

# **Using Economic Concepts to Inform Enrollment Decision Making**

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**Presented at the Annual Conference of the**  
**National Association for College Admission Counseling**  
**September 26, 2008**  
**Seattle, WA**

# Motivation for the Session

- NACAC folks read chapter & thought it would be interesting to some attendees
- *Applying Economics to Institutional Research*. New Directions for Institutional Research, no. 132. San Fran.: Jossey-Bass
- How economic concepts can inform IHE decisions, esp. enrollment decision making
- Session may be a bit more academic than most, but concepts are often useful

# The State of College Admissions

- In a report released at this conference & noted in the *Chronicle of Higher Education* the other day, David Hawkins, Director of Public Policy & Research for NACAC notes that there is a “dynamic and shifting match-making process” taking place between students applying to more colleges & colleges uncertain about which admits will attend

# The State of College Admissions

- He also notes that because the number of high-school graduates will crest this year, admissions offices will have to employ “increasingly sophisticated techniques” to fill their classes with students who are a good fit for the institution
- I believe Dawkins is right, but the sophisticated techniques are useless tools if not informed by fundamental concepts about the processes at work

# Goals of Educational Session

- Examine how decisions about your enrollments can be viewed through an economic conceptual lens
- Demonstrate how economic-based concepts & tools that derive from these can help inform thinking & action about enrollment management
- Provide some examples of the application of these ideas to specific problems

# Enrollment Management

- In earliest form EM was gate keeping function perform largely by Admission Offices (Hossler, 1996)
  - Focus was on admitting/counseling students & providing sufficient financial aid (Coomes, 2000)
- EM has expanded to include:
  - Increase pool of prospects, attract applicants, hit targets
  - Optimize financial aid
  - Establish effective student services
  - Maximize student chances for success
- EM has become more complex & analytic

# Role of Admissions Office

- Critical spoke in the EM wheel
- Often responsible for multiple institutional objectives including, but not limited to:
  - Achieving enrollment targets to generate sufficient operating revenues
  - Attracting a class of sufficient academic quality to satisfy faculty/leadership
  - Meeting multi-faceted diversity objectives
- Economic theory can be useful in assisting IHE's in meeting enrollment objectives

# What is Economics?

- Word comes from Greek for “nomos” (custom or law) and “oikos” or (house)
  - Hence “rules of the household”
- Social science used to study production, distribution, consumption of goods/services
- Not just about money and commerce
- Much of theory focuses on behavior of “agents” (individuals/organizations)

# Roots of Economic Theory

- Ancient roots
- Became object of study in the 18th century
- Now many “schools” or “branches”
  - Microeconomics (behavior of “agents”)
  - Macroeconomics (unemployment, inflation, monetary policy)
  - Welfare economics (allocative efficiency & distributional equity)
  - International economics (trade among countries)
  - Econometrics (link stats & economic theory)

# Role of Theory in Decision Making

- Theory provides the conceptual basis for much of the research of student behavior
  - How student college aspirations are formed
  - Student college choice behavior
  - Student performance & activities in college
  - The labor market choices students make upon graduation
- Choice theory particularly important
  - How and why “agents” make choices

# Choice Theory

- “Agents” weigh options & make important decisions
  - Students/parents make college attendance decisions
  - Institutions decide which students to admit
- Examining behavior through econ. lens, we believe they do so trying to max. well-being
  - Students interested in individual returns
  - IHE’s want to achieve institutional objectives

# The Educational Market

- The aggregation of these agents & their actions comprise the “educational market”
  - Market may be segmented by location, institutional type, selectivity, who peers are...
- Economic theory can help us understand the behavior of individuals & institutional markets
- Helps to understand foundational market concepts such as demand and supply

# Foundational Theories

- Demand—quantity of good/service consumers willing/able to buy at a price
- Supply—quantity of good/service supplied by producers at given price
- “Good” is education offered by IHE’s
- “Consumers” are students/families
- “Producers” are the IHE’s
- “Price” is the tuition charged

# Enrollment Demand Theory

- Enrollments (demand) a function of many factors, including tuition (price)
- First Law of Demand: price changes induce changes in quantity demanded
  - Price/quantity inversely related; results in negatively sloping demand curve
- Others: Family income (ability/willingness to pay), tuition at competitors (role of substitutes), price of complementary goods, future tuition rates (price expectations), & tastes/preferences
- Determinants of Demand equation

# Enrollment Demand Theory

- Understanding simple concepts of price theory can inform decision making
- MN/WI tuition reciprocity example
  - Role of elasticity measures
- Decline in enrollments at Iowa
  - Knowledge about non-resident market
  - Econometric methods applied

