PUBP 4803/8803: Cost Benefit Analysis

TuTh 1:30-2:45 | Clough 250 | Fall 2018

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Overview and broad learning objectives

This course provides an introduction to theory and methods used for Cost-Benefit analysis.

How much should Governments spend in public health or in infrastructure? Should the State invest in better schools or in improving road conditions? Should the City provide subsidies to build a new football stadium? How can NGOs prioritize investment in development projects? What is the optimal balance of investments between climate change mitigation and climate change adaptation?

These are all very relevant policy questions that can be addressed using Cost-Benefit analysis. At the end of the semester students will be able to correctly frame a large variety of public policy problems using Cost-Benefit analysis. Students will be able to perform Cost-Benefit assessments of simple projects and they will be able to critically review Cost-Benefit studies.

The course is dividend in three parts. The first part will introduce conceptual foundations of Cost-Benefit analysis. The second part will present the fundamentals of Cost-Benefit Analysis (Microeconomic foundation, discounting future costs and benefits, uncertainty, distributional issues, option price and existence value). The third part (if time permits) will cover methods to value impacts (observation, contingent valuation, shadow prices). Throughout the course case studies will be used to practice Cost-Benefit Analysis.

Key learning objectives

Upon successful completion of the course the student will be able to:

- Master theory of cost-benefit analysis
    - Microeconomic foundations
    - Discounting
    - Aggregation of social preferences

    - Option value
    - The value of information
    - The value of a statistical life
    - Benefit transfer
    - Risk and uncertainty
- Master all the steps to prepare a cost-benefit assessment
    - Estimation of costs
    - Estimation of benefits
    - Choice of discount rate
    - Robustness tests
    - Critical assessment of the limits of the study
- Critically assess advantages and limitations of cost-benefit analysis
    - A critical appraisal of strengths and weaknesses of cost-benefit analysis for public policy

Assessment

- Attendance (10%)
- Homework (5) (20%)
- Midterm exam (30%)
- Final exam (40%) – Scheduled on December 10 from 2:40pm to 5:10pm.

Undergraduate/graduate rigor

Undergraduate students are expected to rise to the challenge of an advanced class and demonstrate they can master applied cost-benefit analysis methods. In the final exam undergraduate students are required to solve problems in applied cost-benefit analysis. Assigned readings for undergraduate students are marked with an asterisk (*) in the reading list at the end of the syllabus.

Graduate students are expected to master applied cost-benefit analysis and topics of welfare economics. Graduate students must prepare readings marked with an asterisk (*) and also readings marked with the symbol ^ in the list at the end of the syllabus. In the final exam, graduate students will be required to solve problems in applied cost-benefit analysis and to critically assess strengths and weaknesses of each method based on the assigned theory readings.

Grading:

- A: >=90; B: between 80 and 89; C: between 70 and 79; D: between 50 and 69; F: below 50.

Class materials

I will follow very closely the following textbook:

- Boardman, A., D. Greenberg, A. Vining and D. Weimer (2011). Cost Benefit Analysis – Concepts and Practice. Fourth Edition, Pearson.

At the end of each class I will provide lecture notes and slides (if used).

Case studies and additional readings will be assigned to cover applied cost-benefit analysis problems. The reading list for each class and a distribution of topics over the semester is at the end of the syllabus.

I suggest reading Sunstein, C (2004). *Risk and Reason*. Cambridge University Press. This very accessible book provides a general discussion of why cost-benefit analysis should be an important guiding principle in public policy.

Participation

Attendance is rewarded with 10% of total points. When students are in class they must be focused: cellphones cannot be used. No web surfing, email, no social networking when using laptops for class activities.

A student may miss class on occasion due to medical issues. Georgia Tech has a web page that describes the expectations, rights, and responsibilities of students, instructors, the Office of Student Life, and health care providers. The information is intended to give students better direction as to how they should proceed to notify instructors when they are ill and need to miss class and what kind of documentation they should provide and to whom. Students should refer to Georgia Tech policies at the "Student Absence from Class Due to Illness or Personal Emergencies" web page at

http://www.catalog.gatech.edu/policies/student-absence-regulations/

Honor code

The Academic Honor Code is a student initiative that became an official Institute policy in 1996. The objective of the Academic Honor Code is to increase academic integrity and strengthen trust in the Georgia Tech community. Students enrolled at Georgia Tech signed an agreement acknowledging their awareness of the Academic Honor Code. They are strongly encouraged to seek a full understanding of their instructors' expectations regarding academic honor. You can find the Honor Code (with a listing of responsibilities in Sections 3 and 4) at

http://www.policylibrary.gatech.edu/student-affairs/academic-honor-code

Disabilities and special arrangements

Your experience in this class is important to me. If you have already established accommodations with the Offices of Disability Services, please communicate your approved accommodations to me at your earliest convenience so we can discuss your needs in this course. If you have not yet established services through Disability Services, but have a temporary health condition or permanent disability that requires accommodations (conditions include but are not limited to: mental health, attention-related, learning, vision, hearing, physical or health impacts), you are welcome to contact Disability Services at 404-894-2563 or

dsinfo@gatech.edu or disabilityservices.gatech.edu. Disability Services offers resources and coordinates (with students and their instructors) reasonable accommodations for students with disabilities and/or temporary health conditions.

