

**Public Policy 41300 – Cost-Benefit Analysis
Preliminary Syllabus**

Autumn 2024

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Course description: The goals of this course include learning the fundamentals of cost-benefit analysis; using CBA to evaluate policy; and developing an understanding of CBA's strengths and limitations. CBA is ubiquitous in modern policy-making and familiarity with its ideas and methods is a useful tool for policy-makers and policy analysts.

We will concentrate on: 1) concepts – to allow you understand and contextualize CBA, and 2) methods – to help you produce and evaluate CBA. While there is some overlap in material between this course and others (particularly program evaluation and cost-effectiveness analysis), this course provides an introduction to most of the standard techniques involved in CBA.

Prerequisites

Two quarter core microeconomics sequence at Harris, or equivalent. One course statistics or econometrics, or equivalent.

Class meetings

There is a MW section and a TTh section.

MW 1.30 – 2.50pm, Keller 0021, TA session Wednesday 4.30 – 5.50pm, Keller 0023.

TTh 2 – 3.20pm, Keller 0007, TA session Thursday 3.30 – 4.50pm, Keller 0007.

TA session begins second week of quarter.

TA

Head TA: Alison Doxey, adoxey@uchicago.edu

Kathryn's email is above. Please include 41300 in the subject line so that I can prioritize your email; you would not believe how much email I receive. In an emergency you may text me at 312.731.6107. Add your name to the text so I know you aren't a marketer.

Office hours

Kathryn Ierulli

-- after M/T class for two hours, Keller 2053. I have one office hour per class day and then offer extra office hours just before exams. I am also available by appointment.

-- TAs will hold regular weekly office hours, beginning 2nd week. The times and places will be announced on Canvas.

Classes

In-class protocol: This is a lecture course, with discussion encouraged during class. Questions and comments are always apropos, subject to time constraints. You are expected to attend each class and TA session, though attendance will not be part of your graded work. I do not anticipate dual-modality classes.

I will post powerpoint slides on Canvas shortly before class. In my experience, best practice is to take notes by hand and go over the slides later. There has been substantial neurological research that understanding new material is greatly facilitated by actually writing it down, i.e. the following:

<https://www.npr.org/2016/04/17/474525392/attention+students-put-your-laptops-away>

<https://www.scientificamerican.com/article/a-learning-secret-don-t-take-notes-with-a-laptop/>

In fairness, there are also studies that claim the reverse. Many online articles are written to support this, but a substantial fraction is by software companies that market outline or searchable directory templates. A meta-analysis of handwritten versus digital note-taking is:

Typed Versus Handwritten Lecture Notes and College Student Achievement: A Meta-Analysis **Educational Psychology Review**

Published: 12 July 2024
Volume 36, article number 78, (2024)

The main point: handwritten notes are associated with a significant though small positive effect on grade outcomes
In any case, the decision is yours.

Assignment & Exam Due Dates

For both MW and TTh session, problem sets are due Wednesday at 3.30pm, and the weekly TA session will go over answers. Answers are not distributed digitally.

Problem Set 1 – Wednesday of 3rd week

Problem Set 2 – Wednesday of 4th week

Midterm Exam – Wednesday/Thursday of 5th week, in class

Individual Report 1 – Thursday of 6th week

Problem Set 3 – Wednesday of 7th week

Individual Report 2 – Thursday of 8th week

Problem Set 4 – Wednesday of 9th week

Final Exam – 10th week

Problem Sets

Problem sets are submitted on Canvas, through Gradescope. You are allowed and encouraged to work in groups of up to four members and turn in a joint problem set. Please have one member log on to Canvas and set up your Study Group (under the People tab). Use that group to submit homework digitally. When you turn in a problem set, whether you work in a group or not, write **only** your ID number(s) on your work – no names. We also request that the problem sets be typed, although some graphs and figures that are hand-drawn may be acceptable. Neat and readable work is a professional expectation, and if your work cannot be read, it cannot be given points.

Individual Reports

Choose a published cost-benefit analysis of interest to you, and hand in two 2-page write-ups analyzing various aspects of it – the program or policy it evaluated, why a cost-benefit analysis was done, and what components of this course your CBA analyzed. This is done on an individual level and handed in like homework.

