Optimizing Financial Aid Resources and Enrollment Management Strategy

31st Annual Snowmass Institute

Presented by:

Scannell & Kurz, Inc.

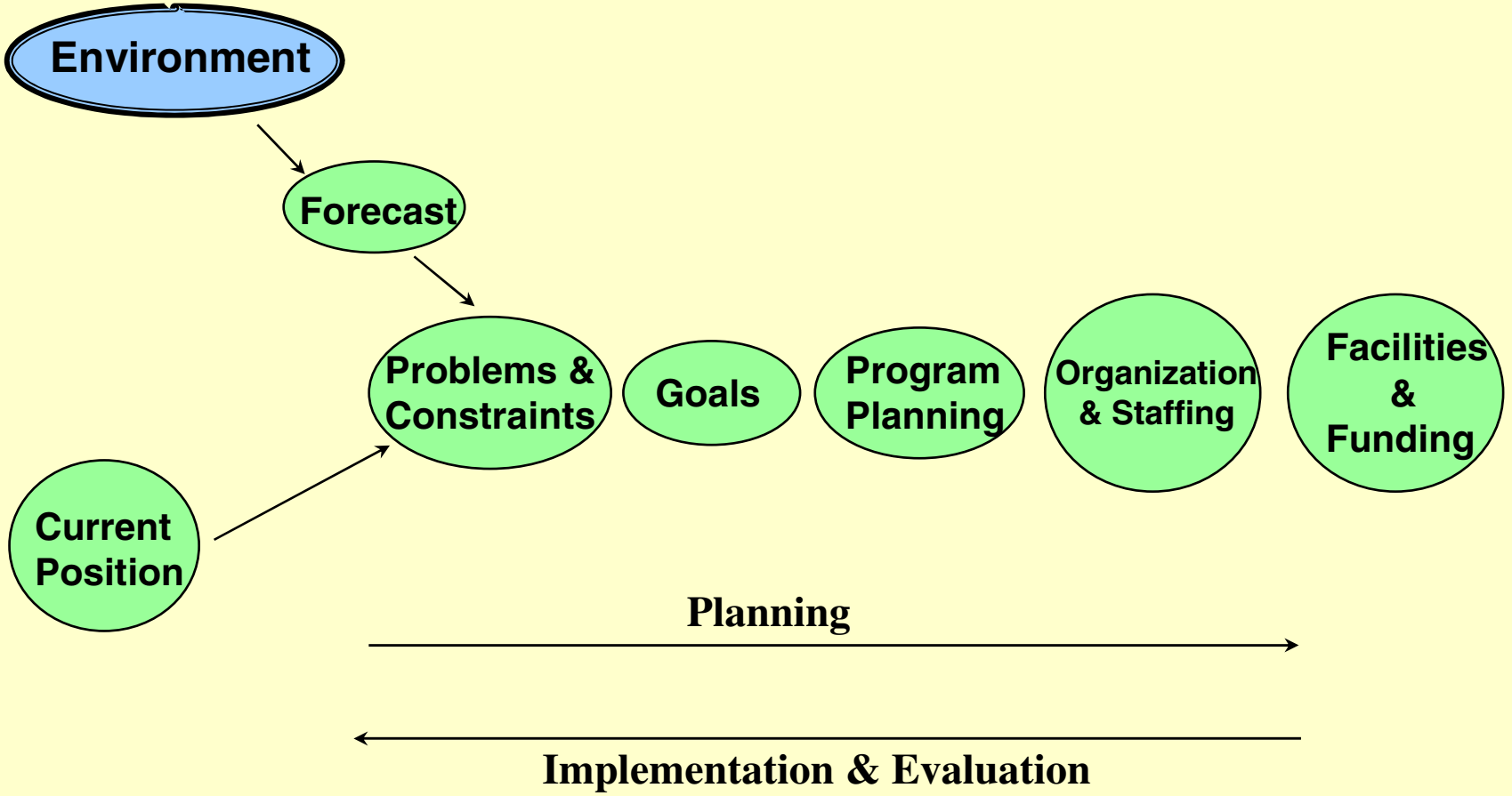
July 11, 2006

www.scannellkurz.com

Agenda

- 8-12:30
  - Strategic Planning Model
  - External Environment
  - Assessing Your Current State
  - Planning Strategic Interventions
  - Case Studies
- 5:30-7:00
  - Econometric Analysis and Simulations

Strategic Planning Model

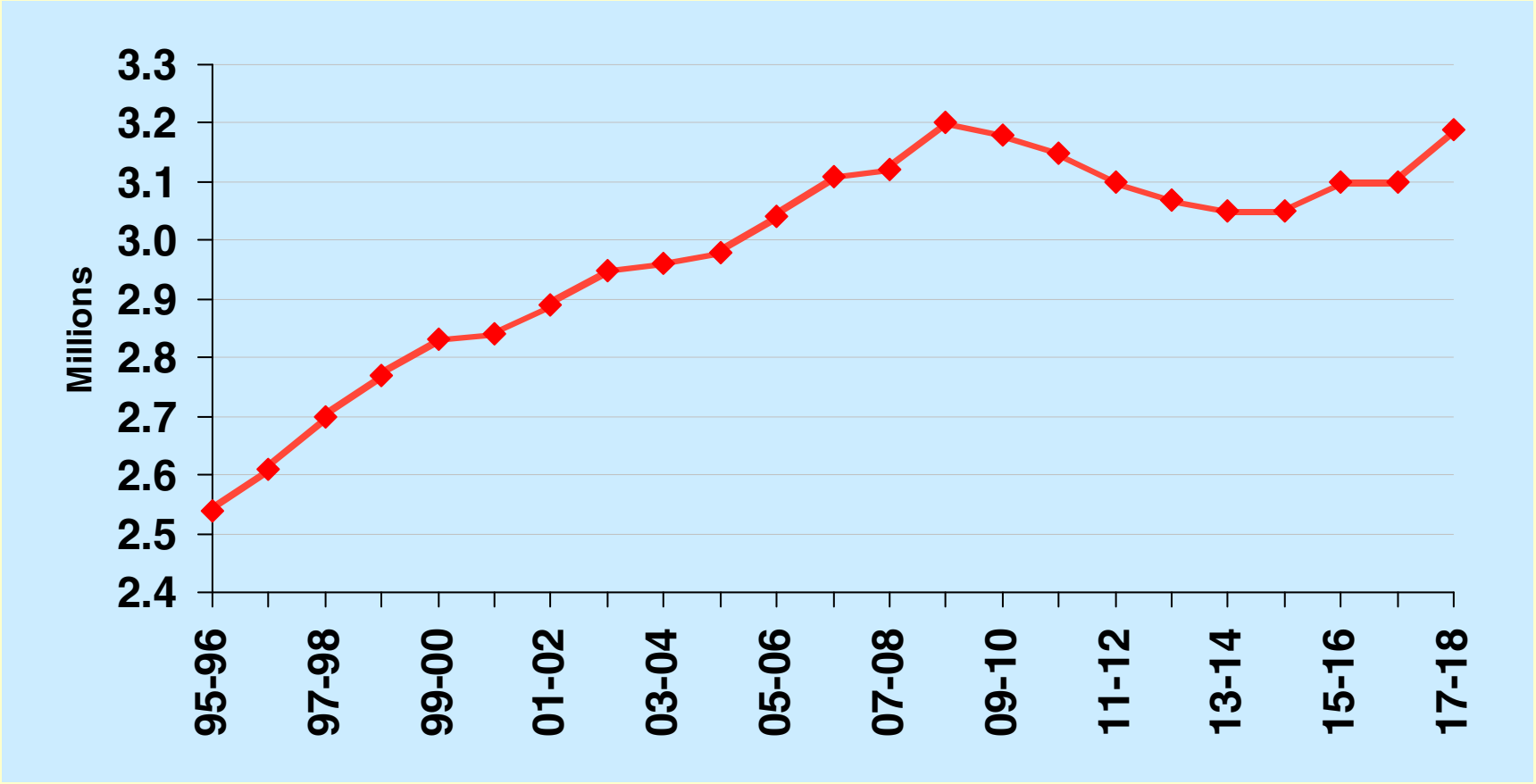


Definition of Strategic Planning

- The development of a set of ideas and actions that enables a school or department to achieve a sustained, competitive advantage in an environment of limited or declining resources and increased competition.

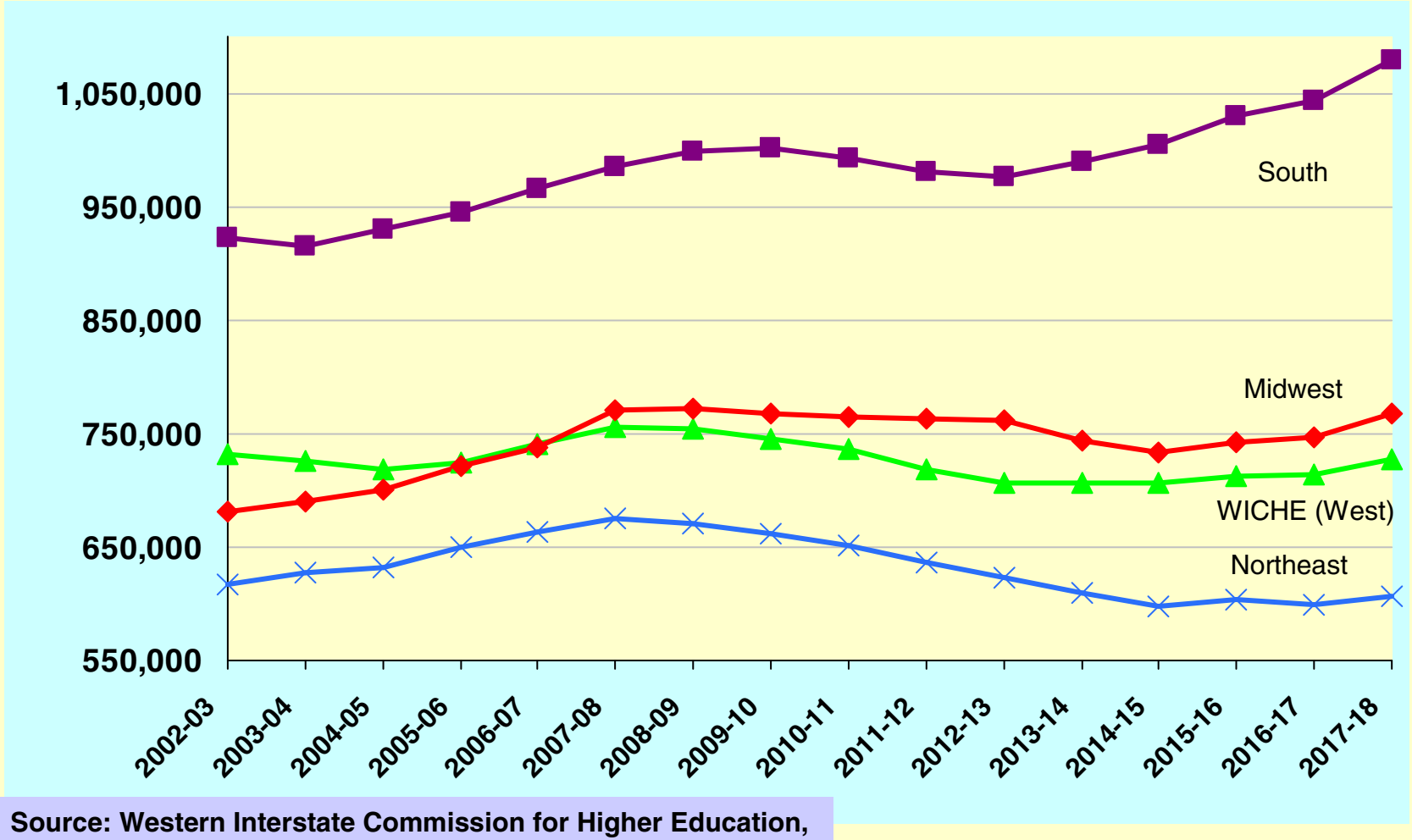
Public and Non-public High School Graduates

1995-96 to 2001-02 (actual) and 2002-03 to 2017-18 (projected)



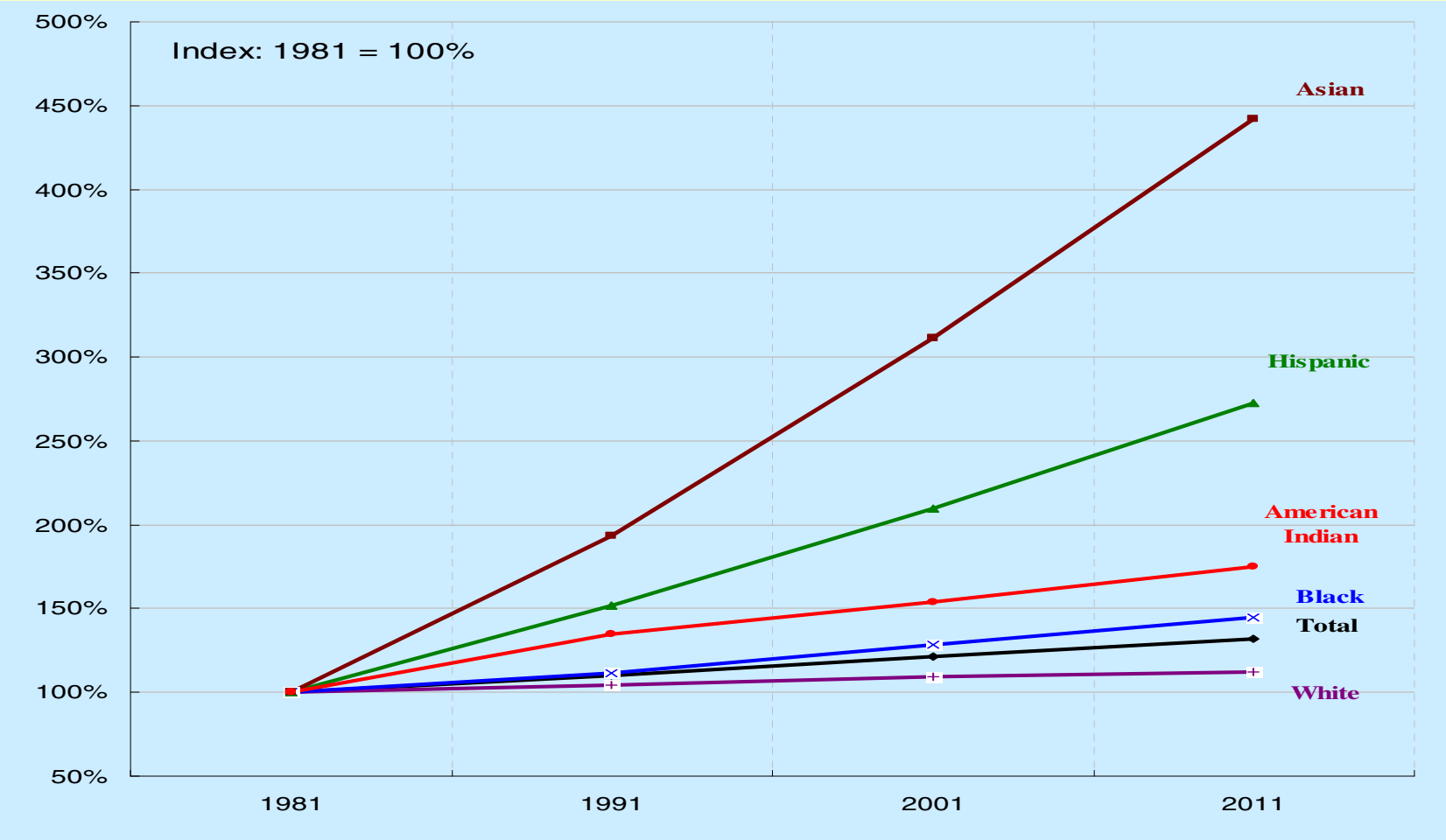
Source: Western Interstate Commission for Higher Education, Fact Book, Policy Indicators, December 2004

