

Public Affairs 881: Cost-Benefit Analysis
Fall 2013

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Class Meetings: Mondays/Wednesdays
8:00 to 9:15 a.m.
Social Science 6240

Office Hours: Mondays and Wednesdays, 10:00 a.m.—noon, 215 North Hall
Mondays 4:00 p.m.— 5:00 p.m., 215 North Hall
Appointments for other times welcome.

Course Objectives: Cost-benefit analysis (CBA) has both narrow and broad applications. In its narrow application, it serves as a decision rule for selecting policies for maximizing economic efficiency. In its broader application, it provides concepts, techniques, and conventions for assessing economic efficiency, or components of economic efficiency, when efficiency is only one of the social goals relevant to policy choice. This course provides the conceptual foundations and craft skills to prepare you to be sophisticated consumers and producers of CBA.

Prerequisites: Some familiarity with the basic concepts of microeconomics and statistics is assumed. Those taking the course should have completed Public Affairs 880 and Public Affairs 819, or their equivalents.

Course Requirements and Grades: Four requirements promote the course objectives:

First, I expect active participation in class and diligence in the completion of problem sets and other assignments. Our class time will be split between lectures and discussion. If this format is to be effective for both you as an individual and your classmates, then you must be prepared to participate in discussion. Sometimes discussion will be around assigned problems, including some that require reading about topics not yet covered in lecture. It is important that you put effort into these problems so that you can fully participate in their discussion. The effort will also reward itself in terms of the depth of your understanding of course material. *Ten percent* of your course grade will be based on class participation and assignments.

Second, an in-class midterm examination (**October 28**) will give you an opportunity to demonstrate your mastery of the basic concepts of CBA. *Thirty percent* of your course grade will be based on your performance on the midterm examination.

Third, although the theory of CBA can be easily learned in the classroom, the craft for actually doing it in a complex world, with inevitable limitations on the availability time, data, and expertise, probably cannot. To get practice in actually doing CBA, you will participate in a team project on a real issue for an actual client. During the semester, each team will make several oral and written progress reports. A complete report is due on **December 2**. December 2, 4, 9, and 11 will be devoted to presentation of the projects. A revised draft is due **December 20** in PDF

format. You should also plan on participating in a briefing on the final report at your client's convenience, most likely after the end of the semester. As most policy analysts work in teams, you should view your participation in the project as an important part of your development as a policy analyst. I expect team members to be professional in interactions with their clients as well as among themselves. I also expect each team member to be fully engaged with the project, and I reserve the right to penalize individuals who are not fully familiar with their teams' products. *I will ask each team member to evaluate the effort and contributions of other team members*, and I will consider the responses in assigning individual grades. *Forty percent* of your course grade will be based on the team project. I cannot overemphasize the importance of the effort you put into the project for your future ability to do cost-benefit analysis. Please do not take this course if you are unwilling or unable to give the project a high priority. I reserve the right to lower the grade of anyone who does not contribute fully to his or her team. I also reserve the right to give a failing grade in the course for anyone who acts unprofessionally.

Fourth, there will be a take-home final examination **distributed December 20 and due December 22 at noon**. *Twenty percent* of your course grade will be based on the final examination. If class attendance after the midterm examination is regular (almost everyone attending each class), and a majority of the class wishes, then I will waive the final and allocate its grade percentage to the final project.

Textbook: We will make extensive use of the following text (BGVW):

Anthony E. Boardman, David H. Greenberg, Aidan R. Vining, and David L. Weimer, *Cost-Benefit Analysis: Concepts and Practice*, 4th ed. (Upper Saddle River, New Jersey: Prentice Hall, 2011).

Copies are available in the bookstore and a copy is on reserve at the College Library. Other readings and class materials will be made available at learn@UW.

Team Projects: The topics for team projects are as follows:

1. Microgrids, small power systems that integrate self-contained generation, distribution, sensors, energy storage, and energy management software with a seamless and synchronized connection to a utility power system, can operate independently within that system. Microgrid systems currently are relatively expensive, but continued deployment and research are likely to lower their costs. As microgrids facilitate the integration of renewable energy into the utility power system, they offer potential for improving energy efficiently domestically. In addition, they have great potential for use in developing countries with limited power system infrastructures. However, microgrids have been largely unaddressed in state and federal policies. To support the development of policy concerning microgrids, your task is to assess the costs and benefits of a microgrid selected by the client. Your analysis should consider both financial and social costs and benefits. It should be implemented with software that can be applied to other sites in the future. Client: Gary Radloff, Wisconsin Energy Institute, gradloff@wbi.wisc.edu.