The individual reports are graded Pass/No Pass.

Since I will read and mark your individual reports, I will log the CBA you are analyzing. If by coincidence two students choose the same CBA to report on, both students will be requested to find another CBA to use going forward, with confirmation that they are no longer identical.

Exams

There will be a midterm and a final exam. See dates above. If you are graduating, contact me via email, as you will need to take an early final exam. You may use one 8.5x11 piece of paper as a cheat sheet for exams, two-sided, and a calculator. The exams are closed-book and no laptops or devices are permitted.

Grading

Grades will be based on problem sets and your individual report on a CBA (40% and 5%), midterm exam (25%); and final exam (30%). I will use the standard Harris distribution for final grades, which means they are curved.

Regrade policy

If you have a question about your grade, either on problem sets or exams, please make an appointment with the individual who graded your work to discuss. If at the end of the discussion you feel you deserve more credit (or less, though I very rarely see this!) please print and turn in your written work to me, along with a paragraph or two explaining your reasoning. The only large differences I have ever seen were addition errors, but anything is possible. All regrades must be requested within 7 days of material being returned to the student.

Academic integrity

You are expected to abide by the University's expectations regarding academic integrity. Please review this excerpt from the University's Student Manual, <https://studentmanual.sites.uchicago.edu/Policies#Honesty>:

It is contrary to justice, academic integrity, and to the spirit of intellectual inquiry to submit another's statements or ideas as one's own work. 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.

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, or by website and date accessed. Any doubts about what constitutes "use" should be addressed to the instructor.

Most importantly, whenever you quote from any source material, be it published, digital, or AI, you must attribute this material to the source.

Large Language Models/AI

AI is recent enough that there is no standard universities have converged upon to set policies that broadly apply across classes.

For the purposes of this course if you use any LLM you are required to precisely indicate the material generated, and to cite your source, just as when you cut and paste from the internet you cite the page your quote is from.

These expectations apply to exams and problem sets as well. *Your submitted work represents your commitment that it is your own independent work, and that you have relied on no other individuals or resources, except as explicitly specified in the assignment instructions.* If you have specific questions, contact me.

General Resources

- [Harris Academic Support Programs and Handbook](#)
- [Student Wellness](#)
- [UChicagoGRAD](#)

Harris School and University of Chicago Policies

- [Harris School Policies](#)
- [University General Policies](#)
- [University Academic Polices](#)
- Policy on audio and video [recordings](#)

Harris Policies – School-Wide

Disability Accommodations

The University's policies regarding students with disabilities are available [here](#). The University of Chicago is committed to ensuring equitable access to our academic programs and services. Students with disabilities who have been approved for the use of academic accommodations by Student Disability Services (SDS) and need a reasonable accommodation(s) to participate fully in this course must follow the [procedures established by the Harris School of Public Policy](#).

Timely notifications are required to ensure that your accommodations can be implemented. Currently registered students are asked to notify the Harris Student Disability Liaison, Eman Alsamara (ealsamara@uchicago.edu) of their access requests by the end of the first week of the quarter. The Harris Student Disability Liaison will work with the student and instructor to coordinate the implementation of student accommodations. *Harris students are not required to submit their accommodations letter to the instructor.* Students from other divisions in the University must submit their accommodations letter to Eman Alsamara (ealsamara@uchicago.edu) in the Harris Dean of Students Office.

Students who are facing extenuating circumstances at any point during the quarter should reach out to their Academic Advisor in the Dean of Students Office for support. If you feel you need accommodations on an ongoing basis, contact Student Disability Services. To contact SDS: website: disabilities.uchicago.edu phone: (773) 702-6000 email: disabilities@uchicago.edu.

Diversity and Inclusion

The Harris School welcomes, values, and respects students, faculty, and staff from a wide range of backgrounds and experiences, and we believe that rigorous inquiry and effective public policy problem-solving requires the expression and understanding of diverse viewpoints, experiences, and traditions. The University and the Harris School have developed distinct but overlapping principles and guidelines to insure that we remain a place where difficult issues are discussed with kindness and respect for all.

