



NYU

**ROBERT F. WAGNER GRADUATE
SCHOOL OF PUBLIC SERVICE**

PADM-GP 2149

Cost-Benefit Analysis

Spring 2024

Instructor Information

- Alexander Heil, PhD
- Email: ah5701@nyu.edu
- Phone: 347-616-9039
- Office Hours: By Appointment only

Course Information

- Class Meeting Times: Wednesdays; 6:45-8:25pm
- Class Location: 194 Mercer St Room 307 Loc: Washington Square

Course Prerequisites

CORE-GP 1021, CORE-GP 1018, and CORE-GP 1011 are prerequisites. Microeconomics provides the foundation for cost-benefit analysis, and consequently the course assumes a basic background in microeconomics at the level of 1018 or higher. Students who have only taken 1018 and received a grade lower than a B may register but should expect to spend extra time learning the underlying microeconomic principles and tools.

Course Description

Cost-benefit analysis (CBA) involves the use of microeconomics to formally assess the costs and benefits of different projects or investments. CBA is required for major regulations in the United States and is frequently used as a key input into major policy decisions. Understanding its advantages and limitations, and being able to distinguish well-conducted from poor analyses, is an important skill for a policy analyst. This course provides you with the conceptual foundations and practical knowledge you will need to both conduct CBA as well as be a more thoughtful consumer of policy research. The course draws on a mixture of economic theory and real-life case studies to examine both the theoretical and practical issues involved in CBA.

Course and Learning Objectives

1. Understand the economic concepts that provide the foundation for cost-benefit analysis.
2. Learn the practical steps involved in conducting CBA.
3. Develop a set of analytical tools that can be applied to decision-making, including impact analysis, Monte Carlo simulation, sensitivity analysis, and valuation.
4. Become a more critical consumer of policy research and analysis.

Required Readings

The textbook for this course is: Boardman et. al, ***Cost-Benefit Analysis***, Fifth Edition (2019), Cambridge University Press. I am referring to this textbook as “BM”. You may use another edition of the textbook, though I caution you that some material has changed.

There will be several other materials, ranging from lecture notes/slides to peer-reviewed academic papers to news articles, to brief excerpts from other books. All of those will be available online via the course website.

Assessment Assignments and Evaluation

Attendance & Participation

Regular attendance and active participation in class are required. Students are expected to have done the readings for each lecture before class. Participation will account for 10% of the final grade. Students will be required to contribute to class discussions. Contributing to class discussions means enhancing the quality of the class experience for yourself and others. It involves making relevant, useful, and non-obvious comments, or posing pertinent questions, in clear and succinct language.

You can utilize the discussion forum feature in Brightspace to communicate with your group members about the project that you are working on. In addition, you can utilize a discussion thread to exchange information, post comments, and ask questions involving everyone else. However, there is no explicit graded component to Brightspace discussion.

5-Minute Presentation & response

You are required to provide a 5-minute presentation on a topic related to cost-benefit analysis. This presentation is supposed to contain a maximum of five PowerPoint slides accompanied by an audio file both of which will be uploaded to Brightspace, not personally presented in class. In addition, you need to respond via Brightspace to another student’s presentation and provide some critical feedback and comments, potentially sparking a discussion of that topic among a wider group.

Group Project

You will be assigned to a group by week 3 of this course. Preferences can be expressed if you have any other individuals that you desire to team up with. Please see me before making a final decision about your project and confirm that it is feasible for the project.

There are four deliverables that are part of the group project:

1. **Project Selection & Background:** Each group will provide a short memo [2-3 pages] outlining the selected project and the project's background [energy, water, transportation etc]. This memo is worth 5% of the total grade.
2. **Project Methodology & Data Needs:** Each group will submit a short memo [2-3 pages] outlining the methodologies likely to be used for the CBA as well as the necessary data. I regard this memo as a work-in-progress deliverable and that changes will likely be made before the completion of the project. This memo is worth 10% of the total grade.
3. **Presentation:** Specific requirements for the presentation [length, number of slides etc] will be provided on Brightspace. The presentation is worth 10% of the total grade.
4. **Project paper:** Each group will compose a paper that outlines and discusses the CBA. The paper will be 10-15 pages in length and include a detailed discussion of the data, assumptions, analysis, and findings of your work. Any Excel calculations need to be included as an appendix, and the Excel file also needs to be submitted electronically. Further details will be provided in class. The paper is worth 25% of the total grade.

Exams

There is one midterm exam (15% of the final grade) and a final exam (15% of the final grade). The final exam will be given during the designated finals week at the end of the semester.

