

**Public Affairs 881: Cost-Benefit Analysis**  
**Fall 2014**

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**Class Meetings:** Mondays/Wednesdays  
8:00 to 9:15 a.m.  
Ingraham 224

**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  
Meetings with teams immediately after class welcome.  
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 27**) 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 1**. December 1, 3, 8, and

10 will be devoted to presentation of the projects. A revised draft is due **December 19** 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*, 4<sup>th</sup> 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. UNICEF has launched an initiative to increase its capacity for conducting benefit-cost analysis. Your task is to assist this initiative by developing shadow prices for primary and secondary schooling impacts for boys and girls in countries at different levels of development. Specifically, you should review research on returns to educational attainment and achievement, translate these returns and related impacts into useful shadow prices, develop a protocol for adjusting the magnitude of the shadow prices so they can be applied in countries at different levels of development, and demonstrate how the protocol can be used. Your report will be especially valuable if it considers how the protocols you develop can be extended to shadow prices for other policy impacts, such as changes in morbidity and mortality. Client: Nicholas Rees, Division of Policy and Strategy, UNICEF, [nrees@unicef.org](mailto:nrees@unicef.org).

2. The Lutheran Health Alliance (LHA) is considering implementing a substance use screening and brief intervention program in central Africa, specifically in Zambia. The LHA would likely use the Screening, Brief Intervention, and Referral to Treatment (SBIRT) model as implemented by the Wisconsin Initiative to Promote Healthy Lifestyles to reduce risky drinking and promote healthy alcohol consumption, thereby reducing social costs attributed to alcohol abuse. The paraprofessionals who would implement the program in Zambia would be existing community health workers and HIV counselors. Most likely, LHA would adapt SBIRT screening and counseling functions to mobile phones for use by the paraprofessionals. Based on the impact of SBIRT as implemented by the Wisconsin Initiative to Promote Healthy Lifestyles and elsewhere, predict the likely impact of SBIRT implementation in Zambia. Also, estimate the cost of adapting SBIRT to a mobile phone platform in the Western context and consider factors that would likely lead to a different cost in Zambia. Finally, develop shadow prices for SBIRT impacts in Zambia and demonstrate their application for a plausible impact. Client: Jason Paltzer, Lutheran Health Alliance Director, [jpaltzer1@gmail.com](mailto:jpaltzer1@gmail.com).

3. Municipalities face tradeoffs in replacing culverts for roads that cross streams. Although costs are initially higher for larger than smaller culverts, the larger culverts offer several potential advantages: reduced maintenance costs, longer life, and less risk of flood damage as well as environmental, ecological, and recreational improvements that result from less constricted water flow. For a set of representative culvert replacement scenarios, estimate the net fiscal and net social benefits of replacing smaller with larger culverts. Positive net fiscal benefits could be the basis for an informational campaign to alert municipalities to life-cycle advantages of larger culverts. Negative net benefits but positive net social benefits could provide the basis for other policies to encourage municipalities to choose larger culvert replacements. Client: Jon Simonsen, Environmental Review Coordinator, Bureau of Energy, Transportation, & Environmental Analysis, Wisconsin Department of Natural Resources, [Jonathan.Simonsen@wisconsin.gov](mailto:Jonathan.Simonsen@wisconsin.gov).

4. Water utilities in Wisconsin are primarily owned and operated by municipalities. In densely populated areas, there can be several abutting municipalities with their own water utilities. A regional approach to utility service could help the municipalities and their ratepayers take advantage of economies of scale and more efficient operations. The state already has examples of regional cooperation for sewer utilities, but none for water. A potential site for the first regional water utility is the Fox River area near Appleton. The project team will assess the net benefits of alternatives for this area to increase regional cooperation in water utility service. The project team will assess net benefits to the ratepayers, municipalities, and society. The project team will apply a wide range of knowledge involving utility financing and accounting, municipal law, state and local tax policy, and utility regulation. Final recommendations will be made to the PSC and the affected municipal leaders. Client: Sam Shannon, Public Service Commission, [sam.shannon@wisconsin.gov](mailto:sam.shannon@wisconsin.gov).

5. In 2008 United Way Fox Cities and community partners piloted a school-based mental health access project in the Menasha Joint School District. PATH (Providing Access to Healing) for

Students is designed to improve access to mental health services for those students experiencing barriers to care elsewhere in the community. Following a very successful, three-year pilot, the program was expanded and is now offered in 23 selected elementary, middle, and high schools in ten Fox Cities school districts. The program is staffed by licensed mental health therapists from three community agencies. The services provided in the schools are the same as those services offered in a community setting: assessment, care planning, treatment, discharge planning, and care coordination. Outcomes are measured in several areas: improved mental health, improved academic performance, and improved school behaviors (fewer suspensions, detentions and unexcused absences). We would like to quantify the benefits of the program to the students (increased future earning power from improved academic performance leading to high school graduation and eligibility for post-secondary education), to the schools (decreased truancy costs), and to the community (reduced costs to the healthcare, social services, and criminal justice systems). A cost-benefit analysis was conducted in 2012 using limited data from just the Menasha Joint School District. The objective of this project is to do a cost-benefit analysis of PATH based on more comprehensive data from all ten school districts. Client: Mary Wisnet, Community Development Program Officer, Health & Healing and Strengthening Families United Way Fox Cities, [Mary.Wisnet@UnitedWayFoxCities.org](mailto:Mary.Wisnet@UnitedWayFoxCities.org).