# Price Elasticity of Demand

- Sensitivity of quantity demanded to changes in price
- Parallel: Tuition elasticity of enrollments, the sensitivity of enrollments to changes in tuition
- How measured? Ratio
- Practical use: Use to assess enrollment changes given changes in tuition rates

# Tuition Elasticity Example

- Assume: Your President wants to raise tuition by 10 percent & wants estimate of the enrollment effect
- Having estimate of tuition elasticity would help to answer this question. Where to get?
- Tuition response literature (Leslie and Brinkman, 1987, 1988; Heller, 1997; Gallet, 2007)
- IR office may know answer: Assume they say tuition elasticity is  $-.55$  (Calculations)

# Tuition Revenue

- Knowledge of tuition elasticity also crucial to understanding how total revenue (price times quantity) is impacted by tuition changes
- Price/TR changes inversely related when demand is elastic; demand quite responsive
- Converse true when operating in inelastic range where demand not as responsive
- Price and total revenue demo

# Other Elasticities

- Income: Slightly inelastic
  - 1% income change induces about equal percentage change in enrollments
- Cross-Price: Positive (negative) when goods are substitutes (complements)
  - Substitute: Competitor raises tuition, your enrollments should rise. By how much?
- Non-Price Cross-Elasticity
  - Competitor increases admissions standards, your enrollments should rise

# Other Elasticities

- Aid: Enrollment depends on sensitivity of students to scholarships, grants, loans, & other forms of aid (Reciprocity example)
  - Really important to know these if you want to optimize financial aid packaging
- Marketing is designed to shape the tastes, preferences, perceptions of prospective students (a determinant of demand)
  - Goal to change students propensities to consider your IHE, visit campus, apply, enroll, succeed!

# Evidence on Elasticities

- Non-whites more responsive to changes in tuition and income than whites
- Enrollments at two-years more responsive to tuition & income changes than four year institutions
- Non-resident enrollments more responsive to tuition changes than resident
- Magnitudes vary depending on many factors (unit of analysis, IHE, method...)

# Supply-Side Considerations

- Often does not look like typical market clearing model from the textbooks
- IHE's are unwilling or unable (in short run) to supply seats to students even if they are willing to pay higher tuition (prices)
- Differences in application policies at IHE's can be analyzed using standard economic theory, even when the market clearing treatment does not apply (see DesJardins & Bell, 2006 for an example)

# Price Discrimination

- Practice of charging different prices to different consumers for the same good
  - Or charging consumers different prices based on the quantity purchased
- Perfect: charging individuals amount equal to willingness to pay.
- Second-degree: Price per unit depends on the amount of the good bought
- Third-degree: Dividing market into segments based on their price elasticities then charging segments different prices for the same good

# Price Discrimination Examples

- IHE's segment market & charge different tuition
  - Residents vs. non-residents; graduate vs. undergraduates; upper vs. lower division
- May also discriminate using aid
  - Merit aid used to attract high ability; athletic scholarships (Iowa NSA example)
- Differential pricing as competitive weapon heavily researched & studied
  - For discussion from the institutions' and students' perspective see McPherson and Schapiro (1998)

# Costs

- Understanding accounting costs necessary but not sufficient; economic costs important
  - Latter is about foregone opportunities
  - \$ spent on buying names could have other uses
- Fixed: Doesn't change with scale
  - Expenditures on facilities
- Variable: Changes with scale
  - Number of recruiters you need
- Average: Cost/scale; seems to be U-shaped
  - Trick: Find scale that minimizes AC

# Costs

- Average: Cost divided by size
  - Evidence it is U-shaped
  - Goal: Find scale that minimizes AC
  - Info on costs: Delaware Study of Costs and Productivity (Middaugh, various years)
- Marginal: Change TC for additional unit
  - Useful when deciding whether/where to add resources
  - Size of entering class/housing example
  - Size of *College Composition* class

# Cost Concepts

- For more information on cost concepts, their determination, and application to enrollment decision-making see chapter in NDIR book by Paul Brinkman.

# Microeconomics

- Joint microeconomic theory and stats
- IA example: Analysis of enrollments using price & financial aid elasticity concepts
- Proposed increase the tuition of Wisconsin students attending the University of Minnesota (Example)
- Segmentation example
- Role of aid expectations on *applications*

# Conclusions

- Knowing about these concepts and how to construct tools using them can help you understand student and institutional decision making processes
- Coupling the conceptual & your “mental model” with inferential methods & commonly available software can produce valuable tools to inform decision making
- Hope this talk and links to the related literature will assist you in being even more effective members of EM team

- Thank NACAC for inviting me and thank you for your kind attention!
- I remain available to assist you if need be ([sdesj@umich.edu](mailto:sdesj@umich.edu))
- Questions? Comments?

