



**PPHA58102: Economic Analysis II, Introduction to Cost-Benefit Analysis**  
**Spring 2024**

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**Course Description**

Cost-benefit analysis (CBA) is the primary tool used to provide objective and transparent, 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, 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. Cost-benefit analysis is an activity that is aptly characterized by the phrase the “the devil is in the details.” In this course, we will review the theoretical/conceptual foundations of CBA as applied in the public sector—mainly the executive branch of the federal government. The course will also present the basic structure of CBA and review the major tools of analysis used in CBA.

**Course Objectives:**

- Describe the intuition, purpose, and structure of cost-benefit analysis (CBA)
- Review the microeconomic foundations of cost-benefit analysis including how to measure consumer willingness-to-pay, consumer surplus, opportunity cost of providing goods, producer surplus and the Kaldor-Hicks Criteria
- Present the philosophical objections and criticism of Kaldor-Hicks Criteria and alternative approaches for assessing whether a public policy increases social welfare
- Develop skills to use supply and demand analysis to examine effects of public policies and to assess changes in social welfare of public policies—i.e., conduct simple cost-benefit analyses using supply and demand
- Review the major market failures that justify government intervention in the market and the appropriate government approaches to addressing these market failures
- Illustrate and describe common techniques used to measure monetary impacts of public policies when markets do not exist or when the use of supply and demand is not feasible.
- Present empirical evidence of important “prices” used in CBA, such as the value of a statistical life, the social cost of carbon, the value of time, and the appropriate discount rate to use
- Analyze several examples of cost-benefit analyses

**Course Outcome:**

*Students will learn how to be astute consumers of CBA, and acquire basic skills needed to begin to conduct CBAs.*

**Course Format**

**The class will meet in-person. Attendance is required. Attendance by Zoom is by permission only.**

Students are expected to complete all assigned readings prior to class. There are almost weekly in-class activities (assignments) that are intended to be student directed. For each activity, I expect students to be ready to engage with me and each other. The in-class activities are intended to allow students to articulate course content in their own words, deepen their understanding of the course content and to provide an opportunity for students to learn from one another. Everyone is expected to participate and everyone should feel comfortable expressing their view. I understand that it may be difficult for some students to speak publicly, but the class is a welcoming, respectful community. The class discussions are an active learning process and by definition learning means not knowing already. So, feel free to think creatively and openly even though sometimes it will be a miss hit.

## Relationship to Curriculum

*This is a course in applied economic analysis focused on assessing whether programs and policies increase social welfare.*

This course is intended to build on the foundation of microeconomics provided in the core economics class. Accordingly, there will be some overlap with the material presented in microeconomics 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 empirical methods (e.g., program evaluation). Finally, applications of cost-benefit analysis span several areas of public policy, including health, education and the environment.

### 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 <http://courses.uchicago.edu/>. Students are responsible for any and all material posted there. I encourage the use of email and I try to respond in a timely fashion. My email address is [kaestner@uchicago.edu](mailto:kaestner@uchicago.edu). Please be sure to set your notifications on CANVAS so that you receive all communications from me sent through this platform.

**Attendance is required.** I understand that circumstances may sometimes require you to miss a class, although with a 9-week schedule, any absence represents a significant loss of time. Students who need to miss class because of illness (or other reasons) shall notify me in a timely manner as to when they will be absent.

**Late Assignments:** 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/>).

### 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.”

### Course Materials

#### 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)
- Weekly Readings: Posted on canvas.

## Grades and Grading

### Quizzes

- There will be eight short quizzes at the start of class each week from week 2 to week 9.
- The quizzes will account for 20% of the final grade.
- Grades for quizzes are: 4 (A)=all correct answers, 3(B)=mostly correct answers, 2(C)=about half correct answers. 1(D)=mostly incorrect answers.
- Total possible points on quizzes is 32 ( $8*4=32$ ).

### Assignments

- There are eight short (1-page), take-home assignments that relate to material that will be covered in class. Assignments and the due dates (by beginning of relevant class) are listed below. Please make sure you identify the due dates.
- Assignments account for 60% of the final grade.
- **All assignments are to be completed independently without assistance except from TAs or Professor.**
- Grades for assignments are: 4 (A)=excellent (professional preparation, provided clear, direct and well-reasoned answers that reflect full understanding of the course material), 3(B)=good (professional preparation, provided clear, direct and well-reasoned answers that reflect a good but not full understanding of the course material), 2(C)=average (professional preparation, provided answers that were adequate but lacked clarity or an adequate understanding of the course material). 1(D)=unacceptable (unprofessional preparation, incomplete and/or incoherent answers).
- Total possible points on assignments is 32 ( $8*4=32$ ).

### Final Exam

- The final exam accounts for 20% of the final grade.
- **The Final Exam is to be completed independently without assistance except from TAs or Professor.**