- The University's policies are available [here](#). Specifically, the University identifies the [freedom of expression](#) as being "vital to our shared goal of the pursuit of knowledge, as is the right of all members of the community to explore new ideas and learn from one another. To preserve an environment of spirited and open debate, we should all have the opportunity to contribute to intellectual exchanges and participate fully in the life of the University."
- The Harris School's commitments to lively, principled, and respectful engagement are available [here](#): "The Harris School of Public Policy welcomes and respects students, faculty, and staff from a wide range of backgrounds, experiences, and perspectives as part of our commitment to building an inclusive community. *Fostering an environment that encourages rigorous inquiry and effective public policy problem-solving requires the involvement and understanding of diverse viewpoints, experiences, and traditions.* As a leading public policy school, Harris holds diversity as a core value. That includes not only diversity of opinion, but diversity along a broad spectrum of factors, including race, ethnicity, national origin, gender identity, sexual orientation, ability status, religion, socio-economic background, and social or political belief. Recognizing the value of diversity and inclusion is essential to combating discrimination, addressing disparities, and cultivating ethical and clear-eyed policy leadership."

Readings

Required:

Cost-Benefit Analysis: Concepts & Practice, 5th edition, by Boardman, Greenburg, Vining, & Weimer (Cambridge University Press, 2018). The e-book version should be available through the bookstore as well.

Supplemental, not required:

Introduction to Cost-Benefit Analysis, Gines de Rus, Edward Elgar, 2010.

A Guide to Cost-Benefit Analysis, Edward M. Gramlich, Prentice Hall.

Other readings are listed below, with URL or source information. In some cases, you may need to access from a campus computer, or provide proof of UC affiliation. In a few cases, no on-line version is available, and I may post those to Canvas. Regenstein Library's website is also useful for finding most journal articles:

http://sfx.lib.uchicago.edu/sfx_local/az/. **The list of readings is subject to revision.** Some URLs are not stable, so please be resourceful if a link has become broken. Try going to the home page of the institution or author, for example. A web search on the article title and author names may also work.

Course Topics / Weeks

Week 1

What is Cost-Benefit Analysis, & How is it Used?

Boardman, Chapter 1 - Introduction

Trumbull, William N. Who Has Standing in Cost-Benefit Analysis? *Journal of policy Analysis and Management*, Vol 9, pp. 201-218, 1990

Supplemental/optional:

Recent and current changes in US Executive branch uses of CBA

Trump administration

1. <https://www.brookings.edu/research/how-the-trump-administration-can-use-benefit-cost-analysis-to-justify-deregulation/>

2. https://www.rand.org/content/dam/rand/pubs/perspectives/PE200/PE241/RAND_PE241.pdf (skim)

Biden administration

1. <https://www.brookings.edu/articles/overview-and-analysis-of-the-biden-administrations-recent-regulatory-review-and-analysis-changes/>

2. <https://www.amacad.org/publication/some-costs-benefits-cost-benefit-analysis>

Overviews of use of CBA

“Cost-Benefit Analysis,” Matthew J. Kotchen, *Encyclopedia of Climate and Weather 2nd edition* New York: Oxford University Press, 2010. <http://environment.yale.edu/kotchen/pubs/CBAchap.pdf>

LeDuc, Daniel, “Results That Bring Change,” MacArthur Foundation, Trust, Summer 2014.

http://www.macfound.org/media/files/PewPartners_FINAL.PDF

Example of unintended effects of policy: Jennifer L. Doleac and Benjamin Hansen, "The Unintended Consequences of "Ban the Box": Statistical Discrimination and Employment Outcomes When Criminal Histories Are Hidden," *Journal of Labor Economics*, 2019

CBA decision rules

Boardman, Chapter 2; Chapter 19 (skip 19.5.2) – Foundations of CBA, Distributional CBA

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

http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2008/02/05/000020953_20080205155606/Rendered/PDF/406190REVISED0irr06122301PUBLIC1.pdf

Supplemental/optional:

'Benefit-Cost Analysis and Distributional Weights: An Overview', Matthew D. Adler, *Review of Environmental Economics and Policy*, Volume 10, Number 2

<https://www.journals.uchicago.edu/doi/full/10.1093/reep/rew005#rew005-B2>

Week 2

Measures of welfare

Boardman, Chapter 3 – Consumer and Producer Surplus, WTP and WTA

OECD, "Willingness to Pay vs. Willingness to Accept," Chapter 11 in *Cost-Benefit Analysis & the Environment: Recent Development*, OECD, 2006. [Note: pp. 155-167.] http://www.oecd-ilibrary.org/environment/cost-benefit-analysis-and-the-environment_9789264010055-en

Can read it though you cannot download it.