Projected High School Graduates by Region
2002-03 to 2017-18



Source: Western Interstate Commission for Higher Education, Fact Book (Policy Indicators), December 2003

Growth in Size of U.S. Population by Ethnic Group 1981-2011



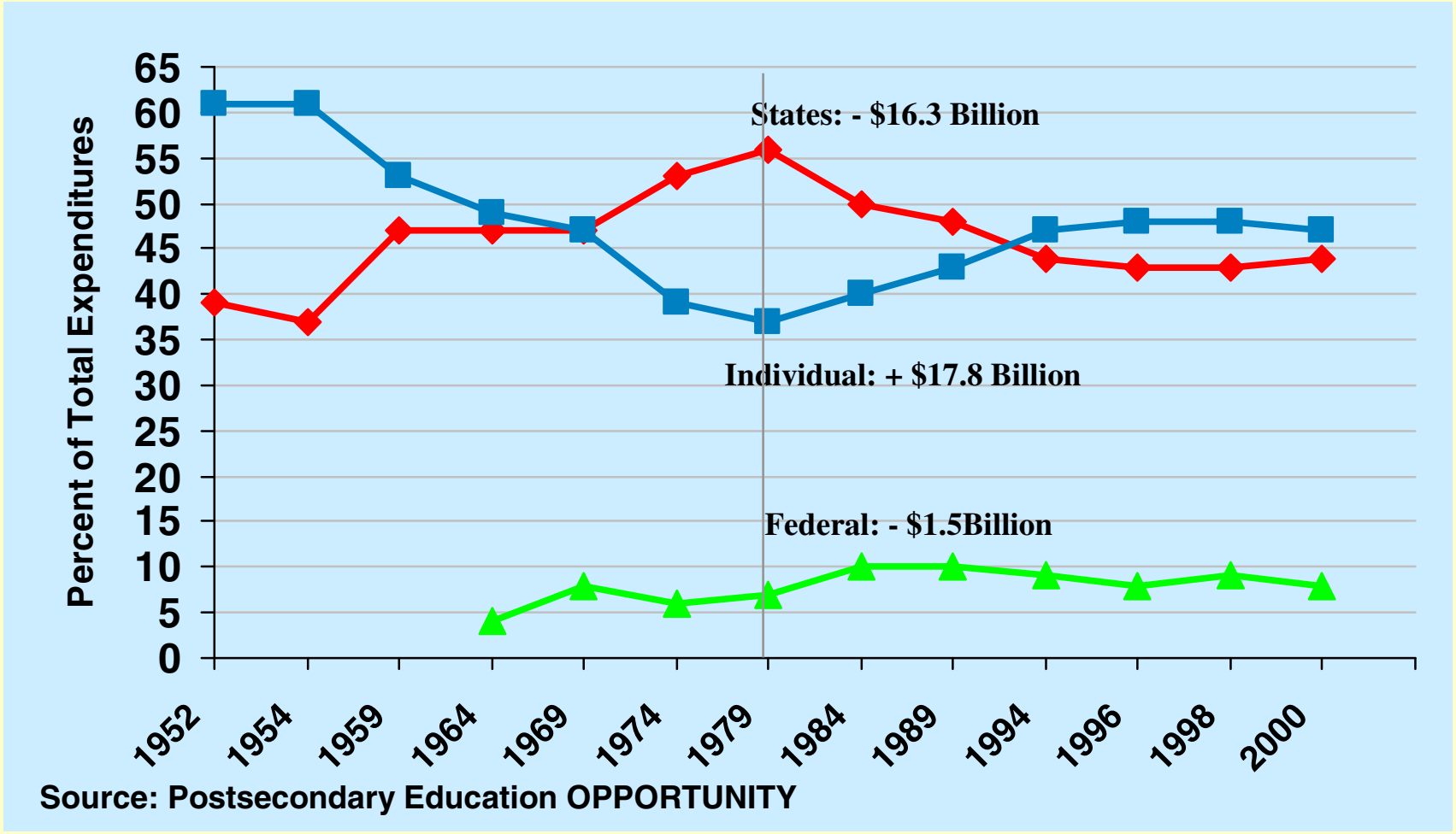
Source: U.S. Census Bureau

National Population Projections and Distribution by Age, 1998 and 2011, in Thousands

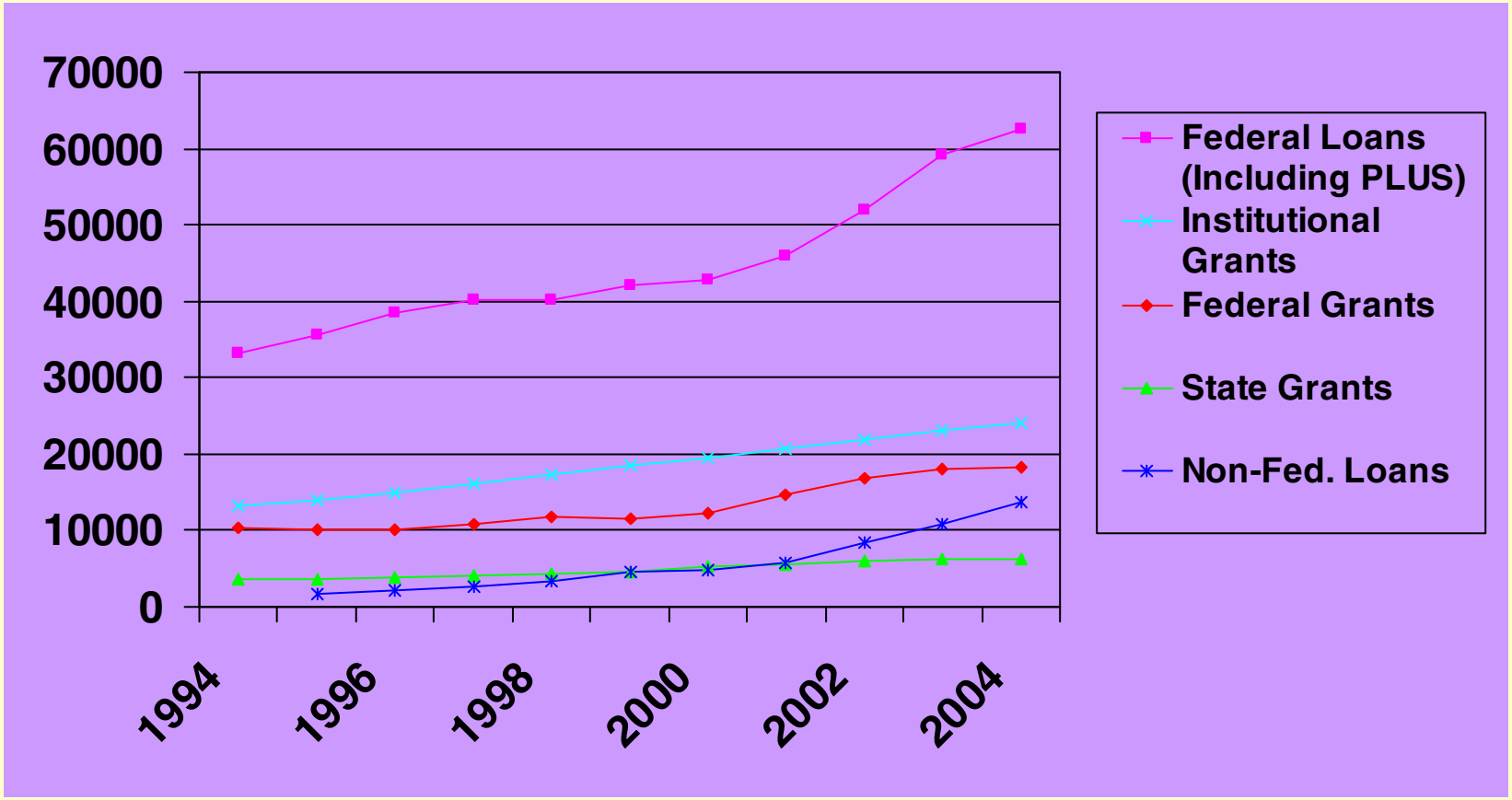
		Total	14 & Under	15 to 24	25 to 44	45 to 64	65 & Older
1998	Number	270,299	58,129	37,213	83,294	57,261	34,401
	Percent	100.0%	21.5%	13.8%	30.8%	21.2%	12.7%
2011	Number	302,300	59,821	42,886	78,468	80,765	40,358
	Percent	100.0%	19.8%	14.2%	26.0%	26.7%	13.4%

Source: U.S. Census Bureau

Distribution of Responsibility for Financing Higher Education 1952 to 2000



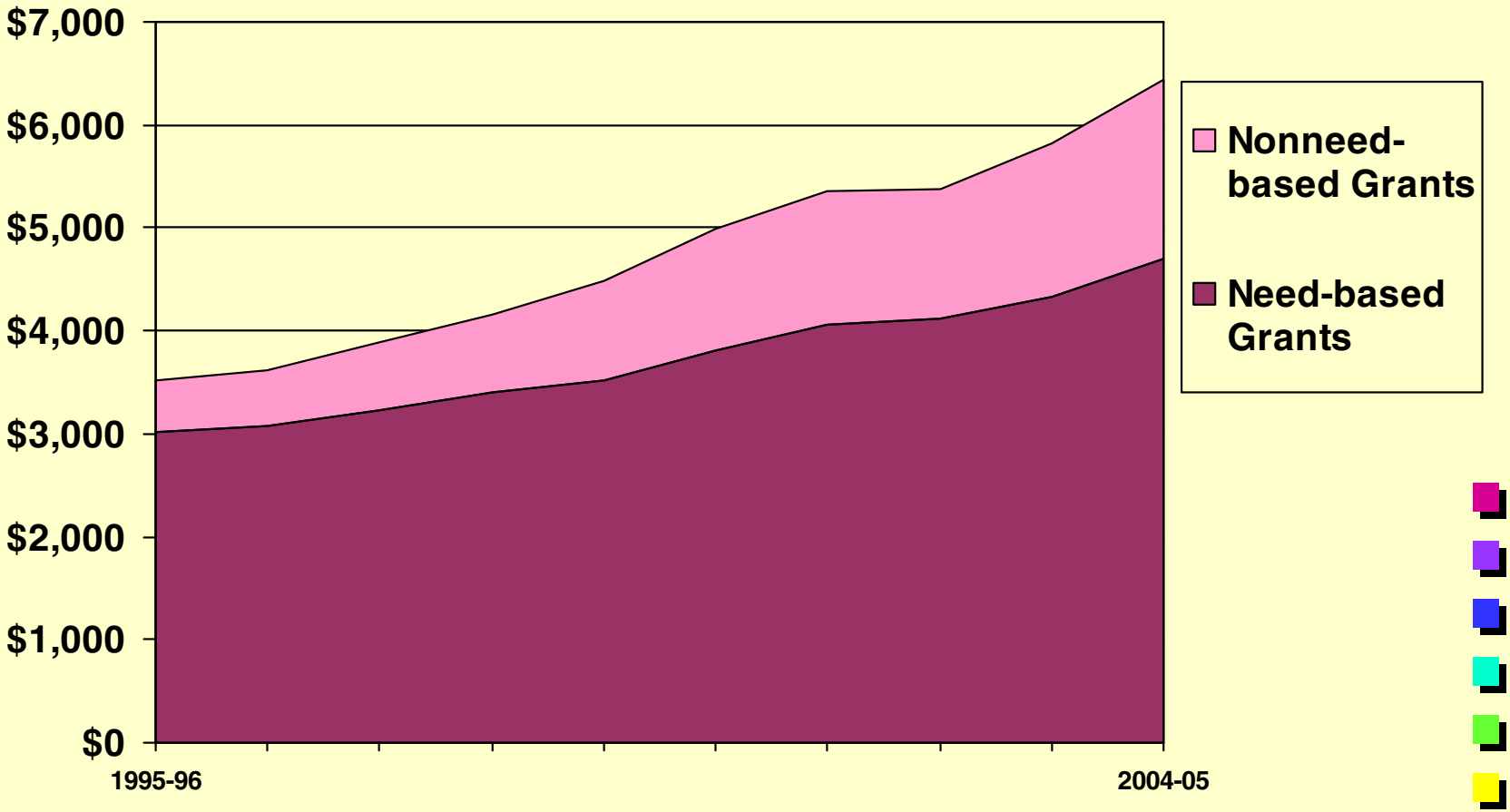
Trend-Line of Aid by Type
Constant Dollars (in Millions)
1994-1995 to 2004-2005*



Source: The College Board Trends in Student Aid 2005

***2003-04 (Estimated) & 2004-05 (Preliminary)** Scannell & Kurz, Inc.

Undergraduate Grant Aid in Constant 2004-05 Dollars: 1995-96 through 2004-05 (in millions of dollars)