Evaluation/Grading

Attendance & Participation	10%
5-minute Presentation & response	10%
Midterm Exam	15%
Group Project Selection & Background	5%
Group Project Methodology & Data Needs	5%
Group Presentation	10%
Group Paper	30%
Final Exam	15%
TOTAL	100%

Late assignment penalty: Students are expected to submit all their work on time and via Brightspace. There will be a 10% grade deduction for all work submitted late.

Course Schedule/Course Calendar

Most readings will be posted as pdf files in the weekly folders. Some changes to these anticipated readings or the course schedule in general might be made based on student interest and course progress.

General useful resources [there are many more]:

FEMA Benefit-Cost Analysis: <https://www.fema.gov/grants/tools/benefit-cost-analysis>

US AID Cost Benefit Analysis: <https://www.usaid.gov/economic-growth-and-trade/cost-benefit-analysis>

CDC Cost-Benefit Analysis: <https://www.cdc.gov/policy/polaris/economics/cost-benefit/index.html>

US DOT CBA Guidance for discretionary grant projects:

<https://www.transportation.gov/mission/office-secretary/office-policy/transportation-policy/benefit-cost-analysis-guidance>

US Army Cost-Benefit Analysis Guide:

<https://www.asafm.army.mil/Portals/72/Documents/Offices/CE/US%20Army%20Cost%20Benefit%20Analysis.pdf>

Course Overview

Week	Date	Class topics	Assignments
1	January 24	Introduction & Overview	
2	January 31	Micro review Case: ADHS	
3	February 7	Valuations Cases: Green roof & plastic bag ban	
4	February 17	Valuations [cont] Case: Heathrow Airport	First group memo [Background & scope]
5	February 21	CV Cases: Water and Wastewater, Bubble curtain	
6	February 28	PV & discounting Cases: BRT & BART	Second group memo [Data needs]
7	March 6	SDR Case: Storm Surge Barrier	Individual short presentation
8	March 13	Uncertainty Cases: Three Gorges Dam, Smart Grid, Vaccinations	Midterm exam
	March 20	SPRING BREAK	
9	March 27	Critiques of CBA Cases: Malawi internet & Bayonne Bridge	
10	April 3	Other analyses Case: HSR	Response to individual presentation
11	April 10	Summary Cases: Bees & Wastewater reclamation	
12	April 17	Discussion of topics	Group presentations
13	April 24	Discussion of topics	Group presentations
14	May 1	Discussion of topics	Group presentations Group paper
	TBD	FINAL EXAM	

Detailed Course Overview

Session 1

January 24

Topic: Course Overview & Introduction
Economic Terminology

Required Readings:

- BM 1 & 2
- European Commission *Guide to Cost-Benefit Analysis of Investment Projects Economic appraisal tool for Cohesion Policy 2014-2020*, December 2014. [This publication is a good general resource that will be useful throughout the entire course and beyond.]
- Richard O. Zerbe and Tyler Scott, A Primer for Understanding Benefit-Cost Analysis, Benefit-Cost Analysis Center, The Daniel J. Evans School of Public Affairs, University of Washington

Session 2

January 31

Topic: Economic Principles/Review of Microeconomics

Case Study: Road Transportation: Completion of the Appalachian Development Highway System

Required Readings:

- You may want to consult a standard microeconomics text [I will provide an electronic version of the Mankiw textbook].
- BM 3
- Port Authority of NY & NJ *Benefit-Cost Manual* (2019)
- Website maintained by Transportation Economics Committee at the Transportation Research Board: *Cost-Benefit Analysis*
<https://sites.google.com/site/benefitcostanalysis/> [There is a lot of excellent material here including links to tools and studies. Exploring this resource will be helpful for some of the other topics covered in this course.]
- Cambridge Systematics, *Economic Impact Study of Completing the Appalachian Development Highway System* Final Report, June 2008

Session 3

February 7

Topic: Valuation of Benefits
Overview of Benefits Methodologies
Experiments

**Case Study: Environmental Investment: Green Roof Infrastructure
Environmental Policy: Plastic Bag Ban**

Required Readings:

- BM 11 & 12
- General Services Administration, *Green roof benefits and challenges cost benefit analysis*, Chapter 3, Page 67.
- Tomalty, Ray, Bartek Komorowski and Dany Doiron *The Monetary Value of the Soft Benefits of Green Roofs* Report prepared for Canada Mortgage and Housing Corporation, 2010.
- Marsden Jacobs Associates *Plastic Bags Ban Options – Cost Benefit Analysis Report prepared for the Victorian Department of Environment, Land, Water and Planning*, NOVEMBER 2016

Session 4**February 17**

Topic: Valuation of Benefits [continued]
Direct estimation of demand curves
Indirect Market Methods

Case Study: Aviation: Heathrow Airport Expansion

Required Readings:

- BM 4, 13 & 14
- McFadden, Daniel. 1996. *Why is Natural Resource Damage Assessment So Hard?* Paper presented as the Agricultural and Resource Economics Hibbard Lecture, University of Wisconsin, Madison, April 12.
- UK House of Commons, *Expansion of Heathrow Airport*, Research paper, 09/11 4 February 2009.