#	Assignment	Due Date
1	<p>Chicago Real Estate Tax Ballot Initiative</p> <p>Shall the City of Chicago impose: 1) a real estate transfer tax decrease of 20% to establish a new transfer tax rate of \$3 for every \$500 of the transfer price, or fraction thereof, for that part of the transfer price under \$1,000,000 to be paid by the buyer of the real estate transferred unless the buyer is exempt from the tax solely by operation of state law, in which case the tax is to be paid by the seller; AND (2) a real estate transfer tax increase of 166.67% to establish a new transfer tax rate of \$10 for every \$500 of the transfer price or fraction thereof, for that part of the transfer price between \$1,000,000 and \$1,500,000 (inclusive) to be paid by the buyer of the real estate transferred unless the buyer is exempt from the tax solely by operation of state law, in which case the tax is to be paid by the seller; AND (3) a real estate transfer tax increase of 300% to establish a new transfer tax rate of \$15 for every \$500 of the transfer price, or fraction thereof, for that part of the transfer price exceeding \$1,500,000 to be paid by the buyer of the real estate transferred unless the buyer is exempt from the tax solely by operation of state law, in which case the tax is to be paid by the seller? The current rate of the real estate transfer tax is \$3.75 per \$500 of the entire transfer price, or fraction thereof, and the revenue is used for general corporate purposes. The revenue from the increase (the difference between revenue generated under the increased rate and the current rate) is to be used for the purpose of addressing homelessness, including providing permanent affordable housing and the services necessary to obtain and maintain permanent housing in the City of Chicago.</p> <p>Prepare a one-page document (11–12-point font, single or double spacing) that briefly describes the 10 steps of cost-benefit analysis of the real estate tax.</p> <p>No outside research is necessary.</p>	March 26
2	<p>Prepare a supply and demand analysis of the effect of the Chicago Real Estate Tax Ballot Initiative assuming that it passed. Make sure to identify the market surplus with and without this policy and use the NPV rule to make a recommendation. No outside research is necessary.</p> <p>Prepare a one-page document (11–12-point font, single or double spacing) and include supply and demand graphs (on separate page if you want and photos of graphs are fine) AND discussion and interpretation of the graphs.</p>	April 2
3	<p>“Sec. 1-2. Public policy. The practices of barbering, cosmetology, esthetics, hair braiding, and nail technology in the State of Illinois are hereby declared to affect the public health, safety and welfare and to be subject to regulation and control in the public interest. It is further declared to be a matter of public interest and concern that the professions merit and receive the confidence of the public and that only qualified persons be permitted to practice said professions in the State of Illinois. This Act shall be liberally construed to carry out these objects and purposes.”</p> <p>Prepare a one-page document (11–12-point font, single or double spacing) that discusses the rationale for this type of government intervention. Be sure to consider internalities, externalities and other rationales if appropriate. Also, discuss the effect of the provision “...that only qualified persons be permitted to practice said professions in the State of Illinois.” On the market for these services. No outside research is necessary.</p>	April 9
4	<p>The Inflation Reduction Act of 2022 (Public Law 117-169) amended the Qualified Plug-in Electric Drive Motor Vehicle Credit (IRC 30D), now known as the Clean Vehicle Credit, and added a new requirement for final assembly in North America that took effect on August 17, 2022.</p> <p>Prepare a one-page document (11–12-point font, single or double spacing) that:</p> <ul style="list-style-type: none"> <li>• discusses the purpose and rational of the policy (Step 1)</li> <li>• identifies the primary and any secondary markets and discusses why they are related</li> <li>• discusses the likely impacts of the policy in the primary market</li> <li>• assesses whether it is necessary to include benefits in the secondary market and what those effects are likely to be</li> </ul> <p>While a supply and demand analysis is not necessary for the assignment, it would be very helpful to your analysis.</p>	April 16

5	<p>The USA has many programs targeted at alleviating poverty. Most programs provide in-kind benefits such as food stamps (SNAP) and housing vouchers (Section 8). Alternative approaches are cash grants, such as those provided in TANF and, in a less frequent way, guaranteed income programs (in a few cities).</p> <p>Prepare a one-page document (11–12-point font, single or double spacing) that discusses the differences in these two policies with respect to the tradeoff between equity and efficiency. Include a discussion of how the cost of public funds relates to these policies and the relevance of distributional weights.</p>	April 23
6	<p>From Curtis, E.M. and Marinescu, I., 2023. Green Energy Jobs in the United States: What Are They, and Where Are They?. Environmental and Energy Policy and the Economy, 4(1), pp.202-237.</p> <p>“Green jobs are created in occupations that are about 21 percent higher paying than average. The pay premium is even higher for jobs with a low educational requirement. Finally, green jobs tend to locate in counties with high shares of employment in fossil fuel extraction. Overall, our results suggest that the growth of renewable energy leads to the creation of relatively high paying jobs, which are more often than not located in areas that stand to lose from a decline in fossil fuel extraction jobs.”</p> <p>Prepare a one-page document (11–12-point font, single or double spacing) that discusses:</p> <ul style="list-style-type: none"> <li>• whether a cost-benefit analysis of the Inflation Reduction Act, which increases investments in green industries, should include the jobs in those industries as benefits.</li> <li>• Regardless of your answer above, assume that jobs would be measured and discuss why green jobs create surplus</li> </ul>	April 30
7	<p>This comes from UNEP Executive Director statement on the closing of COP28:</p> <p>“This means real action on a rapid transition away from fossil fuels, especially for the G20, and real action on the many other positives agreed at COP28: the framework on the Global Goal on Adaptation, operationalizing the Loss and Damage Fund, and new commitments on sustainable cooling, methane reduction, tripling renewable energy targets and nature breakthroughs.”</p> <p>Prepare a one-page document (11–12-point font, single or double spacing) that discusses the implications of the Ramsey Formula for decisions of countries to undertake investments that seek to reduce emissions of greenhouse gases. After providing a general discussion, choose three countries with large populations and assess how the Ramsey formula applies and how the countries decisions may or may not differ.</p>	May 7
8	<p>The Kingdom of Saudi Arabia (KSA) has established the Vision 2030 that is intended to transform society. As part of this is the Riyadh Green project. Riyadh Green will invest billions of dollars to create parks and greenspaces.</p> <p>Prepare a one-page document (11–12-point font, single or double spacing) that discusses how analysts could use hedonic regression methods to measure benefits of either of the two projects. Include descriptions of the type of data that would be required, the intuition of the method and how the results would be interpreted.</p>	May 14