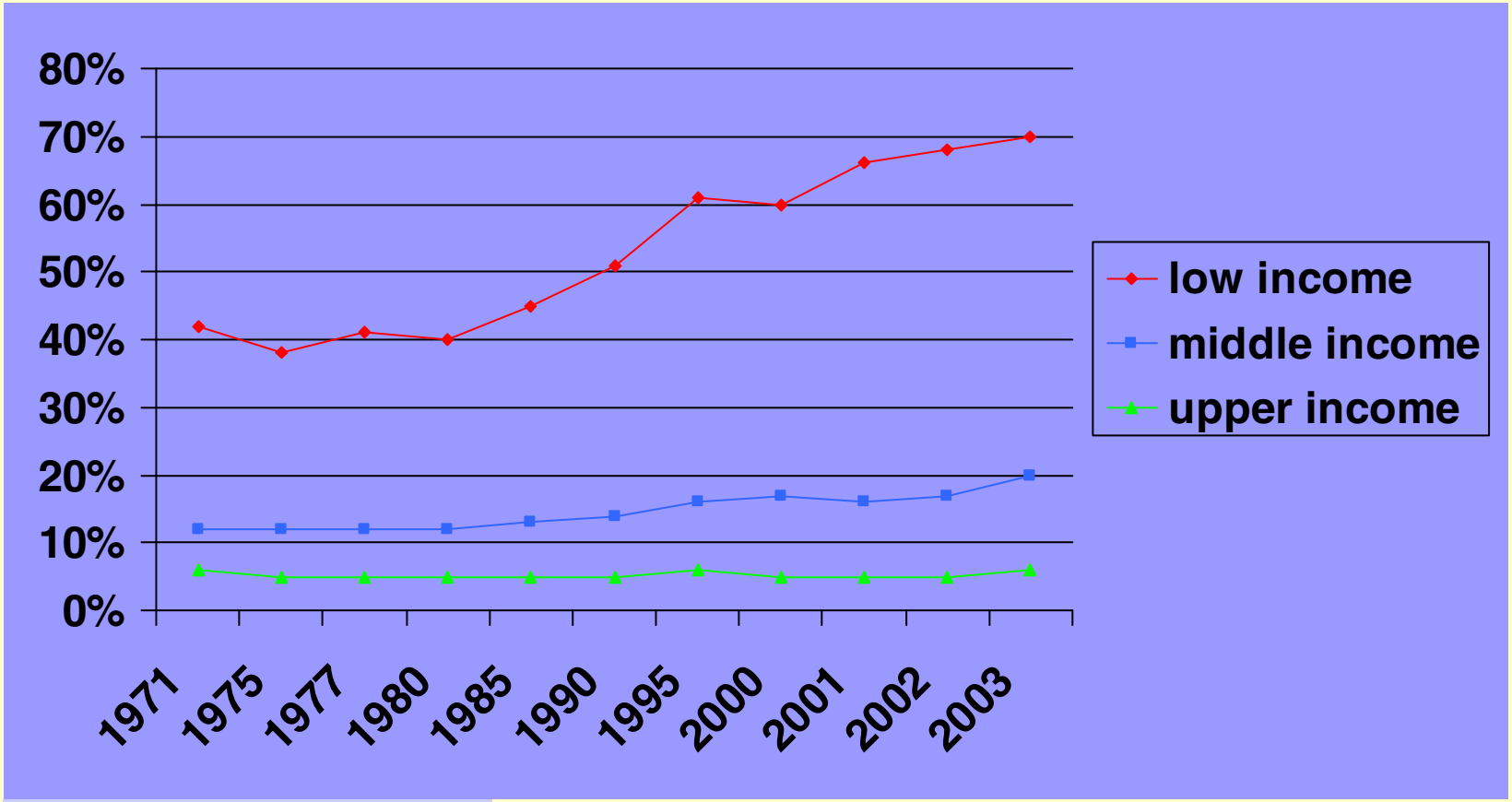
Source: 36th Annual Survey Report on State-Sponsored Student Financial Aid, 2004-2005 Academic Year, *NASSGAP*

Average Undergraduate Tuition & Fee Charges
1995-1996 to 2005-2006 – Constant Dollars

Note: The figures cover tuition and required fees and are weighted by enrollment to reflect the charges incurred by the average undergraduate enrolled at each type of institution. Costs at public institutions are for state residents.

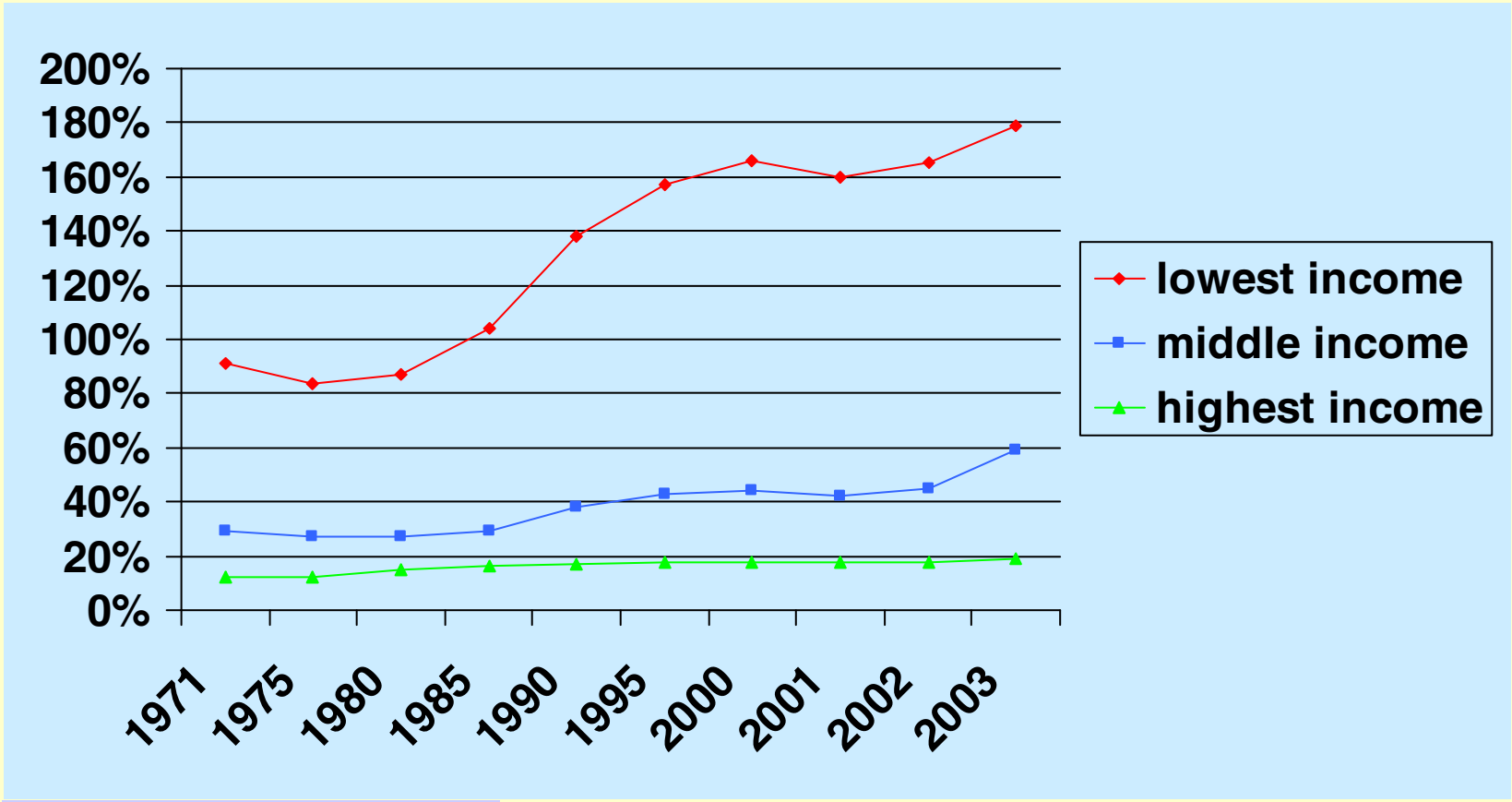
Source: The College Board Trends in College Pricing 2005

Cost of Attendance as a Share of Family Income -- Public Four-Year Institutions 1971-1972 to 2003-2004



Source: The College Board Trends in College Pricing 2003

Cost of Attendance as a Share of Family Income -- Private Four-Year Institutions 1971-1972 to 2003-2004



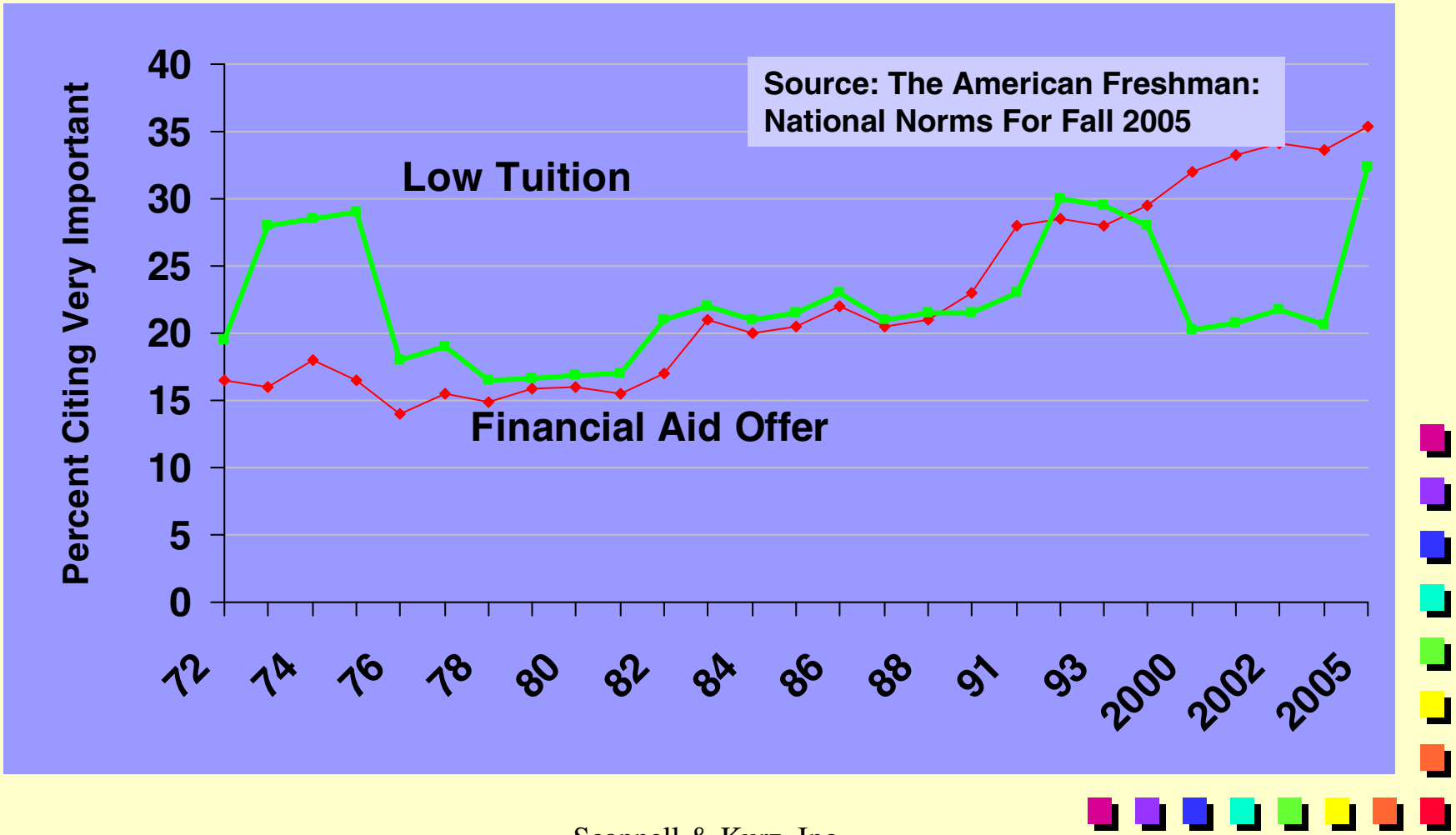
Source: College Board
Trends in College Pricing 2003

College Participation Rates for Dependent 18-24 Year-Old by Family Income and Race/Ethnicity, 2000

