The Retention Rate Among Private Colleges

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Understanding the Retention Rate of Private Liberal Art Colleges

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By: Katherine Hanson
Abstract:

This paper attempts to analyze the determinants that best explain the retention rates of private liberal art colleges. Using the model’s estimated parameters, the effects of acceptance rate, average grants, average loans, and educational related expenditures were calculated. Taken together, these calculations indicate the degree of importance each variable has on the retention rate of private colleges. I concluded that, over the sample period, increases in acceptance rate, average loans, average grants and educational related expenditures will lead to higher levels of retention. This analysis will provide private colleges with a thorough understanding of all the factors that lead a student to drop out, as well as the factors that can enhance a college’s ability to retain its student body.

Introduction:

The reduced number of high school graduates has resulted in a smaller applicant pool for baccalaureate colleges and this has forced private colleges to find new methods to increase the retention rate of the students that already enrolled. According to Marcus (1989), some Baccalaureate Private Colleges have opted to target a new clientele of older students and find new ways to reduce their attrition rate. Finder (2008) projections show that the number of high school graduates is expected to fall until year 2015. Unfortunately for private colleges, this will reduce their applicant pool and reduce selectivity. High school graduates on the other hand, will have an easier time getting into college because they will be competing with fewer students for a spot in the college of their choice. These market changes will affect the industry and cause colleges to find new strategic ways to retain existing students, attract more applicants and better their chances of enrolling the most talented students.

As theory suggests, the rate of retention of a college is a function of acceptance rate. This makes intuitive sense because acceptance rate serves as a proxy for the selectivity of a college. Acceptance rate, average grants and educational related expenditures were cited as important determinants of student retention across Baccalaureate Private Colleges in the U.S. (Marcus, 1989). In order to fully understand the rate of retention, I will rely on theory, literature findings, and common sense to examine the forces that will cause changes in retention and thus, provide institutions with alternatives to counteract the prevailing industry changes that have affected private colleges in recent years. Finder (2008) points out that “the demographic changes in this market include sharp geographic, social and economic variations.” These changes have been the subjects of study, disputes and scrutiny as it affects
a student’s ability to get higher education. This study will provide the reader with a short industry analysis in order to better understand how recent market changes will affect the retention rate of private colleges. Americans place a high value on education and the rising cost of tuition reflects that fact.

The cost of tuition increased during this last recession, and that was triggered by demand pressures in the market. This indicates that students are less likely to drop out during a recession, despite changes in tuition. This idea may seem counter intuitive because the demand for a normal good is expected to be negatively correlated with price or tuition. Hill (2005) discusses the incentives that may cause an individual to get higher education and his findings reveal that the return on investment of earning a college degree is about 16 percent after accounting for the time value of money. The benefits of earning a college degree are about three times the costs of education, even after taking implicit and explicit costs into account. He found that lack of educational ability and information barriers can keep a student from going to college. His study concludes that individuals that are well aware of all the benefits that come with having a bachelor’s degree place a higher value on education and are more likely to go to college.

Hill (2005)’s points out that there is wide spread agreement that supports the idea that graduating from college is a good investment because it enhances a person’s: well-being, ability to get job, career opportunities and income. However, there are many factors that can impede a person from getting a college degree. This study presents the idea that the environment a person grows up in can have a barring in a students’ ability to stay in college and get a degree. Hill (2005) found that financial barriers can also keep a student from graduating, but government intervention can be implemented to correct this market failure.

Talented students coming from low-income families should get the opportunity to reach their full potential; there are many positive spillover benefits that come with education. Furthermore, entitlements can lower attrition rates and help colleges reduce the financial barriers that low income students face while in college. The government should also find a way to reduce the attrition rate among high school students by providing students with educational vouchers. There are many implications associated with this approach, but there are some evidences that suggest that vouchers can enhance the academic performance of students at the high school level. The underlying and most important thing to understand is the fact that this issue requires government intervention because when the secondary education system fails to educate, it affects the sector of higher education as well.
According to (Kent Hill, Dennis Hoffman & Tom R. Rex, 2005), the high attrition rates among high school students will lower the selectivity of private colleges by reducing the size of their applicant pool. Lower selectivity is captured by the acceptance rate of a college, which measures the number of students enrolled at the institution relative to its applicant pool. In essence, low acceptance rates indicate greater selectivity and higher retention. The following equation shows the relationship between acceptance rate and retention:

**Equation (I)**

*Ho: \( \beta_{AC} > 0 \)

*HA: \( \beta_{AC} < 0 \)

As suggested by theory a one sided hypothesis test for acceptance rate (AC) should reveal a negative correlation between AC and RR, which means that the beta of AC must have a negative sign. Another important issue in higher education is the financial burden college students have to bear.

