

# Spring 2020, PPHA 58102, Economic Analysis II: Introduction to Cost Benefit Analysis

**Instructor**: Robert Kaestner **Office**: Zoom Meetings

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Office Hours: Email anytime; Tues. 5:00-5:50; and by appt.

#### **Class Meetings:**

The class will be conducted using asynchronous and synchronous approaches.

Asynchronous: I have recorded the lectures and they are posted on canvas under each week's materials. The PowerPoint slide deck that is the basis of lectures are also posted along with all the readings. Students will be expected to watch the recorded lectures prior to the scheduled class meeting time (Tuesdays 6:00-8:50 pm).

Synchronous meetings using ZOOM: Students will be divided into three groups of 16 and each group will be assigned one of the following meeting times on Tuesdays (pm): 6-6:45, 7:00-7:45, and 8:00-8:45. An invitation to the meetings will be sent to students. The smaller group size will allow for greater interaction among the group. The synchronous meetings will be used to review parts of lectures that students desire greater clarification, to go over readings that are related to the lecture, for example, discuss a specific cost-benefit analysis, to discuss upcoming assignments (not to review assignments) and for general discussion.

There are two teaching assistants (TA's). Students will be assigned to one of the two teaching assistance and will attend ZOOM office hours when their TA is scheduled to hold a meeting. ZOOM meetings for office hours will be as follows:

# **Teaching Assistants:**

Jelal Younes (jmyounes@uchicago.edu) Office: Remote Meetings Office Hours: Monday 4:30-5:50 Victor Vazques Cortes (vazqueszcortes@uchicago.edu) Office: Remote Meetings Office Hours: Wednesday 4:30-5:50

# **Course Description**

Cost-benefit analysis (CBA) is the primary tool used to provide quantitative evidence to inform public policy decisions. Ideally, the use of CBA will improve the efficiency of public policy by identifying public policies/projects that create the most "value" for society. The concept of CBA is easily understood. For any project/policy under consideration (versus current state of the world), do the following: add up all of the current and future monetary costs of the project/policy; add up all of the current and future monetary benefits of the project/policy; and then compare the benefits to costs. If benefits are greater than costs, then the project/policy makes society better off and is candidate to be implemented. Seems straightforward, right? Conceptually it is straightforward, although there are a few theoretical and philosophical issues that arise that complicate the analysis. The conceptual difficulties, while important, are few in comparison, however, to the practical difficulties associated with conducting a CBA. I can think of few issues that merit the characterization "the devil is in the details" more than CBA. In this course, we will review the theoretical/conceptual foundations of CBA as applied in the public sector. We will also review some of the philosophical issues central to the validity of CBA and practical difficulties in conducting CBA.

Ideally, the course will provide a foundation to be an astute consumer of CBA and a beginner producer of CBAs.

# Relationship to Curriculum

This is the second course in economic analysis so there will be a fair amount of microeconomic analysis that is part of class.

This course is intended to build on the foundation provided in the first course in economics. Accordingly, there will be some overlap with the material presented in the first course because cost benefit analysis is based largely on microeconomic analysis of markets. To the extent that there is overlap and review, this will serve to strengthen your understanding of microeconomic analysis. However, this course will focus more on welfare economics (market surplus, market failure and government intervention). Cost-benefit analysis also depends on empirical estimates of costs and benefits, and this aspect of the course will build on your training in statistics and program evaluation. Finally, applications of cost-benefit analysis span several areas of public policy, including health, education and the environment.

#### **Course Objectives:**

- Obtain a thorough understanding of the microeconomic foundations of CBA.
- Understand the philosophical objections to CBA including criticism of the Hicks-Kaldor Criterion and concerns over the distributional impacts and how they are accounted for in CBA.
- Acquire the skill to use supply and demand analysis to measure benefits and costs tin primary and secondary markets that are used in CBA.
- Learn common techniques to value benefits when market prices do not exist.
- Have a working knowledge of the role and importance of each of the key steps in conducting a CBA, such as the issue of who has standing, the importance of transparency and the use of sensitivity analysis.
- Understand the most common practical problems that arise in CBA including the appropriate discount rate, uncertainty, the efficacy of contingent valuation, and how to measure the statistical value of a life.

#### **Course Policies:**

#### Use of Web and Email:

I will post course materials to the university's CANVAS web-based course management system: the URL is <a href="http://courses.uchicago.edu/">http://courses.uchicago.edu/</a>. Students are responsible for any and all material posted there. I encourage the use of email and try to respond in a timely fashion. My email address is <a href="https://courses.uchicago.edu">kaestner@uchicago.edu</a>. Please be sure to set your notifications on CANVAS so that you receive all communications from me sent through this platform.