# References

- **Stephen L. DesJardins & Allison Bell (2006). Using Economic Concepts to Inform Enrollment Management. In Robert K. Toutkoushian and Michael B. Paulsen (Eds.). *Applying Economics to Institutional Research*. New Directions for Institutional Research, no. 132. San Francisco: Jossey-Bass.**

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# Typical Demand Equation

$$Q_{xD} = f (P_x, Y, P_c, P_s, P_{e\ t+1}, T\&P)$$

- Return

# Price Elasticity

$$\frac{\% \Delta Q_x}{\% \Delta P_x}$$

- Values are always negative given inverse relation between price/quantity demanded
- If  $> |1|$  percentage change in quantity demanded  $>$  percentage change in price
- If  $< |1|$  percentage change in quantity demanded is less than the percentage change in price

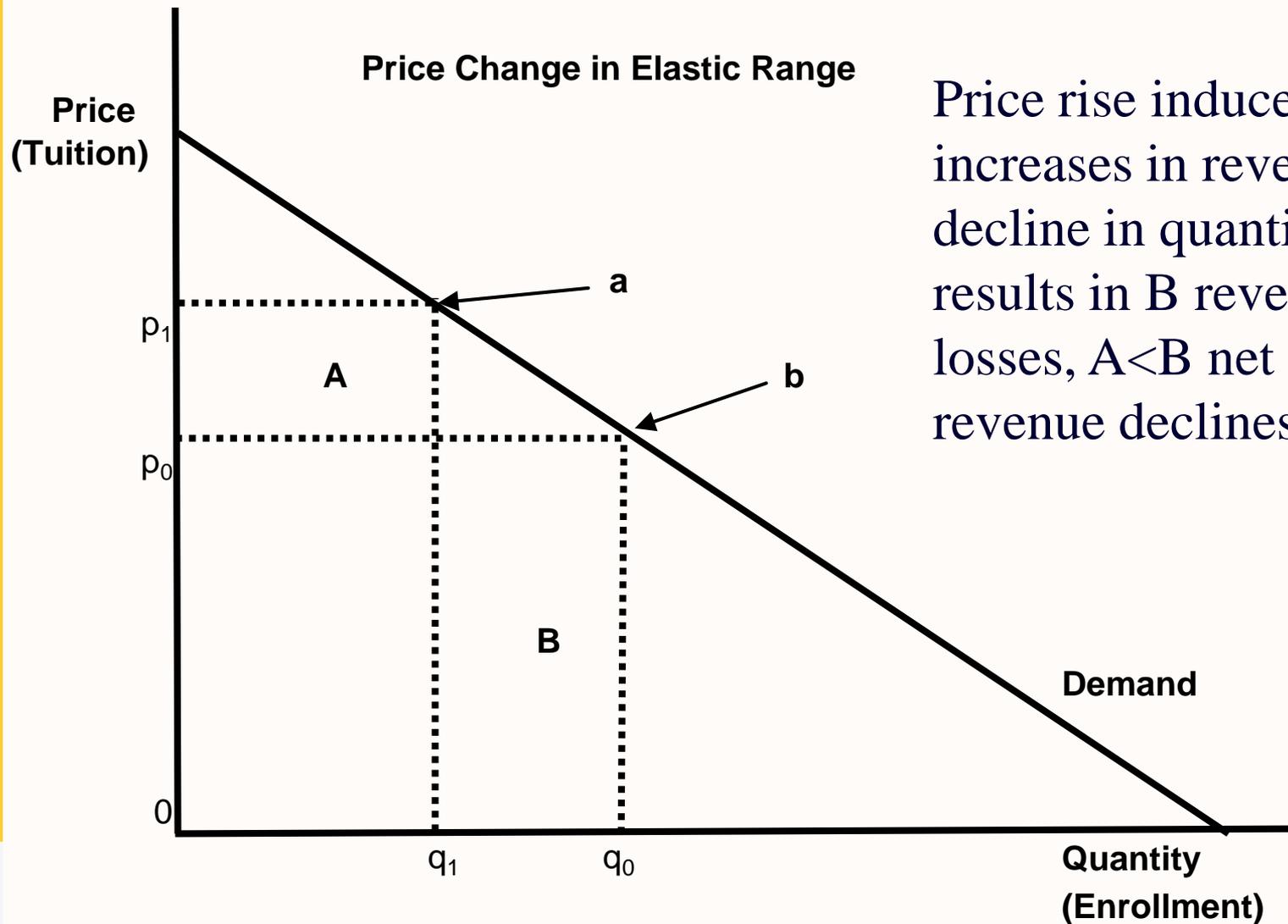
# Tuition Elasticity Calculations

- $-.55 = \frac{\% \Delta Q_x}{10\%}$
- Rearranging terms:
- $\% \Delta Q_x = -0.55 * 10\%$
- $\% \Delta Q_x = -5.5\%$
- Answer: 10 percent tuition increase likely to result in a 5.5% reduction in enrollments