Assignment Due: Project Selection & Background Memo
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Session 5**February 21**

Topic: Valuation of Benefits [continued]
Contingent Valuation
Shadow prices

**Case Study: Water& Sanitation: Global Water & Sanitation Investments
Climate Change Mitigation: Hurricane Bubble Curtain**

Required Readings:

- BM 15, 16 & 17
- Schlapfer, Felix *Contingent valuation: confusions, problems, and solutions* Ecological Economics 68:1569-1571, 2009.
- Guy Hutton, Laurence Haller and Jamie Bartram *Global cost-benefit analysis of water supply and sanitation interventions*, WHO 2007, Journal of Water & Health, 05.4, 2007.

Session 6**February 28**

Topic: Valuation of Benefits [continued]
Contingent Valuation
Present Value & Discounting

Case Study: Transit: Bus Rapid Transit Systems & Expansion of Bay Area Rapid Transit

Vehicle transportation: Vehicle mileage standards

Required Readings:

- BM 6 & 10
- *BUILDING A BETTER BART: Investing in the Future of the Bay Area's Rapid Transit System*, July 2014.
- Bay Area Rapid Transit District, and San Mateo County Transit District *BART San Francisco Airport Extension Draft Environmental Impact Report* Jan 1995.
- NCHRP Project 20-65, Task 22, *Cost/Benefit Analysis of Converting a Lane for Bus Rapid Transit Phase II Evaluation and Methodology*, April 2011.
- National Highway Traffic Safety Administration *Final Regulatory Impact Analysis: Final Rulemaking for Model Years 2024-2026 Light-Duty Vehicle Corporate Average Fuel Economy Standards* March 2022

Assignment Due: Project Methodology & Data Needs Memo
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Session 7**March 6**

Topic: Present Value & Discounting [continued]

Social Discount Rate

Case Study: Climate Change Investment: Storm Surge Barrier for New York City**Required Readings:**

- BM 6 & 10
- Juzhong Zhuang, Zhihong Liang, Tun Lin, and Franklin De Guzman *Theory and Practice in the Choice of Social Discount Rate for Cost-Benefit Analysis: A Survey* ERD ECONOMICS AND RESEARCH DEPARTMENT Working Paper SERIES No. 94 Asian Development Bank, May 2007.
- US Army Corps of Engineers *NY & NJ Harbor & Tributaries Focus Area Feasibility Study (HATS)* <https://www.nan.usace.army.mil/Missions/Civil-Works/Projects-in-New-York/New-York-New-Jersey-Harbor-Tributaries-Focus-Area-Feasibility-Study/>

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| <ul style="list-style-type: none">• Assignment Due: Short individual presentation |
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Session 8**March 13**

Topic: Uncertainty

Sensitivity Analysis

Case Study: Energy: Three Gorges Dam & Smart Grid**Health: Vaccinations****Required Readings:**

- BM 7
- Electric Power Research Institute *Guidebook for Cost/Benefit Analysis of Smart Grid, Demonstration Projects Revision 1, Measuring Impacts and Monetizing Benefits*, 1025734
- Hoen Ben, Ryan Wiser, Peter Cappers and Mark Thayer *An Analysis of the Effects of Residential Photovoltaic Energy Systems on Home Sales Prices in California* Prepared for the Office of Energy Efficiency and Renewable Energy Solar Energy Technologies Program, U.S. Department of Energy and the National Renewable Energy Laboratory and the Clean Energy States Alliance. LBNL-4476E, 2011.
- Justin Carrico, Sandra E. Talbird, Elizabeth M. La, Sara Poston, Jean-Etienne Poirrier, Jessica K. DeMartino, Cosmina Hoge, Cost-benefit analysis of vaccination against four preventable diseases in older adults: Impact of an aging population, *Vaccine*, Volume 39, Issue 36, 2021, Pages 5187-5197.

