

# **Optimizing Net Tuition Revenue Through Pricing and Financial Aid Strategies: How Do You Find Your Way?**

**31<sup>st</sup> Annual Snowmass Institute**

**Presented by:  
Scannell & Kurz, Inc.  
July 10, 2006  
[www.scannellkurz.com](http://www.scannellkurz.com)**



# The Evolution of Financial Aid

- From a mechanism used to promote equity, access, and choice ...
- To becoming a significant factor in determining an institution's competitive position and financial well-being.

**Financial aid policies must address both:  
Social values and fiscal realities.**

Source: The College Board



# In the past, financial aid policies and goals were primarily influenced by:

- Institutional mission
- Philanthropic support



# Now, market forces are the most significant influencers:

- **Competition**
- **Trends in inquiries, applications, and retention-- your demand curve**
- **The demographic and economic environment**



**Even the financial aid policies of the most prestigious institutions in the country are being shaped by market forces:**

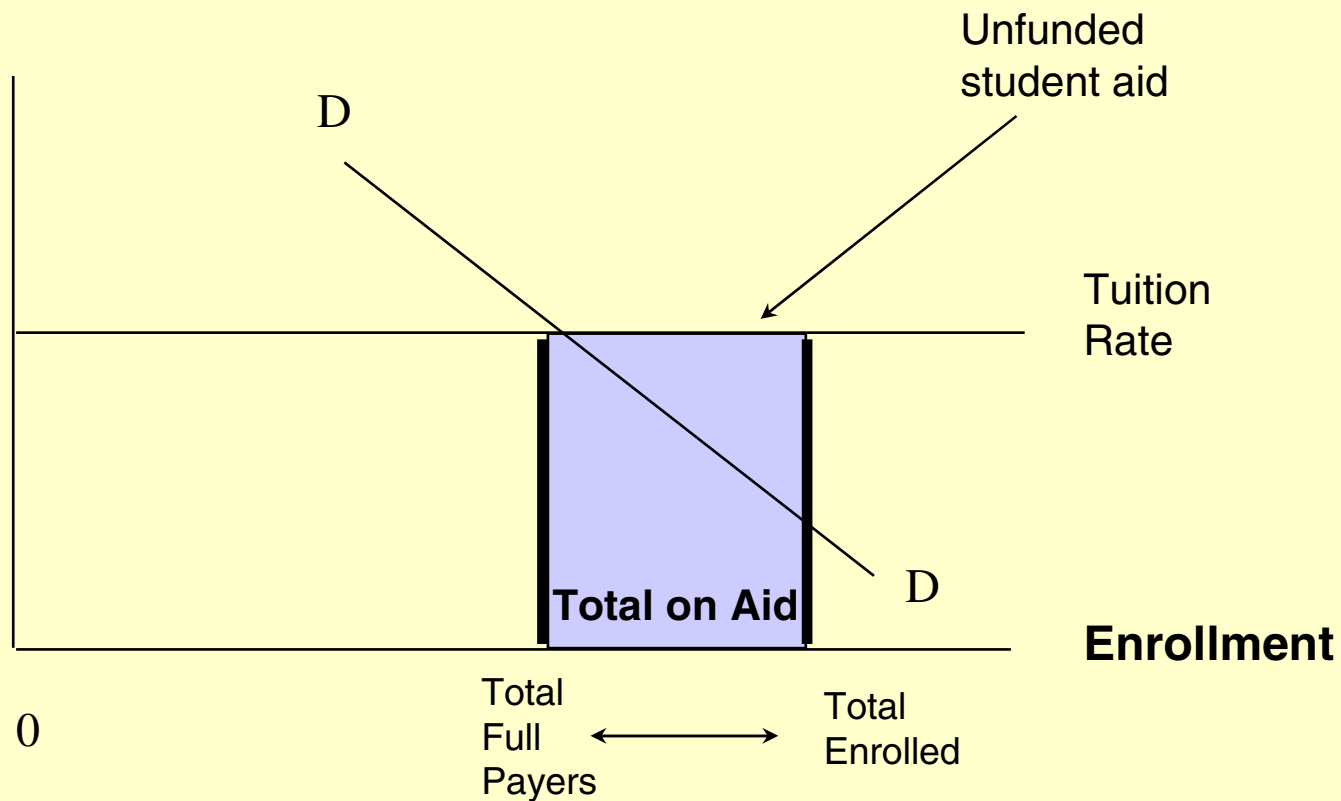
- **Princeton**
- **Williams**
- **Harvard**
- **Virginia**



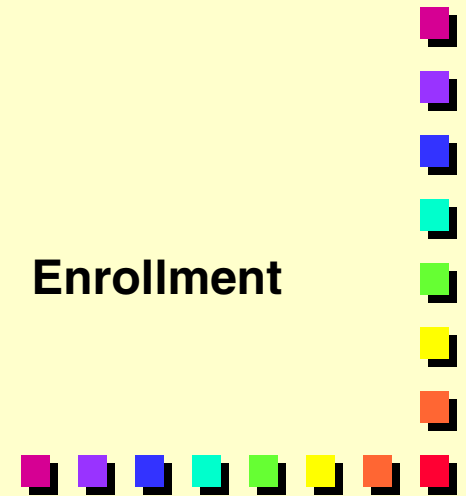
# Enrollment Demand and Net Tuition Revenue\*

\*From "Liberal Arts Colleges: Thriving, Surviving or Endangered?" David W. Breneman