Most students have to find ways to finance the costs of college so financial institutions must provide these students with loans. The only problem with this that getting a loan to finance education is harder than taking out a loan to purchase a collateral asset. Financial institutions bear a lower risk by lending money for tangible assets that can be sold as collateral; the government has to intervene in order to ensure credit to college students. The government can maneuver this market to enhance a students’ ability to succeed in college. In essence, the government is motivated to invest in education because there positive spillover benefits that come with higher education and private colleges play an important role by providing students’ with high quality education.

The underlying and most important goal of a private college is to educate and retain its student so a high attrition rate can keep a college from carrying out its mission. A high attrition rate will have a negative effect on the appeal of the college so understanding the determinants that influence the retention rate of private colleges is of high importance. The retention rate among American colleges has steadily decreased since the 1980’s (Marcus, 1989). This has significant ramifications on many fronts that directly affect individual institutions.

A college’s ability to retain its students not only contributes to their stability and success, but to its reputation and prestige as well. It is apparent that non-monetary attributes such as reputation and prestige play a vital role in students’ desire and willingness to attend a particular college. Furthermore,
Highly reputable colleges are better able to retain students, because they are better equipped to meet the needs of their student body.

Highly reputable colleges are known for having higher net tuition revenue. Consequently, they are likely to offer their student body an environment that is conducive to academics as well as social interaction and support. Lau (2003) discusses the importance of educational related expenditures, financial aid and have on a college’s ability to retain its students. There are evidences that suggest that institutional facilities and resources, such as academic advising and academic support programs and career counselors are vital in retaining students (Marcus, 1989).

Colleges that invest money to offer resources where students can get academic support, counseling and advising in particular indicate that they care about the wellbeing of their students. It results in students feeling more catered to and it reduces the student dropout rate. The following equation shows the relationship between educational related expenditures and retention that is suggested by theory:

Equation (II)

\[ H_0: \beta_{ER} < 0 \]
\[ H_A: \beta_{ER} > 0 \]

The one sided hypothesis for educational related expenditures (ER) shows a positive correlation with RR; consequently, theory indicates that the beta of ER must have a positive sign.

College professors and administrators must strongly encourage students to make full use of these educational related resources and encourage students to come forth with any issues or concerns. The need for support and advising is prevalent among underclassmen so a college must have reliable resources in order to meet the needs of its student body. By virtue of their endowment resources and solid reputations, private colleges can afford to invest in educational related expenditures. As theory suggests, increases in educational related expenditures will lead to higher levels of retention. The extent at which educational related expenditures influence student behavior be discussed later on this paper. This study will examine SAT scores and high school GPA in order to analyze rates of retention among private colleges more in depth.

Average Scholastic Aptitude test (SAT) scores and high school GPA measure a students’ academic ability prior to college entrance. The following equation will show the relationship between SAT scores and retention:
Equation (III)

Ho: $\beta_{\text{SAT}} \leq 0$

HA: $\beta_{\text{SAT}} > 0$

Both of these parameters could be captured by acceptance rate due to the strength of their correlation. Colleges use high school GPA and SAT scores to select the students’ of their choice. Most colleges look for students’ with academic ability, but some colleges put more emphasis on finding students that will be a good fit for the colleges so the strength of this correlation may vary across colleges. If these variables turn out to be highly correlated, multicollinearity may become an issue because E-views will have a difficult time distinguishing the impact each of these variables have on the retention rate of private colleges.

The degree of importance of these parameters will be calculated in the third section of this study with the use of a panel date set of 265 private colleges. Although high school GPA and SAT scores could be closely correlated with acceptance rate, the importance of both of these variables must not be overlooked. Studies written by Marcus (1989) and Lotkowski reveal that HSGPA and SAT scores are closely related to a students’ ability to yield good results in a college environment. This study reveals that HSGPA captures more than just the skill level of a student; HSGPA can be thought of as output per students so it can capture the number of hours a student spends studying and the level of motivation of a given student.