Supplemental:

Kahneman, Knetsch & Thaler, "The Endowment Effect: Evidence of Losses Valued More Than Gains." *Handbook of Experimental Economics*, Chapter 100. Elsevier 2008.

<https://faculty.chicagobooth.edu/Richard.Thaler/research/pdf/The%20Endowment%20Effect%20Evidence%20of%20Losses%20Valued%20More%20Than%20Gains.pdf>

Adamowicz, Bhardwaj & Macnab, "Experiments on the Difference Between Willingness to Pay and Willingness to Accept." *Land Economics*, 69(4), 1993. https://www.jstor.org/stable/3146458?seq=1#page_scan_tab_contents

Sayman & Unculer, "A Meta Analysis of the Willingness to Accept and Willingness to Pay Disparity." Working Paper, INSEAD, 2002/89/MKT/TM. https://flora.insead.edu/fichiersti_wp/inseadwp2002/2002-89.pdf

Brown, Thomas & Gregory, Robert, "Why the WTA-WTP Disparity Matters." *Ecological Economics*, 28 (1999), 323 – 335. https://www.fs.fed.us/rm/pubs_other/rmrs_1999_brown_t001.pdf

Costs & benefits when markets exist: primary markets

Boardman, Chapter 5, 6 – Valuing Impacts in Output and Input Markets

Haveman, Robert H., & David L. Weimer, "Public Policy Induced Changes in Employment: Valuation Issues for Benefit-Cost Analysis," *Journal of Benefit-Cost Analysis* 6 (2015): pp. 112-153.

<http://journals.cambridge.org/action/displayAbstract?fromPage=online&aid=9668866>

Week 3

How do we add up costs and benefits?

Boardman, Chapter 5, 6 – Valuing Impacts in Output and Input Markets, continued

Costs & benefits when markets exist: secondary markets

Boardman, Chapter 7 – Valuing Impacts in Secondary Markets

de Rus, Gines, "The BCA of HSR: Should the Government Invest in High Speed Rail Infrastructure?" *Journal of Benefit-Cost Analysis* 2, 2011. http://www.evaluaciondeproyectos.es/EnWeb/Results/Dissemination/Activities/jan11/vie_wcontent.pdf

de Rus, Gines. "Economic Evaluation of High Speed Rail." <http://www.ems.expertgrupp.se/uploads/documents/hsr.pdf>

Week 4

Discounting – value over time

Boardman, Chapter 9 – Future Impacts and Handling Inflation

Boardman, Chapter 10 – Social Discount Rate

Week 5

CBA of Social Programs

Boardman, Chapter 14 – Valuing Impacts from Observed Behavior, Direct Methods

Reynolds, A., Temple, J., White, B., Ou, S.-R., & Robertson, D. (2011). Age-26 Cost-Benefit Analysis of the Child-Parent Center Early Education Program. *Child Development*, 82(1), 1–36.

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3817956/>

Weeks 6 - 7

Risk

Boardman, Chapters 11-12: Uncertainty, Risk, Option Value

Cost-Benefit Analysis Under Uncertainty, Daniel A. Graham, *The American Economic Review*

Vol. 71, No. 4 (Sep., 1981)

Walton, 2012. A Cost-Benefit Analysis of Vaccines. *The Atlantic*. <http://www.theatlantic.com/health/archive/2012/01/a-cost-benefit-analysis-of-vaccines/251565/>

Blonn, Carlson, Mueller & Scott (2006). Transport 2020 Bus Rapid Transit: A Cost-Benefit Analysis.
https://www.busadvocates.org/articles/regionaltransit/CBA_BRT_FINAL_REPORT.pdf

