The Economics of Tuition Discounting: A Study of Matriculation and Reputation at the University of Utah

DJ Benway
Master of Public Policy
University of Utah
2012
The University of Utah

- Joined the PAC-12 in 2011
- State Flagship Institution
- Enrolls 23,371 Undergraduates, 75.83% of Student Population
- Large Medical Campus and Respected Programs
- Doctoral Granting, Research Intensive University
- 5 Other Public and 2 Private Institutions in the State

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University Mission and Goals

• “As a preeminent research and teaching university with national and global reach, the university cultivates an academic environment in which the highest standards of intellectual integrity and scholarship are practiced.”

• Open to any potential student who is committed to learning and who conforms to high academic standards

• Preserve academic freedom and promote diversity and equal opportunity

• Increase the quality of the student body

• Ensure that students, earn their degrees expeditiously, to optimize the use of time and money

• Protect and strengthen the university’s underlying financial structure

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Research Question

• How can the University of Utah best apply Strategic Enrollment Management Strategies, and the allocation of discretionary financial aid funds, to increase its yield in matriculation of an opportunistic category of university applicants?
  • Increase national prestige and reputation
  • Increase perceived value and quality of student body and institution
  • Maintain tuition revenue stream
  • Not sacrifice access or equity missions and goals
Economic Theory and Application

- Budget restrictions and tuition dependent revenue; **Constrained Optimization**
- Incomes and state funding have declined, while college prices have continued to rise at a rate above inflation; **Consumer Demand**
- Demographics of college-aged individuals are changing, with the fastest growing segment being minorities low-income; **Producer Demand**
- Information Asymmetry & **Price Discrimination**:
  - Students are unaware of exactly what they are purchasing and are left to rely on rankings and perceived value and quality
  - Discount to highest level individual is willing to pay
  - Policies with the sole purpose of maximizing tuition or status, both the institution and the students are losers
  - Policies may seem fiscally sound, but are educationally and morally bankrupt
- Colleges and universities are competing for students in a more market-based model; **Resource Dependency Theory**
- Shift from grants to loans; **Payment Burden**
- Use of discretionary aid funds; **Opportunity Costs**

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## Market & Competition

### Sample of Institutions of Comparison

<table>
<thead>
<tr>
<th>Institution</th>
<th>HS GPA</th>
<th>25th Percentile ≤</th>
<th>75th Percentile ≤</th>
<th>Retention Rate</th>
<th>Graduation Rate (4 year)</th>
<th>Graduation Rate (6 year)</th>
<th>Total # of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Utah</td>
<td>3.52</td>
<td>21</td>
<td>27</td>
<td>85.00%</td>
<td>22.83%</td>
<td>57.00%</td>
<td>30819</td>
</tr>
<tr>
<td>Utah State University</td>
<td>3.54</td>
<td>21</td>
<td>27</td>
<td>71.70%</td>
<td>28.35%</td>
<td>55.70%</td>
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<tr>
<td>Utah Valley University</td>
<td>3.15</td>
<td>18</td>
<td>24</td>
<td>54.00%</td>
<td>7.92%</td>
<td>23.00%</td>
<td>32670</td>
</tr>
<tr>
<td>Brigham young University (Private)</td>
<td>3.8</td>
<td></td>
<td></td>
<td>85.00%</td>
<td></td>
<td></td>
<td>32947</td>
</tr>
<tr>
<td>Westminster College (Private)</td>
<td>3.506</td>
<td>22</td>
<td>27</td>
<td>79.00%</td>
<td>44.03%</td>
<td>59.00%</td>
<td>3163</td>
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<tr>
<td>Arizona State University</td>
<td>3.39</td>
<td>21</td>
<td>27</td>
<td>84.00%</td>
<td>32.39%</td>
<td>58.70%</td>
<td>70440</td>
</tr>
<tr>
<td>University of California, Berkeley</td>
<td>3.84</td>
<td>27</td>
<td>33</td>
<td>97.00%</td>
<td>68.84%</td>
<td>91.00%</td>
<td>35838</td>
</tr>
<tr>
<td>University of Colorado at Boulder</td>
<td>3.55</td>
<td>23</td>
<td>28</td>
<td>85.00%</td>
<td>41.00%</td>
<td>68.00%</td>
<td>32378</td>
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<tr>
<td>Washington State University</td>
<td>3.44</td>
<td>21</td>
<td>26</td>
<td>82.00%</td>
<td>40.50%</td>
<td>69.00%</td>
<td>26308</td>
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<tr>
<td>University of California, San Diego</td>
<td>4</td>
<td>25</td>
<td>31</td>
<td>95.00%</td>
<td>56.76%</td>
<td>86.00%</td>
<td>29176</td>
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<tr>
<td>University of Iowa</td>
<td>3.59</td>
<td>23</td>
<td>28</td>
<td>86.00%</td>
<td>44.17%</td>
<td>70.00%</td>
<td>29518</td>
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<tr>
<td>University of New Mexico</td>
<td>3.29</td>
<td>19</td>
<td>25</td>
<td>78.00%</td>
<td>12.79%</td>
<td>44.00%</td>
<td>28757</td>
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<tr>
<td>University of Pittsburgh</td>
<td>3.91</td>
<td>25</td>
<td>30</td>
<td>92.00%</td>
<td>60.89%</td>
<td>78.00%</td>
<td>28823</td>
</tr>
</tbody>
</table>