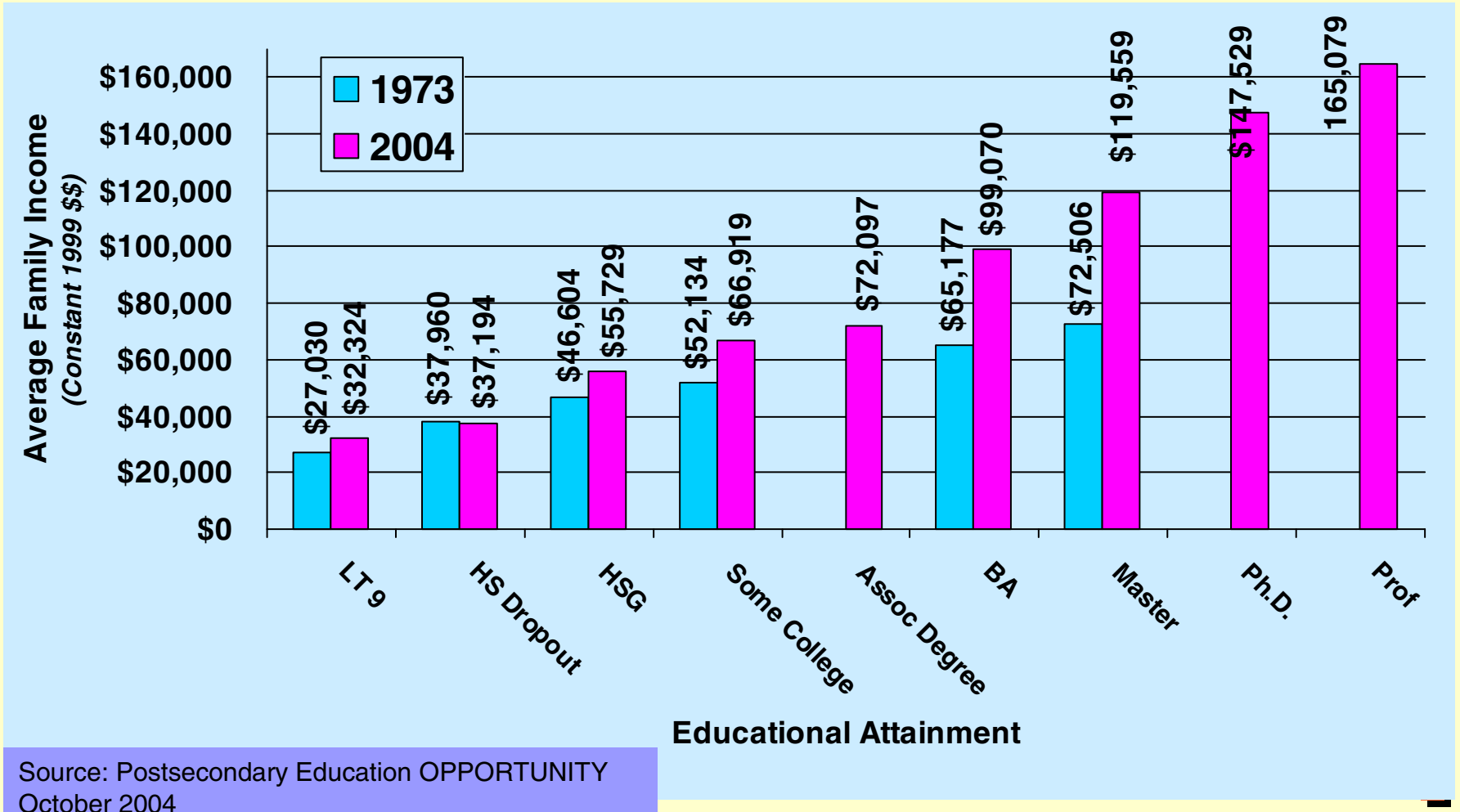
Income	Asian/PI	White, NH	Black	Hispanic
<$25,000	71%	34%	28%	26%
$25-50,000	73%	51%	46%	40%
$50-75,000	69%	67%	63%	54%
>$75,000	80%	75%	85%	57%
Total:	75%	63%	46%	38%

Source: Postsecondary Education OPPORTUNITY

Financial Reasons Cited as Very Important in Selecting Freshman College
1972 to 2005

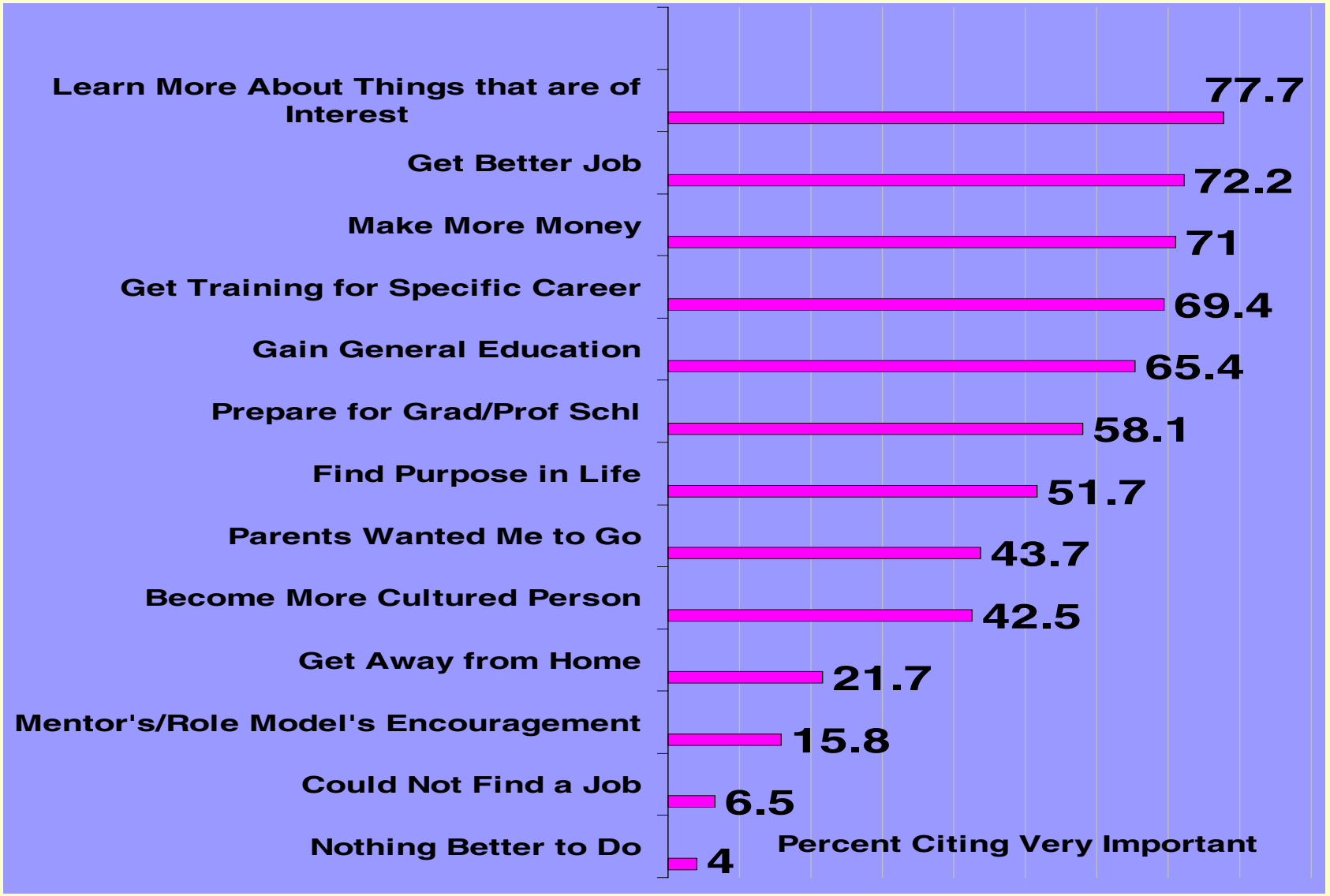


Average Family Income by Educational Attainment of Householder 1973 & 2004



Source: Postsecondary Education OPPORTUNITY
October 2004

Reasons for Attending College

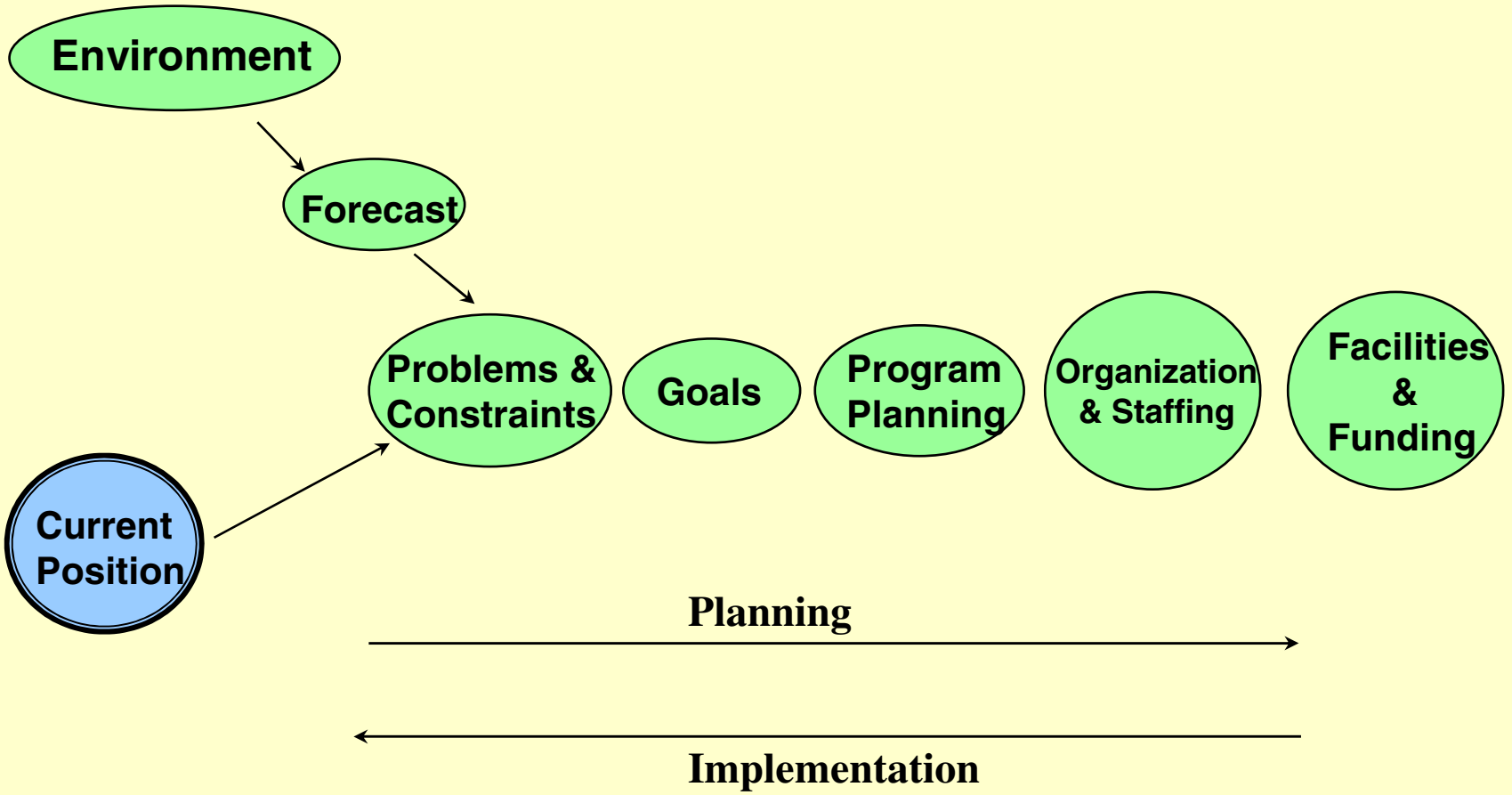


Source:The American Freshman: National Norms For Fall 2005

Current Trends/Issues

- **Results of the Higher Education Reconciliation -- to date:**
  - ***FFELP & Direct Stafford & PLUS at fixed rates***
  - ***Increased Stafford loan limits***
  - ***Grad students borrow PLUS without parent***
  - ***Added ACG & SMART***
- **Privatization of public institutions**
- **Continued growth in the for-profit higher education sector**

Strategic Planning Model



How has our market been changing? … We need to know:

- Inquiry to enroll admission funnels by:
  - source of inquiry
  - geographic region
  - program area

How has our market been changing? … We need to know:

- SAT/ACT summary reports detailing competition at inquiry, or EPS/EIS
- Surveys of admitted students to assess overlap at admission and head to head competition
- CIRP surveys of enrolled freshmen

How has our market been changing? … We need to know:

- Trends in the applicant pool by:
  - quality
  - socio-economic makeup
  - racial/ethnic composition
  - in-state versus out-of-state students
  - program area of interest
  - gender balance
  - etc.

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
- Used to be RHE issue, now all of higher education (public as well as private)

Financial aid policies must address both:

Social values and fiscal realities.

(The College Board)

How have those market forces affected our use of financial aid?

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

- Institutional mission
- Philanthropic support

Now, market forces are the most significant influencers:

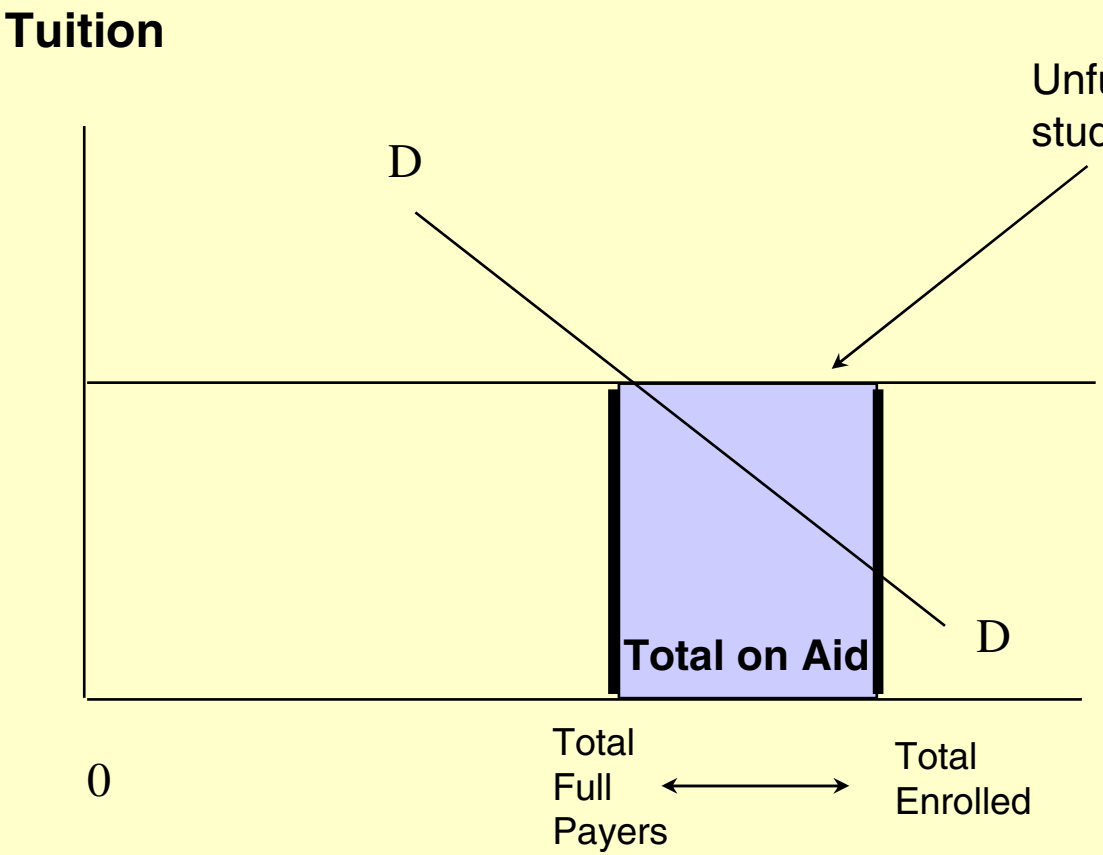
- Competition
- Trends in inquiries, applications, and retention--your demand curve
- The demographic, economic, and political environment