# **Attendance (By ZOOM Meeting Platform):**

As working professionals, I understand that work may sometimes require you to miss a class, although with a 10-week quarter, any absence represents a significant loss of time. Students who need to miss class because of work (or other reasons) shall notify me in a timely manner as to when they will be absent. I will make every reasonable effort to honor the request, not penalize the student for missing the class, and if an examination or project is due during the absence, give the student an exam or assignment equivalent to the one completed by those students in attendance. A similar process for notifying me should be followed for students who wish to observe their religious holidays. Again, I will make every reasonable effort to honor the request and not penalize the student for missing the class.

#### Late Assignments and Missed Exams:

Unless explicitly agreed upon in advance, late assignments will not be accepted.

#### **Disability Accommodation:**

The University of Chicago seeks to provide an environment conducive to learning, teaching, working, and conducting research that values the diversity of its community. The University strives to be supportive of the academic, personal, and work-related needs of each individual and is committed to facilitating the full participation of students with a disability in the life of the University. Students with a disability, particularly those that require an accommodation, should contact Student Disability Services (https://disabilities.uchicago.edu/).

#### **Course Requirements**

#### **Books:**

• Anthony E. Boardman, David H. Greenberg, Aidan R. Vining, and David L. Weimer, *Cost-Benefit Analysis: Concepts and Practice*, 5th ed. 2018, (Cambridge University Press) ISBN: 9781108415996 (Cheaper 4<sup>th</sup> edition is available, cheaper and very similar—but if you go this route it is at your own risk)

#### **Assignments and Exams:**

Grades will be based on eight, take-home assignments. Assignments will be distributed on the following days and will be due by the beginning of class of the next week: 4/7, 4/14, 4/21, 5/5, 5/12, 5/19, 5/26, and 6/2.

#### **Grading:**

Grades for assignments are 4=excellent (professional preparation, answered specific questions directly and germanely, provided interesting analysis/insight), 3=good (professional preparation, answered specific questions directly and in most cases germanely), 2=average (professional preparation, answered specific questions directly but with some error). 1=unacceptable (unprofessional preparation, incomplete answers to specific questions, mostly incorrect answers).

Final grades are letter grades and follow the common grading policy of University and Harris Public Policy: https://registrar.uchicago.edu/records/grading/. The mapping of numerical grades to letter grades is as follows:

A: >=30, A-: 28-29, B+: 25-27, B: 21-24, B-: 19-20, C+: 17-18, C: 15-16, C-:<15e

# Academic Integrity: (https://studentmanual.uchicago.edu/Policies)

"It is contrary to justice, to academic integrity, and to the spirit of intellectual inquiry to submit the statements or ideas of work of others as one's own. To do so is plagiarism or cheating, offenses punishable under the University's disciplinary system. Because these offenses undercut the distinctive moral and intellectual character of the University, we take them very seriously and punishments for them may include expulsion from the University."

"Proper acknowledgment of another's ideas, whether by direct quotation or paraphrase, is expected. In particular, if any written or electronic source is consulted and material is used from that source, directly or indirectly, the source should be identified by author, title, and page number. Any doubts about what constitutes "use" should be addressed to the instructor."

#### **Brief Course Outline**

April 7	Introduction to CBA
April 14	Microeconomics Review
April 21	Hicks Kaldor Criterion, CBA Decision Rules
April 28	Market Failure and Government Failure
May 5	Measuring benefits and costs in primary markets
May 12	Measuring benefits and costs in secondary markets
May 19	Discounting
June 2	Indirect Methods to Measure Costs and Benefits
June 9	Stated Preference and Contingent Valuation

Detailed Course Outline

Important Note: Changes may occur to the course schedule depending on the progress made in class and in response to ideas/issues that arise as the class progresses. When changes are made, students will be notified via Canvas and in-class announcement.