## Detailed Course Outline

March 19, Week 1: Introduction to CBA		
Topic	Objective	Takeaways
<p>What is CBA</p> <p>Readings:</p> <ul style="list-style-type: none"> <li>• Boardman et al. Chapter 1</li> <li>• Office of Management and Budget. Circular A-4. 2003. <a href="https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/circulars/A4/a-4.pdf">https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/circulars/A4/a-4.pdf</a></li> <li>• (Skim Table of Contents and Skim—Look Briefly at 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>	<p>Discuss the intuition, and purpose of cost-benefit analysis</p>	<p>Cost-benefit analysis is intuitively simple, but difficult to implement in practice</p> <p>Cost-benefit analysis provides policy makers with a set of facts about the costs and benefits of a policy</p> <p>CBA is a decision-making tool for policymakers; analysts make recommendations not decisions</p> <p>Cost-benefit analysis ideally leads to adoption of policies that make society better off—improve social welfare</p>
<p>Origins and history of cost-benefit analysis</p>	<p>Provide some historical context and origins of cost-benefit analysis</p>	<p>CBA has been around a long time, although not in formalized way</p> <p>Formalization of CBA in the federal government in the USA was accomplished through a series of Presidential Executive Orders</p> <p>These Executive Orders were codified by the Office of Management and Budget and encapsulated in practice guidelines (e.g., Circular A-4)</p>
<p>Ex-ante vs Ex-post CBAs</p> <p>Readings:</p> <ul style="list-style-type: none"> <li>• Flyvbjerg, Bent and Bester, Dirk W., The Cost-Benefit Fallacy: Why Cost-Benefit Analysis Is Broken and How to Fix It (September 6, 2021). <i>Journal of Benefit-Cost Analysis</i>, October, pp. 1-25</li> </ul>	<p>Highlight the difficulty and uncertainty that characterizes ex-ante cost-benefit analysis</p>	<p>Cost-benefit analysis is usually conducted before (ex-ante) a policy is implemented, and impacts need to be forecasted from current information</p> <p>Because of that uncertainty, CBA is imperfect, but arguably better than the alternative of making policy without access to evidence-based, non-partisan evidence</p> <p>Ex-ante CBAs when re-evaluated using an ex-post analysis are often shown to have systematic bias</p>
<p>Boardman’s 10 steps of cost-benefit analysis</p>	<p>Describe the structure of a cost-benefit analysis</p>	<p>Conducting a CBA requires a conceptual model and/or technical knowledge of the issue</p>

<p>Readings:</p> <ul style="list-style-type: none"> <li>• Boardman et al. Chapter 1</li> </ul>		<p>Cost-benefit analysis has a fairly standard structure with specific steps that are widely recognized as best practice</p> <p>Conducting a cost-benefit analysis requires the analyst to make many choices about various inputs into the analysis that need to be justified and transparently communicated</p>
<p>Cost-benefit analysis as practiced in other countries</p> <p>Readings:</p> <ul style="list-style-type: none"> <li>• Abelson, Peter. "A partial review of seven official guidelines for cost-benefit analysis." <i>Journal of Benefit-Cost Analysis</i> 11, no. 2 (2020): 272-293.</li> </ul>	<p>Review the practice of cost-benefit analysis in other countries</p>	<p>CBA's are conducted around the world and there is agreement on some practices, such as using the NPV rule, and disagreement on others, such as the social rate of discount</p>
<p>Example: A cost-benefit analysis of a child allowance</p> <p>Readings:</p> <ul style="list-style-type: none"> <li>• Garfinkel, Irwin, Laurel Sariscsany, Elizabeth Ananat, Sophie M. Collyer, Robert Paul Hartley, Buyi Wang, and Christopher Wimer. <i>The Benefits and Costs of a US Child Allowance</i>. No. w29854. National Bureau of Economic Research, 2022.</li> </ul>	<p>Present an example of a Cost-Benefit analysis</p>	

**March 26, Week 2: Kaldor-Hicks Criteria and Using Supply and Demand to Conduct Cost-Benefit Analysis**

Topic	Objective	Takeaway
<p>Kaldor-Hicks Criteria</p> <p>Readings:</p> <ul style="list-style-type: none"> <li>Boardman et al. Chapters 2</li> </ul>	<p>Describe the Kaldor-Hicks Criteria, which is the basic rule that determines the recommendation of a cost-benefit analysis</p> <p>Identify the limitations and criticism of Kaldor-Hicks Criteria</p>	<p>Kaldor-Hicks Criteria is what is referred to as a Potential Pareto Improvement</p> <p>A Potential Pareto Improvement assumes that those made better off from a policy can compensate those made worse off</p> <p>Compensation actually never takes place, which some argue invalidates Kaldor-Hicks Criteria</p> <p>Kaldor-Hicks ignores that the value of gains and losses differs for rich and poor—\$1 to the poor is worth more than \$1 to rich</p>
<p>Supply and demand analysis and how to measure market surplus</p> <p>Readings:</p> <ul style="list-style-type: none"> <li>Boardman et al. Chapters 2-3</li> </ul>	<p>Demonstrate the use of supply and demand analysis and market surplus</p> <p>Link supply and demand analysis to Kaldor-Hicks Criteria</p> <p>Show that adding up changes in market surplus resulting from a policy is consistent with Kaldor-Hicks Criteria</p>	<p>Cost-benefit analysis is based on microeconomic theory and, specifically, what is referred to as welfare analysis—measuring the benefits of a policy using consumer, producer and government surpluses</p> <p>Consumer surplus measures the monetary benefits of a policy for consumer</p> <p>Producer surplus measures the monetary benefits of a policy for producers</p> <p>The government sector is included in cost-benefit analysis and changes in government surplus (revenues, expenditures) measure the monetary benefits for the government</p> <p>Supply and demand analysis is a useful conceptual framework to guide a cost-benefit analysis and to implement Boardman’s 10 Steps</p> <p>Measuring changes in market surplus using supply and demand is consistent with the Kaldor-Hicks Criteria because it sums monetary values and identifies if <math>NPV &gt; 0</math></p>
<p>CBA decision rules</p> <p>Readings:</p>	<p>Review several rules related to how costs and benefits are compared and used to make a recommendation</p>	<p>There are several decision rules that are used in CBA to recommend a project</p>