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

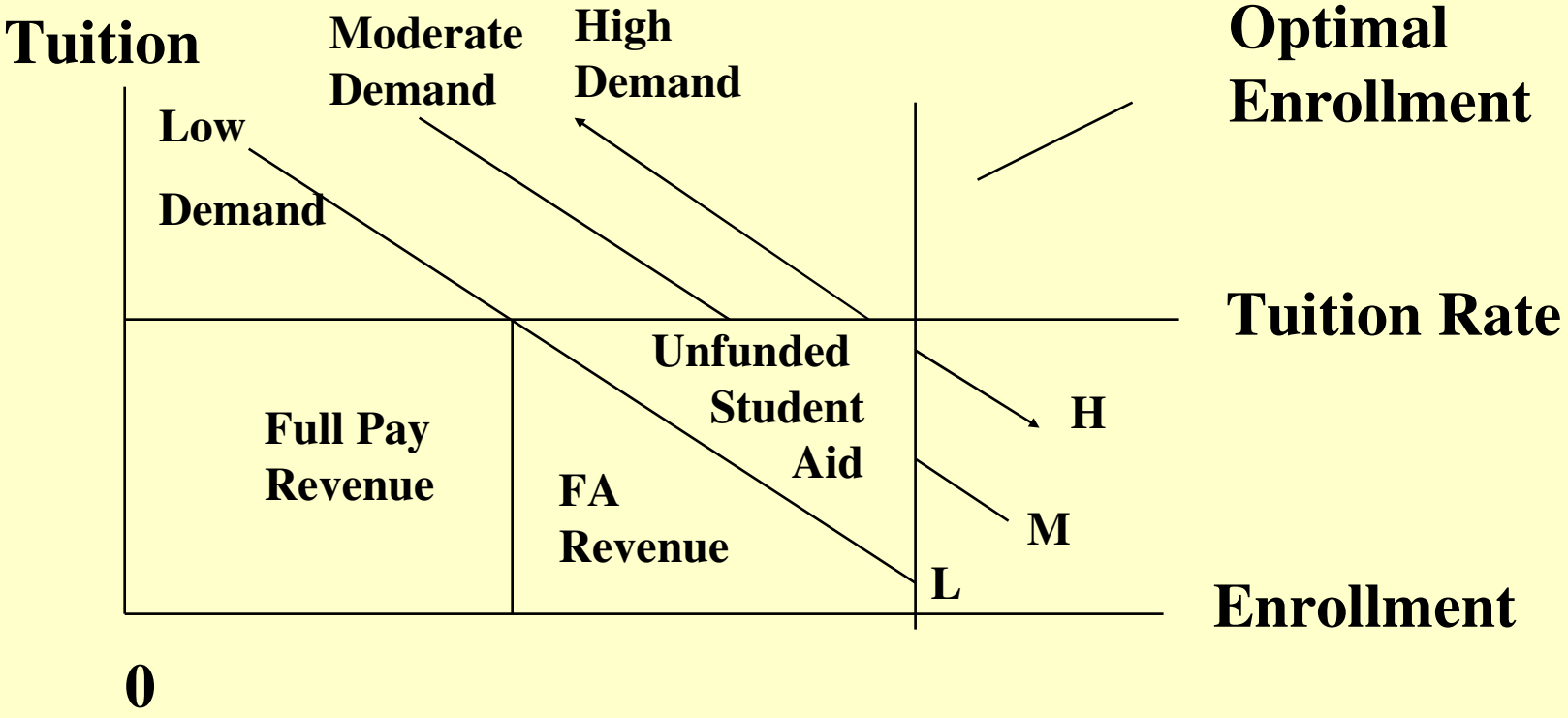
- **Princeton**
- **Williams**
- **Harvard**
- **Virginia**

Enrollment Demand and Net Tuition Revenue*

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



Enrollment Demand and Net Tuition Revenue*



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

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

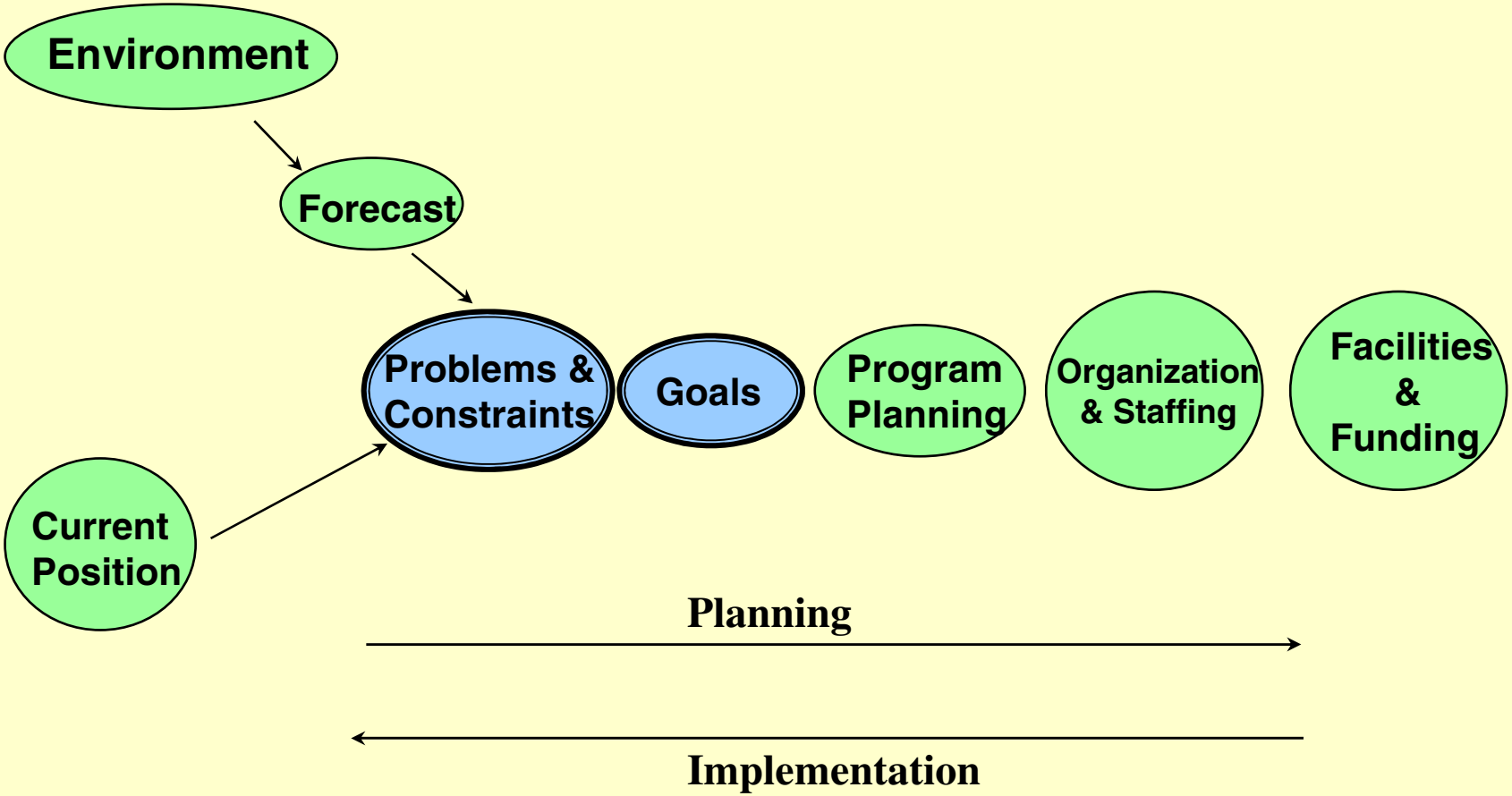
Number of Institutions	Average SAT	Tuition & Fees
13	> 1250	$25,519
8	1200-1250	$25,267
8	1150-1199	$21,000
9	< 1150	$19,981

*Sources: College Board & USNews & World Report

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

Strategic Planning Model



To assess how effectively your aid program is currently responding to market forces, there are 4 key questions to answer:

- Are we perceived as worth the price we're charging?
- Have we convinced our families that we are affordable?
- How much aid do we need to spend to meet our enrollment goals?
- How can we be sure we are spending our aid wisely?

Are we perceived as worth the price we're charging?

- Review changes in your market

Are we perceived as worth the price we're charging?

- Benchmark with competition on price, discount, specific merit programs

Are we perceived as worth the price we're charging?

- Review results of Admitted Student Questionnaire

Admitted Student Questionnaire

With Regard to Factor

We Rate		***The Other College Rates***
1 2 3 4 5		1 2 3 4 5
	1. Financial aid package	
	2. Distance from home	
	3. Social activities	
	4. Teaching reputation	
	5. Campus atmosphere	
	6. Parents' preference	

Admitted Student Questionnaire

EXHIBIT H-4: COMPARATIVE IMPORTANCE AND RATING OF COLLEGE CHARACTERISTICS

How does the mean rating of our college on each of the characteristics compare to the mean rating of this competitor?

A. Less important and our college rated higher	B. Very important and our college rated higher
	Extra-curricular opportunities Avail. of recreational facilities Quality of social life Quality of faculty

Admitted Student Questionnaire

How does the mean rating of our college on each of the characteristics compare to the mean rating of this competitor?

C. Less important and our college not higher	D. Very important and our college not higher
Special academic programs Access to off-campus activities	Surroundings Attractiveness of campus Quality of on-campus housing Quality of academic facilities Preparation for career Personal attention Availability of majors Academic reputation Value for the price Cost of attendance

Are we perceived as worth the price we're charging?

- Are yield rates different for non-aided versus aided students?
- Have we gathered (and shared) data about outcomes?
- Has the number of full-pay customers declined?

Have we made the case for affordability?

- Do we lose our overlap with public institutions as we progress through the admissions funnel?
- Do we have applicants from all socio-economic levels?
- Has the distribution of applicants by socio-economic level changed over time?

Have we made the case for affordability?

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

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 Financial Aid
(c)	=	***Net Tuition Revenue***
(b)/(a)	=	***Tuition Discount Percentage***

(From NACUBO Institutional Aid Survey Executive Summary)

Defining the Tuition Discount, A Component Analysis

% of Students Receiving Aid from Institution	X	Average Grant as % of Tuition and Fees	=	Tuition Discount Percentage

(From 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

The Debate: Tuition Discounting, Good or Evil?

- A couple of years ago a news release 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): 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.

Wide variety of approaches to tuition pricing and discounting

- High price/high discount
- Low price/low discount
- Price reductions
- Merit scholarships
- Meeting need versus “gapping”
- Need conscious admission
- Etc.

Typical questions emerging from this ever increasing line item in the budget…

- 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?

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.**

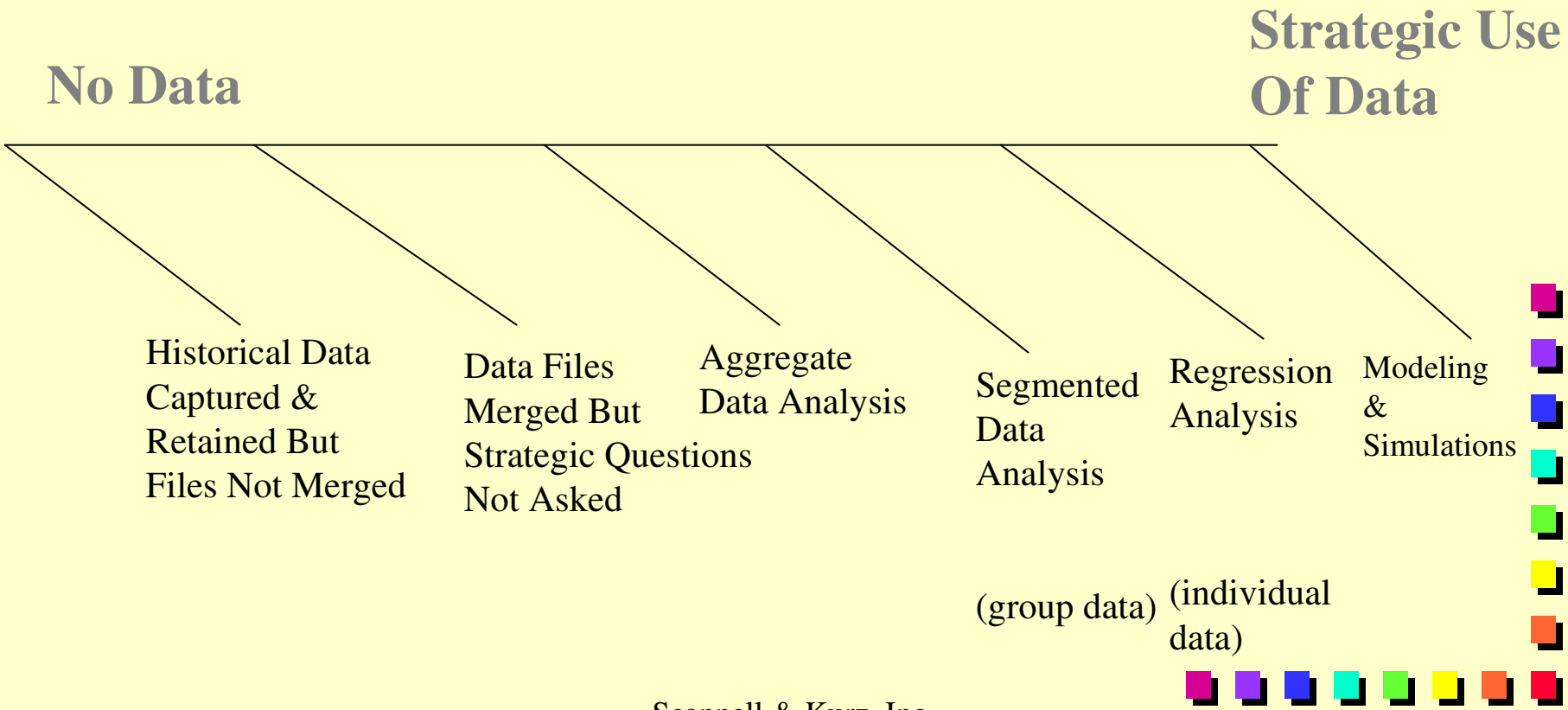
Role of Data

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

Or

Data is not the plural of anecdote.