Date	Topic/Readings
April 7	What is CBA?
Арти /	History of CBA and Codification of CBA for Public Policy The Basic Steps of CBA  • Boardman et al. Chapter 1
	<ul> <li>Scott Farrow, How Not to Lie with Benefit-costs Analysis, <i>The Economists Voice</i>, 10:45-50</li> <li>Dudley, S., Belzer, R., Blomquist, G., Brennan, T., Carrigan, C., Cordes, J., Zerbe, R. (2017). Consumer's Guide to Regulatory Impact Analysis: Ten Tips for Being an Informed Policymaker. Journal of Benefit-Cost Analysis, 8(2), 187-204.</li> </ul>
	<ul> <li>(Skim) Office of Management and Budget. Circular A-4. 2003.         https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/circulars/A4/a-4.pdf     </li> <li>(Skim Table of Contents and Chapters) EPA, Guidelines for Preparing Economic Analyses, <a href="https://www.epa.gov/environmental-economics/guidelines-preparing-economic-analyses">https://www.epa.gov/environmental-economics/guidelines-preparing-economic-analyses</a></li> </ul>
	An Application of CBA: Child-Parent Center for Early Education  • Reynolds, A. J., Temple, J. A., White, B. A., Ou, S. R., & Robertson, D. L. (2011). Age 26 costbenefit analysis of the child-parent center early education program. <i>Child development</i> , 82(1), 379−404. doi:10.1111/j.1467-8624.2010.01563.x
Assignment Due April 14 by 6 pm	Read:  • Regulatory Impact Analysis for the Proposed Emission Guidelines for Greenhouse Gas Emissions from Existing Electric Utility Generating Units; Revisions to Emission Guideline Implementing Regulations; Revisions to New Source Review Program (https://www.epa.gov/sites/production/files/2018- 08/documents/utilities ria proposed ace 2018-08.pdf)
	Using Boardman et al.'s 10 Basic Steps, identify (note if step not included) and briefly discuss each step used in the analysis highlighting any incomplete, incorrect, controversial or omitted elements. Almost all of the information necessary to complete assignment is contained in Executive Summary and Introduction. You can review other chapters if you want to provide more detail about a step.
April 14	Minimum 1-page and Maximum 3-pages (1-inch margins, 11-12 pt. font)  Demand: Measuring Willingness to Pay and Consumer Surplus  Compensating and Equivalent Variation (aka Willingness-to-pay versus Willingness-to-accept)  • Boardman et al. Chapter 3 and Chapter 3, Appendix A
	Supply: Measuring Opportunity Cost and Producer Surplus  Equilibrium and Market Surplus  Boardman et al. Chapter 3
	<ul> <li>Applying Supply and Demand to Analyze Markets and Identify Changes in Surplus</li> <li>Minimum wage and rent control</li> <li>Tobacco taxes and child care subsidies</li> <li>Legalization of marijuana: complements and substitutes</li> </ul>
Assignment Due April 21 by 6 pm	Read:  • Should Public Transit Be Free? More Cities Say, Why Not? New York Times, 1/14/20 (https://www.nytimes.com/2020/01/14/us/free-public-transit.html)
	Use supply and demand analysis to examine the consequences of making public transit free in a city. Analyze the market for public transit rides and for one other market that may be affected by the policy. For each market identify the change in consumer surplus, producer surplus, and government surplus.
	Minimum 1-page and Maximum 2-pages (1-inch margins, 11-12 pt. font) including graphs. You need to include supply and demand graphs. You can draw them by hand and there does not need to be specific numbers in graphs or in answers. It is sufficient to show analytically what are the consequences.

# April 21 Fundamental Theorems of Welfare Economics Hicks-Kaldor Criterion and Alternatives The Cost of Public Funds • Boardman et al. Chapters 2 and 19 • Banzhaf, Spencer. 2011. "Regulatory Impact Analyses of Environmental Justice Effects," Journal of Land Use and Environmental Law 27(1), 2011, pp. 1-30 • (Read Casually) Joseph Persky. 2001. Cost-benefit Analysis and the Classical Creed. Journal of Economic Perspectives, Volume 15, Number 4, Pages 199 –208

#### CBA Decision Rules

 World Bank, "Cost-Benefit Analysis: Evaluation Criteria (Or: "Stay away from the IRR")", Knowledge Brief, 2008.

# Assignment Due April 28 by 6 pm

#### Read the following:

• Diamond et al., 2019. "The Effects of Rent Control Expansion on Tenants, Landlords, and Inequality: Evidence from San Francisco," American Economic Review, 109:3365-94

Discuss why the article talks about rent control as a type of insurance for tenants. How does rent control affect the quantity and price of rental and condominium apartments (use supply and demand graph for this and assume there are two markets: rental market and condo market)? Also, identify changes in consumer and producer surplus in each market. Using the results of the study, discuss who (what identifiable groups) benefits/loses from rent control and if you support rent control?

Minimum 1-page and Maximum 2-pages (1-inch margins, 11-12 pt. font) including graphs.

# April 28

#### Market Failures and Policies to Address Them:

# Externalities, Internalities, Information Problems, Imperfect Competition, Public Goods

• Boardman et al. Chapter 5

#### **Government Failure**

• (Read Casually Chapters 1,2, and 6-8) Winston, Clifford. 2006. Government Failure Versus Market Failure. Brookings Institution Press and AEI.