**Key:**
- **Green:** Utah Institutions
- **Blue:** PAC-12 Institutions
- **Red:** Others

**Key Points:**
- Lowest 4-year graduation Rate
- Tied for 3rd worst ACT Percentiles with UA and ASU
- Worst 6-year graduation rate of all of PAC-12

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## Matriculation Yields of Admitted Students

<table>
<thead>
<tr>
<th>Group</th>
<th>AI Range</th>
<th>Count</th>
<th>Row N %</th>
<th>Count</th>
<th>Enrolled</th>
<th>Row N %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>&lt;= 56.28</td>
<td>72</td>
<td>25.9%</td>
<td>206</td>
<td>74.1%</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>56.29 - 66.23</td>
<td>195</td>
<td>40.6%</td>
<td>285</td>
<td>59.4%</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>66.24 - 72.38</td>
<td>528</td>
<td>52.5%</td>
<td>477</td>
<td>47.5%</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>72.39 - 77.31</td>
<td>627</td>
<td>52.1%</td>
<td>577</td>
<td>47.9%</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>77.32 - 81.69</td>
<td>705</td>
<td>54.8%</td>
<td>582</td>
<td>45.2%</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>81.70 - 85.82</td>
<td>758</td>
<td>58.0%</td>
<td>548</td>
<td>42.0%</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>85.83 - 89.27</td>
<td>762</td>
<td>57.2%</td>
<td>570</td>
<td>42.8%</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>89.28 - 92.67</td>
<td>751</td>
<td>56.7%</td>
<td>573</td>
<td>43.3%</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>92.68 - 95.73</td>
<td>789</td>
<td>59.4%</td>
<td>539</td>
<td>40.6%</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>95.74 - 98.92</td>
<td>811</td>
<td>62.2%</td>
<td>492</td>
<td>37.8%</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>98.93 - 101.93</td>
<td>785</td>
<td>56.9%</td>
<td>548</td>
<td>41.1%</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>101.94 - 104.76</td>
<td>799</td>
<td>61.1%</td>
<td>509</td>
<td>38.9%</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>104.77 - 107.51</td>
<td>859</td>
<td>63.3%</td>
<td>498</td>
<td>36.7%</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>107.52 - 110.31</td>
<td>878</td>
<td>65.9%</td>
<td>455</td>
<td>34.1%</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>110.32 - 113.04</td>
<td>870</td>
<td>65.8%</td>
<td>452</td>
<td>34.2%</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>113.05 - 115.84</td>
<td>912</td>
<td>66.9%</td>
<td>452</td>
<td>33.1%</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>115.85 - 118.56</td>
<td>839</td>
<td>69.2%</td>
<td>374</td>
<td>30.8%</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>118.57 - 122.15</td>
<td>895</td>
<td>62.9%</td>
<td>529</td>
<td>37.1%</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>122.16 - 125.93</td>
<td>695</td>
<td>59.5%</td>
<td>473</td>
<td>40.5%</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>125.94+</td>
<td>960</td>
<td>65.1%</td>
<td>515</td>
<td>34.9%</td>
<td></td>
</tr>
</tbody>
</table>

**ALL Years - 2008 2009 2010 2011**

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Constrained Optimization

• Trying to minimize cost and maximize results given the constraints of our inputs
• What are our constraints as enrollment professionals?
  • Budgetary constraints
  • Non-monetary Constraints
  • Reputation
• What are we trying to maximize?
  • Number of highly qualified applicants enrolling in the University of Utah
  • Reputation
  • Educational Quality

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Law of Demand

Demand for college should follow the law of demand, unless it is a Giffen Good. What affects potential applicants to apply and/or matriculate? Is College a Giffen Good?