Data Analysis Progression



Influences on Enrollment Decisions

Academics **Image**

Mission **Location**

Environment

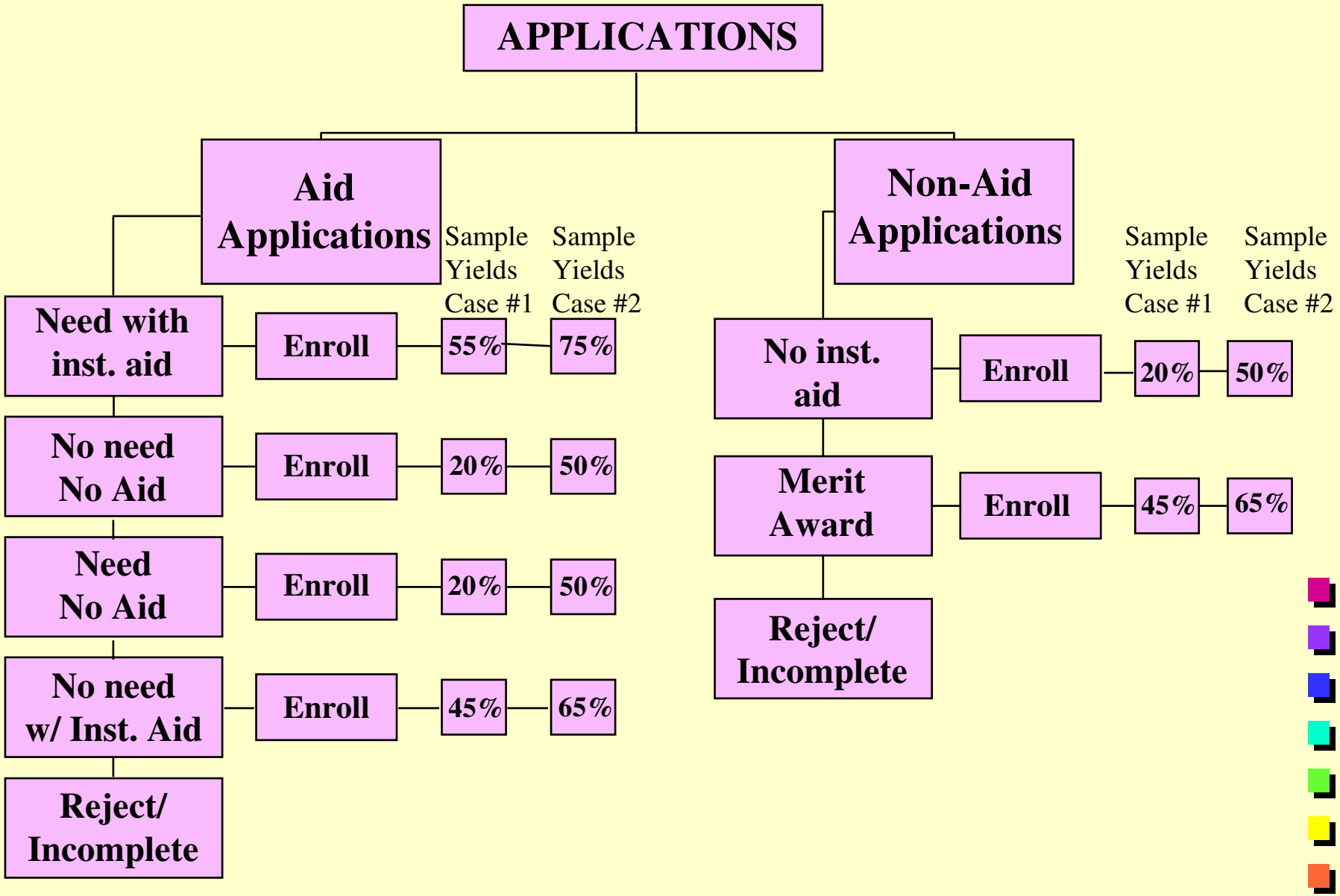
Student Characteristics

PRICE

Net price is the single, easiest factor for the institution to control.

Are we spending our financial aid dollars effectively?

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


APPLICATIONS
Aid Applications
Non-Aid Applications
Sample Yields Case #1
Sample Yields Case #2
Need with inst. aid
Enroll
55%
75%
No need No Aid
Enroll
20%
50%
Need No Aid
Enroll
20%
50%
No need w/ Inst. Aid
Enroll
45%
65%
Reject/ Incomplete
Sample Yields Case #1
Sample Yields Case #2
No inst. aid
Enroll
20%
50%
Merit Award
Enroll
45%
65%
Reject/ Incomplete

Are we spending our financial aid dollars effectively?

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

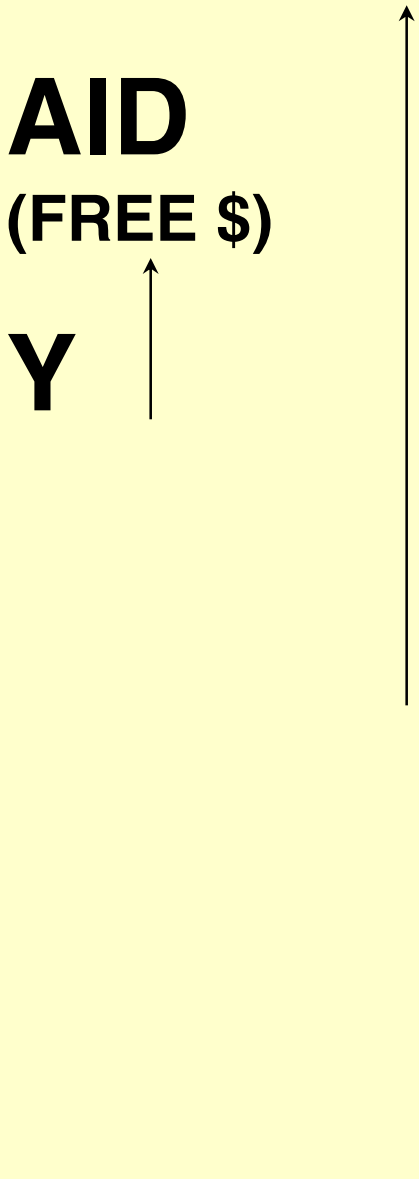
Need by Aid Award

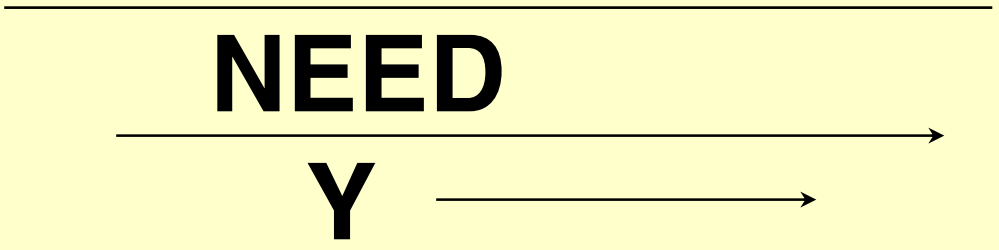
Each cell contains: Enroll/Admit = Yield