Statement on diversity and inclusion

The Ivan Allen College of Liberal Arts supports the Georgia Institute of Technology's commitment to creating a campus free of discrimination on the basis of race, color, religion, sex, national origin, age, disability, sexual orientation, gender identity, or veteran status. We further affirm the importance of cultivating an intellectual climate that allows us to better understand the similarities and differences of those who constitute the Georgia Tech community, as well as the necessity of working against inequalities that may also manifest here as they do in broader society.

Distribution of topics and homework assignment during the semester

Lecture number	Date	Weekday		HW assigned	HW due
1	21-Aug	T	Introduction to Cost-Benefit Analysis		
2	23-Aug	Th	Introduction to Cost-Benefit Analysis		
3	28-Aug	T	Introduction to Welfare Economics		
4	30-Aug	Th	Introduction to Welfare Economics		
5	4-Sep	T	Consumer surplus and consumer welfare I		
6	6-Sep	Th	Consumer surplus and consumer welfare II		
7	11-Sep	T	Consumer surplus and consumer welfare III		
	13-Sep	Th	Cancelled	HW 1	
8	18-Sep	T	Welfare measurement for the producer I		
9	20-Sep	Th	Welfare measurement for the producer II		HW 1
10	24-Sep	M	Government surplus and allocative efficiency		
11	25-Sep	T	Benefits and costs in primary markets - Efficient Markets II	HW 2	
12	27-Sep	Th	Benefits and costs in primary markets - Efficient Markets II		
13	2-Oct	T	Benefits and costs in primary markets - Externalities		HW 2
	4-Oct	Th	Midterm Exam		
	9-Oct	T	Fall Break		
14	11-Oct	Th	Benefits and costs in primary markets - Information Asymmetry		
15	16-Oct	T	Benefits and costs in primary markets - Opportunity costs		
16	18-Oct	Th	Secondary markets I		
17	23-Oct	T	Secondary markets II	HW 3	
18	25-Oct	Th	Discounting I		
19	30-Oct	T	Discounting II		HW 3
20	1-Nov	Th	Social Discount Rate		
21	6-Nov	T	Climate change policy and discounting	HW 4	
22	8-Nov	Th	Uncertainty		
23	13-Nov	T	Case study: urban transport		HW 4
24	15-Nov	Th	Option Price and Option Value		
25	20-Nov	T	Case Study: Water Infrastructure	HW 5	
	22-Nov	Th	Thanksgiving Break		
26	27-Nov	T	Case Study: Natural Gas Pipeline		
27	29-Nov	Th	Cost-effectiveness analysis		HW 5
28	4-Dec	T	Review		
	10-Dec	Th	Final Exam (2:40pm - 5:10pm)		

List of readings

Abbreviations: BGVW refers to the textbook. LN refers to lecture notes distributed before or after class.

Readings marked with an asterisk must be prepared before class by both graduate and undergraduate students.

Readings with the symbol ^ must be prepared by graduate students only.

All readings, with the exception of the textbook chapters, are available on Canvas. These readings complement the material presented in class.

Any change to the distribution of topics and to assigned readings will be announced on Canvas.

August 21 - Lecture 1. Introduction I

August 23 - Lecture 2. Introduction II

* BGVW: Chapter 1.

^ Viscusi, W. K. (1996). Economic foundations of the current regulatory reform efforts. The Journal of Economic Perspectives, 119-134.

August 28- Lecture 3. Introduction to Welfare Economics I

* BGWV: Chapter 2, limited to sections titled:
- CBA as a framework…
- Using CBA for decision making

^ Hammitt, J. K. (2013). Positive versus Normative Justifications for Benefit-Cost Analysis: Implications for Interpretation and Policy. *Review of Environmental Economics and Policy*, *7*(2), 199-218.

August 30 - Lecture 4. Introduction to Welfare Economics II

* BGWV: Chapter 2, limited to sections titled:
- Fundamental issues related to WTP
- Concerns about the role of CBA in the political process
- Limitations of CBA

^ Kaldor, N. (1939). Welfare propositions of economics and interpersonal comparisons of utility. *The Economic Journal*, 549-552.

September 4 - Lecture 5. Consumer surplus and consumer welfare I

* BGWV: Chapter 3, limited to sections titled:

- Demand curves

September 6 - Lecture 6. Consumer surplus and consumer welfare II

* BGWV: Chapter 3, limited to sections titled:
  - Appendix 3-A

^ John K. Horowitz and Kenneth E. McConnell (2002). "A Review of WTA / WTP Studies". Journal of Environmental Economics and Management 44, 426-447.