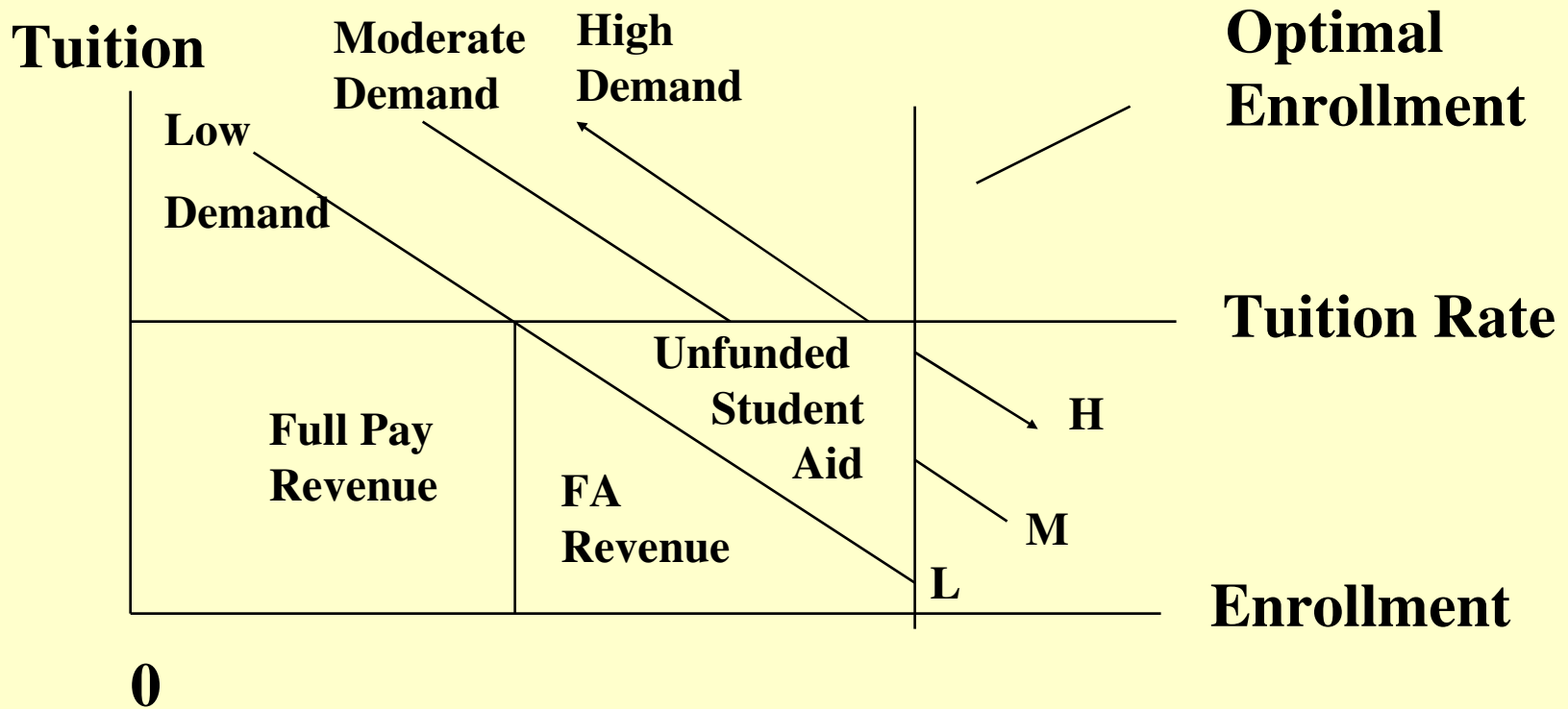
Tuition



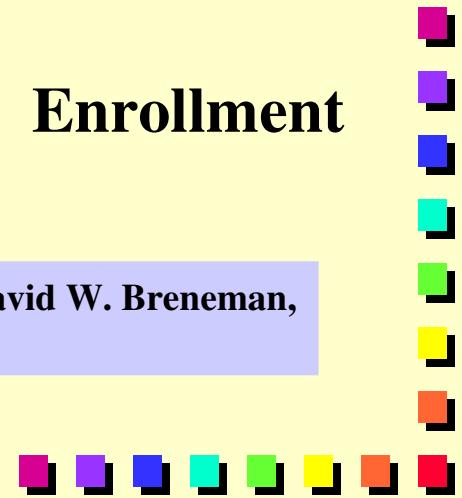
Scannell & Kurz, Inc.



# Enrollment Demand and Net Tuition Revenue\*

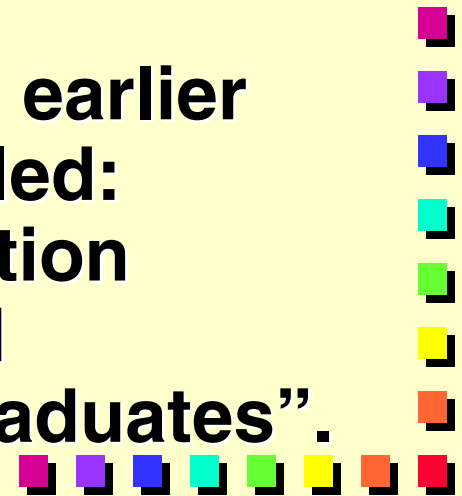


\*From "Liberal Arts Colleges: Thriving, Surviving or Endangered?", David W. Breneman, The Brookings Institution



# The Debate: Tuition Discounting, Good or Evil?

- A couple of years ago a news headline read: “New Lumina Foundation (formerly USA Group) research reveals unintended results of tuition discounting. Tuition discounting may reduce college revenue and financial access for low-income students.”
- This report came on the heels of an earlier USA Group Foundation report entitled: “Discounting Toward Disaster: Tuition Discounting, College Finances, and Enrollment of Low-Income Undergraduates”.

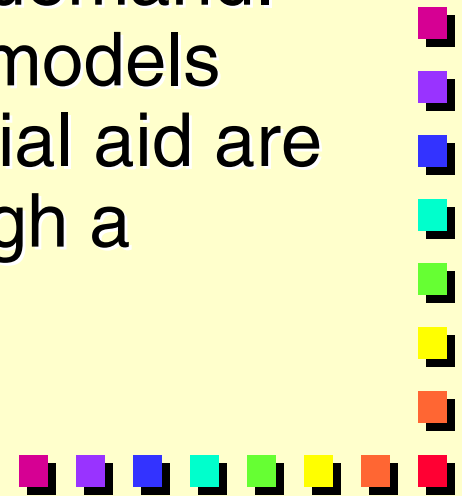


# The Debate (cont'd): Limitations of the Lumina Report

- Assumes that every dollar of financial aid that is awarded to higher income students is “stolen” from lower income students (in a zero-sum-game model)
- Fails to recognize that targeting aid at higher income students to increase their yield generates tuition revenue which can fund more expenditures on aid for all students

# The Debate (cont'd): New York Times, 4/30/04

- David Kirp, Cal Berkeley professor of public policy, argues in his op-ed article “And the Rich Get Smarter” that in an environment where admissions offices are sometimes referred to as profit centers, the “full payers”, students from wealthy families, are in the greatest demand. He further notes that new statistical models being used in admissions and financial aid are intended to increase revenues through a discount from the sticker price.



# The Debate (cont'd): Atlantic Monthly, November 2005

- Matthew Quirk, A.M. reporter-researcher quotes Williams economist Gordon Winston's assessment of enrollment management, "It's a brilliantly analytical process of screwing the poor kids... enrollment managers are ruining American higher education."



# **The Debate (cont'd): So, why then is tuition discounting getting a bad rap?**

**Because in the name of discounting  
many institutions award financial aid  
differentially based on:**

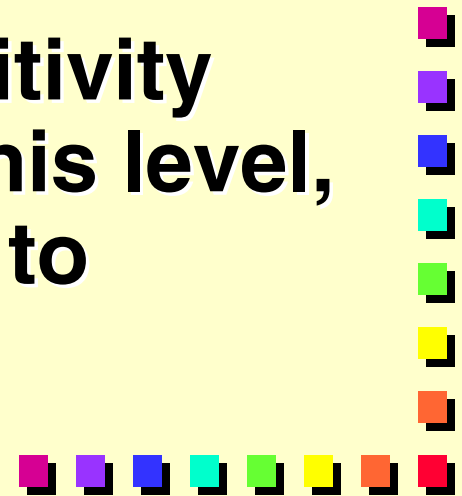
- **matching the competition**
- **anecdotal evidence**
- **intuition**



# **The Debate (cont'd): But, how can discounting have positive results?**

**Before the first institutional aid dollar  
is awarded you should know:**

- **why you're spending institutional  
resources and**
- **demonstrate with price sensitivity  
analysis that this award, at this level,  
to this student is most likely to  
produce the result desired.**



# Different questions emerge for different audiences

Management related questions include:

- ➔ Are the increases in financial aid being spent wisely?
- ➔ Are you under-funding need-based grant programs?
- ➔ Are you focusing institutional aid too heavily on merit programs or is the merit aid focused on the wrong applicant segment?
- ➔ The competition is offering aggressive merit programs, should you respond? If so how much should be offered and to which applicants? What will it cost, what will the precise impact be on quality, revenue, and other class characteristics?

# Governing boards need to know:

- At capacity -- yes or no?
- Information or trends in freshman discount rate as well as the overall discount rate
- Information about the institutional sticker price, discount rate, and relative prestige ranking compared to that of key competitors
- Trends in applications and yields on non-aid students versus those receiving institutional aid



# Governing boards need to know (cont'd):

- Differences in the net tuition revenue generated by desirable subpopulations
- An understanding of the tradeoffs between enrollment goals

**In sum, Trustees need to know more than just the trends in the discount rate; they need to know the factors driving that number.**



**Clearly the need for a data-driven approach to answering these questions has never been more important.**

- **The challenge will be to balance often conflicting enrollment goals.**
- **There is a need for more sophisticated means to fully understand the trade-offs and the impact of various strategies.**
- **Institutions can't afford to get it wrong.**