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

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

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

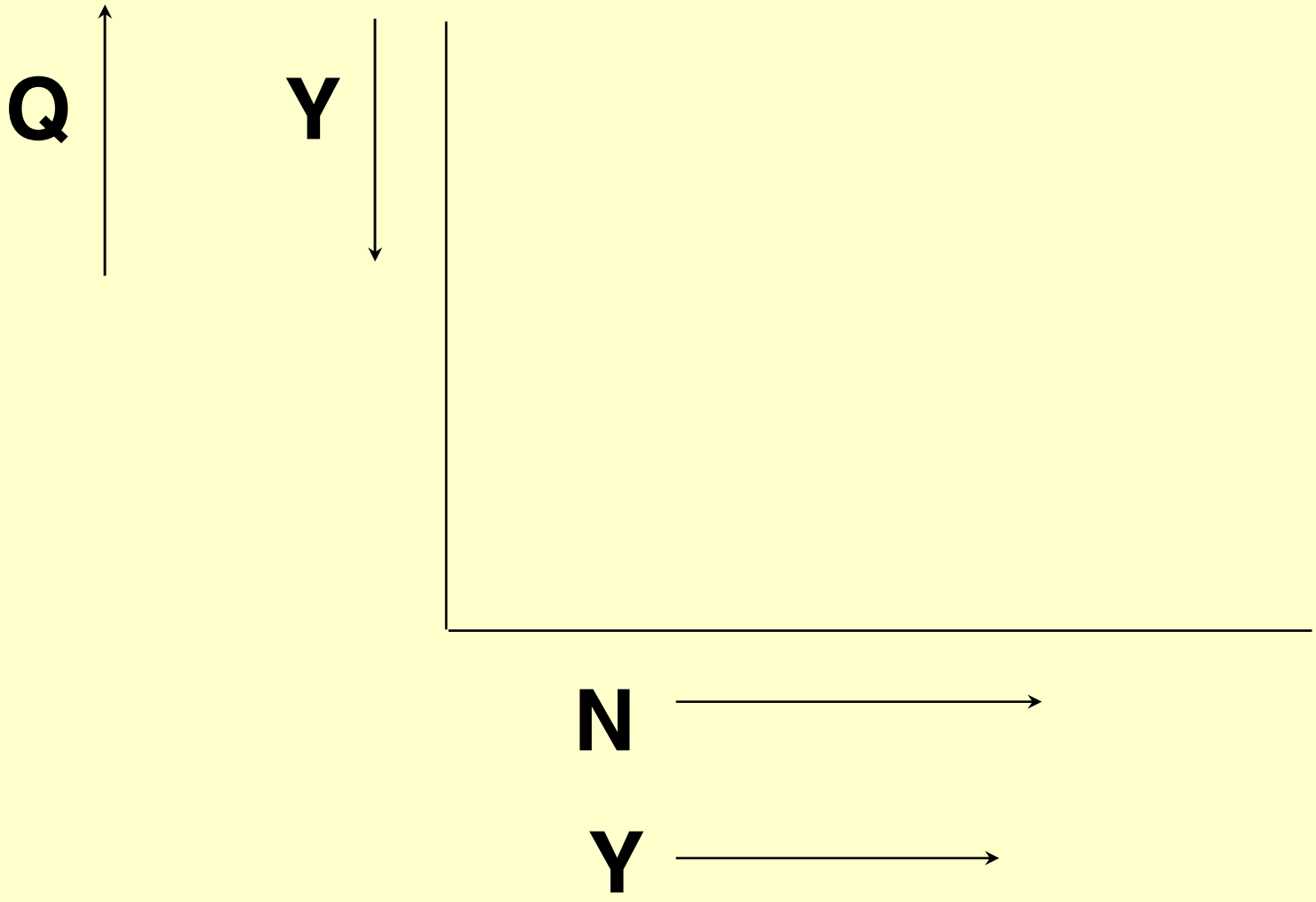

AID
(FREE $)
Y


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**

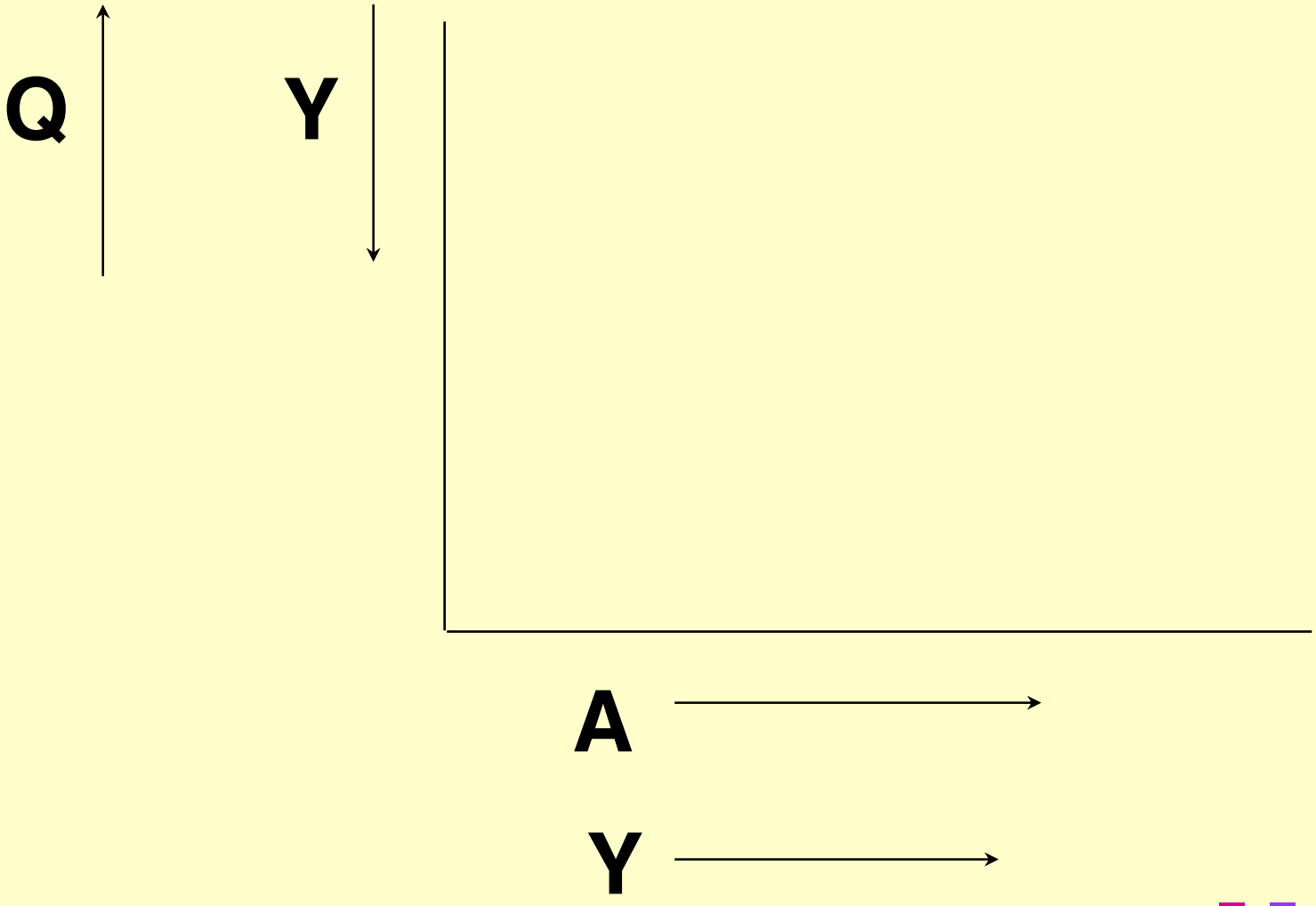

Q
Y
N
Y

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**


Q
Y
A
Y

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 aid analysis

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

Aid Award Pitfalls

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

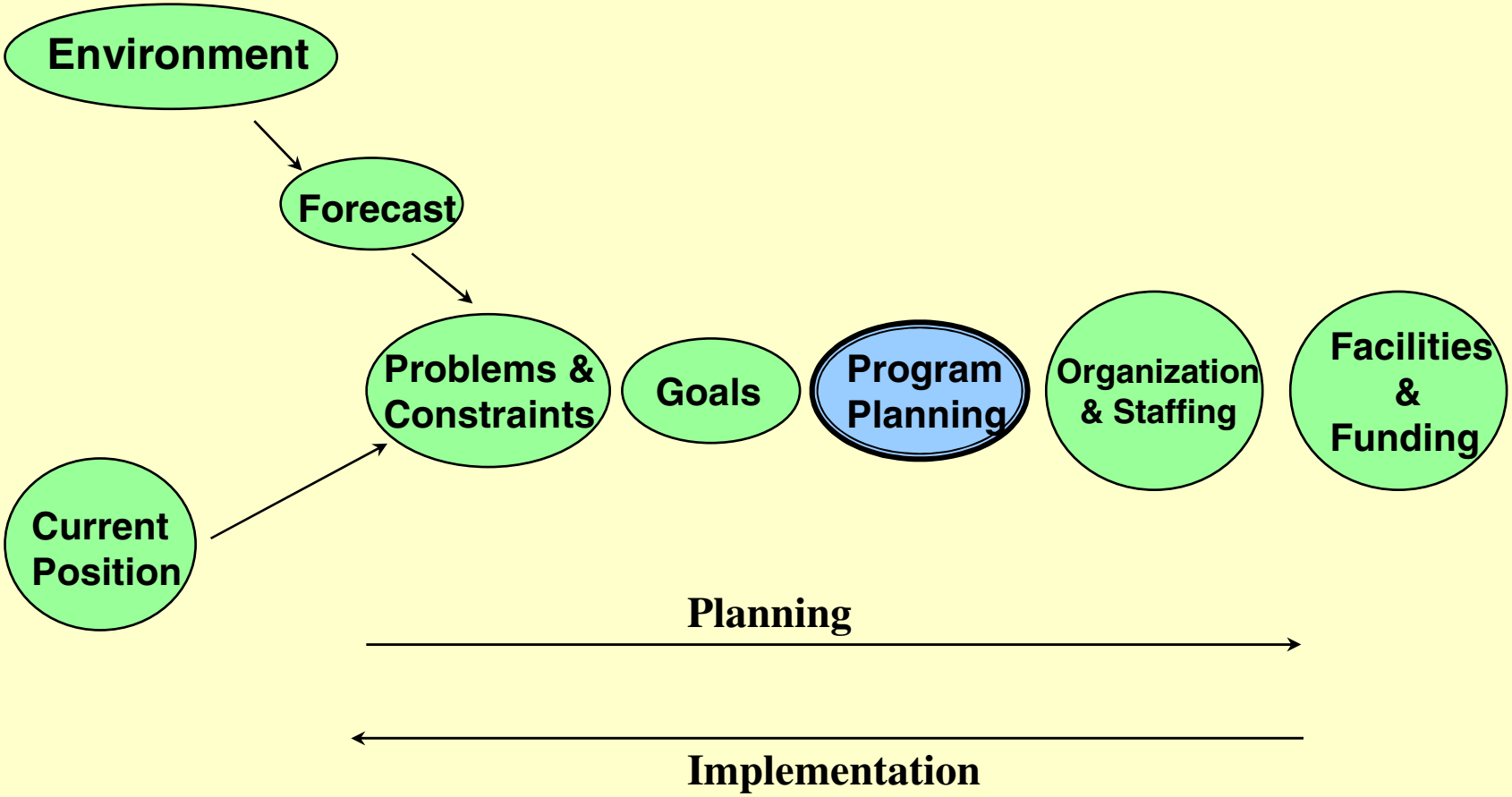
Are we spending our financial aid dollars effectively?

- Conduct cohort retention studies which profile “attrits” and retained students by:
  - Financial aid group
  - Entry statistics
  - Program area
  - Gender
  - GPA at institution
  - Race
  - Etc.

Profile of Freshmen Who Started Fall 2005

	Started in 2004		Returned in 2005		Didn't Return in 2005	
	#	%	#	%	#	%
SAT						
< 900	75	65.8	61	70.9	14	50
900-1100	35	30.7	21	24.4	14	50
1100-1200	4	3.5	4	4.7	0	0
Gender						
Female	47	41.2	37	43	10	35.7
Male	67	58.8	49	57	18	64.3
Financial Aid						
1 Pure merit	3	2.6	2	2.3	1	3.6
2 No aid	43	37.7	34	39.5	9	32.1
3 No grant aid	9	7.9	5	5.8	4	14.3
4 Low need grant	17	14.9	14	16.3	3	10.7
5 Med need grant	21	18.4	14	16.3	7	25
6 High need grant	21	18.4	17	19.8	4	14.3
Total	114	100	86	100	28	100

Strategic Planning Model



Program Planning: Alternatives for Awarding Aid

- Redefining need
- Equity packaging
- Preferential packaging
- Admit/Deny
- Aid conscious admission
- Merit Scholarship

Program Planning:

Identifying Strategic Opportunities Using the Data

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		

Case Study

Cost Benefit Analysis

Cost Benefit Analysis

- **Ideal/budgeted enrollment -- 1,200**
- **University aid budget for 2005-2006: $5.258m**
- **2005-2006 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 significantly 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	$399,000
	$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

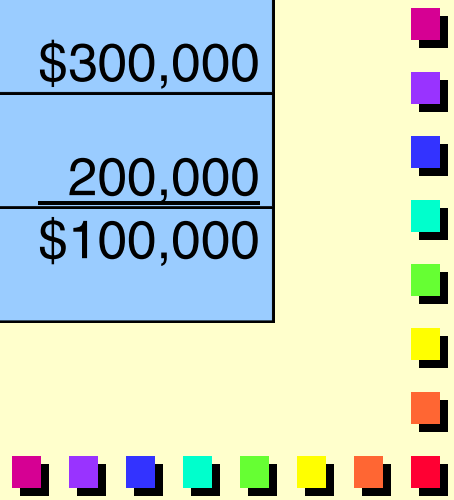
Program Planning

Pilot Experiments

If there's no data to analyze, create some.

Pilot Experiment
150 in Population
Quality: SAT between 1100-1200

Admitted	50	50	50
Merit Award Offered	$0	$5,000	$10,000
Enrolling	5	15	20
Yield	10%	30%	40%
Gross Revenue	$75,000	$225,000	$300,000
Financial Aid	0	75,000	200,000
Net Revenue	$75,000	$150,000	$100,000



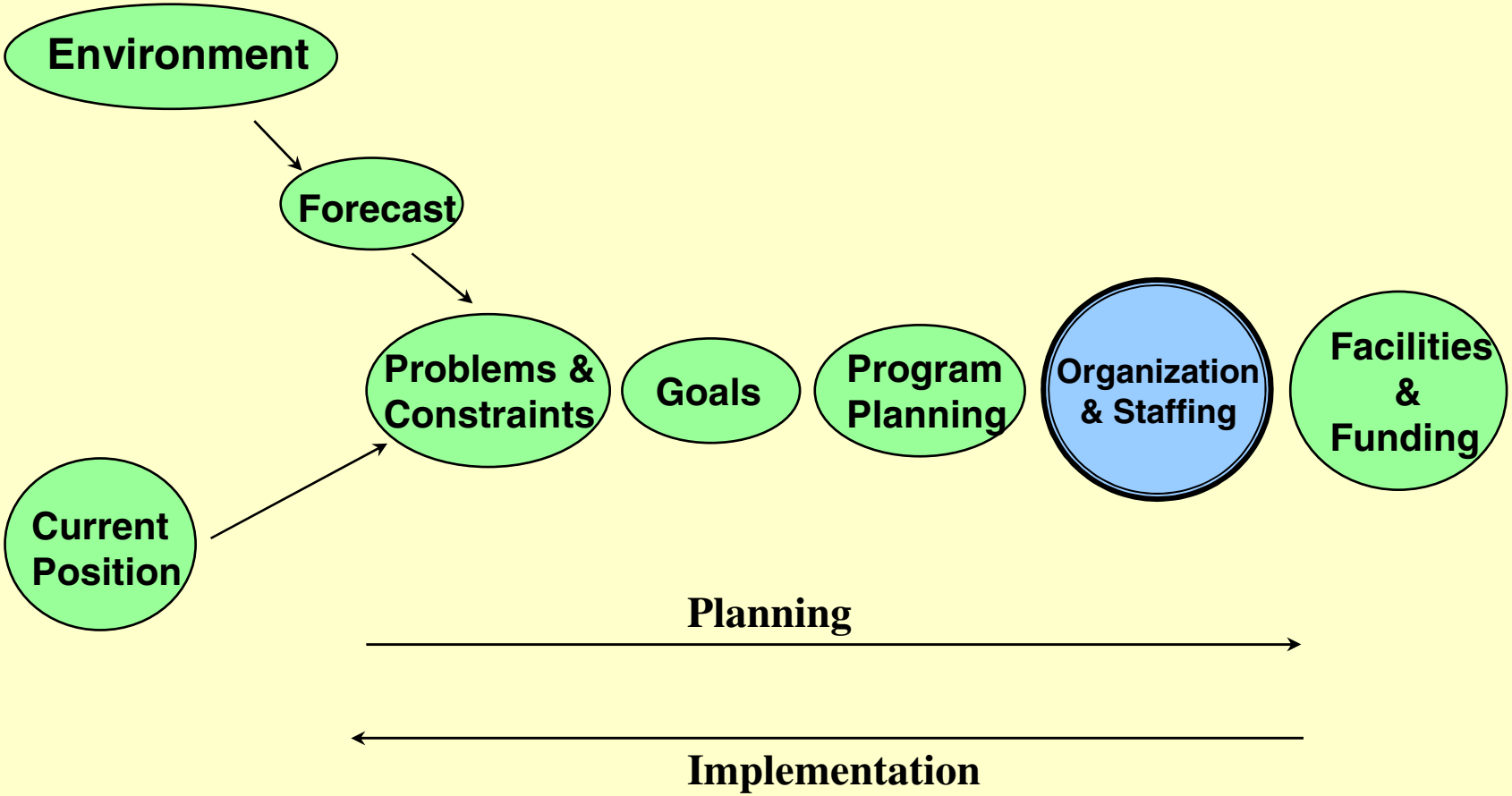
Pilot Pitfalls:

- Comparison group isn't really comparable
- Pilot sample is too small
- More than one change is made
- Ongoing trends aren't considered
- Impact of strategy evaluated only once
- Poor implementation
- Considering experiment a failure just because it doesn't work

Program Planning:
Measuring Results

- Are we doing the right things?
- Are we doing them the right way?
- Are we on track?

Strategic Planning Model



Issues to consider in organizing for strategic use of aid:

- It must be a joint effort between admissions and financial aid.
- Support from institutional research and IT staff may be necessary.
- Decisions must be made well in advance to enable systems to accommodate the changes.

Case Studies

- Will do first case as a large group.
- Will break into groups of approximately 10 to do more detailed case.
- Groups will return here at 12:15 to report out briefly.

Large Group Case Study

Institutional Profile:

This highly selective, small liberal arts college in the Northeast is at capacity, but desires to lower its financial aid discount rate. It competes both with the premiere private research universities as well as with nationally ranked liberal arts colleges.

In the past, in order to stay within the financial aid budget, it had created a financial aid waiting list. However, the yield from that list has been very low.

Case Study

Institutional Profile (cont'd):

It has always awarded financial aid using an equity approach, under which all students receive:

- first, entitlements (Pell, SEOG, state);
- then, maximum Stafford Loan ($2625);
- then, Federal Work Study ($1200);
- then, a gap of $500;
- then, institutional grant to meet institutionally defined need.

Case Study

Institutional Profile (cont'd):

- The discount rate is currently 30%.
- Quality measures and total enrollment are where the institution wishes them to be, with SAT scores averaging 1310 for a freshman class of 606.

Case Study

<u>Step #1</u>: ***Define the problem.***

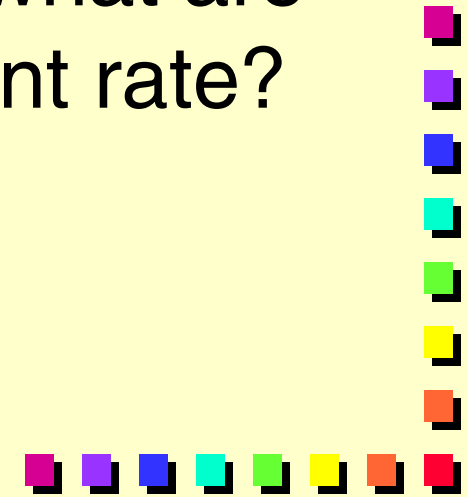
As Is: Describe the current situation in measurable terms.

Desired State: Define the institution's goals in observable terms.

Case Study

<u>Step #2</u>: ***Analyze the problem. Identify the key cause(s).***

Using the data on the next slide, what are the key causes of the high discount rate?



Case Study Data
Enroll/Admit (Yield)
Academic Rating

Need	1 =						4 =		
Level	High Quality		2		3		Low Quality		Total
No app	0/22	0.0%	10/95	11.0%	71/314	23.0%	132/315	42.0%	213/746
No-need	0/13	0.0%	13/78	17.0%	38/177	21.0%	51/169	30.0%	102/437
1-8k	2/9	22.0%	0/15	0.0%	6/45	13.0%	13/27	48.0%	21/96
8k-16k	0/8	0.0%	9/42	21.0%	32/92	35.0%	35/74	47.0%	76/216
16k-20k	2/4	50.0%	6/21	28.0%	22/55	40.0%	24/44	55.0%	54/124
>20k	2/7	29.0%	17/39	44.0%	45/97	46.0%	76/139	55.0%	140/282
Total	6/63	9.5%	55/290	19.0%	214/780	27.4%	331/768	43.1%	606/1901

Case Study

Step #3:

Generate Potential Solutions

Case Study

<u>Step #4</u>: ***Selecting and Planning Solution***

How will you plan to evaluate the solution you choose?