<ul style="list-style-type: none"> <li>World Bank, “Cost-Benefit Analysis: Evaluation Criteria (Or: “Stay away from the IRR”)", Knowledge Brief, 2008.</li> </ul>		<p>The Net Present Value (NPV) rule is recommended as the most reliable rule to use</p> <p>The NPV rule is consistent with Kaldor-Hicks Criteria—it maximizes social surplus and in that sense increases efficiency</p> <p>Other rules, such as benefit-cost ration, may be useful, but can be misleading</p>
<p>Conduct simple cost-benefit analyses using supply and demand</p> <p>Readings:</p> <ul style="list-style-type: none"> <li>Rent Control: 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</li> <li>Lordan, G., Neumark, D., 2018. People versus machines: The impact of minimum wages on automatable jobs. Labour Economics 52, 40–53.</li> </ul>	<p>Conduct simple cost-benefit analysis using supply and demand</p> <p>Examples: Supply and demand analysis to conduct a cost-benefit analyses of minimum wage and rent control</p>	<p>Supply and demand analysis can sometimes be used to conduct a cost-benefit analysis, and can be useful even if purely at an analytical level (i.e., without actual numbers or values)</p> <p>In these two examples, <math>NPV &lt; 0</math> and both policies would not be recommended</p>

**April 2, Week 3: Essential Aspects of Demand for Cost-Benefit Analysis**

Topic	Objective	Takeaway
<p>Essential aspects of demand for cost-benefit analysis</p> <p>Readings:</p> <ul style="list-style-type: none"> <li>• Boardman et al. Chapter 3, Appendix A</li> <li>• Tuncel, Tuba and James K Hammitt. “A new meta-analysis on the WTP/WTA disparity.” Journal of Environmental Economics and Management, 175-187.</li> </ul>	<p>Present microeconomic theory of demand and how it relates to willingness-to-pay, willingness-to-accept and consumer surplus</p>	<p>The demand curve is derived from the theory of the consumer (indifference curve and budget constraint)</p> <p>Willingness-to-pay (WTP) for a good and willingness-to-accept (WTA) the loss of a good are measured by the demand curve, which theoretically reflects all aspects/features of a good or service that are valued by the consumer</p> <p>Consumer surplus is measured using the demand curve and measures the monetary benefits to the consumer of a policy that alters price, for example, by subsidizing a good</p> <p>There are two relevant demand curves: Hicksian, or Compensated Demand, and Marshallian, or ordinary demand</p> <p>The appropriate demand curve to use to measure consumer surplus is the Hicksian Demand curve</p> <p>WTP and WTA are, ideally, both based on the Hicksian Demand curve and, if there are no income effects will be equal</p> <p>Empirically, evidence suggests that WTA is larger than WTP and thus in some cases, particularly for environmental goods, whether WTP or WTA is used may matter a great deal to results of CBA</p>
<p>Elasticity of demand and its use in cost-benefit analysis</p>	<p>Demonstrate the use of the elasticity of demand in cost-benefit analysis</p>	<p>The elasticity of demand is a handy value (input into cost-benefit analysis) that can be used to estimate changes in consumer surplus of a policy that changes the price of a good</p>
<p>A cost-benefit application using elasticity of demand: Mexico City Subway</p> <p>Readings:</p> <ul style="list-style-type: none"> <li>• Davis, Lucas, Estimating the Price Elasticity of Demand for Subways: Evidence from Mexico (December 2020). NBER Working Paper No.</li> </ul>		

<p>w28244, Available at SSRN:  <a href="https://ssrn.com/abstract=3753153">https://ssrn.com/abstract=3753153</a></p>		
<p>Internalities and externalities related to demand and welfare improving government intervention</p>	<p>Describe the market failures referred to as externalities and internalities that relate to demand and how these concepts underlie government intervention in the market and the feasibility of using the demand curve in cost-benefit analysis</p>	<p>The demand curve does not always reflect the full value of a good or service because of the presence of internalities or externalities</p> <p>When internalities or externalities are present, than the demand curve may not be useful to measure impacts of a policy</p> <p>Internalities and externalities are an aspect of a good or service that is not recognized or understood by consumer, which means demand curve does not accurately reflect WTP</p> <p>An internality the unrecognized value of the good affects the consumer themselves; in the case of an externality it affects others (third party)</p> <p>The presence of internalities, like externalities, suggest that government intervention may improve social welfare—increase market surplus</p>
<p>Cost-benefit analysis of sugar-sweetened beverages</p> <p>Readings:</p> <ul style="list-style-type: none"> <li>• Hunt Allcott &amp; Benjamin B. Lockwood &amp; Dmitry Taubinsky, 2019. "Should We Tax Sugar-Sweetened Beverages? An Overview of Theory and Evidence," <i>Journal of Economic Perspectives</i>, vol 33, pages 202-227</li> <li>• Reem Alsukait, Parke Wilde, Sara N. Bleich, Gitanjali Singh, Sara C. Folta, Evaluating Saudi Arabia’s 50% carbonated drink excise tax: Changes in prices and volume sales, <i>Economics &amp; Human Biology</i>, 2020</li> </ul>		
<p>Behavioral economics or when do we trust the consumer?</p> <p>Readings:</p> <ul style="list-style-type: none"> <li>• Sunstein, C. (2020). Behavioral Welfare Economics. <i>Journal of Benefit-Cost Analysis</i>, 11(2), 196-220</li> </ul>	<p>Review principles from behavioral economics that bear on the role of government to intervene in the market and the validity of using the demand curve in cost-benefit analysis</p>	<p>Behavioral economics provides some explanations for internalities, such as inertia and lack of attention</p>