# Role of Data

**Without data, you're just another person with an opinion.**

**Or**

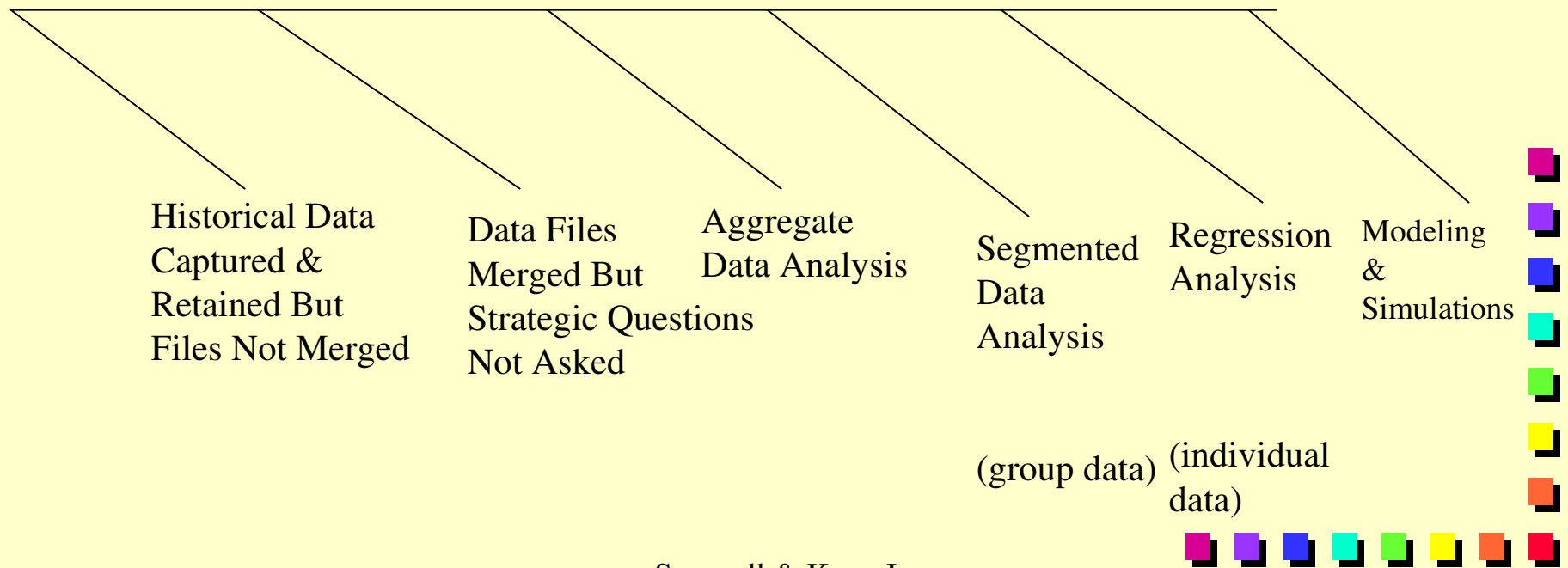
**Data is not the plural of anecdote.**



# Data Analysis Progression

No Data

Strategic Use  
Of Data



# How do you know what is right for your institution?

- Understand your market position by:
  - Asking the right questions
  - Gathering the necessary data

There are at least four important questions.



# **Question #1:**

## **Are we perceived as worth the price we are charging?**

- **Admissions trends from inquiry through enrollment -- volume and conversion rates**
- **Retention trends**
- **Price and student quality position versus competitors**

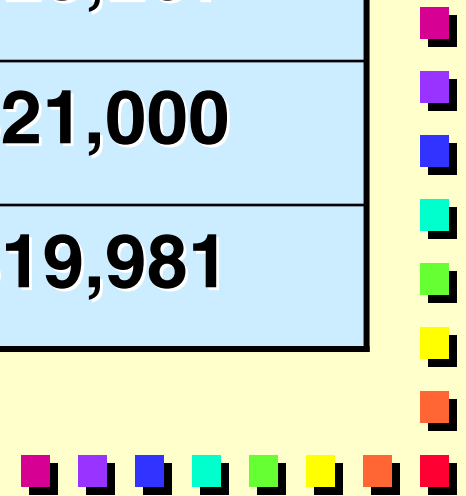


# Comparison of 39 Private Colleges and Universities Based on Sticker Price and Average SAT \*

Number of Institutions	Average SAT	Tuition & Fees
13	> 1250	\$25,519
8	1200-1250	\$25,267
8	1150-1199	\$21,000
9	< 1150	\$19,981

\*Sources: College Board & USNews & World Report

Scannell & Kurz, Inc.



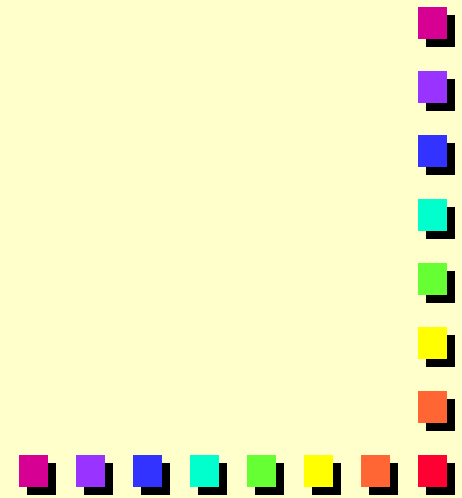
# **Question #2:**

## **Have we convinced students that we are affordable?**

- **For private institutions, do you lose overlap with public institutions from the point of inquiry to matriculation?**
- **Do you have low yields on a growing portion of your pool that does not apply for aid?**
- **How is the socio-economic mix of your applicant pool changing?**
- **How do yields vary by need level?**

# **Question #2 (cont'd): Have we convinced students that we are affordable?**

- **What are yields for families who apply for aid but are denied assistance?**
- **What has been happening to receivables?**
- **Who is leaving the school?**



# Question #3:

**How much aid do we need to spend to meet enrollment goals?**

**It DEPENDS!!!**

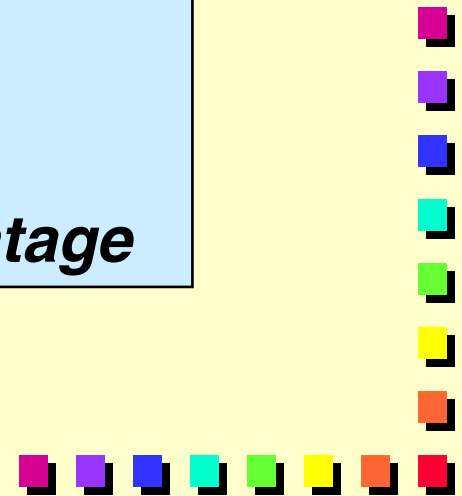
- **If at capacity, the focus should be discount rate and the cost of trading off desired characteristics.**
- **If not at capacity, the priority has to be the maximization of net tuition revenue.**

# How much aid do we need to spend to meet enrollment goals?

What is the “discount rate”?

(a)		Gross Tuition and Fee Revenue
(b)	LESS	Institutionally Funded <u>Financial Aid</u>
(c)	=	<b><i>Net Tuition Revenue</i></b>
(b)/(a)	=	<b><i>Tuition Discount Percentage</i></b>

(From NACUBO Institutional Aid Survey Executive Summary)



# Defining the Tuition Discount, A Component Analysis

$$\begin{array}{l} \text{\% of Students} \\ \text{Receiving Aid} \\ \text{from Institution} \end{array} \times \begin{array}{l} \text{Average Grant as} \\ \text{\% of Tuition} \\ \text{and Fees} \end{array} = \begin{array}{l} \text{Tuition} \\ \text{Discount} \\ \text{Percentage} \end{array}$$

(Source: NACUBO Institutional Aid Survey Executive Summary)



# Average Tuition Discount Percentages for Full-Time Freshmen

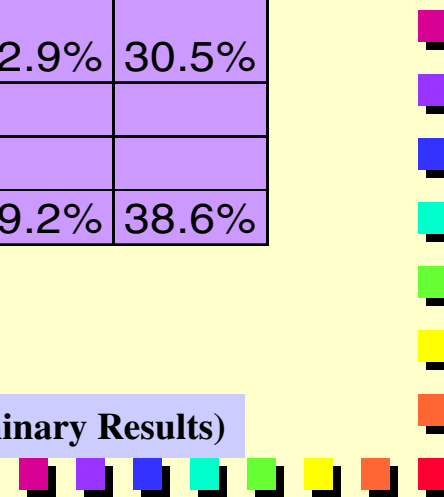
Institutional Type	Number of Respondents	Fall 1990	Fall 1995	Fall 2000	Fall 2003	Fall 2004
Small Colleges, Lower Tuition*	291	28.4%	36.0%	41.0%	42.9%	43.1%
Small Colleges, Higher Tuition*	85	27.8%	34.6%	35.9%	36.8%	35.9%
Large Colleges ** and Universities	73	20.0%	28.7%	29.1%	32.9%	30.5%
All Institutions	449	26.5%	34.2%	37.2%	39.2%	38.6%

\*LT < \$23,600

HT ≥ \$23,600

\*\*Full-time freshman enrollment greater than or equal to 850

(Source: NACUBO Institutional Aid Survey Executive Summary – 2004 – Preliminary Results)



# But what drives the discount rate?

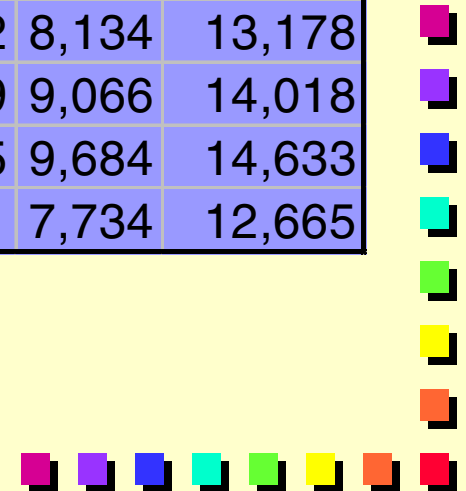
- Trends in family contribution and percent receiving financial aid
- Changes in outside support
- Commitments to diversity, quality, etc.
- Percentage of students applying for aid
- Yield by need level and grant level
- Retention by need level and grant level
- Market Forces

