

Economics 454
Benefit-Cost Analysis
Spring 2015
Professor Robert Halvorsen

Benefit-cost analysis is a widely applied method for evaluating government projects, policies, and regulations. This course reviews the theoretical foundations of benefit-cost analysis and derives formulas and procedures for the monetization of benefits and costs, aggregation over time, valuation of uncertain benefits and costs, and aggregation over individuals. At the end of the quarter students should have a firm understanding of the issues, techniques, and practical difficulties involved in benefit-cost analysis and the ability to critically assess real-life benefit-cost analyses.

The prerequisite for this course is ECON 300 and the class discussions will assume that students have a solid understanding of intermediate level microeconomics. There will be two exams and eight required problem sets. The exams will count for 80% of the grade and the problem sets will count for 20%. The exam grade will be a weighted average of the numeric grades assigned to the individual exams, with the exam on which you do better receiving a weight of .6 and the exam on which you do worse receiving a weight of .4. Please refer to the next page for further, very important, information concerning the rules for taking the exams and policies with respect to academic honesty.

The exams will not include any computational problems beyond simple arithmetic and no calculators should be required. However, you may bring one as long as it is a basic, non-programmable, "four function," calculator. If you don't already own one, they can be purchased very inexpensively. For example, the University Book Store sells the Sharp EL-233 Basic calculator for \$2.95.

There is no textbook for this course. Lecture notes are posted on the course webpage, which can be accessed through MyUW. Practice exams, problem sets, answers to problem sets, and other handouts will also be posted there.

If you have any questions at any point during the course, my office hours during the Spring Quarter are 10:00-11:00 on Monday and Thursday and 2:00-3:00 on Friday in Savery 351. An appointment to meet at another mutually convenient time can be made in person after class, by phone at 543-5546, or by email at halvor@uw.edu. Email may also be used to ask any short questions that may arise as you review your notes or work on the problem sets.

Exam Rules

I Exam Absence Policy

1. If you are unable to make it to an exam period due to illness or another unexpected happening, do the following:
 - i. Notify me no later than the time of the exam that you are not able to take the exam and why.
 - ii. If you missed the exam for health reasons, you need to show me a note issued by a medical professional documenting the reason you missed the exam.
 - iii. If there was some other reason for missing the exam come and see me to explain the reason. You will need to show appropriate documentation. Not waking up or missing your bus/plane is not an acceptable excuse.
2. If you know that you are going to be away due to a University-related activity, such as participation in an away sport or debate, let me know well in advance so that arrangements can be made.

II Exam Taking Rules

1. Material allowed during an exam.
 - i. You must use a large bluebook for your answers.
 - ii. All books, papers, notebooks, etc., must be placed inside your backpack or other type of bag, which must be securely and fully closed. If you do not have a bag, you must place all your material out of your reach.
 - iii. Except for a basic, non-programmable, calculator, no electronic devices can be accessible during the exam. Cellular phones must be turned off before entering the class and placed in your closed bag (not in your pocket). You are not allowed to use a cellular phone during an exam. Doing so will result in the termination of your exam time.
 - iv. Baseball caps and any other kinds of headgear that conceal your eyes are not permitted.
2. Attendance and special accommodation
 - i. You are not allowed to leave the room during the exam. This includes restroom use; be sure to use the restroom before the beginning of the exam.
 - ii. If you arrive late to an exam, you cannot expect to get extra time after the official end of the exam to make up for the missing time at the beginning.
 - iii. If you have a documented disability, please show me documentation from the Office of Disability Resources for Students on the first day of class, so that I can make any arrangements required for accommodations.

III Academic Integrity

1. Exams are individual work and cheating will not be tolerated. Looking at notes or your neighbors' answers will result in the immediate termination of your exam time and a grade of zero for the exam.
2. Altering an exam before submitting it for a review of the grading, obtaining an advance copy of an examination, or arranging for a surrogate test-taker are all flagrant violations of University policy.
3. Cheating of any kind may result in expulsion from the University. The Department will follow University policy in case of academic misconduct. I strongly recommend that you review University policy at <http://www.washington.edu/uaa/advising/help/academicintegrity.php>. Students found to have engaged in academic dishonesty will be subject to sanctions, which range from a disciplinary warning to permanent expulsion from the University, depending on the seriousness of the misconduct.

Lecture and Exam Schedule

Dates shown for lectures and the mid-term exam may be revised as the Quarter proceeds.

I. Introduction

Lecture 1: March 31st

Syllabus
Background
Four-way aggregation
Standing

II. Conceptual Foundations of Benefit-Cost Analysis

Lecture 2: April 2rd

Definition of social welfare
Social welfare criterion
Pareto criterion
Potential compensation criterion
Summary

III. Aggregation over commodities

Lecture 3: April 7th

Perfectly competitive markets
Valuation principles
Demand curve, MWTP, and consumer surplus
Supply curve, MOC, and producer surplus
Aggregate Consumer and Producer Surplus
Valuation of inputs and outputs
 Market price not affected
 Project's output affects market supply
 Project's input affects market demand
Summary

Lecture 4: April 9th

Distorted Markets
Mandatory acquisition of inputs
 Eminent domain
 Conscription
Minimum wage
Per unit tax
 Revenue tax
 Externality tax

IV. Aggregation over Time

Lecture 5: April 14th

Basic principles
Rate of Time Preference
Opportunity Cost Rate
Dynamic Efficiency
Capital Markets and Dynamic Efficiency

Lecture 6: April 16th

Present value of consumption criterion
Net present value formula
Accounting for inflation
Net present value decision rules
Numerical example
Continuous discounting
Special cases of discounting formulas
 Perpetuity
 Annuity
 Annualized value

Lecture 7: April 21st

Alternative investment decision rules
 Benefit-cost ratio
 Internal rate of return
 Summary

Lecture 8: April 23rd

Sources of dynamic inefficiency
Discount rate controversy
Implications of dynamic inefficiency
Net social benefit formula
Summary

FIRST EXAM COVERS SECTIONS I THROUGH IV (Tentative date is May 7th)

V. Aggregation over States of the World

Lecture 9: April 28th

Introduction
Numeric example
Expected monetary value
Certainty equivalent
Risk aversion
Expected utility
Utility Function
Applications

Lecture 10: April 30th

Critiques of expected utility theory

Implications for project analysis

Use of EMV as approximation to CE

Outcomes not correlated with income

Degree of risk aversion

Degree of uncertainty

Size of outcomes relative to income

Outcomes correlated with income

Evaluation of benefits vs. costs

Methods used in practice:

Risk premium

Contingency allowance

Scenarios

VI. Aggregation over Individuals

Lecture 11: May 12th

Methods using explicit distributional weights

Potential compensation formula

Relation to social welfare formula

Rationales for using it

Feldstein's constant elasticity formula

Harberger's alternative cost approach

Lecture 12: May 14th

Methods using non-explicit distributional weights

Disaggregate by income level

Pareto criterion

Quasi-Pareto approach

Social welfare dominance approach

VII. Valuation of Commodities when Market Data Are Incomplete

Lecture 13: May 19th

Partial information on demand curve

Use of market data for similar commodities

Cost of alternative supply

VIII. Valuation of Commodities when Market Data Are Nonexistent

Lecture 14: May 21st

Hedonic technique

Use of market data for related commodities

Use of data on supply curves

Use of data on demand curves

Travel cost technique

Lecture 15: May 26th
Value of statistical life

Lecture 16: May 28th
Stated preference
Cost effectiveness

SECOND EXAM COVERS SECTIONS V THROUGH VIII (June 4th)