6. Criminal justice policymakers face difficult decisions on how to spend limited resources to protect the public. In Illinois, as across the country, one of the major public costs is for incarceration in state prisons or county jails. Alternatives to incarceration are receiving increased attention, especially when the alternatives address underlying criminogenic (i.e., crime-causing) factors such as addiction. The best evidence-based practices require an individualized risk assessment to determine which services are most appropriate for an offender. Using risk assessments to determine services and programming has shown significant improvements in offender outcomes, particularly in reducing recidivism (i.e., commission of new crimes after release). One risk assessment tool has been used by Illinois's county-level probation departments for over a decade but with varying degrees of consistency and oversight. The state Department of Corrections recently obtained a risk assessment tool and is in the process of implementation. The Illinois Sentencing Policy Advisory Council is interested in determining an estimated return on investment for implementing risk assessments at the county and state levels. This project should estimate the costs and benefits of using risk assessment to increase the effectiveness of criminal justice treatment programs. The task is to find and incorporate conservative estimates of total costs and benefits that can inform county and state stakeholders of the social net benefits for investing in risk assessment programs. Client: Nate Inglis Steinfeld, Illinois Sentencing Policy Advisory Council, [nate.steinfeld@illinois.gov](mailto:nate.steinfeld@illinois.gov).

7. The Madison Area Bus Advocates (MABA) requests a cost-benefit analysis of shuttle service at regular intervals connecting the Dane County Airport with downtown Madison and the UW campus. Currently, travelers or workers must drive to the airport and pay to park, get a ride from a friend or taxi, or take a very long and slow city bus ride. Most cities considered to be world-class destinations have shuttle service between their airports and their downtowns and other common destinations. As Madison is home to the Wisconsin state government, a large

world class research university with over 40,000 students, an accompanying research park, a burgeoning hi-tech economy, the Monona Terrace Convention Center, and several high profile hospitals, the city both generates and receives many air travelers. Your task is to ascertain if there would be a net benefit to having airport shuttle services, and, if so, under what scenario of vehicle type and size, frequency of service, routing, and financing. Comparisons of service scenarios with current policy should consider social as well as fiscal costs and benefits. Client: Susan De Vos, Madison Area Bus Advocates, [mabaa@tds.net](mailto:mabaa@tds.net).

8. Childhood obesity is a major public health concern nationwide. In Wisconsin, one out of four adolescents are overweight or obese. An effective strategy for prevention and treatment of childhood obesity must include greater physical activity. Schools provide an attractive venue for efforts to increase physical activity. Increased physical activity in schools can help reduce obesity while instilling lifelong fitness habits that potentially can reduce students' risk for chronic diseases in adulthood. Many states have laws requiring a certain number of minutes of daily physical activity, including physical education, in schools. Your task is to review efforts in other states to implement increased physical activity minutes during school, develop policy alternatives for Wisconsin, and assess the social cost and benefits of each of these alternatives. In addition, you should assess the fiscal impacts of the alternative policies for the state and school districts in both the short and long term. Clients: Dr. Aaron Carrel, University of Wisconsin School of Medicine and Public Health, [alcarrel@pediatrics.wisc.edu](mailto:alcarrel@pediatrics.wisc.edu), and Amy Meinen, Wisconsin Obesity Prevention Network, [amenien@wisc.edu](mailto:amenien@wisc.edu).

### **Tentative Schedule**

#### ***Introduction*** (Sept. 3)

BGVW, Chapter 1

Scan: EPA Guidelines ([yosemite.epa.gov/ee/epa/eed.nsf/webpages/Guidelines.html](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](mailto:learn@UW).

#### ***Class Discussion of Team Projects from Previous Years*** (Sept. 8)

BGVW, Chapter 11

#### ***Conceptual Foundations*** (Sept. 10 and 15)

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

***Valuing in Primary Markets*** (Sept. 17, 22, and 24)

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. 24):** 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. 29)

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

[www.whitehouse.gov/omb/circulars\\_a004\\_a-4](http://www.whitehouse.gov/omb/circulars_a004_a-4)

UK Guidelines (The Green Book)

[www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government](http://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government)

Canadian Guidelines

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

CPI Calculator

[www.bls.gov/data/inflation\\_calculator.htm](http://www.bls.gov/data/inflation_calculator.htm)

Spreadsheet Exercise 6.6

**Project report due (Oct. 6):** 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. 8, 13, 15)

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

Consider WSIPP displayed results: <http://www.wsipp.wa.gov/BenefitCost>

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. 13) Bring write-up of exercise 5 to class — Spreadsheet Exercise 7.5**

**Project report due (Oct 15):** 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. 20)

BGVW, Chapter 8

Spreadsheet Exercise 8.3

***Life-Cycle Analysis*** (Oct. 22)

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. 27)

***Estimation Based on Revealed Preferences: Demonstrations and Experiments*** (Oct. 29)

BGVW, Chapter 12 (Prepare exercise 2 for class)

***Estimation Based on Revealed Preferences: Natural Experiments*** (Nov. 3 and 5)

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. 10, 12 and 17)

BGVW, Chapter 9 (Passive use)

BGVW, Chapter 15 (Prepare exercise 2 for class)

Robert P. Berrens, Alok K. Bohara, Hank C. Jenkins-Smith, Carol L. Silva, and David L. Weimer, "Information and Effort in Contingent Valuation Surveys: Application to Global Climate Change Using National Internet Samples," *Journal of Environmental Economics and Management* 47(2) 2004, 331–363.

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.

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

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.

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.

**Cost-Effectiveness** (Nov. 19)

BGVW, Chapter 18 (Prepare exercise 2 for class)

Spreadsheet Exercise 18.3

**Shadow Prices in Developing Countries** (Nov.24)

BGVW, Chapter 17

Spreadsheet Exercise 17.4

*Project Consultation* (Nov. 26)

*Presentations* (Dec. 1, 3, 8, and 10)

**Team reports due December 2**

**Revised project report (PDF) and explanation of revisions due December 19**

**Evaluation of teammates due December 19**

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