Marcus (1989) stresses the importance of selectivity and its effect on a colleges’ ability to retain its students. Private colleges that are in high demand will be more selective and since demand puts an upper pressure on price, a college that is in high demand relative to its competitors will be able to charge a higher tuition. These colleges are able to generate more revenues that can be used to retain students by providing more financial aid to needy students. Institutions that have lower acceptance rates, by definition, are the ones that are most difficult to obtain a seat in. Therefore, once a student secures a seat, there is certain motivation to make best use of that opportunity. These students tend to work harder because they know what it took for them to get this opportunity and they know how quickly it can be snatched away.

Prestigious universities such as Harvard and Yale have acceptance rates of about 6 and 7 percent so students that are able to get into these colleges feel a great sense of accomplishment because they know how competitive the admission process is. Students that get admitted into these exclusive universities have to demonstrate academic achievement before being admitted into the college so these students tend to be well prepared for college, which enhances the colleges’ ability to retain its student body (Randy, 2008).
An article written by Glater (2009) indicates that colleges that are more selective tend to be well endowed. He found that this last recession, also known as the worst recession since the Great Depression has negatively affected private colleges. The “College in need closes a door to needy students” article reveals that, Reed College lacked the resources to provide needy students with financial aid. The College has provided financial aid based on financial need for years in order to provide talented students coming from low income families with the tools to get higher education and reach their career goals.

The College understands the equity implications associated with this, but lower profits accompanied with the heightened demand for financial aid and other forms of financial support have forced the college to choose affluent students over low income students. This article supports the idea that highly selective colleges are able to generate higher revenues because have a wider selection of students that come from all income levels.

Colleges that are in high demand are also able generate profits because they have a larger applicant pool to choose from, which means that they get to decide how much financial aid they will be willing and able to provide each student. These institutions are able to price discriminate each student through financial aid and they tend to offer more financial aid and lower tuition to low income students at the expense of students that coming from higher income families.

As the costs of college continue to rise, students and families are finding it increasingly difficult to cover the financial burden that comes with college. This implies that students have to rely on financial aid and loans to cover the costs of college. Students that work and go to school are less likely to graduate from a private college because these colleges tend to be very rigorous, which means that students may have to study for more hours, attend study sessions and complete group projects. These students have to put less effort into school and their academic performance is likely to reflect that and cause students to drop out.

Perna (2009) offers a different view of aid claiming that in order to achieve a higher retention rate; a college must offer lenient work study jobs along with grant aid. Average graphs can provide low income students with financial support and that can enhance a students’ ability to graduate. The following equation will show the relationship between grants and retention:

**Equation (IV):**

\[ H_0: \beta_{AG} < 0 \]

\[ H_A: \beta_{AG} > 0 \]
A one sided hypothesis for average grants (AG) should validate this theory, which should state a positive correlation between AC and RR (retention rate); furthermore, the beta of AG must have a positive sign. Grants are expected to have a far more significant effect on retention than loans, because grants do not have to be paid back. Loans have to be paid back and the effect loans have on retention is somewhat ambiguous. The relationship between loans and retention will be represented by the following equation:

\[
\text{Equation (V)}
\]

\[ HO: \beta_{AL} = 0 \]

\[ HA: \beta_{AL} \neq 0 \]

A two sided hypothesis for average loans (AL) will either show a positive or negative correlation with RR, which means that the beta of AL could be either positive or negative. Loans help people who would otherwise be unable to afford college, procure or continue their education. Loans help students who are facing financial pressures and offer them alternatives to dropping out. However, loans can put a financial burden on a students’ post-graduation life, as they need to be paid back with interest. This next section will show the estimates of these parameters in order to examine the degree of important each explanatory variable has on retention.

**Empirical Analysis**

**The data**

The data was drawn from the US department of Education’s Integrated Postsecondary Education Data System (IPEDS) for years 2006-2010. A panel data set was used and it was constructed after identifying 269 private colleges on IPEDS. This panel data set attempts to capture changes over time across all 269 private liberal art colleges.
Model specification

The following model specification shows retention rate (dependent variable) as a function of acceptance rate, educational related expenditures, average loans, average grants and SAT scores. Subscript (i) refer to cross sections and subscript (t) represents the time component that was used (5 year data set) to capture changes over time:

\[
\text{Retention Rate (RR)} = F [\beta_0 - \beta \text{ acceptance rate it (AC)}, + \beta \text{ educational related expenditures it (ER)}, + \beta \text{ average loans it (AL)}, + \beta \text{ average grants it (AG)} \text{ and } + \beta \text{ standardized test scores it (SAT's) } + \epsilon \text{ it }].
\]

The model specification stated above exhibits that the variables chosen should have those respective signs. The Ordinary Least Squares estimator was used to gather the results for this study. The functional form was chosen after a careful examination related to the nature of this model. A linear regression was utilized for this analysis, which implies that this equation appears to be linear in the coefficients due to the fact that the Betas are not being raised to any powers and they are not been divided or multiplied by another beta coefficient. The model stated above was a good fit for this study and that will be discussed in the next section.