# TR/Price Relationships

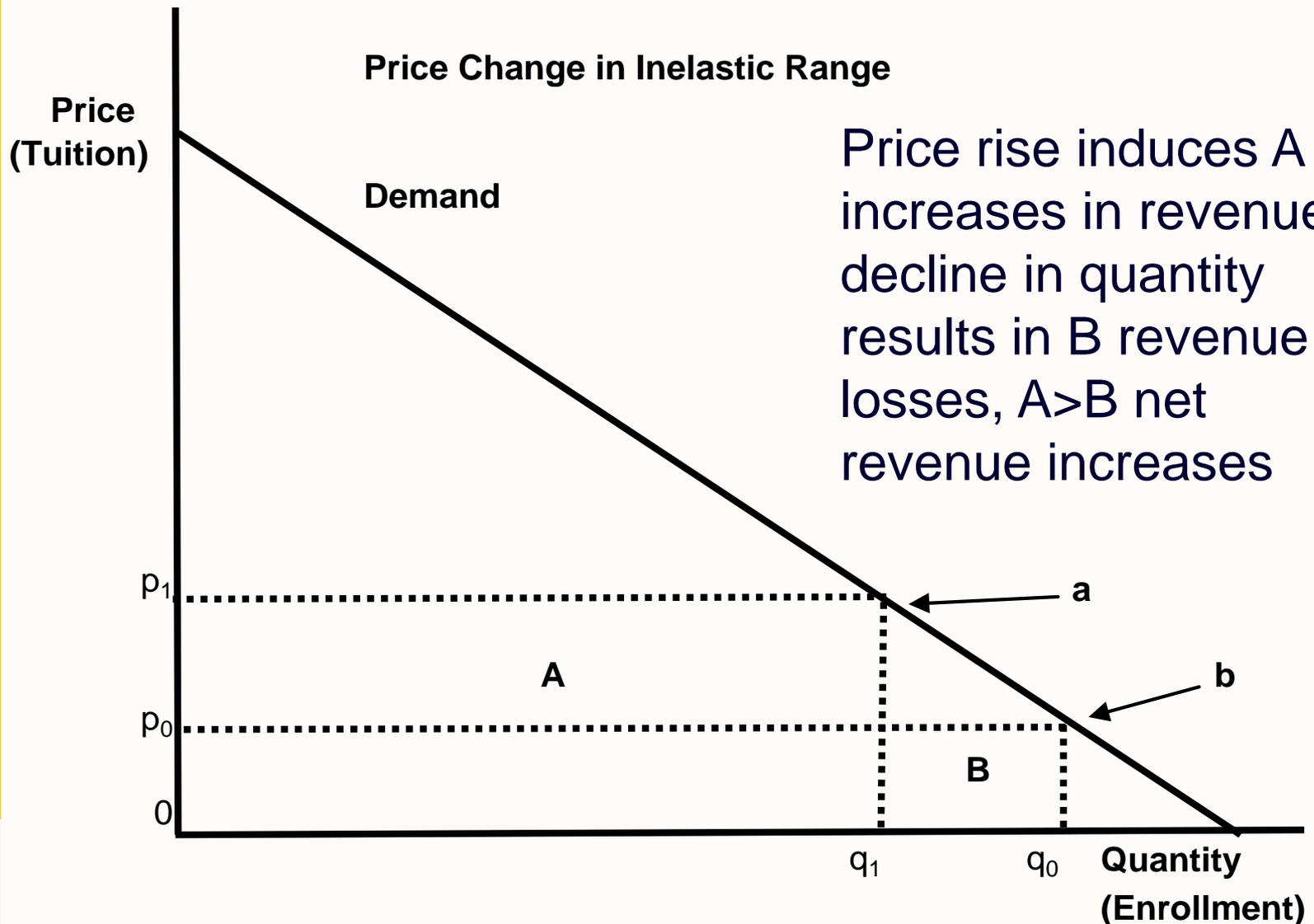
Portion of Demand Curve	Price Increases will... Total Revenue	Price Decreases will... Total Revenue
Elastic ( $> 1 $ )	Decrease TR (Negatively related)	Increase TR (Positively related)
Inelastic ( $< 1 $ )	Increase TR (Positively related)	Decrease TR (Negatively related)

# TR/Price Relation When Elastic



Price rise induces A increases in revenue, decline in quantity results in B revenue losses,  $A < B$  net revenue declines

# TR/Price Relation When Inelastic



# Relative Elasticity