2. Firewood can harbor many different kinds of invasive pests and diseases that are harmful to Wisconsin's trees in both forest and urban settings. Pests such as gypsy moths, oak wilt, and emerald ash borers that hitchhike on firewood are making their way easily into previously uninfested areas. This poses a serious threat to trees throughout the state. To protect communities, parks, and forests from firewood hitchhikers, the Wisconsin Department of Natural Resources (DNR) prohibits bringing firewood onto any DNR properties from more than 25 miles away from the property or from outside of Wisconsin (unless purchased from a Wisconsin certified dealer). The DNR is using a "stepped enforcement" protocol that emphasizes education and voluntary compliance. There are a number of ways to educate the public about firewood restrictions, including television and radio ads, billboards, and instruction from rangers. With limited resources available for enforcement, the DNR would like to know which approaches are most effective in educating the public about firewood restrictions and gaining compliance with the firewood rule. Some survey data relevant to enforcement collected by the DNR may be helpful in providing an answer. Your task is to assess enforcement approaches in terms of their net benefits. Client: Angela Rampton, Policy Advisor, Division of Forestry, Wisconsin Department of Natural Resources, Angela.Rampton@wisconsin.gov.

3. The Wisconsin Government Accountability Board (G.A.B.) is interested in a cost-benefit analysis of online versus paper-based voter registration. In Wisconsin, current statutes require an elector to complete a voter registration application form, and submit the original form with a "wet" signature. The form requires the elector's full name, date of birth, residential address for voting purposes, and Wisconsin driver license or Wisconsin Department of Transportation issued ID number. Municipal clerks are required to retain the original form and to enter the information into the Statewide Voter Registration System (SVRS). In September 2012, the G.A.B. released the MyVote Wisconsin website (myvote.wi.gov), which permits voters to complete a registration form online, print and sign the form, and return it to their municipal clerk. The information that is entered online is automatically populated into the SVRS as a pending application for the clerk to approve once after the signed paper form is received and approved. Fifteen states allow paperless voter registration (12 states have online registration, and three have passed legislation but have not yet implemented it). This online voter registration process typically relies on using voters names, dates of birth, and State ID numbers to verify their identity and to obtain digitized signatures from driver license records. Establishing the necessary electronic information sharing systems between the G.A.B. and the Department of Motor Vehicles may have significant startup costs, but present opportunities for long-term cost savings. Online voter registration could potentially reduce labor costs for entering registrations into SVRS, reduce the need to produce and retain forms, reduce the need for Special Registration Deputies, reduce data quality issues, and reduce the number of provisional ballots cast. Conduct a cost-benefit analysis of online registration in Wisconsin. Client: Brian M. Bell, Elections Data Manager, Wisconsin Government Accountability Board, Brian.Bell@wi.gov.

4. The Wisconsin Government Accountability Board (G.A.B.) is interested in a cost-benefit analysis of using mass mailings to voters versus using the U.S. Postal Service's National Change of Address (NCOA) database to conduct voter list maintenance, as well as completing the list

maintenance process by the G.A.B. versus at the county or municipal level. Within 90 days after a general election (every two years), each municipal clerk is required to review voter records and identify those who have not voted in the past four years. Clerks can mail those identified voters a notice that their registration is suspended. Voters can sign and return the card and ask for their registration to be continued. If the card is returned as undeliverable, or not returned within 30 days, then the voter registration is inactivated and the name will not appear on future poll lists without completing a new registration application. Alternatively, clerks can use information available through the Postal Service's NCOA to update voter records. This process does not require sending any documentation to the voter, but there are costs associated with accessing the NCOA database. Voter record maintenance using NCOA must be done at least every two years during the 60 days preceding the close of registration for the partisan primary. A 2007 study completed by the Legislative Reference Bureau noted that several municipalities were not complying with Wisconsin Statutes regarding voter list maintenance, and as a result, after the 2008 Presidential and General Election, the G.A.B. voluntarily took on the responsibility of mailing the notifications to voters statewide. Conduct a cost-benefit analysis of four alternatives: G.A.B. use of the NCOA, G.A.B. mass mailing, county use of the NCOA, and county mass mailings. Client: Brian M. Bell, Elections Data Manager, Wisconsin Government Accountability Board, Brian.Bell@wi.gov.