September 11 - Lecture 7. Consumer surplus and consumer welfare III

* LN-consumer-welfare limited to the following sections (not required before class, but required for midterm and final exams)

- 1 until proposition 12 at p. 9 included
- 2.1, 2.2, 2.4
- 3 (all)
- 4 from p.13, last line ("Compensating and equivalent variation…")
- 6 (all)

^ LN-consumer welfare: all.

September 18 - Lecture 8. Welfare measurement for the producer I

* LN-producer-welfare, limited to sections 1-3

* BGWV: Chapter 3, limited to sections titled:
  - Supply curves

September 20 - Lecture 9. Welfare measurement for the producer II

* LN-producer-welfare, limited to sections 4 and 5.

September 24 - Lecture 10. Government surplus and allocative efficiency

* BGWV: Chapter 3, limited to sections titled:
  - Social surplus and allocative efficiency
  - Government surplus…
  - Measuring changes in welfare

September 25 - Lecture 11. Benefits and costs in primary markets - Efficient Markets I

* BGWV: Chapter 4:

- Introduction

- Practical versus conceptually correct measures of benefits and costs
- Valuing outcomes: Willingness to Pay
    - Valuing Benefits in Efficient Markets

September 27 - Lecture 12. Benefits and costs in primary markets - Efficient Markets II

October 2 - Lecture 13. Benefits and costs in primary markets - Externalities

* BGWV: Chapter 4:

- Valuing outcomes: Willingness to Pay
    - Valuing Benefits in Distorted Markets
        - Externalities

October 11 - Lecture 14. Benefits and costs in primary markets - Information Asymmetry

* BGWV: Chapter 4:

- Valuing outcomes: Willingness to Pay
    - Valuing Benefits in Distorted Markets
        - Information Asymmetry

October 16 - Lecture 15. Benefits and costs in primary markets – Input markets

* BGWV: Chapter 4:

- Valuing inputs: opportunity costs

October 18 - Lecture 16. Secondary markets I

* BGWV: Chapter 5

- Valuing Costs and Benefits in Efficient Secondary Markets

October 23 - Lecture 17. Secondary markets II

* BGWV: Chapter 5

- Valuing Benefits and Costs in Distorted Secondary Markets
- Indirect Effects on Infrastructure Projects
- Secondary Markets Effects from the Perspective of Local Communities

October 25 - Lecture 18. Discounting I

* BGWV: Chapter 6:

- Introduction

- The basics of discounting
- Compounding and discounting over multiple years
- Timing of benefits and costs

October 30 - Lecture 19. Discounting II

* BGWV: Chapter 6:

- Comparing projects with different time frames
- Inflation and real versus nominal dollars
- Relative price changes
- Long-lived projects and horizon values
- Time-declining discounting
- Sensitivity analysis in discounting
- Appendix 6A

November 1 - Lecture 20. Social Discount Rate

* BGWV: Chapter 10:

- Introduction
- Does the choice of the discount rate matter?
- The theory behind the appropriate social discount rate
- Deriving the social discount rate from market rates: four alternatives

^ Arrow, K. J., Cropper, M. L., Gollier, C., Groom, B., Heal, G. M., Newell, R. G., ... & Weitzman, M. L. (2014). Should Governments Use a Declining Discount Rate in Project Analysis? *Review of Environmental Economics and Policy*, 8(2): 145-163.

November 6 - Lecture 21. Social Discount Rate

^ Weitzman, M. L. (1994). On the "environmental" discount rate. *Journal of Environmental Economics and Management*, *26*(2), 200-209.

November 8 - Lecture 22. Climate Change Policy and Discounting

* BGWV: Chapter 10:

^ Dietz, S., B. Groom and W.A. Pizer (2016). “Weighing the Costs and Benefits of Climate Change to Our Children.” 26 (1). pp. 133-155. ISSN 1054-8289.

November 13 - Lecture 23. Case Study: Urban Transport

* EU CBA Guide

- Methods used in Transport projects: 77-100.

- Case study: Urban transport, pp. 127-144.

^ Viscusi, W. K., & Aldy, J. E. (2003). The value of a statistical life: a critical review of market estimates throughout the world. Journal of risk and uncertainty, 27(1), 5-76.

November 15 - Lecture 24. Case Study: Water and Waste Water Infrastructure

* EU CBA Guide

- Case study: Water and Waste Water Infrastructure: pp. 179-190.

November 20 - Lecture 25. Case Study: Natural Gas Transmission Pipeline

* EU CBA Guide

- Case study: Natural Gas Transmission Pipeline: pp. 231-241.

November 27 - Lecture 26. Cost effectiveness analysis

* WHO Cost Effectiveness Guidelines

- Chapter 1: What is Generalized Cost-Effectiveness Analysis?

^ Carroll, A.E. (2014). Forbidden Topic in Health Policy Debate: Cost Effectiveness. *The New York Times*, December 15, 2014.

November 29 – Lecture 27.

Tbd – remaining issues

December 4 – Lecture 28. Review

Assignment: Prepare one question for review.