# Discount Rate “Tradeoffs”

- **Particularly for institutions that are “shaping” the incoming class, rather than simply “making” the class, it becomes important to make deliberate and data-driven decisions about trade-offs between desirable class characteristics and net tuition revenue.**
- **A first step is to understand how much net tuition revenue is currently received from different subgroups.**

# Net Tuition Revenue Table -- Tuition \$21,000

EFC Quality	Non Filers	> 30k	20-30k	15-20k	10-15k	5-10k	0-5k	Average
Highest	12,511	12,304	11,975	9,056	5,609	4,960	4,866	8,382
High	17,254	17,237	14,543	10,772	7,888	7,423	7,018	11,270
Medium	18,737	18,997	16,075	10,926	9,128	8,082	8,134	13,178
Lower	20,023	20,104	15,614	11,730	9,740	9,479	9,066	14,018
Lowest	20,044	20,049	16,433	11,651	10,798	10,355	9,684	14,633
Average	18,896	18,071	13,243	10,974	8,813	8,161	7,734	12,665



# Question #4: How can we be sure we are spending our aid wisely?

- **Analyze yields on different quality groups of students segmented by need and grant.**



# Sample yield table: SAT 1100-1150, GPA 3.0 or better

NEED→ GRANT ↓	No Aid App	<\$5K	\$5-10K	\$10K-15K	>\$15K
>\$7K				20/40 = 50%	
\$5-7K				23/50 = 46%	
\$3-5K				10/50 = 20%	
\$1-3K				9/60 = 15%	
\$0				3/40 = 8%	

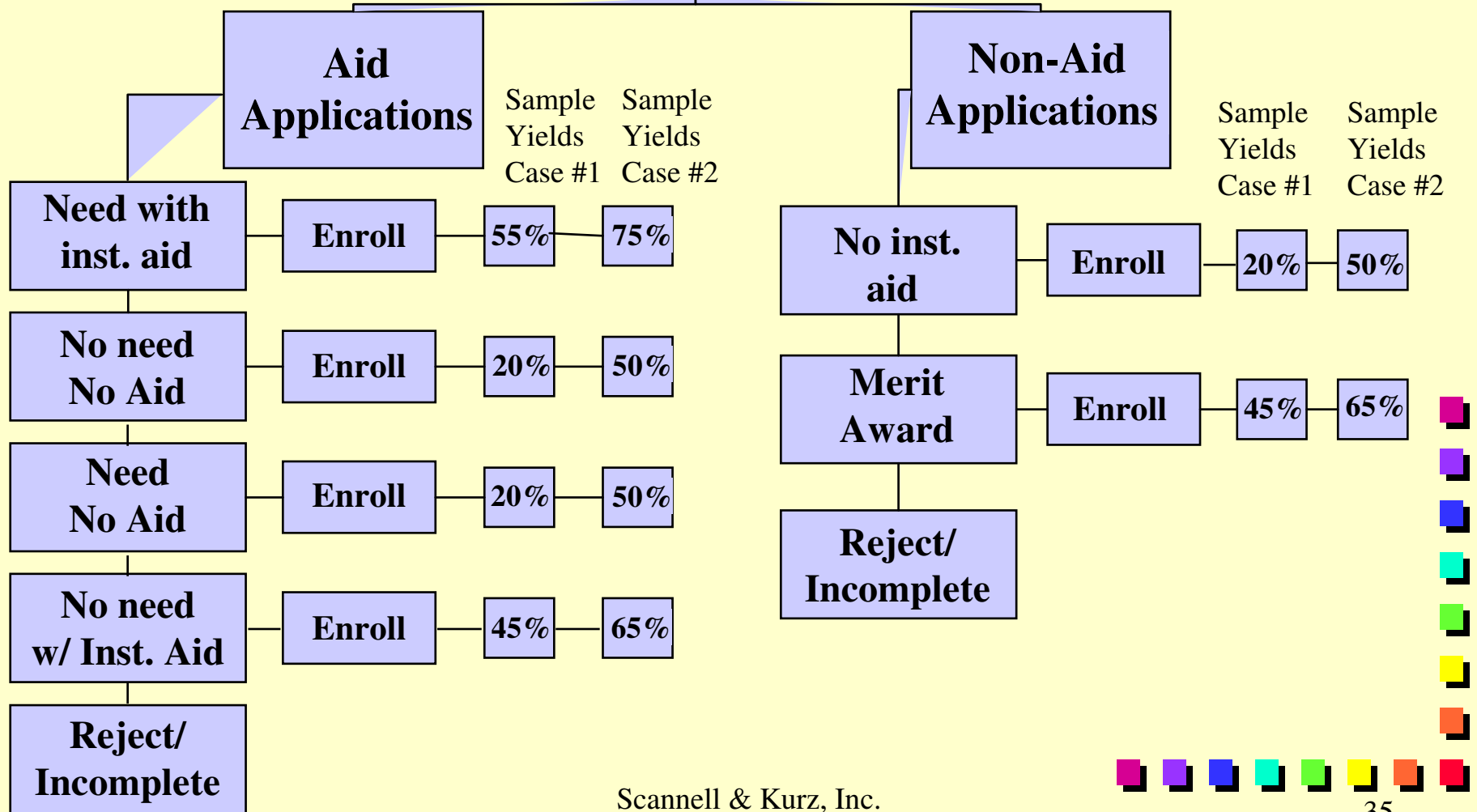


# Data-Driven Discounting

- Are there market segments where yields differ significantly from the norm?



# APPLICATIONS



# Data-Driven Discounting (cont'd)

- Are there market segments where the “universal truths” don't hold?



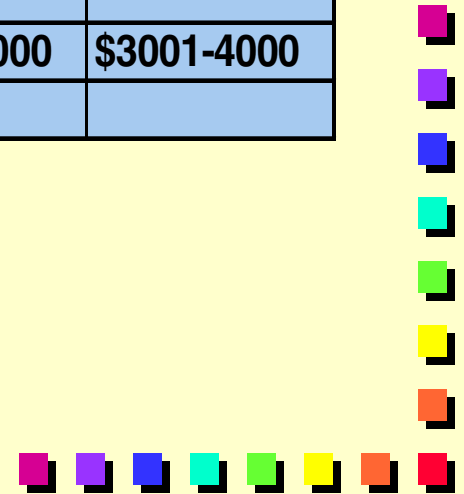
# Need by Aid Award

Each cell contains:  $\text{Enroll/Admit} = \text{Yield}$

	>20,000					
	\$3001-4000					
	\$2001-3000					
<b>Aid*</b>	\$1001-2000					
	\$0					
		\$0	\$1-1000	\$1001-2000	\$2001-3000	\$3001-4000
				<b>Need**</b>		