5. Blood products are often irradiated before transfusion to prevent graft-versus-host-disease. The most commonly used technology for blood irradiation is sealed-source cesium-137 in compound with chloride. As this cesium-chloride radiation source can potentially be diverted for use in a radiation dispersion device, a so-called dirty bomb, it may be desirable to adopt policies to encourage or require X-ray technology as a replacement for cesium-chloride irradiators. Your task is to assess such replacement from the perspectives of the operator of a cesium chloride blood irradiator (business plan analysis) and society (cost-benefit analysis). Your assessment should facilitate the comparison of X-ray technology with cesium-chloride devices with different years of remaining operation and numbers of blood units processed annually. As monetizing the risk of cesium-chloride diversion will not be possible in the context of this project, your cost-benefit analysis should be framed so that it can answer the question: How large would the monetized value of the annual risk per device of cesium-chloride diversion have to be to produce positive net benefits from replacement? Clients: Kristina Hatcher, DOE-HQ Lead, Kristina.Hatcher@nnsa.doe.gov and Whit Creer, Project Manager, Rad Replacement Project, Global Threat Reduction Initiative, wjcreer@gmail.com.

6. Wisconsin state agencies spend substantial amounts annually procuring food for facilities such as hospitals and prisons. Currently, these purchases are made without nutritional guidelines or local procurement preferences. Nutritional guidelines could potentially improve the diet, and therefore the health, not only of people served by these state agencies but also of their employees. Increased local purchasing can potentially contribute to better nutrition and a more vibrant local economy. Your task is to review efforts to implement nutritional standards and local procurement requirements in other states, develop policy alternatives for Wisconsin, and assess the social costs and benefits of each of these alternatives. In addition, you should assess the fiscal impacts

of the alternative policies for the state in both the short- and long-term. Client: Carly Hood, Population Health Service Fellow, Health First Wisconsin, chood@healthfirstwi.org.

7. The Global Livingston Institute (GLI) seeks to promote a more global understanding of poverty and healthy communities by organizing travel and experiential learning opportunities in East Africa. It recently opened the Livingston Retreat Center on Lake Bunyonyi in the Kabale District of Southwestern Uganda. The facility has three major goals: (1) To provide a creative thinking space for scholars, students and community leaders to convene and address complex social issues— central to the communities that the Global Livingston Institute currently serves, these headquarters would afford individuals and groups both a regional location for meeting as well as a base in which to connect with other regions in Uganda and Rwanda. (2) To provide a community center for local non-government organizations such as Mindful Markets to house volunteers and to congregate for local activities. (3) To create a viable business where profits generated from groups and other activities conducted at the center will ultimately be reinvested back into the community for health, education, arts, and culture. Your task is to develop alternatives for using the facility that are both financially viable and maximize social net benefits. You should develop alternatives in conjunction with GLI staff and then assess them through cost-benefit analysis. Client: John Pirkopf, GLI, john@globallivingston.org.

I will evaluate each team in terms of how much progress it makes in light of the scope of the topic, the complexity of the issue, and the availability of information. My assessment will reflect comments from the client on the usefulness of the product and the professionalism of the team when available.

Tentative Schedule

Introduction (Sept. 4)

BGVW, Chapter 1

Scan: EPA Guidelines

(<http://yosemite.epa.gov/ee/epa/eed.nsf/webpages/Guidelines.html>)

Team projects organized

Note: Projects from several previous years and spreadsheets for exercises are available at learn@UW.

Class Discussion of Team Projects from Previous Years (Sept. 9)

BGVW, Chapter 11

Conceptual Foundations (Sept. 11 and 16)

BGVW, Chapter 2 (Prepare exercises 2, 3, and 4 for class)

Valuing in Primary Markets (Sept. 18, 23, and 25)

BGVW, Chapter 3 (Prepare exercises 1 and 2 for class)

BGVW, Chapter 4 (Prepare exercises 1, 2, and 3 for class)

Spreadsheet Exercise 3.3

Spreadsheet Exercise 4.4

Project report due (Sept. 25): Each team should prepare a five- to seven-page (double-spaced) report that describes the issue being addressed in the project and sketches a plan for completion.

Valuing in Secondary Markets (Sept. 30)

BGVW, Chapter 5 (Prepare exercises 1, 2, and 3 for class)

Spreadsheet Exercise 5.4

Basics of Discounting for Time/Social Discount Rate (Oct. 2 and 7)

BGVW, Chapter 6 (Prepare exercises 1, 3, and 4 for class)

BGVW, Chapter 10 (Prepare exercise 1 for class)

Scan: OMB Guidelines

(http://www.whitehouse.gov/omb/circulars_a004_a-4)

UK Guidelines

(<https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government>)

Canadian Guidelines

(<http://www.tbs-sct.gc.ca/rtrap-parfa/analys/analys07-eng.asp#Toc178397874>)

CPI Calculator

(http://www.bls.gov/data/inflation_calculator.htm)

Spreadsheet Exercise 6.6

Project report due (Oct. 7): Each team should prepare an annotated bibliography of the ten most relevant studies to its topic that it can find. Give highest priority to finding published CBAs on similar topics.