**April 9, Week 4: Valuing Costs and Benefits in Primary and Secondary Markets**

Topic	Objective	Takeaway
<p>Definitions of primary and secondary markets</p> <p>Readings:</p> <ul style="list-style-type: none"> <li>Boardman et al. Chapters 5- 7</li> </ul>	<p>Clarify the distinction between primary and secondary markets in cost-benefit analysis</p>	<p>Secondary markets are those that are related to the good or service in the primary market, for example, because they are substitutes of complements for the good or service targeted by policy in the primary market</p> <p>Impacts of policies in secondary markets need to be incorporated into cost-benefit analyses</p> <p>Costs are measured in primary market and are equal to expenditures on resources (e.g., labor) if the markets for resources are free of distortions (e.g., taxes)</p>
<p>Supply and demand to measure benefits and costs in primary markets</p>	<p>Strengthen skill of using supply and demand to conduct cost-benefit analyses</p>	<p>Benefits are measured by consumer, producer and government surplus</p>
<p>Types of market failures</p> <p>Methods to measure benefits in primary market with market failures</p>	<p>Present analyses of government interventions in the presence of market failures: taxes, subsidies and government direct provision</p>	<p>There are several types of market failures: externalities, monopoly and imperfect competition, taxes and subsidies, asymmetric information, and public goods</p> <p>In the presence of market failures, government intervention in the market may improve social welfare (i.e., increase total surplus)</p> <p>There is also government failure, which occurs when government intervention to correct market failures does not improve welfare</p> <p>When secondary markets are characterized by distortions (externality), then the impact of a policy on secondary market needs to be explicitly accounted for in cost-benefit analysis</p>
<p>Methods to measure costs in primary market with market failures</p>	<p>Describe methods to measure costs in primary market with and without market failures</p>	<p>When markets for resources are characterized by distortions (e.g., taxes), then the (opportunity) costs of those resources need to be calculated excluding costs above opportunity cost</p>

<p>Approaches to measuring impacts in secondary markets</p>	<p>Discuss approaches to measuring impacts in secondary markets</p> <p>Derive the equilibrium demand curve and discuss its value for measuring benefits in secondary markets</p>	<p>Impacts occurring in secondary markets need to be included in cost-benefit analysis and supply and demand analysis can identify, or even measure, those benefits</p> <p>If price in the secondary market is unaffected by policy, then there is no need to worry about impacts in that market</p> <p>In some cases, when there are no market distortions (e.g., externality) in secondary market, the equilibrium demand curve in the primary market can be used to measure benefits in both the primary and secondary markets</p> <p>When the secondary market is characterized by distortions (e.g., taxes), then the impacts of a policy in the secondary market need to be included in CBA</p>
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**April 16, Week 5: Fundamental Welfare Theorems and Reconsidering the Kaldor-Hicks Criteria**

Topic	Objective	Takeaway
<p>Fundamental Theorems of Welfare Economics</p> <p>Readings:</p> <ul style="list-style-type: none"> <li>Boardman et al. Chapter 19</li> </ul>	<p>Present Fundamental Theorems of Welfare Economics and how they address efficiency and equity concerns</p> <p>Discuss the limitations of the Theorems as applied to Kaldor-Hicks Criteria</p>	<p>Competitive markets create the maximum amount of social surplus</p> <p>Interventions in a competitive market decrease social surplus and decrease social welfare</p> <p>Theoretically concerns for efficiency and equity can be separated and addressed in different ways</p> <p>Efficiency can be achieved using Kaldor-Hicks criteria and relying on markets to maximize social welfare</p> <p>Equity can be achieved by equalizing incomes—redistributing income</p> <p>There is no feasible, costless method to equalize incomes because the government needs to intervene in markets to raise money and that intervention causes a deadweight loss</p> <p>The lack of a feasible approach to address equity without intervening in market undermines the value of the Second Fundamental Theorem of Welfare Economics</p>
<p>Distributional weights</p>	<p>Link the concept of diminishing marginal utility to the limitation of the Kaldor-Hicks Criteria that stems from ignoring who bears the costs and benefits of a policy</p> <p>Discuss how distributional weights based on the marginal utility of income can address this limitation</p>	<p>Distributional weights are theoretically appealing because their use aligns with the notion of diminishing marginal utility of income</p> <p>Distributional weights upweight costs and benefits of poor people—impacts affecting poor people count more than similar impacts for rich people</p> <p>Distributional weights move away from using dollars to measure social welfare and toward using utility</p> <p>The use of distributional weights incurs costs—a loss of efficiency because it can lead to recommending policies with a <math>NPV &lt; 0</math></p>
<p>Marginal cost of public funds</p>	<p>Define the marginal cost of public funds</p>	<p>Public policies and programs are often funded with taxes</p>

	<p>Show how an income tax leads to a deadweight loss and raises the cost of government programs funded by such a tax</p> <p>Review estimates of the marginal excess burden of a tax and the marginal cost of public funds</p>	<p>Taxes lead to deadweight loss</p> <p>So, policies and programs funded by taxes cost more than expenditures on the program suggest—there is the cost of raising the money to fund the program that needs to be counted and added to the actual expenditures</p> <p>Similarly, simply redistributing income, for example, from rich to poor is not just a transfer from rich to poor because there is the deadweight loss of the taxes that was used to make the transfer</p>
<p>Distributional weights versus cash transfers</p>	<p>Compare the use of distributional weights to the use of cash transfers to address equity</p> <p>Show that it is more efficient (less inefficient) to use cash transfers than distributional weights when the weight is greater than the marginal cost of public funds</p>	<p>When markets for resources are characterized by distortions (e.g., taxes), then the (opportunity) costs of those resources need to be calculated excluding costs above opportunity cost</p>
<p>A debate over best practices in CBA</p> <p>Readings:</p> <ul style="list-style-type: none"> <li>Boardman, A., Greenberg, D., Vining, A., &amp; Weimer, D. (2020). Efficiency without Apology: Consideration of the Marginal Excess Tax Burden and Distributional Impacts in Benefit–Cost Analysis. <i>Journal of Benefit-Cost Analysis</i>, 11(3), 457-478</li> </ul>	<p>Review arguments for including the METB as a cost</p> <p>Review arguments for including distributional considerations in a CBA</p>	<p>The METB has strong theoretical support and most practitioners believe it should be included as a cost</p> <p>Many CBAs fail to include the METB</p> <p>The limitations of the Kaldor-Hicks criteria with respect to the marginal utility of income is well known and valid</p> <p>Thus, some consideration of it and of the distributional impact of a policy should be included in a CBA</p> <p>Use of distributional weights including social welfare functions are impractical and best not used in a CBA</p>