**\*Aid = grant and scholarship aid from all sources**

**\*\*Need = Cost - IM or FM contribution, whichever is used for packaging**



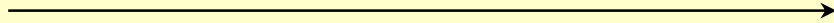
# Universal Truths

**AID**  
(FREE \$)

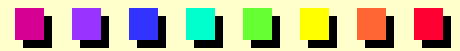
**Y** ↑



**NEED**



**Y** →



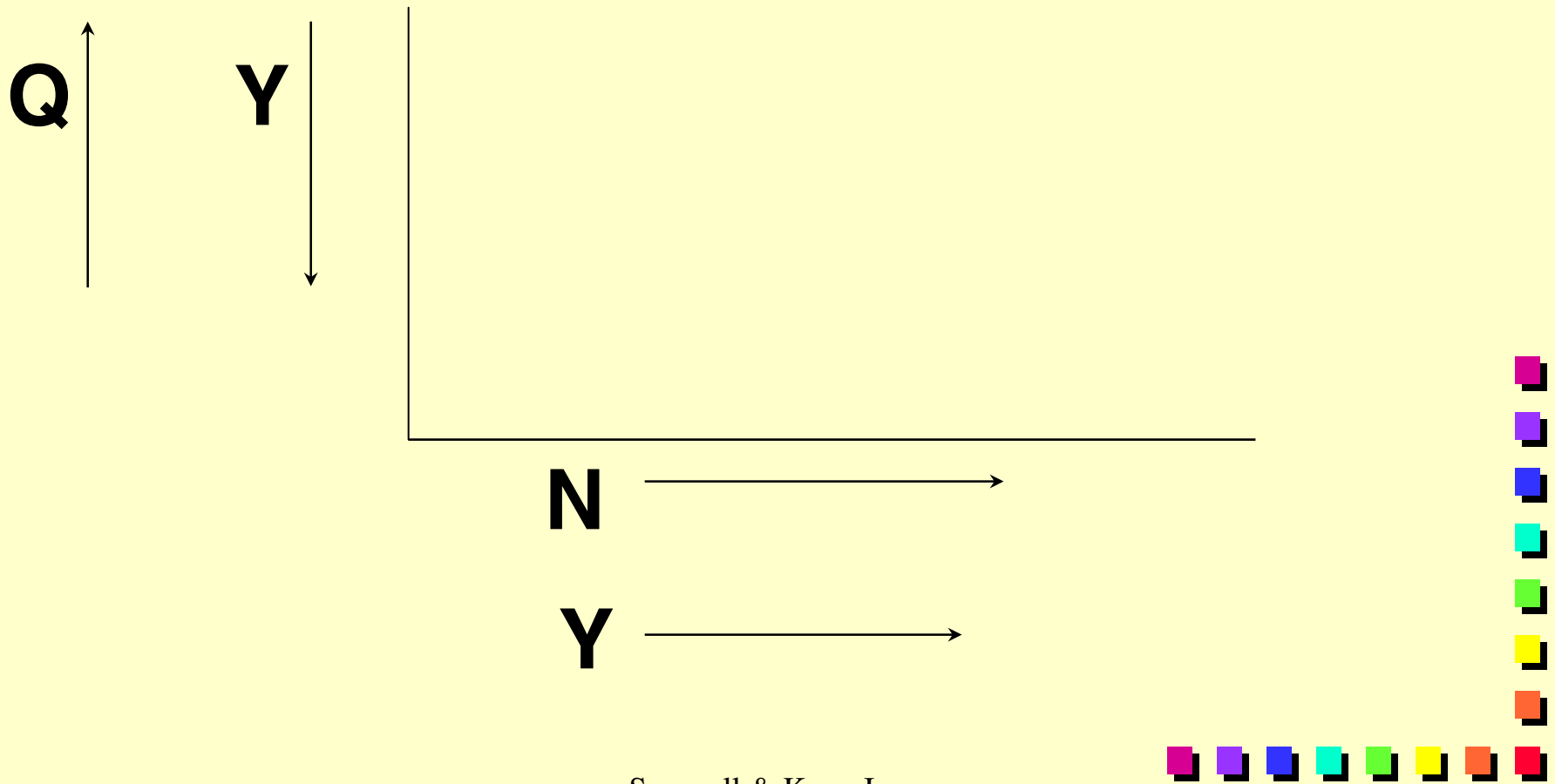
# Quality by Need

	1300				
	1200				
	1100				
Quality*	1000				
	900				
		\$0	\$1-1000	\$1001-2000	\$2001-3000
				Need	

**\*Quality = Admission rating or Predicted  
GPA or SAT**



# Universal Truths



# Quality by Merit Award

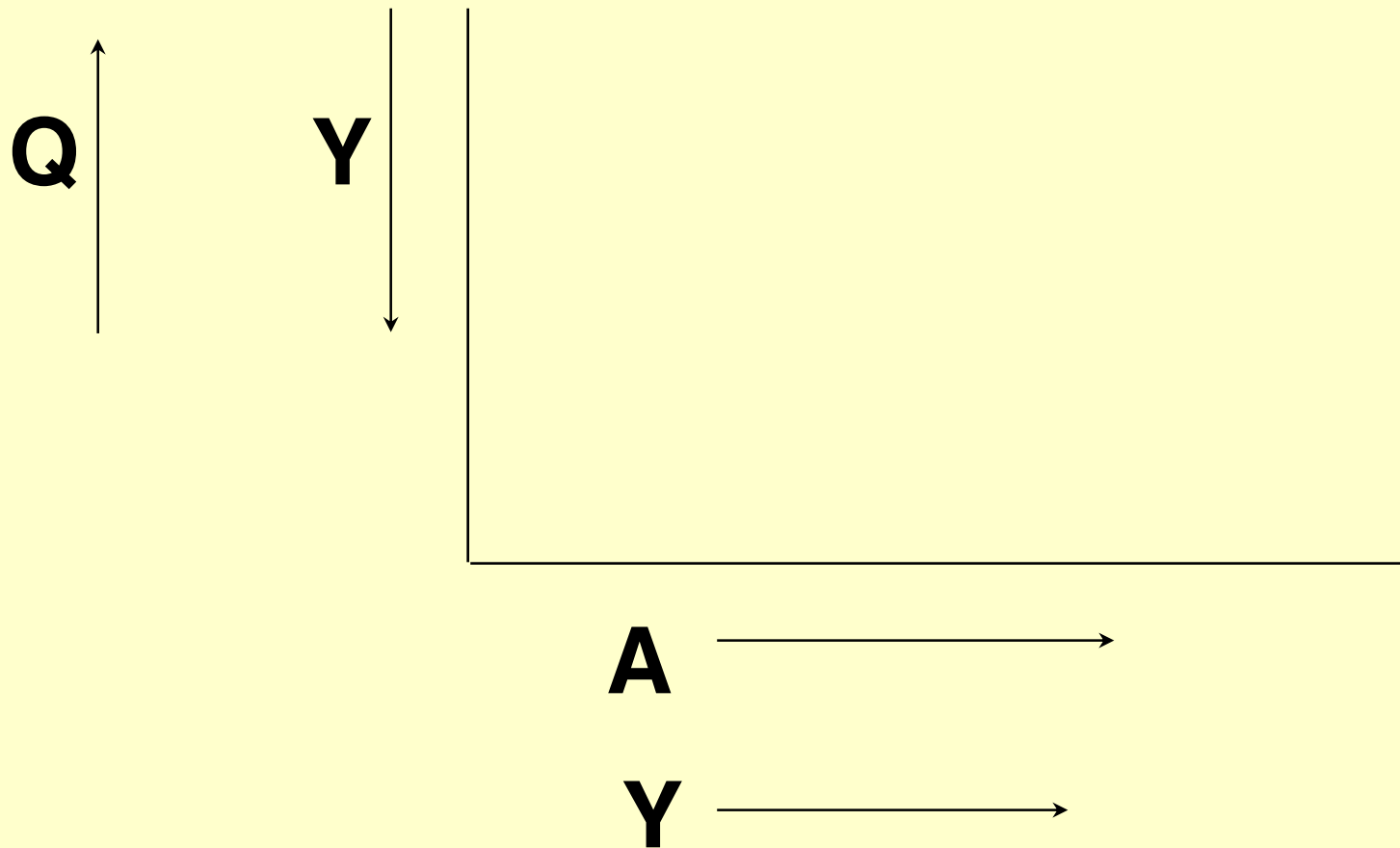
For No-Need Students

	1300				
	1200				
	1100				
Quality*	1000				
	900				
		\$0	\$1-1000	\$1001-2000	\$2001-3000
				Merit Award	

\*Quality = Admission rating or Predicted GPA or SAT



# Universal Truths



# These data can be segmented by:

- Freshman vs. transfer
- In-state vs. out-of-state
- Resident vs. commuter
- Quality of student
- Ethnic group
- Etc.