Expected Values, Value of Information, and Sensitivity Analysis (Oct. 9, 14, 16)

BGVW, Chapter 7 (Prepare exercises 1, 3, 4, and 6 for class)

David L. Weimer and Mark A. Sager, “Early Identification and Treatment of Alzheimer’s Disease: Social and Fiscal Outcomes,” *Alzheimer’s & Dementia* 5(3) 2009, 215–226.

(Oct. 14) Hand-in write-up of exercise 5 — Spreadsheet Exercise 7.5

Project report due (Oct 16): Each team should prepare a list of the relevant categories of costs and benefits, and indicate how each can be measured. *Read BGVW, Chapter 16, to get an idea of available shadow prices from secondary sources.*

Option Price and Option Value (Oct. 21)

BGVW, Chapter 8

Spreadsheet Exercise 8.3

Life-Cycle Analysis (Oct.23)

Joule A. Bergerson and Lester B. Lave, “Should We Transmit Coal, Gas, or Electricity: Cost, Efficiency, and Environmental Implication,” *Environmental Science and Technology* 39(16) 2005, 5905–5910.

Visit: <http://www.eiolca.net> and do the tutorial for the EIO-LCA model.

Midterm Examination (Oct. 28)

Estimation Based on Revealed Preferences: Demonstrations and Experiments (Oct. 30)

BGVW, Chapter 12 (Prepare exercise 2 for class)

Estimation Based on Revealed Preferences: Natural Experiments (Nov. 4 and 6)

BGVW, Chapter 13 (Prepare exercises 1 for class)

BGVW, Chapter 14 (**Bring write-up of exercise 3 to class on Nov. 6**)

Spreadsheet Exercise 13.2

David L. Weimer and Michael Wolkoff, “School Performance and Housing Values: Using Non-Contiguous District and Incorporation Boundaries to Identify School Effects,” *National Tax Journal* 54(2) 2001, 231–253.

W. Kip Viscusi and Joseph E. Aldy, “The Value of a Statistical Life: A Critical Review of Market Estimates Throughout the World,” *Journal of Risk and Uncertainty* 27(1) 2003, 5–76.

Trudy Ann Cameron, “Euthanizing the Value of a Statistical Life,” *Review of Environmental Economics and Policy* 4(2) 2010, 161–178.

Contingent Valuation (Nov. 11, 13 and 18)

BGVW, Chapter 9 (Passive use)

BGVW, Chapter 15 (Prepare exercise 2 for class)

Prior to beginning of section, complete survey at <http://www.unm.edu/~rberrens/gcc/>

EcoResources Consultants, *Evidence of the Socio-Economic Importance of Polar Bears for Canada*, June 2011.

Bruce Johnson and John C. Whitehead, “Value of Public Goods from Sports Stadiums: The CVM Approach,” *Contemporary Economic Problems* 18(1) 2000, 48–58.

Dale Whittington, “Improving the Performance of Contingent Valuation Studies in Developing Countries,” *Environmental and Resource Economics* 22(1&2) 2002, 323–367.

Mark Dickie and Victoria L. Messman, “Parental Altruism and the Value of Avoiding Acute Illness: Are Kids Worth More than Parents?” *Journal of Environmental Economics and Management* 48(3) 2004, 1146–1174.

James K. Hammitt and Kevin Haninger, “Valuing Fatal Risks to Children and Adults: Effects of Disease, Latency, and Risk Aversion,” *Journal of Risk and Uncertainty* 40(1) 2010, 57–83.

Cost-Effectiveness (Nov. 20)

BGVW, Chapter 18 (Prepare exercise 2 for class)

Spreadsheet Exercise 18.3

Shadow Prices in Developing Countries (Nov.25)

BGVW, Chapter 17

Spreadsheet Exercise 17.4

Project Consultation (Nov. 27)

Presentations (Dec. 2, 4, 9, and 11)

Team reports due December 2

Revised project report (PDF) and explanation of revisions due December 20

Evaluation of teammates due December 20

Final Examination (distributed December 20 by e-mail; due at noon December 22)