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Willingness VS. Ability to Pay

<table>
<thead>
<tr>
<th></th>
<th>Willing</th>
<th>Unwilling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Able</td>
<td>Satisfied: Likely to matriculate though potential over-awarded</td>
<td>Unsatisfied: Potential over- or under-awarded, unlikely to matriculate</td>
</tr>
<tr>
<td>Unable</td>
<td>Unsatisfied: Under-awarded, and unlikely to matriculate</td>
<td>Unsatisfied: Potential over- or under-awarded, unlikely to matriculate</td>
</tr>
</tbody>
</table>

- Over-awarded: Student received too much financial aid
- Under-awarded: Student received too little financial aid
- Marginal Award: $1000 to each student valued differently based on elasticity of demand

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Producer demand, can also be thought of as consumer supply. Therefore, universities are facing a series of supply and demand curves, each unique based on the demand for the characteristic by the university and the pool of applicants/potential applicants it gets.

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Price Discrimination

- Price Discrimination is essentially the ability to charge exactly what a customer is willing to pay for a given good/service.
- Price Discrimination can happen in a monopoly, or when there is information asymmetry (where one side, usually the seller has more information about the quality of the good/service than the other, usually the buyer).
Resource Dependency Theory

- Several changes in the market for higher education:
  - Public’s attitude has changed, now searching for “best deal”
  - Incomes have declined nationally, but prices have continued to rise at a rate above inflation.
  - Demographics of college-aged individuals are changing, with the fastest growing segment being minorities and individuals who have grown up in low-income households
  - Payment Burden: shift from grants to loans, now families are paying not the government
- Result:
  - Colleges and universities are competing for students in a more market-based model, rather than as a public good/service
Opportunity Costs

• The cost of an alternative option that is forgone to implement an action
  • Essentially it’s what are the costs and benefits of pursuing the next best option?

• Non-Financial Aid Options
  • Recruitment
  • Infrastructure

• Financial Aid Options
  • Tiered admissions
  • Cut off Scores
  • Etc.
# Alternative Financial Options

<table>
<thead>
<tr>
<th>Program/Practice</th>
<th>Definition</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Differential Packaging</td>
<td>Offer Better aid packages to students found for one reason or another to be more promising</td>
<td>Every needy student is theoretically offered Aid to meet full need (even if some are loans)</td>
</tr>
<tr>
<td>Gapping</td>
<td>Claim that need is being met is dropped and students are offered aid packages that meet only a specified percentage of need (student invited to come up with the rest)</td>
<td>Generally meet larger percentage of the need of more attractive students</td>
</tr>
<tr>
<td>Admit/Deny</td>
<td>Admitted regardless of need and essentially considered, need-blind</td>
<td>Marginal students are denied financial aid</td>
</tr>
<tr>
<td>Need-Aware Second Review</td>
<td>Students on a second review list where on characteristic of getting in is ability to pay, called need-blind, fully met need</td>
<td>Discourages undertaking of financial burden by students</td>
</tr>
<tr>
<td>Two-Tier Admissions</td>
<td>Attract poor and high-achieving students and accept low-achieving, rich ones</td>
<td>Dependency theory, the low achieving rich ones subsidize the high-achieving poor ones</td>
</tr>
</tbody>
</table>

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Alternative Options

• Simply Raise Admission Standards
  • Raise academic profile
  • No change in financial aid awards
  • No cost to University
  • No Tuition Gain or Loss

• High School Marketing
  • Make students aware of the University of Utah
  • Make students aware of financial aid
  • Where to market to?
  • Over coverage and not directed

• Targeted Marketing
  • Directed and target to qualified applicants
  • PLAN/ACT EOS
    • Proven achievement and qualified
    • $0.34 a name
    • Shown interest in higher education

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## Prisoner's Dilemma

<table>
<thead>
<tr>
<th></th>
<th>Other institutions implement a SEM Strategy</th>
<th>Other institutions do not implement a SEM Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utah implements a SEM Strategy</td>
<td>All institutions lose; End up with the same pool of applicants at a tuition revenue loss</td>
<td>Utah advantageous; higher achieving applicants enroll; little to no tuition revenue loss</td>
</tr>
<tr>
<td>Utah does not Implement a SEM Strategy</td>
<td>Utah loses; Higher-achieving students go elsewhere; Utah left with low-achieving, high-need</td>
<td>Utah indifferent; Same pool of applicants and matriculates; no change in tuition revenue</td>
</tr>
</tbody>
</table>

- Collusion found to be illegal under antitrust laws; unless need blind
- Cost of not implementing regardless of others actions