# Cautions on “table” analysis

- **Small numbers in cells can produce misleading results**
- **Needs to be monitored annually**
- **Aggregate numbers can mask differences between market segments**



# Data-Driven Pricing and Discounting: Alternatives In Use

- High price/high discount
- Low price/low discount
- Price reductions
- Redefining need
- Equity packaging
- Preferential packaging
- Admit/Deny
- Aid conscious admission
- Merit scholarship
- Guarantee



# Aid Award Pitfalls

- **Dogged adherence to the financial aid budget without regard to market conditions**
- **“Layering” or “stacking”: the cost of unintended consequences**
- **The “copy cat” syndrome**
- **The “one case at a time” approach**
- **The “low-ball-and-then-negotiate” game**



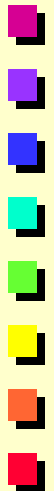
# Case Study I

## Budget or Market Driven



# Need by Gift Aid Award

	>12,000						
	\$9000-12,000					55/100	55%
Gift Aid	\$6000-9000					20/80	25%
	\$3000-6000					8/40	20%
	1001-3000						
	\$0						
		\$0	\$1-5000	\$5000-10,000	\$10,000-15,000	\$15,000-20,000	>\$20,000
					Need		



# Cost Benefit Analysis

- Ideal/budgeted enrollment -- 1,200
- University aid budget for 2004-2005: \$5.258m
- 2004-2005 tuition -- \$14,685

## Question:

Live within financial aid budget and enroll 1160

OR,

*Exceed aid budget and come in closer to ideal/budgeted enrollment?*



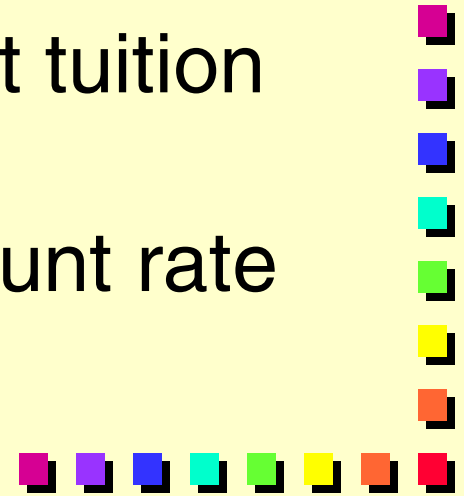
# Scenario I

290 FR/TR

870 Continuing

1160 x \$14,685 = \$17,034,600 gross tuition  
- 5,258,000 financial aid  
\$11,776,600 net tuition

31% discount rate



# Extra Aid Needed

If 120 high need admits, now gapped, instead have their need met:

Additional aid for students who would have enrolled anyway:

8 x (\$10,500 - \$4,500)	\$ 48,000
20 x (\$10,500 - \$7,500)	\$ 60,000

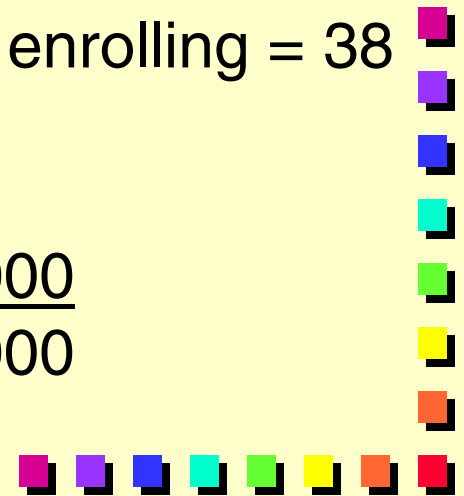
New enrollees = 120 \* 55% yield = 66

- 28 currently enrolling = 38

Aid for new enrollees:

38 x \$10,500	<u>\$399,000</u>
	\$507,000

---



# Scenario II

328 FR/TR

870 Continuing

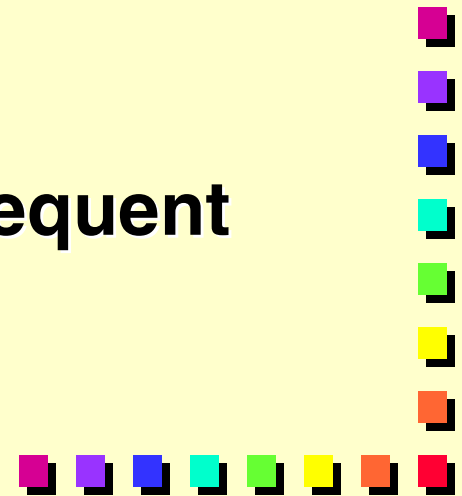
1198 x \$14,685 = \$17,592,630 gross tuition  
-5,258,000 financial aid  
- 507,000 extra aid  
\$11,827,630 net tuition

33% discount rate



# Benefit Scenario II

- **\$51k net revenue**
- **More critical mass -- better educational environment**
- **Better residence hall utilization and additional revenue of \$114k**
- **Better per unit costs in dining**
- **Bigger enrollment base for subsequent years**



# Case Study II

## Unintended Consequences



# Old Institutional Aid Policy

- Significant “stacking” of entitlements, merit and performance awards, as well as need-based aid



# New Institutional Aid Policy

- **Institution guarantees that 40% of the financial need of traditional undergraduate students will be met with grant aid from all sources including federal, state, and college funds.**
- **Only performance based scholarships stack on top of the guarantee.**



# Results

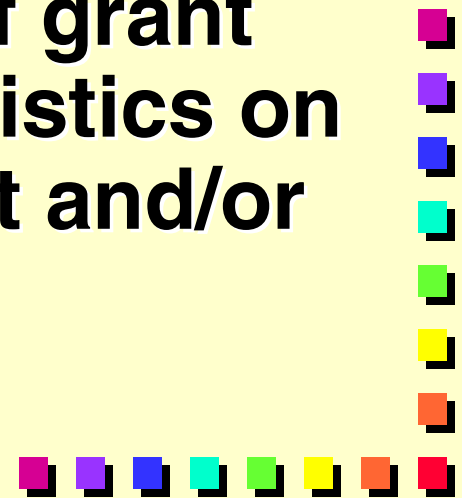
New Policy Implemented

All Traditional Students	0001	0102	0203	0304	0405
Tuition and Fees	\$8,888,338	\$9,982,075	\$10,440,297	\$10,975,145	\$11,651,805
Institutional Aid	\$3,544,898	\$4,127,095	\$4,273,212	\$3,946,186	\$3,925,881
Net Tuition Revenue	\$5,343,440	\$5,854,980	\$6,167,085	\$7,028,960	\$7,725,924
Tuition Discount %	39.88%	41.35%	40.93%	35.96%	33.69%



# **Question #4 (Again): Are we spending our aid dollars efficiently?**

- **Once the results of table analysis have been implemented, more sophisticated econometric modeling is often the next step to understanding the impact of grant and other student characteristics on the probability of enrollment and/or retention.**



# Goals of Econometric Modeling

- To identify factors that are important in the enrollment decision
- To determine the impact of institutional grants on the probability of enrolling
- To determine the revenue-maximizing levels of grants
- To identify alternative financial aid packaging strategies
- To suggest alternative admissions policies
- To simulate the results of alternative admissions and aid strategies and policies

# Advantages of Econometric Modeling

- Ability to consider many more variables in the analysis (solves the small numbers problem)
- Detailed simulations of potential policy and strategic changes
- More powerful trade-off analysis



# Econometric Modeling Step I: Data Requirements

- A file with one record for each admit.
  - Include values for the following types of fields:
    - Admissions fields: application type & status, quality measures etc.
    - Financial Aid fields: grant, need, etc.
    - Demographic fields: race, sex, state of residence, etc.
    - Matriculation indicator
    - Others selected by the institution
- Point: Model is institution specific**



# Econometric Modeling Step II: Enrollment Probability Model

- The probability of enrollment for each student is a function of individual student characteristics appropriate for the institution.

- **Probability of Enrolling (Student)**

- =  $f$  (Student Need, Total Grant, Other student characteristics)



# Sample Enrollment Probability Model (simple example of a linear model)\*

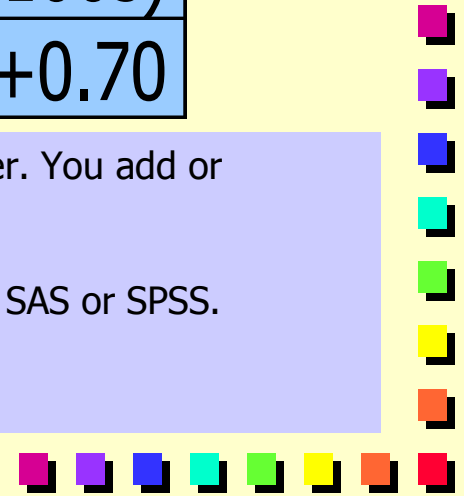
● **Probability of Enrolling (Student) =**

+ 0.03* Total Grant (\$1,000s)
- 0.01* Student Need (\$1,000s)
- 0.05* Math SAT (100s)
- 0.05* Verbal SAT (100s)
+0.70