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| <ul style="list-style-type: none">• Assignment Due: Midterm Exam |
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Session 9**March 27**

Topic: Critiques of CBA

Case Study: Freight Transportation: Bayonne Bridge

Technology: Investment in internet connectivity in Malawi

Required Readings:

- BM 20
- United States Army Corps of Engineers New York District, *Bayonne Bridge Air Draft Analysis* Prepared for The Port Commerce Department The Port Authority of New York and New Jersey, September 2009.
- Kelman, Steven. *Cost-Benefit Analysis: An Ethical Critique (with Replies)* In Economics of the Environment: Selected Readings edited by Robert N. Stavins, Chapter 15, 2000.
- World Bank *Digital Malawi*
<https://www.worldbank.org/en/news/video/2018/04/23/bringing-the-internet-to-the-unconnected-in-malawi>
- Flyvbjerg, Bent and Dirk W. Bester, 2021, "The Cost-Benefit Fallacy: Why Cost-Benefit Analysis Is Broken and How to Fix It," *Journal of Benefit-Cost Analysis*, October, pp. 1-25.

Session 10

April 3

Topic: Other types of analysis
Economic Impact Analysis
Financial cost-benefit analysis
Cost effectiveness analysis
Lifecycle cost analysis

Case Study: Passenger Rail: High speed rail in California

Required Readings:

- BM 18
- Nash, Chris *Environmental and Other Co-benefits of Developing a High Speed Rail System in California: A Prospective Vision 2010-2050*, Symposium December 2-3, 2010, Enhancing the Cost Benefit Analysis of High Speed Rail, Institute for Transport Studies, University of Leeds, 2010.
- Glaeser, Edward *Running the Numbers on High Speed Rail* The New York Times Upshot Blog, August 4, 2009.

- **Assignment Due:** Response to short individual presentation

Session 11

April 10

Topic: Course summary & review

Case Study: Ecosystem Services: Bees, Wastewater reclamation

- Haruvy, Nava, *Agriculture Ecosystems & Environment Agricultural reuse of wastewater: nation-wide cost-benefit analysis*, *Agriculture, Ecosystems and Environment* 66 (1997) 113-119.
- Food and Agriculture Organization of the United Nations *Economic Valuation of Pollination Services: Review of Methods* 2006

Session 12

April 17

Topic: Peer review & discussion of student topics & projects

Assignments Due: Group Presentations

Session 13**April 24**

Topic: Peer review & discussion of student topics & projects

Assignments Due: Group Presentations**Session 14****May 1**

Topic: Peer review & discussion of student topics & projects

Assignments Due: Group Presentations
Group Project Paper
Final Exam (exact due date TBD)

NYU Brightspace

All announcements, resources, and assignments will be delivered through the NYU Brightspace site.

Academic Integrity

Academic integrity is a vital component of Wagner and NYU. All students enrolled in this class are required to read and abide by [Wagner's Academic Code](#). All Wagner students have already read and signed the [Wagner Academic Oath](#). Plagiarism of any form will not be tolerated and students in this class are expected to report violations to me. If any student in this class is unsure about what is expected of you and how to abide by the academic code, you should consult with me.

Policy on the Use of Generative AI

Use of ChatGPT and related tools is allowed in this class, but needs to be documented and properly cited. (Taking credit for writing you did not create is a violation of NYU's Academic Integrity policy.) As with all assignments, learning from the work is your responsibility. You must use the tools in a way that involves effort you learn from.

In case of using ChatGPT or other LLM, for every assignment, you should also turn in a description of:

- Which tools and techniques you used (Include your prompts, any plugins you used, etc.)
- Which parts of the assignment you used them for
- What you think you learned from the work you did, and why you think that matches the goals of the assignment

Be prepared to discuss your answers in class, or in conversation with me. I reserve the right to orally test the content of an assignment or section of the course and adjust grades accordingly if there is a meaningful difference between the quality of an assignment and the oral exam.

Henry and Lucy Moses Center for Students with Disabilities at NYU

Academic accommodations are available for students with disabilities. Please visit the [Moses Center for Students with Disabilities \(CSD\) website](#) and click on the Reasonable Accommodations and How to Register tab, or call or email CSD at (212) 998-4980 or mosescsd@nyu.edu for information. Students who are requesting academic accommodations are strongly advised to reach out to the Moses Center as early as possible in the semester for assistance.

NYU's Calendar Policy on Religious Holidays

[NYU's Calendar Policy on Religious Holidays](#) states that members of any religious group may, without penalty, absent themselves from classes when required in compliance with their religious obligations. Please notify me in advance of religious holidays that might coincide with exams to schedule mutually acceptable alternatives.