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Ethics and Controversy

- **Access (Chance to enroll) vs. Equity (Choice where to enroll)**
- **Award Talent (merit based) vs. Meet Need (need based)**
- **Consumers (students) vs. Producers (higher education institutions)**
- **Baum & Lapovsky, 2006:**
  - Non-need-based aid may be awarded to students who do in fact have financial need, but it is often given to students who have the ability to pay but are unwilling to pay the full published price
  - Public 4-year institutions use their money to provide grants and scholarships at a “nontrivial” amount, where only 40% of institutional grant aid at non-flagship, public four-year institutions, fills documented need
- **Reed & Shireman, 2008:**
  - The effect of merit aid is generally negative in terms of access and affordability
  - Fierce competition and the use of targeted merit aid can lead to bidding wars
  - Aggregated across 4-year schools, merit aid associated with lower affordability for low-income not loss in equity or access
- **Bontrager, 2007:**
  - Oregon state as a model, concludes SEM offers one of the few avenues for achieving the goals of access and equity for students, while maintaining viable financial outcomes for institutions
- **Duffy & Goldberg, 1998:**
  - Strategic use of aid and fiscal responsibility under a constrained budget benefits both students and the institution
  - Marginal decrease in aid to needy students, and often institutions continued to increase need based aid
- **Nick Hillman, 2010:**
  - 12 state representative sample of 31,542 public school student
  - Average discount rate for students at 4-year public institutions was 14.3% and increased opportunity for underrepresented students
  - Low-income, minority, freshman and non-residents are most likely to receive discounts, though only ≥ to upper-income peers

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What will happen to freshman enrollments if a monetary incentive is provided to a select group of admitted nonresident students?

**First model:** Logistic regression to isolate how enrollments changed with changes in the provision of institutional grants.
- Institutional Grant variable increased when other aid-related variables were not included in the model.
- High-ability students are more sensitive to changes in aid.
- Grant responsiveness was fairly consistent for each increase in institutional aid.

**Second model:** Simulation model
- Students with an AIS of 129 or above were considered high-ability,
- Increases in enrollments among this group would tend to improve the quality of the class
- Students above this cut score have admit-to-enrollment yields that were lower than students from below this cut score.

Analyzed two approaches to achieve the institutions outlined goals:

**Undifferentiated Offer:**
- Enrollment increase, increase in quality (average AIS), and increase in net tuition revenue
- Large downside effects if enrollment yield increases do not materialize.

**Differentiated Offer:**
- No change in projected enrollments, but because they offer less money to the 129-139 and 140-153 ability groups), net tuition revenue is projected to be higher.
- A scholarship would induce enrollment increases and increase net tuition revenue. But there’s risk in potential net tuition revenue will decrease if matriculation levels are not realized.


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Economics in Action

- Enrollment Management is a competitive where institutions are “competing” for students
  - What is/are your markets?
  - Prisoner’s Dilemma
- Institutions are subject to the laws of supply and demand
  - Consumer demand
  - Producer demand
- There is price discrimination and information asymmetry present in the market for higher education
  - A perfect SEM strategy is the ability to perfectly price discriminate
- Before any SEM strategy can be undertaken, there must be an assessment of the opportunity costs
  - Financial aid based and non-Financial aid based
- Economics is a social science
  - Always remember your mission
Case Study Summary

• With accurate data collection and analysis, the University of Utah can apply a differentiated tuition-discounting program to more perfectly price discriminate among university applicants and increase its matriculation yield of high-achieving student.
  • The more targeted the aid allocation, the more accurately the institution can perfectly price discriminate, therefore resulting in the optimal allocation of resources,
  • The added benefit is an increase in perceived quality of the student body, a direct representation to the general public of the institutions prestige
  • Increase the yield of qualified students in the future, increase the amount of student research funding, increase future development and giving, and overall reputation

• Recommendation 1: Data Collection and Analysis
  • Single Clearinghouse of data from application to graduation
  • Clear and accurate data reporting and analysis
  • Relevant data reports to all members of institution

• Recommendation 2: Implement SEM & Tuition Discounting Program
  • Implement slow and in test phases to allow for data collection
  • Develop general cut score for which targeted aid is no more effective
  • Differentiated approach to maintain tuition revenue
  • Bridge gap between large awards for top students and small awards for high-achieving students

• Recommendation 3: Hybrid with Targeted Marketing
  • After test implementation of tuition discounting program combine with PLAN/ACT EOS
  • Targeted marketing to attracted qualified applicants and directed aid awards
  • Based on yield rates from R2 and R3 conduct a Cost-Benefit Analysis to determine most effective action

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Thank You

• Professor Cathleen Zick, Committee Chair
• Professor Paul Gore, Committee Member
• Professor Nicholas Hillman, Committee Member
• Mr. Steve Kroes, President of Utah Foundation
• Mike Martineau, OBIA
• Sandy Hughes, OBIA
• Utah MPP Program
DJ Benway, MPP

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