Uncertainty

Sunstein, 2003. Terrorism & probability neglect. *J. of Risk & Uncertainty*, 26, 121–136. doi:10.1023/A:1024111006336
https://www.researchgate.net/publication/5152352_Terrorism_and_Probability_Neglect

Sunstein, 2013. Irreversible and Catastrophic. *Cornell Law Review*. <http://cornelllawreview.org/files/2013/03/Sunstein.pdf>

Mueller & Stewart, 2014. Evaluating Counterterrorism Spending. *J. Economic Literature*.
<http://pubs.aeaweb.org/doi/pdfplus/10.1257/jep.28.3.237>

M. V. Ramana 2011 Beyond our Imagination: Fukushima and the Problem of Assessing Risk,
<https://thebulletin.org/2011/04/beyond-our-imagination-fukushima-and-the-problem-of-assessing-risk/>

Week 8

Indirect Valuation Methods

Boardman, Chapter 15 and 16 – Valuing Impacts from Observed Behavior, Indirect Methods, Contingent Valuation

Hausman, J. (2012). “Contingent Valuation: From Dubious to Hopeless.” *J. Economic Perspectives*.
<https://www.aeaweb.org/articles?id=10.1257/jep.26.4.43>

Kling et al 2012. “From Exxon to BP: Has Some Number Become Better than No Number?” *J. Economic Perspectives*.
<https://www.aeaweb.org/articles?id=10.1257/jep.26.4.3>

Rosenthal & Nelson. “Why Existence Value Should *Not* Be Used in Cost-Benefit Analysis.”

Kopp. “Why Existence Value Should be Used in Cost-Benefit Analysis.”

Both are in this issue of *J. Policy Analysis & Mgt.*, 1992. <http://onlinelibrary.wiley.com/doi/10.1002/pam.v11:1/issuetoc>

“Travel Cost Method,” *Methods*, Section 4, *Ecosystem Valuation*. http://www.ecosystemvaluation.org/travel_costs.htm

Carson et al, 2003. “Contingent Valuation & Lost Passive Use: Damages from the Exxon Valdez Oil Spill.” *Env. & Resource Econ.* <http://econweb.ucsd.edu/~rcarson/papers/ExxonERE.pdf>

Thompson et al 2002. “Valuing the Arts: A Contingent Valuation Approach.” *J. of Cultural Economics*.
<http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1048&context=cbafacpub>

Supplemental:

Johannesson, Magnus, and Johannesson, Per-Olov. “Quality of Life and WTP for an Increased Life Expectancy at an Advanced Age.” *Journal of Public Economics*, 65(1997), 219-228.

<https://www.sciencedirect.com/science/article/pii/S0047272797000145>

Loomis 2001. "Final Snake River Contingent Value Methodology Study Report." US BLM.

[https://www.researchgate.net/publication/252777772_FINAL_SNAKE_RIVER_CONTINGENT_VALUE_METHODOL
OGY_STUDY_REPORT](https://www.researchgate.net/publication/252777772_FINAL_SNAKE_RIVER_CONTINGENT_VALUE_METHODOL
OGY_STUDY_REPORT)
<http://www.blm.gov/style/medialib/blm/wy/programs/planning/rmps/SnakeRiver/feis.Par.32841.File.dat/16app6.pdf>

Nahuelhual, Loureiro & Loomis 2004. "Using Random Parameters to Account for Heterogeneous Preferences in Contingent Valuation of Public Open Space." J. Agricultural & Resource Econ. <http://www.jstor.org/stable/40987248>

Fleming & Cook 2007. "The Recreational Value of Lake McKenzie, Fraser Island: An Application of the Travel Cost Method." Tourism Management. <http://ageconsearch.umn.edu/bitstream/10382/1/cp07fl02.pdf>

Valuation of a Statistical Life (VSL) & Statistical Life-years (VSLY)

Boardman, Chapter 17 – Shadow Prices from Secondary Sources

Viscusi, W. Kip, "Estimating the Value of a Statistical Life Using Census of Fatal Occupational Injuries Data," Vanderbilt University Law School, Law and Economics 2013. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2291727.