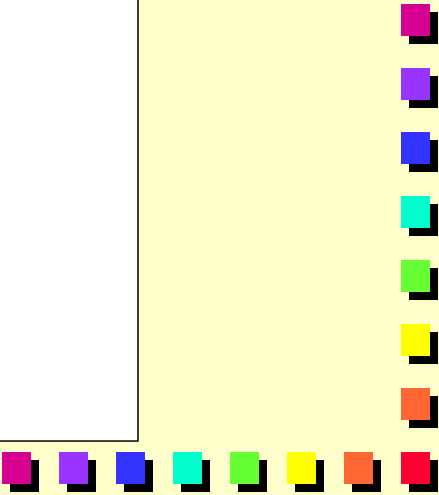
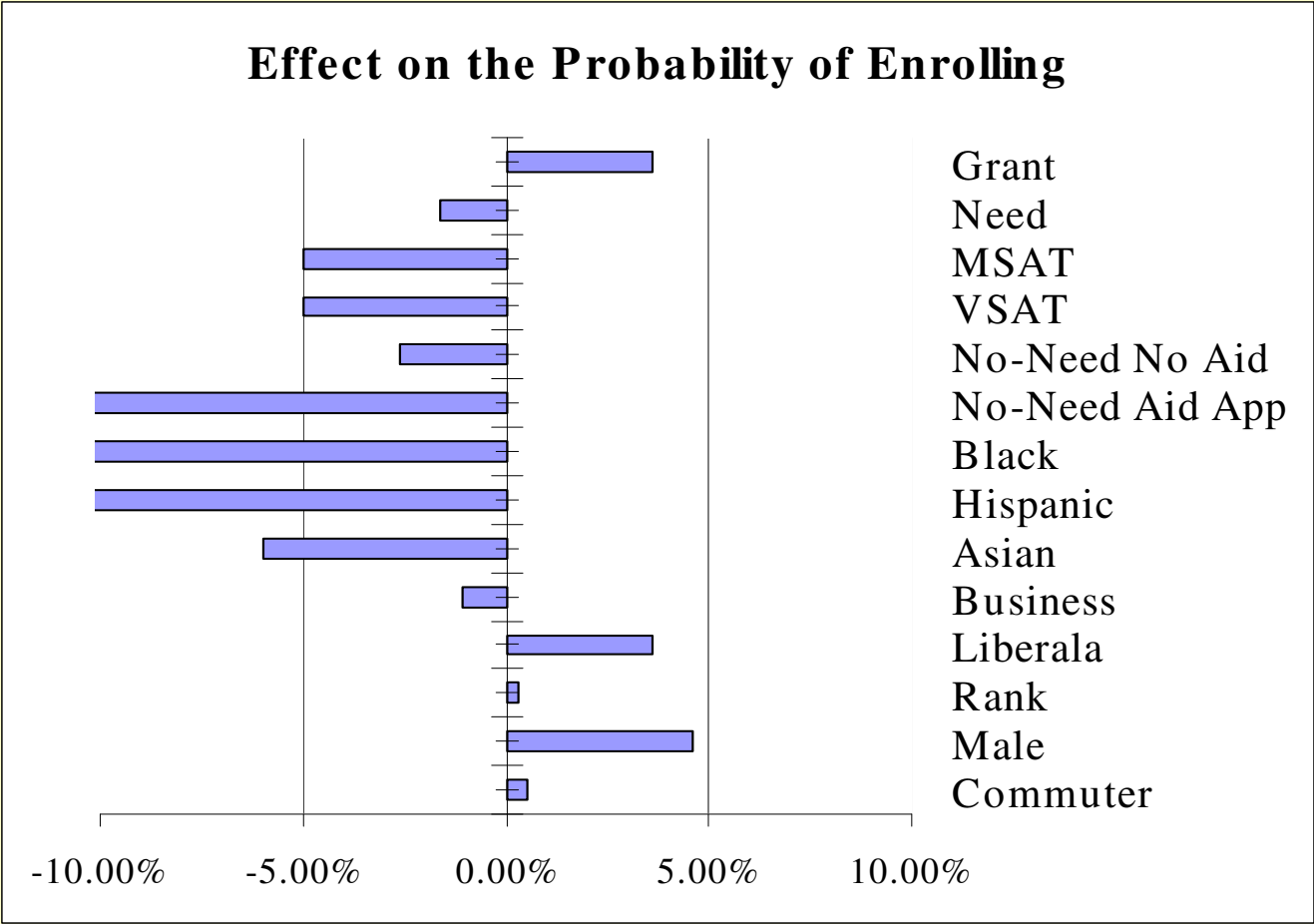
Note: .70 is intercept of the line specific to these data and is a place-holder. You add or subtract from this point for all of the other factors.

Coefficients are estimated from the data using a statistical package such as SAS or SPSS.

\*More advanced models are actually used.



# Sample Enrollment Probability Model (cont'd) : Understanding the Factors Driving Enrollment



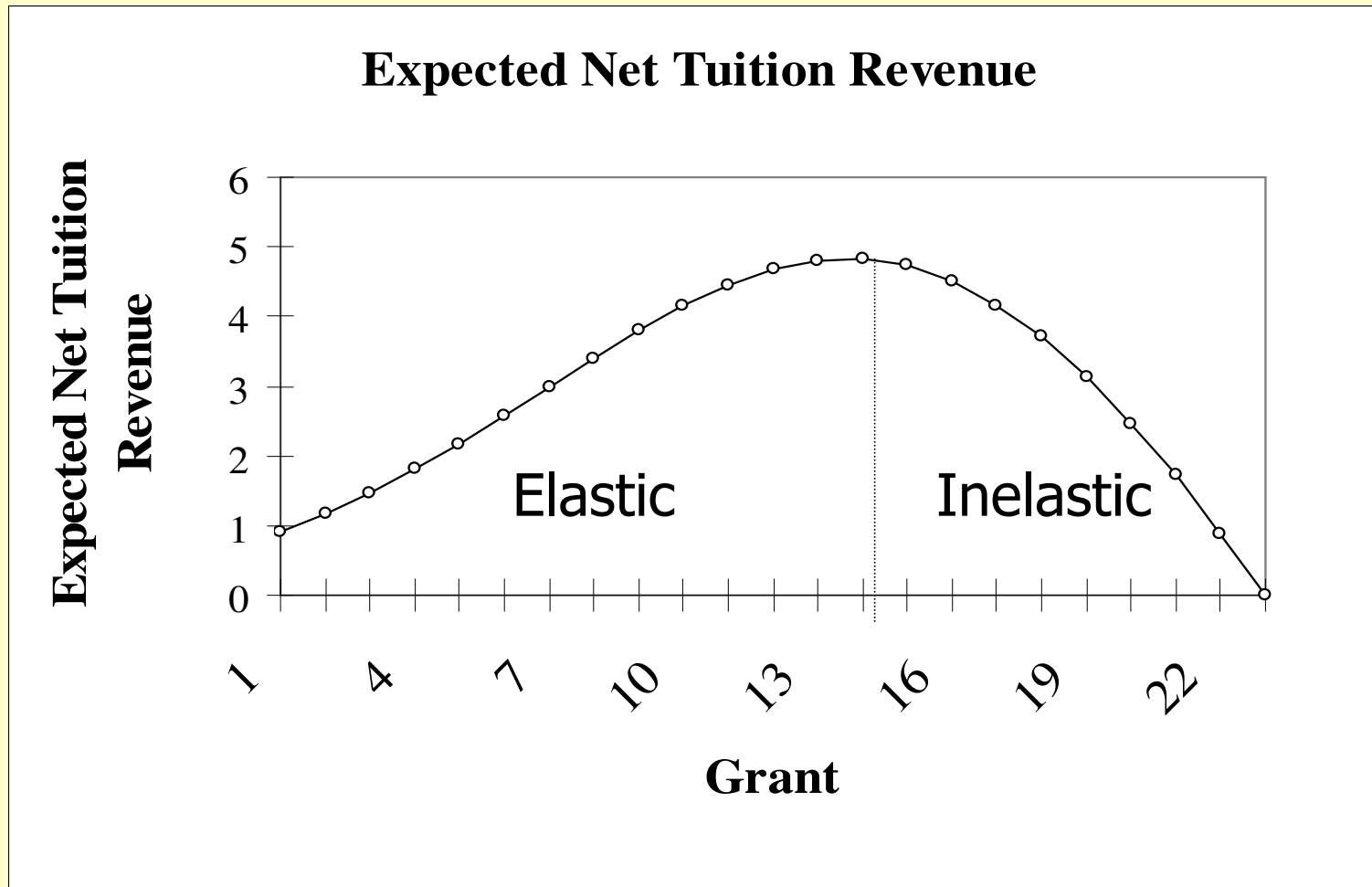
# Econometric Modeling Step III: Exploring Price Sensitivity

- Depending on the magnitude of the change in the probability of enrollment, increasing grant may either raise or lower expected net tuition revenue.