Results

Educational related expenditures are expected to have a positive correlation with retention rate and the coefficient of ER has the sign implied by theory. ER has a coefficient of 0.00162 which states that for every one unit increase in educational related expenditures, all else held equal; retention will increase by .000162 percentage points. The t-statistic of ER turned out to be insignificant, because it’s less that the critical value Tc= 1.658, which implies that the null hypothesis will not be rejected. Educational related expenditures has a P-value of 0.2449 so it turned out to be insignificant.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard of error</th>
<th>T-statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ER</td>
<td>0.000162</td>
<td>0.000139</td>
<td>1.165961</td>
<td>0.2449</td>
</tr>
</tbody>
</table>
Average grants are expected to have a positive correlation with retention, because students with more grants are more likely to cover the costs of college. Figure B has the sign implied by theory. The t-statistic of average grants is greater than Tc (1.645), which implies that the null hypothesis can be rejected. One could say that average grants are statistically significance with a 70% level of confidence. The coefficient of average grants states that for every unit increase in average grants, ceteris paribus, retention will increase by about .011009%.

Figure B

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard of error</th>
<th>T-statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>AG</td>
<td>0.001009</td>
<td>0.000325</td>
<td>3.103806</td>
<td>0.0022</td>
</tr>
</tbody>
</table>

Figure C shows a positive correlation between average loans and retention rate and that was a two-sided test that turned out to be positive. A two sided test revealed that, loans are positive correlated with retention rate. The more loans a student takes out, the more he/she has invested in school and a higher investment, implies a higher opportunity cost that a student would have to incur in order to drop out of college. The coefficient of loans has the sign implied by theory and the t-statistic of loans is greater than critical value (1.960), which implies that the null hypothesis can be rejected without a problem. The P-value of average loans is significant under a 5% level of significance, because loans have a p-value of 0.0038, which is less than 5%. The coefficient of loans states that, all else held equal, a one unit increase in loans, translates into a .15 percent increase in retention.

Figure C

<table>
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</thead>
<tbody>
<tr>
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<td>0.001571</td>
<td>0.000537</td>
<td>2.924893</td>
<td>0.0038</td>
</tr>
</tbody>
</table>
Figure D shows a positive correlation between SAT scores and retention so it has the sign implied by theory. SAT scores are statistically significant, because the t-statistic of AL is higher than critical value (1.645). The p-value of SAT scores is significant under a 5 % level and one could say that SAT scores are statistically significant with a 95% level of confidence. The coefficient of SAT scores shows that, all else held equal, a one unit increase in SAT scores will lead to a 1.5% increase in retention, which is consistent with the literature that was found and theory.

<table>
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<th>Variable</th>
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<tr>
<td>SAT</td>
<td>0.015535</td>
<td>0.000976</td>
<td>15.92071</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

Figure E shows the statistics for acceptance rate (AC). The TK of acceptance rate has the sign implied by theory, which has led to the rejection of the null hypothesis. Acceptance rate is negatively correlated with retention rate and acceptance rate serves as a proxy for selectivity so colleges that are highly selective are going to have lower acceptance rates, and therefore higher retention rates. I would expect a prestigious college to have a low acceptance rate and a high retention rate. Furthermore, acceptance rate (AC) has the sign implied by theory, which validates the negative relationship between AC and RR. The coefficient of AC states that a one unit decrease in AC, all else held equal, will cause RR to go up by 12 percent. AC turned out to be insignificant, because the absolute value of the TK (AC) is lower than its critical value (1.645).