# **CBA** of Sugar-sweetened Beverages

- Hunt Allcott & Benjamin B. Lockwood & Dmitry Taubinsky, 2019. "Should We Tax Sugar-Sweetened Beverages? An Overview of Theory and Evidence," Journal of Economic Perspectives, vol 33(3), pages 202-227
- John Cawley, David Frisvold, David Jones. 2019. The Impact of Sugar-Sweetened Beverage Taxes on Purchases: Evidence from Four City-Level Taxes in the U.S. NBER Working Paper No. 26393

# May 5

# Valuing Inputs and Outputs in Primary Market

• Boardman et al. Chapters 4, 5 and 6

# **Bus Subsidies in England**

• Abrantes, Pedro. (2015). The Economic Value of Bus Subsidy. Transportation Research Procedia. 8. 247-258. 10.1016/j.trpro.2015.06.059.

# Assignment Due May 12 by 6 pm

#### Read:

Bartik, T., Hershbein, B., & Lachowska, M. (2016). The Merits of Universal Scholarships: Benefit-Cost Evidence from the Kalamazoo Promise. Journal of Benefit-Cost Analysis, 7(3), 400-433. doi:10.1017/bca.2016.22

What is the primary market? How would you conduct a cost-benefit analysis using the primary market? Be specific about how you would come up with a monetary value of benefits and costs and why those benefits and costs are conceptually correct. Does Bartik et al. (2016) conduct the cost-benefit analysis using impacts in the primary market? If not, then why not?

Minimum 1-page and Maximum 2-pages (1-inch margins, 11-12 pt. font) including graphs.

#### May 12

# Valuing Inputs and Outputs in Secondary Markets

• Boardman et al. Chapter 7

#### Are Jobs a Benefit?

 (Read Casually) Bartik, Timothy J. "Including Jobs in Benefit-Cost Analysis" Annual Review of Resource Economics 4 (2012): 55-73.

#### **Co-benefits: Mercury and Air Toxics Standards**

- (Read Executive Summary and Chapter 1) Regulatory Impact Analysis for the Final Mercury and Air Toxics Standards, https://www3.epa.gov/ttnecas1/regdata/RIAs/matsriafinal.pdf
- Sunstein, Cass: <a href="https://www.bloomberg.com/opinion/articles/2018-10-03/epa-mercury-regulations-should-reflect-all-benefits-and-all-costs">https://www.bloomberg.com/opinion/articles/2018-10-03/epa-mercury-regulations-should-reflect-all-benefits-and-all-costs</a>
- Bloomberg, Scott: <a href="https://www.nera.com/content/dam/nera/publications/2016/Scott Bloomberg Co-benefits BNA Insights Published.pdf">https://www.nera.com/content/dam/nera/publications/2016/Scott Bloomberg Co-benefits BNA Insights Published.pdf</a>

# Assignment Due May 19 by 6 pm

#### Read the following:

• Bento et al., "Flawed Analyses of U.S. Auto Fuel Economy Standards," Science, 2018, 362 (6419), 1119–1121 (and supplemental material)

Use supply and demand to analyze how rollback of fuel economy standards affects the market for new and used cars and how that analysis leads to the major criticism of the 2018 cost-benefit analysis. Why are impacts in secondary markets included in this cost-benefit analysis? What are the secondary benefits associated with the rollback? Discuss the primary reasons for why the secondary benefits of the rollback are underestimated.

Approximately 2-pages (1-inch margins, 11-12 pt. font) including graphs. No more than 3 pages.

# **May 19**

#### **Discounting**

- Boardman et al. Chapters 9 and 10
- Arrow, K., M. et al. Cropper, C. Gollier, B. Groom, G. Heal, R. Newell, W. Nordhaus, R. Pindyck, W. Pizer, P. Portnoy, T. Sterner, R.S.J. Tol, and M. Weitzman; "Determining Benefits and Costs for Future Generations," Science 26 July 2013; Vol. 34: 349-350
- (Read Sections 1-3) Drupp M, Freeman M C, Groom B and Nesje F (2018). 'Discounting Disentangled'. Forthcoming in the American Economic Journal: Economic Policy. Working paper version: Grantham Research Institute on Climate Change and the Environment Working Paper No. 172
- Council of Economic Advisers, "Discounting For Public Policy: Theory And Recent Evidence On The Merits Of Updating The Discount Rate," January 2017

#### Social Cost of Carbon and the Discount Rate

• Richard Newell, Unpacking the Administration's Revised Social Cost of Carbon

# Assignment Due May 26 by 6 pm

Read the first 17 pages of:

Chapter 9: National Academies of Sciences, Engineering, and Medicine. 2017. Valuing Climate Damages: Updating Estimation of the Social Cost of Carbon Dioxide. Washington, DC: NAP

Why are the estimates of the social discount rates in Table 6-1 always less than the 7% real discount rate recommended (e.g., OMB Circular A-4) to use in CBA (RIA) of federal government projects? What factors account for the variation in the social discount rates in Table 6-1-briefly discuss? Assume that 50 years from now, climate change will generate \$100 million in damages and 100 years from now climate change will generate \$400 million in damages. Using the discount rates of Stern (2007) and Nordhaus (2008) calculate the present value of these damages in each year and compare. Discuss implications.

Approximately 2-pages (1-inch margins, 11-12 pt. font). No more than 3 pages.

#### May 26

#### Measuring Program/Policy Impacts: Revealed Preference and Indirect Methods

Boardman et al. Chapters 14, 15, 17

#### **Measuring the Value of Communication Antennas**

Locke, S. L.: Blomquist, G. C. The Cost of Convenience: Estimating the Impact of Communication Antennas on Residential Property Values. Land Economics, v. 92, n. 1, p. 131-147, 2016

# Measuring the Value of a Statistical Life

- Cropper, Maureen and Hammitt, James K. and Robinson, Lisa A., Valuing Mortality Risk Reductions: Progress and Challenges (October 2011). Annual Review of Resource Economics, Vol. 3, Issue 1, pp. 313-336, 2011.
- Aldy, J. E., & Viscusi, W. K. (2008). Adjusting the Value of a Statistical Life for Age and Cohort Effects. Review of Economics and Statistics, 90 (3), 573-581.

# Assignment Due June 2 by 6 pm

#### Read:

C. Arden Pope III, Jacob S. Lefler, Majid Ezzati, Joshua D. Higbee, Julian D. Marshall, Sun-Young Kim, Matthew Bechle, Kurtis S. Gilliat, Spencer E. Vernon, Allen L. Robinson, and Richard T. Burnett 2019. Mortality Risk and Fine Particulate Air Pollution in a Large, Representative Cohort of U.S. Adults Environmental Health Perspectives 127:7 CID: 077007 https://doi.org/10.1289/EHP4438

Discuss the implications of results presented in Figure 2 with respect to credibility of the conclusions. Discuss the implications of Figure 3 for measuring the mortality costs of pollution and what value of a statistical life should be used and why.

Approximately 2-pages (1-inch margins, 11-12 pt. font) including graphs. No more than 3 pages.

#### June 2

# Measuring Program/Policy Impacts: Stated Preference and Contingent Valuation

- Boardman et al. Chapters 13, 16
- Catherine L. Kling, Daniel J. Phaneuf and Jinhua Zhao, 2012. "From Exxon to BP: Has Some Number Become Better Than No Number?" Journal of Economic Perspectives Vol. 26, No. 4, pp. 3-26. http://www.aeaweb.org/articles.php?doi=10.1257/jep.26.4
- Carson, Richard. 2012. "Contingent Valuation: A Practical Alternative When Prices Aren't Available" Journal of Economic Perspectives Vol. 26, No. 4, pp. 27-42. http://www.aeaweb.org/articles.php?doi=10.1257/jep.26.4
- Hausman, Jerry. 2012. "Contingent Valuation: From Dubious to Hopeless" Journal of Economic Perspectives Vol. 26, No. 4, pp. 43-56. http://www.aeaweb.org/articles.php?doi=10.1257/jep.26.4
- Tuncel, Tuba and James K Hammitt. "A new meta-analysis on the WTP/WTA disparity." Journal of Environmental Economics and Management, 175-187.

# Measuring the Value of Curbside Recycling

Koford, Brandon C., Glenn C. Blomquist, David M. Hardesty, and Kenneth R. Troske. 2012. "Estimating Consumer Willingness to Supply and Willingness to Pay for Curbside Recycling." Land Economics 88 (4): 745–63

# Measuring the Value of Corporate Crime

Cohen, M. (2015). Willingness to Pay to Reduce White-Collar and Corporate Crime. Journal of Benefit-Cost Analysis, 6(2), 305-324

# Assignment Due June 9 by 6 pm

#### Read:

Haefele et al. "Total Economic Valuation of the National Park Service Lands and Programs: Results of a Survey of The American Public" (https://www.nationalparks.org/sites/default/files/NPS-TEV-Report-2016.pdf)

Critically discuss three issues that you think limited the value of the study.

Approximately 2-pages (1-inch margins, 11-12 pt. font) including graphs. No more than 3 pages.