- Expected tuition revenue

- $=(\text{probability of enrolling}) * (\text{net tuition charges})$

# Exploring Price Sensitivity (cont'd)



- *Elasticity Tells You Which Side Of The Peak You Are On.*



# **Econometric Modeling Step IV: Estimate the Net Tuition Revenue Maximizing Level of Grant**

- **Given the estimated coefficients from the model it is possible to estimate for each admit the relationship between total grants and expected revenue,**
- **and then to estimate the amount of grant that would maximize expected net tuition revenue for this admit.**

# Estimate the Net Tuition Revenue Maximizing Level of Grant (cont'd)

## ● Revenue Optimizing Scenario

	Baseline	Simulation	% Difference
Total Net Tuition Revenue (\$1000s)	5.5 mil	5.9 mil	7.2%
Net Tuition Revenue Per Student (\$1000s)	6,340	6,800	7.3%
Class Size	827	863	4.4%
Percent in High Profile Science Major	20.21%	17.00%	-15.9%
Average Need (\$1000s)	9,500	7,550	-20.6%
MSAT	521	522	0.1%
VSAT	517	517	0.0%



# **Econometric Modeling Step V: Simulation of New Financial Aid Strategies**

- **Once a potential change in policy has been developed the model can then be used to simulate the impact of that change on net tuition revenue and, perhaps more importantly, on other characteristics of the entering class.**

# Simulation of New Financial Aid Strategies (cont'd)

- Does the new policy really increase net tuition revenue?
- What is the impact on total class size?
- What is its impact on minority enrollment?
- On test scores?
- On specific academic programs?



# Sample Simulation Summary

	Enrol.	Minority	Engineer	Avg. SAT	NTR	Avg. NTR
Baseline	656	45	96	1043	6.9m	\$10,457
Optimization (NTR)	675	46	81	1033	7.6m	\$11,299
Minority - no gap/+20%	664	64	88	1040	6.9m	\$10,443
Engineer - no gap/+10%	666	43	109	1045	6.9m	\$10,308
Max enrollment	725	45	95	1045	6.6m	\$9,057
Max quality - \$10,000 merit	647	40	87	1047	7.1m	\$10,926



# Case Study III

## Understanding Price Sensitivity



# As Is

- **This comprehensive institution is ranked in the top 20 in its region by *USN&WR*. It is currently over capacity in its most recent freshman class by 50 students.**
- **The discount rate for that class was 56%.**



# Current Aid Policies and Practices

- **The College's current financial aid policies for freshmen are a complex mix of merit and talent programs, differential need-based packages based on quality and desirability, and responses to appeals.**
- **The College offers four basic merit scholarships ranging from \$3,000 to \$15,000. None of these awards is guaranteed based on specific criteria.**

# Historical Practices in Setting Aid Policy

- **The enrollment management division historically has relied more on benchmarking with competitors to set merit levels and tweak need-based strategies than on analyzing past responses to offers of admission and aid.**



# Econometric Modeling: Measuring Price Sensitivity

- The probit model found 70% of the College's 2005 admit pool to be price inelastic, meaning that reductions in grant (or increases in price) to this portion of the pool would have resulted in increased net tuition revenue.
- Even though yields, and therefore gross revenue, would decline, the savings resulting from reducing aid to those who would still enroll would more than compensate.

# Selected Recommendations

- The general direction of the recommended strategies was to:
  - lower the top merit award from \$15,000 to \$10,000, but increase the number of students receiving merit offers;
  - reduce the amount of institutional grant offered to higher need students of all quality levels;
  - preferentially package minority students, but no other subpopulations; and
  - market the \$10,000 merit as guaranteed to new freshmen from target high schools with SAT scores of 1200+ and high school averages of 85+.



# Early Results (implementation of need-based policies)

- New enrollment for a class 50 fewer is on target.
- Discount rate declined by almost 8 percentage points. Each freshman enrolled generated \$1,895 additional net tuition revenue.
- Thus, even with smaller class, the College generated an additional \$450k.

# Case Study IV

## Understanding Elasticities



# As Is

- **Selective, specialty public institution with increasing net tuition revenue as the top priority, due to reductions in state support.**
  - **In-state -- 100% of all admits showed inelastic demand (decrease grants to increase net-tuition revenue).**
  - **Out-of-state -- 41% of all admits showed elastic demand (increase grants to some and decrease grants to some to increase net tuition revenue).**

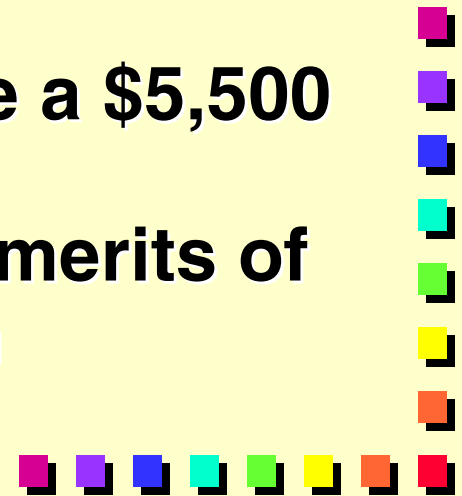
# In-State Recommendations

- **Lower quality admits -- receive no institutional grant. (Prior policy: need-based awards averaged \$1,000 to \$2,000.)**
- **Medium and high-quality admits -- merits of \$1,000-\$3,000 with no additional institutional grant after the merit. (Prior policy: merits \$2,500-\$4,000 with need-based awards up to \$5,500.)**



# Out-of-state Recommendations

- **Lower quality admits -- \$3,500 grant minimum or 40% of need met with grant from all sources. (Prior policy: Low-need average \$1,500 with 30% need met with grant from all sources at higher need levels.)**
- **Medium quality admits -- Receive a \$5,500 merit, which is also the cap on institutional grant. (Prior policy: merits of \$2,500-\$4,000 with \$6,000 cap on institutional grant.)**



# Out-of-state Recommendations

- **Highest quality admits -- Receive a \$7,500 merit, which is also the cap on institutional grant. (Prior policy: \$10,000 merit average and a \$12,000 cap on institutional grant.)**



# Results

- **In-state**

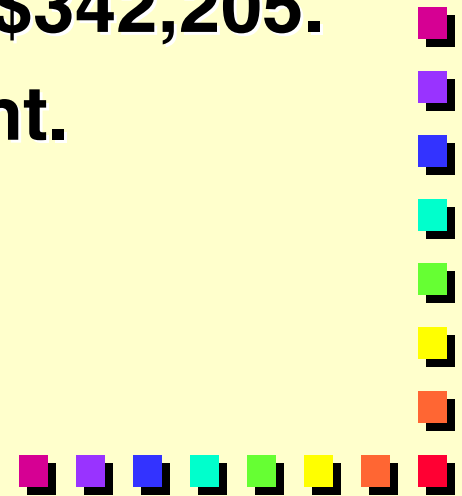
- **Yield actually increased 2% resulting in 5 more enrollees with an increase in net tuition revenue of nearly \$400,000.**
- **Quality dropped one half an ACT point.**



# Results

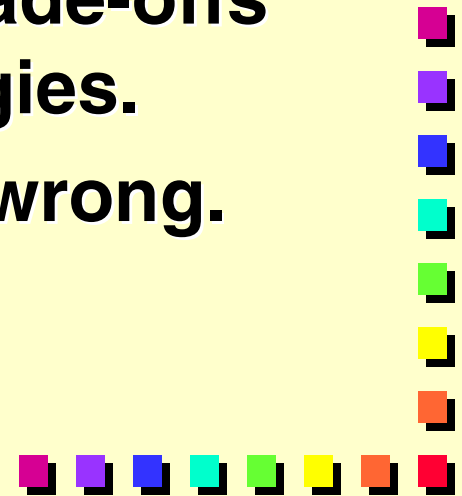
- **Out-of-state**

- **Yield remained about the same, but with fewer applicants and fewer admits, there were 37 fewer enrollees.**
- **Net tuition revenue increased \$342,205.**
- **Quality dropped one ACT point.**



**Clearly the need for a data-driven approach to answering these questions has never been more important.**

- **The challenge will be to balance often conflicting enrollment goals.**
- **There is a need for more sophisticated means to fully understand the trade-offs and the impact of various strategies.**
- **Institutions can't afford to get it wrong.**



# Summary

- **There is no one strategy or approach to pricing and discounting that will work for every institution.**
- **Each institution must chart its own way, using information about the competition and its own historical data on the behavior of admitted students to understand market position and then weigh institutional goals and priorities to arrive at the best approach.**