**April 23, Week 6: Counting Jobs and Macroeconomic Benefits in Cost-Benefit Analysis**

Topic	Objective	Takeaway
<p>Are jobs counted as a benefit in CBA?</p> <p>Readings:</p> <ul style="list-style-type: none"> <li>Bartik, Timothy J. "Including Jobs in Benefit-Cost Analysis" Annual Review of Resource Economics 4 (2012): 55-73.</li> </ul>	<p>Describe the canonical model of the labor market underlying the debate over whether jobs should be counted as a benefit</p> <p>Present evidence of whether the labor market clears—a review of unemployment rates</p> <p>Describe methods of valuing jobs in cost-benefit analysis when it is appropriate to include jobs as a benefit</p>	<p>If the labor market clears—is in equilibrium and free of market imperfections (e.g., minimum wages)—then jobs are not counted as a benefit in cost-benefit analysis</p> <p>High unemployment rates are a priori evidence that the labor market does not clear, which suggests that job creation may be a benefit of a policy</p> <p>Historically unemployment has been relatively low for the country as a whole, but persistently high for some demographic groups</p> <p>Providing a job to an unemployed person can create producer surplus, which is a benefit to be counted</p> <p>Occupational upgrading associated with projects that create jobs suggest a non-trivial amount of producer surplus may be produced</p> <p>In practice, it is difficult to measure the increase in producer surplus from job creation, if it exists, and this is one reason why jobs are not counted as benefits even if it is deemed appropriate</p>
<p>Cost-benefit analysis of infrastructure</p> <p>Readings:</p> <ul style="list-style-type: none"> <li>Glaeser, Edward and James Poterba, "Economic Perspectives on Infrastructure Investment," in Rebuilding the Post-Pandemic Economy, ed. Melissa S. Kearney and Amy Ganz (Washington D.C.: Aspen Institute Press, 2021).</li> </ul>	<p>Outline the two opposing approaches to choosing infrastructure: project-based, bottom-up cost-benefit analysis approach versus the top-down, aggregate spending target approach</p> <p>Present theory of the firm underlying declining average costs and its importance to infrastructure projects and government intervention</p> <p>Discuss some special issues with cost-benefit analysis of infrastructure projects</p> <p>Discuss the advantages of the project-based, bottom-up cost-benefit analysis approach</p>	<p>The engineering approach to deciding on the amount of infrastructure compares the current state of infrastructure to some benchmark</p> <p>Benchmarks used to decide on the amount of infrastructure needed include that necessary to restore the infrastructure (e.g., bridge) to some standard, or the ratio of infrastructure spending to GDP</p> <p>The engineering approach is a top-down approach that comes up with a total amount of funds and then allocates the money based on a benchmark (e.g., worst condition sites)</p> <p>The economic approach is a bottoms-up and based on a comparison of costs and benefits—not need, which is a imprecise term</p>



		<p>But cost-benefit analysis is time consuming and difficult and characterized by great uncertainty (see Flyvberg) making its use limited</p> <p>Macroeconomic benefits of infrastructure are uncertain and there is limited evidence that infrastructure spending addresses macroeconomic “externalities”</p> <p>Options to expand the use of cost-benefit analysis for infrastructure projects include creation of an infrastructure bank or mandated use of cost-benefit analysis</p> <p>The costs of infrastructure projects are much higher in the USA than other countries</p> <p>Two solutions to address high costs are the use of user fees and privatization or public-private partnerships</p>
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**April 30, Week 7: Discounting**

Topic	Objective	Takeaway
<p>Discounting projects within a generation</p> <p>Readings:</p> <ul style="list-style-type: none"> <li>• Boardman et al. Chapters 9 and 10</li> <li>• 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</li> <li>• Council of Economic Advisers, “Discounting For Public Policy: Theory And Recent Evidence On The Merits Of Updating The Discount Rate,”</li> </ul>	<p>Review the concepts of inflation and time value of money</p> <p>Discuss consumer time preferences and how it relates to discounting</p> <p>Describe the mechanics (calculations) of discounting in cost-benefit analysis</p> <p>Discuss Circular A-4 (original and revised) and rationales for using specific discount rates</p> <p>Show how uncertainty affects the discount rate</p>	<p>Price inflation erodes the value of money over time and this needs to be accounted for when measuring costs and benefits in the future</p> <p>Nominal values are measured in current dollars (e.g., in 2030 for a project that has impacts in that year) while real values are measured in constant (e.g., 2023) dollars</p> <p>Because people are impatient and prefer to consume today (consumption) rather than in the future (savings), the value of future benefits needs to be “discounted” by a factor that reflects this impatience, or rate of time preference</p> <p>A related reason that future costs and benefits need to be discounted is the time value of money: funds today can be invested and yield a return in the future. Thus, future costs and benefits need to be discounted to assess the current value of these future values. The nominal interest rate reflects both consumer impatience and inflation</p> <p>The real interest rate reflects only consumer impatience, or the premium required to forgo consumption (save), or the discount necessary to equate future values to current values</p> <p>The rule of cost-benefit analysis is to use all nominal values or all real values to calculate costs and benefits</p> <p>Uncertainty with respect to inflation and interest rates suggest that the discount rate should be declining over the life of the project</p>
<p>Discounting projects that span generations</p> <p>Readings:</p> <ul style="list-style-type: none"> <li>• MacAskill, William. “The Case for Longtermism” New York Times August 5, 2022</li> </ul>	<p>Present and discuss the intuition of the Ramsey Formula</p> <p>Review empirical evidence of expert opinion of the social rate of discount</p>	<p>For projects that span generations, the Ramsey Formula provides the conceptual basis for discounting</p> <p>The Ramsey formula consists of three inputs: the rate of time preference (an interest rate reflecting</p>