Small Group Case Study

Econometric Analysis and Simulation

31st Annual Snowmass Institute

Presented by:

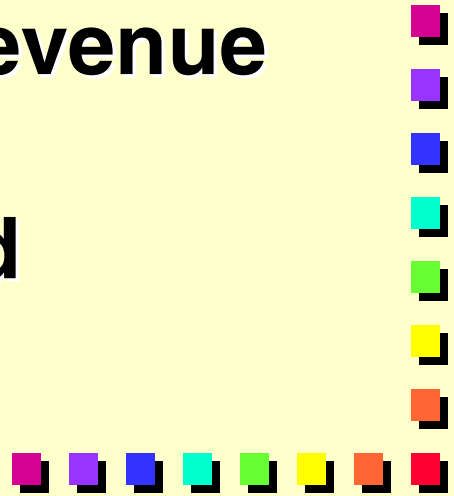
Scannell & Kurz, Inc.

July 11, 2006

www.scannellkurz.com

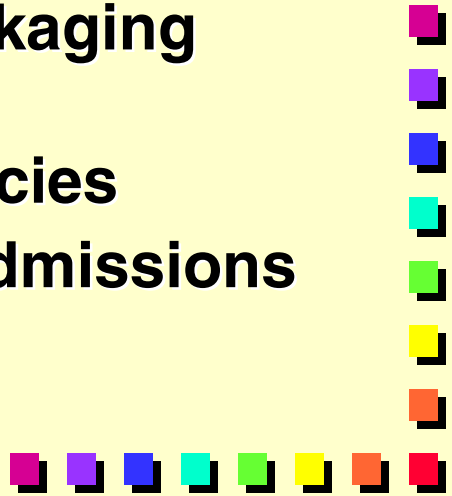
Econometric Analysis and Simulation

- Goals
- Data Requirements
- Enrollment Probability Model
- Exploring Price Sensitivity
- Estimating the Net Tuition Revenue Maximizing Level of Grant
- Simulating New Financial Aid Strategies



Goals of Price Sensitivity Analysis

- 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



Econometric Modeling and Simulation

- **Advantages of Econometric Analysis in Enrollment Planning:**
  - **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 and Simulation
Step I. Data Requirements

- **A file with one record for each** admit.
- **Include values for the following types of fields:**
  - **Admissions fields: application type and 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 and Simulation

Step II. Enrollment Probability Model

- **The probability of enrolling 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)

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 form 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.

Enrollment Probability Model (cont'd)

Examples:

An admit with need of $5,000 who receives a $5,000 scholarship and has Math and Verbal SATs of 800 and 760 respectively would have a probability of enrolling of 2%:

Probability of Enrolling (Student) =	
Total Grant ($1,000s)	+ 0.03*(5)
Student Need ($1,000s)	- 0.01* (5)
Math SAT (100s)	- 0.05*(8)
Verbal SAT(100s)	- 0.05*(7.6)
Intercept	+0.70
Total Probability	**0.02**

Enrollment Probability Model (cont'd)

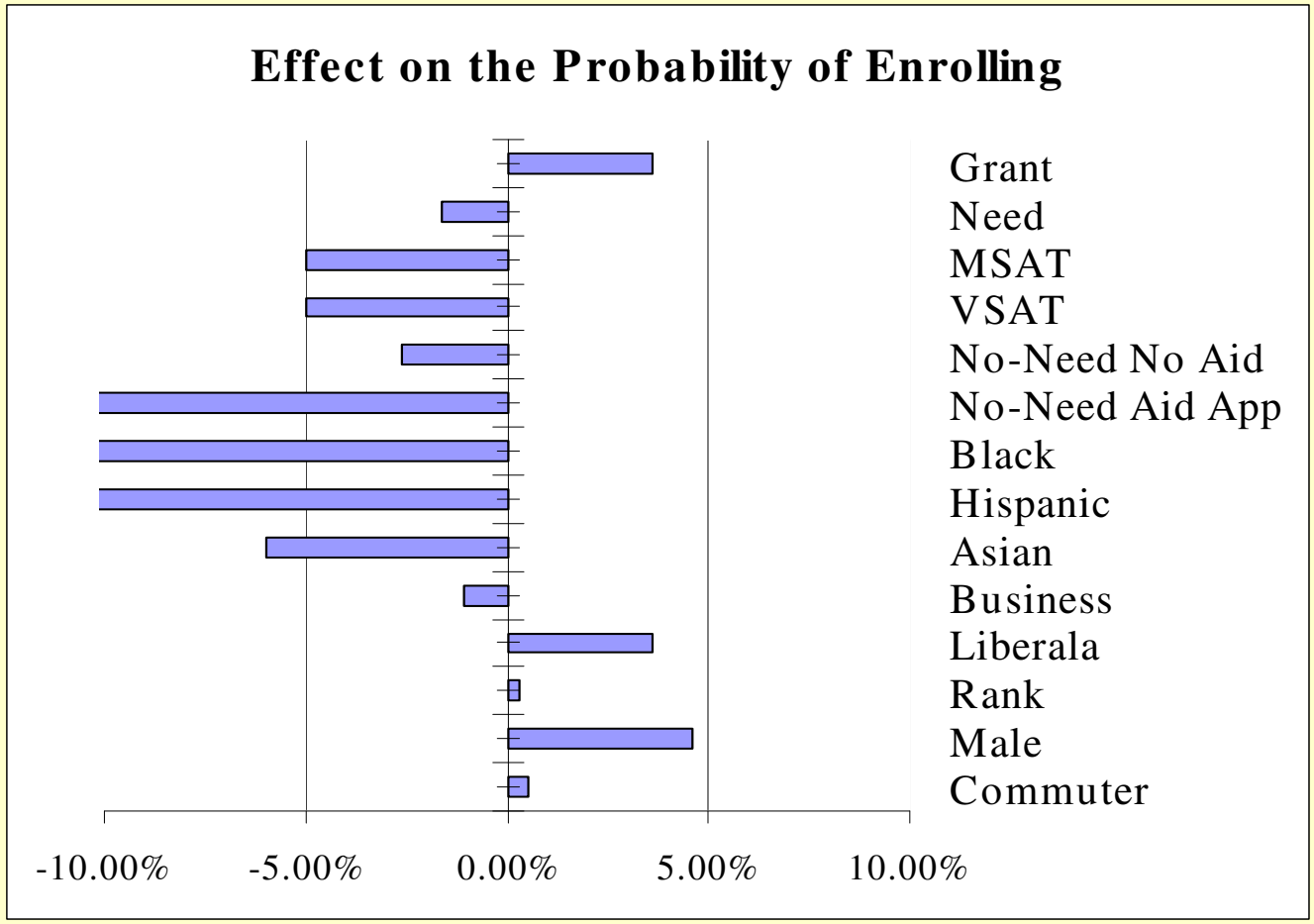
Examples:

While a student with the same need and grants, but with Math and Verbal SAT scores of 500 each, would have a probability of enrolling of 30%.

Probability of Enrolling (Student) =	
Total Grant ($1,000s)	+ 0.03*(5)
Student Need ($1,000s)	- 0.01* (5)
Math SAT (100s)	- 0.05*(5)
Verbal SAT(100s)	- 0.05*(5)
Intercept	+0.70
Total Probability	**0.30**

Enrollment Probability Model (cont'd)

Understanding the Factors Driving Enrollment



Econometric Modeling and Simulation

Step III. Exploring Price Sensitivity

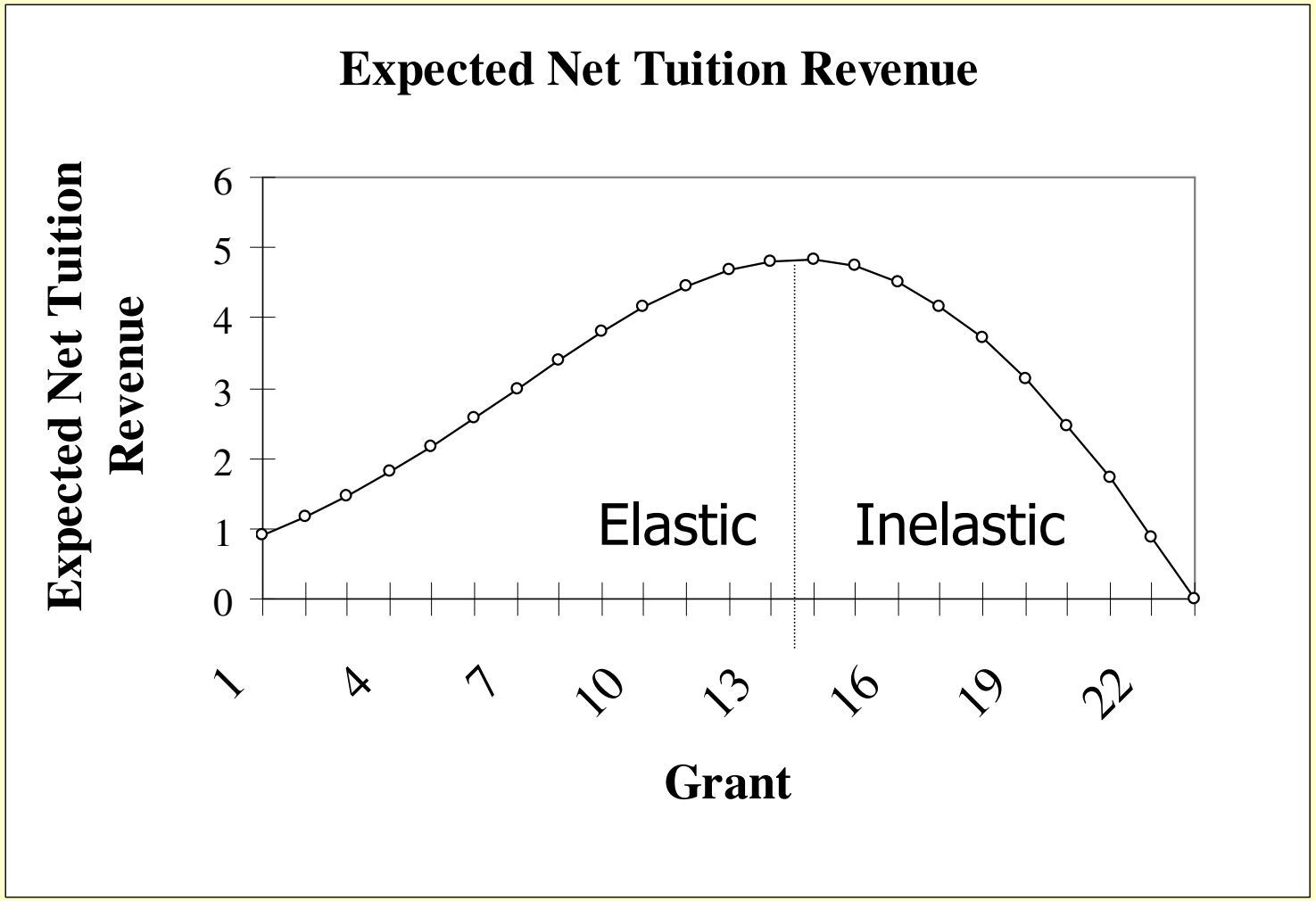
In general, when grants to an admit are increased two things happen:

1. **The probability the student will matriculate increases**
2. **The amount of net tuition revenue that will be received from the student declines**
   - Net Tuition Revenue = Tuition - Grant

Exploring Price Sensitivity (cont'd) Expected Net Tuition Revenue

- Depending on the magnitude of the change in the probability of enrollment, increasing grant may either raise or lower <u>expected</u> net tuition revenue.
  - <u>Expected tuition revenue</u>
    =(probability of enrolling) * (net tuition charges)

Exploring Price Sensitivity (cont'd)



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

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%

Estimate the Net Tuition Revenue Maximizing Level of Grant, (cont'd) Optimal Grant – Actual Grant

- Sample output

Category	Optimal - Actual
Non High Profile Engineering Major	$628
High Profile Engineering Major	-$848
SAT Categories	
Less than 900	$370
900-1000	$457
1000-1100	$551
1100-1200	$284
1300+	-$350

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 Output
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 1

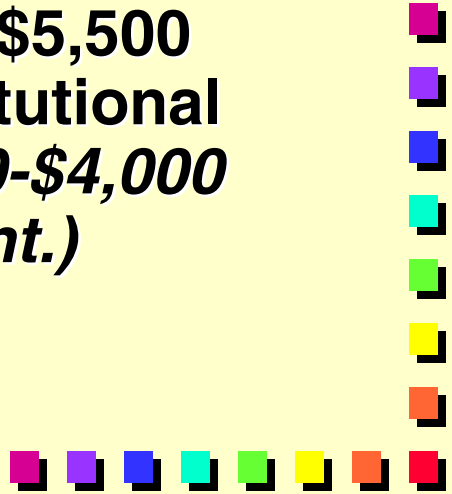
- Selective, specialty public institution with increasing net tuition revenue as the top priority, due to reductions in state support.
  - In-state -- 100% of all admits showed inelastic demand (decrease grants to increase net-tuition revenue)
  - Out-of-state -- 41% of all admits showed elastic demand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

Case Study 1 (cont'd) Recommendations

- **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.)***

Case Study 1
Recommendations (cont'd)

- **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.)***



Case Study 1
Recommendations (cont'd)

- **Out-of-state recommendations (cont'd.)**
  - **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.)***

Case Study 1 (cont'd)
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.

Case Study 1
Results (cont'd)

- **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.**

Case Study 2

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%.

Case Study 2 (cont'd)

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.

Case Study 2 (cont'd)

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.

Case Study 2 (cont'd)

Econometric Modeling: Measuring Price Sensitivity

- The probit model found 70% of the College's 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.

Case Study 2 (cont'd)
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+.**

Case Study 2 (cont'd)

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.

Conclusions

- Business as usual won't work.
- There are no "silver bullets".
- Without careful analysis of data any change in policy or practice has an equal probability of failure or success.
- The stakes are high enough that no institution should gamble.

Conclusions (cont'd)

Ingredients for Successful Decision-Making

Data and information resulting from modeling

+ Lessons learned from experienced practitioners

+ Intuition

+ Institutional context and values

= Well-founded and informed policy decisions