<table>
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<tr>
<th>Variable</th>
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<tr>
<td>AC</td>
<td>-0.122209</td>
<td>0.110790</td>
<td>-1.103068</td>
<td>0.2712</td>
</tr>
</tbody>
</table>
R-square and Interpretation

An R-square of .99 indicates that the model specified is a good fit. The results derived from the panel data set support the theoretical evidences that were previously stated. All the explanatory variables used for this study have the sign implied by theory. Educational related expenditures and acceptance rate turned out to be insignificant, but there is theoretical base for including both of these variables. This analysis concludes that increases in SAT scores, average grants, average loans and educational related expenditures will lead to higher levels of retention. SAT scores, average grants and average loans turned out to be significant.

Taken together, these calculations reveal that SAT scores, average grants and average loans will cause changes in retention for private colleges. Private colleges will have to provide students with financial support (average grants and loans) in order to enhance their rates of retention because that turned out to be an important determinant that can cause a student drop out. As previously stated, SAT scores measure student performance so its significance is supported by the literature that was found and theory. Although SAT scores turned out to be an important factor affecting a students’ ability to stay in school, SAT scores tend to be bias across cultures so relying on just SAT scores to determine a students’ academic ability can be misleading. The literature that was found suggests that SAT scores, GPA and teacher recommendations should be used combined to determine student performance.

The empirical findings that were found used a 5 year panel data set that was drawn from IPEDS, which supported the theoretical underpinnings of the following model:

Equation (1)

\[
\text{Retention Rate (RR)} = F [\beta_0 - \beta \text{ acceptance rate it (AC), } + \beta \text{ educational related expenditures it (ER), } + \beta \text{ average loans it (AL), } + \beta \text{ average grants it (AG) and } + \beta \text{ standardized test scores it (SAT’s) } + \epsilon \text{ it }].
\]

These findings reveal that increases in average grants, average loans and SAT scores’ are the main factors that will impact the student drop-out rate. Although acceptance rate and educational related expenditures turned out to be statistically insignificant, theory and common sense provide base for the inclusion of both of these variables. I concluded that SAT scores should be used to determine student performance, but a college must use other methods to measure student performance.

The literature that was found indicates that SAT can be bias across cultures so GPA and teacher recommendations must also be used to determine a students’ preparedness for college. Students who
perform well on the SAT generally reflect attributes such as preparedness, hard work, desire, and good attitude. Despite these facts, colleges should not rely on SAT scores to measure student performance because SAT scores can put minority students at a disadvantage. A study done by Spangler (2001) cites a cultural bias in SAT scores.

This analysis suggests that there different dialects that only members of a particular region or culture will able to recognize. The study reveals that individuals that are more in tune with another culture will be more likely to do get a low SAT score. This analysis examined 348 of 810 students and it compared the class rank and GPA of both black students and white students. These findings revealed that groups with the same GPA and class rank had different SAT scores; black students had lower SAT scores. This study indicates that the relative quality of a student’s personal statement, GPA and teacher recommendations should be considered. Furthermore, colleges should not place a high emphasis on SAT scores along. Despite these facts, a private college’s ability to recruit these high performance students can be affected by the changes in the market.

**Conclusion**

This study analyzed the prevailing market changes in order to anticipate the environmental forces that can cause changes in retention. An analysis written by (Kent Hill, Dennis Hoffman & Tom R. Rex, 2005) suggested that a higher attrition rate at the high school level will cause the retention of private colleges to fall. This study projected that retention rates among high schools are going to continue to fall until 2015. The government must intervene in order to address this issue and the government should mandate that under-age students’ graduate from high school. Meanwhile, private colleges will have to find strategic ways to attract more students. This study has concluded that average grants, average loans and SAT scores are the main determinants affecting the student drop-out rate so private colleges’ will need to take that into consideration during the admission process.

Increasing the retention rate of most private colleges may also require help from the government. If students are unable to get loans to finance their education, the government will need to correct this market failure, because these would impede a student to reach their full potential. Consequently, the positive spillover benefits that come with higher education must motivate the government to invest in education a study done by Hill, Dennis Hoffman, & Tom R. Rex, (2005) suggests that higher education can lower the crime rate, increase productivity, wages and promote economic growth. Consequently, financial barriers that talented students coming from low income families have to face must be minimized or removed in order to provide these students with the opportunity to reach their full potential.
Appendix

Dependent Variable: RR  
Method: Panel Least Squares  
Date: 05/21/12  Time: 23:11  
Sample: 2006 2010  
Periods included: 5  
Cross-sections included: 187  
Total panel (unbalanced) observations: 412

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Effects Specification

Cross-section fixed (dummy variables)

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<td>Prob(F-statistic)</td>
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T-Critical = 1.645
WORK CITED