	<p>Describe the difference between the “descriptive” and “proscriptive” approaches to discounting projects</p>	<p>consumer impatience or financial return), the growth rate of the economy, and the elasticity of the marginal utility of income.</p> <p>Much of the debate over the appropriate discount rate to use for projects that span generations revolves around the rate of time preference.</p> <p>Some argue it should be virtually zero (prescriptive approach) while others argue it should reflect long term financial returns on investments (descriptive approach)</p>
<p>Social cost of carbon</p> <p>Readings:</p> <ul style="list-style-type: none"> <li>Carleton, Tamma and Greenstone, Michael, Updating the United States Government's Social Cost of Carbon (January 14, 2021). University of Chicago, Becker Friedman Institute for Economics Working Paper No. 2021-04</li> </ul>	<p>Describe the calculations required to calculate the social cost of carbon</p> <p>Show how the discount rate affects estimates of the social cost of carbon</p> <p>Discuss limitations of the current estimate of the social cost of carbon and possible ways to improve it</p>	<p>The social cost of carbon is an extremely important input into cost-benefit analyses because it is the value of changes in greenhouse gases that are associated with many energy and environmental projects</p> <p>The estimation of the social cost of carbon is difficult and characterized by extreme uncertainty</p> <p>The impacts of greenhouse gases last for 100s of years, and thus, use of lower or higher discount rates dramatically change estimates of the social cost of carbon</p> <p>Current estimates of the social cost of carbon are based on arguably outdated studies and conceptual limitations</p>

**May 7, Week 8: Revealed Preference Methods to Value Benefits when it is Infeasible to use Supply and Demand**

Topic	Objective	Takeaway
<p>Overview of revealed preference methods</p> <p>Readings:</p> <ul style="list-style-type: none"> <li>Boardman et al. Chapters 14-15</li> </ul>	<p>Review approaches for measuring the monetary benefits of a policy for goods that do not have market prices or for which the demand curve is not a valid measure of willingness-to-pay</p>	<p>In many cost-benefit analyses, the monetary benefits of a policy cannot be measured by market prices (e.g., the demand curve and willingness-to-pay). For example, there is no “price” of crime that can be used to measure the value of policies that reduce crime</p> <p>In these cases, alternative methods have been developed and one class of methods is referred to a revealed preference methods because they measure the benefits of a good “revealed” by consumers’ choices</p> <p>Three common revealed preference methods are intermediate goods approach; hedonic regression and zonal travel cost approach</p>
<p>Intermediate goods</p> <p>The Kalamazoo Promise Scholarship</p> <p>Readings:</p> <ul style="list-style-type: none"> <li>Bartik, T., Hershbein, B., &amp; Lachowska, M. (2016). The Merits of Universal Scholarships: Benefit-Cost Evidence from the Kalamazoo Promise. <i>Journal of Benefit-Cost Analysis</i>, 7(3), 400-433</li> </ul>	<p>Describe the intermediate goods approach</p> <p>Present an example of the intermediate goods approach</p> <p>Compare the intermediate goods approach to a supply and demand analysis</p>	<p>The intermediate goods approach measures the benefits of a policy by examining the value of a policy using the monetary value of features of a good that underlie the consumer’s demand for that good.</p> <p>For example, the value of preschool is measured by the increased earnings of children who attended high-quality preschool</p>
<p>Hedonic regression</p>	<p>Describe the hedonic regression approach</p> <p>Discuss the interpretation of estimates of willingness-to-pay from hedonic regression</p> <p>Discuss the limitations of the hedonic regression approach</p>	<p>The hedonic regression approach is based on the idea that the value of a good depends on several aspects (features, dimensions) of a good that the consumer values.</p> <p>A regression model is used to obtain the value of these different aspects some of which are the result of public policy.</p> <p>A common example of the use of hedonic regression is the effect of crime on house prices.</p>

		<p>Hedonic regression analyses are usually not based on causal methods and are subject to omitted variable bias</p> <p>It is also unclear whether the hedonic regression measures the full value of the good in focus that is target of public policy</p>
<p>Case studies of hedonic regressions: value of green spaces in UK and value of school quality in Memphis</p> <p>Readings:</p> <ul style="list-style-type: none"> <li>Gibbons, Stephen, Susana Mourato, and Guilherme M. Resende. "The amenity value of English nature: a hedonic price approach." <i>Environmental and Resource Economics</i> 57 (2014): 175-196.</li> <li>Collins, Courtney A., and Erin K. Kaplan. "Capitalization of school quality in housing prices: Evidence from boundary changes in shelby county, tennessee." <i>American Economic Review</i> 107, no. 5 (2017): 628-632.</li> </ul>		
<p>Value of a statistical life</p> <p>Readings:</p> <ul style="list-style-type: none"> <li>Cropper, Maureen and Hammitt, James K. and Robinson, Lisa A., <i>Valuing Mortality Risk Reductions: Progress and Challenges</i> (October 2011). <i>Annual Review of Resource Economics</i>, Vol. 3, Issue 1, pp. 313-336, 2011.</li> <li>Aldy, J. E., &amp; Viscusi, W. K. (2008). <i>Adjusting the Value of a Statistical Life for Age and Cohort Effects</i>. <i>Review of Economics and Statistics</i>, 90 (3), 573-581</li> </ul>	<p>Show how the value of a statistical life is derived from hedonic regression approach</p> <p>Review empirical evidence of the value of a statistical life</p> <p>Present an alternative approach to measuring the value of a statistical life based on standard theory of the consumer</p>	<p>The value of a statistical life (VSL) is an important “price” used in Cost-Benefit analysis because many policies affect mortality.</p> <p>The VSL is derived from a hedonic regression using wages/earnings and how wages/earnings are affected by the risk of death on a job.</p> <p>The VSL from this approach is extremely high—around \$10 million</p> <p>Estimates of the monetary value of a good obtained from the hedonic regression approach are subject to bias because of omitted variable bias</p> <p>An alternative approach to measuring the VSL is to use traditional consumer theory to measure a person’s willingness-to-pay for life extension</p>

