollar aid to costs (tuition plus room and board less aid), thereby creating a relative measure. However, apparently the dollar itself measured in absolute terms influences the decision-makers. When offered a certain aid package in the form of an absolute bundle of dollars, the decision-makers are inclined to accept that offer regardless of how it measures up relative to educational costs.

Perhaps surprisingly, median personal income proved to be statistically insignificant. In fact, all measures of income, such as per capita income and total state-wide personal income of the state in which the college or university is located, were not significant explanatory variables. One would presume in a prior sense that families with higher incomes would be more likely to send their progeny to college. However, such does not seem to be the case. This anomaly might be explained by the changing trends in student diversity. Colleges and universities are beginning to take seriously, whether voluntarily or subject to pressure, the role that diversity takes in forming their students' bodies. This diversity is based on race, age and income levels among other considerations. Increased emphasis has been placed on the recruitment of students from low-income families. To this end, many students who otherwise would not attend college due to the financial strain are given the opportunity to enroll in a college or university. Coupled with the increased amount of aid noted above that is often based on income levels, low-income families have the opportunity to pursue a college program despite rising costs. With the rise in the intensity to promote student diversity, to the degree these efforts are focused on low-income groups, income no longer separates those who attend college from those who don't.

Other Models

In order to more fully capture the impact of aid, a model regressing the response variable of enrollment on those explanatory variables measuring tuition-discounting is estimated. These variables include the dollar amount of aid, the percentage of the student's need that is met by aid, tuition minus aid and tuition plus room and board net of aid. Table 4 contains the results. All the variables carry significant explanatory power except the percentage of the student's financial need that is met with aid. The significance of the other variables is explained above in the discussion of the first model. The question remains then why the percentage of a student's need met with aid does not explain changes in enrollment levels. Perhaps the most plausible explanation is that students under estimate the cost of education. Books, fees and other incidentals are either not included in approximating costs or are underestimated by a large margin. It should be noted that 35.4% of the change in enrollments are explained by this model after adjusting for the degrees of freedom.

Table 4: Second Regression Results (n = 79)

	Unstandardized Coefficients		Standardized Coefficient		
Model 2	B	Standard Error	Beta	t-value	p-value
Constant	3028.850	4251.264		0.712	0.478
Dollar Amount of Aid	-0.646	0.140	-0.669	-4.623	0.000
Percentage of Need Met	34.740	49.366	0.081	0.704	0.484
Tuition Minus Aid	-1.805	0.519	-1.286	-3.479	0.001
Tuition Plus Room and Board Minus Aid	-1.584	0.484	1.301	3.274	0.002

Adjusted $R^2 = 0.354$

Table 5: The Impact of Tuition and Room and Board (n = 102)

	Unstandardized Coefficients		Standardized Coefficient		
Model 2	B	Standard Error	Beta	t-value	p-value
Constant	3707.955	2604.837		1.541	0.127
Tuition	-0.414	0.063	-0.680	-6.518	0.000
Room and Board	1.388	0.403	0.356	3.446	0.001

Adjusted $R^2 = 0.322$

It seems only logical that the direct cost of education in the form of outright expenditures measured by tuition and room and board would affect the demand for education. A third model using only these two variables was therefore estimated. As shown by the output in Table 5, both variables reported in as highly significant. Their VIFs were 1.372 and the model reported an adjusted coefficient of determination of 0.322. However, inexplicably, room and board carried a negative sign.

The results of a simple regression model using only tuition are shown here. The standard errors are shown in parentheses, followed by the t-values and p-values:

$$E = 12311.138 - 0.328T \quad (7)$$
$$(1044.013) \quad (0.057)$$
$$[11.792] \quad [-5.724]$$
$$\{0.000\} \quad \{0.000\}$$

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The adjusted R^2 was 0.536. Tuition proves to be significant indicating that consumers (students and their families) recognize the importance of the absolute cost of education.

Conclusion

There still exists some dispute as to the relationship between enrollment and those variables used as regressors. The findings presented here in the basic model suggest that tuition has no significant impact on enrollments when incorporated into a full model. When other regressors are included in the model, tuition offers no additional explanatory benefit. It reports in as statistically insignificant at any acceptable alpha value. This agrees with the study done by Mixon and Hsing but tends to refute that offered by Hsing and Chang.

However, when used in conjunction with room and board, tuition demonstrates an acceptable level of significance. This is also the case in which a simple model using only tuition as the regressor is estimated. That is, tuition proves to carry a significant level of explanatory power in more parsimonious models. While the measure of the change in enrollment explained by changes in tuition is only 23.6%, it does imply that the absolute cost of education bears on decisions as to whether to seek a four-year degree.

The change in enrollment was also explained in part by the level of financial aid measured in various forms. The absolute dollar amount of aid offered students who qualify was useful in explaining enrollment levels, as was tuition plus room and board less aid received. However, no improvement in the model resulted from including tuition net of the level of aid. This implies that more attention is being devoted to the costs associated with housing and related expenses than might be presumed based on earlier studies.

The undisputed leader in providing explanation as to the changes in enrollments is the retention rate of each school. Numerous models were estimated using the retention rate in conjunction with other regressors. In every case, without exception, not only did the retention rate prove significant, but in every instance its p-value was 0.000. The considerable and growing importance college and university administration places on maintaining and elevating the retention rate at their institution is apparently justified.

Interestingly, various measures of income such as personal income, median income, per capita income and total state personal income showed no relationship with enrollment. This might be due to the greater emphasis placed on efforts to promote diversity within student bodies. To this end, aid packages, programs to identify and assist students-at-risk and other administrative policies to aid low-income students may negate the effect income levels have on the financial ability to attend an institution of higher education. Potential students who are financially disadvantaged are given the same opportunity to attend school as those from more affluent families.

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