Viscusi, W. Kip. "Using Data from the Census of Fatal Occupational Injuries to Estimate the 'Value of a Statistical Life.'" US Bureau of Labor Statistics, Monthly Labor Review, 2013. <http://www.bls.gov/opub/mlr/2013/article/pdf/using-data-from-the-census-of-fatal-occupational-injuries-to-estimate-the.pdf>

Aldy, Joseph & W. Kip Viscusi. "Adjusting the Value of a Statistical Life for Age & Cohort Effects." R. Econ. & Statistics, 2008. https://law.vanderbilt.edu/files/archive/279_Adjusting-VSL-for-Age-and-Cohort-Effects.pdf

Supplemental:

Sunstein, C. R. (2013). The value of a statistical life: some clarifications and puzzles. Journal of Benefit-Cost Analysis, 4(2004), 237–261. <https://www.cambridge.org/core/services/aop-cambridge-core/content/view/S219458880000609>

Week 9

Cost-Effectiveness Analysis

Boardman, Chapter 18 – Cost-Effectiveness

Robberstad 2005. "QALYs vs DALYs vs LYs gained: What are the differences, and what difference do they make for health care priority setting?" Norsk Epidemiologi.

https://www.researchgate.net/publication/41758117_QALYs_vs_DALYS_vs_LYs_gained_What_are_the_differences_and_what_difference_do_they_make_for_health_care_priority_setting

Supplemental:

Policy Perspective Economic Evaluation for Health Investments En Route to Universal Health Coverage: Cost-Benefit Analysis or Cost-Effectiveness Analysis? Anthony J. Culyer, DEcon 1,* , Kalipso Chalkidou, PhD 2

[https://www.valueinhealthjournal.com/article/S1098-3015\(18\)32245-
9/fulltext?returnURL=https%3A%2F%2Flinkinghub.elsevier.com%2Fretrieve%2Fpii%2FS1098301518322459%3Fsho
wall%3Dtrue](https://www.valueinhealthjournal.com/article/S1098-3015(18)32245-9/fulltext?returnURL=https%3A%2F%2Flinkinghub.elsevier.com%2Fretrieve%2Fpii%2FS1098301518322459%3Fsho
wall%3Dtrue)

Dhaliwal et al, 2012. “Comparative Cost-Effectiveness Analysis to Inform Policy in Developing Countries: A General Framework with Applications for Education.” Working paper. <http://economics.mit.edu/files/6959>

Profit et al 2009. “Clinical Benefits, Costs, and Cost-Effectiveness of Neonatal Intensive Care in Mexico.” PLoS Medicine. <http://www.ncbi.nlm.nih.gov/pubmed/21179496>

Meltzer 1997. “Accounting for Future Costs in Medical Cost-Effectiveness Analysis.” J. Health Economics. <http://www.sciencedirect.com/science/article/pii/S0167629696005073>

Optional Readings - Economic Impact Analysis

A User Guide for CAHSEIM: The Culture, Arts, Heritage and Sport Economic Impact Model
<https://www.canada.ca/en/canadian-heritage/corporate/publications/general-publications/culture-arts-heritage-sport-economic-impact-model/user-guide-culture-arts-heritage-sport-economic-impact-model.html>

Sanderson et al 2015. “Analysis of the Boston 2024 Proposed Summer Olympic Plans.”
<http://www.mass.gov/governor/docs/news/final-brattle-report-08-17-2015.pdf>

Shaffer 2003. “A Cost-Benefit Analysis of the Proposed Vancouver 2010 Winter Olympic and Paralympic Games.”
http://www.policyalternatives.ca/sites/default/files/uploads/publications/BC_Office_Pubs/olympics_costbenefit.pdf

Tootelian & Varshney, 2007. “Chicago 2016 Economic Impact Analysis.”
<https://nogames.files.wordpress.com/2009/06/chicago-2016-economic-impact-analysis.pdf>

Watkins & Anderson 2009. “The Likely Economic Impact of a Chicago 2016 Summer Olympics.”
http://www.andersoneconomicgroup.com/Portals/0/upload/AEG_chicago_olympics_final.pdf

Watkins et al 2014. “ArtPrize 2013: Economic Impact and Attendee Profile.”
http://www.andersoneconomicgroup.com/portals/0/artprize_2013econimpact_aeg010914.pdf