<p>Travel cost approach</p>	<p>Describe zonal travel cost approach</p>	<p>The zonal travel cost approach is used mostly to measure the monetary value of recreational sites (e.g., parks), wildlife and nature areas</p> <p>The travel cost approach is intuitively straightforward: measure the cost of travelling to a site from different places and the number of people from those places that visit the site to estimate the relationship between cost and visits (i.e., demand curve for visits)</p> <p>The travel cost approach has several limitations that need to be considered, for example, that travel often involves visits to multiple sites.</p>
<p>Case study of travel cost approach—Singapore parks</p> <p>Readings:</p> <ul style="list-style-type: none"> <li>• Jaung W, Carrasco LR. Travel cost analysis of an urban protected area and parks in Singapore: a mobile phone data application. <i>J Environ Manage.</i> 2020 May 1;261:110238.</li> </ul>	<p>Present an example of the zonal travel cost approach</p>	
<p>Value of time</p> <p>Readings:</p> <ul style="list-style-type: none"> <li>• Victoria Transport Institute-value of time summary</li> </ul>	<p>Discuss the role of the value of time in cost-benefit analyses</p> <p>Review empirical estimates of the value of time used in cost-benefit analyses</p>	<p>Time savings is one of the major impacts of transportation and other policies.</p> <p>The value of time is therefore an important price used to measure benefits of projects that save people time.</p> <p>Conceptually a person's wage is a reasonable value of time and is often used to value time with some adjustment for the mode and purpose of travel.</p>
<p>Measuring the value of time using Lyft experiment</p> <p>Readings:</p> <ul style="list-style-type: none"> <li>• Goldszmidt, Ariel et al. 2020. "The Value of Time in the United States: Estimates from Nationwide Natural Field Experiments", National Bureau of Economic Research", <a href="http://www.nber.org/papers/w28208">http://www.nber.org/papers/w28208</a></li> </ul>		

**May 14, Week 9: Stated Preference Approach**

Topic	Objective	Takeaway
<p>Contingent valuation method</p> <p>Readings:</p> <ul style="list-style-type: none"> <li>• Boardman et al. Chapters 13, 16</li> <li>• Catherine L. Kling, Daniel J. Phaneuf and Jinhua Zhao. 2012. "From Exxon to BP: Has Some Number Become Better Than No Number?" <i>Journal of Economic Perspectives</i> Vol. 26, No. 4, pp. 3-26. <a href="http://www.aeaweb.org/articles.php?doi=10.1257/jep.26.4">http://www.aeaweb.org/articles.php?doi=10.1257/jep.26.4</a></li> <li>• Carson, Richard. 2012. "Contingent Valuation: A Practical Alternative When Prices Aren't Available" <i>Journal of Economic Perspectives</i> Vol. 26, No. 4, pp. 27-42.</li> <li>• Hausman, Jerry. 2012. "Contingent Valuation: From Dubious to Hopeless" <i>Journal of Economic Perspectives</i> Vol. 26, No. 4, pp. 43-56.</li> </ul>	<p>Present and describe the "stated preference" approach, which is also referred to as contingent valuation, for measuring willingness-to-pay for goods that do not have market prices or for which the demand curve is not a valid measure of willingness-to-pay</p> <p>Describe best practices for contingent valuation</p> <p>Describe limitations of contingent valuation</p>	<p>Contingent valuation is a simple idea—ask people what they are willing-to-pay for a good or service</p> <p>The critical aspect of this approach is to implement it in a way that yields reliable and useful information</p> <p>There are several components of a contingent valuation study: design and pilot the survey that will be used to obtain the data (information); select the survey method (e.g., online v. in-person) including the approach for obtaining a representative sample; determine the required sample size; identify an appropriate payment vehicle (e.g., taxes), and choose a method for eliciting the stated willingness-to-pay</p> <p>An important aspect of the contingent value survey is a clear and thorough description of the good being valued.</p> <p>While other methods of elicitation of the stated willingness-to-pay are sometimes appropriate, the recommended approach is dichotomous referendum approach that asks survey respondents to vote yes or no on whether they would be willing-to-pay a specific amount for the good</p> <p>The primary limitation of a contingent value study is hypothetical bias—respondents do not actually have to pay for the good. This issue highlights the importance of the payment vehicle—how will consumer pay for the good in a realistic context (e.g., through higher taxes)</p> <p>Other problems associated with a contingent value survey is yea- and nay-saying, protest votes and embedding effects, which is failing to understand the scope of the good.</p>

<p>Empirical evidence of comparison of contingent valuation, or stated preference approach, with revealed preference approach</p>	<p>Assess the empirical differences between the stated and revealed preference approaches</p>	<p>While stated preference approach is often criticized, empirically, estimates of willingness-to-pay from stated preference approach are similar to those from revealed preference approach</p>
<p>Case studies:</p> <p>Contingent valuation of willingness-to-pay for life extension; for crime; and for healthcare services</p> <p>Readings:</p> <ul style="list-style-type: none"> <li>• Alberini, Anna, Maureen Cropper, Alan Krupnick, and Nathalie B. Simon. "Does the value of a statistical life vary with age and health status? Evidence from the US and Canada." In <i>Distributional Effects of Environmental and Energy Policy</i>, pp. 365-388. Routledge, 2017.</li> <li>• Ludwig, J., Cook, P.J. The Benefits of Reducing Gun Violence: Evidence from Contingent-Valuation Survey Data. <i>Journal of Risk and Uncertainty</i> 22, 207–226 (2001)</li> <li>• Al-Hanawi, M., Alsharqi, O., &amp; Vaidya, K. (2020). Willingness to pay for improved public health care services in Saudi Arabia: A contingent valuation study among heads of Saudi households. <i>Health Economics, Policy and Law</i>, 15(1), 72-93.</li> </ul>	<p>Present examples of contingent valuation: contingent valuation of willingness-to-pay for life extension; for crime; and for healthcare services</p>	